



AirPrime HL6 and HL8 Series

AT Commands Interface Guide



SIERRA
WIRELESS®

4114680
20.0
August 20, 2019

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Contact Information

Sales information and technical support, including warranty and returns	Web: sierrawireless.com/company/contact-us/ Global toll-free number: 1-877-687-7795 6:00 am to 5:00 pm PST
Corporate and product information	Web: sierrawireless.com

Document History

Version	Date	Updates
1.0	October 18, 2013	Document creation
2.0	February 17, 2014	Added: • HL8548x support • 15.8 +KECALLONLY Command: Configure eCall Only Feature • 16.4 +KSIMSLOT Command: SIM2 Slot Configuration • 18 Location Service Commands • 19 Test Commands
3.0	March 10, 2014	Added: • 7.5 +PBREADY URC: Phonebook Ready • 18.9 +GPSCONF Command: Configure the Location Service and GPS Receiver • 18.10 +GPSRELEASE Command: Power the GPS Chipset Off
		Updated: • 2.19 IPR Command: Set Fixed Local/DTE Rate • 2.31 W Command: Extended Result Code • 5.34 +KGPIOCFG Command: GPIO Configuration • 5.61 +KJAM Command: Jamming Detection • 13 Protocol Specific Commands • 23.2.1 CME Error Codes
		Deleted: • +KSSCFG Command • Duplicate +KTCP_DATA Notification and +KUDP_DATA Notification
3.1	March 25, 2014	Updated: • 13.9.8 +KTCP_DATA Notification: Incoming Data through a TCP Connection • 13.10.3 +KFTPRCV Command: Receive FTP Files
3.2	April 02, 2014	Updated: • 13.10.4 +KFTPSND Command: Send FTP Files • 13.10.5 +KFTPDEL Command: Delete FTP Files
3.3	April 09, 2014	Added: • 5.70 +KSTKI Command: SIM ToolKit Interface Configuration • 5.71 +WMUSBVCC Command: USB VCC Detection Setting
		Updated: • 5.17 +CPIN Command: Enter Pin • 5.54 +KSIMDET Command: SIM Detection • 5.57 +KBND Command: Current Networks Band Indicator • 5.58 +KNETSCAN Command: Network Scan • 5.67 +KSRAT Command: Set Radio Access Technology • 6.7 +CLCK Command: Facility Lock • 18.1 +GPSSTART Command: Start or Restart the Location Service

Version	Date	Updates
3.3	April 09, 2014	Updated: • 18.9 +GPSCONF Command: Configure the Location Service and GPS Receiver • 19.4 +WMGNSSTEST Command: GNSS Test • 2.16 &F Command: Restore Factory Settings • 2.17 &W Command: Save Stored Profile • 5.26 +KRIC Command: Ring Indicator Control • 5.27 +KSREP Command: Mobile Start-up Reporting • 5.55 +KSIMSEL Command: SIM Selection • 5.61 +KJAM Command: Jamming Detection • 18.3 +GPSSTOP Command: Stop the Location Service • 18.4 +GPSINIT Command: Initialization of the Location Service
		Deleted 17.2. +WDSB Command: Device Services Bootstrap
4.0	May 26, 2014	Added • 3.30 +KCIPHER Command: Set Ciphering and Integrity • 18.11 +GPSAID Command: GNSS Aiding Management • 18.12 +GPSCORE Command: Report GNSS Receiver Core Information • 23.2.6 GNSS Error Codes • 23.22 Using Location Service
		Updated: • 2.16 &F Command: Restore Factory Settings • 2.18 &V Command: Display Current Configuration • 3.1 I Command: Request Identification Information • 3.3 +CGMI Command: Request Manufacturer Identification • 3.11 +GMI Command: Request Manufacturer Identification • 5.18 +CPIN2 Command: Send Password to MT • 5.35 +KADC Command: Analog Digital Converter • 5.56 +KSYNC Command: Application Synchronization Signal • 5.57 +KBND Command: Current Networks Band Indicator • 5.61 +KJAM Command: Jamming Detection • 5.64 +KBCAP Command: Retrieve Bitmap Capabilities • 5.67 +KSRAT Command: Set Radio Access Technology • 6.16 +CREG Command: Network Registration • Default value for <mem1>, <mem2> and <mem3> in section 8.2 Parameters Definition • 11.4 +STKPRO Command: Display List of Supported Proactive Commands • 18.1 +GPSSTART Command: Start or Restart the Location Service • 18.2 +GPSSLEEP Command: Put GPS Receiver to the Specified GPS Sleep Mode • 18.4 +GPSINIT Command: Initialization of the Location Service • 18.9 +GPSCONF Command: Configure the Location Service and GPS Receiver • 18.10 +GPSRELEASE Command: Power the GPS Chipset Off • 19.1 +WMTXPOWER Command: Test RF Tx • 19.2 +WMRXPOWER Command: Test RF Rx

Version	Date	Updates
4.0	June 04, 2014	Added: • 5.51 +KGNSSAD Command: GNSS Antenna Detection • 5.72 +WEXTCLK Command: External Clocks Setting • 18.13 +GPSAUTOINIT Command: Select GPS State at Power Up • 18.15 +KIICADDR Command: Configure the I²C Device • 18.16 +GPSSUPLCFG Command: GPS SUPL Configuration
	June 04, 2014	Updated: • 5.4 +CALA Command: Set Alarm • 5.5 +CALD Command: Delete Alarm • 5.30 +KCELL Command: Cell Environment Information • 5.37 +CALM Command: Alert Sound Mode • 5.38 +CRSL Command: Ringer Sound Level • 5.50 +KGSMAD Command: GSM/UMTS Antenna Detection • 5.53 +KTEMPMON Command: Temperature Monitor • 8.6 +CMGR Command: Read SMS Message • 12.2 +CLVL Command: Loudspeaker Volume Level • 12.6 +VGR Command: Receive Gain Selection • 12.7 +VGT Command: Transmit Gain Selection • 12.8 +KVGR Command: Receive Gain Selection • 12.9 +KVT Command: Transmit Gain Selection • 12.10 +KECHO Command: Echo Cancellation • 12.11 +KNOISE Command: Noise Cancellation • 12.12 +KST Command: Side Tone • 12.13 +KPC Command: Peak Compressor • 12.17 +KPCMCFG Command: Configure PCM Digital Audio • 13 Protocol Specific Commands • 17 AVMS Commands • 18.5 +GPSNMEA Command: Configure the NMEA Frames Flow • 23.2.1 CME Error Codes • 23.5 Command Timeout and Other Information
	June 13, 2014	Updated: • 2.13 X Command: Result Code Selection and Call Progress Monitoring Control • 2.22 &K Command: Flow Control Option • 2.31 W Command: Extended Result Code • 5.6 +CCLK Command: Real Time Clock • 5.28 +KGPIO Command: Hardware IO Control • 5.34 +KGPIOCFG Command: GPIO Configuration • 10.2 +CGACT Command: PDP Context Activate or Deactivate
	June 18, 2014	Updated: • 5.23 +CPAS Command: Phone Activity Status • 7.1 +CPBF Command: Find Phonebook Entries • 7.2 +CPBR Command: Read Current Phonebook Entries • 7.4 +CPBW Command: Write Phonebook Entries

Version	Date	Updates
4.0	June 20, 2014	Updated: • 3.1 I Command: Request Identification Information • 5.23 +CPAS Command: Phone Activity Status • 5.50 +KGSMAD Command: GSM/UMTS Antenna Detection • 5.51 +KGNSSAD Command: GNSS Antenna Detection • 5.61 +KJAM Command: Jamming Detection • 5.67 +KSRAAT Command: Set Radio Access Technology • 7.1 +CPBF Command: Find Phonebook Entries • 7.2 +CPBR Command: Read Current Phonebook Entries • 7.4 +CPBW Command: Write Phonebook Entries • 11.5 +STKTR Command: Enter Response • 12.2 +CLVL Command: Loudspeaker Volume Level • 12.6 +VGR Command: Receive Gain Selection • 12.7 +VGT Command: Transmit Gain Selection • 12.10 +KECHO Command: Echo Cancellation • 12.11 +KNOISE Command: Noise Cancellation • 12.12 +KST Command: Side Tone • 12.13 +KPC Command: Peak Compressor • 12.17 +KPCMCFG Command: Configure PCM Digital Audio
5.0	July 10, 2014	Added 5.73 +KUSBCOMP Command: Set USB Composition Updated: • 3.16 #CLS Command: Service Class • 5.13 +CMER Command: Mobile Equipment Event Reporting • 5.21 +CPWC Command: Power Class • 5.22 *PSRDBS Command: Change Frequency Band • 5.29 +KSLEEP Command: Power Management Control • 5.48 +CSGT Command: Greeting Text • 5.50 +KGSMAD Command: GSM/UMTS Antenna Detection • 5.51 +KGNSSAD Command: GNSS Antenna Detection • 5.57 +KBND Command: Current Networks Band Indicator • 9.1 +CBST Command: Select Bearer Service Type • 11.2 *PSSTKI Command: SIM ToolKit Interface Configuration • 12.14 +KSRAP Command: Save or Restore Audio Parameters • 18.6 +GPSPVT Command: Configure PVT Frames Flow • 18.7 +GPSTTFF Command: Report Calculated TTFF of the Last Run • 18.9 +GPSCONF Command: Configure the Location Service and GPS Receiver • 18.12 +GPSCORE Command: Report GNSS Receiver Core Information Deleted 5.71. +KSTKI Command: SIM ToolKit Interface Configuration

Version	Date	Updates
5.0	July 15, 2014	Added: • 10.22 +XDNS Command: Dynamic DNS Request • 10.23 +XCEDATA Command: Establish ECM Data Connection • 16.5 +KDSIMEI Command: IMEI Slot2 Configuration • 17.10 +WDSM Command: Manage Device Services • 17.11 +WPPP Command: PDP Context Authentication Configuration • 18.17 +CMTLR Command: Mobile Terminated Location Request Notification • 18.18 +CMTLRA Command: Mobile Terminated Location Request Disclosure Allowance • 18.19 +CMOLR Command: Mobile Originated Location Request • 18.20 +CMOLRE Command: Mobile Originated Location Request Error
		Updated: • 2.19 IPR Command: Set Fixed Local/DTE Rate • 5.26 +KRIC Command: Ring Indicator Control • 17.2 +WDSC Command: Device Services Configuration • 17.3 +WDSO Command: Device Services Local Download • 17.5 +WDSF Command: Device Services Fallback • 17.6 +WDSG Command: Device Services General Status • 17.7 +WDSI Command: Device Services Indications • 17.8 +WDSR Command: Device Services Reply • 17.9 +WDSS Command: Device Services Session • 18.11 +GPSAID Command: GNSS Aiding Management • 18.14 18.15 +KIICADDR Command: Configure the I²C Device • 23.22.4.4 Navigation Aiding
6.0	August 28, 2014	Moved +KURCCFG to section 13.8.2
		Renamed sub-section title for 5.57 +KBND Command: Current Networks Band Indicator
		Updated: • 3.15 +CMUX Command: Multiplexing Mode • 5.35 +KADC Command: Analog Digital Converter • 5.55 +KSIMSEL Command: SIM Selection • 5.57 +KBND Command: Current Networks Band Indicator • 5.73 +KUSBCOMP Command: Set USB Composition • 8.18 +CRES Command: Restore Settings • 12.2 +CLVL Command: Loudspeaker Volume Level • 12.6 +VGR Command: Receive Gain Selection • 12.7 +VGT Command: Transmit Gain Selection • 12.8 +KVGR Command: Receive Gain Selection • 12.9 +KVGTT Command: Transmit Gain Selection • 13.10.1 +KFTPCFG Command: FTP Configuration • 13.10.3 +KFTPRCV Command: Receive FTP Files • 13.10.4 +KFTPSND Command: Send FTP Files • 17.2 +WDSC Command: Device Services Configuration • 17.6 +WDSG Command: Device Services General Status • 17.7 +WDSI Command: Device Services Indications • 17.9 +WDSS Command: Device Services Session • 17.10 +WDSM Command: Manage Device Services

Version	Date	Updates
6.0	August 28, 2014	Updated: • 17.11 +WPPP Command: PDP Context Authentication Configuration • 18.1 +GPSSTART Command: Start or Restart the Location Service • 18.16 +GPSSUPLCFG Command: GPS SUPL Configuration • 18.6 +GPSPVT Command: Configure PVT Frames Flow • 19.1 +WMTXPOWER Command: Test RF Tx • 19.2 +WMRXPOWER Command: Test RF Rx • 19.4 +WMGNSSTEST Command: GNSS Test • 23.22.3.1 Supported NMEA Sentences • 23.22.6 Asynchronous Events
	September 08, 2014	Updated: • 5.54 +KSIMDET Command: SIM Detection • 5.55 +KSIMSEL Command: SIM Selection • 7.3 +CPBS Command: Select Phonebook Memory Storage • 10.10 +CGED Command: GPRS Cell Environment • 13.7.1 +KCNXCFG Command: GPRS Connection Configuration • 17.5 +WDSF Command: Device Services Fallback • 17.8 +WDSR Command: Device Services Reply • 19.4 +WMGNSSTEST Command: GNSS Test • 23.22.3.1 Supported NMEA Sentences
7.0	October 15, 2014	Added: • 4.14 +XCALLSTAT Command: Set Reporting Call Status • 5.25 \$CSQ Command: Signal Quality • 5.74 +XPINCNT Command: Get Remaining SIM PIN Attempts • 23.2.7 Generic CEER Error Codes
		Updated: • 2.6 S0 Command: Set Number of Rings before Automatic Call Answering • 2.13 X Command: Result Code Selection and Call Progress Monitoring Control • 2.19 IPR Command: Set Fixed Local/DTE Rate • 4.3 D Command: Mobile Originated Call to Dial a Number • 4.4 D>: Direct Dialing from Phonebook • 4.6 +CRC Command: Set Cellular Result Codes for Incoming Call Indication • 4.9 +CEER Command: Extended Error Report • 4.12 +CSNS Command: Single Numbering Scheme • 5.20 +CPUC Command: Price per Unit and Currency • 5.57 +KBND Command: Current Networks Band Indicator • 5.58 +KNETSCAN Command: Network Scan • 6.10 +CNUM Command: Subscriber Number • 8.18 +CRES Command: Restore Settings • 10.15 +CGEQMIN Command: 3G Quality of Service Profile (Minimum) • 10.13 +CGPADDR Command: Show PDP Address • 10.17 +CGEQREQ Command: 3G Request Quality of Service Profile • 13.15.1 +KHTTPCFG Command: HTTP Connection Configuration

Version	Date	Updates
7.0	October 15, 2014	Updated: • 17.9 +WDSS Command: Device Services Session • 18 Location Service Commands ▪ 18.1 +GPSSTART Command: Start or Restart the Location Service ▪ 18.6 +GPSPVT Command: Configure PVT Frames Flow ▪ 18.9 +GPSCONF Command: Configure the Location Service and GPS Receiver ▪ 18.16 +GPSSUPLCFG Command: GPS SUPL Configuration ▪ 18.17 +CMTLR Command: Mobile Terminated Location Request Notification
		Removed EWM200/EWM1000 Custom AT Commands
	November 03, 2014	Added: • HL8549x support • HL6528x support for: ▪ 5.54 +KSIMDET Command: SIM Detection ▪ 5.55 +KSIMSEL Command: SIM Selection • 5.75 +XCONFIG Command: Configure DLCs (Data Logical Channels)
		Updated: • 3.8 +CSCS Command: Set TE Character Set • 5.30 +KCELL Command: Cell Environment Information • 5.64 +KBCAP Command: Retrieve Bitmap Capabilities • 6.4 +CHLD Command: Call Hold and Multiparty • 8.10 +CNMI Command: New SMS Message Indication
8.0	December 16, 2014	Added: • 5.76 +COREDUMP Command: Configure Core Dump Collection • 12.19 +CODECINFO Command: Display Audio Codec Information • 12.20 +WVR Command: Voice Codec Selection • 23.2.8 Error Case Examples
		Updated: • 2.16 &F Command: Restore Factory Settings • 5.2 +CMM Command: Accumulated Call Meter Maximum (ACM max) • 5.25 \$CSQ Command: Signal Quality • 5.31 +CRMP Command: Ring Melody Playback • 5.49 +CSVM Command: Voice Mail Number • 5.53 +KTEMPMON Command: Temperature Monitor • 5.67 +KSRAT Command: Set Radio Access Technology • 5.74 +XPINCNT Command: Get Remaining SIM PIN Attempts • 6.14 +CPOL Command: Preferred PLMN List • 6.18 +CPLS Command: Select Preferred PLMN list • 8.4 +CMGF Command: Select SMS Message Format • 8.10 +CNMI Command: New SMS Message Indication • 8.15 +CPMS Command: Preferred Message Storage • 8.17 +CSAS Command: Save Settings • 10.11 +CGEREP Command: GPRS Event Reporting • 12.10 +KECHO Command: Echo Cancellation

Version	Date	Updates
8.0	December 16, 2014	Updated: 13 Protocol Specific Commands 18.9 +GPSCONF Command: Configure the Location Service and GPS Receiver 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table 23.18.4 Events that Wake the Module Up
	December 23, 2014	Updated: 4.2 H Command: Disconnect Existing Connection 5.4 +CALA Command: Set Alarm 5.13 +CMER Command: Mobile Equipment Event Reporting 5.29 +KSLEEP Command: Power Management Control 5.50 +KGSMAD Command: GSM/UMTS Antenna Detection 5.54 +KSIMDET Command: SIM Detection 5.55 +KSIMSEL Command: SIM Selection 5.61 +KJAM Command: Jamming Detection 6.20 +KAAT Command: GPRS Automatic Attach 10.10 +CGED Command: GPRS Cell Environment 12.18 +KMAP Command: Microphone Analog Parameters 16.1 +KSS Command: Switch SIM 17.7 +WDSI Command: Device Services Indications 18.1 +GPSSTART Command: Start or Restart the Location Service 18.11 +GPSAID Command: GNSS Aiding Management 19.1 +WMTXPOWER Command: Test RF Tx 19.2 +WMRXPOWER Command: Test RF Rx 23.22.3.1 Supported NMEA Sentences 23.22.5.2 AT Commands Calls Requirements 23.22.6 Asynchronous Events 23.22.7 GNSS Aiding Example
		Deleted +KLVB
	January 08, 2015	Added 5.77 +XSVM Command: Set Voice Mail Number
		Updated: 5.73 +KUSBCOMP Command: Set USB Composition 13.12.6 +KUDPSND Command: Send Data through a UDP Connection 13.12.7 +KUDPRCV Command: Receive Data through a UDP Connection 13.15.6 +KHTTPPOST Command: Send Data to HTTP Server
9.0	February 24, 2015	Added 5.78 +CPWROFF Command: Switch MS Off
		Updated: 2.2 +++ Command: Switch from Data Mode to Command Mode 2.15 &D Command: Set Data Terminal Ready (DTR) Function Mode 3.15 +CMUX Command: Multiplexing Mode 5.67 +KSRAT Command: Set Radio Access Technology 12.4 +VTS Command: DTMF and Tone Generation 13.6 Parameter Format of AT Commands 13.7.1 +KCNXCFG Command: GPRS Connection Configuration

Version	Date	Updates
9.0	February 24, 2015	Updated: 13.10.3 +KFTPRCV Command: Receive FTP Files 13.10.4 +KFTPSND Command: Send FTP Files 13.10.5 +KFTPDEL Command: Delete FTP Files 13.12.6 +KUDPSND Command: Send Data through a UDP Connection 13.12.7 +KUDPRCV Command: Receive Data through a UDP Connection 13.15.1 +KHTTPCFG Command: HTTP Connection Configuration 13.16.1 +KHTTPSCFG Command: HTTPS Connection Configuration 17.3 +WSDS Command: Device Services Local Download 18.5 +GPSNMEA Command: Configure the NMEA Frames Flow 18.6 +GPSPVT Command: Configure PVT Frames Flow 18.12 +GPSCORE Command: Report GNSS Receiver Core Information 18.16 +GPSSUPLCFG Command: GPS SUPL Configuration 23.18.4 Events that Wake the Module Up 23.18.6 Management of DTR Signal and AT&D Option
	March 06, 2015	Added 1.6 UART Message Updated: 3.15 +CMUX Command: Multiplexing Mode 5.12 +CFUN Command: Set Phone Functionality 5.58 +KNETSCAN Command: Network Scan 17.11 +WPPP Command: PDP Context Authentication Configuration 23.18.4 Events that Wake the Module Up
	March 16, 2015	Updated: 12.3 +VIP Command: Initialize Voice Parameters 13 Protocol Specific Commands 19.4 +WMGNSSTEST Command: GNSS Test
	March 26, 2015	Updated 10.7 +CGDCONT Command: Define PDP Context
9.1	April 01, 2015	Added a note regarding IPv4v6 compliance throughout the document
10.0	June 16, 2015	Added: - Support for HL8518, HL8528 and HL8529 5.79 *PSTACS Command: Timing Advance Measurement 5.80 +KNTP Command: Network Time Protocol 18.14 +GPSPTFC Command: Configure Push-to-Fix Mode 23.22.8 Push-to-Fix Mode
	June 22, 2015	Updated: 5.29 +KSLEEP Command: Power Management Control 5.35 +KADC Command: Analog Digital Converter 5.61 +KJAM Command: Jamming Detection 16.5 +KDSIMEI Command: IMEI Slot2 Configuration 18.2 +GPSSLEEP Command: Put GPS Receiver to the Specified GPS Sleep Mode 18.5 +GPSNMEA Command: Configure the NMEA Frames Flow 18.6+GPSPVT Command: Configure PVT Frames Flow

Version	Date	Updates
10.0	June 22, 2015	Updated: • 18.11 +GPSAID Command: GNSS Aiding Management • 23.2.6.2 Aiding Errors • 23.5 Command Timeout and Other Information • 23.22.3.1 Supported NMEA Sentences
10.1	June 25, 2015	Updated 23.5 Command Timeout and Other Information
10.2	July 16, 2015	Updated: • 4.9 +CEER Command: Extended Error Report • 5.80 +KNTP Command: Network Time Protocol • 10.2 +CGACT Command: PDP Context Activate or Deactivate • 12.17 +KPCMCFG Command: Configure PCM Digital Audio • 18.9 +GPSCONF Command: Configure the Location Service and GPS Receiver • 23.5 Command Timeout and Other Information
11.0	November 24, 2015	Added: • 3.31 +KODIS Command: Access ODIS Information • 3.32 +WIMEI Command: IMEI Write and Read • 3.33 +WCARRIER Command: Show Carrier Name • 20 NV Commands
		Updated: • 2.32 &S Command: DSR Option • 3.15 +CMUX Command: Multiplexing Mode • 4.3 D Command: Mobile Originated Call to Dial a Number • 5.25 \$CSQ Command: Signal Quality • 5.30 +KCELL Command: Cell Environment Information • 5.52 +KMCLASS Command: Change GPRS and EGPRS Multislot Class • 5.56 +KSYNC Command: Application Synchronization Signal • 5.69 +CTZR Command: Time Zone Reporting • 5.73 +KUSBCOMP Command: Set USB Composition • 6.3 +CCWA Command: Call Waiting • 11.4 +STKPRO Command: Display List of Supported Proactive Commands • 11.5 +STKTR Command: Enter Response • 12.20 +WVR Command: Voice Codec Selection • 13.8.3 +KIOPT Command: General Options Configuration • 13.9.8 +KTCP_DATA Notification: Incoming Data through a TCP Connection • 17.7 +WDSI Command: Device Services Indications • 17.8 +WDSR Command: Device Services Reply • 17.11 +WPPP Command: PDP Context Authentication Configuration • 19.4 +WMGNSSTEST Command: GNSS Test
12.0	January 18, 2016	Added: • 5.81 +WESHUTDOWN Command: Emergency Shutdown • 6.28 +PHYR Command: Physical Randomization

Version	Date	Updates
12.0	January 18, 2016	Updated: 2.22 &K Command: Flow Control Option 3.32 +WIMEI Command: IMEI Write and Read 12.2 +CLVL Command: Loudspeaker Volume Level 12.3 +VIP Command: Initialize Voice Parameters 12.10 +KECHO Command: Echo Cancellation 17 AVMS Commands 23.2.1 CME Error Codes
13.0	March 23, 2016	Added: 10.24+WACCM Command: Set ACCM Value 12.21 +WDDM Command: Downlink DTMF Detection 23.6.2.1 Server Mode in Transparent Mode
		Updated: 2.19 IPR Command: Set Fixed Local/DTE Rate 3.1 I Command: Request Identification Information 5.26 +KRIC Command: Ring Indicator Control 8.10 +CNMI Command: New SMS Message Indication 12.10 +KECHO Command: Echo Cancellation 13.9.11 +KTCPSTART Command: Start a TCP Connection in Direct Data Flow 17 AVMS Commands 18.1 +GPSSTART Command: Start or Restart the Location Service 18.5 +GPSNMEA Command: Configure the NMEA Frames Flow
13.1	March 31, 2016	Updated: 10.6 +CGCLASS Command: GPRS Mobile Station Class 14.1 +KFSFILE Command: Flash File Operation Command
	April 12, 2016	Updated: 3.1 I Command: Request Identification Information 12.2 +CLVL Command: Loudspeaker Volume Level 18.9 +GPSCONF Command: Configure the Location Service and GPS Receiver 23.22.3.2 Proprietary NMEA Sentences
13.2	May 23, 2016	Added Table 2 CEER Error Codes Specific to the HL85xxx
		Updated: 5.62 +KUART Command: Set UART Bit Mode 5.66 +KPLAYAMR Command: Play AMR File 6.13 +COPS Command: Operator Selection 23.22.3.2 Proprietary NMEA Sentences
14.0	June 29, 2016	Added 1.8 NCC Warning
	July 20, 2016	Added 21 M2M Service Optimization Commands
		Updated: 3.9 +CIMI Command: Request International Subscriber Identity 5.25 \$CSQ Command: Signal Quality 6.13 +COPS Command: Operator Selection 10.6 +CGCLASS Command: GPRS Mobile Station Class 12.3 +VIP Command: Initialize Voice Parameters 12.17 +KPCMCFG Command: Configure PCM Digital Audio

Version	Date	Updates
14.0	July 20, 2016	Updated: 13.8.3 +KIOPT Command: General Options Configuration 19.1 +WMTXPOWER Command: Test RF Tx - Table 5 Location AT Command Prerequisites
	July 27, 2016	Updated: 2.10 S5 Command: Write Command Line Editing Character 3.28 *PSSMPH Command: SIM Phase 5.16 +CCID Command: Request SIM Card Identification 10.7 +CGDCONT Command: Define PDP Context 14.1 +KFSFILE Command: Flash File Operation Command 18.1 +GPSSTART Command: Start or Restart the Location Service 23.22.4.4 Navigation Aiding
14.1	August 10, 2016	Updated 10.21 *PSGCNT Command: GPRS Counters
15.0	October 20, 2016	Updated: 3.9 +CIMI Command: Request International Subscriber Identity 5.30+KCELL Command: Cell Environment Information 5.58 +KNETSCAN Command: Network Scan 6.26 *PSGAAT Command: GPRS Automatic Attach 8.10 +CNMI Command: New SMS Message Indication 10.10 +CGED Command: GPRS Cell Environment 10.20 +CGSMS Command: Select Service for MO SMS Messages 12.3 +VIP Command: Initialize Voice Parameters 12.12 +KST Command: Side Tone 21.2 +MSOSTATUS Command: Operating Status 21.4 +MSOPOLICY Command: Update MSO Policies 21.5 +MSORETRYINFO Command: Read Retry Information 21.6 +MSOMONITOR Command: MSO Monitoring Status 21.7 +MSOMONITORVALUE Command: Read Monitor Data
16.0	January 16, 2017	Added: 13.15.10 +KHTTTPUT Command: Perform HTTP PUT 13.15.11 +KHTTPDELETE Command: Perform HTTP Delete 13.16.10 +KHTTSPUT Command: Perform HTTPS PUT 13.16.11 +KHTTSPDELETE Command: Perform HTTPS Delete 13.18 SSL Configuration
		Updated: 5.21 +CPWC Command: Power Class 13.4 Connection of PDP Contexts 13.9.1 +KTCPCFG Command: TCP Connection Configuration 13.15.1 +KHTTPCFG Command: HTTP Connection Configuration 17.5 +WDSF Command: Device Services Fallback 18.9 +GPSCONF Command: Configure the Location Service and GPS Receiver 23.2.1 CME Error Codes

Version	Date	Updates
17.0	April 11, 2017	Added: 2.34 +ICF Command: DTE-DCE Character Framing 3.34 +KGEA Command: Select Encryption Algorithm 5.82 +KRFMUTE Command: Mute 2G/3G TX 23.2.6.3 SUPL Errors
		Updated: 5.24 +CSQ Command: Signal Quality 5.25 \$CSQ Command: Signal Quality 5.30 +KCELL Command: Cell Environment Information 10.6 +CGCLASS Command: GPRS Mobile Station Class 11.4 +STKPRO Command: Display List of Supported Proactive Commands 11.8 +STKCC Notification: SIM – APPL – TK Call Control - Table 6 Asynchronous Events
	September 22, 2017	Added: 6.29 +KFDOR Command: Trigger Fast Dormancy 12.22 +WPCM Command: PCM On/Off
		Updated: 5.16 +CCID Command: Request SIM Card Identification 13.8.3 +KIOPT Command: General Options Configuration 18.5 +GPSNMEA Command: Configure the NMEA Frames Flow 18.6 +GPSPVT Command: Configure PVT Frames Flow - Error response for commands in 21 M2M Service Optimization Commands
	October 12, 2017	Added: 5.83 +OMADMST Command: Configure OMADM Status URC 19.5 +XOMADMALERT Command: Send Generic Alert to OMA DM Server
		Updated: 5.29 +KSLEEP Command: Power Management Control 5.81 +WESHDOWN Command: Emergency Shutdown 6.28 +PHYR Command: Physical Randomization
18.0	November 21, 2017	Added: - Support for HL8518-S 22. AirVantage System Data Commands 23.2.8. AirVantage System Data Error Codes Updated 5.26 +KRIC Command: Ring Indicator Control
	December 06, 2017	Updated: 10.7 +CGDCONT Command: Define PDP Context 10.23 +XCEDATA Command: Establish ECM Data Connection 11.2 *PSSTKI Command: SIM ToolKit Interface Configuration 13.16.11 +KHTTPSDELETE Command: Perform HTTPS Delete 17.8 +WDSR Command: Device Services Reply 17.9 +WDSS Command: Device Services Session
19.0	July 23, 2018	Added 22.1 +KI2CFREQ Command: I ² C_CLK Frequency

Version	Date	Updates
19.0	July 23, 2018	Updated: • 3.10 +GCAP Command: Request Complete TA Capability List • 3.34 +KGEA Command: Select Encryption Algorithm • 5.26 +KRIC Command: Ring Indicator Control • 5.29 +KSLEEP Command: Power Management Control • 5.30 +KCELL Command: Cell Environment Information • 6.2 +CCFC Command: Call Forwarding Conditions • 10.2 +CGACT Command: PDP Context Activate or Deactivate • 10.4 +CGCMOD Command: Modify PDP Context • 10.7 +CGDCONT Command: Define PDP Context • 10.8 +CGDSCONT Command: Define Secondary PDP Context • 10.12 +CGAUTO Command: Automatic Response • 11.2 *PSSTKI Command: SIM ToolKit Interface Configuration • 11.4 +STKPRO Command: Display List of Supported Proactive Commands • 13.8.3 +KILOPT Command: General Options Configuration • 13.9.8 +KTCP_DATA Notification: Incoming Data through a TCP Connection • 17.3 +WSDSD Command: Device Services Local Download • 17.5 +WDSF Command: Device Services Fallback • 17.7 +WDSI Command: Device Services Indications • 17.8 +WDSR Command: Device Services Reply • 17.9 +WDSS Command: Device Services Session • 23.2.1 CME Error Codes • 23.18.3 Sleep States • 23.18.4 Events that Wake the Module Up
		Deleted: • HL8518-S • 22. AirVantage System Data Commands • 23.2.8. AirVantage System Data Error Codes
		Added 2.35 S100 Command: Set Line Delete Character
20.0	August 20, 2019	Updated: • 2.10 S5 Command: Write Command Line Editing Character • 18.16 +GPSSUPLCFG Command: GPS SUPL Configuration

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1. Introduction

1.1. Scope of this Document

This document presents the AT Command Set for the AirPrime HL6528x and HL85xxx series of embedded modules. The HL6528x series consists of:

- HL6528
- HL6528-G
- HL6528-2.8V
- HL6528-G2.8V
- HL6528 AUTO
- HL6528-G AUTO
- HL6528-2.8V AUTO
- HL6528-G2.8V AUTO

While the HL85xxx series consists of:

- HL8518
- HL8528
- HL8529
- HL8548
- HL8548-G
- HL8549
- HL8549-G

Each AT command is described and when necessary, the standard reference is noted (e.g.: [27.007] §7.5).

Some AT commands are Sierra Wireless proprietary; in this case it is clearly indicated.

1.2. Reference Documents

[04.08]	GSM 04.08 (6.7.1) – Mobile radio interface layer 3 specification (Release 1997)
[22.022]	3GPP 22.022 (3.1.0) – Personalization of Mobile Equipment (ME); Mobile functionality specification (Release 1999)
[27.005]	3GPP 27.005 (5.0.0) – Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)
[27.007]	3GPP 27.007 (6.0.0) – AT command set for User Equipment (UE) (Release 6)
[V25ter]	ITU-T Recommendation V.25 ter – Serial asynchronous automatic dialing and control
[SIM]	Specification of the Subscriber Identity Module – Mobile Equipment (SIM – ME) interface. (GSM 11.11 version 8.3.0 Release 1999)

- [21.905] 3GPP 21.905 (9.4.0) Vocabulary for 3GPP Specifications (Release 9)
 [26.267] 3GPP 26.267 (10.0.0) – eCall Data Transfer - In-band modem solution
 [2174048] Air Prime HL6528x Dual SIM Dual Standby Application Note

1.3. Reference Configuration

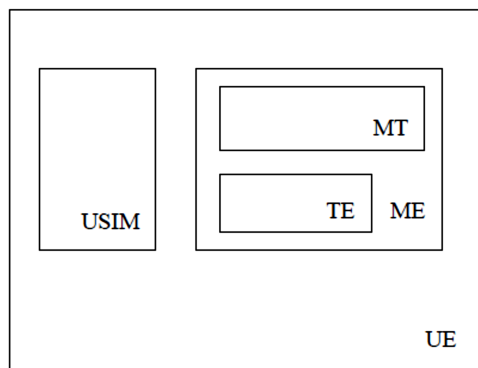


Figure 1. Reference Configuration

The User Equipment (UE) consists of the mobile equipment (ME) and the (U)SIM messages may be stored in either, but the present document does not distinguish between messages stored in the (U)SIM or in the ME. The management of message storage in the two parts of the UE is a matter for the UE implementation.

1.4. AT Command Principles

The "AT" or "at" prefix must be set at the beginning of each line. To terminate a command line, a <CR> character must be inserted.

Commands are usually followed by a response that includes '<CR><LF><response><CR><LF>'. Throughout this document, only the responses are indicated, the <CR> and <LF> characters are omitted intentionally.

Four kinds of extended AT commands are implemented:

Command Type	Syntax	Definition
Test Command	AT+CXXX=?	The equipment returns the list of parameters and values ranges set with the corresponding Write command or by internal processes
Read Command	AT+CXXX?	This command returns the currently set value of parameters
Write Command	AT+CXXX=<...>	This command sets user-related parameter values
Execution command	AT+CXXX	The execution command reads non-variable parameters affected by internal processes in the equipment

1.4.1. Parameters

In this document, the default parameters are underlined and the optional parameters are enclosed in square brackets.

Optional parameters or sub-parameters can be omitted unless they are followed by other parameters. A parameter in the middle of a string can be omitted by replacing it with a comma.

When the parameter is a character string, the string must be enclosed in quotation marks.

All space characters will be ignored when using strings without quotation marks.

1.4.2. Answers and Responses

There is always an answer sent by the TA to an AT Command line (except the very special case of a TA setup for no answer, see ATQ).

The answer is always terminated by an indication of success or failure. However, regarding the setup of the TA (by AT Commands), the message may be different.

Conventional messages:

OK or **ERROR**

Extended Error message (see AT+CMEE):

+CME ERROR: <n>

(See Appendix for the different values for <n>)

Numeric Mode (see ATV) :

<n> with: <n> = 0 ⇔ OK or <n> is an error code

1.4.3. Multiple AT Commands on the Same Command Line

You may enter several AT commands on the same line. This eliminates the need to type the "AT" or "at" prefix before each command and to wait for the answer for each command. The main advantage is to avoid losing bandwidth on the link between DTE and the Module.

There is no separator between two basic commands but a semi-colon character is necessary between two extended commands (prefix +). The command line buffer accepts a maximum of 391 characters. If this number is exceeded none of the commands will be executed and TA returns ERROR.

If a command is not supported, then the treatment of the line is stopped (i.e. the following ones are not treated) and an error message is returned.

Example:

Command: **ATZ&K3+CBST=7,0,1;+CBST?**

Answer: **+CBST=7,0,1**

OK

1.4.4. AT Commands on Separate Lines

When you enter a series of AT commands on *separate* lines, it is strongly advised to leave a pause between the preceding and the following command until the final answer (OK or Error message) appears. This avoids sending too many AT commands at a time without waiting for a response for each.

1.5. Unsolicited Result Codes (URCs)

Unsolicited result codes (URCs) are sent simultaneously to all the channels (USB/UART) configured in AT commands mode.

URCs are not sent to channels configured in Data/NMEA/Traces modes.

In sleep mode URCs wake up the module and are sent to the AT commands channels.

1.6. UART Message

Note: For HL85xxx only.

The NUL (0x00) character is received on the UART on power cycle or reset.

1.7. Document Modification

The commands described in this document are only to be used for usual AT commands use.

The information provided for the commands are subject to change without notice.

1.8. NCC Warning

Note: For HL8518 only.

Model No: HL8518 Product Name: Module (2G 900 1800 / 3G FDD I)

NCC Warning: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

1.9. Abbreviations

Abbreviation	Definition
ACM	Accumulated Call Meter
ADC	Analog Digital Converter
ADN	Abbreviated Dialing Number (Phonebook)
AMR	Adaptive Multi-Rate
AMR-FR	AMR Full Rate (full rate speech version 3)
AMR-HR	AMR Half Rate (half rate speech version 3)
AOC	Advice Of Charge
APN	Access Point Name
ARN	Address Resolution Protocol
ARFCN	Absolute Radio Frequency Channel Number
ASCII	American Standard Code for Information Interchange, Standard characters table (1 byte coding)
AT	ATtention; Hayes Standard AT command Set
BCCH	Broadcast Channel
BER	Bit Err Rate

Abbreviation	Definition
BM	Broadcast Message Storage
CBM	Cell Broadcast Message
CB	Cell Broadcast
CCK	Corporate Control Key
CCM	Current Call Meter
CHV	Card Holder Verification
CHAP	Challenge handshake Authentication Protocol
CI	Cell Identifier
CLI	Client Line Identification
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CNL	Cooperative Network List
CODEC	Coder Decoder
COLP	Connected Line Identification Presentation
CPHS	Common PCN Handset Specification
CPU	Central Processing Unit
CSD	Circuit Switched Data
CSP	Customer Service Profile
CTM	Cellular Text telephone Modem
CTS	Clear To Send signal
CUG	Closed User Group
DAC	Digital to Analog Converter
DTR	Data Terminal Ready
DCS	Digital Cellular System
DCE	Data Circuit Equipment
DCD	Data Carrier Detect
DLC	Data Link Connection
DLCI	Data Link Connection Identifier
DM	Device Management
DNS	Domain Name System
DSR	Data Set Ready
DTE	Date Terminal Equipment
DTMF	Dual Tone Multi-Frequency
DTR	Data Terminal Ready
ECC	Emergency Call Codes
ECM	Error Correction Mode
ECT	Explicit Call Transfer
EDGE	Enhanced Data rates for GSM Evolution
EEPROM	Electrically Erasable Programming Only Memory
EF	Elementary Files
EFR	Enhanced Full Rate (full rate speech version 2)
EGPRS	Enhanced GPRS
ENS	Enhanced Network Selection
E-ONS	Enhanced Operator Name Service

Abbreviation	Definition
ERMES	European Radio Messaging System
ETSI	European Telecommunications Standards Institute
FD	FIFO depth
FDN	Fixed Dialing Number (Phonebook)
FR	Full Rate (full rate speech version 1)
GERAN	GSM EDGE Radio Access Network
GPIO	General Purpose Input Output
GPRS	General Packet Radio Service
GSM	Global System for Mobile communication
HDLC	High-level Data Link Control
HFR	High Frequency Regeneration
HLR	Home Location Register
HR	Half Rate (half rate speech version 1)
ID	Identifier
IETF	Internet Engineering Task Force
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IN/OUT/IN_OUT	In, out or in/out
I/O	Input/Output
IP	Internet Protocol
LAC	Local Area Code
LED	Light Emitting Diode
LND	Last Number Dialed
LP	Language Preferred
LPI	Lines Per Inch
M	Mandatory
MCC	Mobile Country Code
ME	Mobile Equipment
MMI	Man Machine Interface
MNC	Mobile Network Code
MNP	Microcom Networking Protocol
MO	Mobile Originated
MOC	Mobile Originated Call (outgoing call)
MS	Mobile Station
MSB	Most Significant Bit
MSISDN	Mobile Station International ISDN Number
MT	Mobile Terminal
MTC	Mobile Terminated Call (incoming call)
N.A.	Not applicable
NCK	Network Control Key
NITZ	Network Information and Time Zone
NSCK	Network Subset Control Key
NTC	Negative Temperature Coefficient
N.U.	Not used

Abbreviation	Definition
O	Optional
OA	Outgoing Access
OPL	Operator PLMN List
OS	Operating System
OTA	Over the Air
PAD	Portable Application Description
PAP	Password Authentication Protocol
PC	Personal Computer
PCCP	PC character set Code Page
PCK	Personalization Control Key
PCL	Power Control Level
PCM	Protection Circuit Module
PCN	Personal Communication Network
PCS 1900	Personal Communication Service (GSM system offering 148 full duplex voice channels per cell)
PDP	Packet Data Protocol
PDU	Protocol Description Unit
PIN	Personal Identification Number
PLMN	Public Land Mobile Networks
PNN	PLMN Network Name
PPP	Point-to-Point Protocol/Peer to Peer
PSTN	Public Switched Telephone Network
PTS	Product Technical Specification
PUCT	Price per Unit and Currency Table
PUK	PIN Unlock Key
PWM	Pulse Width Modulation
QoS	Quality of Service
RAM	Random Access Memory
RDMS	Remote Device Management Services
RI	Ring Indicator
RIL	Radio Interface Layer
RLP	Radio Link Protocol
RSSI	Received Signal Strength Indication
RTS	Ready To Send signal
RX	Reception
SAP	Service Access Point
SC	Service Center
SDU	Service Data Unit
SIM	Subscriber Information Module
SMSR	Short Message Status Report
SMS	Short Message Service
SS	Supplementary Services
SPCK	Service Provider Control Key
SPN	Service Provider Name

Abbreviation	Definition
STK	SIM ToolKit
SVN	Software Version Number
TA	Terminal Adaptor
TBF	Temporary Block Flow
TE	Terminal Equipment
TTY	TeleTYpe
TON/NPI	Type Of Number/Numbering Plan Identification
TX	Transmission
UART	Universal Asynchronous Receiver Transmitter
UCS2	Universal Character Set 2 Character table (2-byte coding)
UDUB	User Determined User Busy
UIH	Unnumbered Information with Header check
USB	Universal Serial Bus
USSD	Unstructured Supplementary Service Data

>> 2. V25ter AT Commands

2.1. A/ Command: Repeat Previous Command Line

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> A/	<u>Response</u> Depends on the previous command
<u>Reference</u> V.25Ter	<u>Notes</u> Line does not need to end with terminating character

2.2. +++ Command: Switch from Data Mode to Command Mode

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> +++	<u>Response</u> OK

HL6528x and HL85xxx	
<u>Reference</u> V.25Ter	<u>Notes</u> - This command is only available during data mode. The +++ character sequence suspends the data flow over the AT interface and switches to command mode. This allows entering AT commands while maintaining the data connection to the remote device. - To return to data mode, use the ATO[n] command - Line needs one second silence before and one second after (do not end with terminating character) - The "+" character may be changed with the ATS2 command (see following chapters) - The +++ characters are not transmitted in the data flow - Additionally for the HL85xxx, the "+++" escape sequence is not supported in the DLC port in CMUX mode. Alternatively, DTR can be used to switch from data mode to command mode, or use another DLC port to send AT commands.

2.3. O Command: Switch from Command Mode to Data Mode

HL6528x and HL85xxx							
<i>Test command</i>							
<u>Syntax</u> ATO[<n>]	<u>Response</u> TA returns to data mode from command mode: CONNECT <text> If connection is not successfully resumed: NO CARRIER <u>Parameter</u> <table><tr><td><n></td><td>0</td><td>Switch from command mode to data mode</td></tr><tr><td></td><td>1 – 200</td><td>Session ID, See “Protocol specific commands (TCP/UDP/FTP, etc.)”</td></tr></table>	<n>	0	Switch from command mode to data mode		1 – 200	Session ID, See “Protocol specific commands (TCP/UDP/FTP, etc.)”
<n>	0	Switch from command mode to data mode					
	1 – 200	Session ID, See “Protocol specific commands (TCP/UDP/FTP, etc.)”					
<u>Reference</u> V.25Ter	<u>Notes</u> ATO is the alternative command to the +++ escape sequence described in section 2.2. When a data call has been established and TA is in command mode, ATO causes the TA to resume the data connection and return to data mode.						

2.4. E Command: Enable Echo Command

HL6528x and HL85xxx		
Execute command		
<u>Syntax</u> ATE[<value>]	<u>Response</u> OK	
	<u>Parameters</u>	
	<value>	0 Echo mode off
		1 Echo mode on
<u>Reference</u> V.25Ter	<u>Notes</u>	This setting determines whether or not the TA echoes characters received from TE during the command state.

2.5. Q Command: Set Result Code Presentation Mode

HL6528x and HL85xxx							
<i>Execute command</i>							
<u>Syntax</u> ATQ[<n>]	<u>Response</u> OK (if <n> = 0) Nothing (if <n> = 1) <u>Parameters</u> <table><tr><td><n></td><td>0</td><td>result codes transmitted by TA</td></tr><tr><td></td><td>1</td><td>no result codes transmitted by TA</td></tr></table>	<n>	0	result codes transmitted by TA		1	no result codes transmitted by TA
<n>	0	result codes transmitted by TA					
	1	no result codes transmitted by TA					
<u>Reference</u> V.25Ter	<u>Notes</u> Specifies whether or not the TA transmits any result code to the TE. Information text transmitted in response is not affected by this setting.						

2.6. S0 Command: Set Number of Rings before Automatic Call Answering

HL6528x and HL85xxx	
Read command	
<u>Syntax</u> ATS0?	<u>Response</u> <n> OK
Write command	
<u>Syntax</u> ATS0=<n>	<u>Response</u> OK <u>Parameters</u> <n> 0 Automatic answering deactivated 1 – 255 Number of rings before automatically answering
<u>Reference</u> V.25ter	<u>Notes</u> • See data stored by &W for default value. • In data mode (after any CONNECT) automatic call answering does not work that means that incoming calls are not automatically answered during data mode. • Additionally for the HL8548x: ▪ For auto-answering an MT voice call, the connection can be established on either the USB or UART port. ▪ For auto-answering an MT data call, the connection is established on the UART port; therefore, the UART port has to be opened before any "RING" indicator.

2.7. S2 Command: Set Character for the Escape Sequence (Data to Command Mode)

HL6528x and HL85xxx	
<i>Read command</i>	
<u>Syntax</u> ATS2?	<u>Response</u> <n> OK
<i>Write command</i>	
<u>Syntax</u> ATS2=<n>	<u>Response</u> OK <u>Parameters</u> <n> only 43 ("+") is supported
<u>Reference</u> V.25ter	<u>Notes</u> The default character is "+" (043) and cannot be changed.

2.8. S3 Command: Command Line Termination Character

HL6528x and HL85xxx	
<i>Read command</i>	
<u>Syntax</u> ATS3?	<u>Response</u> <n> OK

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> ATS3=<n>	<u>Response</u> OK <u>Parameters</u> <n> 13 command line termination character<CR>: carriage return
<u>Reference</u> V.25Ter	<u>Notes</u> - This parameter determines the character recognized by TA to terminate an incoming command line (13 = <CR> by default); it cannot be changed. - See data stored by &W for default value.

2.9. S4 Command: Set Response Formatting Character

HL6528x and HL85xxx	
<i>Read command</i> <u>Syntax</u> ATS4?	<u>Response</u> <n> OK
<i>Write command</i> <u>Syntax</u> ATS4=<n>	<u>Response</u> OK <u>Parameters</u> <n> 10 Response formatting character <LF>: line feed

HL6528x and HL85xxx	
<u>Reference</u> V.25Ter	<u>Notes</u> - This parameter determines the character recognized by TA to terminate answer line (10 = <LF> by default); it cannot be changed. - See data stored by &W for default value.

2.10. S5 Command: Write Command Line Editing Character

HL6528x and HL85xxx	
<i>Read command</i>	
<u>Syntax</u> ATS5?	<u>Response</u> <n> OK
<i>Write command</i>	
<u>Syntax</u> ATS5=<n>	<u>Response</u> OK <u>Parameter</u> <n> 1 – 255 Backspace character
<u>Reference</u> V.25Ter	<u>Notes</u> This parameter is used to set the backspace character. The backspace character should be set to a non-printable character, for example 9; setting it to a printable character gives the character special meaning.

2.11. S7 Command: Set Delay for Connection Completion

HL6528x and HL85xxx	
<i>Read command</i>	
<u>Syntax</u> ATS7?	<u>Response</u> <n> OK
<i>Write command</i>	
<u>Syntax</u> ATS7=<n>	<u>Response</u> OK <u>Parameters</u> <n> 1 – 255 Number of second to wait for connection completion
<u>Reference</u> V.25Ter	<u>Notes</u> • See also AT&V for default values of this parameter. • See data stored by &W for default value.

2.12. V Command: TA Response Format

HL6528x and HL85xxx							
Execute command							
<u>Syntax</u> ATV[<value>]	<u>Response</u> 0 (When numeric mode activated) OK (When verbose mode activated) <u>Parameters</u> <table><tr><td><value></td><td>0</td><td>Short result code format: <numeric code></td></tr><tr><td></td><td>1</td><td>Long result code format: <verbose code></td></tr></table>	<value>	0	Short result code format: <numeric code>		1	Long result code format: <verbose code>
<value>	0	Short result code format: <numeric code>					
	1	Long result code format: <verbose code>					
<u>Reference</u> V.25Ter	<u>Notes</u> See data stored by &W for default value.						

2.13. X Command: Result Code Selection and Call Progress Monitoring Control

HL6528x and HL85xxx		
Write command		
<u>Syntax</u> ATX[<value>]	<u>Response</u> OK	
	<u>Parameters</u>	
	<value>	0 CONNECT result code only returned, dial tone and busy detection are both disabled
		1 CONNECT<text> result code only returned, dial tone and busy detection are both disabled
		2 CONNECT<text> result code returned, dial tone detection is enabled, busy detection is disabled
		3 CONNECT<text> result code returned, dial tone detection is disabled, busy detection is enabled
		4 CONNECT<text> result code returned, dial tone and busy detection are both enabled

HL6528x and HL85xxx	
<u>Reference</u> V.25Ter	<u>Notes</u> - See data stored by &W for default value. - This command defines the result code to be returned, as well as sets the dial tone or busy detection features.
<u>Examples</u>	ATX0 OK ATX4 OK ATX5 ERROR ATX10 ERROR

2.14. &C Command: Set Data Carrier Detect (DCD) Function Mode

HL6528x and HL85xxx							
<i>Execute command</i>							
<u>Syntax</u> AT&C<value>	<u>Response</u> OK						
	<u>Parameters</u> <table><tr><td><value></td><td>0</td><td>DCD line is always active</td></tr><tr><td></td><td>1</td><td>DCD line is active in the presence of data carrier only</td></tr></table>	<value>	0	DCD line is always active		1	DCD line is active in the presence of data carrier only
<value>	0	DCD line is always active					
	1	DCD line is active in the presence of data carrier only					
<u>Reference</u> V.25Ter	<u>Notes</u> See data stored by &W for default value.						

2.15. &D Command: Set Data Terminal Ready (DTR) Function Mode

HL6528x			HL85xxx		
<i>Execute command</i>			<i>Execute command</i>		
<u>Syntax</u> AT&D<value>			<u>Syntax</u> AT&D<value>		
<u>Response</u> OK			<u>Response</u> OK		
<u>Parameters</u>			<u>Parameters</u>		
<value> 0 TA ignores status on DTR			<value> 0 TA ignores status on DTR		
1 DTR drop from active to inactive: Change to command mode while retaining the connected data call			1 DTR drop from active to inactive: Change to command mode while retaining the connected data call		
2 DTR drop from active to inactive: Disconnect data call, change to command mode. During state DTR inactive auto-answer is off			2 DTR drop from active to inactive: Disconnect data call, change to command mode. During state DTR inactive auto-answer is off		
<u>Reference</u> V.25Ter			<u>Reference</u> V.25Ter		
<u>Notes</u> • The command AT&D only applies to data calls. Thus, a DTR drop from active to inactive in AT&D2 mode will not hang up a voice call. • See also the appendix about the DTR +++ ATO behaviors matrix.			<u>Notes</u> • The command AT&D only applies to data calls. For voice calls, AT&D only applies when AT+CVHU=2 has been previously set. • When <value>=2, auto-answer is off when UART DTR is inactive. • See also the appendix about the DTR +++ ATO behaviors matrix.		

2.16. &F Command: Restore Factory Settings

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> AT&F[<value>]	<u>Response</u> OK <u>Parameters</u> <value> 0 or Omitted Restore parameters to factory settings
<u>Reference</u> V.25Ter	<u>Notes</u> • See also AT&V. • Restore factory settings to active profile. • AT&F also restore the settings of AVMS services indication +WDSI (if the AVMS feature is applicable). • Additionally for the HL85xxx, this command restores the settings of +CMER.
<u>Examples</u>	AT&F OK AT&F0 OK AT&F1 ERROR

2.17. &W Command: Save Stored Profile

HL6528x		HL85xxx																													
<i>Execute command</i>		<i>Execute command</i>																													
<u>Syntax</u> AT&W[<value>]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><value></td><td>0</td><td>Save in STORED PROFILE 0</td></tr><tr><td></td><td>1</td><td>Save in STORED PROFILE 1</td></tr></table>	<value>	0	Save in STORED PROFILE 0		1	Save in STORED PROFILE 1	<u>Syntax</u> AT&W[<value>]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><value></td><td>0 or Omitted</td><td>Save in STORED PROFILE 0</td></tr><tr><td></td><td>1</td><td>Save in STORED PROFILE 1</td></tr></table>	<value>	0 or Omitted	Save in STORED PROFILE 0		1	Save in STORED PROFILE 1																
<value>	0	Save in STORED PROFILE 0																													
	1	Save in STORED PROFILE 1																													
<value>	0 or Omitted	Save in STORED PROFILE 0																													
	1	Save in STORED PROFILE 1																													
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command saves the current configuration in a non-erasable place. - See also AT&V. - The default stored profile may be adapted for customer needs. Configuration saved: <table><tr><td>E</td><td>Echo</td></tr><tr><td>Q</td><td>Set result code presentation mode</td></tr><tr><td>V</td><td>Verbose</td></tr><tr><td>X</td><td>Extended result code</td></tr><tr><td>&C</td><td>DCD control</td></tr><tr><td>&D</td><td>DTR behavior</td></tr><tr><td>&R</td><td>RTS control</td></tr><tr><td>&S0</td><td>DSR control</td></tr><tr><td>&K</td><td>Flow control</td></tr><tr><td>FCLASS</td><td>FCLASS</td></tr><tr><td>S0</td><td>Set number of rings before automatically answering the call</td></tr><tr><td>S3</td><td>Write command line termination character</td></tr><tr><td>S4</td><td>Set response formatting character</td></tr><tr><td>S5</td><td>Write command line editing character</td></tr></table>	E	Echo	Q	Set result code presentation mode	V	Verbose	X	Extended result code	&C	DCD control	&D	DTR behavior	&R	RTS control	&S0	DSR control	&K	Flow control	FCLASS	FCLASS	S0	Set number of rings before automatically answering the call	S3	Write command line termination character	S4	Set response formatting character	S5	Write command line editing character	<u>Reference</u> V.25Ter	<u>Notes</u> - This command saves the current configuration in a non-erasable place. - The parameters will be saved to the active profile if <value> is not specified.
E	Echo																														
Q	Set result code presentation mode																														
V	Verbose																														
X	Extended result code																														
&C	DCD control																														
&D	DTR behavior																														
&R	RTS control																														
&S0	DSR control																														
&K	Flow control																														
FCLASS	FCLASS																														
S0	Set number of rings before automatically answering the call																														
S3	Write command line termination character																														
S4	Set response formatting character																														
S5	Write command line editing character																														

HL6528x			HL85xxx	
	S7	Set number of seconds to wait for connection completion		
	S8	Comma dial modifier time		
	S10	Automatic disconnect delay		
			<u>Examples</u>	AT&W // Save current configuration to Profile 0 OK AT&W0 // Save current configuration to Profile 0 OK AT&W1 // Save current configuration to Profile 1 OK

2.18. &V Command: Display Current Configuration

HL6528x and HL85xxx	
<i>Execute command</i> <u>Syntax</u> AT&V[<value>]	<u>Response</u> ACTIVE PROFILE: <current configuration> STORED PROFILE 0: <user default configuration> STORED PROFILE 1: <manufactory configuration> OK <u>Parameters</u> <value> <u>0</u> Profile number
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - At startup, the latest profile stored with AT&W is restored to the Active profile (no restoration if AT&W has not been used). - The configuration is a text string on multiple lines as shown in the example below. This string may vary depending on the manufactory, the product and the user setup. - AT&V lists +IFC and S01 parameters which are directly editable. +IFC answer reflects the flow control parameters set by AT&K command.
<u>Example</u>	E1 Q0 V1 X4 &C1 &D1 &R1 &S0 +IFC= 0,2 &K0 +FCLASS0 S00:0 S03:13 S04:10 S05:8 S07:50 S08:2 S10:14 This command indicates the result of certain actions as shown below: <pre> graph TD AP[Active Profile] -- ATZ --> SP[Stored profile] SP -- AT&W --> AP DS[Default Settings] -- AT&F --> AP </pre>

2.19. IPR Command: Set Fixed Local/DTE Rate

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+IPR=?	<u>Response</u> +IPR: (list of supported auto-detectable <rate>s), (list of supported fixed-only <rate>s) OK	<u>Syntax</u> AT+IPR=?	<u>Response</u> +IPR: (list of supported auto detectable <rate> values) [, (list of fixed only <rate> values)] OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+IPR?	<u>Response</u> +IPR: <rate> OK	<u>Syntax</u> AT+IPR?	<u>Response</u> +IPR: <baud_rate> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+IPR=<rate>	<u>Response</u> OK <u>Parameters</u> <rate> Bit rate per second 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 0 = Autobaud	<u>Syntax</u> AT+IPR= <baud_rate>	<u>Response</u> OK or +CME ERROR: <error> <u>Parameters</u> <baud_rate> 115200 (default value) 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 230400, 460800, 500000, 750000, 921600, 1843200, 3000000, 3250000, 6000000

HL6528x				HL85xxx	
<u>Reference</u> V.25ter	<u>Notes</u> - The speed is modified after sending the answer. - With AUTOBAUD only capital letters for AT commands have to be used. 0 (autobaud) is not listed in the response to +IPR=?				<u>Notes</u> - Not all listed rates may be available as they depend on the target. - The full range of data rate values may be reduced depending on hardware or other criteria. <baud_rate> is only for the UART port. USB port is always in auto.
	Normalized Baud Rate	Accepted Range (Autobaud)	Accepted Range (Not Autobaud)		
	115200	[115044.25;115555.56]	[109810;120870]		
	57600	[57522.12;57649.67]	[54855;60374]		
	38400	[38348.08;38404.73]	[36510;40230]		
	19200	[19188.19;19202.36]	[18249;20124]		
	9600	[9597.64;9601.18]	[9125;10061]		
	4800	[4799.70;4800.59]	[4562;5030]		
	2400	[2399.85;2400.07]	[2290;2516]		
	1200	[1199.98;1200.04]	[1140;1256]		

2.20. B Command: Data Rate Selection

HL6528x and HL85xxx	
<u>Execute command</u>	
<u>Syntax</u> ATB<rate>	<u>Response</u> OK <u>Parameters</u> <rate> number from 0-99, but meaningless

HL6528x and HL85xxx	
<u>Reference</u> V.25ter	<u>Notes</u> • The responses of this command are compliant with the recommendation but this command has no effect. • It is recommended to use AT+CBST instead of this command.

2.21. \N Command: Data Transmission Mode

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> AT+N<x>	<u>Response</u> OK
	<u>Parameters</u> <x> 0 transparent mode 4, 6 RLP mode (nontransparent)
<u>Reference</u> V.25ter	<u>Notes</u> Not supported. It is recommended to use AT+CBST instead of this command.

2.22. &K Command: Flow Control Option

HL6528x and HL85xxx	
Execute command	
<u>Syntax</u> AT&K<mode>	<u>Response</u> OK <u>Parameters</u> <mode> 0 Disable all flow control 3 Enable bi-directional hardware flow control 4 Enable XON/XOFF flow control (not supported in the HL85xxx)
<u>Reference</u> V.25ter	<u>Notes</u> • Use AT&V0 to display the current flow control setting. • Sierra Wireless recommends the use of the hardware flow control. • The software flow control is supported if the data to be transmitted are coded in ASCII (in this case XON/XOFF controls and data are differentiated) or the customer manages the data encapsulation and does not include XON XOFF with the data. • The flow could reach up to 255 bytes of transmission after RTS is deasserted.

2.23. L Command: Monitor Speaker Loudness

HL6528x and HL85xxx	
Write command	
<u>Syntax</u> ATL [<volume>]	<u>Response</u> OK <u>Parameter</u> <volume> 0 – 9

HL6528x and HL85xxx	
<u>Reference</u> ITU-T V.250 § 6.3.13	<u>Notes</u> The responses of this command are compliant with the recommendation but this command has no effect.

2.24. M Command: Monitor Speaker Mode

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> ATM[<mode>]	<u>Response</u> OK <u>Parameter</u> <mode> 0 – 9
<u>Reference</u> ITU-T V.250 § 6.3.14	<u>Notes</u> The responses of this command are compliant with the recommendation but this command has no effect.

2.25. S6 Command: Pause before Blind Dialing

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> ATS6=<time>	<u>Response</u> OK <u>Parameter</u> <time> 0 – 999
<u>Reference</u> ITU-T V.250 § 6.3.9	<u>Notes</u> The responses of this command are compliant with the recommendation but this command has no effect.

2.26. S8 Command: Comma Dial Modifier Time

HL6528x and HL85xxx	
<i>Read command</i>	
<u>Syntax</u> ATS8?	<u>Response</u> <time> OK
<i>Write command</i>	
<u>Syntax</u> ATS8=<time>	<u>Response</u> OK <u>Parameter</u> <time> 0 – 255 See Data stored by &W for default value

HL6528x and HL85xxx	
<u>Reference</u> ITU-T V.250 §6.3.11	<u>Notes</u> Since comma is ignored in D command, this command has no effect.

2.27. S10 Command: Automatic Disconnect Delay

HL6528x and HL85xxx	
<i>Read command</i> <u>Syntax</u> ATS10?	<u>Response</u> <time> OK
<i>Write command</i> <u>Syntax</u> ATS10=<time>	<u>Response</u> OK <u>Parameter</u> <time> 1 – 254 See Data stored by &W for default value
<u>Reference</u> ITU-T V.250 §6.3.12	<u>Notes</u> The responses for this command are compliant with the recommendation but this command has no effect.

2.28. N Command: Negotiate Handshake Option

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> ATN[<option>]	<u>Response</u> OK <u>Parameter</u> <option> 0 – 9
<u>Reference</u>	<u>Notes</u> The responses for this command are compliant with the recommendation but this command has no effect.

2.29. S1 Command: Ring Count

HL6528x and HL85xxx	
<i>Read command</i>	
<u>Syntax</u> ATS1?	<u>Response</u> <num> OK <u>Parameter</u> <num> 0 – 255 See Data stored by &W for default value
<u>Notes</u>	Read command returns the number <num> of ring occurrences for last incoming data or voice call.

2.30. S11 Command: DTMF Dialing Speed

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> ATS11=<time>	<u>Response</u> OK <u>Parameter</u> <time> 0 – 999
<u>Notes</u>	The responses for this command are compliant with the recommendation but this command has no effect.

2.31. W Command: Extended Result Code

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> ATW <mode>	<u>Response</u> OK <u>Parameter</u> <mode> 0 (only result code CONNECT is supported)	<u>Syntax</u> ATW<mode>	<u>Response</u> OK <u>Parameter</u> <mode> 0 or omitted Only CONNECT will be shown 1 CONNECT<connection speed> will be shown
<u>Notes</u>	Execution command determines which result code <mode> is to be used as an extended result code in addition to the CONNECT result code.	<u>Notes</u>	- Execution command determines which result code <mode> is to be used as an extended result code in addition to the CONNECT result code. - If <mode>=1, this command will display whatever the setting is set with ATX. If <mode>=0, this command will only display "CONNECT" regardless of the settings specified with ATX.

HL6528x		HL85xxx	
		<u>Examples</u>	ATW1 OK //Extended result code will be shown in CSD call ATW0 OK //Extended result code will not be shown is CSD call ATW OK ATW2 ERROR

2.32. &S Command: DSR Option

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> AT&S [<override>]	<u>Response</u> OK <u>Parameter</u> <override> 0, 1 or omitted DSR signal always ON (0 is the default value)

2.33. &R Command: RTS/CTS Option

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT&R <option>	<u>Response</u> OK <u>Parameter</u> <option> <u>1</u> In sync mode, CTS is always ON (RTS transitions are ignored). In async mode, CTS will only drop if required by the flow control
<u>Notes</u>	This selects how the modem controls CTS. CTS operation is modified if hardware flow control is selected (see &K command). The parameter value, if valid, is written to S21 bit2.

2.34. +ICF Command: DTE-DCE Character Framing

Note: For HL854xx only.

HL854xx	
<i>Test command</i>	
<u>Syntax</u> AT+ICF=?	<u>Response</u> +ICF: (1-6),(0-4) OK
<i>Read command</i>	
<u>Syntax</u> AT+ICF?	<u>Response</u> +ICF: (list of supported <format>s),(list of supported <parity>s) OK

HL854xx					
<i>Write command</i>					
<u>Syntax</u> AT+ICF= <format> , <parity>	<u>Response</u> OK				
	<u>Parameters</u>				
	<format>	1	8 data 2 stop; <parity> parameter is ignored		
		2	8 data 1 parity 1 stop; if no <parity> provided, 3 is used by default as <parity> value		
		<u>3</u>	8 data 1 stop; <parity> parameter is ignored		
		4	7 data 2 stop; <parity> parameter is ignored		
		5	7 data 1 parity 1 stop; if no <parity> provided, 3 is used by default as <parity> value		
		6	7 data 1 stop; <parity> parameter is ignored		
	<parity>	0	Odd		
		1	Even		
		2	Mark		
		3	Space		
		<u>4</u>	None		
<u>Notes</u>	Command parameters are persistent to resets.				
<u>Examples</u>	AT+ICF=? +ICF: (1-6),(0-4) // Possible values OK AT+ICF=2,0 // New values OK AT+ICF? +ICF: 2,0 // Current values OK AT+ICF=2,2 // New values OK				

2.35. S100 Command: Set Line Delete Character

HL6528x and HL85xxx	
<i>Read command</i>	
<u>Syntax</u> ATS100?	<u>Response</u> <n> OK
<i>Write command</i>	
<u>Syntax</u> ATS100=<n>	<u>Response</u> OK <u>Parameter</u> <n> 1 – 255 Deletion character
<u>Reference</u> V.25Ter	<u>Notes</u> This parameter determines the character recognized by TA to delete the previous line. The line delete character should be set to a non-printable character, for example 20; setting it to a printable character gives the character special meaning.

>> 3. General AT Commands

3.1. I Command: Request Identification Information

HL6528x		HL85xxx	
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> ATI[<value>]	<u>Response</u> If <value> = 0 or omitted: <model> OK If <value> = 3: <model identification text> OK	<u>Syntax</u> ATI[<value>]	<u>Response</u> If <value> = 0 or omitted: <model> OK If <value> = 3: <version tag> OK Additionally for the HL8518, HL8528 or HL8529 module, if <value> = 4: <secure status> OK If <value> = 9: <version tag> <build date & time> <SVN rev> OK
	<u>Parameters</u> <model> Model identifier		<u>Parameters</u> <model> Model identifier

HL6528x		HL85xxx	
	<model identification text> Model and software version		<version tag> Version tag (No Revision) : non-tagged version xHL85xxx...x : tagged version string <build date & time> YYYY/MM/DD HH:MM:SS <SVN rev> SVN last changed revision <secure status> FUSED Secure module NON-FUSED Non-secure module This parameter is only for the HL8518, HL8528 and HL8529 modules.
<u>Examples</u>	ATI HL6528 OK ATI3 SIERRA HL6N,000.16 OK	<u>Examples</u>	// Using an HL8548 module ATI HL8548 OK ATI3 (No Revision) OK ATI4 NON-FUSED OK ATI9 (No Revision) 2013/08/16 18:04:53 r546 OK ATI3 AHL8548.4.0.1.0.201307101445.x6250_1 OK

HL6528x		HL85xxx	
			ATI9 AHL8548.4.0.1.0.201307101445.x6250_1 2013/07/10 14:45:15 r546 OK // Using an HL8518, HL8528 or HL8529 module // Non-secure hardware ATI9 BHL85xx.5.14.4.4.20160129.x6255 2016/02/01 12:10:51 10 NON-FUSED OK ATI4 NON-FUSED OK // Secure hardware (e-fused) ATI9 BHL85xx.5.14.4.4.20160129.x6255 2016/02/01 12:10:51 10 FUSED OK ATI4 FUSED OK
<u>Reference</u> V.25ter	<u>Notes</u> See also AT+GMR, AT+CGMR.	<u>Reference</u> V.25ter	<u>Notes</u> See also AT+CGMR.

3.2. Z Command: Reset and Restore User Configuration

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> ATZ[<value>]	<u>Response</u> OK
	<u>Parameter</u> <value> <u>0</u> Reset and restore user configuration with profile 0 1 Reset and restore user configuration with profile 1
<u>Reference</u> V.25ter	<u>Notes</u> See also AT&V

3.3. +CGMI Command: Request Manufacturer Identification

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CGMI=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CGMI	<u>Response</u> (manufacturer identification text) OK
<u>Example</u>	AT+CGMI Sierra Wireless OK

HL6528x and HL85xxx	
<u>Reference</u> [27.007] § 5.1	

3.4. +CGMM Command: Request Model Identification

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CGMM=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CGMM	<u>Response</u> (model identification text) OK
<u>Reference</u>	[27.007] § 5.2

3.5. +CGMR Command: Request Revision Identification

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CGMR=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CGMR	<u>Response</u> (model revision identification text) OK
<u>Reference</u> [27.007] § 5.3	<u>Notes</u> For the HL85xxx, the (model revision identification text) could be: (No Revision) or AHL854x.4.0.1.0.201307101445.x6250_1

3.6. +CGSN Command: Request Product Serial Number Identification (IMEI)

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CGSN=?	<u>Response</u> OK	<u>Syntax</u> AT+CGSN=?	<u>Response</u> OK

HL6528x		HL85xxx	
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> AT+CGSN	<u>Response</u> <sn> (identification text for determination of the individual ME) OK	<u>Syntax</u> AT+CGSN	<u>Response</u> <IMEI> (identification text for determination of the individual ME) OK
<u>Reference</u>	[27.007] § 5.4	<u>Reference</u> V.25ter	<u>Notes</u> - This command can work with or without a SIM card - See also AT+KGSN, AT+GSN

3.7. +KGSN Command: Request Product Serial Number and Software Version

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KGSN=?	<u>Response</u> +KGSN: (list of supported <number type>s) OK	<u>Syntax</u> AT+KGSN=?	<u>Response</u> +KGSN: (list of supported <number type>s) OK
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> AT+KGSN= <number type>	<u>Response</u> If <number type> = 0: +KGSN: <IMEI> OK If <number type> = 1: +KGSN: <IMEISV> OK	<u>Syntax</u> AT+KGSN= <number type>	<u>Response</u> If <number type> = 0: +KGSN: <IMEI> OK If <number type> = 1: +KGSN: <IMEISV> OK

HL6528x		HL85xxx	
	If <number type> = 2: +KGSN: <IMEISV_STR> OK If <number type> = 3: +KGSN: <SN> OK If <number type> = 4: +KGSN: <SN-BB> OK <u>Parameters</u> <IMEI> 15 digits IMEI <8 digits for TAC + 6 digits for SNR>-<1 check digit> <IMEISV> 16 digits IMEISV <8 digits for TAC + 6 digits for SNR> <2 SVN digits> <IMEISV_STR> formatted string: <8 digits for TAC + 6 digits for SNR>-<1 check digit> <2 SVN digits> <SN> 14 digits Serial Number <SN-BB> 16 digits Serial Number + BB		If <number type> = 2: +KGSN: <IMEISV_STR> OK If <number type> = 3: +KGSN: <FSN> OK <u>Parameters</u> <IMEI> 15 digits IMEI (8 digits for TAC + 6 digits for SNR + 1 check digit) <IMEISV> 16 digits IMEISV (8 digits for TAC + 6 digits for SNR + 2 SVN digits) <IMEISV_STR> formatted string: <15 digits>-<Check digit> SV: <Software version> <FSN> 14 digits Serial Number
<u>Examples</u>	AT+KGSN=0 +KGSN: 351578000023006 OK AT+KGSN=1 +KGSN: 3515780000230001 OK	<u>Examples</u>	AT+KGSN=0 +KGSN: 351578000023006 OK AT+KGSN=1 +KGSN: 3515780000230001 OK

HL6528x		HL85xxx	
			AT+KGSN=2 +KGSN: 35157800002300-6 SV:01 OK AT+KGSN=3 +KGSN: 0123456789ABCD OK
<u>Reference</u> Sierra Wireless proprietary	<u>Notes</u> This command has been developed to provide the IMEI SV and Serial Number through an AT Command	<u>Reference</u> Sierra Wireless proprietary	<u>Notes</u> This command has been developed to provide the IMEI SV and Serial Number through an AT Command and it can work with or without SIM card.

3.8. +CSCS Command: Set TE Character Set

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CSCS=?	<u>Response</u> +CSCS: (list of supported <chset>) OK
<i>Read command</i> <u>Syntax</u> AT+CSCS?	<u>Response</u> +CSCS: <chset> OK

HL6528x and HL85xxx									
<i>Write command</i> <u>Syntax</u> AT+CSCS= <chset>	<u>Response</u> OK <u>Parameter</u> <chset> <table> <tr> <td>"GSM"</td><td>GSM default alphabet (GSM 03.38 sub clause 6.2.1)</td></tr> <tr> <td>"UCS2"</td><td>16 bit universal multiple-octet coded character set (ISO/IEC 10646)</td></tr> <tr> <td>"IRA"</td><td>default value</td></tr> <tr> <td>"HEX"</td><td>Hexadecimal mode. No character set is used; the user can read or write hexadecimal values. (This option is only available in the HL85xxx.)</td></tr> </table>	"GSM"	GSM default alphabet (GSM 03.38 sub clause 6.2.1)	"UCS2"	16 bit universal multiple-octet coded character set (ISO/IEC 10646)	"IRA"	default value	"HEX"	Hexadecimal mode. No character set is used; the user can read or write hexadecimal values. (This option is only available in the HL85xxx.)
"GSM"	GSM default alphabet (GSM 03.38 sub clause 6.2.1)								
"UCS2"	16 bit universal multiple-octet coded character set (ISO/IEC 10646)								
"IRA"	default value								
"HEX"	Hexadecimal mode. No character set is used; the user can read or write hexadecimal values. (This option is only available in the HL85xxx.)								
<u>Reference</u> [27.007] §5.5	<u>Notes</u> Select the character set used for all string types (Phonebook entries, SMS data, etc.)								

3.9. +CIMI Command: Request International Subscriber Identity

HL6528x		HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CIMI=?	<u>Response</u> OK	<i>Test command</i> <u>Syntax</u> AT+CIMI=?	<u>Response</u> OK
<i>Execute command</i> <u>Syntax</u> AT+CIMI	<u>Response</u> <IMSI> : (International Mobile Subscriber Identifier) OK	<i>Execute command</i> <u>Syntax</u> AT+CIMI	<u>Response</u> <IMSI> OK or CME ERROR: <error>

HL6528x		HL85xxx	
	<u>Parameter</u> <IMSI> International Mobile Subscriber Identity		<u>Parameter</u> <IMSI> International Mobile Subscriber Identity
<u>Reference</u>	[27.007] § 5.6		

3.10. +GCAP Command: Request Complete TA Capability List

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> AT+GCAP	<u>Response</u> +GCAP: list of <name>s OK
<u>Example</u>	+GCAP: +FCLASS,+CGSM OK
<u>Reference</u> V.25ter	

3.11. +GMI Command: Request Manufacturer Identification

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+GMI=?	<u>Response</u> OK

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> AT+GMI	<u>Response</u> (manufacturer identification text) OK
<u>Example</u>	AT+GMI Sierra Wireless OK
<u>Reference</u> V.25ter (for HL6528x) [27.007] § 5.1 (for HL85xxx)	<u>Notes</u> See also AT+CGMI (for HL6528x)

3.12. +GMM Command: Request Model Identification

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+GMM=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+GMM	<u>Response</u> (model identification text) OK

HL6528x and HL85xxx	
<u>Reference</u> V.25ter (for HL6528x) [27.007] § 5.2 (for HL85xxx)	<u>Notes</u> See also AT+CGMM (for HL6528x)

3.13. +GMR Command: Request Revision Identification

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+GMR=?	<u>Response</u> OK	<u>Syntax</u> AT+GMR=?	<u>Response</u> OK
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> AT+GMR	<u>Response</u> (model identification text) OK	<u>Syntax</u> AT+GMR	<u>Response</u> (model revision identification text) OK
<u>Reference</u> V.25ter	<u>Notes</u> See also AT+CGMR	<u>Reference</u> [27.007] § 5.3	<u>Notes</u> The (model revision identification text) could be: (No Revision) or AHL854x.4.0.1.0.201307101445.x6250_1

3.14. +GSN Command: Request Product Serial Number (IMEI)

Note: This command is identical to +CGSN.

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+GSN=?	<u>Response</u> OK	<u>Syntax</u> AT+GSN=?	<u>Response</u> OK
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> AT+GSN	<u>Response</u> <sn> (identification text for determination of the individual ME) OK	<u>Syntax</u> AT+GSN	<u>Response</u> <IMEI> (identification text for determination of the individual ME) OK
<u>Reference</u> V.25ter	<u>Notes</u> See also AT+KGSN, AT+CGSN	<u>Reference</u> V.25ter	<u>Notes</u> - This command can work with or without a SIM card - See also AT+KGSN, AT+CGSN

3.15. +CMUX Command: Multiplexing Mode

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CMUX=?	<u>Response</u> +CMUX: (list of supported <mode>s),(list of supported <subset>s),(list of supported <port_speed>s),(list of supported <N1>s),(list of supported <T1>s),(list of supported <N2>s),(list of supported <T2>s),(list of supported <T3>s),(list of supported <k>s) OK	<u>Syntax</u> AT+CMUX=?	<u>Response</u> +CMUX: (list of supported <mode>s),(list of supported <subset>s),(list of supported <port_speed>s),(list of supported <N1>s),(list of supported <T1>s),(list of supported <N2>s),(list of supported <T2>s),(list of supported <T3>s),(list of supported <k>s) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CMUX?	<u>Response</u> +CMUX: <mode>,[<subset>],<port_speed>,<N1>,<T1>,<N2>,<T2>,<T3>[,<k>] OK	<u>Syntax</u> AT+CMUX?	<u>Response</u> +CMUX: <mode>,[<subset>],,<N1>,<T1>,<N2>,<T2>,<T3>[,<k>] OK or +CME ERROR: <error> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CMUX= <mode> [,<subset> [,<port_speed> [,<N1>[,<T1> [,<N2>[,<T2> [,<T3>[,<k>]]]]]]]	<u>Response</u> OK <u>Parameters</u> <mode> Multiplexer Transparency Mechanism 0 Basic option 1 Advanced option <subset> 0 UIH frames used only 1 UI frames used only <port_speed> transmission rate (1-8) 1 9 600 bit/s 2 19 200 bit/s	<u>Syntax</u> AT+CMUX= <mode> [,<subset> [,<port_speed> [,<N1>[,<T1> [,<N2>[,<T2> [,<T3>[,<k>]]]]]]]	<u>Response</u> OK or +CME ERROR: <error> OK <u>Parameters</u> <mode> Multiplexer Transparency Mechanism 0 Basic option 1 Advanced option (not supported) <subset> 0 UIH frames used only 1 UI frames used only; value currently not supported 2 I frames used only; value currently not supported <port_speed> transmission rate (1-7) 1 9 600 bit/s 2 19 200 bit/s

HL6528x	HL85xxx
3 38 400 bit/s 4 57 600 bit/s <u>5</u> 115 200 bit/s <N1> maximum frame size (Payload size) (31 - 1540) default Value: <u>31</u> <T1> acknowledgement timer in units of ten milliseconds 1-254, where <u>10</u> is default (100 ms) <N2> maximum number of re-transmissions 0-100, where <u>3</u> is default <T2> response timer for the multiplexer control channel in units of ten milliseconds 2-255, where <u>30</u> is default (300 ms) <T3> wake up response timer in seconds 1-255, where <u>10</u> is default <k> window size, for Advanced operation with Error Recovery options 1-7, where <u>2</u> is default	3 38 400 bit/s 4 57 600 bit/s 5 115 200 bit/s 6 230 400 bit/s <u>7</u> 1 Mbit/s <N1> maximum frame size (supported range: 1-1509) default Value: <u>31</u> (64 if Advanced option is used) <T1> acknowledgement timer in units of ten milliseconds 1-255, where <u>10</u> is default (100 ms) <N2> maximum number of re-transmissions 0-100, where <u>3</u> is default ; currently only the range 0 -5 is supported <T2> response timer for the multiplexer control channel in units of ten milliseconds 2-255, where <u>30</u> is default (300 ms) Note that <T2> must be longer than <T1>. <T3> wake up response timer in seconds 1-255, where <u>10</u> is default; currently not supported, in case of read command 0 is returned. <k> window size, for Advanced operation with Error Recovery options 1-7, where <u>2</u> is default; currently not supported, in case of read command 0 is returned.

HL6528x		HL85xxx	
<u>Reference</u> [27.007] § 5.7	<u>Notes</u> - Multiplexing protocol is described in 3 GPP TS 27 010 - For Maximum Frame Size (N1), it defines the maximum number of octets that that may be contained in information field. It does not include octets added for transparency purposes		<u>Notes</u> - This command enables the multiplexing protocol control channel as defined in GSM07.10. - The AT command sets parameters for the Control Channel. If parameters are left out the default values are used. If no autobauding is supported, a customer related interface speed is pre selected. The final response code OK or CME ERROR: <err> is returned using the old interface speed; the parameters become active only after sending OK. - The "+++" escape sequence is not supported in the DLC port in CMUX mode. Alternatively, DTR can be used to switch from data mode to command mode, or use another DLC port to send AT commands. - The module handles the frame data step by step in CMUX mode. If there are any wrong data in the frame, e.g., wrong CRC, nothing will be returned to the terminal, and the module will wait for a valid frame data. - If the AT+CFUN command is entered with <rst>=1, all open CMUX channels will be closed and the module will reset. - There is no activity timeout to return to AT mode after entering MUX mode. - MUX DLC ports are not persistent over power cycles. After a power cycle, DLC ports need to be re-established. - When an established MT call is hanged up from the caller side, NO CARRIER will only be sent to the port on which the call was established (i.e. the port on which ATD/ATA was sent).

3.16. #CLS Command: Service Class

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT#CLS=?	<u>Response</u> #CLS: (list of currently available <class>s) OK
<i>Read command</i>	
<u>Syntax</u> AT#CLS?	<u>Response</u> #CLS <class> OK
<i>Write command</i>	
<u>Syntax</u> AT#CLS=<class>	<u>Response</u> OK <u>Parameter</u> <class> <u>0</u> For Data mode 1 No effect
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Same behavior as +FCLASS command; needed for Microsoft agreement

3.17. *PSLOCUP Command: Location Update for Mobile Station

Note: For HL6528x only.

HL6528x	
<i>Write command</i>	
<u>Syntax</u> AT*PSLOCUP	<u>Response</u> OK
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command generates a location update of MS

3.18. *PSCSCN Command: Call State Change Notification

Note: For HL6528x only.

HL6528x		
<i>Read command</i>		
	<u>Syntax</u> AT*PSCSCN?	<u>Response</u> *PSCSCN: <mode> OK
<i>Write command</i>		
	<u>Syntax</u> AT*PSCSCN= <mode>	<u>Response</u> OK
	<u>Parameters</u> <Mode>	<u>0</u> 1 Disable presentation of the notification Enable presentation of the notification when the state of a call changes

HL6528x

<Call Id> integer type value representing the number of the call

0 when call Id not yet assigned

1-7 for speech calls

Greater than 8 for data calls

<State> State of the call

0 MO call SETUP (if no control by SIM)

1 MO call SETUP WITH CONTROL BY SIM (accepted)

2 MO call SETUP ERROR (control by SIM rejected or other problem)

3 MO call PROCEED

4 MO call ALERT (at distant)

5 MO call CONNECT (with distant)

6-9 RFU

10 MT call SETUP

11 MT call SETUP ACCEPTED (Bearer capabilities accepted by the ME)

12 MT call SETUP REJECTED (Bearer capabilities rejected by the ME)

13 MT call ALERT

14 MT call CONNECT (ME has successfully accepted the call)

15 MT call CONNECT ERROR (ME was not able to accept the call)

16-19 RFU

20 Call DISCONNECT BY NETWORK

21 Call DISCONNECT BY USER

22 Call REJECT BY USER

Note: This command uses information available at APPI interface (application i/f). AT parser does not interface directly with protocol stack so it does not have immediate access to L3 messages, this means that <state> does not match L3 messages exactly (as they are defined in 24.008 recommendations).

<Status> integer representing the status of the call once connected (applicable only for speech calls, either MO or MT)

0 ACTIVE

1 HELD (applicable only for speech calls, either MO or MT)

2 MULTIPARTY ACTIVE (applicable only for speech calls, either MO or MT)

3 MULTIPARTY HELD (applicable only for speech calls, either MO or MT)

HL6528x	
	<Number> string type phone number of format specified by <type> (same as CLIP or COLP) <Type> type of address octet in integer format (same as CLIP or COLP) <Line Id> Indication of the line 1 Line 1 2 Aux. Line <CauseSelect> integer value representing the Cause Select. See [23.19] for possible values (used in error case or network disconnection) <Cause> integer value representing the Cause. See [23.19] for possible values (used in error case or network disconnection) <Bearer> String (hexadecimal character format) representing bearer capability (for data calls only)
<u>Examples</u>	MO speech alerting at distant and initiated on line 1 *PSCSC: 1, 4, 1,, 1, , , MO speech call connected to "11111111" and active on line 1 *PSCSC: 1, 5, 1, "11111111", 129, 1, , , MT data call connected to "123456" and active on line 1, BC list=A28881211563A6 *PSCSC: 8, 14, 1, "123456", 129, 1, , , "A28881211563A6"
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Command allows presentation of information about CS call states • This command does not replace +CLCC command. TE is notified whenever a call state changes, this avoids TE to use polling mechanism with +CLCC command to know the states of each call • Set command enable (or disable) the presentation of *PSCSC: <Call Id>, <State>, <Status>, [<Number>], [<type>], [<Line Id>], [<CauseSelect>], [<Cause>], [<Bearer>] every time the states of a call change. The optional fields of the URC are filled only when information is available (i.e. depending on the state of the call), otherwise they are left empty

3.19. *PSFSNT Command: Field Strength Notification with Threshold

Note: For HL6528x only.

HL6528x	
<i>Read command</i> <u>Syntax</u> AT*PSFSNT?	<u>Response</u> *PSSNT: <mode> OK
<i>Write command</i> <u>Syntax</u> AT*PSFSNT= <mode>	<u>Response</u> OK <u>Parameters</u> <mode> 0 Disable presentation of the notification 1 Enable presentation of the notification <Field strength> 0 less than -110 dBm 1 -109 dBm ...intermediate values... 62 -48dBm 63 greater than -48 dBm 255 field strength is unavailable
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Be careful: these are not the same values as +CSQ • This command allows presentation of field strength notification • Set command enable (or disable) the presentation of *PSFS : <Field strength> each time field strength increase or decrease of 5 dBm

3.20. *PSSSURC Command: Enable Additional Result Code

Note: For HL6528x only.

HL6528x							
<i>Test command</i>							
<u>Syntax</u> AT*PSSSURC=?	<u>Response</u> *PSSSURC: (list of supported <mode> s) OK						
<i>Read command</i>							
<u>Syntax</u> AT*PSSSURC?	<u>Response</u> *PSSSURC: <mode> OK						
<i>Write command</i>							
<u>Syntax</u> AT*PSSSURC= <mode>	<u>Response</u> OK <u>Parameter</u> <table><tr><td><mode></td><td><u>0</u></td><td>Disable sending of additional result code</td></tr><tr><td></td><td><u>1</u></td><td>Enable sending of additional result code</td></tr></table>	<mode>	<u>0</u>	Disable sending of additional result code		<u>1</u>	Enable sending of additional result code
<mode>	<u>0</u>	Disable sending of additional result code					
	<u>1</u>	Enable sending of additional result code					
<u>Reference</u> [27.007] § 6.1	<u>Notes</u> The aim of this AT command is to configure the AT interface to give additional information through result code to TE when D command is entered with an SS string as parameter. When <mode> parameter is enabled, *PSSSURC (resp. *PSSERR) result code is sent to TE before OK (resp. ERROR) result code						

3.21. *PSALS Command: Alternate Line Service

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSALS=?	<u>Response</u> *PSALS: (list of supported <line Id>s) OK
<i>Read command</i> <u>Syntax</u> AT*PSALS?	<u>Response</u> *PSALS: <current Lineld> OK
<i>Write command</i> <u>Syntax</u> AT*PSALS= <Lineld>	<u>Response</u> OK <u>Parameter</u> <Lineld> <u>1</u> Line 1 2 Line 2 (auxiliary line if ALS supported)
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command allows control on alternate line service - For MT (speech) calls, +CRING urc (see +CRC command) indicates on which line call is received: +CRING: VOICE -> default case=line 1, +CRING: VOICE_AUX -> line 2

3.22. *PSDCIN Command: Diverted Call Indicator Notification

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSDCIN=?	<u>Response</u> *PSDCIN: (list of supported <modes>s),(list of supported <line>s) OK
<i>Read command</i> <u>Syntax</u> AT*PSDCIN?	<u>Response</u> *PSDCIN: <mode> OK
<i>Write command</i> <u>Syntax</u> AT*PSDCIN= <mode> [, <LineId>]	<u>Response</u> [*PSDCIN: <Line Id> , <status> [[...] <CR> <LF> *PSDCIN: <Line Id> , <status>]] OK <u>Parameters</u> <mode> Parameter set/shows the*PSDCI result code presentation status in the ME 0 CFU notification presentation disabled 1 CFU notification presentation enabled 2 Query CFU status <Line Id> 0 All lines. Only present in Response 1 Line 1 2 Aux. line 3 Data

HL6528x	
	<status> 0 Not active 1 Active
<u>Reference</u> [27.007] § 6.1	<u>Notes</u> • This command allows presentation of diverted call indicator • Set command enables/disables the presentation of notification result code from ME to TE. If <mode> =2 status of <Line Id> is requested. If <Line Id> is not provided , query is requested for all lines • When <mode> =1,*PSDCI : <Line Id> , <status> Diverted Call Indication result code is sent to TE on reception of network notification. (Several result code can be sent at the same time on reception of the notification) • When <mode>= 0,1, no Line ID value is expected for Set command.

3.23. *PSMBNB Command: Mailbox Numbers

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSMBNB=?	<u>Response</u> *PSMBNB: (list of supported <Line Id>s),(List of supported <type>s), [<nlength>],[<tlength>] OK
<i>Read command</i> <u>Syntax</u> AT*PSMBNB?	<u>Response</u> [*PSMBNB: <Line Id> , <number> , <type> , <text> [[...] <CR> <LF> *PSMBNB: <Line Id> , <number> , <type> , <text>]] OK

HL6528x	
<i>Write command</i> <u>Syntax</u> AT*PSMBNB= <Line Id> [, <number> , <type>[, <text>]]	<u>Response</u> OK <u>Parameters</u> <Line Id> 1 Line 1 2 Aux. line 3 Data <number> String type phone number of format <type> <type> Type of address octet in integer format (refer GSM 04.08 [8] sub clause 10.5.4.7) ; default 145 when dialing string includes international access code character "+", otherwise 129 <text> String type field of maximum length <tlength>; character set as specified by command Select TE Character Set +CSCS <nlength> Integer type value indicating the maximum length of field <number> <tlength> Integer type value indicating the maximum length of field <text>
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • The number to the voice mail server is set with this command. If setting fails, a ME error, +CME ERROR: <err> is returned. If only <Line Id> is present in command corresponding record is deleted in SIM. • The purpose of this command is not to replace +CSVM command but to offer more possibilities for Mailbox numbers settings (+CSVM command allows only voice mailbox settings).

3.24. *PSCSP Command: Customer Service Profile

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSCSP=?	<u>Response</u> *PSCSP: (list of supported <Service Groupe code>s) OK
<i>Read command</i> <u>Syntax</u> AT*PSCSP?	<u>Response</u> [*PSCSP: <Service Groupe code>, <status> [...] <CR><LF> *PSCSP: <Service Groupe code>, <status>]] OK
<i>Write command</i> <u>Syntax</u> AT*PSCSP	<u>Response</u> OK <u>Parameters</u> <Service Groupe code> string representing the hexadecimal value of the Service Group Code <status> string representing a record of the CSP sim file (8 bit bitfield)
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command is reserved for future use - Set command has no effect. For example: *PSCSP: "02", "11000000" ... *PSCSP: "C0", "11000110" OK

3.25. *PSSEAV Command: Service Availability

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSSEAV=?	<u>Response</u> *PSSEAV: (list of supported <mode>s),(list of supported <service>s) OK
<i>Read command</i> <u>Syntax</u> AT*PSSEAV?	<u>Response</u> *PSSEAV: <mode> OK
<i>Write command</i> <u>Syntax</u> AT*PSSEAV=<mode>	<u>Response</u> OK <u>Parameters</u> <mode> Parameter set/shows the *PSREADY result code presentation status in the ME parameter 0 Disabled 1 Enabled <service> 0 Phone book service availability 1 SMS service availability 2 SMS-CB service availability
<u>Reference</u> [27.007] § 6.1	<u>Notes</u> Set command enables/disables the presentation of notification result code from ME to TE. When <mode> =1,*PSREADY: <service> result code is sent to TE when <service> is available.

3.26. *PSCHRU Command: Channel Registration URC

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSCHRU=?	<u>Response</u> *PSCHRU: (list of supported <mask>s) OK
<i>Read command</i> <u>Syntax</u> AT*PSCHRU?	<u>Response</u> *PSCHRU: <mask> OK
<i>Write command</i> <u>Syntax</u> AT*PSCHRU= <mask>	<u>Response</u> OK <u>Parameter</u> <mask> Mask used to filter URCs 0 No URC will be displayed on the channel 1 CALL related URC 2 SMS related URC 4 CBM related URC 8 CIEV related URC 16 NET_REG related URC 32 SS related URC 64 INIT related URC 128 DBG related URC 256 STK related URC

HL6528xReference

Sierra Wireless
Proprietary

Notes

- This command is used to filter one or several URC on a channel. By default all URC are enabled on a newly opened channel
- This command only applies on the channel which is submitted, other channels are not impacted
- Example: To enable the display of URC SMS (2) and CALL(1) and to forbid the display of the others on a channel, choose 2 and 1 parameter, i.e. AT*PSCHRU=3
- The table below lists each mask and the URCs they are associated with:

Mask	URC list
1	RING, CRING, +CCM, +CCWV, +CCWA, +CLIP, +COLP, +CSSI, +CSSU, *PSCALL, *PSDCI
2	+CDS, +CMT, +CMTI, *PSMWI
4	+CBM
8	+CIEV
16	+CREG, +CGREG
32	+CUSD
64	*PSREADY
128	*PSDBG
256	*PSSTK

3.27. *PSCSSC Command: Call Successful Setup Control

Note: For HL6528x only.

HL6528xRead commandSyntax

AT*PSCSSC?

Response

*PSCSSC: <mode>

OK

HL6528x					
<i>Write command</i> <u>Syntax</u> AT*PSCSSC= <mode>	<u>Response</u> OK <u>Parameters</u> <mode> <table> <tr> <td>0</td><td>OK is returned after call is connected to the called party (successful call setup)</td></tr> <tr> <td>1</td><td>Default mode, OK is returned when call setup is started .The user is not informed of call successful setup. If the calls fails, NO_ANSWER or NO_CARRIER will be sent after the OK</td></tr> </table>	0	OK is returned after call is connected to the called party (successful call setup)	1	Default mode, OK is returned when call setup is started .The user is not informed of call successful setup. If the calls fails, NO_ANSWER or NO_CARRIER will be sent after the OK
0	OK is returned after call is connected to the called party (successful call setup)				
1	Default mode, OK is returned when call setup is started .The user is not informed of call successful setup. If the calls fails, NO_ANSWER or NO_CARRIER will be sent after the OK				
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This command controls the emission of the result code for MO speech successful setup • If "Connected line identification presentation" supplementary service is activated (refer to +COLP), result code for ATD command will be sent to TE when call is connected to the called party (successful call setup) • If "Connected line identification presentation" supplementary service is NOT activated (refer to +COLP), result code for ATD can be sent as soon as call setup is started or after call is connected to the called party (after (successful call setup) • Set command allows selection of <mode> for MO speech call result code • If user set <mode> =1 when +COLP is also activated, ERROR will be returned. Mode will remains to 0 • Read command returns current <mode>				

3.28. *PSSMPH Command: SIM Phase

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSSMPH=?	<u>Response</u> *PSSMPH: (list of supported <phase>s)

HL6528x												
<i>Read command</i>	Get supported SIM phase											
	<u>Syntax</u>	<u>Response</u>										
	AT*PSSMPH?	*PSSMPH: <phase>										
		<u>Parameter</u>										
	<phase>	<table><tr><td>0</td><td>Unknown</td></tr><tr><td>1</td><td>Phase 1</td></tr><tr><td>2</td><td>Phase 2</td></tr><tr><td>3</td><td>Phase 2+</td></tr><tr><td>4</td><td>Phase 3G</td></tr></table>	0	Unknown	1	Phase 1	2	Phase 2	3	Phase 2+	4	Phase 3G
0	Unknown											
1	Phase 1											
2	Phase 2											
3	Phase 2+											
4	Phase 3G											
<u>Reference</u>	<u>Notes</u>											
Sierra Wireless Proprietary	This commands is used to get current (U)SIM phase.											

3.29. *PSCIPH Command: Cipherring Notification

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT*PSCIPH=?	<u>Response</u> *PSCIPH: (list of supported <mode>s), (list of supported <Cipherring status>s)

HL6528x													
<i>Read command</i>	Get current state												
<u>Syntax</u> AT*PSCIPH?	<u>Response</u> *PSCIPH: <mode>, <Ciphering status> <u>Parameters</u> <table><tr><td><mode></td><td><u>0</u></td><td>Disable ciphering notification</td></tr><tr><td></td><td>1</td><td>Enable ciphering notification</td></tr></table> <table><tr><td><Ciphering status></td><td>0</td><td>Ciphering is OFF</td></tr><tr><td></td><td>1</td><td>Ciphering is ON</td></tr></table> <u>Example</u> *PSCP: 1	<mode>	<u>0</u>	Disable ciphering notification		1	Enable ciphering notification	<Ciphering status>	0	Ciphering is OFF		1	Ciphering is ON
<mode>	<u>0</u>	Disable ciphering notification											
	1	Enable ciphering notification											
<Ciphering status>	0	Ciphering is OFF											
	1	Ciphering is ON											
<i>Write command</i>	Set mode												
<u>Syntax</u> AT*PSCIPH= <mode>	<u>Response</u> OK												
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Set command is used to enable or disable presentation of ciphering status notification (*PSCP). Notification is sent each time ciphering status changes.												

3.30. +KCIPHER Command: Set Ciphering and Integrity

Note: For HL85xxx only.

HL85xxx							
<i>Test command</i>							
<u>Syntax</u> AT+KCIPHER=?	<u>Response</u> +KCIPHER: (list of supported <mode> s) OK						
<i>Read command</i>	Get current mode						
<u>Syntax</u> AT+KCIPHER?	<u>Response</u> +KCIPHER: <mode> OK						
<i>Write command</i>	Set integrity and cipher check						
<u>Syntax</u> AT+KCIPHER= <mode>	<u>Response</u> OK <u>Parameter</u> <table><tr><td><mode></td><td>0</td><td>Disable 3G integrity and ciphering</td></tr><tr><td></td><td><u>1</u></td><td>Enable 3G integrity and ciphering</td></tr></table>	<mode>	0	Disable 3G integrity and ciphering		<u>1</u>	Enable 3G integrity and ciphering
<mode>	0	Disable 3G integrity and ciphering					
	<u>1</u>	Enable 3G integrity and ciphering					
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This command works with a SIM card inserted in the modem • The setting will be reset after the module is restarted						

HL85xxx	
<u>Examples</u>	AT+KCIPHER=? +KCIPHER: (0-1) OK <insert the SIM card> <ensure that the CMW is switched off; <i>Network -> Security Settings -> Authentication and Security options</i>> AT+CMEE=1 OK AT+KCIPHER? +KCIPHER: 1 OK AT+KCIPHER=0 OK AT+KCIPHER? +KCIPHER: 0 OK

3.31. +KODIS Command: Access ODIS Information

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KODIS=?	<u>Response</u> OK

HL85xxx	
Read command	
<u>Syntax</u> AT+KODIS?	<u>Response</u> +KODIS: <index>,"<hostMan>","<hostMod>","<hostSwv>","<hostPlasmaID>","<hostIMEISV>" OK
Write command	
<u>Syntax</u> AT+KODIS= <index>, <hostMan>, <hostMod>, <hostSwv>, <hostPlasmaID>, <hostIMEISV>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <index> Index number of the following parameters <hostMan> Host manufacturer of ODIS node <hostMod> Host model of ODIS node <hostSwv> Host software version of ODIS node <hostPlasmaID> Host plasma ID of ODIS node <hostIMEISV> Host IMEI software version
<u>Reference</u> Sierra Wireless proprietary	<u>Notes</u> • This AT command is used for modifying host device details required by specific ODIS test cases. • The maximum number of characters for the parameters above is 31 (2 for <hostIMEISV>). Characters beyond the maximum number will be ignored.

HL85xxx	
<u>Examples</u>	<pre>at+kodis? +KODIS: 1,"HostMan","HostMod","HostSwV","HostPlasmaID","" OK at+kodis=1,"HostMan","HostMode","01.00","HostPlasmaID","01" OK at+kodis? +KODIS: 1,"HostMan","HostMode","01.00","HostPlasmaID","01" OK</pre>

3.32. +WIMEI Command: IMEI Write and Read

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+WIMEI=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+WIMEI?	<u>Response</u> +WIMEI: <IMEI> OK

HL85xxx	
Write command	
<u>Syntax</u> AT+WIMEI= <IMEI>	<u>Response</u> +WIMEI: <IMEI> OK <u>Parameter</u> <IMEI> 14 or 15 digit IMEI as defined in GSM 23.003
<u>Notes</u>	• The default IMEI is 012345678901237. • The write command can only be used once for IMEI programming. • The IMEI to be written must be different from the default IMEI. • If a 14-digit IMEI is entered, the 15th checksum digit is automatically calculated. • NV backup of static calibrated NV partition which stores the IMEI is automatically updated after successful execution of the write command (i.e. backup is updated when OK is returned). • Customers take on the responsibility of adhering to 3GPP TS 22.016, Section 2 – General requirements when using this command. This includes ensuring that each IMEI is within the allocated range and is unique to the ME in which it resides, as well as ensuring that detailed records of produced and delivered MEs are kept.
<u>Examples</u>	<pre>// Default IMEI at+wimei? +WIMEI: 012345678901237 OK // Enter 15 digits IMEI at+wimei=354610060035829 OK at+wimei? +WIMEI: 354610060035829 OK // Enter 14 digits IMEI at+wimei=35461006003582 OK</pre>

HL85xxx	
	at+wimei? +WIMEI: 354610060035829 OK

3.33. +WCARRIER Command: Show Carrier Name

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+WCARRIER =?	<u>Response</u> OK
<i>Action command</i>	
<u>Syntax</u> AT+WCARRIER	<u>Response</u> +WCARRIER: <Carrier Name> OK <u>Parameters</u> <Carrier Name> Carrier name; maximum of 8 characters string
<u>Notes</u>	The carrier name is written in non-volatile memory during the factory customization process.
<u>Example</u>	at+wcarrier +WCARRIER: Telstra OK

3.34. +KGEA Command: Select Encryption Algorithm

Note: For HL854xx only.

HL854xx							
Test command							
<u>Syntax</u> AT+KGEA=?	<u>Response</u> +KGEA: 0,(0-7) +KGEA: 1,(0-7) OK						
Read command							
<u>Syntax</u> AT+KGEA?	<u>Response</u> +KGEA: <bearer>,<algorithm> +KGEA: <bearer>,<algorithm> OK						
Execute command							
<u>Syntax</u> AT+KGEA= <bearer>, <algorithm>	<u>Response</u> OK or ERROR or +CME ERROR: 3 <u>Parameters</u> <table><tr><td><bearer></td><td>0</td><td>Circuit-switched</td></tr><tr><td></td><td>1</td><td>Packet-switched</td></tr></table>	<bearer>	0	Circuit-switched		1	Packet-switched
<bearer>	0	Circuit-switched					
	1	Packet-switched					

HL854xx	
	<algorithm> For circuit-switched: 0 Deactivate A5/1, A5/2 and A5/3 1 Activate A5/1 2 Activate A5/2 3 Activate A5/1 and A5/2 4 Activate A5/3 5 Activate A5/1 and A5/3 6 Activate A5/2 and A5/3 7 Activate A5/1, A5/2 and A5/3 For packet-switched: 0 Deactivate GEA1, GEA2 and GEA3 1 Activate GEA1 2 Activate GEA2 3 Activate GEA1 and GEA2 4 Activate GEA3 5 Activate GEA1 and GEA3 6 Activate GEA2 and GEA3 7 Activate GEA1, GEA2 and GEA3
<u>Notes</u>	• Multiple Encryption Algorithms can be enabled by executing this command for different values. • &F and &W have no effect on this command.
<u>Examples</u>	AT+KGEA=? +KGEA: 0,(0-7) +KGEA: 1,(0-7) OK AT+KGEA? +KGEA: 0,5 +KGEA: 1,3 OK

HL854xx	
	AT+KGEA=0,4 OK
	AT+KGEA=1,3 OK

>> 4. Call Control Commands

4.1. A Command: Answer a Call

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> ATA	<u>Response</u> CONNECT[<text>] Data Connection established OK Voice Connection established or if cancellation of the command ERROR Response if no connection
<u>Reference</u>	V.25Ter

4.2. H Command: Disconnect Existing Connection

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> ATH[<type>]	<u>Response:</u> OK <u>Parameters</u> <type> Type of call affected by ATH request. Voice call disconnection is also dependent of +CVHU settings 0 Same behavior as without parameter. Disconnect ALL calls on the channel the command is requested. All active or waiting calls, CS data calls, GPRS call of the channel will be disconnected 1 Disconnect all calls on ALL connected channels. All active or waiting calls, CSD calls, GPRS call will be disconnected (cleanup of all calls of the ME). 2 Disconnect all connected CS data call only on the channel the command is requested (speech calls (active or waiting) or GPRS calls are not disconnected). 3 Disconnect all connected GPRS calls only on the channel the command is requested (speech calls (active or waiting) or CS data calls are not disconnected). 4 Disconnect all CS calls (either speech or data) but does not disconnect waiting call (either speech or data) on the channel the command is requested. 5 Disconnect waiting call (either speech or data) but does not disconnect other active calls (CS speech, CS data or GPRS) on the channel the command is requested (rejection of incoming call).
<u>Reference</u> V.25Ter	<u>Notes</u> • See 23.15 ATH Command Behavior • See also AT+CHLD

4.3. D Command: Mobile Originated Call to Dial a Number

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> ATD=?	<u>Response</u> 1 2 3 4 5 6 7 8 9 0 * # + A B C D T OK	<u>Syntax</u> ATD=?	<u>Response</u> 1 2 3 4 5 6 7 8 9 0 * # + A B C D P T W , @ ! OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> ATD?	<u>Response</u> 1 2 3 4 5 6 7 8 9 0 * # + A B C D T OK	<u>Syntax</u> ATD?	<u>Response</u> 1 2 3 4 5 6 7 8 9 0 * # + A B C D P T W , @ ! OK
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> ATD[<n>][:]	<u>Response</u> NO DIALTONE BUSY NO CARRIER The connection cannot be established NO ANSWER CONNECT[<text>] Data connection successfully connected OK If successfully connected and voice call <u>Parameters</u> <n> String of dialing digits and optionally V.25ter modifiers (dialing digits): 0-9, *, #, +, A, B, C (maximum length: 20 digits) <;> Only required to set up voice calls. TA remains in command mode	<u>Syntax</u> ATD[<n>][:]	<u>Response</u> NO DIALTONE BUSY NO CARRIER The connection cannot be established NO ANSWER CONNECT[<text>] Data connection successfully connected OK If successfully connected and voice call <u>Parameters</u> <n> String of dialing digits and optionally V.25ter modifiers (dialing digits): 0-9, *, #, +, A, B, C, D, P, T, W, ,, @, ! (maximum length: 20 digits) <;> Only required to set up voice calls. TA remains in command mode

HL6528x		HL85xxx	
<u>Reference</u> V.25Ter	<u>Notes</u> - The command may be aborted generally when receiving an ATH command during execution - Same behavior for ATDT, ATPD, ATRD, ATTD - OK answer may arrive just after the ATD command or after the call is actually active (see AT+COLP)	<u>Reference</u> V.25Ter	<u>Notes</u> - The command may be aborted generally when receiving an ATH command during execution - Same behavior for ATDT, ATPD, ATRD, ATTD - OK answer may arrive just after the ATD command or after the call is actually active (see AT+COLP) <n> = ",", "T", "I", "W" or "@" are ignored - When an established MT call is hanged up from the caller side, NO CARRIER will only be sent to the port on which the call was established (i.e. the port on which ATD/ATA was sent).

4.4. D>: Direct Dialing from Phonebook

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> ATD><str>[:] ATD>[<mem>] <n>[:]	<u>Response</u> See ATD <u>Parameters</u> <str> alphanumeric field (if possible all available memories should be searched for correct entry) <mem> memory storage ("ME", "SM", etc.) <n> entry location
<u>Reference</u> [27.007] § 6.2	<u>Notes</u> - For memory storage locations, see AT+CPBS - This command is regarded as an option of ATD in the HL85xxx; it will not be displayed in the list of commands returned by +CLAC.

4.5. +CHUP Command: Hang up Call

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> AT+CHUP	<u>Response</u> OK
<i>Test command</i>	
<u>Syntax</u> AT+CHUP=?	<u>Response</u> OK
<u>Reference</u> [27.007] § 6.5	<u>Notes</u> This command hangs up waiting/active MT calls and MO calls.

4.6. +CRC Command: Set Cellular Result Codes for Incoming Call Indication

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CRC=?	<u>Response</u> +CRC: (list of supported <mode>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CRC?	<u>Response</u> +CRC:<mode> OK

HL6528x and HL85xxx							
<i>Write command</i>							
<u>Syntax</u> AT+CRC= [<mode>]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><mode></td><td><u>0</u></td><td>Disable extended format</td></tr><tr><td></td><td>1</td><td>Enable extended format</td></tr></table>	<mode>	<u>0</u>	Disable extended format		1	Enable extended format
<mode>	<u>0</u>	Disable extended format					
	1	Enable extended format					
<u>Reference</u> [27.007] § 6.11	<u>Notes</u> When enabled, an incoming call is indicated with +CRING: <type>. For the list of available <type> s, refer to document [27.007] 3GPP 27.007 (6.0.0) – AT command set for User Equipment (UE) (Release 6).						

4.7. +CSTA Command: Select Type of Address

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CSTA=?	<u>Response</u> +CSTA: (list of supported <type> s) OK
<i>Read command</i> <u>Syntax</u> AT+CSTA?	<u>Response</u> +CSTA: <type> OK

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+CSTA= [<type>]	<u>Response</u> OK <u>Parameter</u> <type> <u>129</u> National type of address <u>145</u> International type of address: Dialing string includes international access code character "+"
<u>Reference</u>	[27.007] § 6.1

4.8. +CMOD Command: Call Mode

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CMOD=?	<u>Response</u> +CMOD: (list of supported <mode>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CMOD?	<u>Response</u> +CMOD: <mode> OK

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+CMOD= [<mode>]	<u>Response</u> OK <u>Parameter</u> <mode> <u>0</u> Single mode
<u>Reference</u> [27.007] § 6.4	<u>Notes</u> - Only single mode is supported in the HL6528x - In [27.007] document, <mode> can be either single or alternating (more than one basic service (voice, data) within one call)

4.9. +CEER Command: Extended Error Report

HL6528x		HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CEER=?	<u>Response</u> OK	<i>Test command</i> <u>Syntax</u> AT+CEER=?	<u>Response</u> OK
<i>Execute command</i> <u>Syntax</u> AT+CEER	<u>Response</u> +CEER: <report> OK <u>Parameter</u> <report> String "Cause Select: <cause_select> Cause: <cause>	<i>Execute command</i> <u>Syntax</u> AT+CEER	<u>Response</u> +CEER: <category>[,<cause>,<descriptions>] <u>Parameters</u> <category> "No report available" "CC setup error" "CC modification error" "CC release" "SM attach error"

HL6528x		HL85xxx	
	<cause_select> 0: No cause 16: Service provider 65: Local cause	<cause> 0: No cause 0: Unknown 1: Not Allowed 2: No cause 6: Wrong parameter 9: Network access not allowed 20: all call instances are used 21: ACM over ACM Max 22: invalid AOC element 23: SIM increase not allowed 24: switch off 25: Unknown call id 28: barred 1: state error 2: no call entity 3: wrong TI 6: DTMF buffer overflow 7: call disconnected 17: No cell available 32: Local rejection 33: PLMN not allowed 34: emergency call not possible 35: authentication rejected 36: network rejection 37: LA not allowed 38: Local timeout 39: server congestion 40: local data rejection	"SM detach" "SM activation error" "SM deactivation" "SS network error cause" "SS network reject cause" "SS network GSM cause" <cause> Contains a digit representing the error cause sent by network or internally. Refer to 23.2.7 CEER Error Codes for more information. <descriptions> Verbose string containing the textual representation of <cause>. Refer to 23.2.7 CEER Error Codes for more information.

HL6528x		HL85xxx	
	48: failed replace PDP context 66: MM network cause See [04.08] 67: CC network cause See [04.08] 69: RP cause See [04.08] 71: SIM cause 0: Unknown problem 1: Memory problem 2: File Id not found 6: Increase problem 7: Technical problem 11: Command not allowed 15: SIM card out 73: SM cause See [04.08]		
<u>Reference</u> [27.007] § 6.10	<u>Notes</u> - No GPRS error causes are display - See Data impacted by &F for default value		

4.10. +CVHU Command: Voice Hang Up Control

HL6528x and HL85xxx	
<u>Test command</u> <u>Syntax</u> AT+CVHU=?	<u>Response</u> +CVHU: (list of supported <mode>s) OK

HL6528x and HL85xxx	
<i>Read command</i>	
<u>Syntax</u> AT+CVHU?	<u>Response</u> +CVHU: <mode> OK
<i>Write command</i>	
<u>Syntax</u> AT+CVHU= [<mode>]	<u>Response</u> OK <u>Parameter</u> <mode> <u>0</u> "Drop DTR" ignored but OK response given. ATH disconnects <u>1</u> "Drop DTR" and ATH ignored but OK response given <u>2</u> "Drop DTR" behavior according to &D setting. ATH disconnects
<u>Reference</u> [27.007] § 6.20	<u>Notes</u> If DTR signal is inactive (if DTR is not a pulse), then "Drop DTR" does not respond "OK"

4.11. +KFILTER Command: Create a Filter for Incoming Calls

Note: For HL6528x only.

HL6528x	
<i>Read command</i>	
<u>Syntax</u> AT+KFILTER?	<u>Response</u> +KFILTER: <num1> [,<num2> [,<num3> [,<num4> [,<num5>]]]] OK

HL6528x	
<i>Write command</i> <u>Syntax</u> AT+KFILTER= <num> [,<num2> [,<num3> [,<num4> [,<num5>]]]]	<u>Response</u> OK <u>Parameter</u> <num> string type phone number. A filter will be created with this phone number and all the others ones will be rejected
<u>Example</u>	AT+KFILTER="89" -> set 1 filter number AT+KFILTER="234","5345","87655789" -> set 3 filter numbers AT+KFILTER="11","3233","739","8447","65532" -> set 5 filter numbers AT+KFILTER="" -> disable the filter (all filter numbers will be deleted) AT+KFILTER? -> read the filter numbers
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • To disable the filter, <num> has to be an empty string. • CLIP has to be supported by the network. • This filter tries to match the clip beginning by the last digit of the phone number. • If the module reboots <num 1>, <num 2>,<num 3>,<num 4>,<num 5> are saved. • After a software upgrade, <num2>, <num3>, <num4>, <num5> are erased, and <num1> will be erased or restored depending on the parameter file. • If flash memory is full, <num2>, <num3>, <num4>, <num5> can't be saved.

4.12. +CSNS Command: Single Numbering Scheme

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CSNS=?	<u>Response</u> +CSNS: (list of supported <mode>) OK

HL6528x and HL85xxx	
<i>Read command</i>	
<u>Syntax</u> AT+CSNS?	<u>Response</u> +CSNS:<mode> OK
<i>Write command</i>	
<u>Syntax</u> AT+CSNS= [<mode>]	<u>Response</u> OK <u>Parameter</u> <mode> <u>0</u> Voice <u>4</u> Data
<u>Reference</u> [27.007] § 6.19	<u>Notes</u> See also AT+CBST

4.13. +KATH Command: Select ATH Mode

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KATH=?	<u>Response</u> +KATH: (list of supported <num>) OK

HL6528x																			
<i>Read command</i>																			
<u>Syntax</u> AT+KATH?	<u>Response</u> +KATH:<num> OK																		
<i>Write command</i>																			
<u>Syntax</u> AT+KATH= <num>	<u>Response</u> OK <u>Parameter</u> <table><tr><td><num></td><td><u>0</u></td><td>Default (User Busy)</td></tr><tr><td></td><td>17</td><td>User Busy</td></tr><tr><td></td><td>18</td><td>No User Responding</td></tr><tr><td></td><td>19</td><td>No Answer</td></tr><tr><td></td><td>21</td><td>Call Rejected</td></tr><tr><td></td><td>27</td><td>Destination Out of order</td></tr></table>	<num>	<u>0</u>	Default (User Busy)		17	User Busy		18	No User Responding		19	No Answer		21	Call Rejected		27	Destination Out of order
<num>	<u>0</u>	Default (User Busy)																	
	17	User Busy																	
	18	No User Responding																	
	19	No Answer																	
	21	Call Rejected																	
	27	Destination Out of order																	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This command selects the disconnect type sent to the network on AT+ATH cmd • These values follow 24.008 3GPP specification (Table 10.5.123)																		

4.14. +XCALLSTAT Command: Set Reporting Call Status

Note: For HL85xxx only.

HL85xxx							
<i>Test command</i>							
<u>Syntax</u> AT+XCALLSTAT =?	<u>Response</u> +XCALLSTAT: (list of supported <enable>s) OK						
<i>Read command</i>							
<u>Syntax</u> AT+XCALLSTAT ?	<u>Response</u> +XCALLSTAT: <enable> OK						
<i>Write command</i>							
<u>Syntax</u> AT+XCALLSTAT =<enable>	<u>Response</u> OK or +CME ERROR: <error> <u>Parameter</u> <table><tr><td><enable></td><td><u>0</u></td><td>Reporting disabled</td></tr><tr><td></td><td>1</td><td>Reporting enabled</td></tr></table>	<enable>	<u>0</u>	Reporting disabled		1	Reporting enabled
<enable>	<u>0</u>	Reporting disabled					
	1	Reporting enabled					

HL85xxx	
Unsolicited Notification	<u>Reponse</u> +XCALLSTAT: <call_id><stat>
	<u>Parameters</u>
	<call_id> Indicates the call identification (GSM 02.30 4.5.5.1)
	<stat> Indicates the voice call status
	0 Active 1 Hold 2 Dialling (MO call) 3 Alerting (MO call; ringing for the remote party) 4 Ringing (MT call) 5 Waiting (MT call) 6 Disconnected 7 Connected (indicates the completion of a call setup first time for MT and MO calls – this is reported in addition to the active state)

>> 5. Mobile Equipment Control and Status Commands

5.1. +CACM Command: Accumulated Call Meter (ACM) Reset or Query

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CACM=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+CACM?	<u>Response</u> +CACM: <acm> (current acm value) OK
<i>Write command</i>	
<u>Syntax</u> AT+CACM= <password> (reset the value)	<u>Response</u> OK <u>Parameters</u> <password> SIM PIN2
<u>Reference</u> [27.007] §8.25	<u>Notes</u> This AT command needs SIM and network where AOC are allowed.

5.2. +CAMP Command: Accumulated Call Meter Maximum (ACM max)

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CAMP=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+CAMP?	<u>Response</u> +CAMP: <acmmax> OK
<i>Write command</i>	
<u>Syntax</u> AT+CAMP= [<acmmax> [,<passwd>]]	<u>Response</u> +CAMP: <acmmax> OK <u>Parameters</u> <acmmax> string type; three bytes of the max ACM value in hexadecimal format 0 disables ACMmax feature <passwd> SIM PIN2
<u>Reference</u> [27.007] § 8.26	<u>Notes</u> • This AT command needs SIM and network where AOC are allowed. • Additionally for the HL85xxx, if SIM PIN2 is already entered in a previous write command, <passwd> will be ignored (not compared with the correct PIN2). In this case, no error will be returned even if an incorrect SIM PIN2 is entered.

5.3. +CCWE Command: Call Meter Maximum Event

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CCWE=?	<u>Response</u> +CCWE: (list of supported <mode>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CCWE?	<u>Response</u> +CCWE: <mode> OK
<i>Write command</i>	
<u>Syntax</u> AT+CCWE= <mode>	<u>Response</u> OK <u>Parameter</u> <mode> <u>0</u> Disable the call meter warning event 1 Enable the call meter warning event
<u>Reference</u> [27.007] §8.28	<u>Notes</u> • When enabled, a notification (+CCWV) is sent shortly (approx. 30s) before the ACM max is reached. • This AT command needs SIM and network where AOC are allowed.

5.4. +CALA Command: Set Alarm

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CALA=?	<u>Response</u> +CALA: <time>,(list of supported <n>s),(list of supported <recurr>s) OK	<u>Syntax</u> AT+CALA=?	<u>Response</u> +CALA: <time>,(list of supported <n>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CALA?	<u>Response</u> [+CALA: <time>,<n1>,<recurr>]<CR><LF> [+CALA: <time>,<n2>,<recurr>]<CR><LF> OK	<u>Syntax</u> AT+CALA?	<u>Response</u> [+CALA: <time>,<n>] OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CALA= <time>[,<n> [,<recurr>]]	<u>Response</u> OK <u>Parameters</u> <time> internal clock (refer to +CCLK). String type with format "hh:mm:ss" is used if <recurr> is present; format "yy/mm/dd,hh:mm:ss" is used if not <n> 1 – 4 Alarm index <recurr> integer type value indicating day of week for the alarm in one of the following formats: <1..7>[,<1..7>[...]] Sets a recurrent alarm for one or more days in the week. The digits 1 to 7 corresponds to the days in the week Monday(1), ..., Sunday (7)	<u>Syntax</u> AT+CALA= <time>[,<n>]	<u>Response</u> OK +CALV:1 //when an alarm occurs <u>Parameters</u> <time> internal clock (refer to +CCLK). String type with format "yy/mm/dd,hh:mm:ss" is used <n> Alarm index

HL6528x		HL85xxx	
	0 Sets a recurrent alarm for all days in the week <u>Examples</u> AT+CALA="07/04/11,11:34:25" -> set a one shot alarm saved at index 1 for the specified date and time AT+CALA="07/04/11,11:34:00",3 -> set a one shot alarm saved at index 3 for the specified date and time AT+CALA="11:50:45",1,1,4 -> set a recurrent alarm saved at index 1 for every Monday and Thursday at 11:50:45		<u>Examples</u> AT+CCLK="14/05/13,12:00:00+0" Set the date and time OK AT+CALA=" 14/05/13,12:00:10" Set an alarm for the specified date and time OK +CALV: 1 When the alarm expires, an unsolicited result code is displayed AT+CALA=? +CALA: ("yy/mm/dd, hh:mm:ss"),(1) OK
<u>Reference</u> [27.007] §8.16	<u>Notes</u> - To set up a recurrent alarm for one or more days in the week, the <recurr>-parameter may be used - When an alarm is timed out and executed, the unsolicited result code +CALV: <n> is returned - When woken up by an alarm, the module is fully started. It is the responsibility of the host to turn it off and to set a new alarm if recurrent alarms are not used - After *PSCPOF or +CPOF command, +CALV: correctly received if autobaud speed is not selected	<u>Notes</u>	- When an alarm is timed out and executed, the unsolicited result code +CALV: 1 is returned. - Only one alarm can be set at a time; therefore, <n> must always be 1. - The alarm will wake the module up even if it is already in the off state. E.g., turned off by AT+CPOF. The module will then boot up normally, and no unsolicited result code "+CALV: 1" is returned. - This command can be used without SIM. - Year must be 2004 or later for the HL85xxx.

5.5. +CALD Command: Delete Alarm

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CALD=?	<u>Response</u> +CALD: (list of supported <n>s) OK	<u>Syntax</u> AT+CALD=?	<u>Response</u> +CALD: (list of supported <n>s) OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CALD=<n>	<u>Response</u> OK <u>Parameters</u> <n> Alarm index	<u>Syntax</u> AT+CALD=<n>	<u>Response</u> OK <u>Parameters</u> <n> Alarm index
<u>Reference</u> [27.007] §8.38	<u>Notes</u> Action command deletes an alarm in the MT	<u>Notes</u>	- Only one alarm can be set at a time; therefore, <n> must always be 1. - This command can be used without SIM.
		<u>Examples</u>	AT+CALD=1 OK AT+CALD=2 ERROR

5.6. +CCLK Command: Real Time Clock

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CCLK=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+CCLK?	<u>Response</u> +CCLK: <time> OK
<i>Write command</i>	
<u>Syntax</u> AT+CCLK= <time>	<u>Response</u> OK <u>Parameter</u> <time> string type value; format is "yy/MM/dd,hh:mm:ss+/-Timezone", where characters indicate year (last two digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -96...+96). E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"
<u>Reference</u> [27.007] § 8.15	<u>Notes</u> • NITZ information is taken into account when available • Year must be 2004 or later for the HL85xxx.

5.7. *PSCPOF Command: Power Off

Note: For HL6528x only.

HL6528x	
<i>Execute command</i>	
<u>Syntax</u> AT*PSCPOF	<u>Response</u> OK
<u>Notes</u>	This command allows switching off the mobile. Note that " OK " result code will appear immediately if the command is accepted and power off will occur after that. Unexpected random characters may also be issued during switch off of MS.

5.8. +CPOF Command: Power Off

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> AT+CPOF	<u>Response</u> OK
<u>Notes</u>	This command allows switching off the mobile. Note that " OK " result code will appear immediately if the command is accepted and power off will occur after that. Unexpected random characters may also be issued during switch off of MS.

5.9. +CIND Command: Indicator Control

HL6528x and HL85xxx	
Test command	
<u>Syntax</u> AT+CIND=?	<u>Response</u> +CIND: ("battchg",(0-5)),("signal",(0-5)),("service",(0-1)),("message",(0-1)),("call",(0-1)),("roam",(0-1)),("smsfull",(0-1)) OK
Read command	
<u>Syntax</u> AT+CIND?	<u>Response</u> +CIND: <battchg>,<signal>,<service>,<call>,<smsfull> OK <u>Parameters</u> <battchg> battery charge level (0-5) 0 low level 4 high level 5 means that the battery is charging (not supported) <signal> signal quality (0-5) 0 low level signal 5 high level signal <service> service availability (0-1) <message> Message received (0-1) <call> call in progress (0-1) <roam> Roaming indicator (0-1) 0 Home net 1 Roaming

HL6528x and HL85xxx	
	<smsfull> SMS memory storage (0-1) 0 Memory available 1 Memory full
<u>Reference</u> [27.007] § 8.9	<u>Notes</u> <smsfull> indication not available on all products

5.10. +CLAC Command: List Available AT Commands

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> AT+CLAC	<u>Response</u> List of all supported AT Commands +CLAC: <CR> <LF> <AT Command1><CR> <LF> <AT Command2><CR> <LF> [...] OK
<u>Reference</u> [27.007] § 8.37	<u>Notes</u> This command provides the AT Command list available for the user

5.11. +CMEC Command: Mobile Equipment Control Mode

HL6528x and HL85xxx											
<i>Test command</i>											
<u>Syntax</u> AT+CMEC=?	<u>Response</u> +CMEC: (list of supported <keyp>s),(list of supported <disp>s),(list of supported <ind>s) OK										
<i>Read command</i>											
<u>Syntax</u> AT+CMEC?	<u>Response</u> +CMEC: <keyp> , <disp> , <ind> OK										
<i>Write command</i>											
<u>Syntax</u> AT+CMEC= [<keyp>[,<disp> [,<ind>]]]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><keyp></td><td>0</td><td>Keypad management, not significant (no keypad)</td></tr><tr><td><disp></td><td>0</td><td>Display management, not significant (no display)</td></tr><tr><td><ind></td><td>0</td><td>Only ME can set the status of its indicators (command +CIND can only be used to read the indicators)</td></tr></table>		<keyp>	0	Keypad management, not significant (no keypad)	<disp>	0	Display management, not significant (no display)	<ind>	0	Only ME can set the status of its indicators (command +CIND can only be used to read the indicators)
<keyp>	0	Keypad management, not significant (no keypad)									
<disp>	0	Display management, not significant (no display)									
<ind>	0	Only ME can set the status of its indicators (command +CIND can only be used to read the indicators)									
<u>Reference</u> [27.007] § 8.6	<u>Notes</u> Set command selects the equipment, which operates ME keypad, writes to ME display and sets ME indicators										

5.12. +CFUN Command: Set Phone Functionality

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CFUN=?	<u>Response</u> +CFUN: (list of supported <fun>s), (list of supported <rst>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CFUN?	<u>Response</u> +CFUN: <fun> OK
<i>Write command</i>	
<u>Syntax</u> AT+CFUN=[<fun> [,<rst>]]	<u>Response</u> OK <u>Parameters</u> <fun> 1 Full functionality 2 Disable phone transmit RF circuits only (not supported) 3 Disable phone receive RF circuits only (not supported) 4 Disable phone both transmit and receive RF circuits <rst> 0 Set the ME to <fun> power level immediately 1 Reset the MT before setting it to <fun> power level

HL6528x and HL85xxx	
<u>Reference</u> [27.007] § 8.2	<u>Notes</u> - AT+CFUN=1,1 generates a blocking defense to reset the mobile. "OK" result code will appear after reset has been completed (AT+CFUN=1,1 has no effect on radio on/off, it leaves it as is was before reset) - HL6528x does not support AT+CFUN=4,1 - Additionally on the HL85xxx, if <rst>=1: - All open CMUX channels will be closed and the module will reset "OK" result code is returned before reset

5.13. +CMER Command: Mobile Equipment Event Reporting

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CMER=?	<u>Response</u> +CMER: (list of supported <mode>s),(list of supported <keyp>s),(list of supported <disp>s),(list of supported <ind>s),(list of supported <bfr>s) OK	<u>Syntax</u> AT+CMER=?	<u>Response</u> +CMER: (list of supported <mode>s),(list of supported <keyp>s),(list of supported <disp>s),(list of supported <ind>s),(list of supported <bfr>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CMER?	<u>Response</u> +CMER: <mode>,<keyp>,<disp>,<ind>,<bfr> OK	<u>Syntax</u> AT+CMER?	<u>Response</u> +CMER: <mode>,<keyp>,<disp>,<ind>,<bfr> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CMER= [<mode>,<keyp> [,<disp>,<ind> [,<bfr>]]]]	<u>Response</u> OK	<u>Syntax</u> AT+CMER= [<mode>,<keyp> [,<disp>,<ind> [,<bfr>]]]]	<u>Response</u> OK

HL6528x			HL85xxx		
	<u>Parameters</u>			<u>Parameters</u>	
	<mode>	0		0	Buffer unsolicited result codes in the TA; if TA result code buffer is full, codes can be buffered in some other place or the oldest ones can be discarded.
		1		1	Discard unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE
	<keyp>	0		2	Buffer unsolicited result codes in the TA when TA TE link is reserved (e.g. in on line data mode) and flush them to the TE after reservation; otherwise forward them directly to the TE
	<disp>	0			
	<ind>	0		<keyp>	0
		1			No keypad event reporting
				<disp>	0
					No display event reporting
		2		<ind>	0
					No indicator event reporting
				1	Indicator event reporting using result code +CIEV: <ind>,<value>. <ind> indicates the indicator order number (as specified for +CIND) and <value> is the new value of indicator. Only those indicator events, which are not caused by +CIND shall be indicated by the TA to the TE
	<bfr>	0			Indicator event reporting using result code +CIEV: <ind>,<value>. All indicator events shall be directed from TA to TE
				<bfr>	0
					TA buffer of unsolicited result codes defined within this command is cleared when <mode>=1 is entered
				1	TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode>=1 or 2 is entered (OK response shall be given before flushing the codes)

HL6528x		HL85xxx	
<u>Reference</u>	[27.007] § 8.10	<u>Reference</u> [27.007] § 8.10	<u>Notes</u> • This command can work with or without a SIM card. • +CIEV: 4,x indication of <message> is not supported • +CIEV: 7,x indication of <smsfull> is not supported
		<u>Examples</u>	at+cind=? +CIND: ("battchg",(0-5)),("signal",(0-5)),("service",(0-1)),("message",(0-1)),("call",(0-1)),("roam",(0-1)),("smsfull",(0-1)) OK ==> "call" refers to +CIEV index 5 ==> "roam" refers to +CIEV index 6 at+cmer=? +CMER: (1-2),0,0,(0-1),(0-1) OK at+cmer=2,,,1 OK # mode =2: enable indication if AT link is available # ind = 1: enable indicator event report (+CIEV) at+cmer? +CMER: 2,0,0,1,0 OK # +CMER setting can be preserved after boot at+cfun=1,1 OK

HL6528x		HL85xxx	
			<pre>at+cmer? +CMER: 2,0,0,1,0 OK # roaming status = 0 update on registration status change +CIEV: 6,0 +PBREADY # enable +CMER <mode> = 0 buffering at+cmer=0 OK at+cfun=4 OK at+cfun=1 OK # wait for registration, one +CIEV: 6 should be buffered at+creg? +CREG: 0,1 OK # buffered +CIEV is flushed with <bfr>=1 and <mode>=2 at+cmer=2,,,,1 OK +CIEV: 6,0 at+cmer=0 OK</pre>

HL6528x		HL85xxx	
			at+cfun=4 OK at+cfun=1 OK # wait for registration, one +CIEV: 6 should be buffered at+creg? +CREG: 0,1 OK # buffered +CIEV is cleared with <bfr>=1 and <mode>=2 at+cmer=2,,,0 OK

5.14. +CMEE Command: Report Mobile Termination Error

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CMEE=?	<u>Response</u> +CMEE: (list of supported <n>s) OK
<i>Read command</i> <u>Syntax</u> AT+CMEE?	<u>Response</u> +CMEE: <n> OK

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+CMEE=[<n>]	<u>Response</u> OK <u>Parameter</u> <n> 0 Disable +CME ERROR: <err> result code and use ERROR instead 1 +CME ERROR: <err> result code and use numeric <err> values 2 +CME ERROR: <err> result code and use verbose <err> values
<u>Reference</u> [27.007] § 9.1	<u>Notes</u> See data impacted by &F and &V for default value.

5.15. +CMUT Command: Mute Control

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CMUT=?	<u>Response</u> +CMUT: (list of supported <n>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CMUT?	<u>Response</u> +CMUT: <n> OK

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+CMUT=<n>	<u>Response</u> OK
	<u>Parameter</u> <n> <u>0</u> Mute off <u>1</u> Mute on
<u>Reference</u> [27.007] § 8.24	<u>Notes</u> This command can only be used during voice calls.

5.16. +CCID Command: Request SIM Card Identification

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CCID=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+CCID?	<u>Response</u> For HL6528x, HL8518, HL8528 and HL8529: +CCID: <ICCID> OK For HL854xx: +CCID: <ICCID>[,<EID>] OK

HL6528x and HL85xxx	
	or +CME ERROR: <err> or ERROR
<i>Write command</i> <u>Syntax</u> AT+CCID	<u>Response</u> +CCID: <ICCID> OK or +CME ERROR: <err> or ERROR // for HL854xx only <u>Parameters</u> <ICCID> Integrated Circuit Card ID of the SIM card <EID> eUICC-ID of the eUICC SIM card
<u>Notes</u>	• <ICCID> is read from the EF ICCID. If an eUICC is inserted, this value identifies the active profile. • <EID> parameter is only displayed if an eUICC is inserted.

5.17. +CPIN Command: Enter Pin

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CPIN=?	<u>Response</u> OK	<u>Syntax</u> AT+CPIN=?	<u>Response</u> OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CPIN?	<u>Response</u> +CPIN: <code> OK	<u>Syntax</u> AT+CPIN?	<u>Response</u> +CPIN: <code> OK or +CME ERROR: <err>
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CPIN=<pin> [,<newpin>]	<u>Response</u> OK <u>Parameters</u> <code> values reserved by this TS: READY ME is not pending for any password SIM PIN ME is waiting for SIM PIN to be given SIM PUK ME is waiting for SIM PUK to be given. A second pin, <newpin>, is used to replace the old pin in the SIM and should thus be supplied SIM PIN2 ME is waiting SIM PIN2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if	<u>Syntax</u> AT+CPIN=<pin> [,<newpin>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <code> Values when queried using the read command READY MT is not pending for any password SIM PIN MT is waiting for SIM PIN to be given SIM PUK MT is waiting for SIM PUK to be given. SIM PIN2 MT is waiting SIM PIN2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered

HL6528x		HL85xxx	
	PIN2 is not entered right after the failure, it is recommended that ME does not block its operation) SIM PUK2 ME is waiting SIM PUK2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that ME does not block its operation). Also, a second pin, <newpin>, is used to replace the old pin in the SIM and should thus be supplied PH-NET PIN ME is waiting personalization password to be given		right after the failure, it is recommended that MT does not block its operation) SIM PUK2 MT is waiting SIM PUK2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that ME does not block its operation). PH-NET PIN MT is waiting for the network personalization password to be given PH-NET PUK MT is waiting network personalization unblocking password to be given PH-NETSUB PIN MT is waiting network subset personalization password to be given PH-NETSUB PUK MT is waiting network subset personalization unblocking password to be given PH-SP PIN MT is waiting service provider personalization password to be given PH-SP PUK MT is waiting service provider personalization unblocking password to be given PH-CORP PIN MT is waiting corporate personalization password to be given PH-CORP PUK MT is waiting corporate personalization unblocking password to be given
	<pin>, <newpin> string type value (8 characters max.)		<pin>, <newpin> String type values
Reference [27.007] § 8.3	Notes - Parameter <newpin> can only be used if SIM is PIN blocked. <pin> must be PUK. Otherwise, the command is rejected - If the SIM card is extracted, AT+CPIN? will answer with a maximum of 30 seconds		

5.18. +CPIN2 Command: Send Password to MT

Note: For HL85xxx only.

HL85xxx		
Test command		
<u>Syntax</u> AT+CPIN2=?	<u>Response</u> OK	
Read command		
<u>Syntax</u> AT+CPIN2?	<u>Response</u> +CPIN:code OK or +CME ERROR: <err>	
Write command		
<u>Syntax</u> AT+CPIN2= <puk2/oldpin2> [,<newpin2>] or AT+CPIN2= <oldpin2>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <puk2/oldpin2>, <newpin2> String type values <code> READY MT is not pending for any password SIM PIN2 MT is waiting for SIM PIN2 to be given (this "code" is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered right after the failure, it is recommended that MT does not block its operation) SIM PUK2 MT is waiting for SIM PUK2 to be given (this "code" is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that MT does not block its operation)	

5.19. *PSPRAS Command: PIN Remaining Attempt Status

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSPRAS=?	<u>Response</u> *PSPRAS: (list of supported <code>) OK
<i>Read command</i> <u>Syntax</u> AT*PSPRAS?	<u>Response</u> *PSPRAS: < pin1>, <puk1>,<pin2>,<puk2> OK
<i>Write command</i> <u>Syntax</u> AT*PSPRAS	<u>Response</u> OK <u>Parameters</u> <pin1> Integer type value indicating the number of false presentations remaining for PIN1. The maximum value is 3, and the minimum value is 0. Zero means that the PIN1 is blocked <puk1> Integer type value indicating the number of false presentations remaining for PUK1. The maximum value is 10, and the minimum value is 0. Zero means that the PUK1 is blocked <pin2> Integer type value indicating the number of false presentations remaining for PIN2. The maximum value is 3, and the minimum value is 0. Zero means that the PIN2 is blocked <puk2> Integer type value indicating the number of false presentations remaining for PUK2. The maximum value is 10, and the minimum value is 0. Zero means that the PUK2 is blocked <code> "SIM PIN1", "SIM PUK1", "SIM PIN2", "SIM PUK2"

HL6528x	
<u>Reference</u> Sierra Wireless proprietary command	<u>Notes</u> - This commands returns information about the number of codes attempts remaining - Set command has no effect (return OK) - If MT is waiting SIM PIN or SIM PUK to be given, the returned value of <pin2> and <puk2> is invalid

5.20. +CPUC Command: Price per Unit and Currency

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CPUC=?	<u>Response</u> OK	<u>Syntax</u> AT+CPUC=?	<u>Response</u> OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CPUC?	<u>Response</u> +CPUC: <currency>,<ppu> OK	<u>Syntax</u> AT+CPUC?	<u>Response</u> +CPUC: <currency>,<ppu> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CPUC= <currency>, <ppu> [,<passwd>]	<u>Response</u> OK <u>Parameters</u> <currency> string type; three-character currency code (e.g. .GBP., .DEM.); character set as specified with AT+CSCS	<u>Syntax</u> AT+CPUC= <currency>, <ppu> [,<passwd>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <currency> string type containing the three-character currency code (e.g. GBP, EUR)

HL6528x		HL85xxx															
	<ppu> string type; price per unit; dot is used as a decimal separator (e.g. 2.66). The length is limited to 20 characters. If the string length is exceeded, the command is terminated with an error. This string may only contain digits and a dot. Leading zeros are removed from the string <passwd> string type; SIM PIN2. String parameter which can contain any combination of characters. The maximum string length is limited to 8 characters		<ppu> string type containing the price per unit; dot is used as a decimal separator. The length is limited to 10 characters (including the decimal separator when used in the write command). <passwd> string type containing SIM PIN2														
<u>Reference</u> [27.007] § 8.27	<u>Notes</u> This AT command needs SIM and network where AOC are allowed.	<u>Notes</u>	<ppu> is stored in mantissa format, and the maximum number of the mantissa is 4095 (0x0FFF). Examples: <table><tr><th>Input Value</th><th>Displayed Value</th></tr><tr><td>1234567890</td><td>1235000000.0000 (= 1235 x 10⁶)</td></tr><tr><td>4095111</td><td>4095000.0000 (= 4095 x 10³)</td></tr><tr><td>4096111</td><td>4100000.0000 (= 410 x 10⁴)</td></tr><tr><td>4123000</td><td>4120000.0000 (= 412 x 10⁴)</td></tr><tr><td>000789.234</td><td>789.0000 (leading zeroes were discarded)</td></tr><tr><td>0.012345</td><td>0.01235 (= 1235 x 10⁻⁵)</td></tr></table>	Input Value	Displayed Value	1234567890	1235000000.0000 (= 1235 x 10 ⁶)	4095111	4095000.0000 (= 4095 x 10 ³)	4096111	4100000.0000 (= 410 x 10 ⁴)	4123000	4120000.0000 (= 412 x 10 ⁴)	000789.234	789.0000 (leading zeroes were discarded)	0.012345	0.01235 (= 1235 x 10 ⁻⁵)
Input Value	Displayed Value																
1234567890	1235000000.0000 (= 1235 x 10 ⁶)																
4095111	4095000.0000 (= 4095 x 10 ³)																
4096111	4100000.0000 (= 410 x 10 ⁴)																
4123000	4120000.0000 (= 412 x 10 ⁴)																
000789.234	789.0000 (leading zeroes were discarded)																
0.012345	0.01235 (= 1235 x 10 ⁻⁵)																

5.21. +CPWC Command: Power Class

Note: For HL6528x and HL854xx only.

HL6528x and HL854xx	
<i>Test command</i> <u>Syntax</u> AT+CPWC=?	<u>Response</u> +CPWC: list of supported (<band>,(list of <class>es)) pairs OK
<i>Read command</i> <u>Syntax</u> AT+CPWC?	<u>Response</u> +CPWC: <curr_class1>,<def_class1>,<band1>[,<curr_class2>,<def_class2>,<band2>[...]] OK
<i>Write command</i> <u>Syntax</u> AT+CPWC= [<class> [,<band>]]	<u>Response</u> OK <u>Parameters</u> <class>, <curr_classn>, <def_classn> 0 Default (not applicable to <curr_class>es or <def_classn>s) 1 MS output power class as in GSM 45.005 [38] <band>, <bandn> 0 GSM900 AND GSM850 1 GSM1800 2 GSM1900
<u>Reference</u> [27.007] § 8.29	<u>Notes</u> Module must be rebooted for the selection to be effective

5.22. *PSRDBS Command: Change Frequency Band

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT*PSRDBS=?	<u>Response</u> *PSRDBS: (list of supported<mode>s), (list of supported <GSM band>s) OK	<u>Syntax</u> AT*PSRDBS=?	<u>Response</u> *PSRDBS: (list of supported<mode>s), (list of supported <band>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT*PSRDBS?	<u>Response</u> *PSRDBS: <GSM band> OK	<u>Syntax</u> AT*PSRDBS?	<u>Response</u> *PSRDBS: <band> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT*PSRDBS= <mode> , <GSMband>	<u>Response</u> OK <u>Parameter</u> <Mode> 0 Set <Band> at next switch on 1 Set <Band> immediately by restarting stack <GSM Band> Bit field type parameter; to set several bands, sum up the values 1 GSM 850 2 GSM 900 4 E-GSM 8 DCS 1800 16 PCS 1900	<u>Syntax</u> AT*PSRDBS= <mode> ,<band>	<u>Response</u> OK <u>Parameter</u> <Mode> 0 Set <band> at next switch on 1 Set <band> immediately <band> Bit field type parameter; to set several bands, sum up the values 1 GSM 850 2 GSM 900 4 E-GSM 8 DCS 1800 16 PCS 1900 32 UMTS_BAND_I 64 UMTS_BAND_II

HL6528x		HL85xxx	
			128 UMTS_BAND_V 256 UMTS_BAND_VI 512 UMTS_BAND_VIII 1024 UMTS_BAND_XIX
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> GSM 900 is included into the E-GSM band so the module answers 29 to AT*PSRDBS?	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Selection can be one or more (up to four) GSM bands and one or more (up to six) UMTS bands - GSM 900 is included into E-GSM band, so the module answers 2045 to "AT*PSRDBS?" when all bands are selected.

5.23. +CPAS Command: Phone Activity Status

HL6528x and HL85xxx		
Test command		
<u>Syntax</u> AT+CPAS=?	<u>Response</u> +CPAS: (list of supported <pas> s) OK	
Execute command		
<u>Syntax</u> AT+CPAS	<u>Response</u> +CPAS: <pas> OK	
	<u>Parameter</u>	
	<pas>	0 Ready (ME allows commands from TA/TE)
		1 Unavailable (ME does not allow commands from TA/TE); this option is only available in the HL85xxx
		2 Unknown (ME is not guaranteed to respond to instructions)
		3 Ringing (ME is ready for commands from TA/TE, but the ringer is active)

HL6528x and HL85xxx	
	4 Call in progress (ME is ready for commands from TA/TE, but a call is in progress) 5 Asleep (ME is unable to process commands from TA/TE because it is in a low function-ality state); this option is only available in the HL85xxx
<u>Reference</u> [27.007] § 8.1	<u>Notes</u> <pas>=1 and <pas>=5 are only available in the HL85xxx

5.24. +CSQ Command: Signal Quality

HL6528x and HL85xxx			
<i>Test command</i>			
<u>Syntax</u> AT+CSQ=?		<u>Response</u> +CSQ: (list of supported <rssi> s),(list of supported <ber> s) OK	
<i>Execute command</i>			
<u>Syntax</u> AT+CSQ		<u>Response</u> +CSQ: <rssi> , <ber> OK	
		<u>Parameters</u>	
		<rssi>	0 -113 dBm or less 1 -111 dBm 2 to 30 -109 to -53 dBm 31 -51 dBm or greater 99 not known or not detectable
		<ber>	(in percent) 0 to 7 As RXQUAL values in the table in GSM 05.08 [20] sub clause 8.2.4 99 Not known or not detectable

HL6528x and HL85xxxReference

[27.007] § 8.5

Notes

- To read the UMTS signal quality of the HL85xxx, see command AT\$CSQ.
- This command must have a SIM and a network connection to return an accurate value.

5.25. \$CSQ Command: Signal Quality

*Note: For HL85xxx only.***HL85xxx***Test command*Syntax**AT\$CSQ=?**Response

\$CSQ: (list of supported <rssi>s),(list of supported <ber>s),(list of supported <Ec/No>s)]
OK

*Execute command*Syntax**AT\$CSQ**Response

\$CSQ: <rssi>,<ber>[,<Ec/No>]
OK

Parameters

<rssi>	0	-113 dBm or less
	1	-111 dBm
	2 to 30	-109 to -53 dBm
	31	-51 dBm or greater
	99	Not known or not detectable

<ber>	(in percent)	0 to 7	As RXQUAL values in the table in GSM 05.08 [20] sub clause 8.2.4
		99	Not known or not detectable

<Ec/No>	(in dB)	0 to -24	No output if not supported

HL85xxx	
<u>Reference</u> [27.007] § 8.5	<u>Notes</u> - This command is derived from the standard +CSQ with the addition of the <Ec/No> variable. - This command extends AT+CSQ to include UMTS quality. - In UMTS mode, the RSSI value is RSCP and not the physical channel power measurement as in 2G. - RSCP in dBm is: <rssi> * 2 - 113. - The physical channel power is: $\text{RSCP} - (-\text{EC/No})$. - This command must have a SIM and a network connection to return an accurate value.
<u>Examples</u>	<pre> at\$csq? +CME ERROR: 3 at\$csq=? \$CSQ: (0-31,99),(0-7,99),(0--24) OK at\$csq \$CSQ: 25,99,-3 // <Ec/No> = -3 dB OK at+cops? +COPS: 0,0,"SmarTone HK",2 // register to 3G network OK at+ksrat=1 // change RAT to GSM OK at\$csq \$CSQ: 29,99 // no <Ec/No> is returned OK at+cops? +COPS: 0,0,"SmarTone HK",0 // register to 2G network OK </pre>

5.26. +KRIC Command: Ring Indicator Control

HL6528x		HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+KRIC=?	<u>Response</u> +KRIC: (list of supported <mask>s),(list of supported <shape>s) OK	<i>Test command</i> <u>Syntax</u> AT+KRIC=?	<u>Response</u> For HL854xx: +KRIC: (list of supported <mask>s),(list of supported <shape>s) OK For HL8518, HL8528 and HL8529: +KRIC: (list of supported <mask>s),(list of supported <shape>s),(list of supported <pulse duration>) OK
<i>Read command</i> <u>Syntax</u> AT+KRIC?	<u>Response</u> +KRIC: <mask> , <shape> , <pulse duration> OK	<i>Read command</i> <u>Syntax</u> AT+KRIC?	<u>Response</u> For HL854xx: +KRIC: <mask> , <shape> OK For HL8518, HL8528 and HL8529: +KRIC: <mask> , <shape> , <pulse duration> OK
<i>Write command</i> <u>Syntax</u> AT+KRIC= <mask> [,<shape> [,<pulse duration>]]	<u>Response</u> OK <u>Parameters</u> <mask> Use of RI signal 0x00 RI not used	<i>Write command</i> <u>Syntax</u> For HL854xx: AT+KRIC= <mask> [,<shape>]	<u>Response</u> OK <u>Parameters</u> <mask> Use of RI signal 0x00 RI not used

HL6528x		HL85xxx	
	0x01 RI activated on incoming calls (+CRING, RING) 0x02 RI activated on SMS (+CMT, +CMTI) 0x04 RI activated on SMS-CB (+CBM, +CBMI) 0x08 RI activated on USSD (+CUSD) 0x10 RI activated on network state (+CIEV) <shape> signal shape – available only for incoming calls 0 Repeat pulses. The total length of the pulse is equivalent to the transfer of the RING or CRING notification 1 Always active. The signal is set to active during the whole incoming call notification <pulse duration> <u>1</u> – 5 RI pulse duration in seconds	For HL8518, HL8528 and HL8529: AT+KRIC= <mask> [,<shape> [,<pulse duration>]]	0x01 RI activated on incoming calls (+CRING, RING) 0x02 RI activated on SMS (+CMT, +CMTI) 0x04 RI activated on SMS-CB (+CBM, +CBMI) 0x08 RI activated on USSD (+CUSD) 0x10 RI activated on network state (+CIEV) <shape> signal shape – available only for incoming calls 0 Repeat pulses. The total length of the pulse is equivalent to the transfer of the RING or CRING notification 1 Always active. The signal is set to active during the whole incoming call notification <pulse duration> <u>1</u> – 5 RI pulse duration in seconds
Reference Sierra Wireless Proprietary	<u>Notes</u> - For SMS and other unsolicited messages, only one pulse is set. - If the 0710 is woken up by an incoming call only one pulse is set, even if shape=0 is used. - The width of the pulse is 1s. - Setup command only to send once to define the RI behavior. - Do not use the command during an incoming call, SMS, SMSCB, USSD, etc.	Reference Sierra Wireless Proprietary	<u>Notes</u> - The current configuration is kept in non-volatile memory after a reset. - For SMS and other unsolicited messages, only one pulse is set, regardless of <shape>. - The width of the pulse is 1s. For repeated pulse on incoming calls, pulse width is 1s, and then rest for 4 second, and then repeated. - Do not use the command during an incoming call, SMS, SMSCB, USSD, etc. - This command can be used without SIM - If <shape> is omitted, the previously saved value will be used.
		<u>Examples</u>	AT+KRIC=? +KRIC: (0-31),(0-1) // for HL854xx +KRIC: (0-31),(0-1),(1-5) // for HL8518, HL8528 and HL8529 OK AT+KRIC? +KRIC: 15,0 OK

HL6528x		HL85xxx	
			AT+KRIC=1,1 //RI is activated on incoming call with //always active OK AT+KRIC? +KRIC: 1,1 OK AT+KRIC=2 //RI is activated on SMS OK AT+KRIC? +KRIC: 2,1 OK

5.27. +KSREP Command: Mobile Start-up Reporting

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KSREP=?	<u>Response</u> +KSREP: (list of supported <act>s) OK	<u>Syntax</u> AT+KSREP=?	<u>Response</u> +KSREP: (list of supported <act>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KSREP?	<u>Response</u> +KSREP: <act>,<stat> OK	<u>Syntax</u> AT+KSREP?	<u>Response</u> +KSREP: <act>,<stat>,<PB ready> OK

HL6528x		HL85xxx	
Write command		Write command	
<u>Syntax</u> AT+KSREP= <act>	<u>Response</u> OK <u>Parameters</u> <act> Indicates if the module must send a unsolicited code during the startup 0 The module doesn't send an unsolicited code 1 The module will send an unsolicited code <stat> This code indicates the status of the module 0 The module is ready to receive commands for the TE. No access code is required 1 The module is waiting for an access code. (The AT+CPIN? command can be used to determine it) 2 The SIM card is not present 3 The module is in "SIMlock" state 4 unrecoverable error 5 unknown state	<u>Syntax</u> AT+KSREP= <act>	<u>Response</u> OK <u>Parameters</u> <act> Indicates if the module must send a unsolicited code during the startup 0 The module doesn't send an unsolicited code 1 The module will send an unsolicited code <stat> This code indicates the status of the module 0 The module is ready to receive commands for the TE. No access code is required 1 The module is waiting for an access code. (The AT+CPIN? command can be used to determine it) 2 The SIM card is not present 3 The module is in "SIMlock" state 4 unrecoverable error 5 unknown state <PB ready> Indicates if +PBREADY URC is received or not 0 Phonebook is not ready 1 Phonebook is ready for read and write
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The module uses unsolicited code once after the boot process +KSUP: <stat> - The KSUP notification will not be sent if the module is in autobaud mode and no bytes have been received from TE to adapt the serial link to the actual speed	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The module uses unsolicited code once after the boot process +KSUP: <stat> - The KSUP notification will not be sent if the module is in autobaud mode and no bytes have been received from TE to adapt the serial link to the actual speed. - If <act>=0, +PBREADY and +SIM URC notifications will not be sent at the start up process. However, they will still be sent afterwards during normal modem operation.

HL6528x	HL85xxx
	<u>Examples</u> 1) SIM detect is enabled, AT+KSIMDET=1 //Reboot module with SIM card inserted and +KSREP disabled //no +KSUP, +PBREADY, and +SIM URC at start-up +CREG: 1,"2F33","00D0273C",6 at+ksimdet? +KSIMDET: 1 //SIM detect enabled OK at+ksrep? +KSREP: 0,0,1 //Start-up reporting is disabled //module is ready, +PBREADY is received OK +SIM: 0 //remove SIM card +CREG: 0 at+ksrep? +KSREP: 0,2,0 //Start-up reporting is disabled //SIM card not present, +PBREADY not //received OK +SIM: 1 //insert SIM card +CREG: 1,"2F33","00D0273C",6 +PBREADY at+ksrep? +KSREP: 0,0,1 //Start-up reporting is disabled //module is ready, +PBREADY is received OK

HL6528x	HL85xxx
	<pre> at+ksrep=1 //enable start-up reporting OK //reboot module +SIM: 1 //URC display at start-up +KSUP: 0 //module is ready +CREG: 1,"2F33","00D0273C",6 +PBREADY at+ksrep? +KSREP: 1,0,1n //Start-up reporting is enabled //module is ready, +PBREADY is received OK +SIM: 0 //remove SIM card +CREG: 0 at+ksrep? +KSREP: 1,2,0 //Start-up reporting is enabled //SIM card not present, +PBREADY not //received OK +SIM: 1 //insert SIM card +CREG: 1,"2F33","00D0273C",6 +PBREADY at+ksrep? +KSREP: 1,0,1 //Start-up reporting is enabled //module is ready, +PBREADY is received //SIM card present OK </pre>

HL6528x	HL85xxx
	//Reboot module without SIM card inserted and +KSREP //disabled at+ksimdet? +KSIMDET: 1 //SIM detect enabled OK at+ksrep? +KSREP: 0,2,0 //Start-up reporting is disabled //SIM card not present, +PBREADY not //received OK +SIM: 1 //insert SIM card +CREG: 1,"2F33","00D0273C",6 +PBREADY at+ksrep? +KSREP: 0,0,1 //Start-up reporting is disabled //module is ready, +PBREADY is received OK +SIM: 0 //remove SIM card +CREG: 0 at+ksrep? +KSREP: 0,2,0 //Start-up reporting is disabled //SIM card not present, +PBREADY not //received OK at+ksrep=1 //enable start-up reporting OK

HL6528x	HL85xxx
	<pre> //reboot module +SIM: 0 +KSUP: 2 at+ksrep? +KSREP: 1,2,0 //Start-up reporting is enabled //SIM card not present, +PBREADY not //received OK 2) SIM detect is disabled, AT+KSIMDET=0 //Reboot module with SIM card inserted and +KSREP disabled +CREG: 1,"2F33","00D0273C",6 at+ksimdet? +KSIMDET: 0 //SIM detect disabled OK at+ksrep? +KSREP: 0,0,1 //Start-up reporting is disabled //module is ready, +PBREADY is received OK at+ksrep=1 //enable start-up reporting OK //reboot module +KSUP: 0 +CREG: 1,"2F33","00D0273C",6 +PBREADY </pre>

HL6528x		HL85xxx	
			at+ksrep? +KSREP: 1,0,1 //Start-up reporting is enabled //module is ready, +PBREADY is received OK //Reboot module without SIM card inserted and +KSREP //disabled at+ksimdet? +KSIMDET: 0 //SIM detect disabled OK at+ksrep? +KSREP: 0,2,0 //Start-up reporting is disabled //SIM card not present, +PBREADY not //received OK at+ksrep=1 //enable start-up reporting OK //reboot module +KSUP: 2 at+ksrep? +KSREP: 1,2,0 //Start-up reporting is enabled //SIM card not present, +PBREADY not //received OK

5.28. +KGPIO Command: Hardware IO Control

HL6528x		HL85xxx	
Test command		Test command	
<u>Syntax</u> AT+KGPIO=?	<u>Response</u> +KGPIO: (list of supported <IO> s),(list of supported <cde> s) OK	<u>Syntax</u> AT+KGPIO=?	<u>Response</u> +KGPIO: (list of supported <IO> s),(list of supported <cde> s) OK
Read command		Read command	
<u>Syntax</u> AT+KGPIO?	<u>Response</u> OK	<u>Syntax</u> AT+KGPIO?	<u>Response</u> OK
Write command		Write command	
<u>Syntax</u> AT+KGPIO=<IO>,<cde>	<u>Response</u> If <cde> = 2: +KGPIO: <IO>, <current_value> OK Else OK <u>Parameters</u> <IO> 1 – 8 Selected IO <cde> 0 Reset the selected IO 1 Set the selected IO 2 Request the current value of the IO	<u>Syntax</u> AT+KGPIO=<IO>,<cde>	<u>Response</u> If <cde> = 2: +KGPIO: <IO>, <current_value> OK Else OK <u>Parameters</u> <IO> 1 – 8, 10 – 12, 15 Selected IO <cde> 0 Reset the selected IO 1 Set the selected IO 2 Request the current value of the IO <current_value> 0 GPIO is Low 1 GPIO is High

HL6528x		HL85xxx	
<u>Examples</u>	Make GPIO1 output high/low level AT+KGPIOCFG=1,0,2 Configure GPIO 1 as output mode; <pull mode> must be "no pull" OK AT+KGPIO=1, 1 Set the selected I/O OK AT+KGPIO=1, 0 Reset the selected I/O OK Define input/output mode for GPIO1 AT+KGPIOCFG=1,1,0 Configure GPIO 1 as input mode;<pull mode> is "pull down" OK AT+KGPIO=1,2 Request the current value of this I/O +KGPIO: 1,1 Value is 1 for GPIO 1 OK	<u>Examples</u>	Make GPIO1 output high/low level AT+KGPIOCFG=1,0,2 Configure GPIO 1 as output mode; <pull mode> must be "no pull" OK AT+KGPIO=1, 1 Set GPIO1 OK AT+KGPIO=1, 0 Reset GPIO1 OK Define input/output mode for GPIO1 AT+KGPIOCFG=1,1,0 Configure GPIO 1 as input mode;<pull mode> is "pull down" OK AT+KGPIO=1,2 Request the current value of GPIO1 +KGPIO: 1,1 Value is High for GPIO 1 OK Set GPIO12 with PWM2 ON or OFF AT+KGPIOCFG=12,0,2 Set GPIO12 as output OK AT+KGPIO=12,1 Set GPIO12 as High OK

HL6528x		HL85xxx	
			AT+KPWM=1,1 Turn PWM2 ON OK AT+KGPIO =? +KGPIO: GPIO12 is used for PWM2, (1,2,4,5,6,7,8,10,11,15),(0-2) so it's not displayed OK AT+KGPIO=12,1 Set GPIO12; it should return ERROR +CME ERROR: 3 AT+KPWM=1,0 Turn PWM2 OFF OK AT+KGPIOCFG=12,0,2 Set GPIO12 as output OK AT+KGPIO=12,1 GPIO12 can be set as High again OK AT+KGPIO =? +KGPIO: After PWM2 is turned off, (1,2,4,5,6,7,8,10,11,12,15), GPIO12 is displayed in the (0-2) list again OK

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The current configuration is kept in flash after a reset - Check the configuration of +KGPIOCFG when +CME ERROR: 3 (operation not allowed) is issued - GPIOs may already be used by +KSIMDET, +KJAMDET, +KJAM, +KSYNC, +KTEMPMON, +KGSMAD, +KSIMSLOT or I²C	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The current configuration is saved in non-volatile memory after a reset - Check the configuration of +KGPIOCFG when +CME ERROR: 3 issued - This command will return ERROR if the selected GPIO is already being used by another feature. Check GPIO availability with other related commands +KSIMDET, +KSIMSEL, +KSYNC, +KJAM, +GSMAD, +GNSSAD, and +KTEMPMON when using this command - Since PWM2 is multiplexed with GPIO12, GPIO12 cannot be used when PWM2 is already turned on. Using +KGPIOCFG and +KGPIO in this case will return +CME ERROR: 3 - The test command AT+KGPIO=? returns a dynamic list of supported GPIO. GPIOs assigned to a specific purpose are not listed - This command can be used without SIM

5.29. +KSLEEP Command: Power Management Control

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KSLEEP=?	<u>Response</u> +KSLEEP: (list of supported <mngt>s) OK

HL6528x and HL85xxx										
<i>Read command</i>										
<u>Syntax</u> AT+KSLEEP?	<u>Response</u> +KSLEEP: <mngt> OK									
<i>Write command</i>										
<u>Syntax</u> AT+KSLEEP= <mngt>	<u>Response</u> OK <u>Parameter</u> <table><tr><td><mngt></td><td>0</td><td>The module doesn't go in sleep mode as long as DTR is active (low level). DTR has to be active to send AT commands.</td></tr><tr><td></td><td>1</td><td>The module decides by itself (internal timing) when it goes in sleep mode.</td></tr><tr><td></td><td>2</td><td>The module never goes in sleep mode regardless of the DTR state. (Default value for HL85xxx)</td></tr></table>	<mngt>	0	The module doesn't go in sleep mode as long as DTR is active (low level). DTR has to be active to send AT commands.		1	The module decides by itself (internal timing) when it goes in sleep mode.		2	The module never goes in sleep mode regardless of the DTR state. (Default value for HL85xxx)
<mngt>	0	The module doesn't go in sleep mode as long as DTR is active (low level). DTR has to be active to send AT commands.								
	1	The module decides by itself (internal timing) when it goes in sleep mode.								
	2	The module never goes in sleep mode regardless of the DTR state. (Default value for HL85xxx)								
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • See section 23.18 Sleep Mode Management • Additionally, for the HL85xxx: ▪ The current configuration is kept in non-volatile memory after a reset. ▪ This command only controls UART power management, and does not affect the USB AT command port. ▪ When AT+KSLEEP=1 and the module is in sleep mode, the user needs to input a character to wake the module up. After which, AT commands can be input normally. Note that for the HL8518, HL8528 and HL8529 modules, inputting a character is unable to wake the module up in case of a 2-wire application. ▪ To enable sleep mode when MUX is used, AT+KSLEEP must be sent after the module enters MUX mode (e.g. sent over one of the MUX DLCs) • Additionally for the HL854xx, the DTR signal applies to UART1, USB and CMUX virtual ports; but not to UART2.									

HL6528x and HL85xxxExamples

AT+KSLEEP=?
+KSLEEP: (0-2)
OK

AT+KSLEEP?
+KSLEEP: 2
OK

AT+KSLEEP=0 *// change setting to mode 0*
OK

AT+KSLEEP?
+KSLEEP: 0
OK

AT+KSLEEP=2 *// change setting to mode 2*
OK

AT+KSLEEP?
+KSLEEP: 2
OK

5.30. +KCELL Command: Cell Environment Information

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KCELL=?	<u>Response</u> +KCELL: (list of supported <revision>s) OK	<u>Syntax</u> AT+KCELL=?	<u>Response</u> +KCELL: (list of supported <revision>s),(list of supported <oper>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KCELL?	<u>Response</u> OK	<u>Syntax</u> AT+KCELL?	<u>Response</u> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KCELL= <revision>	<u>Response</u> +KCELL: <nbcells> [,<ARFCN _i >,<BSIC _i >,<PLMN _i >,<LAC _i >,<CI _i >,<RSSI _i >,<TA>] [,<ARFCN _i >,<BSIC _i >,<PLMN _i >,<LAC _i >,<CI _i >,<RSSI _i >] [...]] OK <u>Parameters</u> <revision> reserved for future development (only 0 for the moment)	<u>Syntax</u> AT+KCELL= <revision> [,<oper>]	<u>Response</u> For GSM cells: +KCELL: <nbGSMcells>[,<cell_typei>,<ARFCNi>,<BSICi>,<PLMNi>,<LACi>,<CII>,<RSSIi>,<TA>][,<cell_typei>,<ARFCNi>,<BSICi>,<PLMNi>,<LACi>,<CII>,<RSSIi>] [...]] For UMTS cells: +KCELL: <nbUMTScells>[,<cell_typek>,<dl_UARFCNk>,<PLMNk>,<LACK>,<UMTS_CIk>,<scrambling_codek>,<rscpk>,<ecnok>[,<pathlossk>]][...]] OK <u>Parameters</u> <revision> 0 Provide cell information of serving cells and neighbor cells (excluding <PLMN>,<LAC>,<UMTS_CI> of UMTS cells). 1 In addition to information from revision 0, the module will also scan UMTS neighbor

HL6528x	HL85xxx										
<nbcells> number of base stations available. The first base station is the serving cell ($0 \leq i \leq 7$) <ARFCN> Absolute Radio Frequency Channel Number in decimal format. <BSIC> Base Station Identify Code in decimal format <PLMN> PLMN identifiers (3 bytes) in hexadecimal format, made of MCC (Mobile Country Code), and MNC (Mobile Network Code) <LAC> Location Area in hexadecimal format <CI> Cell ID, 4 hexadecimal digits, e.g. ABCD <RSSI> Received signal level of the BCCH carrier, decimal value from 0 to 63. The indicated value is an offset which should be added to -110 dBm to get a value in dBm. See the formula specified in TS 05.08 Radio Subsystem Link Control <TA> Timing Advance. 0...63 in decimal format□ available only during a communication (equals to 255 at any other time). Only available on serving cell during communication	cells for obtaining <PLMN>, <LAC> and <UMTS_CI> <nbGSMcells> number of base stations available ($0 \leq i \leq 7$) <cell_type> <table border="0"> <tr><td>0</td><td>GSM serving cell</td></tr> <tr><td>1</td><td>GSM neighbor cell</td></tr> <tr><td>2</td><td>UMTS serving cell</td></tr> <tr><td>3</td><td>UMTS neighbor cell</td></tr> <tr><td>4</td><td>UMTS detected cell</td></tr> </table> <ARFCN> 0...1023 Absolute Radio Frequency Channel Number in decimal format. <BSIC> 0...63 Base Station Identify Code in 6 bits decimal format. <PLMN> PLMN identifiers (3 bytes) in hexadecimal format, made of MCC (Mobile Country Code), and MNC (Mobile Network Code) <LAC> 4-digit Location Area in hexadecimal format <CI> Cell ID, 4 hexadecimal digits, e.g. ABCD <RSSI> Received signal level of the BCCH carrier, decimal value from 0 to 63. The indicated value is an offset which should be added to -110 dBm to get a value in dBm. See the formula specified in TS 05.08 Radio Subsystem Link Control. This parameter = 99 when signal is not known or not detectable. <TA> Timing Advance 0...63 in decimal format, available only during a communication (equals to 255 at any other time). Only available serving cell during communication.	0	GSM serving cell	1	GSM neighbor cell	2	UMTS serving cell	3	UMTS neighbor cell	4	UMTS detected cell
0	GSM serving cell										
1	GSM neighbor cell										
2	UMTS serving cell										
3	UMTS neighbor cell										
4	UMTS detected cell										

HL6528x	HL85xxx
	<nbUMTScells> number of UMTSbase stations available. ($0 \leq k \leq 25$) <dl_UARFCN> DL UARFCN of serving cell in decimal format. The range can be found at 3GPP TS 25.101 <UMTS_CI> Cell ID, maximum of 7 hexadecimal digits <scrambling code> 0...511 The downlink scrambling code in decimal format <rscp> 0...91 Received Signal Code Power. The power level in one chip. 0 rscp < -115 dBm 1 -115 dBm ≤ rscp < -114 dBm : 91 -25 dBm ≤ rscp <u>255</u> Invalid/default value <ecno> 0...24 Ratio of energy per modulating bit to the noise spectral density. This is the cell quality and is equal to RSCP/RSSI Energy per chip/noise. 0 CPICH_Ec/No < -24dB 1 -24 dB ≤ CPICH_Ec/No < -23dB : 24 -1 dB ≤ CPICH_Ec/No < 0dB <u>255</u> Invalid/default value <pathloss> Path Loss in decimal format range from 46 dB to 158 dB, set to 255 if not available

HL6528x		HL85xxx	
			<oper> Operation to cache table (only applicable when <revision>=1) 1 Dump the cache table. List of UMTS cells will be printed as follows: +KCELL: <dl_UARFCN>,<scrambling_code>,<PLMN>,<LAC>,<UMTS_CI> 2 Clear the cache table
<u>Example</u>	AT+KCELL=0 +KCELL: 5,46,51,64f000,2791,f78,46,1,78,255,ff,ff,2e73,26,60,51,ff,ff, e2f,24,80,60,ff,ff,fca,21,16,29,ff,ff,111c,19 OK	<u>Examples</u>	# GSM mode AT+KSRAT=1 OK #delay 30 sec AT+KCELL=0 +KCELL: 7,0,88,12,54f460,8c,26ea,58,0,1,119,11,54f460,8c, ffff,39,1,114,11,54f460,8c,5976,27,1,101,12,54f460,8c,6772,22 ,1,102,9,54f460,8c,535,14,1,103,255,54f460,ffff,ffff,0,1,107, 255,54f460,ffff,ffff,0 +KCELL: 0 OK # GSM & UMTS mode AT+KSRAT=3 OK #delay 30 sec AT+KCELL=0 +KCELL: 6,1,88,12,54f460,ffff,ffff,99,1,95,32,54f460,ffff,ffff,99 ,1,105,12,54f460,ffff,ffff,99,1,107,8,54f460,ffff,ffff,99,1,114,11, 54f460,ffff,ffff,99,1,124,34,54f460,ffff,ffff,99 +KCELL: 9,2,10737,54f460,1f9a,926ef,6,61,4,255,3,4400,ffffff, ffff,ffffff,9,59,2,91,3,10713,ffffff,ffff,ffffff,7,59,4,91,3,10737, ffffff,fff,ffffff,6,255,255,255,3,10737,ffffff,fff,ffffff,96,255, 255,255,3,10737,ffffff,fff,ffffff,126,255,255,255,3,10737,ffffff ,ffff,ffffff,220,255,255,255,3,10737,ffffff,fff,ffffff,165,255, 255,255,3,10737,ffffff,fff,ffffff,156,255,255,255 OK

HL6528x	HL85xxx
	# UMTS mode AT+KSRAT=2 OK #delay 30 sec AT+KCELL=0 +KCELL: 0 +KCELL: 7,2,10713,54f460,1f9a,926e8,7,60,4,255,3,10713,ffff ff,ffff,ffffffffff,7,255,255,255,3,10713,ffffff,ffff,ffffffffff,97,255,255, 255,3,10713,ffffff,ffff,ffffffffff,223,255,255,255,3,10713,ffffff,ffff, ffffffffff,166,255,255,255,3,10713,ffffff,ffff,ffffffffff,157,255,255,25 5,3,10713,ffffff,ffff,ffffffffff,138,255,255,255 OK AT+KCELL=1 +KCELL: 6,1,62,10,54f460,ffff,ffff,99,1,63,1,54f460,ffff,ffff,99,1,113,9,54 f460,ffff,ffff,99,1,114,33,54f460,ffff,ffff,99,1,115,33,54f460,ffff, ffff,99,1,117,34,54f460,ffff,ffff,99 +KCELL: 3,2,10737,54f460,1f9a,98c60,126,80,4,255,3,10713,54f460,1f9 a,98c63,135,75,3,107,3,10737,54f460,1f9a,9850a,313,88,12,2 55 OK AT+KCELL=1,1 +KCELL: 10737,126,(F454,FF60),1F9A,98C60 +KCELL: 10713,135,(F454,FF60),1F9A,98C63 +KCELL: 10737,313,(F454,FF60),1F9A,9850A OK AT+KCELL=1,2 OK

HL6528x		HL85xxx	
			AT+KCELL=1,1 OK
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command provides information related to the network environment and can be used for example for localization calculation - Values in <i>italic</i> are not available during some times; i.e. during a communication phase CI is not available. By default, all values will be initialized to 0xFF; thus when a value is returned equal to 0xFF, this will mean it was not possible to decode it	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command provides information related to the network environment and can be used for example for localization calculation. - The data returned by +KCELL command may be based on the cached cell environmental data. For instant data, please use +CGED command. - SIM card must be inserted to support this command. The cell information can only be retrieved when the UE stays in an attached mode. - When the module is registered on UMTS, the LAC/CellID of GSM cells are not available. The LAC/Cell ID of UMTS cells are available only with <revision>=1. However, if 0xff is shown, it means that the module is unable to scan the LAC of the cell ID of neighbor cells. This could happen for example, when the signal from the neighbor cell is not good enough.

5.31. +CRMP Command: Ring Melody Playback

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+CRMP=?	<u>Response</u> +CRMP: (list of supported <call type>s),(list of supported <volume>s),(0),(list of supported <index>s) OK

HL6528x	
<i>Write command</i>	
<u>Syntax</u> AT+CRMP= <call type> [,<volume> [,<type> <index>]]	<u>Response</u> OK <u>Parameters</u> <index> integer which defines a ring melody (1-10) <volume> integer which defines the sound level (1-3). The smaller the value, the lower the volume <call type> integer which specifies the type of event which will start the ring. 0 Voice call (default value) <type> 0 Ring melody is manufacturer defined (unique supported value)
<u>Reference</u> [27.007] § 8.35	<u>Notes</u> If a melody is played, it is just played for 10 sec., and then stopped

5.32. *PSVMWN Command: Voice Message Waiting Notification

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT*PSVMWN=?	<u>Response</u> *PSVMWN: (list of supported <mode>s) *PSVMWN: (list of supported <mode>s) OK

HL6528x	
Read command	
<u>Syntax</u> AT*PSVMWN?	<u>Response</u> *PSVMWN: <current mode> OK
Write command	
<u>Syntax</u> AT*PSVMWN= <mode>	<u>Response</u> OK <u>Parameters</u> <Mode> 0 Disable presentation of notification 1 Enable presentation of notification <line Id > 1 Line 1 2 Aux. Line 3 Data <status> 0 No message waiting 1 At least one message is waiting <index> 0 – 255 Record index in EF SMS if the received MWI message has been stored in SIM (if it is a STORE MWI SMS) <NbMsgWaiting> 0 – 255 Number of message waiting on line <line Id>
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Set command enables/disables the presentation of notification result code from ME to TE When <mode> = 1, * PSVMWI: <line Id> , <status> [,<index>[,<NbMsgWaiting>]] (Voice Message Waiting Indication is sent to TE when notification is received from network or at switch on.

5.33. +KPWM Command: PWM Control

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KPWM=?	<u>Response</u> +KPWM: (list of supported <output> s),(list of supported <operation> s),(list of supported <period> s),(list of supported <dutycycle> s) OK	<u>Syntax</u> AT+KPWM=?	<u>Response</u> +KPWM: (list of supported <output> s),(list of supported <operation> s),(list of supported <period> s),(list of supported <dutycycle> s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KPWM?	<u>Response</u> +KPWM: <output> , <operation> , <period> , <dutycycle> OK	<u>Syntax</u> AT+KPWM?	<u>Response</u> +KPWM: <output> , <operation> , <period> , <dutycycle> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KPWM= <output> , <operation> , [<period>] , [<dutycycle>]	<u>Response</u> OK <u>Parameters</u> <output> 1 PWM1 2 BUZZER <operation> 0 Turn Off 1 Turn On 2 Always High Level <period> 0...126 As number of SYSCLK/8 period 0 Forces DC PWM output to be high 1...126 DC period is n+1 T _{SYSCLK/8} , T = 1 / (26M / 8) = 307 ns or 0...1023 When output is buzzer; freq = 250000 / (n+1)	<u>Syntax</u> AT+KPWM= <output> , <operation> , [<period>] , [<dutycycle>]	<u>Response</u> OK <u>Parameters</u> <output> 0 PWM1 1 PWM2 (multiplexed with GPIO12) <operation> 0 Turn Off 1 Turn On <period> 1...126 As (n+1) number of T _{sysclk/8} period (T _{sysclk/8} period = 1 / (26MHz / 8) = ~307ns) For example, when <period> = 50, then T = (50+1) x 307ns = ~15.6μs, freq = ~63KHz

HL6528x		HL85xxx	
	<dutycycle> ranges from 0 to 100 as a percentage		<dutycycle> Ranges from 1 to 99 as a percentage
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Buzzer does not have “Always High Level” operation - Default value of period and duty-cycle for PWM are 63, 50 - Default value of period and duty-cycle for buzzer are 250,100 - New setting of period and duty-cycle will be remembered by Module for future use - This command is available only if DSDS feature is deactivated. When the DSDS is activated, the module returns “ERROR” on this AT command.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - New setting of period and duty-cycle will be saved automatically. - Default value of <period> and <dutycycle> for PWM1 and PWM2 are 63, 50. - If <period> and/or <dutycycle> is/are missing, previously used valued will be used. - This command can be used without SIM. - Due to Hardware limitation, <dutycycle> must be bigger than or equal to 7 if <period> is 1-12. - Since PWM2 is multiplexed with GPIO12, when PWM2 is turned on already, GPIO12 cannot be used and return error if using GPIO commands.

5.34. +KGPIOCFG Command: GPIO Configuration

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KGPIOCFG= ?	<u>Response</u> +KGPIOCFG: (list of supported <n>s),(list of supported <dir>s), (list of supported<pull mode>s) OK	<u>Syntax</u> AT+KGPIOCFG= ?	<u>Response</u> +KGPIOCFG: (list of supported <n>s),(list of supported <dir>s), (list of supported <pull mode>s) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KGPIOCFG?	<u>Response</u> +KGPIOCFG: <n>,<dir>,<pull mode>[<CR><LF> +KGPIOCFG: <n>,<dir>,<pull mode> [...] OK	<u>Syntax</u> AT+KGPIOCFG?	<u>Response</u> +KGPIOCFG: <n>,<dir>,<pull mode>[<CR><LF> +KGPIOCFG: <n>,<dir>,<pull mode> [...] OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KGPIOCFG =<n>,<dir>,<pull mode>	<u>Response</u> OK <u>Parameters</u> <n> 1 – 8 GPIO number <dir> Direction 0 Output 1 Input <pull mode> 0 Pull down. Internal pull down resistor available. Only used in input mode 1 Pull up. Internal pull up resistor available. Only used in input mode 2 no pull. Internal pull up/down resistor NOT available. Only used in output mode	<u>Syntax</u> AT+KGPIOCFG =<n>,<dir>,<pull mode>	<u>Response</u> OK <u>Parameters</u> <n> 1 – 8, 10 – 12, 15 GPIO number <dir> Direction 0 Output 1 Input <pull mode> 0 Pull down. Internal pull down resistor available. Only used in input mode 1 Pull up. Internal pull up resistor available. Only used in input mode 2 No pull. Internal pull up/down resistor NOT available. Only used in output mode
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command provides configuration for +KGPIO command - The current configuration is kept in non-volatile memory after a reset - When I²C is used, GPIO1 and GPIO5 are mandatorily assigned to I²C Clock and I²C Data, and therefore are not available for any other purpose.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command provides configuration for +KGPIO command - The current configuration is saved in non-volatile memory before a reset - GPIOs may already be used by other functions such as SIM detection, I²C, jamming detection, temperature monitoring, GSM antenna detection, GNSS antenna detection, or network status indication features. When

HL6528x		HL85xxx	
	- Pull down/up mode provides a stable input level, but due to hardware design, some of the GPIOs do not have an internal pull up/down resistor. Refer to the product technical specification for more information - The test command AT+KGPIOCFG=? returns a dynamic list of supported GPIOs. GPIOs assigned to a specific purpose are not listed. - When the second SIM slot is active (+KSIMSLLOT:1), GPIO2 is mandatorily assigned to SIM2 power supply enabling.		using this command, also check with related commands such +KSIMDET, +KSIMSEL, +KSYNC, +KJAM, +GSMAD, +GNSSAD, and +KTEMPMON - Pull down/up mode provides a stable input level - The test command AT+KGPIOCFG=? and AT+KGPIOCFG? return a dynamic list of supported GPIOs. GPIOs assigned to a specific purpose are not listed - Since PWM2 is multiplexed with GPIO12, GPIO12 cannot be used when PWM2 is already turned on. Using +KGPIOCFG and +KGPIIO in this case will return +CME ERROR: 3 - This command can be used without SIM
<u>Examples</u>	If the second SIM slot is active (+KSIMSLLOT:1) then GPIO is not available and entering AT+KGPIOCFG=? will display: +KGPIOCFG: (1,3,4,5,6,7,8),(0,1),(0,1,2)	<u>Examples</u>	AT+KGPIOCFG=1,0,0 Set GPIO1 as output, with an incorrect <pull mode> ERROR AT+KGPIOCFG=1,0,1 Set GPIO1 as output, with an incorrect <pull mode> ERROR AT+KGPIOCFG=1,0,2 Set GPIO1 as output, with a correct <pull mode> OK AT+KGPIOCFG=1,1,0 Set GPIO1 as input, with pull down OK AT+KGPIOCFG=1,1,1 Set GPIO1 as input, with pull up OK

HL6528x		HL85xxx	
			AT+KGPIOCFG=1,1,2 Set GPIO1 as input, with an incorrect <pull mode> ERROR AT+KPWM=1,1 Turn PWM2 ON OK AT+KGPIOCFG=? +KGPIOCFG: GPIO12 is not displayed (1,2,4,5,6,7,8,10,11,15), (0-1),(0-2) OK AT+KGPIOCFG=? +KGPIOCFG: 1,0,2 GPIO12 is not displayed +KGPIOCFG: 2,1,0 +KGPIOCFG: 4,0,2 +KGPIOCFG: 5,0,2 +KGPIOCFG: 6,0,2 +KGPIOCFG: 7,0,2 +KGPIOCFG: 8,0,2 +KGPIOCFG: 10,0,2 +KGPIOCFG: 11,0,2 +KGPIOCFG: 15,0,2 OK AT+KGPIOCFG=12,1,0 Set GPIO12 +CME ERROR: 3 Error is returned AT+KPWM=1,0 Turn PWM2 OFF OK

HL6528x		HL85xxx	
			AT+KGPIOCFG? +KGPIOCFG: 1,0,2 +KGPIOCFG: 2,0,2 +KGPIOCFG: 3,0,2 +KGPIOCFG: 4,0,2 +KGPIOCFG: 5,0,2 +KGPIOCFG: 6,0,2 +KGPIOCFG: 7,0,2 +KGPIOCFG: 8,0,2 +KGPIOCFG: 10,0,2 +KGPIOCFG: 11,0,2 +KGPIOCFG: 12,0,2 +KGPIOCFG: 15,0,2 OK AT+KGPIOCFG=? +KGPIOCFG: (1,2,4,5,6,7,8,10,11,12,15),(0-1),(0-2) OK GPIO 9, 13, 14 are not available for use Also, GPIO12 is displayed since PWM2 is now turned off

5.35. +KADC Command: Analog Digital Converter

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KADC=?	<u>Response</u> +KADC: (list of supported <Meas id>s),(list of supported <Meas time>s) OK	<u>Syntax</u> AT+KADC=?	<u>Response</u> +KADC: (list of supported <Meas id>s),(list of supported <Meas time>s) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KADC= <Meas id> , <Meas time>	<u>Response</u> +KADC: <Meas result>,<Meas id>,<Meas time> , <burst power> <u>Parameters</u> <Meas id> Measurement ID 0 Reserved 2 Reserved 3 Reserved 4 ADCaux0 5 Reserved 6 Reserved 7 ADCaux1 <Meas time> Measurement time 1 During TX 2 Far from TX 3 No constraint <Meas result> Measurement result is in μV	<u>Syntax</u> AT+KADC= <Meas id> , <Meas time>	<u>Response</u> +KADC: <Meas result>,<Meas id>,<Meas time> [,<Temperature>] <u>Parameters</u> <Meas id> Measurement ID 0 VBATT – “VBATT” voltage 1 VCOIN – “BAT RTC” backup battery voltage 2 THERM – connected to NTC200 (the thermistor on board which is located close to the 26MHz VCTCXO) 3 Reserved 4 ADC0 5 Reserved 6 Reserved 7 ADC1 <Meas time> Measurement time 1 During TX 2 Far from TX 3 No constraint <Meas result> Measurement result is in μV <Temperature> Temperature for VCOIN in degrees Celsius.

HL6528x		HL85xxx											
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> 10 bits converter - Only ADCaux0 (id 4) and ADCaux1 are available as external input. Other values are reserved - Available range for input (ADCaux0 and ADCaux1 only) is [0; 3] V	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> 10 bits converter - VBATT does not support no constraint measurement time - This AT command does not require a SIM card - Available range for voltage input are as follows:<table><tr><th><Meas id></th><th>Range (V)</th></tr><tr><td>VBATT</td><td>3.2 - 4.5</td></tr><tr><td>VCOIN</td><td>0 - 1.8</td></tr><tr><td>THERM</td><td>0 - 1.2</td></tr><tr><td>ADC0 & ADC1</td><td>0 - 1.2</td></tr></table>	<Meas id>	Range (V)	VBATT	3.2 - 4.5	VCOIN	0 - 1.8	THERM	0 - 1.2	ADC0 & ADC1	0 - 1.2
<Meas id>	Range (V)												
VBATT	3.2 - 4.5												
VCOIN	0 - 1.8												
THERM	0 - 1.2												
ADC0 & ADC1	0 - 1.2												
		<u>Examples</u>	Put the ADC0 and ADC1 in floating state AT+KADC=4,1 +KADC: 0, 4, 1 OK AT+KADC=4,2 +KADC: 1248047, 4, 2 OK AT+KADC=4,3 +KADC: 1181250, 4, 3 OK AT+KADC=7,1 +KADC: 0, 7, 1 OK “during TX” mode is only used when measuring during an active voice/data call.										

HL6528x		HL85xxx	
			AT+KADC=7,2 +KADC: 1248047, 7, 2 OK AT+KADC=7,3 +KADC: 1248047, 7, 3 OK Assign 0.6V to ADC0 AT+KADC=4,1 +KADC: 0, 4, 1 OK AT+KADC=4,2 +KADC: 603516, 4, 2 OK AT+KADC=4,3 +KADC: 601172, 4, 3 OK Measuring THERM AT+KADC=2,2 +KADC: 397266, 2, 2, 25 OK

HL6528x		HL85xxx	
			Measure ADC during a call ATD28245250; OK AT+KADC=4,1 +KADC: 603516, 4, 1 OK AT+KADC=4,2 +KADC: 600000, 4, 2 OK AT+KADC=4,3 +KADC: 600000, 4, 3 OK

5.36. +CSIM Command: Generic SIM Access

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CSIM =?	<u>Response</u> OK	<u>Syntax</u> AT+CSIM =?	<u>Response</u> OK

HL6528x		HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+CSIM= <length>, <command>	<u>Response</u> +CSIM: <length>,<response> OK <u>Parameters</u> <length> integer type; length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response) all other values are reserved <command> command passed on by the ME to the SIM in the format as described in GSM 11.11 [28] (hexadecimal character format; refer to +CSCS) <response> response to the command passed on by the SIM to the ME in the format as described in GSM 11.11 [28] (hexadecimal character format; refer +CSCS)	<i>Write command</i> <u>Syntax</u> AT+CSIM= <length>, <command>	<u>Response</u> +CSIM: <length>,<response> OK or +CME ERROR: <err> <u>Parameters</u> <length> integer type; length of the characters that are sent to TE in <command> or <response> <command> command passed on by MT to the SIM in hexadecimal format <response> response to the command passed on by the SIM to the MT in hexadecimal format
<u>Reference</u> [27.007] § 8.17	<u>Notes</u> Compared to Restricted SIM Access command +CRSM, the definition of +CSIM allows TE to take more control over the SIM-ME interface. The locking and unlocking of the interface may be done by a special <command> value or automatically by TA/ME (by interpreting <command> parameter). In case that TE application does not use the unlock command (or does not send a <command> causing automatic unlock) in a certain timeout value, ME may release the locking		

5.37. +CALM Command: Alert Sound Mode

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CALM=?	<u>Response</u> +CALM: (list of supported <mode>s) OK	<u>Syntax</u> AT+CALM=?	<u>Response</u> +CALM: (list of supported <mode>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CALM?	<u>Response</u> +CALM: <mode> OK	<u>Syntax</u> AT+CALM?	<u>Response</u> +CALM: <mode> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CALM= [<mode>]	<u>Response</u> OK <u>Parameter</u> <mode> <u>0</u> Normal mode 1 Silent mode (all sounds from MT are prevented)	<u>Syntax</u> AT+CALM= <mode>	<u>Response</u> OK <u>Parameter</u> <mode> <u>0</u> Normal mode 1 Silent mode (all sounds from MT are prevented)
<u>Reference</u> [27.007] § 8.20	<u>Notes</u> In the case of <mode> =1, all sounds from TA are prevented except the sound of an incoming call (sound of incoming call treated by +CRSL command)	<u>Reference</u> [27.007] § 8.20	<u>Examples</u> AT+CALM? +CALM: 0 OK AT+CALM=1 OK AT+CALM=? +CALM: (0-1)

5.38. +CRSL Command: Ringer Sound Level

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CRSL=?	<u>Response</u> +CRSL: (list of supported <level>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CRSL?	<u>Response</u> +CRSL: <level> OK
<i>Write command</i>	
<u>Syntax</u> AT+CRSL= <level>	<u>Response</u> OK <u>Parameter</u> <level> 0, 1, 2, 3 Integer type value with manufacturer specific range (smallest value represents the lowest sound level)
<u>Reference</u> [27.007] § 8.21	<u>Notes</u> This command is used to select the incoming call ringer sound level of the MT
<u>Examples</u>	AT+CRSL? +CRSL: 0 OK AT+CRSL=1 OK AT+CRSL=? +CRSL: (0-3)

5.39. +CLAN Command: Language

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CLAN=?	<u>Response</u> +CLAN: (list of supported <code>s) OK	<u>Syntax</u> AT+CLAN=?	<u>Response</u> OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CLAN?	<u>Response</u> +CLAN: <code> OK	<u>Syntax</u> AT+CLAN?	<u>Response</u> +CLAN: <In> <u>Parameter</u> <In> Two letter abbreviation of the language. The language codes, as defined in ISO 639, consists of two characters, e.g. "sv", "en" etc.
<i>Write command</i>			
<u>Syntax</u> AT+CLAN= <code>	<u>Response</u> OK <u>Parameter</u> <code> "auto" ,"en"		
<u>Reference</u>	[27.007] § 8.30		

5.40. +CCHO Command: Open Logical Channel

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CCHO=?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+CCHO= <dfname>	<u>Response</u> <session_id> OK or +CME ERROR: <err> <u>Parameters</u> <dfname> DF name coded on 1 to 16 bytes that references to all selectable application in the UICC <session_id> Session ID to be used in order to target a specific application on the smart card using logical channels mechanism (string without double quotes that represents a decimal value).
<u>Notes</u>	The +CCHO execute command gives the <session_id> when it receives SIM application response Status words as shown below: '90' '00' – normal ending of the command '91' 'XX' – normal ending of the command with extra information from the proactive UICC containing a command for the terminal.length 'XX' of the response data '92' 'XX' – normal ending of the command with extra information concerning an ongoing data transfer session

5.41. +CCHC Command: Close Logical Channel

Note: For HL85xxx only.

HL85xxx	
Test command	
<u>Syntax</u> AT+CCHC=?	<u>Response</u> OK
Write command	
<u>Syntax</u> AT+CCHC= <session_id>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> Session ID to be used in order to target a specific application on the smart card using logical channels mechanism (string without double quotes that represents a decimal value).

5.42. +CGLA Command: Generic UICC Logical Channel Access

Note: For HL85xxx only.

HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+CGLA= <sessionid> , <length> , <command>	<u>Response</u> +CGLA: <length>,<response> OK or +CME ERROR: <err> <u>Parameters</u> <sessionid> Integer type; used as the identifier of the session to be used in order to send the APDU commands to the UICC. It is mandatory in order to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0"). <length> integer type; length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response). <command> command passed on by the MT to the UICC in the format as described in 3GPP TS 31.101 in hexadecimal format (refer to +CSCS). <response> response to the command passed on by the UICC to the MT in the format as described in 3GPP TS 31.101 in hexadecimal format (refer to +CSCS).

5.43. +CRLA Command: Restricted UICC Logical Channel Access

Note: For HL85xxx only.

HL85xxx															
Write command															
<u>Syntax</u> AT+CRLA= <sessionid> , <command> [,<file id>[,<P1> , <P2>,<P3> [,<data> [,<pathid>]]]]>	<u>Response</u> +CRLA: <sw1>,<sw2>[,<response>] OK or +CME ERROR: <err>														
	<u>Parameters</u> <sessionid> Integer type which identifies the session to be used in order to send the APDU commands to the UICC. It is mandatory in order to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0"). <command> <table> <tr><td>176</td><td>READ BINARY</td></tr> <tr><td>178</td><td>READ RECORD</td></tr> <tr><td>192</td><td>GET RESPONSE</td></tr> <tr><td>214</td><td>UPDATE BINARY</td></tr> <tr><td>220</td><td>UPDATE RECORD</td></tr> <tr><td>242</td><td>STATUS</td></tr> <tr><td>219</td><td>SET DATA</td></tr> </table> All other values are reserved <fileid> integer type that identifies the elementary datafile on SIM. Mandatory for every <command> except STATUS. <P1>, <P2>, <P3> integer type; parameters passed on by the MT to the UICC. These parameters are mandatory for every command, except GET RESPONSE and STATUS. <data> information which shall be written to the SIM in hexadecimal format	176	READ BINARY	178	READ RECORD	192	GET RESPONSE	214	UPDATE BINARY	220	UPDATE RECORD	242	STATUS	219	SET DATA
176	READ BINARY														
178	READ RECORD														
192	GET RESPONSE														
214	UPDATE BINARY														
220	UPDATE RECORD														
242	STATUS														
219	SET DATA														

HL85xxx	
	<pathid> string type containing the path of an elementary file on the UICC in hexadecimal format. <sw1>, <sw2> integer type; information from the UICC about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command. <response> response of a successful completion of the command previously issued in hexadecimal format. STATUS and GET RESPONSE returns data, which gives information about the current elementary datafield. This information includes the type of file and its size (refer to 3GPP TS 31.101). After READ BINARY, READ RECORD or RETRIEVE DATA command the requested data will be returned.
<u>Notes</u>	By using this command instead of generic UICC access command, +CGLA, the TE application has an easier but more limited access to the UICC database

5.44. +CUAD Command: UICC Application Discovery

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CUAD=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CUAD	<u>Response</u> <response> OK or +CME ERROR: <err> <u>Parameters</u> <response> string type in hexadecimal format. This is the content of the EFDIR.

5.45. +CRSM Command: Restricted SIM Access

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CRSM=?	<u>Response</u> OK	<u>Syntax</u> AT+CRSM=?	<u>Response</u> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CRSM= <command> [,<fileid>[,<P1> <P2>,<P3> [,<data>]]]	<u>Response</u> +CRSM: <sw1>,<sw2>[,<response>] OK <u>Parameters</u> <command> command passed on by the MT to the SIM; refer to GSM 51.011 [28] 176 READ BINARY 178 READ RECORD 192 GET RESPONSE 214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS all other values are reserved <fileid> integer type; this is the identifier of an elementary data file on SIM. Mandatory for every command except STATUS.	<u>Syntax</u> AT+CRSM= <command> [,<fileid>[,<P1> <P2>,<P3> [,<data> [,<pathid>]]]]	<u>Response</u> +CRSM: <sw1>,<sw2>[,<response>] OK or +CME ERROR: <err> <u>Parameters</u> <command> 176 READ BINARY 178 READ RECORD 192 GET RESPONSE 214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS <fileid> integer type; this is the identifier of an elementary data file on the SIM. Mandatory for every command except STATUS. 28423 IMSI file (6F07) 28473 ACM file (6F39) 28481 PUKT file (6F41) 28482 SMS file (6F42)

HL6528x	HL85xxx
<Pi> integer type; parameters passed on by the MT to the SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in GSM 51.011 [28] <data> information which shall be written to the SIM (hexadecimal character format; refer +CSCS) <swi> integer type; information from the SIM about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command	<P1>, <P2>, <P3> integer type defining the request. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in GSM 51.011 <data> information which shall be written to the SIM (hexadecimal character format; refer +CSCS) <sw1>, <sw2> integer type containing SIM information 0x90 0x00 normal entry of the command 0x9F 0xXX length XX of the response data 0x92 0x0X update successful but after using an internal retry routine X times 0x92 0x40 memory problem 0x94 0x00 no EF selected 0x94 0x02 out of range (invalid address) 0x94 0x04 file ID not found; pattern not found 0x94 0x08 file is inconsistent with the command 0x98 0x02 no CHV initialized 0x98 0x04 access cond. Not fullfiled / unsucc. CHV verify / authent.failed 0x98 0x08 in contradiction with CHV status 0x98 0x10 in contradiction with invalidation status 0x98 0x40 unsucc. CHV-verif. Or UNBLOCK CHF / CHV blocked /UNBL.blocked 0x98 0x50 increase can not be performed. Max. value reached 0x61 0xXX SW2 indicates the number of response bytes still available. Use Get Response to access this data. 0x62 0xXX Warning - state unchanged 0x62 0x00 Warning - no information provided 0x62 0x81 Warning - part of returned data may be corrupt 0x62 0x82 Warning - end of file/record reached (bad cmd) 0x62 0x83 Warning - selected file invalidated

HL6528x		HL85xxx	
		0x62 0x84	Warning - bad file control information format
		0x63 0xXX	Warning - state unchanged
		0x63 0x00	Warning - no information provided
		0x63 0x81	Warning - file filled up with last write
		0x63 0xCx	Warning - counter value is x
		0x64 0xXX	Error - state unchanged
		0x65 0xXX	Error - state changed
		0x65 0x00	Error - no information provided
		0x65 0x81	Error - memory failure 66 xx Security Error
		0x66 0xXX	Security Error
		0x67 0xXX	Incorrect parameter P3
		0x68 0xXX	Check Error - CLA function not supported
		0x68 0x00	Check Error - no information provided
		0x68 0x81	Check Error - logical channel not supported
		0x68 0x82	Check Error - secure messaging not supported
		0x69 0xXX	Check Error - command not allowed
		0x69 0x00	Check Error - no information provided
		0x69 0x81	Check Error - command incompatible with file structure
		0x69 0x82	Check Error - security status not satisfied
		0x69 0x83	Check Error - authentication method blocked
		0x69 0x84	Check Error - referenced data invalidated
		0x69 0x85	Check Error - conditions of use not satisfied
		0x69 0x86	Check Error - command not allowed (no current EF)
		0x69 0x87	Check Error - expected SM data objects missing
		0x69 0x88	Check Error - SM data objects incorrect
		0x6A 0xXX	Check Error - wrong parameters
		0x6A 0x00	Check Error - no information provided
		0x6A 0x80	Check Error - incorrect parameters in data field
		0x6A 0x81	Check Error - function not supported
		0x6A 0x82	Check Error - file not found
		0x6A 0x83	Check Error - record not found

HL6528x		HL85xxx	
	<response> response of a successful completion of the command previously issued (hexadecimal character format; refer +CSCS). STATUS and GET RESPONSE return data, which gives information about the current elementary data field. This information includes the type of file and its size (refer GSM 51.011 [28]). After READ BINARY or READ RECORD command the requested data will be returned. <response> is not returned after a successful UPDATE BINAR or UPDATE RECORD command		0x6A 0x84 Check Error - not enough memory space in the file 0x6A 0x85 Check Error - Lc vailable on with TLV structure 0x6A 0x86 Check Error - vailable on parameters P1-P2 0x6A 0x87 Check Error - Lc vailable on with P1-P2 0x6A 0x88 Check Error - referenced data not found 0x6B 0xXX Incorrect parameter P1 or P2 0x6C 0xXX Check Error - wrong length - xx is the correct length 0x6D 0xXX Unknown instruction code given in the command 0x6E 0xXX Wrong instruction class given in the command 0x6F 0xXX Technical problem with no diagnostic given <response> response of successful completion of the command previously issued in hexadecimal character format; refer to +CSCS. STATUS and GET RESPONSE returns data, which gives information about the current elementary datafield. This information includes the type of file and its size (refer to GSM 51.011 [28]). After READ BINARY or READ RECORD commands, the requested data will be returned. <response> is not returned after a successful UPDATE BINARY or UPDATE RECORD command. <pathid> string type that contains the path of an elementary file on the SIM/USIM in hexadecimal format as defined in ETSI TS 102 221 (e.g. "7F205F70" in SIM and USIM case).
<u>Example</u>	Read EF_{ICCID} (ICC Identification, unique identification number of the SIM): AT+CRSM=176,12258,0,0,10 +CRSM: 144,0,"89330126239181282150" So ICC number is 98331062321918821205		

HL6528x		HL85xxx	
<u>Reference</u> [27.007] § 8.18	<u>Notes</u> - For the command READ_BINARY, no transparent file greater than 256 bytes exists. So <P1> parameter is always 0 in SAP. (If <P1> != 0, AT+CRSM will return ERROR to TE). <P1> is not interesting (error if <P1>>256), <P2> is an offset in the range 0-256, <P3> has a maximum value depending of <P2>. SAP returns always 256 bytes (maximum). If we can use <P2> and <P3>, ATP reads the zones it wants, else ERROR - For the command READ_RECORD, only mode <P2>="04" (absolute) is supported in SAP. (Other modes seem not to be useful) - For the command UPDATE_BINARY, only <P1>="00" and <P2>="00" is possible in SAP. (Same reason as previously: other modes seem not to be useful) - For the command UPDATE_RECORD, as mentioned in the 11.11 recommendation, only PREVIOUS mode (<P2>="03") is allowed for updates on cyclic file. For linear files, SAP only supports mode <P2>="04" (absolute) - For the commands STATUS and GET_RESPONSE, If <FileId> is not given, the command must be done on the last selected file: ATP must memorize <FileId> of the last command (3F00 at the initialization of ATP, by default) Moreover, v_LengthPattern = 0	<u>Notes</u>	By using this command instead of generic SIM access command, +CSIM, the DTE application has an easier but more limited accessto the SIM database.

5.46. +CEAP Command: EAP Authentication

Note: For HL85xxx only.

HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+CEAP= <dfname>, <EAPMethod>, <EAP packet data>[,<DFeap>]	<u>Response</u> +CEAP: <EAPsessionid>,<EAP packet response> OK or +CME ERROR: <err> <u>Parameters</u> <dfname> string type in hexadecimal format. All selectable applications are represented in the UICC by an AID coded on 1 to 16 bytes. <EAPMethod> string type in hexadecimal format.The value range for 1 byte format and for 8 bytes expanded format is defined in RFC 3748. <EAP packet data> string type in hexadecimal format <DFeap> string type in hexadecimal format <EAPsessionid> [1...4294967295] identifier of the EAP session to be used in order to retrieve the EAP parameters with EAP Retreive Parameters (+CERP) command. <EAP packet response> string type in hexadecimal format

5.47. +CERP Command: EAP Retrieve Parameters

Note: For HL85xxx only.

HL85xxx		
Write command		
<u>Syntax</u>	<u>Response</u>	
AT+CERP=	+CERP: <EAP parameter response>	
<EAPsessionid>,	OK	
<EAPparameter>		
	or	
	+CME ERROR: <err>	
	<u>Parameters</u>	
<EAPparameter>	1	Keys
	2	Status
	3	Identity
	4	Pseudonym
<EAPsessionid>	1 – 4294967295	Identifier of the EAP session to be used in order to retrieve the EAP parameters corresponding to an active EAP session.
<EAP parameter response>	String type in hexadecimal format	

5.48. +CSGT Command: Greeting Text

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT+CSGT=?	<u>Response</u> +CSGT: (list of supported <mode>s), <text> OK
<i>Read command</i> <u>Syntax</u> AT+CSGT?	<u>Response</u> +CSGT: <text> , <mode> OK
<i>Write command</i> <u>Syntax</u> AT+CSGT= <mode>[, <text>]	<u>Response</u> OK <u>Parameter</u> <text> See [27.007] <mode> 0, 1
<u>Reference</u> [27.007] § 8.32	<u>Notes</u> - The mode is not saved, therefore: - setting the mode to 0, even with a text as parameter is equivalent to setting the mode to 1 with an empty string (the greeting text is lost) - the test command returns 1 if and only if the saved text is not empty (in other words +CSGT=1,then +CSGT? returns 0) - This command handles the greeting text in the SIM cards if it exists else the greeting text is handled in EEPROM

5.49. +CSVM Command: Voice Mail Number

HL6528x			HL85xxx														
<i>Test command</i>			<i>Test command</i>														
Syntax AT+CSVM=?	<u>Response</u> +CSVM: (list of supported mode >s), (list of supported <type> s) OK		Syntax AT+CSVM=?	<u>Response</u> +CSVM: (list of supported mode >s), (list of supported <type> s) OK or +CME ERROR: <err>													
<i>Read command</i>			<i>Read command</i>														
Syntax AT+CSVM?	<u>Response</u> +CSVM: <mode> , <number> , <type> OK		Syntax AT+CSVM?	<u>Response</u> +CSVM: <mode>,<number>,<type> OK or +CME ERROR: <err>													
<i>Write command</i>			<i>Write command</i>														
Syntax AT+CSVM= <mode> [, <number> [, <type>]]	<u>Response</u> OK <u>Parameter</u> <table><tr><td><mode></td><td>0</td><td>Disable the voice mail number. Removes the information about the voice number instead of setting the number as disabled</td></tr><tr><td></td><td>1</td><td>Enable the voice mail number.</td></tr></table>		<mode>	0	Disable the voice mail number. Removes the information about the voice number instead of setting the number as disabled		1	Enable the voice mail number.	Syntax AT+CSVM= <mode> [,<number> [,<type>]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <table><tr><td><mode></td><td>0</td><td>Disable the voice mail number. <number> and <type> are not required if <mode> = 0.</td></tr><tr><td></td><td>1</td><td>Enable the voice mail number</td></tr></table>		<mode>	0	Disable the voice mail number. <number> and <type> are not required if <mode> = 0.		1	Enable the voice mail number
<mode>	0	Disable the voice mail number. Removes the information about the voice number instead of setting the number as disabled															
	1	Enable the voice mail number.															
<mode>	0	Disable the voice mail number. <number> and <type> are not required if <mode> = 0.															
	1	Enable the voice mail number															

HL6528x		HL85xxx	
	<number> string type; Character string <0..9,+> <type> default 145 when dialing string includes international access code character "+", otherwise 129		<number> string type; Character string <0..9,+> <type> type of address octet in integer format (refer to TS 24.008 subclause 10.5.4.7). Default value is 145 when dialing string includes international access code character "+"; otherwise, default value is 129.
Reference [27.007] § 8.33	<u>Notes</u> The command type SET allows to modify the existing Voice Mail Number or to create a Voice Mail number if no existing Voice Mail number	Reference [27.007] § 8.33	<u>Notes</u> The command type SET allows to modify the existing Voice Mail Number or to create a Voice Mail number if no existing Voice Mail number

5.50. +KGSMAD Command: GSM/UMTS Antenna Detection

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KGSMAD=?	<u>Response</u> +KGSMAD: <mod>,<urcmode>,<interval>,<detGPIO>,<repGPIO> OK	<u>Syntax</u> AT+KGSMAD=?	<u>Response</u> +KGSMAD: (list of supported <mod>s),(list of supported <urcmode>s),(list of supported <interval>s),(list of supported <detGPIO>s),(list of supported <repGPIO>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KGSMAD?	<u>Response</u> +KGSMAD: <mod>,<urcmode>,<interval>,<detGPIO>,<repGPIO> OK	<u>Syntax</u> AT+KGSMAD?	<u>Response</u> +KGSMAD: <mod>,<urcmode>,<interval>,<detGPIO>,<repGPIO> OK

HL6528x			HL85xxx																						
<i>Write command</i>			<i>Write command</i>																						
<u>Syntax</u> AT+KGSMAD= <mod>, [<urcmode> [,<interval> [,<detGPIO> [,<repGPIO>]]]]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><mod></td><td>0</td><td>Disable antenna detection</td></tr><tr><td></td><td>1</td><td>Periodic antenna detection</td></tr><tr><td></td><td>2</td><td>Instantaneous antenna detection</td></tr></table> <urcmode> URC presentation mode. This parameter only means something if <mod> = 1. 0 Disable the presentation of antenna detection URC <u>1</u> Enable the presentation of antenna detection URC <interval> 45 – 3600 seconds Interval (in seconds) between two detections and only means something if <mod> = 1. Default value = <u>120</u> . <detGPIO> 1 – 8 Defines which GPIO is used as input by the antenna detection algorithm. Default value = <u>5</u> . <repGPIO> <u>1</u> – 8 Defines which GPIO is used as output by the antenna detection algorithm and only means something is <mod> = 1. Default value = <u>1</u> .		<mod>	0	Disable antenna detection		1	Periodic antenna detection		2	Instantaneous antenna detection	<u>Syntax</u> AT+KGSMAD= <mod>, [<urcmode> [,<interval> [,<detGPIO> [,<repGPIO>]]]]			<u>Response</u> OK <u>Parameters</u> <table><tr><td><mod></td><td>0</td><td>Disable antenna detection</td></tr><tr><td></td><td>1</td><td>Periodic antenna detection</td></tr><tr><td></td><td>2</td><td>Instantaneous antenna detection</td></tr></table> <urcmode> URC presentation mode. This parameter only means something if <mod> = 1. 0 Disable the presentation of antenna detection URC <u>1</u> Enable the presentation of antenna detection URC <interval> 45 – 3600 seconds Interval (in seconds) between two detections and only means something if <mod> = 1. Default value = <u>120</u> . <detGPIO> 1 – 8, 10 – 12, 15 Defines which GPIO is used as input by the antenna detection algorithm. Default value = <u>5</u> . <repGPIO> 1 – 8, 10 – 12, 15 Defines which GPIO is used as output by the antenna detection algorithm and only means something is <mod> = 1. Default value = <u>7</u> .		<mod>	0	Disable antenna detection		1	Periodic antenna detection		2	Instantaneous antenna detection
<mod>	0	Disable antenna detection																							
	1	Periodic antenna detection																							
	2	Instantaneous antenna detection																							
<mod>	0	Disable antenna detection																							
	1	Periodic antenna detection																							
	2	Instantaneous antenna detection																							
<u>Notes</u>	• <repGPIO> is set to LOW when the antenna is connected; otherwise, it is set to HIGH. • If the antenna detection algorithm detects a change in the antenna status, the module is notified by URC: +KGSMAD: <presence> where <presence>: 0 - antenna connected 1 - antenna connector short circuited to ground 2 - antenna connector short circuited to power 3 - antenna not detected (open)		<u>Notes</u>	• <repGPIO> is set to LOW when the antenna is connected; otherwise, it is set to HIGH. • If the antenna detection algorithm detects a change in the antenna status, the module is notified by URC: +KGSMAD: <presence> where <presence>: 0 - antenna connected 1 - antenna connector short circuited to ground 2 - antenna connector short circuited to power 3 - antenna not detected (open)																					

HL6528x		HL85xxx	
	- GPIOs may already be used by +KSIMDET, +KJAMDET, +KJAM, +KSYNC, +KTEMPMON, +KSIMSLOT or I²C - Configure GPIOs with +KGPIOCFG when using this command. - Instantaneous activation doesn't affect a periodic activation that has already been started. - CME error 23 will be reported, when module start up, because of boot up of file system.		- This command will return ERROR if the selected GPIO is already being used by another feature. Check GPIO availability with other related commands +KSIMDET, +KSIMSEL, +KSYNC, +KJAM, +GSMAD, +GNSSAD, and +KTEMPMON when using this command. - Configure GPIOs with +KGPIOCFG when using this command. - Instantaneous activation doesn't affect a periodic activation that has already been started. - When <mod> = 2, the result is reported by URC +KGSMAD: <presence>

5.51. +KGNSSAD Command: GNSS Antenna Detection

Note: For HL854x-G only.

HL854x-G	
<i>Test command</i> <u>Syntax</u> AT+KGNSSAD=?	<u>Response</u> +KGNSSAD: (list of supported <mod>s),(list of supported <urcmode>s),(list of supported <interval>s),(list of supported <detGPIO>s),(list of supported <repGPIO>s) OK
<i>Read command</i> <u>Syntax</u> AT+KGNSSAD?	<u>Response</u> +KGNSSAD: <mod>,<urcmode>,<interval>,<detGPIO>,<repGPIO> OK

HL854x-G	
<i>Write command</i> <u>Syntax</u> AT+KGNSSAD= <mod>, [<urcmode> [,<interval> [,<detGPIO> [,<repGPIO>]]]]	<u>Response</u> OK <u>Parameters</u> <mod> 0 Disable antenna detection 1 Periodic antenna detection 2 Instantaneous antenna detection <urcmode> URC presentation mode. This parameter only means something if <mod> = 1. 0 Disable the presentation of antenna detection URC 1 Enable the presentation of antenna detection URC <interval> 45 – 3600 seconds Interval (in seconds) between two detections and only means something if <mod> = 1. Default value = <u>120</u>. <detGPIO> 1 – 8, 10 – 12, 15 Defines which GPIO is used as input by the antenna detection algorithm. Default value = <u>1</u>. <repGPIO> 1 – 8, 10 – 12, 15 Defines which GPIO is used as output by the antenna detection algorithm to report antenna condition and only means something if <mod> = 1. Default value = <u>8</u>.
<u>Notes</u>	• <repGPIO> is set to LOW when the antenna is connected; otherwise, it is set to HIGH. • If the antenna detection algorithm detects a change in the antenna status, the module is notified by URC: +KGNSSAD: <presence> where <presence>: 0 - antenna connected 1 - antenna connector short circuited to ground 2 - antenna connector short circuited to power 3 - antenna not detected (open) • This command will return ERROR if the selected GPIO is already being used by another feature. Check GPIO availability with other related commands +KSIMDET, +KSIMSEL, +KSYNC, +KJAM, +GSMAD, +GNSSAD, and +KTEMPMON when using this command. • Configure GPIOs with +KGPIOCFG when using this command. • Instantaneous activation doesn't affect a periodic activation that has already been started. • When <mod> = 2, the result is reported by URC +KGNSSAD: <presence>

5.52. +KMCLASS Command: Change GPRS and EGPRS Multislot Class

HL6528x		HL85xxx																																											
<i>Test command</i>		<i>Test command</i>																																											
<u>Syntax</u> AT+KMCLASS=?	<u>Response</u> +KMCLASS: (list of supported <class>s) OK	<u>Syntax</u> AT+KMCLASS=?	<u>Response</u> +KMCLASS: (list of supported <mclass>es) OK																																										
<i>Read command</i>		<i>Read command</i>																																											
<u>Syntax</u> AT+KMCLASS?	<u>Response</u> +KMCLASS: <class> OK	<u>Syntax</u> AT+KMCLASS?	<u>Response</u> +KMCLASS: <mclass> OK																																										
<i>Write command</i>		<i>Write command</i>																																											
<u>Syntax</u> AT+KMCLASS= <mclass>	<u>Response</u> OK <u>Parameter</u> <mclass> 1 1 + 1 2 2 + 1 4 3 + 1 8 4 + 1 10 4 + 2	<u>Syntax</u> AT+KMCLASS= <mclass>	<u>Response</u> OK <u>Parameter</u> <mclass> <table> <thead> <tr> <th rowspan="2">Multislot Class</th><th colspan="2">Maximum Number of Slots</th><th rowspan="2">Sum</th></tr> <tr> <th>Rx</th><th>Tx</th></tr> </thead> <tbody> <tr><td>1</td><td>1</td><td>1</td><td>2</td></tr> <tr><td>2</td><td>2</td><td>1</td><td>3</td></tr> <tr><td>3</td><td>2</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>3</td><td>1</td><td>4</td></tr> <tr><td>5</td><td>2</td><td>2</td><td>4</td></tr> <tr><td>6</td><td>3</td><td>2</td><td>4</td></tr> <tr><td>7</td><td>3</td><td>3</td><td>4</td></tr> <tr><td>8</td><td>4</td><td>1</td><td>5</td></tr> <tr><td>9</td><td>3</td><td>2</td><td>5</td></tr> </tbody> </table>	Multislot Class	Maximum Number of Slots		Sum	Rx	Tx	1	1	1	2	2	2	1	3	3	2	2	3	4	3	1	4	5	2	2	4	6	3	2	4	7	3	3	4	8	4	1	5	9	3	2	5
Multislot Class	Maximum Number of Slots		Sum																																										
	Rx	Tx																																											
1	1	1	2																																										
2	2	1	3																																										
3	2	2	3																																										
4	3	1	4																																										
5	2	2	4																																										
6	3	2	4																																										
7	3	3	4																																										
8	4	1	5																																										
9	3	2	5																																										

HL6528x		HL85xxx																													
			<table> <tr><td>10</td><td>4</td><td>2</td><td>5</td></tr> <tr><td>11</td><td>4</td><td>3</td><td>5</td></tr> <tr><td>12 (default)</td><td>4</td><td>4</td><td>5</td></tr> <tr><td>30*</td><td>5</td><td>1</td><td>6</td></tr> <tr><td>31*</td><td>5</td><td>2</td><td>6</td></tr> <tr><td>32*</td><td>5</td><td>3</td><td>6</td></tr> <tr><td>33*</td><td>5</td><td>4</td><td>6</td></tr> </table> * Multislot class 30, 31, 32 and 33 are not supported by the HL8518, HL8528 and HL8529.	10	4	2	5	11	4	3	5	12 (default)	4	4	5	30*	5	1	6	31*	5	2	6	32*	5	3	6	33*	5	4	6
10	4	2	5																												
11	4	3	5																												
12 (default)	4	4	5																												
30*	5	1	6																												
31*	5	2	6																												
32*	5	3	6																												
33*	5	4	6																												
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command needs a restart in order to be effective	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command works with a SIM card inserted in the modem - Change is effective on the next call <mclass> is automatically stored in non-volatile memory																												
		<u>Examples</u>	// For HL854xx AT+KMCLASS=? +KMCLASS: (1-12,30-33) OK <remove the SIM card> AT+CMEE=1 OK AT+KMCLASS? +CME ERROR: 10 <insert the SIM card> AT+KMCLASS? +KMCLASS: 12 OK																												

HL6528x	HL85xxx
	<Test on GSM only> AT+KSRAT=1 OK <PS Connect Test Mode, check 4 Rx, 4 Tx, Sum 5> <Disconnect> AT+KMCLASS=31 OK AT+KMCLASS? +KMCLASS: 31 OK <PS Connect Test Mode, check 5 Rx, 2 Tx, Sum 6> <Disconnect> <Test on 3G only> AT+KSRAT=2 OK <Connect Test Mode, check 5 Rx, 2 Tx, Sum 6> <Disconnect> // For HL8518, HL8528 and HL8529 AT+KMCLASS=? +KMCLASS: (1-12) OK AT+KMCLASS? +KMCLASS: 12 OK

HL6528x		HL85xxx	
			<Test on GSM only> AT+KSRAT=1 OK <PS Connect Test Mode, check 4 Rx, 4 Tx, Sum 5> <Disconnect> AT+CMEE=1 OK AT+KMCLASS=31 +CME ERROR: 4 AT+KMCLASS? +KMCLASS: 12 OK <Test on 3G only> AT+KSRAT=2 OK <Connect Test Mode, check 4 Rx, 4 Tx, Sum 5> <Disconnect>

5.53. +KTEMPMON Command: Temperature Monitor

HL6528x			HL85xxx														
<i>Test command</i>			<i>Test command</i>														
<u>Syntax</u> AT+KTEMPMON=?	<u>Response</u> +KTEMPMON: <mod>,<temperature>,<urcMode>,<action>,<hystTime>,<repGPIO> OK		<u>Syntax</u> AT+KTEMPMON=?	<u>Response</u> +KTEMPMON: (list of supported <mod>s),(list of supported <temperature>s),(list of supported <urcMode>s),(list of supported <action>s),(list of supported <hystTime>s),(list of supported <repGPIO>s) OK													
<i>Read command</i>			<i>Read command</i>														
<u>Syntax</u> AT+KTEMPMON?	<u>Response</u> +KTEMPMON: <mod>,<temperature>,<urcMode>,<action>,<hystTime>,<repGPIO> OK		<u>Syntax</u> AT+KTEMPMON?	<u>Response</u> +KTEMPMON: <mod>,<temperature>,<urcMode>,<action>,<hystTime>,<repGPIO> OK													
<i>Write command</i>			<i>Write command</i>														
<u>Syntax</u> AT+KTEMPMON=<mod>,<temperature>,<urcMode>,<action>,<hystTime>,<repGPIO>]	<u>Response</u> +KTEMPMON: <level>,<value> OK <u>Parameters</u> <table><tr><td><mod></td><td><u>0</u></td><td>Disable the module's internal temperature monitor</td></tr><tr><td></td><td>1</td><td>Enable the module's internal temperature monitor</td></tr></table> <temperature> Temperature limit before the module acts as defined by <action> . Default value: 0		<mod>	<u>0</u>	Disable the module's internal temperature monitor		1	Enable the module's internal temperature monitor	<u>Syntax</u> AT+KTEMPMON=<mod>,<temperature>,<urcMode>,<action>,<hystTime>,<repGPIO>]	<u>Response</u> +KTEMPMON: <level>,<value> OK <u>Parameters</u> <table><tr><td><mod></td><td><u>0</u></td><td>Disable the module's internal temperature monitor</td></tr><tr><td></td><td>1</td><td>Enable the module's internal temperature monitor</td></tr></table> <temperature> Temperature limit before the module acts as defined by <action> . Range = 0 – 150; default value = 0		<mod>	<u>0</u>	Disable the module's internal temperature monitor		1	Enable the module's internal temperature monitor
<mod>	<u>0</u>	Disable the module's internal temperature monitor															
	1	Enable the module's internal temperature monitor															
<mod>	<u>0</u>	Disable the module's internal temperature monitor															
	1	Enable the module's internal temperature monitor															

HL6528x		HL85xxx	
	<urcMode> 0 Disables the presentation of the temperature monitor URC 1 Enables the presentation of the temperature monitor URC <action> 0 No action 1 Automatic shut-down when the temperature is beyond <temperature> 2 The output pin <repGPIO> is tied HIGH when <temperature> is reached; when the temperature is normal the output pin <repGPIO> is tied LOW. Note that if this parameter is required, it is mandatory to set the <repGPIO> parameter. <hyst_time> [0,255] Hysteresis time in seconds. All action will only happen if <temperature> is maintained for at least as long as this period. This parameter is mandatory if <action> is not zero. Default value: 30. <repGPIO> 1 – 8 Defines which GPIO is used as output pin. This parameter is mandatory only if <action>=2 is required. Default value: 1.		<urcMode> 0 Disables the presentation of the temperature monitor URC 1 Enables the presentation of the temperature monitor URC <action> 0 No action 1 Automatic shut-down when the temperature is beyond <temperature> 2 The output pin <repGPIO> is tied HIGH when <temperature> is reached; when the temperature is normal the output pin <repGPIO> is tied LOW. Note that if this parameter is required, it is mandatory to set the <repGPIO> parameter. <hyst_time> [0,255] Hysteresis time in seconds. All action will only happen if <temperature> is maintained for at least as long as this period. This parameter is mandatory if <action> is not zero. Default value: 30. <repGPIO> 1 – 8, 10 – 12, 15 Defines which GPIO is used as output pin. This parameter is mandatory only if <action>=2 is required. Default value: 12.
<u>Notes</u>	- When the module's internal temperature reaches either operating or extreme levels; the unsolicited message is in the format: +KTEMPMEAS: <level>,<value> where: <level> is the threshold level: -2 extreme temperature lower bound (-40°C) -1 operating temperature lower bound (-20°C) 0 normal temperature 1 operating temperature upper bound (+55°C) 2 extreme temperature upper bound (+85°C)	<u>Notes</u>	- When the module's internal temperature reaches either operating or extreme levels; the unsolicited message is in the format: +KTEMPMEAS: <level>,<value> where: <level> is the threshold level: -2 extreme temperature lower bound (-40°C) -1 operating temperature lower bound (-20°C) 0 normal temperature 1 operating temperature upper bound (+90°C) 2 extreme temperature upper bound (+107°C)

HL6528x		HL85xxx	
	<value> is the actual temperature expressed in degrees Celsius - Due to temperature measurement uncertainty there is a tolerance of +/-2°C - Check available GPIOs with +KGPIOCFG when using this command - GPIOs may already be used by +KSIMDET, +KJAMDET, +KJAM, +KSYNC, +KGSMAD, +KSIMSLOT or I²C - CME error 23 will be reported, when module start up, because of boot up of file system		<value> is the actual temperature expressed in degrees Celsius - Due to temperature measurement uncertainty there is a tolerance of +/-2°C - Check available GPIOs with +KGPIOCFG when using this command - This command will return ERROR if the selected GPIO is already being used by another feature. Check GPIO availability with other related commands +KSIMDET, +KSIMSEL, +KSYNC, +KJAM, +GSMAD, +GNSSAD, and +KTEMPMON when using this command.

5.54. +KSIMDET Command: SIM Detection

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KSIMDET=?	<u>Response</u> +KSIMDET: (list of supported <mod>s), (list of supported <selected_sim>s) OK	<u>Syntax</u> AT+KSIMDET=?	<u>Response</u> +KSIMDET: (list of supported <mod>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KSIMDET?	<u>Response</u> +KSIMDET: <mod>,3,1 +KSIMDET: <mod>,4,2 OK	<u>Syntax</u> AT+KSIMDET?	<u>Response</u> +KSIMDET: <mod> OK

HL6528x		HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+KSIMDET= <mod>,<selected_ _sim>	<u>Response</u> OK <u>Parameters</u> <mod> 0 Disable SIM detection 1 Enable SIM detection <selected_sim> 1 First external SIM 2 Second external SIM	<i>Write command</i> <u>Syntax</u> AT+KSIMDET= <mod>	<u>Response</u> OK <u>Parameters</u> <mod> 0 Disable SIM detection 1 Enable SIM detection
<u>Notes</u>	- If it detects a change of the SIM status, the module is notified by URC: +SIM: <status>,<selected_sim> where: <status> 0 - EXTRACTED 1 - INSERTED - If UIM1_DET is enabled, the HOT Plug feature is automatically enabled. Refer to the Air Prime HL6528x Dual SIM Dual Standby Application Note for more information - UIM1_DET (GPIO 3) is used for SIM1 detection, while UIM2_DET (GPIO 4) is used for SIM2 detection. When SIM detection is disabled, both GPIO 3 and GPIO 4 will be free for customer use via the +KGPIO command (configured to output, no pull) - GPIOs may already be used by +KSIMSEL, +KJAMDET, +KSYNC, +KTEMPMON, +KGSMAD, +KSIMSLT or I²C +KJAM and +KJAMDET commands can be used simultaneously but may not answer the same result. - This command can be supported even without SIM card - The setting of <mod> will be kept after the module reboots	<u>Notes</u>	- If it detects a change of the SIM status, the module is notified by URC: +SIM: <status> where: <status> 0 - EXTRACTED 1 - INSERTED - UIM1_DET (GPIO 3) is used for SIM1 detection, while GPIO 4 is used for SIM2 detection. When SIM detection is disabled, both GPIO 3 and GPIO 4 will be free for customer use via the +KGPIO command (configured to output, no pull) - This command can be supported even without SIM card - The setting of <mod> will be kept after the module reboots - Disable SIM detection is not allowed when +KSIMSEL <mode>=3

HL6528x		HL85xxx	
	This command is not available when the DSSS feature is embedded (feature presence is indicated via +KBCAP)		
<u>Examples</u>	<A SIM card is inserted on slot 1> AT+KSIMDET? // read current setting +KSIMDET: 1,3,1 +KSIMDET: 0,4,2 OK +SIM: 0,1 // SIM card is removed +SIM: 1,1 // SIM card is inserted AT+KSIMDET=? // check supported setting +KSIMDET: (0-1),(1-2) OK AT+KSIMDET=0,1 // disable SIM detection on slot 1 OK <No URC indication when SIM card is removed or inserted in slot 1> AT+KSIMDET? // read current setting +KSIMDET: 0,3,1 +KSIMDET: 0,4,2 OK <Reboot module> AT+KSIMDET? // read current setting +KSIMDET: 0,3,1 +KSIMDET: 0,4,2 OK	<u>Examples</u>	<A SIM card is inserted> AT+KSIMDET? // read current setting +KSIMDET: 1 OK +SIM: 0 // SIM card is removed +SIM: 1 // SIM card is inserted AT+KSIMDET=? // check supported setting +KSIMDET: (0-1) OK AT+KSIMDET=0 // disable SIM detection OK <No URC indication when SIM card is removed or inserted> AT+KSIMDET? // read current setting +KSIMDET: 0 OK <Reboot module> AT+KSIMDET? // read current setting +KSIMDET: 0 OK

5.55. +KSIMSEL Command: SIM Selection

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KSIMSEL=?	<u>Response</u> +KSIMSEL: (list of supported <sim_used>s) OK	<u>Syntax</u> AT+KSIMSEL=?	<u>Response</u> +KSIMSEL: (list of supported <mode>s),(list of supported <GPIO>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KSIMSEL?	<u>Response</u> +KSIMSEL: <sim_used> OK	<u>Syntax</u> AT+KSIMSEL?	<u>Response</u> +KSIMSEL: <mode>[,<GPIO>[,<sim_used>]] OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KSIMSEL= <sim_used>	<u>Response</u> OK <u>Parameters</u> <sim_used> 1 First external SIM is currently used 2 Second external SIM is currently used	<u>Syntax</u> AT+KSIMSEL= <mode> [,<GPIO>]	<u>Response</u> [+KSIMSEL: 4,<sim1_pres>,<sim2_pres>] OK <u>Parameters</u> <mode> <u>0</u> Disable SIM selection. 1 Force to select the first external SIM. The presence of a second external SIM will be ignored. 2 Force to select the second external SIM. The presence of a first external SIM will be ignored. 3 Select the first external SIM if present else select the second external SIM 4 Read the SIM presence status <GPIO> 1 – 8, 10 – 12, 15 GPIO to be used for SIM selection. If omitted, the last valid GPIO will be used. <u>6</u> Default value

HL6528x		HL85xxx	
			<sim_used> 1 First external SIM is currently used 2 Second external SIM is currently used <sim1_pres> 0 First external SIM is not present 1 First external SIM is present <sim2_pres> 0 Second external SIM is not present 1 Second external SIM is present
<u>Notes</u>	- This command is available when DSSS feature is embedded (feature presence is indicated via +KBCAP) - The GPIO used for SIM switching is GPIO6 - Only one SIM is active at a time (DSSS: Dual SIM Single Standby)	<u>Notes</u>	- Only one SIM is active at a time (DSSS: Dual SIM Single Standby). - When the first external SIM is selected, <GPIO 9> is set LOW; whereas when the second external SIM is selected, <GPIO 9> is set HIGH. <sim_used> information is only available when <mode>=3. <sim1_pres> and <sim2_pres> information are only available when <mode>=4. - This command can be supported even without SIM card. - The setting of <mode> will be kept after the module reboots. - When SIM select feature is disabled, only the first external SIM interface is available and the dedicated GPIO is free for customer use via the +KGPI0 command (configured to output, no pull). - When <mode>=3, SIM selection is performed at the time the user enters the AT+KSIMSEL command and not afterwards (in case the SIM card is not present and inserted later). <mode>=3 and <mode>=4 are not available when SIM detection is disabled (AT+KSIMDET=0). <mode>=4 is not available when SIM selection is disabled (AT+KSIMSEL=0).

HL6528x		HL85xxx	
			- The module has to be rebooted whenever the +KSIMSEL state changes from enable (<mode>=1, 2 or 3) to disable (<mode>=0) or vice versa. - This command will return ERROR if the selected GPIO is already being used by another feature. Check GPIO availability with other related commands +KSIMDET, +KSIMSEL, +KSYNC, +KJAM, +GSMAD, +GNSSAD, and +KTEMPMON when using this command. - After selecting a SIM with this command, it is recommended to wait a few seconds before sending other AT commands to access the SIM context or check network status. The suggested wait time is about 3 – 4 seconds but may vary depending on SIM content and network.
<u>Examples</u>	AT+KSIMSEL=? //test command +KSIMSEL: (1-2) OK AT+KSIMSEL? //check current settings +KSIMSEL: 1 //first external SIM card is selected and //GPIO 6 is used as SIM selection pin OK AT+KSIMSEL=2 //force to select the second external SIM OK +CREG: 2 +CREG: 1 AT+KSIMSEL? +KSIMSEL:2 //second external SIM is selected and //GPIO 6 is used as SIM selection pin OK	<u>Examples</u>	AT+KSIMSEL=? //test command +KSIMSEL: (0-4),(1-8,10-12,15) OK AT+KSIMSEL? //check current settings +KSIMSEL: 1,6 //first external SIM card is selected and //GPIO 6 is used as SIM selection pin OK AT+KSIMSEL=2,6 //force to select the second external SIM OK +CREG: 2 +CREG: 1 AT+KSIMSEL? +KSIMSEL:2,6 //second external SIM is selected and //GPIO 6 is used as SIM selection pin OK

HL6528x		HL85xxx	
	AT+KSIMSEL=1 //force to select the first external SIM OK +CREG: 2 +CREG: 1		AT+KSIMSEL=1 //force to select the first external SIM OK +CREG: 2 +CREG: 1 AT+KSIMSEL? +KSIMSEL:1,6 //first external SIM is selected and GPIO 6 //is used as SIM selection pin OK AT+KSIMSEL=4 //read SIM card presence status +KSIMSEL: 4,0,1 //first external SIM is not present but //second external SIM is present OK AT+KSIMSEL=0 //disable SIM select feature, and free the //GPIO OK AT+KSIMSEL? +KSIMSEL: 0 //SIM select feature is disabled, the 1st //external SIM interface is active OK

5.56. +KSYNC Command: Application Synchronization Signal

HL6528x			HL85xxx																				
<i>Test command</i>			<i>Test command</i>																				
<u>Syntax</u> AT+KSYNC=?	<u>Response</u> +KSYNC: (list of supported <mod>s),(list of supported <IO>s),(range of <Duty Cycle>s),(range of <Pulse Duration>s) OK		<u>Syntax</u> AT+KSYNC=?	<u>Response</u> +KSYNC: (list of supported <mod>s),(list of supported <IO>s),(range of <Duty Cycle>s),(range of <Pulse Duration>s) OK																			
<i>Read command</i>			<i>Read command</i>																				
<u>Syntax</u> AT+KSYNC?	<u>Response</u> +KSYNC: <mod> , <IO> , <Duty Cycle> , <Pulse Duration> OK		<u>Syntax</u> AT+KSYNC?	<u>Response</u> +KSYNC: <mod> , <IO> , <Duty Cycle> , <Pulse Duration> OK																			
<i>Write command</i>			<i>Write command</i>																				
<u>Syntax</u> AT+KSYNC= <mod>[,<IO> [,<Duty Cycle> [,<Pulse Duration>]]]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><mod></td><td>0</td><td>Disable the generation of synchronization signal</td></tr><tr><td></td><td>1</td><td>Manage the generation of signal according to <Duty Cycle> and <Pulse Duration>. The waveform of the signal is controlled only by these two parameters; Network status would not affect the waveform</td></tr><tr><td></td><td>2</td><td>Manage the generation of signal according to network status; PERMANENTLY OFF: Not registered / Initialization / Registration denied / no SIM card 600 ms ON / 600ms OFF: Not registered but searching</td></tr></table>		<mod>	0	Disable the generation of synchronization signal		1	Manage the generation of signal according to <Duty Cycle> and <Pulse Duration> . The waveform of the signal is controlled only by these two parameters; Network status would not affect the waveform		2	Manage the generation of signal according to network status; PERMANENTLY OFF: Not registered / Initialization / Registration denied / no SIM card 600 ms ON / 600ms OFF: Not registered but searching	<u>Syntax</u> AT+KSYNC= <mod>[,<IO> [,<Duty Cycle> [,<Pulse Duration>]]]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><mod></td><td>0</td><td>Disable the generation of synchronization signal</td></tr><tr><td></td><td>1</td><td>Manage the generation of signal according to <Duty Cycle> and <Pulse Duration>. The waveform of the signal is controlled only by these two parameters; Network status would not affect the waveform</td></tr><tr><td></td><td>2</td><td>Manage the generation of signal according to CS network registration status; PERMANENTLY OFF: Not registered / Initialization / Registration denied / no SIM card 600 ms ON / 600ms OFF: Not registered but searching</td></tr></table>		<mod>	0	Disable the generation of synchronization signal		1	Manage the generation of signal according to <Duty Cycle> and <Pulse Duration> . The waveform of the signal is controlled only by these two parameters; Network status would not affect the waveform		2	Manage the generation of signal according to CS network registration status; PERMANENTLY OFF: Not registered / Initialization / Registration denied / no SIM card 600 ms ON / 600ms OFF: Not registered but searching
<mod>	0	Disable the generation of synchronization signal																					
	1	Manage the generation of signal according to <Duty Cycle> and <Pulse Duration> . The waveform of the signal is controlled only by these two parameters; Network status would not affect the waveform																					
	2	Manage the generation of signal according to network status; PERMANENTLY OFF: Not registered / Initialization / Registration denied / no SIM card 600 ms ON / 600ms OFF: Not registered but searching																					
<mod>	0	Disable the generation of synchronization signal																					
	1	Manage the generation of signal according to <Duty Cycle> and <Pulse Duration> . The waveform of the signal is controlled only by these two parameters; Network status would not affect the waveform																					
	2	Manage the generation of signal according to CS network registration status; PERMANENTLY OFF: Not registered / Initialization / Registration denied / no SIM card 600 ms ON / 600ms OFF: Not registered but searching																					

HL6528x		HL85xxx	
	75 ms ON / 3s OFF: Right connected to the network <Duty Cycle> and <Pulse Duration> are not used in mode 2 <IO> 1...8 defines which GPIO is used as output to indicate the network status 99 defines which PWM is used to output the signal 99 PWM0 <Duty Cycle> integer type; range:1..100; only used in mode 1 <Pulse Duration> integer type; range:1..65535 milliseconds; only used in mode 1		75 ms ON / 3s OFF: Right connected to the network <Duty Cycle> and <Pulse Duration> are not used in mode 2 3 Manage the generation of signal according to PS network registration status; OFF Not registered / Initialization / Registered denied / no SIM card ON Registered to the network <IO> 1...8, 10...12, 15 Defines which GPIO is used as output to indicate the network status <Duty Cycle> integer type; range:1...100; only used in mode 1 <Pulse Duration> integer type; range:1...65535 milliseconds; only used in mode 1
<u>Notes</u>	- The settings of <mod>, <IO>, <Duty Cycle>, <Pulse Duration> are automatically saved in HL6528x. - Check available GPIOs with +KGPIOCFG when using +KSYNC command - GPIOs may already be used by +KSIMDET, +KJAMDET, +KJAM, +KTEMPMON, +KGSMAD, +KSIMSL0T or I²C For write command, CME error 23 will be reported, when module start up, because of boot up of file system	<u>Notes</u>	- The settings of the <mod>, <IO>, <Duty Cycle>, <Pulse Duration> are automatically saved in HL85xxx. - This command will return ERROR if the selected GPIO is already being used by another feature. Check GPIO availability with other related commands +KSIMDET, +KSIMSEL, +KSYNC, +KJAM, +GSMAD, +GNSSAD, and +KTEMPMON when using this command. - This command can be used without SIM - This command will force the GPIO pins as output, regardless of the AT+KGPIOCFG configuration - Only 1 GPIO signal can be generated at any time - The default settings are <mod>=0, <IO>=1, <Duty Cycle>=50, <Pulse Duration>=1000 the first time firmware is downloaded in the factory

HL6528x		HL85xxx	
		<u>Examples</u>	AT+KSYNC=1,1,50,2000 Generate the signal, 50% duty cycle, and 2000 ms pulse duration on GPIO1 OK AT+KSYNC=1,2,50,2000 Generate the signal, 50% duty cycle, and 2000 ms pulse duration on GPIO2. Note that the previous signal on GPIO1 will be stopped OK AT+KSYNC=0,2 Disable the signal generation OK AT+KSYNC=2,1 Generate signal on GPIO1, according to the CS network registration status OK AT+KSYNC=3,1 Generate signal on GPIO1, according to the PS network registration status. OK

5.57. +KBND Command: Current Networks Band Indicator

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KBND=?	<u>Response</u> +KBND: (list of supported <bnd>) OK	<u>Syntax</u> AT+KBND=?	<u>Response</u> +KBND: (list of supported <bnd>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KBND?	<u>Response</u> +KBND: <bnd> OK <u>Parameter</u> <bnd> in Hexadecimal 0x00 Not available 0x01 850 MHz 0x02 900 MHz 0x04 1800 MHz 0x08 1900 MHz	<u>Syntax</u> AT+KBND?	<u>Response</u> +KBND: <bnd> OK <u>Parameter</u> <bnd> in Hexadecimal 0x0000 Not available 0x0001 GSM 850 MHz 0x0002 GSM 900 MHz and E-GSM 0x0004 DCS 1800 MHz 0x0008 PCS 1900 MHz 0x0010 UMTS Band I (2100 MHz) 0x0020 UMTS Band II (1900 MHz) 0x0040 UMTS Band V (850 MHz) 0x0080 UMTS Band VI (800 MHz) 0x0100 UMTS Band VIII (900 MHz) 0x0200 UMTS Band XIX (800 MHz)
<u>Notes</u>	This command returns the GSM band that the module currently uses	<u>Notes</u>	- This command returns the GSM or UMTS band that the module currently uses - A SIM card must be inserted to support this command
		<u>Examples</u>	AT+KBND=? +KBND: (0,1,2,4,8,10,20,40,80,100,200) OK

HL6528x		HL85xxx	
			<Insert a SIM card> AT+CMEE=1 OK AT+KBND? +KBND: 0000 OK AT+COPS? +COPS: 0,0,"SmarTone" OK AT+KBND? +KBND: 0002 OK <Remove the SIM card> AT+KBND? +CME ERROR: 10

5.58. +KNETSCAN Command: Network Scan

HL6528x			HL85xxx																				
<i>Test command</i>			<i>Test command</i>																				
<u>Syntax</u> AT+KNETSCAN=?			<u>Syntax</u> AT+KNETSCAN=?																				
<u>Response</u> +KNETSCAN: (list of supported <mode> s), (list of supported <max_cells> s), (list of supported <URC> s), (list of supported <timeout> s), (list of supported <ext> s) OK			<u>Response</u> +KNETSCAN: (list of supported <mode> s), (list of supported <max_cells> s), (list of supported <URC> s), (list of supported <timeout> s), (list of supported <ext> s) OK																				
<i>Read command</i>			<i>Read command</i>																				
<u>Syntax</u> AT+KNETSCAN?			<u>Syntax</u> AT+KNETSCAN?																				
<u>Response</u> +KNETSCAN: <mode> OK			<u>Response</u> +KNETSCAN: <mode> OK																				
<i>Write command</i>			<i>Write command</i>																				
<u>Syntax</u> AT+KNETSCAN=<mode>[,<oper>[,<max_cells>[,<URC>[,<timeout>[,<ext>]]]]]			<u>Syntax</u> AT+KNETSCAN=<mode>[,<oper>[,<max_cells>[,<URC>[,<timeout>[,<ext>]]]]]																				
<u>Response</u> OK when <mode> =2 and command successful +KNETSCAN: <nbcalls>[,<ARFCN>,<BSIC>,<PLMN>,<LAC>,<CI>,<RSSI>,<RAC>[,<ARFCN_i>,<BSIC_i>,<PLMN_i>,<LAC_i>,<CI_i>,<RSSI_i>,<RAC>]] OK			<u>Response</u> OK when <mode> =2 and command successful +KNETSCAN: <nbGSMcells>[,<ARFCN>,<BSIC>,<PLMN>,<LAC>,<CI>,<RSSI>[,<ARFCN_i>,<BSIC_i>,<PLMN_i>,<LAC_i>,<CI_i>,<RSSI_i>]] +KNETSCAN: <nbUMTScells>[,<dI_UARFCN_k>,<PLMN_k>,<LAC_k>,<CI_k>,<scrambling_code_k>,<rscp_k>,<ecno_k>] OK																				
<u>Parameters</u> <table><tr><td><mode></td><td>0</td><td>deactivate network scan</td></tr><tr><td></td><td>1</td><td>activate network scan</td></tr><tr><td></td><td>2</td><td>request cells information</td></tr></table>			<mode>	0	deactivate network scan		1	activate network scan		2	request cells information	<u>Parameters</u> <table><tr><td><mode></td><td>0</td><td>deactivate network scan</td></tr><tr><td></td><td>1</td><td>activate network scan</td></tr><tr><td></td><td>2</td><td>request cells information</td></tr></table>			<mode>	0	deactivate network scan		1	activate network scan		2	request cells information
<mode>	0	deactivate network scan																					
	1	activate network scan																					
	2	request cells information																					
<mode>	0	deactivate network scan																					
	1	activate network scan																					
	2	request cells information																					

HL6528x	HL85xxx								
<oper> String type, name of the operator in numeric format. If not specified, search entire band. <PLMN> PLMN identifiers (3 bytes), made of MCC (Mobile Country Code), and MNC (Mobile Network Code) <max_cells> [1..33] maximum number of cells of which information will be given (default: 7) <URC> <table data-bbox="560 558 1120 686"> <tr> <td>0</td> <td>no Unsolicited Result Code sent at the end of the scan</td> </tr> <tr> <td><u>1</u></td> <td>Unsolicited Result Code sent at the end of the scan</td> </tr> </table> <timeout> [1..600] timeout in seconds for sending Unsolicited Result Code (default: 300) <ext> <u>0</u> reserved for future purposes <nbcells> number of base stations available (less than or equal to <max_cells>). The first base station is the serving cell. <ARFCN> Absolute Radio Frequency Channel Number <BSIC> Base Station Identify Code <LAC> Location Area	0	no Unsolicited Result Code sent at the end of the scan	<u>1</u>	Unsolicited Result Code sent at the end of the scan	<oper> String type, name of the operator in numeric format. If not specified, search entire band. <PLMN> PLMN identifiers (3 bytes), made of MCC (Mobile Country Code), and MNC (Mobile Network Code) <max_cells> [1...33] maximum number of cells of which information will be given (default: 7) <URC> <table data-bbox="1456 558 2016 686"> <tr> <td>0</td> <td>no Unsolicited Result Code sent at the end of the scan</td> </tr> <tr> <td><u>1</u></td> <td>Unsolicited Result Code sent at the end of the scan</td> </tr> </table> <timeout> [1...600] timeout in seconds for sending Unsolicited Result Code (default: 300) <ext> <u>0</u> reserved for future purposes <nbGSMcells> number of GSM base stations available (less than or equal to <max_cells>). The first base station is the serving cell. <nbUMTScells> number of UMTS base stations available (less than or equal to <max_cells>). The first base station is the serving cell. <ARFCN> [0...1023] Absolute Radio Frequency Channel Number in decimal format <BSIC> [0...63] Base Station Identify Code in decimal format <LAC> Location Area in hexadecimal format (maximum of 4-digits)	0	no Unsolicited Result Code sent at the end of the scan	<u>1</u>	Unsolicited Result Code sent at the end of the scan
0	no Unsolicited Result Code sent at the end of the scan								
<u>1</u>	Unsolicited Result Code sent at the end of the scan								
0	no Unsolicited Result Code sent at the end of the scan								
<u>1</u>	Unsolicited Result Code sent at the end of the scan								

HL6528x	HL85xxx
<CI> Cell ID, 4 hexadecimal digits, e.g. ABCD <RSSI> Received signal level of the BCCH carrier, decimal value from 0 to 63. The indicated value is an offset which should be added to -110 dBm to get a value in dBm. See the formula specified in TS 05.08 Radio Subsystem Link Control <RAC> Routing Area (only for serving cell)	<CI> Cell ID, maximum of 7 hexadecimal digits <RSSI> Received signal level of the BCCH carrier, decimal value from 0 to 63. The indicated value is an offset which should be added to -110 dBm to get a value in dBm. See the formula specified in TS 05.08 Radio Subsystem Link Control. <dl_UARFCN> DL UARFCN of serving cell in decimal format. The range can be found in 3GPP TS 25.101 <scrambling code> [0...511] The downlink scrambling code of the serving cell for 3G networks only. <rscp> -5...91 Received Signal Code Power. The power level in one chip. -5 CPICH RSCP < 120 dBm -4 -120 dBm ≤ CPICH RSCP < -119 dBm : 91 -25dbm ≤ CPICH RSCP <u>255</u> Invalid/default value <ecno> 0...49 Ratio of energy per modulating bit to the noise spectral density. This is the cell quality and is equal to RSCP/RSSI Energy per chip/noise. The range can be found in 3GPP TS 25.133. 0 CPICH Ec/Io < -24 dB 1 -24 dB ≤ CPICH Ec/Io < -23.5 dB : 49 0 dB ≤ CPICH Ec/Io dB <u>255</u> Invalid/default value

HL6528x		HL85xxx		
Unsolicited Notification	<u>Response</u> +KNETSCAN: <nbcells>[,<ARFCN>,<BSIC>,<PLMN>,<LAC>,<CI>,<RSSI>,<RAC>[,<ARFCNi>,<BSICi>,<PLMNi>,<LACi>,<CIi>,<RSSIi>]]	Unsolicited Notification	<u>Response</u> +KNETSCAN: <nbGSMcells>[,<ARFCN>,<BSIC>,<PLMN>,<LAC>,<CI>,<RSSI>[,<ARFCNi>,<BSICi>,<PLMNi>,<LACi>,<CIi>,<RSSIi>]] +KNETSCAN: <nbUMTScells>[,<ARFCNi>,<BSICi>,<PLMNi>,<LACi>,<CIi>,<scrambling_codei>,<rscpi>,<ecnoi>]	
<u>Examples</u>	Network scan activation AT+KNETSCAN=1,"20801" OK +KNETSCAN: 7,567,22,02f810,3802,4f24,2 9,4,586,26,02f810,3802,4f27, 31,571,13,02f810,3802,ae3b, 20,8,20,02f810,3802,7c95,21 ,535,29,02f810,3802,c186,11 ,24,12,02f810,3802,4f29,12,3 9,22,02f810,3802,7c96,15 Retrieving cells information: AT+KNETSCAN=2 +KNETSCAN: 7,567,22,02f810,3802,4f24,29 ,4,586,26,02f810,3802,4f27,3 1,571,13,02f810,3802,ae3b,2 0,8,20,02f810,3802,7c95,21,5 35,29,02f810,3802,c186,11,2	Define the PLMN to use in numeric format, the number of cells, the sending of notification, the timeout: reboot Module launches a power campaign Wait for unsolicited message: +KNETSCAN Power campaign is finished and all information about the serving and neighbors cells has been received To check cells information at any time	<u>Examples</u> Network scan activation AT+COPS=2 OK AT+KNETSCAN=1,"45406" OK +KNETSCAN: 5,88,12,54f460,8c,26ea,60,119,11,54f460,8c,6704,28,103,3,54f460,8c,6771,21,114,11,54f460,8c,5976,17,107,8,54f460,8c,6703,4 +KNETSCAN: 4,4400,54f460,1f9a,98a90,9,-71,251,10762,54f460,1f9a,926ea,8,-75,251,10713,54f460,1f9a,926e8,7,-81,251,10737,54f460,1f9a,926ef,6,-88,250 Retrieving cells information: AT+KNETSCAN=2 +KNETSCAN: 5,88,12,54f460,8c,26ea,60,119,11,54f460,8c,6704,28,103,3,54f460,8c,6771,21,114,11,54f460,8c,5976,17,107,8,54f460,8c,6703,4 +KNETSCAN: 4,4400,54f460,1f9a,98a90,9,-71,251,10762,54f460,1f9a,926ea,8,-75,251,1071	Deregister from network Define the PLMN to use in numeric format, the number of cells, the sending of notification, the timeout Wait for unsolicited message: +KNETSCAN Power campaign is finished and all information about the serving and neighbors cells has been received To check cells information at any time

HL6528x		HL85xxx	
	4,12,02f810,3802,4f29,12,39, 22,02f810,3802,7c96,15 OK Network scan deactivation: AT+KNETSCAN=0 OK Return to nominal mode: reboot		3,54f460,1f9a,926e8,7,-81,251, 10737,54f460,1f9a,926ef,6,- 88,250 OK Maximum number of cells for each technology: AT+KNETSCAN=1,"45406",2 Max number of cells is 2 OK +KNETSCAN: 2,88,12,54f460 ,8c,26ea,60,119,11,54f460,8c, For each technology, only 6704,37 2 cells is shown +KNETSCAN: 2,4400,54f460, 1f9a,98a90,9,-64,253,10737,5 4f460,1f9a,926ef,6,-73,252 No unsolicited result code sent at the end of scan: AT+KNETSCAN=1,"45406",,0 +KNETSCAN: 5,88,12,54f460,8 c,26ea,61,119,11,54f460,8c,670 4,36,103,3,54f460,8c,6771,22,1 14,11,54f460,8c,5976,18,96,35, 54f460,8c,65eb,6 +KNETSCAN 4,4400,54f460,1f9 a,98a90,9,-64,253,10762,54f460 ,1f9a,926ea,8,-76,251,10713,54f 460,1f9a,926e8,7,-79,252,10737 ,54f460,1f9a,926ef,6,-84,251 OK OK is returned after scanning AT+KNETSCAN=0 Abort the network scan OK

HL6528x		HL85xxx	
			AT+KNETSCAN=1,,,0 Abort the network scan by sending a character on the AT interface OK AT+KNETSCAN=1,"45406" Read the network scan mode OK AT+KNETSCAN? +KNETSCAN: 1 OK Network scan is activated +KNETSCAN: 6,88,12,54f460,8c,26ea,50,119,11,54f460,8c,6704,29,114,11,54f460,8c,5976,24,103,3,54f460,8c,6771,20,101,12,54f460,8c,6772,19,96,35,54f460,8c,65eb,13 +KNETSCAN: 4,4400,54f460,1f9a,98a90,9,-65,252,10737,54f460,1f9a,926ef,6,-68,251,10762,54f460,1f9a,926ea,8,-68,252,10713,54f460,1f9a,926e8,7,-69,254 AT+KNETSCAN? +KNETSCAN: 0 OK Network scan is deactivated
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Switch from nominal mode to network scan mode (<mode>=1) makes the HL6528x reboot if neither netscan nor cellscan is still active, then HL6528x answers OK after reboot. If netscan or cellscan is active, a new scan request doesn't make the HL6528x reboot and the answer is immediate	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - For parameter <mode>=0 and <mode>=2, no other parameter is needed - URC is sent when all information are available or when <timeout> expires - Found cells description can be obtained after scan with an AT command

HL6528x		HL85xxx	
	- Switch from network scan mode to nominal mode (<mode>=0) makes the HL6528x reboot: HL6528x answers OK after reboot - A value returned equal to 0xFF in the response or the notification, means that it was not possible to decode it - For parameter <mode>=0 and <mode>=2, no other parameter is needed - URC is sent when all information are available or when <timeout> expire or when serving cell has changed - The working band is the one defined by AT+PSRDBS or KSRATFound cells description can be obtained at any moment during scan with an AT command - A new scan can be requested at any moment, even if the last one is not finished: in that case the HL6528x doesn't reboot - Activation of the scan of a channel stops previous scan of PLMN		- When starting a scan, if <URC>=1, the scan needs to be explicitly stopped with the AT+KNETSCAN=0 command. Sending anything else will not abort the scan and the unit will not be able to reattach to the network until it has completed the scan operation. - Abortion will be initiated by sending a character on the AT interface provided <URC>=0. - This command works without a SIM card inserted in the modem - UE must be in "Detached Mode" (using AT+COPS=2) before starting a network scan
<u>Restrictions</u>	- No normal network activity is possible (call reception, call emission, etc.) - AT commands related to network are not allowed - Unsolicited result code are not sent (except the one related to network scan)	<u>Restrictions</u>	- During execution of the network scan AT command, no other AT commands can be invoked. - STK must not be activated during execution of the network scan AT command

5.59. +KCELLSCAN Command: Cell Scan

Note: For HL6528x only.

HL6528x											
<i>Test command</i> <u>Syntax</u> AT+KCELLSCAN=?	<u>Response</u> +KCELLSCAN: (list of supported <mode> s), (list of supported <URC> s), (list of supported <timeout> s), (list of supported <ext> s) OK										
<i>Read command</i> <u>Syntax</u> AT+KCELLSCAN?	<u>Response</u> +KCELLSCAN: <mode> OK										
<i>Write command</i> <u>Syntax</u> AT+KCELLSCAN=<mode>[,<ARFCN>[,<URC>[,<timeout>[,<ext>]]]]	<u>Response</u> OK when <mode> =2 and command successful +KCELLSCAN: <ARFCN> , <BSIC> , <PLMN> , <LAC> , <CI> , <RSSI> , <RAC> OK <u>Parameters</u> <mode> <table> <tr><td>0</td><td>deactivate cell scan</td></tr> <tr><td>1</td><td>activate cell scan</td></tr> <tr><td>2</td><td>request cell information</td></tr> </table> <PLMN> PLMN identifiers (3 bytes) – made of MCC (Mobile Country Code), and MNC (Mobile Network Code). If not specify, search on entire band <URC> <table> <tr><td>0</td><td>No Unsolicited Result Code sent at the end of the scan</td></tr> <tr><td>1</td><td>Unsolicited Result Code sent at the end of the scan</td></tr> </table>	0	deactivate cell scan	1	activate cell scan	2	request cell information	0	No Unsolicited Result Code sent at the end of the scan	1	Unsolicited Result Code sent at the end of the scan
0	deactivate cell scan										
1	activate cell scan										
2	request cell information										
0	No Unsolicited Result Code sent at the end of the scan										
1	Unsolicited Result Code sent at the end of the scan										

HL6528x	
	<timeout> 1 – 120 timeout in seconds for sending Unsolicited Result Code (default: 60) <ext> 0 reserved for future purposes <ARFCN> Absolute Radio Frequency Channel Number <BSIC> Base Station Identify Code <LAC> Location Area <CI> Cell ID, 4 hexadecimal digits, e.g. ABCD. <RSSI> Received signal level of the BCCH carrier, decimal value from 0 to 63. The indicated value is an offset which should be added to –110 dBm to get a value in dBm. See the formula specified in TS 05.08 Radio Subsystem Link Control <RAC> Routing Area
<u>Examples</u>	Cell scan activation: AT+KCELLSCAN=1,567 OK +KCELLSCAN: 567,22,02f810,3802,4f24,29,4 Retrieving cell information: AT+KCELLSCAN=2 +KCELLSCAN: 567,22,02f810,3802,4f24,29,4 OK Cell scan deactivation: AT+KCELLSCAN=0 OK Define the Arfcn, the sending of notification, the timeout: reboot Module launches a power campaign and synchronizes on Arfcn Wait for unsolicited message: +KCELLSCAN Power campaign is finished and all information about the cell have been received To check cells information at any time Return to nominal mode: reboot

HL6528x	
<i>Unsolicited Notification</i>	<u>Response</u> +KCELLSCAN: <ARFCN>,<BSIC>,<PLMN>,<LAC>,<CI>,<RSSI>,<RAC>
<u>Notes</u>	- Switch from nominal mode to cell scan mode (<mode>=1) makes the HL6528x reboot if neither netscan nor cellscan is still active, then HL6528x answers OK after reboot. If netscan or cellscan is active, a new scan request doesn't make the HL6528x reboot and the answer is immediate - Switch from network scan mode to nominal mode (<mode>=0) makes the HL6528x reboot: HL6528x answers OK after reboot - A value returned equal to 0xFF in the response or the notification, means that it was not possible to decode it - For parameter <mode>=0 and <mode>=2, no other parameter is needed - For parameter <mode>=1, parameter <ARFCN> is mandatory - URC is sent when all information are available or when <timeout> expired - Found cells description can be obtained at any moment during scan with an AT command - A new scan can be requested at any moment, even if the last one is not finished: in that case the HL6528x doesn't reboot - Activation of the scan of PLMN stops previous scan of cell and conversely
<u>Restrictions</u>	- No normal network activity is possible (call reception, call emission, etc.) - AT commands related to network are not allowed - Unsolicited result code are not sent (except the one related to network scan)

5.60. +KJAMDET Command: Jamming Detection

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KJAMDET=?	<u>Response</u> +KJAMDET: (list of supported <mode>s),(list of supported <urc_mode>s),(list of supported <gpio_mode>s),(list of supported <gpio_index>s), (list of supported <rss_i_threshold>s) OK

HL6528x	
<i>Read command</i>	
<u>Syntax</u> AT+KJAMDET?	<u>Response</u> +KJAMDET: <mode>,<urc_mode>,<gpio_mode>,<gpio_index>,<rss_i_threshold> OK
<i>Write command</i>	
<u>Syntax</u> AT+KJAMDET= <mode> [,<urc_mode> [,<gpio_mode> [,<gpio_index> [,<rss_i_threshold >]]]]	<u>Response</u> If <mode>=0 and the command is successful OK if <mode>=1 or 2, <urc_mode>=1, and the command is successful +KJAMDET: <status> OK <u>Parameters</u> <mode> 0 Disable jamming detection (default) 1 Detect jamming once 2 Detect jamming every 30 seconds <urc_mode> 0 Disable the URC presentation for the result of jamming detection 1 Enable the URC presentation for the result of jamming detection <gpio_mode> 0 Not report result by GPIO (default) 1 Report result by GPIO. If jamming is detected, the corresponding GPIO will be set to low; if not, it will be set to high <gpio_index>: 1...8 Defines which GPIO will be used as output to report the result 3 Default <rss_i_threshold> 1...31 It defines the threshold which will be compared with the received signal level. Values follow the same definition as in +CSQ. 20 Default 1 -111 dBm 2...30 -109... -53 dBm / 2 dBm per step 31 -51 dBm or greater

HL6528x	
	<status> 0 No jamming detected 1 Jamming is detected
<u>Notes</u>	Not supported. It is recommended to use AT+KJAM instead of this command.

5.61. +KJAM Command: Jamming Detection

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KJAM=?	<u>Response</u> +KJAM: (list of supported <mode>s),(list of supported <continuous_detection>s),(list of supported <urc_mode>s),(list of supported <gpio_mode>s),(list of supported <gpio_index>s),(list of supported <gpio_result_threshold>s),(list of supported <urc_result_threshold>s) OK	<u>Syntax</u> AT+KJAM=?	<u>Response</u> +KJAM: (list of supported <mode>s),(list of supported <continuous_detection>s),(list of supported <urc_mode>s),(list of supported <gpio_mode>s),(list of supported <gpio_index>s),(list of supported <gpio_result_threshold>s),(list of supported <urc_result_threshold>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KJAM?	<u>Response</u> +KJAM: <mode> , <continuous_detection> , <urc_mode> , <gpio_mode> , <gpio_index> , <gpio_result_threshold> , <urc_result_threshold> OK	<u>Syntax</u> AT+KJAM?	<u>Response</u> +KJAM: <mode> , <continuous_detection> , <urc_mode> , <gpio_mode> , <gpio_index> , <gpio_result_threshold> , <urc_result_threshold> OK

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u>	<u>Response</u>	<u>Syntax</u>	<u>Response</u>
AT+KJAM= <mode> [,<continuous_ detection> [,<urc_mode> [,<gpio_mode> [,<gpio_index> [,<gpio_result_ threshold>]]]]]	OK When <mode> =2 and the command is successful: +KJAM: <result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>]]] OK	AT+KJAM= <mode> [,<continuous_ detection> [,<urc_mode> [,<gpio_mode> [,<gpio_index> [,<gpio_result_ threshold>]]]]]	OK When <mode> =2 and the command is successful +KJAM: <result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>]]]]]]] OK
	<u>Parameters</u>		<u>Parameters</u>
	<mode> 0 disable jamming detection 1 start jamming detection 2 get latest final result (final as <result_type>, see below)		<mode> 0 disable jamming detection (default) 1 start jamming detection 2 get latest final result (final as <result_type>, see below)
	<continuous_detection> 0 detect once 1 continuous detection		<continuous_detection> 0 detect once 1 continuous detection
	<urc_mode> 0 Disable the URC presentation for the result of jamming detection 1 Enable the URC presentation for the result of jamming detection 2 Enable the URC presentation for Final result of jamming detection (no intermediate result sent)		<urc_mode> 0 Disable the URC presentation for the result of jamming detection 1 Enable the URC presentation for the result of jamming detection 2 Enable the URC presentation for final result of jamming detection (no intermediate result)
	<gpio_mode> 0 Not report result by GPIO (default) 1 Report result by GPIO. If jamming is detected, the corresponding GPIO will be set to low; if not, it will be set to high		<gpio_mode> 0 Not report result by GPIO (default) 1 Report result by GPIO. If jamming is detected, the corresponding GPIO will be set to low; if not, it will be set to high

HL6528x	HL85xxx
<gpio_index> 1 – 8 Defines which GPIO will be used as output to report the result <u>7</u> Default <gpio_result_threshold> Defines the threshold of <status> above which result will be reported by GPIO; Jamming state: 1 LOW 2 MEDIUM 3 HIGH <u>4</u> JAMMED <urc_result_threshold> Defines the threshold of <status> above whose result will be reported by URC; Jamming state: <urc_result_threshold> concerns both intermediate and final results. <u>1</u> LOW 2 MEDIUM 3 HIGH 4 JAMMED <result> Indicates the percentage degree the module is jammed. 0 0% no jamming detected 1 0% to 25%, low jamming 2 25% to 50%, medium jamming 3 50% to 75%, high jamming 4 75% to 100%, JAMMED 5 result not available yet 6 detection impossible <result_type> Indicates if <result> is an intermediate result or a final result 0 intermediate result <u>1</u> final result	<gpio_index> 1 – 8, 10 – 12, 15 Defines which GPIO will be used as output to report the result <u>5</u> Default <gpio_result_threshold> Defines the threshold of <status> above which result will be reported by GPIO 1 LOW 2 MEDIUM 3 HIGH <u>4</u> JAMMED <urc_result_threshold> Defines the threshold of <status> above whose result will be reported by URC; Jamming state: <urc_result_threshold> concerns both intermediate and final results. 1 LOW 2 MEDIUM 3 HIGH <u>4</u> JAMMED <result> Indicates the percentage degree the module is jammed. 0 0% no jamming detected 1 0% to 25%, low jamming 2 25% to 50%, medium jamming 3 50% to 75%, high jamming 4 75% to 100%, JAMMED 5 result not available yet 6 detection impossible <result_type> Indicates if <result> is an intermediate result or a final result 0 intermediate result <u>1</u> final result

HL6528x		HL85xxx	
	<band> Indicates the band concerned by <result> 0 Not available 1 850 MHz 2 900 MHz 4 1800 MHz 8 1900 MHz		<band> Indicates the band concerned by <result> 0 Not available 1 GSM 850 MHz 2 GSM 900 MHz 4 GSM 1800 MHz 8 GSM 1900 MHz 10 UMTS Band I 20 UMTS Band II 40 UMTS Band V 80 UMTS Band VI 100 UMTS Band VIII 200 UMTS Band XIX
<i>Unsolicited Notification</i>	<u>Response</u> +KJAM:<result_type>,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>]]]	<i>Unsolicited Notification</i>	<u>Response</u> +KJAM:<result_type>,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>]]]]]]]]]
<u>Examples</u>	AT+KJAM=1,0 // Detect jamming once; the result will be reported by URC; AT+KJAM=1,0,0,1 // Detect jamming once; Set by default because not précised as parameters: the result will be reported by GPIO 3 when result is 4 (JAMMED) AT+KJAM=1,0,0,1,2,3 // Detect jamming once; the result will be reported by GPIO 2 when result is 3 or 4 AT+KJAM=1 // Detect jamming continuously; the result will be reported by URC;	<u>Examples</u>	AT+KJAM=1,0 // Detect jamming once; the result will be reported by URC when result is 4 AT+KJAM=1,0,0,1 // Detect jamming once; Set by default because not précised as parameters: the result will be reported by GPIO 5 when result is 4 (JAMMED) AT+KJAM=1,0,0,1,2,3 // Detect jamming once; the result will be reported by GPIO 2 when result is 3 or 4 AT+KJAM=1

HL6528x		HL85xxx	
	AT+KJAM=1,1,1,3 // Detect jamming continuously; the result will be reported by URC and GPIO 3 when result is 4 AT+KJAM=1,1,1,3,2 // Detect jamming continuously; the result will be reported by URC and GPIO 3 when result is 2, 3 or 4 AT+KJAM=0 // Disable jamming detection		// Detect jamming continuously; the result will be reported by URC when result is 4 AT+KJAM=1,1,1,5 // Detect jamming continuously; the result will be reported by URC and GPIO 5 when result is 4 AT+KJAM=1,1,1,5,2 // Detect jamming continuously; the result will be reported by URC when result is 4, and reported by GPIO 5 when result is 2, 3 or 4 AT+KJAM=0 // Disable jamming detection
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • In case of continuous detection, URC +KJAM is sent only when the <result> of at least one <band> changes. • For parameter <mode>=0 and <mode>=2, no other parameters are needed. • Configuration is saved in non-volatile memory and therefore is still effective after power cycle. The intermediate result is an estimation of jamming. It can be different from the final result, especially in case of low network coverage. • The intermediate result, when useful, is sent before the final result. The number of intermediate results is context dependent: several intermediate results can be sent before a final result or none at all. • "Detection impossible" result is answered when jamming detection is not activated (+KJAM=0) or when the module is in flight mode (radio off). • The first couple <result>,<band> in the URC or the answer to AT+KJAM=2, is the result on the current band. • Bands whose results are unknown, are not present in answers.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • In case of continuous detection, URC +KJAM is sent only when the <result> of at least one <band> changes. • For parameter <mode>=0 and <mode>=2, no other parameters are needed. • Configuration is saved in non-volatile memory and therefore is still effective after power cycle. The intermediate result is an estimation of jamming. It can be different from the final result, especially in case of low network coverage. • The intermediate result, when useful, is sent before the final result. The number of intermediate results is context dependent: several intermediate results can be sent before a final result or none at all. • "Detection impossible" result is answered when jamming detection is not activated (+KJAM=0) or when the module is in flight mode (radio off). • The first couple <result>,<band> in the URC or the answer to AT+KJAM=2, is the result on the current band. • Bands whose results are unknown, are not present in answers.

HL6528x	HL85xxx
• Intermediate result only concerns the current band. • Notification by GPIO only concerns the final result. As soon as <result> of at least one band is above <gpio_result_threshold>, the GPIO is set to low. • Check available GPIOs with +KGPIOCFG when using +KJAM command. • GPIOs may already be used by +KSIMDET, +KJAMDET, +KSYNC, +KTEMPMON, +KGSMAD, +KSIMSLT or I²C +KJAM and +KJAMDET commands can be used simultaneously but may not answer the same result. • +KJAM command cannot be supported without SIM card. • AT+KJAM=2 returns final result without considering <urc_result_threshold> • Result 0 (NO JAMMING) is sent regardless of <urc_result_threshold>'s value. • If results are always below <urc_result_threshold>, no URC will be sent. • +KJAM features are not available when +KNETSCAN or +KCELLSCAN features are active.	• Intermediate result concerns only current band. • Notification by GPIO only concerns the final result. As soon as <result> of at least one band is above <gpio_result_threshold>, the GPIO is set to low. • This command will return ERROR if the selected GPIO is already being used by another feature. Check GPIO availability with other related commands +KSIMDET, +KSIMSEL, +KSYNC, +KJAM, +GSMAD, +GNSSAD, and +KTEMPMON when using this command.. • +KJAM command cannot be supported without SIM card. • AT+KJAM=2 returns final result without considering <urc_result_threshold> • Result 0 (NO JAMMING) is sent regardless of <urc_result_threshold>'s value. • If results are always below <urc_result_threshold>, no URC will be sent.

5.62. +KUART Command: Set UART Bit Mode

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT+KUART=?	<u>Response</u> +KUART: (7,8),(0,1,2) OK
<i>Read command</i> <u>Syntax</u> AT+KUART?	<u>Response</u> +KUART: <num>,<parity> OK
<i>Write command</i> <u>Syntax</u> AT+KUART= <num>,<parity>	<u>Response</u> OK <u>Parameters</u> <num> Number of bits. It can only be 7 or 8. The default value is <u>8</u> <parity> UART parity <u>0</u> No parity (default value) <u>1</u> Odd parity <u>2</u> Even parity
<u>Examples</u>	AT+KUART=7,0 // set 7-bit mode and no parity; the setting will be effective after reboot AT+KUART=8,1 // set 8-bit mode and odd parity; the setting will be effective after reboot AT+KUART=8,2 // set 8-bit mode and even parity; the setting will be effective after reboot AT+KUART? // read the number of bits and parity for UART

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - After the number of bits for UART is changed, the module must be rebooted for the setting to be effective - When UART is in 7-bit mode: - CSD call and SMS can only work with basic ASCII characters (0-127) - PPP doesn't work - POP3, SMTP, HTTP, TCP, UDP, FTP and KFSFILE will be affected. It is not recommended to use these features in 7-bit mode

5.63. +KPLAYSOUND Command: Play Audio File

Note: For HL6528x only.

HL6528x	
<u>Write command</u> <u>Syntax</u> AT+ KPLAYSOUND= <mode> [,<audio_file>] [,<volume>] [,<duration>]	<u>Response</u> OK <u>Error case</u> +CME ERROR: <err> +KPLAY_ERROR: <play_notif> <u>Parameters</u> <mode> integer type 0 Start playing 1 Stop playing <audio_file> string type, indicates the path and midi filename to be played. This is a must when <mode> is 0 <volume> integer which defines the sound level (1-3). The smaller the lower. The default value is <u>2</u>

HL6528x	
	<duration> 1-32767 integer type 0 Play the file repetitively Other values Whole playing time (in seconds) Default - play the file ONCE <play_notif> integer type. Indicates the cause of the play failure. 1 Cannot play during a call
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Audio file should be stored in "/ftp" • Only support Sierra Wireless proprietary file format. The max file size is 2048 bytes. • If the HL6528x receives a SMS or call, the play will stop • If a melody is already playing, +KPLAYSOUND will stop the current melody and play the new melody • The volume cannot be changed when a melody is playing. +CLVL command has no effect on melody playing • Refer to section 12 Audio for information on how to build an audio file.
<u>Examples</u>	To add a file: AT+KFSFILE=0,"/ftp/abc.snd",1024 CONNECT The module is ready to receive the file. Once received, the answer is: OK To list the information of directory and file: AT+KFSFILE=4,"/ftp/" +KFSFILE: <F> abc.snd 1024 +KFSFILE: 1048004 bytes free OK To play a file: AT+KPLAYSOUND=0, "abc.snd", 3, 20 ---- play abc.snd file in 3 volume for 20 seconds OK

HL6528x	
	To play a file repetitively: AT+KPLAYSOUND=0, "abc.snd", 3, 0 ---- play abc.snd file in 3 volume repetitively OK To play a file once: AT+KPLAYSOUND=0, "abc.snd", 3 ---- play abc.snd file in 3 volume once OK To stop playing immediately: AT+KPLAYSOUND=1 ---- stop playing OK

5.64. +KBCAP Command: Retrieve Bitmap Capabilities

Note: For HL6528x only.

HL6528x	
<i>Execute command</i>	
<u>Syntax</u> AT+KBCAP	<u>Response</u> +KBCAP: 0xWXYZ (where WXYZ is the Bitmap Capabilities value in Hexa) AVMS: <status> ECALL: <status> GNSS: <status> TLS: <status> TTS: <status> DSSS: <status> DBV: <pinout_config> PARAM: <FDPname> UBOOT:<microboot_version> OK

HL6528x	
	<u>Parameters</u> <status> 0 deactivated 1 activated <pinout_config> 1 GPIO pinout configured for demoboard design version 1 2 GPIO pinout configured for demoboard design version 2 <FDPname> Product definition file number <microboot_version> microboot version (if AVMS status is 0, the field will be empty)
<u>Reference</u> Sierra Wireless Proprietary	

5.65. +KRST Command: Module Reset Period

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KRST=?	<u>Response</u> +KRST=<0,1,2>[,<time information>,<reset notification>] OK

HL6528x	
Read command	
<u>Syntax</u> AT+KRST?	<u>Response</u> If <type> = 1: +KRST: 1,<time information>,<reset notification>,<time left> If <type> = 2: +KRST=2, <time information>,<reset notification> If <type> = 0: +KRST: 0 OK
Write command	
<u>Syntax</u> AT+KRST =<type> [,<time information>,<reset notification>]	<u>Response</u> OK <u>Parameters</u> <type> Indicates the type of reset operation 0 Cancel current programmed reset. 1 Program a periodic reset. 2 Program a timely scheduled reset on a daily basis <time information> reset period or a reset time 1-168 hours when <type>=1 module will reset after hours of time; "HH:MM" when <type>=2 module will reset at this time every day; (HH = hour from 00 to 23, MM = minutes from 00 to 59) <reset notification> enables the display of a reset notification before module restarts. 0 no notification displayed 1 notification display <time left> displays the time left (in minutes) left to reset

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - When programmable time is come: - For voice call and data call, reset will be delayed until the communication over - For an ongoing AT command, reset will be delayed until the process finished - In other cases, e.g. GPRS connection, SMS services, reset will occur immediately and without URC notification. - The module is notified by URC if reset time is coming: +KRST: RESET, then module will reset in 3 seconds - Programming a new one will take effect immediately: e.g. AT+KRST=0 will cancels any pending programmable reset - Parameters are kept even after start up, it is stored in flash. - It is software reset, not a hardware reset - Scheduling at a specific time requires the user to setup the device clock correctly using AT+CCLK. AT+KRST won't prevent the user to use scheduled reset with an incorrect date and time setup. It's up to the user to setup its system correctly

5.66. +KPLAYAMR Command: Play AMR File

Note: For HL6528x only.

HL6528x	
<u>Test command</u>	
<u>Syntax</u> AT+KPLAYAMR=?	<u>Response</u> +KPLAYAMR: (list of supported <mode>s), <audio_file>),(list of supported <volume>s),(list of supported <progress>s) OK
<u>Write command</u>	
<u>Syntax</u> AT+KPLAYAMR= <mode>, [<audio_file>], [<volume>], [progress]	<u>Response</u> OK +AMR playing : <percent_done> +AMR playing : <percent_done> [...]

HL6528xError case**+KPLAYAMR_ERROR: <play_notif>**Parameters**<mode>** integer type

- 0 Start playing
- 1 Stop playing
- 2 Play pause
- 3 Play resume

<audio_file> string type, indicates the path and amr filename to be played. This is a mandatory when <mode> is 0

<volume> 1-10 integer which defines the sound level (the smaller the number, the lower the sound level).
5 default value

<http_notif> <progress> integer type

- 0 Disable progress display
- 1 Enable progress display

<play_notif> integer type. Indicates the cause of the play failure

- 1 Unknown error
- 2 Service not supported
- 3 Parameters invalid
- 4 Order incoherent
- 5 Playback buffer underflow
- 7 Gaudio init failed
- 8 Resource blocked
- 9 Session invalid (Cannot pause or resume the AMR file playing)
- 10 File not found
- 11 File read error
- 12 Memo not exist
- 13 Param invalid
- 14 Read out buffer fail

HL6528x	
	16 Session ID invalid 17 Memory alloc fail 18 File stat error 19 File not opened 20 Null buffer 21 Format file unsupported 22 File seek error <percent_done> integer type. Indicates the percent of the AMR file already played
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The AMR file can be uploaded by AT+KFSFILE, and it should be stored in "/ftp". - Only narrow-band AMR file format is supported. - The max AMR file size depends on the available space of the HL6528x flash. - The AMR playing will be stopped when making or incoming a call. - If KPLAYAMR is started during a voice call, the AMR audio is only heard on the HL6528x side (and not on the distant party's side). When the AMR file is playing on the HL6528x side, the audio for voice call is disabled and nothing is heard on the distant party's side. - If an AMR or SND file (+KPLAYSOUND) is already playing, +KPLAYAMR will stop the current playing and play the new one. - The volume cannot be changed when an AMR file is playing. +CLVL command has no effect on the AMR file playing.

5.67. +KSRAT Command: Set Radio Access Technology

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KSRAT=?	<u>Response</u> +KSRAT: (list of supported <mode>s) OK

HL85xxx	
<i>Read command</i> <u>Syntax</u> AT+KSRAT?	<u>Response</u> +KSRAT: <mode> OK
<i>Write command</i> <u>Syntax</u> AT+KSRAT= <mode>	<u>Response</u> OK <u>Parameter</u> <mode> 1 2G only 2 3G only 3 Search for 2G first 4 Search for 3G first
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This command works without a SIM card inserted in the modem • <mode> is not persistent after reset • The setting takes effect immediately • If both 2G and 3G are available, the modem will select 3G by default
<u>Examples</u>	AT+KSRAT=? +KSRAT: (1-4) OK AT+CMEE=1 OK AT+KSRAT=1 OK AT+KSRAT? +KSRAT: 1 OK

HL85xxx

AT+KBND?
+KBND: 0002
OK

AT+KSRAT=2
OK

AT+KBND?
+KBND: 0010
OK

AT+KSRAT=3
OK

AT+KBND?
+KBND: 0010
OK

AT+KSRAT=4
OK

AT+KBND?
+KBND: 0010
OK

5.68. +CTZU Command: Automatic Time Zone Update

HL6528x and HL85xxx							
<i>Test command</i>							
<u>Syntax</u> AT+CTZU=?	<u>Response</u> +CTZU: (list of supported <onoff> s) OK						
<i>Read command</i>							
<u>Syntax</u> AT+CTZU?	<u>Response</u> +CTZU: <onoff> OK						
<i>Write command</i>							
<u>Syntax</u> AT+CTZU =<onoff>	<u>Response</u> OK <u>Parameter</u> <table><tr><td><onoff></td><td><u>0</u></td><td>Disable automatic time zone update via NITZ</td></tr><tr><td></td><td><u>1</u></td><td>Enable automatic time zone update via NITZ</td></tr></table>	<onoff>	<u>0</u>	Disable automatic time zone update via NITZ		<u>1</u>	Enable automatic time zone update via NITZ
<onoff>	<u>0</u>	Disable automatic time zone update via NITZ					
	<u>1</u>	Enable automatic time zone update via NITZ					
<u>Reference</u> [27.007] §8.40							

5.69. +CTZR Command: Time Zone Reporting

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CTZR=?	<u>Response</u> +CTZR: (list of supported <onoff>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CTZR?	<u>Response</u> +CTZR: <onoff> OK
<i>Write command</i>	
<u>Syntax</u> AT+CTZR =<onoff>	<u>Response</u> OK <u>Parameter</u> <onoff> Integer type 0 Disable time zone change event reporting 1 Enable time zone change event reporting
<i>Unsolicited Notification</i>	<u>Response</u> +CTZV: <tz>,<time> XNITZINFO: <timzone_variance>,<time> +CTZDST: <dst> <u>Parameters</u> <tz> Integer value indicating the timezone <time> String type of the format "Yy/MM/dd,hh:mms"; where Yy=year, MM=month, hh=hour, mm=minutes, and s=seconds <timzone_variance> String type of the format "GMT+HH:MM" or "GMT-HH:MM"; for example, "GMT+5:30"

HL6528x and HL85xxx							
	<dst> Daylight savings time value <table><tr><td>0</td><td>No adjustment for daylight savings time</td></tr><tr><td>1</td><td>+1 hour adjustment for daylight savings time</td></tr><tr><td>2</td><td>+2 hours adjustment for daylight savings time</td></tr></table>	0	No adjustment for daylight savings time	1	+1 hour adjustment for daylight savings time	2	+2 hours adjustment for daylight savings time
0	No adjustment for daylight savings time						
1	+1 hour adjustment for daylight savings time						
2	+2 hours adjustment for daylight savings time						
Reference [27.007] §8.41	<u>Notes</u> - Time zone reporting is not affected by the automatic time zone setting command +CTZU. - If reporting is enabled, the MT returns the unsolicited result code +CTZV: <tz> whenever the time zone is changed.						

5.70. +KGSMBOOT Command: GSM Stack Boot Mode

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KGSMBOOT= ?	<u>Response</u> +KGSMBOOT: <boot_mode> OK
<i>Read command</i>	
<u>Syntax</u> AT+KGSMBOOT ?	<u>Response</u> +KGSMBOOT: <boot_mode> OK

HL6528x			
<i>Execute command</i>			
<u>Syntax</u> AT+KGSMBOOT= <boot_mode>	<u>Response</u> OK		
	<u>Parameters</u>		
	<boot_mode>	0	Boot with GSM stack OFF
		1	Boot with GSM stack ON
		<u>2</u>	Boot in the last state (default)
<u>Notes</u>	• To activate the GSM stack, still use AT+CFUN=1,0 • To deactivate the GSM stack, still use AT+CFUN=4,0		

5.71. +WMUSBVCC Command: USB VCC Detection Setting

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+WMUSBVCC =?	<u>Response</u> +WMUSBVCC: (list of supported <mode>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+WMUSBVCC ?	<u>Response</u> +WMUSBVCC: <mode> OK

HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+WMUSBVCC =<mode>	<u>Response</u> OK <u>Parameter</u> <mode> 0 USB detection if Vbus > 4.75V 1 USB detection if Vbus > 2.5V (for example, PC mini-card application)
<u>Notes</u>	• The current configuration is kept in flash after reset • This command can be used without SIM • The default value is 0 after firmware download from the factory.
<u>Examples</u>	AT+WMUSBVCC=? +WMUSBVCC: (0-1) OK AT+WMUSBVCC? +WMUSBVCC: 0 OK AT+WMUSBVCC=0 // Change setting to mode 0 OK AT+WMUSBVCC? +WMUSBVCC: 0 OK AT+WMUSBVCC=1 // Change setting to mode 1 OK AT+WMUSBVCC? +WMUSBVCC: 1 OK

5.72. +WEXTCLK Command: External Clocks Setting

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+WEXTCLK=?	<u>Response</u> +WEXTCLK: (list of supported <output>s),(list of supported <status>es) OK
<i>Read command</i> <u>Syntax</u> AT+WEXTCLK?	<u>Response</u> +WEXTCLK: <ouptut>,<status> +WEXTCLK: <ouptut>,<status> OK
<i>Write command</i> <u>Syntax</u> AT+WEXTCLK= <output>, <status>	<u>Response</u> +WEXTCLK: <ouptut>,<status> OK <u>Parameter</u> <output> 0 32kHz output (32K_CLKOUT) 1 26MHz output (26M_CLKOUT) <status> <u>0</u> Disabled 1 Enabled
<u>Notes</u>	• This command allows generating 32 kHz and 26 MHz on the output clock pins of the embedded module • Parameters are saved in non-volatile memory • This command is available when the module has finished its initialization • This command works without SIM card • 32kHz output is always enabled for HL854x-G

5.73. +KUSBCOMP Command: Set USB Composition

Note: For HL85xxx only.

HL85xxx	
Test command	
<u>Syntax</u> AT+KUSBCOMP =?	<u>Response</u> +KUSBCOMP: (list of supported <mode>s) OK
Read command	
<u>Syntax</u> AT+KUSBCOMP?	<u>Response</u> +KUSBCOMP: <mode> OK
Write Command	
<u>Syntax</u> AT+KUSBCOMP =<mode>	<u>Response</u> OK <u>Parameters</u> <mode> 0 7 CDC-ACM mode, (PID: 0x0020) USB0 – AT / NMEA / modem port USB1 – Mobile Analyzer traces port USB2 – 3G traces port USB3 – AT / NMEA / modem port USB4 – AT / NMEA / modem port USB5 – AT / NMEA / modem port USB6 – On-chip traces port 1 3 CDC-ACM and 3 CDC-ECM mode, (PID: 0x0302) ECM1 – Network adapter port ECM2 – Network adapter port ECM3 – Network adapter port

HL85xxx	
	USB1 – AT / NMEA / modem port USB2 – Mobile Analyzer traces port USB3 – 3G traces port 2 5 CDC-ACM and 1 CDC-ECM mode, (PID: 0x0303) ECM1 – Network adapter port USB1 – AT / NMEA / modem port USB2 – Mobile Analyzer traces port USB3 – 3G traces port USB4 – AT / NMEA / modem port USB5 – AT / NMEA / modem port
<u>Notes</u>	• The current configuration is kept in flash. • New configuration will only be activated after a module reboot. • The factory preset value of the <mode> is 0. • This command can be used without SIM. • For 7 CDC-ACM mode, Comneon8 driver has to be installed. • For 3 CDC-ACM and 3 CDC-ECM mode, Comneon8 driver V4.28 or newer has to be installed. • For 5 CDC-ACM and 1 CDC-ECM mode, Comneon8 driver V4.32 or newer has to be installed. • When the module boots, two USB devices will appear with (VID,PID) equals (058b,0041) and (8087,07ed). These are from the module bootloader and are used for firmware download. After a few seconds, these bootloader devices will disappear and the normal USB device will be enumerated with (VID,PID) equals (1519,0020/0302/0303).
<u>Examples</u>	AT+KUSBCOMP=0 //set to 7 CDC-ACM mode OK AT+KUSBCOMP=1 // set to 3 CDC-ACM and 3 CDC-ECM mode OK AT+KUSBCOMP=2 // set to 5 CDC-ACM and 1 CDC-ECM mode OK AT+KUSBCOMP=3 ERROR

HL85xxx

```
AT+KUSBCOMP?           // To change to 3 CDC-ACM and 3 CDC-ECM mode.
+KUSBCOMP: 0
OK

AT+KUSBCOMP=1
OK

<<<< Reboot module >>>> // After rebooting the module, use the new Comneon8 driver V4.28 (or newer) and there will be new network adapters
                          // shown in the Device Manager in Windows

// Example to connect to the internet in Windows.

AT+KUSBCOMP?
+KUSBCOMP: 1
OK

AT+CGDCONT=1,"IP","peoples.net"
OK

AT+COPS=0
OK

AT+XDNS=1,1
OK

AT+XCEDATA=1,1          // Wait for a few seconds. Windows will then connect to the Internet and data connection is established.
OK
```

5.74. +XPINCNT Command: Get Remaining SIM PIN Attempts

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+XPINCNT=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+XPINCNT	<u>Response</u> +XPINCNT: <PIN attempts>,<PIN2 attempts>,<PUK attempts>,<PUK2 attempts> OK or +CME ERROR: <error> <u>Parameters</u> <PIN attempts> Number of remaining attempts to enter PIN. Default value = <u>3</u> <PIN2 attempts> Number of remaining attempts to enter PIN2. Default value = <u>3</u> <PUK attempts> Number of remaining attempts to enter PUK. Default value = <u>10</u> <PUK2 attempts> Number of remaining attempts to enter PUK2. Default value = <u>10</u>

5.75. +XCONFIG Command: Configure DLCs (Data Logical Channels)

Note: For HL85xxx only.

HL85xxx												
Test command												
<u>Syntax</u> AT+XCONFIG=?	<u>Response</u> +XCONFIG: (0-4),0 1,(0-max supported DLCs) OK											
Read command												
<u>Syntax</u> AT+XCONFIG?	<u>Response</u> +XCONFIG: 0 or +XCONFIG: <dlc/tid>											
Write command												
<u>Syntax</u> AT+XCONFIG= <config_item>, <switch> [,<dlc/tid>]	<u>Response</u> OK or +CME ERROR: <error>											
	<u>Parameters</u> <config_item>	<table><tr><td>0</td><td>Configure voice channel for auto answering</td></tr><tr><td>1</td><td>Configure CSD channel for auto answering</td></tr><tr><td>2</td><td>Configure GPRS channel for auto answering</td></tr><tr><td>3</td><td>Configure unsolicited call results</td></tr><tr><td>4</td><td>Configure unsolicited GPRS results</td></tr></table>	0	Configure voice channel for auto answering	1	Configure CSD channel for auto answering	2	Configure GPRS channel for auto answering	3	Configure unsolicited call results	4	Configure unsolicited GPRS results
0	Configure voice channel for auto answering											
1	Configure CSD channel for auto answering											
2	Configure GPRS channel for auto answering											
3	Configure unsolicited call results											
4	Configure unsolicited GPRS results											

HL85xxx	
	<switch> If <config> = 0, 1 or 2: 0 Disable selection 1 Enable selection for <dlc/tid> If <config> = 3 or 4: 0 Disable on all channels, or channel specific with optional parameter <dlc/tid> 1 Enable on all channels, or channel specific with optional parameter <dlc/tid> <dlc/tid> Integer type indicating the DLC in the range of 1 – 9 (the maximum number of DLC is customizable). In MUX mode, DLC 0 is reserved for GSM 07.10 use.
Notes	- Enabling auto answer with ATS0 is a prerequisite for the configuration of channels. - Using ATS0 enables auto answer for voice, CSD and GPRS on the DLC where it was last requested. Using AT+XCONFIG on the other hand, allows for separate configuration of voice, CSD and GPRS channels.

5.76. +COREDUMP Command: Configure Core Dump Collection

Note: For HL85xxx only.

HL85xxx	
Test command	
<u>Syntax</u> AT+COREDUMP =?	<u>Response</u> +COREDUMP: (list of supported <mode>s) OK
Read command	
<u>Syntax</u> AT+COREDUMP?	<u>Response</u> +COREDUMP: <mode> OK

HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+COREDUMP= <mode>	<u>Response</u> OK <u>Parameter</u> <mode> Core dump collection mode <u>0</u> Disable <u>1</u> Enable

5.77. +XSVM Command: Set Voice Mail Number

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+XSVM=?	<u>Response</u> +XSVM: (list of supported <line>s),(list of supported <mode>s),<nlength>,(list of supported <type>s) OK

HL85xxx																						
Read command																						
<u>Syntax</u> AT+XSVM?	<u>Response</u> +XSVM: <line1>,<index1>,<mode1>,<number1>,<type1>,<mailbox_type> <CR><LF> +XSVM: <line1>,<index2>,<mode2>,<number2>,<type2>,<mailbox_type> <CR><LF> +XSVM: <line2>,<index1>,<mode3>,<number3>,<type3>,<mailbox_type> <CR><LF> +XSVM: <line2>,<index2>,<mode4>,<number4>,<type4>,<mailbox_type> OK																					
Write command																						
<u>Syntax</u> AT+XSVM= <line>,<index>,<mode> [,<number [,<type>]]	<u>Response</u> OK or +CME ERROR: <error> <u>Parameters</u> <table><tr><td rowspan="2"><line></td><td>1</td><td>Line 1</td></tr><tr><td>2</td><td>Line 2</td></tr><tr><td rowspan="2"><index></td><td>1</td><td>Home network voice mail number</td></tr><tr><td>2</td><td>Roaming voice mail number</td></tr><tr><td rowspan="2"><mode></td><td>0</td><td>Disable voice mail number</td></tr><tr><td>1</td><td>Enable voice mail number</td></tr><tr><td><number></td><td>0 – 9, +</td><td>String containing the phone number</td></tr><tr><td><nlength></td><td colspan="2">Maximum length of the <number> phone string; normally gets the value 44</td></tr></table>	<line>	1	Line 1	2	Line 2	<index>	1	Home network voice mail number	2	Roaming voice mail number	<mode>	0	Disable voice mail number	1	Enable voice mail number	<number>	0 – 9, +	String containing the phone number	<nlength>	Maximum length of the <number> phone string; normally gets the value 44	
<line>	1		Line 1																			
	2	Line 2																				
<index>	1	Home network voice mail number																				
	2	Roaming voice mail number																				
<mode>	0	Disable voice mail number																				
	1	Enable voice mail number																				
<number>	0 – 9, +	String containing the phone number																				
<nlength>	Maximum length of the <number> phone string; normally gets the value 44																					

HL85xxx			
	<type>	128 – 255	Type of address octet
		129	ISDN / telephony numbering plan, national / international unknown
		145	ISDN / telephony numbering plan, international number
	<mailbox type>	String type indicating the mailbox type contained in the corresponding alpha_tag field of the CPHS-file from the SIM card	

5.78. +CPWROFF Command: Switch MS Off

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CPWROFF=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CPWROFF [=<mode>]	<u>Response</u> OK or +CME ERROR: <error> <u>Parameter</u> <mode> Power down mode 1 Fast power down mode
<u>Notes</u>	- Not specifying a parameter value for the execute command will perform normal IMSI detach before powering down. <mode>=1 will perform fast power down (~100 to 300 ms) without an IMSI detach request being sent to the network.

5.79. *PSTACS Command: Timing Advance Measurement

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSTACS=?	<u>Response</u> *PSTACS: (range of <nb cells>) OK
<i>Write command</i> <u>Syntax</u> AT*PSTACS= <nb cells>	<u>Response</u> *PSTACS: <arfcn 1>,<cell id 1>,<timing advance 1> *PSTACS: <arfcn 2>,<cell id 2>,<timing advance 2> ... OK <u>Parameter</u> <nb cells> 1 - 7 Maximum number of measured neighbor cells
<u>Notes</u>	• *PSTACS provides measurement of the timing advance value over the serving cell and a number of neighbor cells. • The command works in best effort mode and returns up to <nb cells> measurements depending on the current cellular environment. • When the command ends, the protocol stack manager may decide to perform full cell reselection which seems as if the GSM device lost the network (+CREG: 0/4 can be issued). It is advised to test the status of the network attachment before issuing a new command that requires network services. • Network services such as incoming calls or short messages are not guaranteed as long as the command is ongoing and the HL6528 is scanning neighbor cells in order to retrieve their associated timing advance values.

5.80. +KNTTP Command: Network Time Protocol

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT+KNTTP=?	<u>Response</u> +KNTTP: (list of supported <CnxCfg>s),(list of supported <NTPport>s),(list of supported <UpdateCclk>s),(list of supported <Timeout>s),(list of supported <TimeZone>s) OK
<i>Write command</i> <u>Syntax</u> AT+KNTTP= <cnx cnf>, <NTPaddr>, [<NTPport>], [<UpdateCclk>], [<Timeout>], [<TimeZone>]	<u>Response</u> +KNTTP: <time> OK <u>Parameters</u> <cnx cnf> 0 – 7 (PDP context configuration) a numeric parameter which specifies a particular PDP context configuration (see section 13.7.1 +KCNXCFG Command: GPRS Connection Configuration) <NTPaddr> 0 – 255 Dot-separated numeric parameters on the form a1.a2.a3.a4 or explicit name of the remote server <NTPport> 0 – 65535 Numeric parameter <UpdateCclk> <u>0</u> Real Time Clock is not updated (default) 1 Real TimeClock is updated with time received from server <Timeout> 1 – <u>10</u> Timer during which the module will wait for an answer from the server in seconds (default value = 10) <TimeZone> Indicates the difference, expressed in quarters of an hour, between the local time and GMT. Range = -48 to 56 <time> String type value; format is "yy/MM/dd,hh:mm:ss+/-Timezone", where characters indicate year (last two digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT). Range = -48 to 56. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"

HL6528x	
Reference Sierra Wireless Proprietary	<u>Examples</u> // Define APN for GPRS connection: at+kcncfg=0,"GPRS","internet-entreprise" OK // Require time from server, no clock update at+kntp=0,"145.238.203.10",123 +KNTTP: 15/05/20,09:41:20+00 OK at+cclk? +CCLK: "00/01/01,06:02:56+08" OK // Require time from server,with clock update and timezone set at+kntp=0,"145.238.203.10",123,1,5,"+08" +KNTTP: 15/05/20,09:42:30+08 OK // check clock update at+cclk? +CCLK: "15/05/20,09:42:30+08" OK

5.81. +WESHDOWN Command: Emergency Shutdown

Note: For HL6528x, HL8518, HL8528 and HL8529 only.

HL6528x, HL8518, HL8528 and HL8529	
<i>Test command</i> <u>Syntax</u> AT+WESHDOWN =?	<u>Response</u> +WESHDOWN: (0-2), (list of supported <gpio_index>s) OK
<i>Read command</i> <u>Syntax</u> AT+ WESHDOWN?	<u>Response</u> +WESHDOWN: <mode>,<gpio_index> OK
<i>Write command</i> <u>Syntax</u> AT+WESHDOWN =<mode> [,<gpio_index>]	<u>Response</u> OK +CME ERROR <err> <u>Parameters</u> <mode> 0 Disable emergency shutdown feature by GPIO 1 Enable emergency shutdown feature by GPIO 2 Trigger emergency shutdown <gpio_index> 1 – 8 Defines which GPIO will be used as input to trigger the emergency shutdown on the falling edge 4 Default

HL6528x, HL8518, HL8528 and HL8529	
Examples	AT+WESHDOWN=? +WESHDOWN: (0-2),(1-8) OK AT+WESHDOWN? +WESHDOWN: 0,4 <i>// Emergency shutdown by GPIO is not active</i> OK AT+WESHDOWN=1,4 <i>// Activate emergency shutdown on GPIO4</i> OK AT+WESHDOWN? +WESHDOWN: 1,4 <i>// A falling edge on GPIO4 will shut the module down in less than 25 ms</i> OK AT+WESHDOWN=2 OK <i>// Module shuts down in less than 25ms</i> <i>// In the case of the HL8518, HL8528 and HL8529:</i> AT+WESHDOWN=2 <i>// the module shuts down in less than 25ms and the OK response couldn't be received</i>
Notes	• No <gpio_index> parameter is needed when <mode>=0 or 2. • Configuration is saved in non-volatile memory and therefore is still effective after a power cycle. • GPIOs may already be used by +KSIMDET, +KJAMDET, +KSYNC, +KTEMPMON, +KGSMAD, +KSIMSL0T or I²C. • It might occasionally happen that the OK response to AT+WESHDOWN=2 is not received on the serial link by the application due to the quick shut down; OK response is never received in the case of the HL8518, HL8528 and HL8529. • For compatibility with HL3 the following syntax is also supported: ▪ AT!DIOCFG=4,1,1,2 to get the same result as AT+WESHDOWN=1,4 ▪ AT!DIOCFG=4,0,1,2 to get the same result as AT+WESHDOWN=0,4 ▪ AT!POWERDOWN=0 to get the same result as AT*PSCPOF ▪ AT!POWERDOWN=1 to get the same result as AT+WESHDOWN=2

5.82. +KRFMUTE Command: Mute 2G/3G TX

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+KRFMUTE=?	<u>Response</u> +KRFMUTE: (list of supported <mode> s),(list of supported <duration> s),(list of supported <ind> s) OK or +CME ERROR: <err>
<i>Read command</i> <u>Syntax</u> AT+KRFMUTE?	<u>Response</u> +KRFMUTE: <mode> , <duration> , <ind> OK or +CME ERROR: <err>
<i>Write command</i> <u>Syntax</u> AT+KRFMUTE= <mode> [,<duration> [,<ind>]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <mode> Enable or Disable 2G/3G TX mute <u>0</u> The feature is deactivated; the 2G, 3G transmit power emission is unmuted. <u>1</u> The feature is activated for 2G, and the 2G transmit power emission is currently muted.

HL85xxx	
	2 The feature is activated for 3G, and the 3G transmit power emission is currently muted. 3 The feature is activated for 2G+3G; and the 2G+3G transmit power emission is currently muted. <duration> 0.5 – 120 (in seconds) Mute duration (used when <mode>= 1, 2 or 3). Default value = <u>30</u> <ind> Unsolicited result code mode <u>0</u> Disable 2G, 3G and 2G+3G TX mute unsolicited result code. 1 Enable 2G, 3G and 2G+3G TX mute unsolicited result code +KRFMUTE: <mode>,<duration>
Unsolicited Notification	<u>Response</u> +KRFMUTE: <mode>,<duration> <mode> 1 // start of 2G mute with duration <mode> 0 // stop of 2G mute
Reference Sierra Wireless Proprietary	<u>Notes</u> • If AT+KRFMUTE=1 is resent within <duration> after it has already been sent, then it will not take any effect. The <duration> timer will not be reactivated and will continue to run as expected. • If AT+KRFMUTE=0 is sent within <duration> after AT+KRFMUTE=1 is sent, then the <duration> timer will be killed and the mute will be deactivated. • If AT+KRFMUTE=0 is sent while the mute is not activated, then the AT command does not take any effect. • When the feature is activated, <mode> will automatically be reset to 0 after the <duration> mute timer expires. • At module power up, <mode> is always 0 by default. • This command is only effective with a SIM card.
Example	AT+KRFMUTE=? +KRFMUTE: (0-3),(0.5-120),(0-1) OK AT+KRFMUTE? // Read the current settings +KRFMUTE: 0,30.0,0 OK AT+KRFMUTE=2,40,1 // Activate 3G TX mute during 40s OK +KRFMUTE: 2,40.0 // 3G TX mute is started

HL85xxx	
	AT+KRFMUTE? +KRFMUTE: 2, 40.0,1 OK
	AT+KRFMUTE=3,50,0 // Activate 2G+3G TX mute during 50s OK // No indication in this case as <ind> is set 0.
	AT+KRFMUTE? +KRFMUTE: 3,50.0,0 OK
	AT+KRFMUTE=3,0.5,1 // Activate 2G+3G TX mute during 0.5s OK +KRFMUTE: 3,0.5
	AT+KRFMUTE=1,0.5,1 // Activate 2G TX mute during 0.5s OK +KRFMUTE: 1,0.5

5.83. +OMADMST Command: Configure OMADM Status URC

Note: For HL854xx only.

HL854xx	
<i>Test command</i>	
<u>Syntax</u> AT+OMADMST=?	<u>Response</u> +OMADMST: (list of supported <mode>s) +OMADMST: (20),<uri> OK

HL854xx	
Read command	
<u>Syntax</u> AT+OMADMST?	<u>Response</u> +OMADMST: <mode>[,<verbose_urc>] +OMADMST: <omadm_reg_mode>,<omadm_reg_state> OK
Write command	
<u>Syntax</u> AT+OMADMST= <mode> [,<verbose_urc>] For <mode>=20: AT+OMADMST= <mode>,<uri>	<u>Response</u> OK <u>Parameters</u> <mode> 0 Disable configuration of OMADM status URC 1 Enable configuration of OMADM status URC (only on the first port that executes this command) 20 Display the OMADM tree with given <uri> <omadm_reg_mode> Behavior of OMADM client bootstrapping 0 Disables bootstrapping initiated by client 1 Enables bootstrapping initiated by client on next successful registration if the module's IMEI is used the first time and no server initiated session happens before 2 Enables bootstrapping initiated by client on next successful registration regardless of the above conditions <omadm_reg_state> State of bootstrap registration 0 Client has not yet been bootstrapped (no server initiated session happens before) 1 Client was previously bootstrapped with successful server initiated session
Unsolicited Notification	<u>Response</u> +OMADMST: 0,"<server>",<sess_id> // A OMADM session starts +OMADMST: 1,<orig>,<server>,<sess_id>,<msg_id>,<server_addr_url>,<server_port>,<auth_type> // Contact OMADM server for requests +OMADMST: 2,<res> // Received response from server, HTTP result = <res> +OMADMST: 3,<err> // Request was processed, internal error code = <err>, 0 means no error +OMADMST: 4 // Setting up ADMIN PDP connection +OMADMST: 5 // ADMIN PDP connection is connected for OMADM +OMADMST: 6 // ADMIN PDP connection is freed +OMADMST: 7 // OMADM session is finished, ADMIN PDP connection is kept active

HL854xx	
Notes	<mode> is persistent over module boot, but URC is only available on the AT port that enabled the URC setting.
Examples	<pre>// For a session being processed with several HTTP read and processing: +OMADMST: 0,"com.vzwdmserver",256 +OMADMST: 4 +OMADMST: 5 +OMADMST: 1,1,"com.vzwdmserver",256,1,"https://xxx/dm",443,4 +OMADMST: 2,200 +OMADMST: 3,0 +OMADMST: 1,1,"com.vzwdmserver",256,2,"https://xxx/dm/xxx",443,4 +OMADMST: 2,200 +OMADMST: 3,0 +OMADMST: 1,1,"com.vzwdmserver",256,3,"https://xxx/dm/xxx",443,4 +OMADMST: 2,200 +OMADMST: 3,0 +OMADMST: 6</pre>

>> 6. Network Service Related Commands

6.1. +CAOC Command: Advice of Charge Information

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CAOC=?	<u>Response</u> +CAOC: (list of supported <mode>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CAOC?	<u>Response</u> +CAOC: <mode> OK
<i>Unsolicited notification</i>	<u>Response</u> +CCCM: <ccm>
<i>Write command</i>	
<u>Syntax</u> AT+CAOC= [<mode>]	<u>Response</u> If <mode> = 0 +CAOC: <ccm> OK else OK

HL6528x and HL85xxx	
	<u>Parameters</u> <mode> 0 Query CCM value 1 Deactivation of the unsolicited notification (+CCCM) 2 Activation of the unsolicited notification <ccm> String type; three bytes of the current CCM value in hexadecimal format
<i>Execute command</i> <u>Syntax</u> AT+CAOC	<u>Response</u> +CAOC: <ccm> OK
<u>Reference</u> [27.007] §7.16	<u>Notes</u> - When activated this message is sent to the TE every time there is a change in the ccm value with a minimum of 10 seconds between 2 messages - This AT command needs SIM and network where AOC are allowed

6.2. +CCFC Command: Call Forwarding Conditions

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CCFC=?	<u>Response</u> +CCFC: (list: range of supported <reas>) OK

HL6528x and HL85xxx*Write command*Syntax

AT+CCFC=
<reas>, <mode>
[,<number>
[,<type>,<class>
[,<subaddr>
[,<satype>
[,<time>]]]]]

Response

If <mode> = 2 and command successful:

+CCFC: <status>,<class1>[,<number>,<type>,<subaddr>,<satype>,<time>]]]
[+CCFC: <status>,<class2>[,<number>,<type>,<subaddr>,<satype>,<time>]]]
[...]
OK

Else

OK

Parameters

<reas> 0 unconditional
 1 mobile busy
 2 no reply
 3 not reachable
 4 all call forwarding
 5 all conditional call forwarding

<mode> 0 disable
 1 enable
 2 query status
 3 registration
 4 erasure

<number> string type phone number of forwarding address in format specified by <type>

<type> type of address octet in integer format

<class> is a sum of integers each representing a class of information (default 7)

1 Voice
 2 Data

HL6528x and HL85xxx	
	4 Fax 8 SMS 16 Data Circuit Synchronization 32 Data Circuit Asynchronization 64 Dedicated Packet Access 128 Dedicated Pad Access 256 Auxiliary Speech <subaddr> string type sub address of format specified by <satype> <satype> type of subaddress octet in integer format <time> 1 – 30 when "no reply" is enabled, this gives the time in seconds to wait before call is forwarded (default value is <u>20</u>) <status> 0 not active 1 active
<u>Reference</u> [27.007] § 7.11	<u>Notes</u> This command allows control of the call forwarding supplementary service according to GSM 02.84

6.3. +CCWA Command: Call Waiting

HL6528x and HL85xxx	
<u>Test command</u> <u>Syntax</u> AT+CCWA=?	<u>Response</u> +CCWA: (list of supported <n>s) OK

HL6528x and HL85xxx	
Read command	
<u>Syntax</u> AT+CCWA?	<u>Response</u> +CCWA: <n> OK
Write command	
<u>Syntax</u> AT+CCWA=[<n> [,<mode> [,<class>]]]	<u>Response</u> when <mode>=2 and command successful +CCWA: <status>,<class1> [+CCWA: <status>,<class2>[...]] OK <u>Parameters</u> <n> sets/shows the result code presentation status in the TA 0 disable 1 enable <mode> when <mode> parameter is not given, network is not interrogated 0 disable 1 enable 2 query status <class> sum of integers each representing a class of information (default 7) 1 voice (telephony) 2 data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64 and 128) <status> 0 not active 1 active <number> string type phone number of calling address in format specified by <type> <type> type of address octet in integer format (refer TS 24.008 [8] sub clause 10.5.4.7)

HL6528x and HL85xxx							
	<alpha> optional string type alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command Select TE Character Set +CSCS <CLI validity> <table> <tr> <td>0</td><td>CLI valid</td></tr> <tr> <td>1</td><td>CLI has been withheld by the originator</td></tr> <tr> <td>2</td><td>CLI is not available due to interworking problems or limitations of originating network.</td></tr> </table>	0	CLI valid	1	CLI has been withheld by the originator	2	CLI is not available due to interworking problems or limitations of originating network.
0	CLI valid						
1	CLI has been withheld by the originator						
2	CLI is not available due to interworking problems or limitations of originating network.						
<u>Reference</u> [27.007] § 7.12	<u>Notes</u> - When enabled (<n>=1), the following unsolicited code is sent to the TE: +CCWA: <number>,<type>,<class>[,<alpha>][,<CLI validity>]. - When <mode> is not given, the setting only takes effect on the current port in use regardless of whether it is enabled or disabled.						

6.4. +CHLD Command: Call Hold and Multiparty

HL6528x and HL85xxx																
<i>Test command</i>																
<u>Syntax</u> AT+CHLD=?	<u>Response</u> +CHLD: (list of supported <n>s) OK															
<i>Execute command</i>																
<u>Syntax</u> AT+CHLD=[<n>]	<u>Response</u> OK <u>Parameter</u> <table><tr><td><n></td><td>0</td><td>Terminate all held calls; or set UDUB (User Determined User Busy) for a waiting call, i.e. reject the waiting call.</td></tr><tr><td></td><td>1</td><td>Terminate all active calls (if any) and accept the other call (waiting call or held call)</td></tr><tr><td></td><td>1X</td><td>Terminate the active call X (X= 1-7)</td></tr><tr><td></td><td>2</td><td>Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call</td></tr><tr><td></td><td>2X</td><td>Place all active calls except call X (X= 1-7) on hold</td></tr></table>	<n>	0	Terminate all held calls; or set UDUB (User Determined User Busy) for a waiting call, i.e. reject the waiting call.		1	Terminate all active calls (if any) and accept the other call (waiting call or held call)		1X	Terminate the active call X (X= 1-7)		2	Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call		2X	Place all active calls except call X (X= 1-7) on hold
<n>	0	Terminate all held calls; or set UDUB (User Determined User Busy) for a waiting call, i.e. reject the waiting call.														
	1	Terminate all active calls (if any) and accept the other call (waiting call or held call)														
	1X	Terminate the active call X (X= 1-7)														
	2	Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call														
	2X	Place all active calls except call X (X= 1-7) on hold														

HL6528x and HL85xxx		
	3	Add the held call to the active calls
	4	Explicit Call Transfer
	5	Reserved (only available in the HL85xxx)
	6	Put an active call on hold or a held call to active, while another call is waiting (only available in the HL85xxx)
	7	Disconnect users in multiparty without accepting an incoming call (only available in the HL85xxx)
	8	Release all calls (only available in the HL85xxx)
Reference [27.007] §7.13		

6.5. +CUSD: Unstructured Supplementary Service Data

HL6528x and HL85xxx		
<i>Test command</i>		
<u>Syntax</u> AT+CUSD=?	<u>Response</u> +CUSD: (list of supported <n>s) OK	
<i>Read command</i>		
<u>Syntax</u> AT+CUSD?	<u>Response</u> +CUSD: <n> OK	
<i>Unsolicited Notification</i>	<u>Response</u> +CUSD: <m>[,<str>,<dcs>]	
<i>Write command</i>		
<u>Syntax</u> AT+CUSD=[<n> [,<str>[,<dcs>]]]	<u>Response</u> OK	

HL6528x and HL85xxx													
	<u>Parameters</u> <n> parameter sets/shows the result code presentation status in the TA 0 disable the result code presentation to the TE (default value if no parameter) 1 enable the result code presentation to the TE 2 cancel session (not applicable to read command response) <str> string type USSD-string (when <str> parameter is not given, network is not interrogated): - if <dcsc> indicates that 3GPP TS 23.038 [25] 7 bit default alphabet is used - if TE character set other than "HEX" (refer command Select TE Character Set +CSCS): MT/TA converts GSM alphabet into current TE character set according to rules of 3GPP TS 27.005 [24] Annex A - if TE character set is "HEX": MT/TA converts each 7-bit character of GSM alphabet into two IRA character long hexadecimal number (e.g. character Π (GSM 23) is presented as 17 (IRA 49 and 55)) - if <dcsc> indicates that 8-bit data coding scheme is used: MT/TA converts each 8-bit octet into two IRA character long hexadecimal numbers (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) <dcsc> 3GPP TS 23.038 [25] Cell Broadcast Data Coding Scheme in integer format (default 0) <m> <table> <tr> <td>0</td><td>no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)</td></tr> <tr> <td>1</td><td>further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation)</td></tr> <tr> <td>2</td><td>USSD terminated by network</td></tr> <tr> <td>3</td><td>other local client has responded</td></tr> <tr> <td>4</td><td>operation not supported</td></tr> <tr> <td>5</td><td>network time out</td></tr> </table>	0	no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)	1	further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation)	2	USSD terminated by network	3	other local client has responded	4	operation not supported	5	network time out
0	no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)												
1	further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation)												
2	USSD terminated by network												
3	other local client has responded												
4	operation not supported												
5	network time out												
<u>Reference</u> [27.007] §7.15	<u>Notes</u> - When TE sends an USSD to the network, the OK result code is sent before the response of the network. When network answers, the response will be sent as an URC (as if it was a network initiated operation, in case of error +CUSD: 4 will be sent) - This allows the link not to be blocked for a long time (the network can take a long time to answer a USSD request initiated by the TE) - The USSD session can be aborted using command AT+CUSD=2												

6.6. +CLCC Command: List Current Call

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CLCC=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CLCC	<u>Response</u> [+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>]]] [+CLCC: <id2>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>]]] [...] OK <u>Parameters</u> <id> integer type; call identification number as described in GSM 02.30 [19] sub clause 4.5.5.1; this number can be used in +CHLD command operations <dir> 0 mobile originated (MO) call 1 mobile terminated (MT) call <stat> state of the call 0 active 1 held 2 dialing (MO call) 3 alerting (MO call) 4 incoming (MT call) 5 waiting (MT call) <mode> bearer/teleservice 0 voice 1 data 9 unknown

HL6528x and HL85xxx	
	<empty> 0 call is not one of multiparty (conference) call parties 1 call is one of multiparty (conference) call parties <number> string type phone number in format specified by <type> <type> type of address octet in integer format (refer GSM 04.08 [8] sub clause 10.5.4.7) <alpha> string type alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command Select TE Character Set +CSCS
Reference [27.007] §7.18	<u>Notes</u> This commands returns the current list of calls of ME
Example	+CLCC: 1,0,0,0,0 //Outgoing voice call in progress

6.7. +CLCK Command: Facility Lock

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CLCK=?	<u>Response</u> +CLCK: (list of supported <fac>s) OK
<i>Write command</i> <u>Syntax</u> AT+CLCK=<fac>,<mode> [,<passwd>] [,<class>]]	<u>Response</u> If <mode> <> 2 and command is successful OK

HL6528x and HL85xxx

If **<mode>** = 2 and command is successful
+CLCK:<status>[,<class1>[<CR>,<LF>+CLCK:<status>,class2...]]
OK

Parameters

<fac> values reserved by the present document:

"AO" BAOC (Barr All Outgoing Calls) (refer 3GPP TS 22.088 [6] clause 1)
 "OI" BOIC (Barr Outgoing International Calls) (refer 3GPP TS 22.088 [6] clause 1)
 "OX" BOIC-exHC (Barr Outgoing International Calls except to Home Country) (refer 3GPP TS 22.088 [6] clause 1)
 "AI" BAIC (Barr All Incoming Calls) (refer 3GPP TS 22.088 [6] clause 2)
 "IR" BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (refer 3GPP TS 22.088 [6] clause 2)
 "AB" All Barring services (refer 3GPP TS 22.030 [19]) (applicable only for mode>=0)
 "AG" All outgoing barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)
 "AC" All incoming barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)
 "FD" SIM card or active application in the UICC (GSM or USIM) fixed dialing memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as <passwd>)
 "SC" SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command issued)
 "PN" Network Personalization (refer 3GPP TS 22.022 [33])
 "PU" Network subset Personalization (refer 3GPP TS 22.022 [33])
 "PP" Service Provider Personalization (refer 3GPP TS 22.022 [33])
 "PS" PH-SIM (lock Phone to SIM/UICC card installed in the currently selected card slot) (MT asks for the password when other than current SIM/UICC card is inserted; MT may remember certain previously used cards thus not requiring password when they are inserted)
 "PC" Corporate Personalization (refer 3GPP TS 22.022 [33])

<mode> 0 unlock
 1 lock
 2 query status

<status> 0 not active
 1 active

<passwd> string type; shall be the same as password specified for the facility from the ME user interface or with command Change Password
+CPWD

HL6528x and HL85xxx	
	<class> sum of integers each representing a class of information (default 7) 1 voice (telephony) 2 data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64 and 128) 8 short message service 16 data circuit sync 32 data circuit async
Reference [27.007] §7.4	<u>Notes</u> - This commands may be used by the TE to lock or unlock ME or network facilities (with a password protection) AT+CLCK="PN",2 Query the status of the Network Personalization (commonly named "SIMLock", "SIM Lock") +CLCK: 0 Unlock state OK - In case of unlock ME then re-lock again, a reset of the module is mandatory in order to have the ME locked

6.8. +CLIP Command: Calling Line Identification Presentation

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CLIP=?	<u>Response</u> +CLIP: (list of supported <n>) OK
<i>Read command</i>	
<u>Syntax</u> AT+CLIP?	<u>Response</u> +CLIP: <n>,<m> OK

HL6528x and HL85xxx							
<i>Write command</i>							
<u>Syntax</u> AT+CLIP=<n>	<u>Response</u> OK <u>Parameters</u> <n> parameter sets/shows the result code presentation status in the TA 0 disable 1 enable <m> parameter shows the subscriber CLIP service status in the network 0 CLIP not provisioned 1 CLIP provisioned 2 unknown (e.g. no network, etc.) <number> string type phone number of format specified by <type> <type> type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7) <subaddr> string type subaddress of format specified by <satype> <satype> type of subaddress octet in integer format (refer GSM 04.08 [8] sub clause 10.5.4.8) <alpha> optional string type alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command +CSCS. Not supported. <CLI validity> <table> <tr> <td>0</td><td>CLI valid</td></tr> <tr> <td>1</td><td>CLI has been withheld by the originator</td></tr> <tr> <td>2</td><td>CLI is not available due to interworking problems or limitations of originating network</td></tr> </table>	0	CLI valid	1	CLI has been withheld by the originator	2	CLI is not available due to interworking problems or limitations of originating network
0	CLI valid						
1	CLI has been withheld by the originator						
2	CLI is not available due to interworking problems or limitations of originating network						
<u>Reference</u> [27.007] § 7.6	<u>Notes</u> When the presentation to the CLI at the TE is enabled, the following notification is sent after every ring notification +CLIP: <number>,<type>[,<subaddr>,<satype>[,<alpha>[,<CLI validity>]]]						

6.9. +CLIR Command: Calling Line Identification Restriction

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CLIR=?	<u>Response</u> +CLIR: (list of supported <n>) OK
<i>Read command</i>	
<u>Syntax</u> AT+CLIR?	<u>Response</u> +CLIR: <n>,<m> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CLIR=<n>	<u>Response</u> OK <u>Parameters</u> <n> parameter sets the adjustment for outgoing calls 0 presentation indicator is used according to the subscription of the CLIR service 1 CLIR invocation 2 CLIR suppression <m> parameter shows the subscriber CLIR service status in the network 0 CLIR not provisioned 1 CLIR provisioned in permanent mode 2 unknown (e.g. no network, etc.) 3 CLIR temporary mode presentation restricted 4 CLIR temporary mode presentation allowed
<u>Reference</u>	[27.007] § 7.7

6.10. +CNUM Command: Subscriber Number

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CNUM=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CNUM	<u>Response</u> +CNUM: [<alpha1>,<number1>,<type1>[,<speed>,<service>[,<itc>]] [<CR><LF> +CNUM: [<alpha2>,<number2>,<type2>[,<speed>,<service>[,<itc>]] [...]] OK <u>Parameters</u> <alpha> optional alphanumeric string associated with <number>; used character set should be the one selected with command +CSCS <number> string type phone number of format specified by <type> <type> type of address octet in integer format (refer GSM 04.08 [8] sub clause 10.5.4.7) <speed> as defined in 27.007 sub clause 6.7 or +CBST <service> service related to the phone number 0 asynchronous modem 1 synchronous modem 2 PAD Access (asynchronous) 3 Packet Access (synchronous) 4 voice All other values below 128 are reserved by the present document <itc> information transfer capability 0 3.1kHz 1 UDI

HL6528x and HL85xxx	
<u>Example</u>	AT+CNUM +CNUM: "TEL","0612345678",129 +CNUM: "", "", 255 +CNUM: "", "", 255 +CNUM: "", "", 255 OK
<u>Reference</u> [27.007] § 7.1	<u>Notes</u> • Action command returns the MSISDNs related to the subscriber (this information can be stored in the SIM or in the ME) • The Read Command (AT+CNUM?) returns an error • All the numbers are in the "ON" (Own number) phonebook • Response depends on network providers' policy

6.11. +COLP Command: Connected Line Identification Presentation

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+COLP=?	<u>Response</u> +COLP: (list of supported <n>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+COLP?	<u>Response</u> +COLP: <n>,<m> OK

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> AT+COLP=[<n>]	<u>Response</u> OK
	<u>Parameters</u> <n> parameter sets/shows the result code presentation status in the TA 0 disable 1 enable <m> parameter shows the subscriber COLP service status in the network 0 COLP not provisioned 1 COLP provisioned 2 unknown (e.g. no network, etc.) <number>, <type>, <subaddr>, <satype>, <alpha> refer to +CLIP
<u>Reference</u> [27.007] § 7.8	<u>Notes</u> - This command refers to the GSM supplementary service COLP (Connected Line Identification Presentation) that enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call. - When enabled (and called subscriber allows) >]] the following intermediate result code is returned from TA to TE before any +CR or V.25ter [14] responses +COLP: <number>,<type>[,<subaddr>,<satype> [<alpha>]] - If COLP=1, the OK answer to an ATD Command happens only after the call is active (and not just after the command)

6.12. +COPN Command: Read Operator Name

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+COPN=?	<u>Response</u> OK

HL6528x and HL85xxx	
<i>Execute command</i>	
<u>Syntax</u> AT+COPN	<u>Response</u> +COPN: <numeric1>,<alpha1>[<CR><LF> +COPN: <numeric2>,<alpha2> [...]] OK <u>Parameters</u> <numeric> string type; operator in numeric format (see +COPS) <alpha> string type; operator in long alphanumeric format (see +COPS)
<u>Reference</u> [27.007] § 7.21	

6.13. +COPS Command: Operator Selection

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+COPS=?	<u>Response</u> +COPS: [list of supported (<stat>,long alphanumeric <oper>,short alphanumeric <oper>,numeric <oper>)s] [,,(list of supported <mode>s),(list of supported <format>s)] OK	<u>Syntax</u> AT+COPS=?	<u>Response</u> +COPS: [list of supported (<stat>,long alphanumeric <oper>,short alphanumeric <oper>,numeric <oper> [,< Act>][,,(list of supported <mode>s),(list of supported <format>s)] OK or +CME ERROR: <err>

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+COPS?	<u>Response</u> +COPS: <mode>[,<format>,<oper>] OK	<u>Syntax</u> AT+COPS?	<u>Response</u> +COPS: <mode>[,<format>,<oper>[,< AcT>]] OK or +CME ERROR: <err>
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+COPS= [<mode> [,<format> [,<oper>]]]	<u>Response</u> OK <u>Parameters</u> <mode> <u>0</u> automatic (<oper> field is ignored) 1 manual (<oper> field shall be present) 3 set the read format; use with <format> 4 manual/automatic (<oper> field shall be present); if manual selection fails, automatic mode (<mode>=0) is entered <format> <u>0</u> long format alphanumeric <oper> 1 short alphanumeric <oper> 2 numeric <oper> <oper> string type; <format> indicates if the format is alphanumeric or numeric	<u>Syntax</u> AT+COPS= [<mode> [,<format> [,<oper> [,< AcT>]]]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <mode> <u>0</u> automatic; in this case other fields are ignored and registration is done automatically by ME 1 manual (other parameters like format and operator need to be passed) 2 deregister from network 3 sets <format> value. In this case <format> becomes a mandatory input 4 manual/automatic; if manual selection fails then automatic mode is entered <format> 0 long alphanumeric 1 short alphanumeric 2 numeric <oper> string type given in format <format>; this field may be up to 16 character long for long alphanumeric format, up to 8

HL6528x			HL85xxx		
	<stat> 0 1 2 3 unknown available current forbidden		characters for short alphanumeric format and 5 characters long for numeric format (MCC/MNC codes) <stat> 0 1 2 3 unknown networks network available current (registered) forbidden network <AcT> 0 2 GSM UMTS		
Reference [27.007] §7.3			Notes This command forces an attempt to select and register the GSM, UMTS network. Set command sets automatic network selection or selects network and a certain access technology AcT. Read command returns current network. Command returns available networks and lists of supported <mode>s and <format>s. This command is abortable. The port shall be freed for issuing another command. No network abort shall be triggered. Priority order used for display of long alphanumeric format <oper> and short alphanumeric <oper> strings: 1. EONS name from SIM-files, EF-OPL and EF-PNN. 2. NITZ Name. 3. Network Operator Name in SIM file CPHS ONS (0x6F14) for long name and SIM file CPHS SONS (0x6F18) for short name. 4. Long Name in NVM (according to the TS.25 version specified in CRN). 5. Numeric format of network MCC/MNC (three BCD digit country code and two/three BCD digit network code).		

6.14. +CPOL Command: Preferred PLMN List

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CPOL=?	<u>Response</u> +CPOL: (list of supported <index>s),(list of supported <format>s) OK
<i>Read command</i> <u>Syntax</u> AT+CPOL?	<u>Response</u> +CPOL: <index1>,<format>,<oper1>[,<GSM_AcT1>,<GSM_Comp_AcT1>,<UTRAN_AcT1>] [+CPOL: <index2>,<format>,<oper2>[,<GSM_AcT2>,<GSM_Comp_AcT2>,<UTRAN_AcT2>] [...]] OK
<i>Write command</i> <u>Syntax</u> AT+CPOL= [<index>] [,<format> [,<oper>[,<GSM_ AcT>,<GSM_ Compact_AcT>,<UTRAN_AcT>]]]	<u>Response</u> OK <u>Parameters</u> <index> integer type; the order number of operator in the SIM/USIM preferred operator list <format> 0 long format alphanumeric <oper> 1 short format alphanumeric <oper> 2 numeric <oper> <opern> string type; <format> indicates if the format is alphanumeric or numeric (see +COPS) <GSM_AcTn> GSM access technology 0 access technology not selected 1 access technology selected

HL6528x and HL85xxx	
	<GSM_Comp_AcTn> GSM compact access technology 0 access technology not selected 1 access technology selected <UTRA_AcTn> UTRA access technology 0 access technology not selected 1 access technology selected
<u>Reference</u> [27.007] §7.19	<u>Notes</u> The read command returns all used entries from the SIM/USIM list of preferred PLMNs, previously selected by command +CPLS, with the Access Technologies for each PLMN in the list.

6.15. +CPWD Command: Change Password

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CPWD=?	<u>Response</u> +CPWD: list of supported (<fac>,<pwdlength>)s OK
<i>Write command</i> <u>Syntax</u> AT+CPWD= <fac>, <oldpwd>, <newpwd>	<u>Response</u> OK <u>Parameters</u> <fac> "AO" BAOC (Barr All Outgoing Calls) "OI" BOIC (Barr Outgoing International Calls) "OX" BOIC-exHC (Barr Outgoing International Calls except to Home Country) "AI" BAIC (Barr All Incoming Calls)

HL6528x and HL85xxx	
	"IR" BIC-Roam (Barr Incoming Calls when Roaming outside the home country) "AB" All Barring services (refer GSM02.30[19]) (applicable only for <mode>=0) "P2" SIM PIN2<oldpwd> password specified for the facility from the user interface or with command. If an old password has not yet been set, <oldpwd> is not to enter. "SC" SIM (lock SIM card) (SIM asks password in ME power-up and when this lock command issued) <oldpwd>, <newpwd> string type; <oldpwd> shall be the same as password specified for the facility from the ME user interface or with command Change Password +CPWD and <newpwd> is the new password; maximum length of password can be determined with <pwdlength> <pwdlength> integer type maximum length of the password for the facility
<u>Reference</u> [27.007] §7.5	<u>Notes</u> - Test command returns a list of pairs which present the available facilities and the maximum length of their password - Write command sets a new password for the facility lock function

6.16. +CREG Command: Network Registration

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CREG=?	<u>Response</u> +CREG: (list of supported <n>s) OK	<u>Syntax</u> AT+CREG=?	<u>Response</u> +CREG: (list of supported <n>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CREG?	<u>Response</u> +CREG: <n>,<stat>[,<lac>,<ci>] OK	<u>Syntax</u> AT+CREG?	<u>Response</u> +CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]] OK

HL6528x		HL85xxx	
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> AT+CREG=<n>	<u>Response</u> OK	<u>Syntax</u> AT+CREG=[<n>]	<u>Response</u> OK
		or +CME ERROR: <err>	
	<u>Parameters</u>	<u>Parameters</u>	
	<n> 0 disable network registration unsolicited result code	<n> <u>0</u> disable network registration unsolicited result code	
	1 enable network registration unsolicited result code +CREG: <stat>	1 enable network registration unsolicited result code +CREG: <stat>	
	2 enable network registration and location information unsolicited result code +CREG: <stat>[,<lac>,<ci>]	2 enable network registration and location information unsolicited result code +CREG: <stat>[,<lac>,<ci>[,<Act>]]	
	<stat> 0 not registered, ME is not currently searching a new operator to register to	<stat> <u>0</u> not registered, ME is not currently searching a new operator to register to	
	1 registered, home network	1 registered, home network	
	2 not registered, but ME is currently searching a new operator to register to	2 not registered, but ME is currently searching a new operator to register to	
	3 registration denied	3 registration denied	
	4 unknown	4 unknown	
	5 registered, roaming	5 registered, roaming	
	<lac> string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)	<lac> string type; two byte location area code in hexadecimal format (e.g. "00C3")	
	<ci> string type; two byte cell ID in hexadecimal format	<ci> string type; two byte cell ID in hexadecimal format for GSM, or four byte cell ID in hexadecimal format for UMTS	
		<Act> 0 GSM	
		2 UTRAN	

HL6528x		HL85xxx	
			3 GSM with EGPRS 4 UTRAN with HSDPA 5 UTRAN with HSUPA 6 UTRAN with HSDPA and HSUPA Note that <Act> is supported from Protocol Stack R7 and above.
<u>Reference</u> [27.007] § 7.2	<u>Notes</u> Set command controls the presentation of an unsolicited result code +CREG: <stat> when <n>=1 and there is a change in the ME network registration status, or code +CREG: <stat>[,<lac>,<ci>] when <n>=2 and there is a change of the network cell		<u>Notes</u> - This command controls the presentation of an unsolicited result code +CREG and provides the information of network registration status. - Set command is used to control the unsolicited result code +CREG. The syntax of unsolicited result +CREG as mentioned below: +CREG: <stat> when <n>=1 and there is a change in the ME network registration status code. +CREG: <stat> [,<lac>,<ci> [,<AcT>]] when <n>=2 and there is a change of the network cell. - Read command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. Location information elements <lac>, <ci> and <AcT> are returned only when <n>=2 and MT is registered in the network. - Test command returns the range of supported modes (i.e. <n>s).

6.17. +CSSN Command: Supplementary Service Notification

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CSSN=?	<u>Response</u> +CSSN: (list of supported <n>s), (list of supported <m>s) OK
<i>Read command</i> <u>Syntax</u> AT+CSSN?	<u>Response</u> +CSSN: <n>,<m> OK
<i>Write command</i> <u>Syntax</u> AT+CSSN=<n> [,<m>]	<u>Response</u> OK <u>Parameters</u> <n> 0 Suppresses the +CSSI messages 1 Activates the +CSSI messages <m> 0 Suppresses the +CSSU messages 1 Activates the +CSSU messages
<u>Reference</u> [27.007] § 7.17	<u>Notes</u> Currently, modules support the following values: • CSSI: 0 to 6 • CSSU: 0 to 5

6.18. +CPLS Command: Select Preferred PLMN list

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CPLS=?	<u>Response</u> +CPLS: (list of supported <list>s) OK
<i>Read command</i> <u>Syntax</u> AT+CPLS?	<u>Response</u> +CPLS: <list> OK
<i>Write command</i> <u>Syntax</u> AT+CPLS=<list>	<u>Response</u> OK <u>Parameter</u> <list> 0 User controlled PLMN selector with Access Technology EFPLMNwAcT, if not found in the SIM/UICC, then the PLMN preferred list EFPLMNsel (this file is only available in SIM card or GSM application selected in UICC) (default value for the HL85xxx) 1 Operator controlled PLMN selector with Access Technology EFOPLMNwAcT 2 HPLMN selector with Access Technology EFHPLMNwAcT (not available on the HL6528x)
<u>Reference</u> [27.007] § 7.20	<u>Notes</u> This command appears in 27.007 Release 5, but SIM files EFPLMNwAcT, EFOPLMNwAcT exists in Release 99

6.19. +CTFR Command: Call Deflection

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CTFR=?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+CTFR= <number> [, <type> [, <subaddr> [, <satype>]]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <number> string type phone number of format specified by <type> <type> type of address octet in integer format (refer TS 24.008 [8] sub clause 10.5.4.7); default 145 when dialing string includes international access code character "+", otherwise 129 <subaddr> string type subaddress of format specified by <satype> <satype> type of subaddress octet in integer format (refer TS 24.008 [8] sub clause 10.5.4.8); default 128
<u>Reference</u> [27.007] § 7.14	

6.20. +KAAT Command: GPRS Automatic Attach

Note: For HL85xxx only.

HL85xxx							
<i>Test command</i>							
<u>Syntax</u> AT+KAAT=?	<u>Response</u> +KAAT: (list of supported <attach mode>s) OK						
<i>Read command</i>	Get current mode						
<u>Syntax</u> AT+KAAT?	<u>Response</u> +KAAT: <attach mode> OK						
	<u>Parameter</u> <table><tr><td><attach mode></td><td>0</td><td>No GPRS automatic attach at switch on</td></tr><tr><td></td><td><u>1</u></td><td>GPRS automatic attach at switch on</td></tr></table>	<attach mode>	0	No GPRS automatic attach at switch on		<u>1</u>	GPRS automatic attach at switch on
<attach mode>	0	No GPRS automatic attach at switch on					
	<u>1</u>	GPRS automatic attach at switch on					
<i>Write command</i>	Set attach mode						
<u>Syntax</u> AT+KAAT= <attach mode>	<u>Response</u> OK						
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Set command is used to select GPRS attach mode at ME switch on - This AT command works with a SIM card inserted in the modem. - The <attach mode> is automatically stored in non-volatile memory						
<u>Example</u>	<start up with no SIM card> AT+KAAT? +CME ERROR: 10 <Insert SIM card and reset>						

HL85xxx

<default mode is GPRS automatic attach at switch on>

AT+KAAT?

+KAAT: 1

OK

AT+CGATT?

+CGATT: 1

OK

<set no GPRS automatic attach at switch on>

AT+KAAT=0

OK

AT+CGATT?

+CGATT: 1

OK

<reset>

AT+CGATT?

+CGATT: 0

OK

AT+KAAT?

AT+KAAT: 0

OK

AT+CGATT=1

OK

AT+CGATT?

+CGATT: 1

OK

<reset>

HL85xxx	
	AT+KAAT? +KAAT: 0 OK
	AT+CGATT? +CGATT: 0 OK

6.21. *PSOPNM Command: Operator Name

Note: For HL6528x only.

HL6528x	
<i>Read command</i> <u>Syntax</u> AT*PSOPNM?	<u>Response</u> *PSOPNM: <Operator Name string>
	<u>Parameters</u> <Operator Name string> <String type>: Operator name Character set as specified by command +CSCS
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Read command returns operator name string which can be: - The operator name in long format if EFONS SIM file is present and readable in SIM - The operator name short format if EFONS SIM file not present or not readable in SIM - An empty string if neither EFONS nor EFONSF SIM files are present or readable. - ONSF file (Operator Name Short Format) is used for mobile that cannot accommodate to the long name format. - Set command has no effect (OK returned)

6.22. *PSNTRG Command: Network Registration

Note: For HL6528x only.

HL6528x																							
<i>Test command</i>	Select notification mode																						
<u>Syntax</u> AT*PSNTRG=?	<u>Response</u> *PSNTRG: (list of supported <Registration state>s), (list of supported <GPRS state>s), (list of supported <Band indication>s), (list of supported <Rat>s), (list of supported <EGPRS state>s)																						
<i>Read command</i>	Get current network status																						
<u>Syntax</u> AT*PSNTRG?	<u>Response</u> *PSNTRG: <Registration state> , <GPRS state> , <MCC> , <MNC> , <LAC> , <CI> , <PLMN Name> , [<Band indication>], [<Rat>], [<EGPRS state>]																						
	<u>Parameters</u> <Registration state> <table> <tr><td>0</td><td>Not registered</td></tr> <tr><td>1</td><td>Registered, home PLMN</td></tr> <tr><td>2</td><td>Not registered but searching (registration ongoing)</td></tr> <tr><td>3</td><td>Registration denied</td></tr> <tr><td>4</td><td>Unknown</td></tr> <tr><td>5</td><td>Registered, roaming</td></tr> <tr><td>6</td><td>Limited service (emergency)</td></tr> </table> <GPRS state> <table> <tr><td>0</td><td>No GPRS available on cell</td></tr> <tr><td>1</td><td>GPRS available on cell and MS attached</td></tr> <tr><td>2</td><td>GPRS available on cell but MS not attached</td></tr> <tr><td>3</td><td>GPRS suspended</td></tr> </table> <MCC> <String type>: Mobile country code in numeric format (e.g. "208") <MNC> <String type>: Mobile network code in numeric format (e.g. "10") <LAC> <String type>: Two byte location area code in hexadecimal format (e.g. "3FA2")	0	Not registered	1	Registered, home PLMN	2	Not registered but searching (registration ongoing)	3	Registration denied	4	Unknown	5	Registered, roaming	6	Limited service (emergency)	0	No GPRS available on cell	1	GPRS available on cell and MS attached	2	GPRS available on cell but MS not attached	3	GPRS suspended
0	Not registered																						
1	Registered, home PLMN																						
2	Not registered but searching (registration ongoing)																						
3	Registration denied																						
4	Unknown																						
5	Registered, roaming																						
6	Limited service (emergency)																						
0	No GPRS available on cell																						
1	GPRS available on cell and MS attached																						
2	GPRS available on cell but MS not attached																						
3	GPRS suspended																						

HL6528x																							
	<CI> <String type>: Two byte cell ID in hexadecimal format (e.g. "6CA5") <PLMN Name> <String type>: Current PLMN Name in long alphanumeric format <Band indication> <table> <tr><td>0</td><td>GSM 900</td></tr> <tr><td>1</td><td>E-GSM 900</td></tr> <tr><td>2</td><td>DCS 1800</td></tr> <tr><td>3</td><td>DCS 1900</td></tr> <tr><td>4</td><td>GSM 850</td></tr> </table> <Rat> <table> <tr><td>0</td><td>GSM</td></tr> <tr><td>1</td><td>UMTS</td></tr> </table> <EGPRS state> <table> <tr><td></td><td>Not supported</td></tr> <tr><td>0</td><td>EGPRS service not available on cell</td></tr> <tr><td>1</td><td>EGPRS service available on cell but MS not GPRS attached</td></tr> <tr><td>2</td><td>EGPRS service available on cell</td></tr> </table>	0	GSM 900	1	E-GSM 900	2	DCS 1800	3	DCS 1900	4	GSM 850	0	GSM	1	UMTS		Not supported	0	EGPRS service not available on cell	1	EGPRS service available on cell but MS not GPRS attached	2	EGPRS service available on cell
0	GSM 900																						
1	E-GSM 900																						
2	DCS 1800																						
3	DCS 1900																						
4	GSM 850																						
0	GSM																						
1	UMTS																						
	Not supported																						
0	EGPRS service not available on cell																						
1	EGPRS service available on cell but MS not GPRS attached																						
2	EGPRS service available on cell																						
<i>Write command</i> <u>Syntax</u> AT*PSNTRG= <mode>	Select notification mode <u>Response</u> OK <u>Parameter</u> <mode> <table> <tr><td><u>0</u></td><td>Disable presentation of the notification</td></tr> <tr><td>1</td><td>Enable presentation of the notification</td></tr> </table>	<u>0</u>	Disable presentation of the notification	1	Enable presentation of the notification																		
<u>0</u>	Disable presentation of the notification																						
1	Enable presentation of the notification																						

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command allows access to network registration information - It provides information for both CS and PS domain and is more flexible than +CREG or +CGREG commands. - When <mode> =1, set command enables the presentation of network registration URC (*PSNTRG) every time one of the parameter is updated by network or MS.
<u>Example</u>	AT*PSNTRG? *PSNTRG: 1,1,"208","10","1234","4568","SFR", 0, 0, 0 OK

6.23. *PSHZNT Command: Home Zone Notification

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT*PSHZNT=?	<u>Response</u> *PSHZNT: (list of supported <mode>s)
<i>Read command</i>	Get current status
<u>Syntax</u> AT*PSHZNT?	<u>Response</u> *PSHZNT: <mode>, <Line 1 zonal indicator>,<Line 1 zonal Label>,<Line 2 zonal indicator>, <Line 2 zonal Label> <u>Parameters</u> <mode> 0 Disable zonal indication 1 Enable zonal indication <Line 1 zonal indicator> 0 Line 1 is not in its home zone 1 Line 1 is in its home zone

HL6528x	
	<Line 1 zonal label> <String type> Label. Character set as specified by command +CSCS <Line 2 zonal indicator> 0 Line 2 is not in its home zone 1 Line 2 is in its home zone <Line 2 zonal label> <String type> Label. Character set as specified by command +CSCS
<i>Write command</i>	Set home zone notification mode
<u>Syntax</u> AT*PSHZNT= <mode>	<u>Response</u> OK
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Set command is used to enable or disable presentation of home zone zonal indicators (*PSHZ) - Read command returns current < mode> and zonal indicators

6.24. *PSUTTZ Command: Universal Time and Time Zone

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT*PSUTTZ=?	<u>Response</u> *PSUTTZ: (list of supported <mode>s)
<i>Read command</i>	Get current mode
<u>Syntax</u> AT*PSUTTZ?	<u>Response</u> *PSUTTZ: <mode>

HL6528x	
	<u>Parameters</u> <mode> 0 Disable time zone indication 1 Enable time zone indication <year> <Integer type> UT year <month> 1...12 UT month <day> 1...12 UT day <hour> 0...23 UT hour <minute> 0...59 UT minute <second> 0...59 UT second <timezone> <String type> String representing time zone. Range: "-128"... "0"... "+127" <daylight saving> 0...2 Daylight saving
<i>Write command</i>	Set time zone notification mode
<u>Syntax</u> AT*PSUTTZ= <mode>	<u>Response</u> OK
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Set command is used to enable or disable presentation of universal time and time zone change (*PSUTTZ)

6.25. *PSHPLMN Command: Home PLMN

Note: For HL6528x only.

HL6528x	
<i>Read command</i>	Get HPLMN information
<u>Syntax</u> AT*PSHPLMN?	<u>Response</u> *PSHPLMN: <mcc>, <mnc>, <PLMN name>
	<u>Parameters</u> <MCC> <String type> Mobile country code in numeric format (e.g. "208") <MNC> <String type> Mobile network code in numeric format (e.g. "10") <PLMN name id> <String type> PLMN name in alphanumeric format
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command is used to get Home PLMN identification (MCC /MNC are decoded from IMSI) - Set command has no effect (returns OK)

6.26. *PSGAAT Command: GPRS Automatic Attach

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT*PSGAAT=?	<u>Response</u> *PSGAAT: (list of supported <attach mode>s)

HL6528x		
<i>Read command</i>	Get current mode	
<u>Syntax</u> AT*PSGAAT?	<u>Response</u> *PSGAAT: <attach mode>	
	<u>Parameter</u>	
	<attach mode>	0 No GPRS automatic attach at switch on
		1 GPRS automatic attach at switch on
<i>Write command</i>	Set attach mode	
<u>Syntax</u> AT*PSGAAT= <attach mode>	<u>Response</u> OK	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Set command is used to select GPRS attach mode at ME switch on. <attach mode> must be 1 to guarantee AVMS services.	

6.27. *PSNWID Command: Network Identity

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT*PSNWID=?	<u>Response</u> *PSNWID: (list of supported <mode>s)

HL6528x	
<i>Read command</i> <u>Syntax</u> AT*PSNWID?	Get current mode <u>Response</u> *PSNWID: <mode> <u>Parameters</u> <attach mode> 0 Disable network identity indication 1 Enable network identity indication <MCC> <String type> Mobile country code in numeric format (e.g. "208") <MNC> <String type> Mobile network code in numeric format (e.g. "10") <long name id> <String type> Network identity long name. Character set as specified by command +CSCS <long name CI> 0 Do not add country's initial to network name 1 Add country's initial to network name <short name id> <String type> Network identity short name. Character set as specified by command +CSCS. <short name CI> 0 Do not add country's initial to network name 1 Add country's initial to network name
<i>Write command</i> <u>Syntax</u> AT*PSNWID= <mode>	Set notification mode <u>Response</u> OK
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Set command is used to enable or disable presentation of network identity notification (*PSNWID)

6.28. +PHYR Command: Physical Randomization

Note: For HL6528x, HL8518, HL8528 and HL8529 only.

HL6528x, HL8518, HL8528 and HL8529	
<i>Test command</i> <u>Syntax</u> AT+PHYR=?	<u>Response</u> +PHYR: (list of supported <rand_start_wind>s), (list of supported <mltp_factor>s), (list of supported <num_of_retries>s) OK
<i>Read command</i> <u>Syntax</u> AT+PHYR?	<u>Response</u> +PHYR: <rand_start_wind>,<mltp_factor>,<num_of_retries> OK
<i>Write command</i> <u>Syntax</u> AT+PHYR=<rand_start_wind>,<mltp_factor>,<num_of_retries>	<u>Response</u> OK +CME ERROR <err> <u>Parameters</u> <rand_start_wind> Integer type. Randomisation start window lenght in seconds. The module selects random moment within this window for registration attempt to the BTS. If set to 0, the module performs immediate registration with unlimited number of attempts. Value in range [0 to 65535] (units: seconds), default value: 0 <mltp_factor> Integer type. Multiplication factor is used for the next randomization time window calculation in case of unsuccessful registration to BTS. Next randomization window length in seconds is calculated as the multiplication of the last randomization window with the multiplication factor. Value in range [1 to 10], default value: 2 <num_of_retries> Integer type. Number of retries defines how many times module will attempt to register to the BTS with different randomization window time per attempt. If module after defined number of retries does not successfully register to the BTS, it resets and the process of registration starts again. Value in range [1 to 31], default value: 5

HL6528x, HL8518, HL8528 and HL8529	
Examples	AT+PHYR=? +PHYR: (0-65535),(1-10),(1-31) OK AT+PHYR? +PHYR: 0 <i>// smart connect not active</i> OK AT+PHYR=0 <i>// smart connect gets disabled</i> OK AT+PHYR=5000,2,6 OK AT+PHYR? +PHYR: 5000,2,6 OK <i>// Randomization window length 5000s on the first try, 10000s for the second try, 20000s for the third try, 40000s for the fourth try, 80000s for the fifth try, // and 160000s for the sixth try. Reset is done on the seventh try.</i>
Notes	• Configuration is saved in non-volatile memory and therefore is still effective after power cycle. • This command is only allowed when SIM2 is deactivated (AT+KSIMSL0T=0). • If <rand_start_window> is not 0: ▪ AT+KGSMBOOT is not allowed ▪ AT+CFUN=4 puts the module in flight mode until the next reboot or until AT+CFUN=1 is entered. This means that the smart connect mechanism is deactivated but as parameters are still saved in NV memory, it will be restarted on the next reboot. Another way to restart the smart connect process is to send AT+CFUN=1. • Attachment state “UNKNOWN” (+CREG: 4) and “DENIED” (+CREG: 3) are considered as failure and so the next attachment try will depend on <rand_start_window>, <mtp_factor> and <num_of_retries>. • The number of retries is not reset after a successful attachment. • The smart connect mechanism is taken into account after the first loss of attachment after this command is received. • If <rand_start_wind>=0, the smart connect mechanism is disabled and no other parameter is required.

6.29. +KFDOR Command: Trigger Fast Dormancy

Note: For HL854xx only.

HL854xx	
Test command	
<u>Syntax</u> AT+KFDOR=?	<u>Response</u> +KFDOR: (list of supported <mode>s)[,(list of supported <FDDelay-Timer>s)][,(list of supported <SCRI-Timer>s)] OK
Read command	
<u>Syntax</u> AT+KFDOR?	<u>Response</u> +KFDOR: <mode>,<FDDelay-Timer>,<SCRITimer> OK
Write command	
<u>Syntax</u> AT+KFDOR=<mode>[,<FDDelay-Timer>][,<SCRI-Timer>]	<u>Response</u> OK or ERROR or +CME ERROR: <err> <u>Parameters</u> <mode> 1 Indicate application driven (1-shot) Fast Dormancy to modem 2 Switch ON autonomous Fast Dormancy 3 Switch OFF autonomous Fast Dormancy <FDDelay-Timer> 1 – 60 Fast dormancy delay timer value in seconds. Default value = 5

HL854xx			
	<SCRI-Timer>	1 – 120 0	SCRI timer to inhibit fast dormancy in seconds. Default value = <u>5</u> . Timer is not used
<u>Reference</u> REL.8	<u>Notes</u>	This command is only available if fast dormancy is supported by the network.	

>> 7. Phone Book Management

7.1. +CPBF Command: Find Phonebook Entries

HL6528x		HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CPBF=?	<u>Response</u> +CPBF: [<nlength>],[<tlength>] OK	<i>Test command</i> <u>Syntax</u> AT+CPBF=?	<u>Response</u> +CPBF: [<nlength>],[<tlength>], [<glength>],[<slength>],[<elength>] OK or +CME ERROR: <err>
<i>Execute command</i> <u>Syntax</u> AT+CPBF= <findtext>	<u>Response</u> [+CPBF: <index1>,<number>,<type>,<text>] [+CBPF: <index2>,<number>,<type>,<text>] OK <u>Parameters</u> <index1>, <index2> Integer type values in the range of location numbers of phonebook memory <number> String type phone number of format <type>	<i>Execute command</i> <u>Syntax</u> AT+CPBF= <findtext>	<u>Response</u> [+CPBF: <index1>,<number>,<type>,<text> [,<hidden>],[<group>],[<adnumber>],[<adtype>] [,<secondtext>],[<email>]] OK or +CME ERROR: <err> <u>Parameters</u> <index1>, <index2>, <index> Integer type values in the range of location numbers of phonebook memory <number> String type phone number of format <type>

HL6528x	HL85xxx
<type> Type of address octet in integer format (refer to GSM 04.08 [8] sub clause 10.5.4.7) <findtext>, <text> String type field of maximum length <tlength>; character set as specified by command Select TE Character Set +CSCS <nlength> Integer type value indicating the maximum length of field <number> <tlength> Integer type value indicating the maximum length of field <text>	<type> Type of address octet in integer format (refer to TS 24.008 [8] subclause 10.5.4.7) <text> String type field of maximum length <tlength>; character set as specified by command Select TE Character Set +CSCS <group> String type field of maximum length <glength>; character set as specified by command Select TE Character Set +CSCS <adnumber> String type phone number of format <adtype> <adtype> Type of address octet in integer format (refer to TS 24.008 [8] subclause 10.5.4.7) <secondtext> String type field of maximum length <slength>; character set as specified by command Select TE Character Set +CSCS <email> String type field of maximum length <elength>; character set as specified by command Select TE Character Set +CSCS <nlength> Integer type value indicating the maximum length of field <number> <tlength> Integer type value indicating the maximum length of field <text> <glength> Integer type value indicating the maximum length of field <group>

HL6528x		HL85xxx	
			<slength> Integer type value indicating the maximum length of field <secondtext> <elength> Integer type value indicating the maximum length of field <email> <hidden> Indicates if the entry is hidden or not 0 Phonebook entry not hidden 1 Phonebook entry hidden
<u>Reference</u> [27.007] §8.13	<u>Notes</u> Execution command returns phonebook entries (from the current phonebook memory storage selected with +CPBS).	<u>Notes</u>	Execution command returns phonebook entries (from the current phonebook memory storage selected with +CPBS).

7.2. +CPBR Command: Read Current Phonebook Entries

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CPBR=?	<u>Response</u> +CPBR: (list of supported <index>s),[<nlength>],[<tlength>] OK	<u>Syntax</u> AT+CPBR=?	<u>Response</u> +CPBR: (list of supported <index>es),[<nlength>],[<tlength>],[<glength>],[<alength>],[<slength>],[<elength>] OK
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> AT+CPBR= <index1> [,<index2>]	<u>Response</u> [+CPBR: <index1>,<number>,<type>,<text>] [+CPBR: <index2>,<number>,<type>,<text>] OK	<u>Syntax</u> AT+CPBR= <index1> [,<index2>]	<u>Response</u> [+CPBR: <index1>,<number>,<type>,<text>[,<hidden>] [,<group>][,<adnumber>][,<adtype>][,<secondtext>] [,<email>]] [[...]] OK

HL6528x	HL85xxx
Parameters <index1>, <index2>, <index> Integer type values in the range of location numbers of phonebook memory <number> String type phone number of format <type> <type> Type of address octet in integer format (refer GSM 04.08 [8] sub clause 10.5.4.7) <text> String type field of maximum length <tlength>; character set as specified by command Select TE Character Set +CSCS <nlength> Integer type value indicating the maximum length of field <number>	or +CME ERROR: <err> Parameters <index1>, <index2>, <index> Integer type values in the range of location numbers of phonebook memory <number> String type phone number of format <type> <type> Type of address octet in integer format <text> String type field of maximum length <tlength> <hidden> Indicates if the entry is hidden or not – only available if a UICC with an active USIM application is present 0 Phonebook entry not hidden 1 Phonebook entry hidden <group> String type field of maximum length <glength> <adnumber> String type phone number of format <adtype> <adtype> Type of address octet in integer format (refer TS 24.008[8] subclause 10.5.4.7) <secondtext> String type field of maximum length <slength> <email> String type field of maximum length <elength> <nlength> integer type value indicating the maximum length of field <number>

HL6528x		HL85xxx	
	<length> Integer type value indicating the maximum length of field <text>		<length> integer type value indicating the maximum length of field <text> <glength> Integer type value indicating the maximum length of field <group> <alength> Integer type value indicating the maximum length of field <adnumber> <slength> Integer type value indicating the maximum length of field <secondtext> <elength> Integer type value indicating the maximum length of field <email>
<u>Reference</u> [27.007] §8.12	<u>Notes</u> Execution command returns phonebook entries in location number range <index1>... <index2> from the current phonebook memory storage selected with +CPBS.	<u>Notes</u>	- Optional parameters <nlength>, <length>, <glength>, <alength>, <slength>, <elength> are only applicable for 3G UICC. - Execution command returns phonebook entries in location number range <index1>... <index2> from the current phonebook memory storage selected with +CPBS.

7.3. +CPBS Command: Select Phonebook Memory Storage

HL6528x		HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CPBS=?	<u>Response</u> +CPBS: (list of supported <storage>s) OK	<i>Test command</i> <u>Syntax</u> AT+CPBS=?	<u>Response</u> +CPBS: (list of supported <storage>s) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CPBS?	<u>Response</u> +CPBS: <storage>[,<used>,<total>] OK	<u>Syntax</u> AT+CPBS?	<u>Response</u> +CPBS: <storage>[,<used>,<total>] OK
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> AT+CPBS= <storage>	<u>Response</u> OK <u>Parameters</u> <storage> "DC" ME dialed calls list (+CPBW may not be applicable for this storage) \$(AT R97)\$ "EN" SIM/USIM (or MT) emergency number (+CPBW is not be applicable for this storage) "FD" SIM fix dialing-phonebook "MC" MT missed (unanswered received) calls list (+CPBW may not be applicable for this storage) "ON" SIM (or ME) own numbers (MSISDNs) list (reading of this storage may be available through +CNUM also) \$(AT R97)\$ "RC" MT received calls list (+CPBW may not be applicable for this storage) " <u>SM</u> " SIM phonebook <used> Integer type value indicating the number of used locations in selected memory <total> Integer type value indicating the total number of locations in selected memory	<u>Syntax</u> AT+CPBS= <storage> [,<password>]	<u>Response</u> OK <u>Parameters</u> <storage> "DC" ME dialed calls list (+CPBW may not be applicable for this storage) \$(AT R97)\$ "EN" SIM/USIM (or MT) emergency number (+CPBW is not be applicable for this storage) "FD" SIM fix dialing-phonebook "MC" MT missed (unanswered received) calls list (+CPBW may not be applicable for this storage) "ON" SIM (or ME) own numbers (MSISDNs) list (reading of this storage may be available through +CNUM also) \$(AT R97)\$ "RC" MT received calls list (+CPBW may not be applicable for this storage) " <u>SM</u> " SIM phonebook <used> Integer type value indicating the number of used locations in selected memory <total> Integer type value indicating the total number of locations in selected memory <password> String type value representing the PIN2-code required when selecting PIN2-code locked <storage>s above

HL6528x		HL85xxx	
<u>Reference</u> [27.007] §8.11	<u>Notes</u> Set command selects phonebook memory storage <storage>, which is used by other phonebook commands.	<u>Reference</u> [27.007] §8.11	<u>Notes</u> Set command selects phonebook memory storage <storage>, which is used by other phonebook commands.

7.4. +CPBW Command: Write Phonebook Entries

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CPBW=?	<u>Response</u> +CPBW: (list of supported <index>s),[<nlength>], (list of supported <type>s),[<tlength>] OK	<u>Syntax</u> AT+CPBW=?	<u>Response</u> +CPBW: (list of supported <index>es),[<nlength>], (list of supported <type>s),[<tlength>],[<glength>], [<alength>],[<slength>],[<elength>] OK
<i>Execute command</i>		<i>Execute command</i>	
<u>Syntax</u> AT+CPBW= [<index>] [,<number> [,<type>[,<text>]]]	<u>Response</u> OK <u>Parameters</u> <index> Integer type values in the range of location numbers of phonebook memory <number> String type phone number of format <type> <type> Type of address octet in integer format (refer GSM 04.08 [8] sub clause 10.5.4.7); default 145 when dialing	<u>Syntax</u> AT+CPBW= [<index>] [,<number> [,<type>[,<text> [,<group> [,<adnumber> [,<adtype> [,<secondtext> [,<email> [,<hidden>]]]]]]]]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <index> Integer type values in the range of location numbers of phonebook memory <number> String type phone number of format <type>

HL6528x	HL85xxx
string includes international access code character "+", otherwise 129 <text> String type field of maximum length <tlength>; character set as specified by command Select TE Character Set +CSCS <nlength> Integer type value indicating the maximum length of field <number> <tlength> Integer type value indicating the maximum length of field <text>	<type> Type of address octet in integer format; default 145 when dialing string includes international access code character "+", otherwise 129 <text> String type field of maximum length <tlength> <hidden> Indicates if the entry is hidden or not – only available if a UICC with an active USIM application is present 0 Phonebook entry not hidden 1 Phonebook entry hidden <group> String type field of maximum length <glength> <adnumber> String type phone number of format <adtype> <adtype> Type of address octet in integer format (refer TS 24.008[8] subclause 10.5.4.7) <secondtext> String type field of maximum length <slength> <email> String type field of maximum length <elength> <nlength> integer type value indicating the maximum length of field <number> <tlength> integer type value indicating the maximum length of field <text> <glength> Integer type value indicating the maximum length of field <group> <alength> Integer type value indicating the maximum length of field <adnumber>

HL6528x		HL85xxx	
			<slength> Integer type value indicating the maximum length of field <secondtext> <elength> Integer type value indicating the maximum length of field <email>
<u>Reference</u> [27.007] §8.14	<u>Notes</u> Execution command writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS.	<u>Notes</u>	- Optional parameters <nlength>, <tlength>, <glength>, <alength>, <slength>, <elength> are only applicable for 3G UICC. - Execution command writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS.

7.5. +PBREADY URC: Phonebook Ready

+PBREADY URC will be displayed when the phone book is ready for read and write operation on boot-up or upon insertion of a valid SIM card.

8. SMS AT Commands

8.1. Preliminary Comments

The commands supported in both PDU and text modes are only described for PDU mode. For details about text modes, refer to the [27.005].

8.2. Parameters Definition

The following parameters are used in the subsequent clauses which describe all commands. The formats of integer and string types referenced here are defined in V.25ter.

The default values are for command parameters, not for result code parameters.

Message Storage Parameters

<index>	integer type; value in the range of location numbers supported by the associated memory
<mem1>	string type; memory from which messages are read and deleted (commands List Messages +CMGL, Read Message +CMGR and Delete Message +CMGD); defined values (others are manufacturer specific): "BM" broadcast message storage "ME" ME message storage "MT" any of the storages associated with ME "SM" (U)SIM message storage ; default value "TA" TA message storage "SR" status report storage
<mem2>	string type; memory to which writing and sending operations are made (commands Send Message from Storage +CMSS and Write Message to Memory +CMGW); refer <mem1> for defined values. Default value is "SM".
<mem3>	string type; preferred memory to which received SMs are to be stored (unless forwarded directly to TE; refer command New Message Indications +CNMI); refer <mem1> for defined values; received CBMs are always stored in "BM" (or some manufacturer specific storage) unless directly forwarded to TE; received status reports are always stored in "SR" (or some manufacturer specific storage) unless directly forwarded to TE. Default value is "SM".
<stat>	integer type in PDU mode (default 0), or string type in text mode (default "REC UNREAD"); indicates the status of message in memory; defined values: 0 "REC UNREAD" received unread message (i.e. new message) 1 "REC READ" received read message 2 "STO UNSENT" stored unsent message (only applicable to SMs) 3 "STO SENT" stored sent message (only applicable to SMs) 4 "ALL" all messages (only applicable to +CMGL command)
<total1>	integer type; total number of message locations in <mem1>
<total2>	integer type; total number of message locations in <mem2>
<total3>	integer type; total number of message locations in <mem3>

- <used1> integer type; number of messages currently in <mem1>
- <used2> integer type; number of messages currently in <mem2>
- <used3> integer type; number of messages currently in <mem3>

Message Data Parameters

- <ackpdu> 3G TS 23.040 [3] RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without 3G TS 24.011 [6] SC address field and parameter shall be bounded by double quote characters like a normal string type parameter
- <alpha> string type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook; implementation of this feature is manufacturer specific; used character set should be the one selected with command Select TE Character Set +CSCS (see definition of this command in 3G TS 27.007 [9])
- <cdata> 3G TS 23.040 [3] TP-Command-Data in text mode responses; ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))
- <ct> 3G TS 23.040 [3] TP-Command-Type in integer format (default 0)
- <da> 3G TS 23.040 [3] TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in 3G TS 27.007 [9]); type of address given by <to>
- <data> In the case of SMS: 3G TS 23.040 [3] TP-User-Data in text mode responses; format:
 - if <dc> indicates that 3G TS 23.038 [2] GSM 7 bit default alphabet is used and <fo> indicates that 3G TS 23.040 [3] TP-User-Data-Header-Indication is not set:
 - if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in 3G TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A
 - if TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character II (GSM 7 bit default alphabet 23) is presented as 17 (IRA 49 and 55))
 - if <dc> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that 3G TS 23.040 [3] TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))

In the case of CBS: 3G TS 23.041 [4] CBM Content of Message in text mode responses; format:

 - if <dc> indicates that 3G TS 23.038 [2] GSM 7 bit default alphabet is used:
 - if TE character set other than "HEX" (refer command +CSCS in 3G TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A
 - if TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7 bit default alphabet into two IRA character long hexadecimal number
 - if <dc> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number
- <dc> depending on the command or result code: 3G TS 23.038 [2] SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format
- <dt> 3G TS 23.040 [3] TP-Discard-Time in time-string format: "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"

<fo>	depending on the command or result code: first octet of 3G TS 23.040 [3] SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format
<length>	integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
<mid>	3G TS 23.041 [4] CBM Message Identifier in integer format
<mn>	3G TS 23.040 [3] TP-Message-Number in integer format
<mr>	3G TS 23.040 [3] TP-Message-Reference in integer format
<oa>	3G TS 23.040 [3] TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 27.07); type of address given by <tooa>
<page>	3G TS 23.041 [4] CBM Page Parameter bits 4-7 in integer format
<pages>	3G TS 23.041 [4] CBM Page Parameter bits 0-3 in integer format
<pdu>	In the case of SMS: 3G TS 24.011 [6] SC address followed by 3G TS 23.040 [3] TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) In the case of CBS: 3G TS 23.041 [4] TPDU in hexadecimal format
<pid>	3G TS 23.040 [3] TP-Protocol-Identifier in integer format (default 0)
<ra>	3G TS 23.040 [3] TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in 3G TS 27.007 [9]); type of address given by <tora>
<sca>	3G TS 24.011 [6] RP SC address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in 3G TS 27.007 [9]); type of address given by <tosca>
<scts>	3G TS 23.040 [3] TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)
<sn>	3G TS 23.041 [4] CBM Serial Number in integer format
<st>	3G TS 23.040 [3] TP-Status in integer format
<toda>	3G TS 24.011 [6] TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129)
<tooa>	3G TS 24.011 [6] TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>)
<tora>	3G TS 24.011 [6] TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>)
<tosca>	3G TS 24.011 [6] RP SC address Type-of-Address octet in integer format (default refer <toda>)
<vp>	depending on SMS-SUBMIT <fo> setting: 3G TS 23.040 [3] TP-Validity-Period either in integer format (default 167) or in time-string format (refer <dt>)
<vp>	depending on SMS-SUBMIT <fo> setting: 3G TS 23.040 [3] TP-Validity-Period either in integer format (default 167), in time-string format (refer <dt>), or if EVPF is supported, in enhanced format (hexadecimal coded string with double quotes)

8.3. +CMGD Command: Delete SMS Message

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CMGD=?	<u>Response</u> +CMGD: (list of supported <index>s)[,(list of supported <delflag>s)] OK
<i>Execute command</i> <u>Syntax</u> AT+CMGD= <index> [,<delflag>]	<u>Response</u> OK <u>Parameter</u> <delflag> an integer indicating multiple message deletion request as follows: 0 (or omitted) Delete the message specified in <index> 1 Delete all read messages from preferred message storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched 2 Delete all read messages from preferred message storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched 3 Delete all read messages from preferred message storage, sent and unsent mobile originated messages leaving unread messages untouched 4 Delete all messages from preferred message storage including unread messages
<u>Reference</u> [27.005] §3.5.4	<u>Notes</u> Execution command deletes message from preferred message storage <mem1> location <index>. If <delflag> is present and not set to 0 then the ME shall ignore <index> and follow the rules for <delflag> shown before.

8.4. +CMGF Command: Select SMS Message Format

HL6528x and HL85xxx							
<i>Test command</i> <u>Syntax</u> AT+CMGF=?	<u>Response</u> +CMGF: (list of supported <mode> s) OK						
<i>Read command</i> <u>Syntax</u> AT+CMGF?	<u>Response</u> +CMGF: <mode> OK						
<i>Execute command</i> <u>Syntax</u> AT+CMGF= [<mode>]	<u>Response</u> OK <u>Parameter</u> <table><tr><td><mode></td><td>0</td><td>PDU mode (default value for the HL85xxx)</td></tr><tr><td></td><td>1</td><td>Text mode</td></tr></table>	<mode>	0	PDU mode (default value for the HL85xxx)		1	Text mode
<mode>	0	PDU mode (default value for the HL85xxx)					
	1	Text mode					
<u>Reference</u> [27.005] §3.2.3	<u>Notes</u> Set command tells the TA, which input and output format of messages to use. <mode> indicates the format of messages used with send, list, read and write commands and unsolicited result codes resulting from received messages. Mode can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters). Text mode uses the value of parameter <chset> specified by command Select TE Character Set +CSCS to inform the character set to be used in the message body in the TA-TE interface.						

8.5. +CMGL Command: List SMS Messages from Preferred Storage

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CMGL=?	<u>Response</u> +CMGL: (list of supported <stat>s) OK
<i>Execute command</i> <u>Syntax</u> AT+CMGL [=<stat>]	<u>Response</u> Only if PDU mode (+CMGF=0) and command successful: +CMGL:<index>,<stat>,<[alpha]>,<length><CR><LF><pdu>[<CR><LF> +CMGL:<index>,<stat>,<[alpha]>,<length><CR><LF><pdu>[...]] OK <u>Parameter</u> <stat> 0, 1, 2, 3, 4 in PDU mode "REC UNREAD", "REC READ", "STO UNSET", "STO SENT", "ALL" in text mode
<u>Reference</u> [27.005] § 3.4.2 and 4.1	<u>Notes</u> • Execution command returns messages with status value <stat> from preferred message storage <mem1> to the TE. Entire data units <pdu> are returned. • If status of the message is 'received unread', status in the storage changes to 'received read'. • <alpha> is optional, it is NOT used.

8.6. +CMGR Command: Read SMS Message

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CMGR=?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+CMGR= <index>	<u>Response</u> if PDU mode (+CMGF=0) and command successful: +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> OK
<u>Reference</u> [27.005] §3.4.3 and 4.2 (+CMGR)	<u>Notes</u> • Execution command returns message with location value <index> from preferred message storage <mem1> to the TE. Status of the message and entire message data unit <pdu> is returned. • With AT+CMGR, if status of the message is 'received unread', status in the storage changes to 'received read'. • <alpha> is optional, it is NOT used.

8.7. +CMGS Command: Send SMS Message

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CMGS=?	<u>Response</u> OK

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> if PDU mode (+CMGF=0): AT+CMGS= <length><CR> PDU is given <ctrl-Z/ESC>	<u>Response</u> if PDU mode (+CMGF=0) and sending successful: +CMGS: <mr>[,<ackpdu>] OK
<u>Reference</u> [27.005] § 3.5.1 and 4.3	<u>Notes</u> • <length> must indicate the number of octets coded in the TP layer data unit to be given (i.e. SMSC address octets are excluded). • The TA shall send a four character sequence <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>; after that PDU can be given from TE to ME/TA the DCD signal shall be in ACTIVE state while PDU is given the echoing of given characters back from the TA is controlled by V.25ter echo command E. • The PDU shall be hexadecimal format (similarly as specified for <pdu>) and given in one line; ME/TA converts this coding into the actual octets of PDU when the length octet of the SMSC address (given in the PDU) equals zero, the SMSC address set with command Service Centre Address +CSCA is used; in this case the SMSC Type-of-Address octet shall not be present in the PDU, i.e. TPDU starts right after SMSC length octet sending can be cancelled by giving <ESC> character (IRA 27) <ctrl-Z> (IRA 26) must be used to indicate the ending of PDU.

8.8. +CMGW Command: Write SMS Message to Memory

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CMGW=?	<u>Response</u> OK

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> if PDU mode (+CMGF=0): AT+CMGW= <length>[,<stat>] <CR>PDU is given<ctrl- Z/ESC>	<u>Response</u> +CMGW: <index> OK
<u>Reference</u> [27.005] § 3.5.3 and 4.4	<u>Notes</u> Execution command stores a message to memory storage <mem2>. Memory location <index> of the stored message is returned. By default message status will be set to 'stored unsent', but parameter <stat> allows also other status values to be given. (ME/TA manufacturer may choose to use different default <stat> values for different message types.) The entering of PDU is done similarly as specified in command Send Message +CMGS.

8.9. +CMSS Command: Send SMS Message from Storage

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CMSS=?	<u>Response</u> OK
<i>Write command</i> <u>Syntax</u> AT+CMSS= <index>[,<da> [,<toda>]]	<u>Response</u> if PDU mode (+CMGF=0) and sending successful: +CMSS: <mr>[,<ackpdu>] OK

HL6528x and HL85xxx	
<u>Reference</u> [27.005] § 3.5.2 and 4.7	<u>Notes</u> - Execution command sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address <da> is given for SMS-SUBMIT, it shall be used instead of the one stored with the message. Reference value <mr> is returned to the TE on successful message delivery. Optionally (when +CSMS <service> value is 1 and network supports) <ackpdu> is returned. Values can be used to identify message upon unsolicited delivery status report result code. - Be careful, all the messages stored in the module may not be forwarded (for instance, carrier messages as SMS replace, etc.)

8.10. +CNMI Command: New SMS Message Indication

HL6528x and HL85xxx								
Test command								
<u>Syntax</u> AT+CNMI=?	<u>Response</u> +CNMI: (list of supported <mode> s), (list of supported <mt> s), (list of supported <bm> s), (list of supported <ds> s), (list of supported <bfr> s) OK							
Read command								
<u>Syntax</u> AT+CNMI?	<u>Response</u> +CNMI: <mode> , <mt> , <bm> , <ds> , <bfr> OK							
Write command								
<u>Syntax</u> +CNMI=[<mode> [,<mt>[,<bm> [,<ds>[,<bfr>]]]]]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><mode></td><td><u>0</u></td><td>Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.</td></tr><tr><td></td><td><u>1</u></td><td>Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved. Otherwise forward them directly to the TE.</td></tr></table>	<mode>	<u>0</u>	Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.		<u>1</u>	Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved. Otherwise forward them directly to the TE.	
<mode>	<u>0</u>	Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.						
	<u>1</u>	Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved. Otherwise forward them directly to the TE.						

HL6528x and HL85xxx		
	2	Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.
	3	Always forward unsolicited result codes directly to the TE (not supported on the HL85xxx)
<mt>	0	No SMS-DELIVER indications are routed to the TE
	1	If SMS-DELIVER, when an SMS is received there is an unsolicited result code +CMTI: <memory>,<index> for the HL6528x; +CMT: [<alpha>,<length><CR><LF><pdu> (PDU mode enabled) or +CMT: <oa>,<alpha>,<scts>,<tooa>,<fo>,<pid>,<dcsc>,<sca>,<tosca>,<length><CR><LF><data> (text mode enabled) for the HL85xxx
	2	Class 2 SMS are stored in SM and notification +CMTI: "SM",<index> is sent to TE. Other SMS are routed directly to TE and notification sent to TE is +CMT: [<alpha>,<length><CR><LF><pdu> (PDU mode enabled) +CMT: <oa>,<alpha>,<scts>,<tooa>,<fo>,<pid>,<dcsc>,<sca>,<tosca>,<length><CR><LF><data> (text mode enabled)
	3	Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in <mt>=2. Messages of other data coding schemes result in indication as defined in <mt>=1. (This option is only available in the HL85xxx.)
	0	No CBM indications are routed to the TE
	1	If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CBMI: <mem>,<index> (this option is only available in the HL85xxx).
	2	New CBMs are routed directly to the TE using unsolicited result code: +CBM: <length><CR><LF><pdu> (PDU mode enabled) or +CBM: <sn>,<mid>,<dcsc>,<page>,<pages><CR><LF><data> (text mode Enabled).
	3	Class 3 CBMs are routed directly to TE using unsolicited result codes defined in <bm>=2. If CBM storage is supported, messages of other classes result in indication as defined in <bm>=1 (this option is only available in the HL85xxx).
	0	No SMS-STATUS-REPORTs are routed to the TE
	1	SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: <length><CR><LF><pdu> (PDU mode enabled) or +CDS: <fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st> (text mode enabled)
	2	If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CDSI: <mem>,<index> (this option is only available in the HL85xxx)
	0	The buffered notification are sent
	1	TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1 – 3 is entered
Reference [27.005] § 3.4.1	Notes	When <mode>=3 during GPRS PPP sessions, the character 0x00 will be sent once on the serial link at the current baudrate. To avoid disruption of PPP data flow, the character is sent between PPP frames.

8.11. +CSCB Command: Select Cell Broadcast Message

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CSCB=?	<u>Response</u> +CSCB: (list of supported <mode>s) OK
<i>Read command</i> <u>Syntax</u> AT+CSCB?	<u>Response</u> +CSCB: <mode>,<mids>,<dcss> OK
<i>Write command</i> <u>Syntax</u> AT+CSCB= [<mode> [,<mids>]]	<u>Response</u> OK <u>Parameters</u> <mode> 0 Accepts messages that are defined in <mids> 1 Does not accept messages that are defined in <mids> <mids> String type; combinations of CBM message IDs (e.g. "0,1,5,320-478,922"). The number of ranges in <mids> parameter string is limited to 6. Note that intervals are not allowed. <dcss> string type; all different possible combinations of CBM data coding schemes (refer <dcsc>) (default is empty string); e.g. "0-3,5"
<u>Reference</u> [27.005] § 3.3.4	<u>Notes</u> - Set command selects which types of CBMs are to be received by the ME - The module does not manage SMSCB language, nor the data coding scheme parameter (<dcss> parameter)

8.12. +CSCA Command: SMS Service Center Address

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CSCA=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+CSCA?	<u>Response</u> +CSCA: <sca>,<tosca> OK
<i>Write command</i>	
<u>Syntax</u> AT+CSCA=<sca> [,<tosca>]	<u>Response</u> OK
<u>Reference</u> [27.005] § 3.3.1	<u>Notes</u> Set command updates the SMSC address, through which mobile originated SMS is transmitted. In text mode, the setting is used in the send and write commands. In PDU mode, setting is used by the same commands, but only when the length of the SMSC address coded into <pdu> parameter equals zero

8.13. +CSMP Command: Set SMS Text Mode Parameters

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CSMP=?	<u>Response</u> OK

HL6528x and HL85xxx	
<i>Read command</i> <u>Syntax</u> AT+CSMP?	<u>Response</u> +CSMP: <fo>,<vp>,<pid>,<dc> OK
<i>Write command</i> <u>Syntax</u> AT+CSMP=[<fo> [,<vp>[,<pid> [,<dc>]]]]	<u>Response</u> OK <u>Examples</u> To activate the SMS-STATUS-REPORT: AT+CSMP=49,167,0,0 OK To use UCS2 data coding scheme: AT+CSMP=17,167,0,8
<u>Reference</u> [27.005] § 3.3.2	<u>Notes</u> - Set command is used to select values for additional parameters needed when SM is sent to the network or placed in storage when text format message mode is selected. It is possible to set the validity period starting from when the SM is received by the SMSC (<vp> is in range 0... 255) or define the absolute time of the validity period termination (<vp> is a string). The format of <vp> is given by <fo>. If TA supports the EVPF, see 3G TS 23.040 [3], it shall be given as a hexadecimal coded string (refer e.g. <pdu>) with double quotes. - When storing a SMS-DELIVER from the TE to the preferred memory storage in text mode (refer command Write Message to Memory +CMGW), <vp> field can be used for <scts>.

8.14. +CSMS Command: Select Message Service

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CSMS=?	<u>Response</u> +CSMS: (list of supported <service>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CSMS?	<u>Response</u> +CSMS: <service> , <mt> , <mo> , <bm> OK
<i>Write command</i>	
<u>Syntax</u> AT+CSMS= <service>	<u>Response</u> +CSMS: <mt> , <mo> , <bm> OK <u>Parameters</u> <service> 0 GSM 03.40 and 03.41 (the syntax of SMS AT commands is compatible with GSM 27.05 Phase 2 version 4.7.0; Phase 2+ features which do not require new command syntax may be supported, e.g. correct routing of messages with new Phase 2+ data coding schemes) 1 Used only on dual OS platforms i.e. when TE is the only SMS client (SMS are only routed to TA in this case) <mt> Mobile Terminated Messages 0 Type not supported 1 Type supported <mo> Mobile Originated Messages 0 Type not supported 1 Type supported

HL6528x and HL85xxx	
	<bm> Broadcast Type Messages 0 Type not supported 1 Type supported
<u>Reference</u> [27.005] §3.2.1	<u>Notes</u> Set command selects messaging service <service>. It returns the types of messages supported by the ME: <mt> for mobile terminated messages, <mo> for mobile originated messages and <bm> for broadcast type messages.

8.15. +CPMS Command: Preferred Message Storage

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CPMS=?	<u>Response</u> +CPMS: (list of supported <mem1>s), (list of supported <mem2>s), (list of supported <mem3>s) OK <u>Example</u> AT+CPMS=? +CPMS: ("SM","ME"),("SM","ME"),("SM","ME") OK
<i>Read command</i> <u>Syntax</u> AT+CPMS?	<u>Response</u> +CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> OK

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+CPMS= <mem1> [,<mem2> [,<mem3>]]	<u>Response</u> +CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK <u>Parameters</u> See chapter section 8.2 Parameters Definition
<u>Examples</u>	AT+CPMS? +CPMS: "SM",27,50,"SM",27,50,"SM",27,50 OK AT+CPMS="SM" +CPMS: 27,50,27,50,27,50 OK AT+CPMS="SM","SM","SM" +CPMS: 27,50,27,50,27,50 OK
<u>Reference</u> [27.005] §3.2.2	<u>Notes</u> - Set command selects memory storages <mem1>,<mem2>,<mem3> to be used for reading, writing, etc. - Configuration is set to default values when the module starts

SMS Classes Table VS Preferred Storage:

	Preferred SIM Storage		Preferred ME Storage	
	Free Records	Full	Free Records	Full
SMS Class 0 (Immediate display)	Class 0 is not stored (by default on the HL6528x), it is only seen with +CMTI notification. Also on the HL6528x, a factory parameter can be used to save Class 0 in "SIM", if SIM is full SMS is refused.			
SMS Class 1 (ME specific)	SIM	ME if free space, else refused on the HL6528x; refused on the HL85xxx	ME	SIM if free space, else refused on the HL6528x; refused on the HL85xxx

	Preferred SIM Storage		Preferred ME Storage	
SMS Class 2 (SIM specific)	SIM	Refused	SIM	Refused
SMS Class 3 (TE specific)	SIM	Refused	SIM on the HL6528x, ME on the HL85xxx	Refused
SMS No Class	SIM	ME if free space , else refused on the HL6528x; refused on the HL85xxx	ME	SIM if free space, else refused on the HL6528x; refused on the HL85xxx

8.16. +CSDH Command: Show Text Mode Parameters

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CSDH=?	<u>Response</u> +CSDH: (list of supported <show>s) OK
<i>Read command</i> <u>Syntax</u> AT+CSDH?	<u>Response</u> +CSDH: <show> OK

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+CSDH= [<show>]	<u>Response</u> OK <u>Parameter</u> <show> 0 do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in +CMT, +CMGL, +CMGR result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in +CMGR result code, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata> 1 show the values in result codes
<u>Reference</u> [27.005] §3.3.3	<u>Notes</u> Set command controls whether detailed header information is shown in text mode result codes

8.17. +CSAS Command: Save Settings

Note: For HL6528x only.

HL6528x	
<i>Test command</i> <u>Syntax</u> AT+CSAS=?	<u>Response</u> +CSAS: (list of supported <profile>s) OK
<i>Write command</i> <u>Syntax</u> AT+CSAS= [<profile>]	<u>Response</u> OK <u>Parameter</u> <profile> profile number where user settings are to be stored

HL6528x	
<u>Reference</u> [27.005] §3.3.3	<u>Notes</u> Save the active message service settings (+CSMP) to nonvolatile memory.

8.18. +CRES Command: Restore Settings

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+CRES=?	<u>Response</u> +CRES: (list of supported <profile>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+CRES [=<profile>]	<u>Response</u> OK <u>Parameter</u> <profile> profile number where user settings are stored <u>0</u> Values saved by the user <u>1</u> Default factory settings
<u>Reference</u> [27.005] §3.3.3	<u>Notes</u> Restore the saved message service settings (+CSMP) from a nonvolatile memory

8.19. +CMT Notification: Received SMSPP Content

HL6528x and HL85xxx	
<i>Unsolicited notification</i>	<u>Response</u> +CMT: [<alpha>], <length><CR><LF><pdu> +CMT: <oa>,<alpha>,<scts>,<tooa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>] <CR> <LF> <data>
<u>Reference</u> [27.005]	<u>Notes</u> - All parameters are extracted from received message - Detailed header information is shown in text mode result codes according to command Show Text Mode Parameters +CSDH

8.20. *PSMEMCAP Command: SMS Memory Capacity

Note: For HL6528x only.

HL6528x							
Test command							
<u>Syntax</u> AT*PSMEMCAP=?	Response *PSMEMCAP: (list of supported <TE memory status>es), (list of supported <mode>s)						
Read command	Get current status						
<u>Syntax</u> AT*PSMEMCAP?	<u>Response</u> *PSMEMCAP: <mode>, <TE memory status> , <SIM memory free records> <u>Parameters</u> <table><tr><td><mode></td><td>0</td><td>Disable notification presentation</td></tr><tr><td></td><td>1</td><td>Enable notification presentation</td></tr></table>	<mode>	0	Disable notification presentation		1	Enable notification presentation
<mode>	0	Disable notification presentation					
	1	Enable notification presentation					

HL6528x			
	<TE memory status> 0 TE memory available for SMS storage 1 TE memory capacity exceeded <SIM memory free records> 0 SIM is full 1..255 Number of free SMS records		
<i>Write command</i> <u>Syntax</u> AT*PSMEMCAP= <TE memory status> [,<mode>]	<u>Response</u> *PSMEMCAP: <SIM memory status>, <Network status> <u>Parameters</u> <SIM memory status> 0 SIM memory available for SMS storage 1 SIM memory capacity exceeded <Network status> 0 No notification sent to network 1 "Memory available" has been sent to network after last SMS operation 2 "Memory capacity exceeded" has been sent to network after last SMS operation		
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This command allows SMS memory status synchronization between ME (SIM) and TE. It allows suspend/resume SMS reception depending on SIM and TE memory status availability for SMS storage • Set command is used to inform ME about SMS memory status on TE side • Set command is also used to control presentation memory notification when SIM memory status changes (full/available) or when network has been informed of "memory capacity exceeded" or "memory available"		

>> 9. Data AT Commands

9.1. +CBST Command: Select Bearer Service Type

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CBST=?	<u>Response</u> +CBST: (list of supported <speed>s),(list of supported <name>s),(list of sup-ported <ce>s) OK	<u>Syntax</u> AT+CBST=?	<u>Response</u> +CBST: (list of supported <speed>s),(list of supported <name>s),(list of sup-ported <ce>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CBST?	<u>Response</u> +CBST: <speed>,<name>,<ce> OK	<u>Syntax</u> AT+CBST?	<u>Response</u> +CBST: <speed>,<name>,<ce> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CBST= [<speed> [,<name>[,<ce>]]]	<u>Response</u> OK <u>Parameter</u> <speed> 0 Autobauding (automatic selection of the speed; this setting is possible in case of 3.1 kHz modem and non-transparent service) Z 9600 bps (V.32)	<u>Syntax</u> AT+CBST= [<speed> [,<name>[,<ce>]]]	<u>Response</u> OK or CME ERROR: <error> <u>Parameter</u> <speed> 0 Autobauding (automatic selection of the speed; this setting is possible in case of 3.1 kHz modem and non-transparent service) 4 2400 bps (V.22bis)

HL6528x		HL85xxx	
	71 9600 bps (V.110 or X.31 flag stuffing)		5 2400 bps (V.26ter) 6 4800 bps (V.32) 7 9600 bps (V.32) 12 9600 bps (V.34) 14 14400 bps (V.34) 15 19200 bps (V.34) 16 28800 bps (V.34) 17 33600 bps (V.34) 39 9600 bps (V.120) 43 14400 bps (V.120) 47 19200 bps (V.120) 48 28800 bps (V.120) 49 38400 bps (V.120) 50 48000 bps (V.120) 51 56000 bps (V.120) 68 2400 bps (V.110 or X.31 flag stuffing) 70 4800 bps (V.110 or X.31 flag stuffing) 71 9600 bps (V.110 or X.31 flag stuffing) 75 14400 bps (V.110 or X.31 flag stuffing) 79 19200 bps (V.110 or X.31 flag stuffing) 80 28800 bps (V.110 or X.31 flag stuffing) 81 38400 bps (V.110 or X.31 flag stuffing) 82 48000 bps (V.110 or X.31 flag stuffing) 83 56000 bps (V.110 or X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent UDI or RDI service in order to get FTM) 84 64000 bps (X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent UDI service in order to get FTM) 115 56000 bps (bit transparent) 116 64000 bps (bit transparent) 120 32000 bps (PIAFS32k)

HL6528x		HL85xxx	
	<name> <u>0</u> Data circuit asynchronous (UDI or 3.1 kHz modem) <ce> <u>1</u> Non-transparent		121 64000 bps (PIAFS64k) 130 28800 bps (multimedia) 131 32000 bps (multimedia) 132 33600 bps (multimedia) 133 56000 bps (multimedia) 134 64000 bps (multimedia) <name> <u>0</u> Data circuit asynchronous (UDI or 3.1 kHz modem) 1 Data circuit synchronous (UDI or 3.1 kHz modem) 4 Data circuit asynchronous (RDI) 5 Data circuit synchronous (RDI) <ce> <u>0</u> Transparent 1 Non-transparent 2 Both, transparent preferred 3 Both, non-transparent preferred
<u>Reference</u> [27.007] §6.7	<u>Notes</u> Set command selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated (refer 3G TS 22.002 [1]). Values may also be used during mobile terminated data call setup, especially in case of single numbering scheme calls	<u>Notes</u>	Set command selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated.

9.2. +CRLP Command: Select Radio Link Protocol Parameter

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CRLP=?	<u>Response</u> +CRLP: (list of supported <iws>s),(list of supported <mws>s),(list of supported <T1>s),(list of supported <N2>s)[,<ver1>[(list of supported <T4>s)]] [+CRLP: (list of supported <iws>s),(list of supported <mws>s),(list of supported <T1>s),(list of supported <N2>s)[,<ver1>[(list of supported <T4>s)]]][...] OK
<i>Read command</i> <u>Syntax</u> AT+CRLP?	<u>Response</u> +CRLP: <iws>,<mws>,<T1>,<N2>[,<ver1>[,<T4>]] [+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver2>[,<T4>]] [...]] OK
<i>Write command</i> <u>Syntax</u> AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>[,<T4>]]]]]]]	<u>Response</u> OK <u>Parameters</u> <ver>,<verx> RLP version number in integer format; when version indication is not present it shall equal 0 <iws>,<mws>,<T1>,<N2>,<T4> IWF to MS window size, MS to IWF window size, acknowledgement timer T1, retransmission attempts N2, re-sequencing period T4 in integer format (default values and value ranges depend on RLP version; refer 3G TS 24.022 [18]): T1 and T4 are in units of 10 ms

HL6528x and HL85xxx	
<u>Reference</u> [27.007] §6.8	<u>Notes</u> • Radio link protocol (RLP) parameters used when non-transparent data calls are originated may be altered with set command. Available command subparameters depend on the RLP versions implemented by the device (e.g. <ver> may not be available if device supports only versions 0 and 1) • If radio link protocol is not used, but some other error correcting protocol (for transparent data calls), V.25ter [14] Error Control Selection test command +ES=? may be used to indicate the presence of the protocol • Read command returns current settings for each supported RLP version <verx>. Only RLP parameters applicable to the corresponding <verx> are returned • Test command returns values supported by the TA as a compound value. If ME/TA supports several RLP versions <verx>, the RLP parameter value ranges for each <verx> are returned in a separate line • Versions 0 and 1 share the same parameter set. Read and test commands shall return only one line for this set (where <verx> is not present)

9.3. +CR Command: Service Reporting Control

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CR=?	<u>Response</u> +CR: (list of supported <mode>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CR?	<u>Response</u> +CR: <mode> OK

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+CR= [<mode>]	<u>Response</u> OK <u>Parameters</u> <mode> <u>0</u> Disables reporting 1 Enables reporting <serv> ASYNC Asynchronous transparent SYNC Synchronous transparent REL ASYNC Asynchronous non-transparent REL SYNC Synchronous non-transparent GPRS [<L2P>] GPRS The optional <L2P> proposes a layer 2 protocol to use between the MT and the TE. It is defined in the Enter GPRS Data Mode command.
<u>Reference</u> [27.007] §6.9	<u>Notes</u> - Set command controls whether or not intermediate result code +CR: <serv> is returned from the TA to the TE. If enabled, the intermediate result code is transmitted at the point during connect negotiation at which the TA has determined which speed and quality of service will be used, before any error control or data compression reports are transmitted, and before the intermediate result code CONNECT is transmitted - This command replaces V.25ter [14] command Modulation Reporting Control +MR, which is not appropriate for use in the GSM/UMTS network. Possible error control (other than radio link protocol) and data compression reporting can be enabled with V.25ter commands Error Control Reporting +ER and Data Compression Reporting +DR

9.4. +FMI Command: Manufacturer Identification

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+FMI=?	<u>Response</u> OK

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+FMI	<u>Response</u> <manufacturer> OK
<u>Reference</u> EIA/TIA-578-D	<u>Notes</u> See Manufacturer identification +CGMI

9.5. +FMM Command: Model Identification

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+FMM=?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+FMM	<u>Response</u> <model> OK
<u>Reference</u> EIA/TIA-578-D	<u>Notes</u> See Model identification +CGMM

9.6. +FMR Command: Revision Identification

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+FMR=?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+FMR	<u>Response</u> <revision> OK
<u>Reference</u> EIA/TIA-578-D	<u>Notes</u> See Revision identification +CGMR

>> 10. GPRS AT Commands

These commands are fully supported when the SIM card and the network have GPRS capability.

10.1. +CGATT Command: PS Attach or Detach

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CGATT=?	<u>Response</u> +CGATT: (list of supported <state>s) OK	<u>Syntax</u> AT+CGATT=?	<u>Response</u> +CGATT: (list of supported <state>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CGATT?	<u>Response</u> +CGATT: <state> OK	<u>Syntax</u> AT+CGATT?	<u>Response</u> +CGATT: <state> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CGATT= <state>	<u>Response</u> OK <u>Parameter</u> <state> Indicates the state of PS attachment 0 detached 1 attached	<u>Syntax</u> AT+CGATT = [<state>]	<u>Response</u> OK or ERROR <u>Parameter</u> <state> Indicates the state of PS attachment 0 detached 1 attached Other values are reserved and will result in an ERROR response to the write command.

HL6528x		HL85xxx	
Reference			
[27.007] §10.1.9			

10.2. +CGACT Command: PDP Context Activate or Deactivate

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CGACT=?	<u>Response</u> +CGACT: (list of supported <state>s) OK	<u>Syntax</u> AT+CGACT=?	<u>Response</u> +CGACT: (list of supported <state>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CGACT?	<u>Response</u> +CGACT: <cid>, <state> OK	<u>Syntax</u> AT+CGACT?	<u>Response</u> +CGACT: <cid>, <state> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CGACT= <state>[, <cid>]	<u>Response</u> OK <u>Parameters</u> <state> Indicates the state of PDP context activation 0 deactivated 1 activated Other values are reserved and will result in an ERROR response to the execution command	<u>Syntax</u> AT+CGACT= [<state> [, <cid> [, <cid> [...]]]	<u>Response</u> OK or ERROR <u>Parameters</u> <state> Indicates the state of PDP context activation 0 deactivated 1 activated Other values are reserved and will result in an ERROR response to the execution command

HL6528x		HL85xxx	
	<cid> PDP Context Identifier is a numeric parameter which specifies a particular PDP context definition. (see +CGDCONT command)		<cid> Numeric parameter which specifies a particular PDP context definition. This is mandatory when MSO is enabled and the value should be from 1 – 5.
<u>Reference</u> [27.007] §10.1.10	<u>Notes</u> - After CGACT it is impossible to use ATD*99... or *98... commands - Up to two (2) PDP contexts can be active at once	<u>Notes</u>	Although up to eight (8) PDP contexts can be active at once, this can be limited by the network provider.

10.3. +CGANS Command: PDP Context Activation Manual Response

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CGANS=?	<u>Response</u> +CGANS: (list of supported <response> s), (list of supported <L2P> s) OK
<i>Execute command</i>	
<u>Syntax</u> AT+CGANS= [<response>, <L2P> ,<cid>]]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <response> 0 Reject the request 1 Accept and request that the PDP context be activated Other values are reserved and will result in an ERROR response

HL85xxx	
	<L2P> String parameter indicating the layer 2 protocol to be used (see +CGDATA command) <cid> Numeric parameter that specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands). Parameter <response> allows the TE to accept or reject the request.
Notes	- If <response> is 0, the request is rejected and the MT returns OK to the TE. - If <response> is 1, the following procedure is followed by the MT. - Commands following the +CGANS command in the AT command line shall not be processed by the MT. - If the <L2P> parameter value is unacceptable to the MT, the MT shall return an ERROR or +CME ERROR response. Otherwise, the MT issues the intermediate result code CONNECT and enters V.250 online data state. If no <cid> is given or if there is no matching context definition, the MT will attempt to activate the context using the values for PDP type and PDP address provided by the network, together with any other relevant information known to the MT. The other context parameters will be set to their default values. - If the activation is successful, data transfer may proceed. Note that this is not the same as if the MT issues a +CGDATA (or +CGACT) command after receiving a +CRING unsolicited result code. A +CGDATA (or +CGACT) does not command the MT to acknowledge the network request but rather to make a new request for context activation. The network request would be ignored.

10.4. +CGCMOD Command: Modify PDP Context

Note: For HL85xxx only.

HL85xxx	
Test command	
Syntax AT+CGCMOD=?	Response +CGCMOD: (list of <cid>s associated with active contexts) OK

HL85xxx	
Execute command	
<u>Syntax</u> AT+CGCMOD= [<cid>[,<cid> [,...]]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <cid> Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands)
<u>Notes</u>	- This command is used to modify the specified PDP context(s). - If no <cid>s are specified, the activation form of the command modifies all the active context(s).

10.5. +CGTFT Command: Traffic Flow Template

Note: For HL85xxx only.

HL85xxx	
Test command	
<u>Syntax</u> AT+CGTFT=?	<u>Response</u> +CGTFT: <PDP_type> , (list of supported <packet filter identifier>s), (list of supported <evaluation precedence index>s), (list of supported <source address and subnet mask>s), (list of supported <protocol number (ipv4) / next header (ipv6)>s), (list of supported <destination port range>s), (list of supported <source port range>s), (list of supported <ipsec security parameter index (spi)>s), (list of supported <type of service (tos) (ipv4) and mask traffic class (ipv6) and mask>s), (list of supported <flow label (ipv6)>s) [<CR><LF>] +CGTFT: <PDP_type> , (list of supported <packet filter identifier>s), (list of supported <evaluation precedence index>s), (list of supported <source address and subnet mask>s), (list of supported <protocol number (ipv4) / next header (ipv6)>s), (list of supported <destination port range>s), (list of supported <source port range>s), (list of supported <ipsec security parameter index (spi)>s), (list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s), (list of supported <flow label (ipv6)>s) [...]

HL85xxx	
<i>Read command</i>	
<u>Syntax</u> AT+CGTFT?	<u>Response</u> +CGTFT: <cid>, <packet filter identifier>, <evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)> [<CR><LF>+CGTFT: <cid>, <packet filter identifier>, <evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)> [...]]
<i>Execute command</i>	
<u>Syntax</u> AT+CGTFT= [<cid>,<packet filter identifier>,<evaluation precedence index> [<source address and subnet mask> [<protocol number (ipv4) / next header (ipv6)> [<destination port range> [<source port range> [<ipsec security parameter index (spi)> [<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask> [<flow label (ipv6)>]]]]]]]]]]	<u>Response</u> OK or ERROR <u>Parameters</u> <cid> Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands) <packet filter identifier> [1...8] <evaluation precedence index> [0...255] Dot-separated numeric parameter of the form 'a1.a2.a3.a4.m1.m2.m3.m4', for ipv4 and 'a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16', for ipv6 <source address and subnet mask> [0...255] <protocol number (ipv4) / next header (ipv6)> [0...65535] Dot-separated numeric parameter of the form 'f.t.' <destination port range> [0...65535] Dot-separated numeric parameter of the form 'f.t.' <source port range> [00000000...FFFFFFFF] <ipsec security parameter index (spi)> [0...255] Dot-separated numeric parameter of the form 't.m.'

HL85xxx	
	<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask> [00000...FFFFF] (valid for IPv6 only) <flow label (ipv6)> [0...255]

10.6. +CGCLASS Command: GPRS Mobile Station Class

HL6528x		HL85xxx	
Test command		Test command	
<u>Syntax</u> AT+CGCLASS=?	<u>Response</u> +CGCLASS: (list of supported <class>es) OK	<u>Syntax</u> AT+CGCLASS=?	<u>Response</u> +CGCLASS: (list of supported <class>es) OK
Read command		Read command	
<u>Syntax</u> AT+CGCLASS?	<u>Response</u> +CGCLASS: <class> OK	<u>Syntax</u> AT+CGCLASS?	<u>Response</u> +CGCLASS: <class> OK
Write command		Write command	
<u>Syntax</u> AT+CGCLASS= <class>	<u>Response</u> OK	<u>Syntax</u> AT+CGCLASS= [<class>]	<u>Response</u> OK or ERROR +CME ERROR: 3

HL6528x		HL85xxx	
	<u>Parameter</u> <class> A string parameter which indicates the GPRS mobile class (in descending order of functionality) "B" Class B "CC" Class C in circuit switched only mode (lowest) "CG" Class C in GPRS mode		<u>Parameter</u> <class> String parameter which indicates the mode of operation "A" Class A (default value for HL854xx) "B" Class B (default value for HL8518, HL8528 and HL8529) "CC" Class C in circuit switched only mode "CG" Class C in GPRS mode
<u>Reference</u> [27.007] §10.1.17	<u>Notes</u> Class A is not supported; the module must be restarted in order to be effective	<u>Notes</u>	• <class> is stored in non-volatile memory without using the AT&W command. • Class A is only supported on UMTS bands. • When Class A is selected, AT+CGCLASS? will only display Class A after successfully registering to a network that supports Class A.
		<u>Examples</u>	AT+CGCLASS=? +CGCLASS: ("A","B","CC","CG") OK AT+CGCLASS="CG" OK AT+CGCLASS? +CGCLASS: "CG" OK

10.7. +CGDCONT Command: Define PDP Context

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CGDCONT=?	<u>Response</u> +CGDCONT: (range of supported <cid>s), <PDP_type>,...(list of supported <d_comp>s), (list of supported <h_comp>s)[,(list of supported <pd1>s)[,...[(list of supported <pdN>s)]]][...] OK	<u>Syntax</u> AT+CGDCONT=?	<u>Response</u> +CGDCONT: (range of supported <cid>s), <PDP_type>,...(list of supported <d_comp>s), (list of supported <h_comp>s)[,(list of supported <pd1>s)[,...[(list of supported <pdN>s)]]][...] [<CR><LF>] +CGDCONT: (range of supported <cid>s), <PDP_type>,...(list of supported <d_comp>s), (list of supported <h_comp>s)[,(list of supported <pd1>s)[,...[(list of supported <pdN>s)]]][...] OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CGDCONT?	<u>Response</u> +CGDCONT: <cid>, <PDP_type>, <APN>,<PDP_addr>,<d_comp>, <h_comp>[,<pd1>[,...[,<pdN>]]] OK	<u>Syntax</u> AT+CGDCONT?	<u>Response</u> +CGDCONT: <cid>, <PDP_type>, <APN>,<PDP_addr>,<d_comp>, <h_comp>[,<pd1>[,...[,<pdN>]]] OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CGDCONT= [<cid> [, <PDP_type> [, <APN> [, <PDP_addr> [, <d_comp> [, <h_comp>]]]]]]	<u>Response</u> OK <u>Parameters</u> <cid> 1 – 3 PDP context identifier; numeric parameter which specifies a particular PDP context definition.	<u>Syntax</u> AT+CGDCONT= [<cid> [, <PDP_type> [, <APN> [, <PDP_addr> [, <d_comp> [, <h_comp> [, <pd1> [... [, <pdN>]]]]]]]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <cid> 1 – 20 PDP context identifier; numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of the permitted values (minimum value = 1) is returned by the TEST command.

HL6528x	HL85xxx
<PDP_type> Packet Data Protocol type. A string parameter which specifies the type of packet data protocol. Only IP Internet Protocol - IETF STD 5) is supported. <APN> Access Point Name A string parameter which is a logical name that is used to select the GGSN or the external packet data network. <PDP_address> a string parameter that identifies the MT in the address space applicable to the PDP. As only IP is currently supported, it shall be an IP address. If the value is null ("0.0.0.0" or 0), then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The read form of the command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using the +CGPADDR command. <d_comp> a numeric parameter that controls PDP data compression. 0 Off (default and only value supported) <h_comp> a numeric parameter that controls PDP header compression 0 Off (default and only value supported)	<PDP_type> Packet Data Protocol type. A string parameter which specifies the type of packet data protocol. "IP" Internet Protocol (IETF STD 5) "IPv6" Internet Protocol, version 6 (IETF RFC 2460) "IPv4V6" Virtual <PDP_type> introduced to handle dual IP stack UE capability (see 3GPP TS 24.301[83]) Note that IPv4v6 is up to 3GPP Release 7 compliant. <APN> Access Point Name A string parameter which is a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested. <PDP_address> String parameter that identifies the MT in the address space applicable to the PDP. If the value is null or omitted then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The READ command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using the command +CGPADDR command. <d_comp> Numeric parameter that controls PDP data compression (applicable for SND CP only) 0 Off (default if value is omitted) 1 On (manufacturer preferred compression) 2 V.42 bis Other values are reserved <h_comp> Numeric parameter that controls PDP header compression 0 Off (default if value is omitted) 1 On (manufacturer preferred compression) 2 RFC1144 (applicable for SND CP only)

HL6528x		HL85xxx	
	<pd1>, ... <pdN> zero to N string parameters whose meanings are specific to <PDP_type>		3 RFC2507 4 RFC3095 (applicable for PDCP only) Other values are reserved <IPv4AddrAlloc> [0...n] string parameters whose meanings are specific to <PDP_type>
<u>Reference</u> [27.007] §10.1.1	<u>Notes</u> - The set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command - A special form of the set command, +CGDCONT=<cid> causes the values for context number <cid> to become undefined	<u>Reference</u> 3GPP TS 31.102 version 9.3.0	<u>Notes</u> - If the command is used only with the one parameter <cid>, it means that the corresponding PDP context becomes undefined. - Up to 11 PDP contexts can be added, after which +CME ERROR: 148 will be returned. <cid> = 4 is reserved for SUPL. A correct <APN> has to be configured at <cid>=4 for SUPL to work. - The APN Control List (ACL) will be checked only if a USIM is inserted. Before performing context definition it will check if the ACL-service is enabled and activated. If yes, all APNs from ACL of EF-ACL of the USIM will be read out and compared with the requested APN. - If the requested APN is listed in the EF-ACL the context definition will be performed. - If the requested APN is empty ("") and EF-ACL contains "network provided APN" the context definition will also be requested. - If the APN is not listed in the ACL the command returns error. - If the ACL-service is enabled or activated in the USIM but EF-ACL is empty then context definition will also be requested. - If the ACL-service is not enabled or not activated in the USIM or a GSM-SIM is inserted the context definition will be performed without any checks.

10.8. +CGDSCONT Command: Define Secondary PDP Context

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CGDSCONT= ?	<u>Response</u> +CGDSCONT: (list of <cid>s),(list of <p_cid>s),(list of <d_comp>s),(list of <h_comp>s) [<CR><LF>+CGDSCONT: (list of <cid>s),(list of <p_cid>s),(list of <d_comp>s),(list of <h_comp>s) [...]] OK
<i>Read command</i> <u>Syntax</u> AT+CGDSCONT?	<u>Response</u> +CGDSCONT: <cid>, <p_cid>, <d_comp>, <h_comp> OK
<i>Write command</i> <u>Syntax</u> AT+CGDSCONT= [<cid>, <p_cid> [, <d_comp> [, <h_comp>]]]	<u>Response</u> OK or ERROR <u>Parameters</u> <cid> PDP Context Identifier Numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of the permitted values (minimum value = 1) is returned by the TEST command. <p_cid> Primary PDP Context Identifier Numeric parameter which specifies a particular PDP context definition which has been specified by use of the +CGDSCONT command. The parameter is local to the TE-MT interface. The list of permitted values is returned by the test form of the command.

HL85xxx	
	<d_comp> Numeric parameter that controls PDP data compression (applicable for SNDCP only) <u>0</u> Off (default value if omitted) 1 On (manufacturer preferred compression) 2 V.42 bis Other values are reserved <h_comp> Numeric parameter that controls PDP header compression <u>0</u> Off (default value if omitted) 1 On (manufacturer preferred compression) 2 RFC1144 (applicable for SNDCP only) 3 RFC2507 4 RFC3095 (applicable for PDCP only) Other values are reserved

10.9. +CGDATA Command: Enter Data State

Note: For HL85xxx only.

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CGDATA=?	<u>Response</u> +CGDATA: (list of supported <L2P>s) OK

HL6528x and HL85xxx											
<i>Execute command</i>											
<u>Syntax</u> AT+CGDATA = [<L2P> [,<cid> [,<cid> [...]]]	<u>Response</u> CONNECT (and then data transfer) or CME ERROR: <error> <u>Parameters</u> <table> <tr> <td><L2P></td><td>String parameter that indicates the layer 2 protocol to be used between the TE and MT</td></tr> <tr> <td>PPP</td><td>Point-to-point protocol for a PDP such as IP</td></tr> <tr> <td>M-OPT-PPP</td><td>MS supports manufacturing specific protocol</td></tr> <tr> <td>M-HEX</td><td>MS supports manufacturing specific protocol</td></tr> <tr> <td>M-RAW_IP</td><td>MS supports manufacturing specific protocol</td></tr> </table> <cid> Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands)	<L2P>	String parameter that indicates the layer 2 protocol to be used between the TE and MT	PPP	Point-to-point protocol for a PDP such as IP	M-OPT-PPP	MS supports manufacturing specific protocol	M-HEX	MS supports manufacturing specific protocol	M-RAW_IP	MS supports manufacturing specific protocol
<L2P>	String parameter that indicates the layer 2 protocol to be used between the TE and MT										
PPP	Point-to-point protocol for a PDP such as IP										
M-OPT-PPP	MS supports manufacturing specific protocol										
M-HEX	MS supports manufacturing specific protocol										
M-RAW_IP	MS supports manufacturing specific protocol										

10.10. +CGED Command: GPRS Cell Environment

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CGED=?	<u>Response</u> +CGED: (list of supported <mode>s) OK

HL85xxx	
Read command	
<u>Syntax</u> AT+CGED?	<u>Response</u> +CGED: <mode> OK
Execute command	<u>Response</u> If UMTS is not supported: +CGED: Service-Cell: <MCC>,<MNC>,<LAC>,<CI>,<BSIC>,<AcT> Equivalent PLMNs : <MCC>,<MNC> <MCC>,<MNC> <arfcn>,<RxLevServ>,<RfChannels>,<Arfcn_ded>,<RxLevFull>,<RxLevSub>,<RxQualFull>,<RxQualSub>,<GSM-<ciphering>,<GPRS Ciphering Algorithm: GEA<gprs_ciphering>,<ms_txpwr>,<rx_acc_min>,<cbq>,<cba>,<c2_valid>,<cr_offset>,<tmp_offset>,<penalty_t>,<c1>,<c2>,<ch_type>,<ch_mode>,<txpwr>,<dtx_used>,<dtr_used>,<t3212>,<acc>,<t_adv>,<bs_pa_mfrms>,<dsc>,<rll>,<amr_acs>,<amr_cod_ul>,<amr_cod_dl>,<amr_c_i>,<BEP GMSK: <mean_bep_gmsk>,<cv_bep_gmsk>,<BEP 8PSK: <mean_bep_8psk>,<cv_bep_8psk>,<Neighbour Cell <n>:<MCC>,<MNC>,<LAC>,<CI>,<BSIC>,<arfcn>,<RxLev> <C1_nc>,<C2_nc>
<i>Note: Neighbour cell content may be repeated up to 6 times.</i>	
GPRS Parameters : <GPRS_sup>,<RAC>,<Split_Pg_Cycle>,<NCO>,<NOM>,<T3192>,<Acc_Burst_type>,<DRX_Timer_Max>,<PBCCH>,<Ext_Measure_Order> <PSI1_r_per>,<si13_location>,<packet_psi_status>,<packet_si_status>,<ext_upl_tbf_supported>,<ccn_active>,<pfc_feat_supported> Coding Scheme: dl_sc: <dl_sc>,ul_sc: <ul_sc> <Count_LR>,<Count_HR>,<C_R_Hyst>,<C31>,<C32>,<Prior_Acc_Thr> OK	
If UMTS is supported and RAT = UMTS: +CGED: RAT:<rat>,URR:<rrc_state>,DC:<urrcdc_state>,BP:<urrcbp_state>, M:<urrcm_state>, ERR:<as_error_code>, RC:<release_cause>,<OOS:<out_of_service>,BLER:<meas_bler>,TSIR:<target_sir>,MSIR:<meas_sir>,DPUC:<dlpc_power_up_commands_count>,DPDC:<dlpc_power_down_commands_count>,UPUC:<ulpc_power_up_commands_count>,UPDC:<ulpc_power_down_commands_count>,CMOD:	

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<compressed_mode>,TPCA:<tx_ul_pwr_ctrl_alg>, DCL:<drx_cycle_length>,UPCS: <ul_pwr_ctrl_step_size>,BTRG:<bler_target>,
 NHSC:<num_hsscch_codes>,HSC:<hierarchical_cell_structure>, HMD:<high_mobility_detected>, LM:<limited_mode>,RJCZ:
 <urrc_con_rej_cause>
 CMAX:<UMAC data CQI max value>, CMEAN:<UMAC data CQI mean value>,CMIN:<UMAC data CQI min value>,AFTI:<AMR frame type id>,
 ATYP:<AMR type>,CellId:<cell_identity>,DLF:<dl_frequency>,ULF:<ul_frequency>,C:<ciphering>,D:<ps_data_transferred>,
 PSM:<power_saving_mode>,
 Cell:<celltype=AS>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>
 Cell:<celltype=VAS>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>, DLF:<dl_frequency>
 Cell:<celltype=M>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>
 Cell:<celltype=D>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>
 Cell:<celltype=G>, B:<gsm_band>,Arfcn:<arfcn>, RxLev:<rxLev>,
 Bsic:<bsic>, RV:<ranking_value>
 Cell:<celltype=U>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>, DLF:<dl_frequency>, RV:<ranking_value>
 Cell:<celltype=NU>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>, DLF:<dl_frequency>, RS:<ranking_status>
 Cell:<celltype=NG>, B:<gsm band>, Arfcn:<arfcn>, RxLev:<rxLev>, Bsic:<bsic>, RS:<ranking_status>
 RR measurement evaluation :
 MeasId :<meas_id>, EventId :<event_id>, <par 3>,<par 4>, <par 5>,<par 6>,...,
 <par N>,MeasId :<meas_id>, EventId :<par 3>,<par 4>,<par 5>,<par 6>,...,
 <par M>,etc...
 MM:
 Process:CO,MMS:<mm_state>,MMSs:<mm_service_state>,MSC:<ms_class>,T:<active_timer_bitmap>
 Process:CS,MMS:<mm_state>,MMSs:<mm_service_state>,LUS:<location_update_status>,T:<active_timer_bitmap>,L:<limited_service>
 Process:PS,Ms:<mm_state>,MMSs:<mm_service_state>,LUS:<location_update_status>,T:<active_timer_bitmap>,L:<limited_service>,GS:<gprs_supported>,R:<ready_state>
 Cell change counters:
 CRT:<cell_reselecetion_total>,IRCR:<ir_cell_reselecetion>,AIRCR:<attempted_ir_cell_reselecetion>,IRHO:<ir_handover>,
 AIRHO:<attempted_ir_handover>
 Equivalent PLMNs:
 MCC:<mobile_country_code>, MNC:<mobile_network_code>
 Serving PLMN:
 MCC:<mobile_country_code>, MNC:<mobile_network_code>,
 LAC:<location_area_code>,RAC:<routing_area_code>

Note: The maximum total number of cells can be 24.

OK

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If UMTS is supported and RAT = GSM/GPRS:

+CGED: RAT: <rat>,RR:<rr_state>

SFRLC:<signal_failure/radio_link_counter>, RSR:<reselection_reason>, RC:<release_cause>,
LM:<limited_mode>B:<gsm_band>,Arfcn:<arfcn>,
Rxlev:<rxlev>,C1:<c1>,C2:<c2>,Bsic:<bsic>,MA:<nr_of_rf_in_ma>,MADed:<dedicated_arfcn>,GSM:
B:<gsm_band>,Arfcn:<arfcn>,RxLev:<rxLev>,C1:<c1>,
Bsic:<bsic>

UMTS: SC:<scrambling_code>,RSCP:<rscp>,ECN0:<ecn0>,
DLF:<dl_frequency>

MM:

Process:CO,MMs:<mm_state>,MMSs:<mm_service_state>,MSC:<ms_class>,T:<active_timer_bitmap>

Process:CS,MMs:<mm_state>,MMSs:<mm_service_state>,LUS:<location_update_status>,T:<active_timer_bitmap>,L:<limited_service>

Process:PS,MMs:<mm_state>,MMSs:<mm_service_state>,LUS:<location_update_status>,T:<active_timer_bitmap>,L:<limited_service>,GS:<gprs_supported>,R:<ready_state>

Cell change counters:

CRT:<cell_reselecetion_total>,IRCR:<ir_cell_reselecetion_counter>,AIRCR:<attempted_ir_cell_reselecetion>,IRHO:<ir_handover>,AIRHO:<attempted_ir_handover>

Coding Scheme:

dl_sc:<dl_sc>,ul_sc:<ul_sc>

Equivalent PLMNs:

MCC:<mobile_country_code>,MNC:<mobile_network_code>

Serving PLMN: MCC:<mobile_country_code>,MNC:<mobile_network_code>,
LAC:<location_area_code>,RAC:<routing_area_code>,
AcT:<access technology>

Note: Up to 6 GSM + 24 UMTS cells may be displayed.

OK

or

CME ERROR: <error>

Parameters

<mode>	0	One shot dump
	1	Periodic refreshed dump
	2	Stop periodic dump

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	If UMTS is not supported, follow Service-Cell.
<MCC>	[0...999] 3-digit mobile country code
<MNC>	[0...99] 2-digit mobile network code
<LAC>	[0h...FFFFh] 2-octet location area code
<CI>	[0h...FFFFh] 2-octet cell identity
<BSIC>	[0h...3Fh] 3-bit base station identify code
<AcT>	0 GSM 1 GPRS 3 EGPRS_PCR 4 EGPRS_EPCR 5 UMTS (unused) 8 Undefined
<arfcn>	[0...1023] Absolute radio frequency channel number
<RfChannels>	Number of frequencies in MA 0 N.A. 0x01 Single RF
<Arfcn_ded>	Single ARFCN of dedicated channel of first ARFCN of MA
<RxLevFull>	[0h...3Fh] Received signal strength on serving cell, measured on all slots
<RxLevSub>	[0h...3Fh] Received signal strength on serving cell, measured on all slots
<RxQualFull>	[0...7] Received signal quality on serving cell, measured on all slots

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	<RxQualSub> [0...7] Received signal qual.onserving cell, measured on a subset of slots <ms_txpwr> [0...31] Maximum TX power level an MS may use when accessing the system until otherwise commanded <rx_acc_min> [0...63] RXLEV-ACCESS-MIN <cbq> [0...1] CELL_BAR_QUALIFY <cba> [0...1] CELL_BAR_ACCESS <cs_valid> True if all parameter for calculation of c2 are available <cr_offset> [0...63] CELL_RESELECT_OFFSET <tmp_offset> [0...7] TEMPORARY_OFFSET <penalty_t> [0...31] Penalty time <c1> Value of c1 <c2> Value of c2 <ch_type> Channel type of the current connection 0 INVALID_CHN_TYPE 1 TCH_F 2 TCH_F 3 SDCCH_4 4 SDCCH_8 5 TCH_H_H 6 TCH_F_M <ch_mode> [0...255] Channel mode of the current connection 0 MODE_SIG_ONLY

HL85xxx		
	1	MODE_SPEECH_F
	2	MODE_SPEECH_H
	3	MODE_DATA_96_F
	4	MODE_DATA_48_F
	5	MODE_DATA_48_H
	6	MODE_DATA_24_F
	7	MODE_DATA_24_H
	8	MODE_SPEECH_F_V2
	9	MODE_SPEECH_F_V3
	10	MODE_SPEECH_H_V2
	11	MODE_SPEECH_H_V3
	12	MODE_DATA_144_F
	<txpwr> [0...31] 3-bit transmit power level of the current connection <dtx_used> [0...1] DTX used <dtr_used> [0...1] DTX used <t3212> [0...255] The T3212 timeout value field is coded as the binary representation of the timeout value for periodic updating in decihours <acc> [0...65535] Access control class (RACH Control Parameters) <t_adv> FFh Timing Advance (not used) <bs_pa_mfrms> [0...7] BS_PA_MFRMS (multiframes period for transmission of PAGING REQUEST) <amr_acs> AMR active codec <amr_cod_dl> AMR codec used in DL <amr_cod_ul> AMR codec used in UL	

HL85xxx**<amr_ci_i>** AMR C/I in dB/2**<mean_bep_8psk>** [0...31] MEAN_BEP_8PSK**<cv_bep_8psk>** [0...7] CV_BEP_8PSK**<mean_bep_gmsk>** [0...31] MEAN_BEP_GMSK**<cv_bep_gmsk>** [0...7] CV_BEP_GMSK

GPRS Parameters:

<GPRS_sup> [0...255] GPRS supported (in serving cell)**<RAC>** [0...1] Routing Area Code**<Split_Pg_Cycle>** [0...1] SPGC_CCH_SUP split pg_cycle on ccch by network**<NCO>** [0...3] NETWORK_CONTROL_ORDER (GPRS_Cell_Options)**<NOM>** [0...3] NETWORK OPERATION MODE (GPRS_Cell_Options)**<T3192>** Wait for release of the TBF after reception of the final block

0 500 msec

1 1000 msec

2 1500 msec

3 0 msec

4 80 msec

5 120 msec

7 200 msec

<Acc_Burst_type> 0 8 bit access burst

1 11 bit access burst

HL85xxx	
	<DRX_Timer_Max> [0...7] DRX_TIMER_MAX <PBCCH> PBCCH present <Ext_Measure_Order> [0...3] EXT_MEASUREMENT_ORDER <PSI1_r_per> [0....15 mapped to 1...16] PSI1_REPEAT_PERIOD <si14_location> "BCCH_NORM" "BCCH_EXT" "NO_BCCH_TYPE" <packet_psi_status> [0...1] <packet_si_status> [0...1] <ext_upl_tbf_supported> [0...1] <ccn_active> [0...1] <pfc_feat_supported> [0...1] <dl_sc>, <ul_sc> Current modulation and coding scheme of downlink <dl_sc> or uplink <ul_sc> NB_CS_1 NB_CS_2 NB_CS_3 NB_CS_4 NB_MCS_1 NB_MCS_2 NB_MCS_3 NB_MCS_4 NB_MCS_5 NB_MCS_6

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NB_MCS_7
 NB_MCS_8
 NB_MCS_9
 NB_MCS_5_7
 NB_MCS_6_9
 AB_8
 AB_11
 AB_11_E

<Count_LR> [0...63] PSI_COUNT_LR

<Count_HR> [0...15 mapped to 1...16] PSI_COUNT_HR

<C_R_Hyst> [0...7] CELL-RESELECT-HYSTERESIS

<C1> Integer value of c1

<C2> Integer value of c2

<C31> Integer value of c31

<C32> Integer value of c32

<Prior_Acc_Thr> [0...7] Priority_ACCESS_THR

Parameter definitions, if UMTS is supported:

<rat> Currently selected Radio Access Technology

"UMTS"

"GSM"

UMTS RR Parameters:

<rrc_state> "CD" CELL_DCH (0)
 "CF" CELL_FACH(1)

HL85xxx	
	"CP" CELL_PCH(2) "UP" URA_PCH(3) "ID" IDLE(4) "ST" START(5)
	<urrcdc_state> Indicated by three hex digits (octet 1, 2: event; 3: state)
	<urrcbp_state> Indicated by four hex digits (octet 1, 2: event; 3, 4: state)
	<urrcm_state> Indicated by three hex digits (octet 1: event, 2: state, 3: number of sent measurements)
	<as_error_code> [0...99] Indication of error in UAS
	<release_cause> [0...99]
	<out_of_service> [0...1]
	<meas_bler> [1.0 * 10exp(-6)...9.9 * 10exp(-1)] Block error rate. The value '-' is indicated if the parameter is not available or for all cells except DCH; the internal received value is divided by 2^23 before display
	<target_sir> [-10...20] Target SIR; the value '-' is displayed if the parameter is not available or for all cells except DCH; the internal received value is divided by 2^24 before display
	<meas_sir> [-10...20] Integer displayed in hexadecimal format; the value '-' is displayed if the parameter is not available or for all cells except DCH; the internal received value is divided by 2^24 before display
	<hierarchical_cell_structure> [0...1]
	<high_mobility_detected> [0...1]
	<limited_mode> [0...1]
	<dlpc_power_up_commands_count> L1 related data counter

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	<dlpc_power_down_commands_count>	L1 related data counter
	<ulpc_power_up_commands_count>	L1 related data counter
	<ulpc_power_down_commands_count>	L1 related data counter
	<compressed_mode>	Flag indicating if Compressed Mode is Active or not
	<tx_ul_pwr_ctrl_alg>	Tx Uplink Power Control Algorithm
	<drx_cycle_length>	DRX Cycle Length value, 2^k
	<ciphering>	GSM Ciphering may be ON or OFF
	<gprs_ciphering>	GPRS Ciphering Algorithm GEA1- GEA7
	<ps_data_transferred>	[0...1]
	<power_saving_mode>	[0...1]
	<cell_type>	"AS" Active Set "VAS" Virtual Active Set "M" Monitored Cells "D" Detected Cells "G" GSM cells "U" UMTS cells "NU" Non-ranked UMTS cells "NG" Non-ranked GSM cells
	<scrambling_code>	[0...511]
	<rsdp>	[0...91] Received Signal Code Power
	<u>255</u>	Invalid

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<ecno> [0...24] Energy per chip/noise
 255 Invalid

<gsm_band> "D" 1800 MHz
 "P" 1900 MHz
 "G" 900 MHz

<arfcn> [0...1023] Absolute radio frequency channel number

<rssi> [-110...-48] Radio signal strength (negative values)

<bsic> [0...3Fh] Base station identify code

<ranking_value> [0...999]

<ranking_status> [0...9]

Measurement Paramters:

<meas_id> [0...Fh]

<event_id> [1Ah...3Dh]

<par 3,4,5,...,M,...,N> [0...99]

GSM RR Parameters:

<rr_state> [1...43]

1 STATE_GRR_START
 2 STATE_GRR_CELL_SELECTION
 3 STATE_GRR_WAIT_CELL_SELECTION
 4 STATE_GRR_DEACT_CELL_SELECTION
 5 STATE_GRR_SELECT_ANY_CELL
 6 STATE_GRR_WAIT_SELECT_ANY_CELL

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7	STATE_GRR_DEACT_SELECT_ANY_CELL
8	STATE_GRR_WAIT_INACTIVE
9	STATE_GRR_INACTIVE
10	STATE_GRR_IDLE
11	STATE_GRR_PLMN_SEARCH
12	STATE_GRR_CELL_RESELECTION
13	STATE_GRR_WAIT_CELL_RESELECTION
14	STATE_GRR_DEACT_PLMN_SEARCH
15	STATE_GRR_CELL_CHANGE
16	STATE_GRR_CS_CELL_CHANGE
17	STATE_GRR_WAIT_CELL_CHANGE
18	STATE_GRR_SINGLE_BLOCK_ASSIGN
19	STATE_GRR_DOWNLN_TBF_EST
20	STATE_GRR_UPL_TBF_EST
21	STATE_GRR_WAIT_TBF
22	STATE_GRR_TRANSFER
23	STATE_GRR_WAIT_SYNC
24	STATE_GRR_DTM_ENH_CALL_EST
25	STATE_GRR_DTM
26	STATE_GRR_DTM_ENH_MO_CAL_EST
27	STATE_GRR_MO_CON_EST
28	STATE_GRR_MT_CON_EST
29	STATE_GRR_RR_CONNECTION
30	STATE_GRR_DTM_REL
31	STATE_GRR_CALL_REESTABLISH
32	STATE_GRR_DEACT_CALL_REESTABLISH
33	STATE_GRR_NORMAL_CHN_REL
34	STATE_GRR_LOCAL_CHN_REL
35	STATE_GRR_WAIT_IDLE
36	STATE_GRR_DEACTIVATION
37	STATE_GRR_ENH_DTM_CS_CALL_EST
38	STATE_GRR_IR_CELL_RESEL_TO_UTRAN
39	STATE_GRR_DTM_ENH_CS_CALL_EST

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40 STATE_GRR_IR_ACTIVE_ON_HOLD
 41 STATE_GRR_IR_RESEL_ABORT
 42 STATE_GRR_IR_WAIT_INTER_RAT
 43 STATE_GRR_IR_WAIT_FOR_RSRC

<signal_failure/radio_link_counter> [0...9] In case of grr_state == GRR_IDLE (11) Downlink Signaling Counter will be printed; in case of grr_state == GRR_RR_CONNECTION (28) Radio Link Loss Counter will be printed

<reselection_reason> [0...99]

0 RESEL_PLMN_CHANGE
 1 RESEL_SERV_CELL_NOT_SUITABLE
 2 RESEL_BETTER_C2_C32
 3 RESEL_DOWNLINK_FAIL
 4 RESEL_RA_FAILURE
 5 RESEL_SI_RECEIPT_FAILURE
 6 RESEL_C1_LESS_NULL
 7 RESEL_CALL_REEST_TIMEOUT
 8 RESEL_ABNORMAL_RESEL
 9 RESEL_CELL_CHANGE_ORDER
 10 RESEL_NOT_OCCURRED

<c1> [0...99]

<c2> [0...99]

<nr_of_rf_in_ma> [0...99]

<dedicated_arfcn> [0...1023]

<dl_sc>, <ul_sc> Current modulation and coding scheme of downlink(<dl_sc>) or uplink(<ul_sc>)

NB_CS_1
 NB_CS_2
 NB_CS_3

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NB_CS_4
 NB_MCS_1
 NB_MCS_2
 NB_MCS_3
 NB_MCS_4
 NB_MCS_5
 NB_MCS_6
 NB_MCS_7
 NB_MCS_8
 NB_MCS_9
 NB_MCS_5_7
 NB_MCS_6_9
 AB_8
 AB_11
 AB_11_E

UMTS/GSM MM Parameters:

<mm_state> [0...99]

<mm_service_state> [0...99]

<ms_class> MS GPRS-class (previously stored in ATC either at reception of message MN_GCLASS_IND or sending the message MN_GCLASS_REQ)

class A

class B

class CG class C in GPRS only mode

classCC class C in circuit switched only mode (lowest class)

<active_timer_bitmap> Four hex coded digits

<location_update_status>	1	Updated
	2	Not updated
	3	Roaming not allowed

HL85xxx		
	<limited_service> [0...1]	
	<gprs_supported> [0...1]	
	<ready_state> [0...1]	
	<cell_reselecetion_total> [0...999]	
	<ir_cell_reseelection_counter> [0...999]	
	<attempted_ir_cell_reselection> [0...999]	
	<ir_handover> [0...999]	
	<attempted_ir_handover> [0...999]	
	<mobile_country_code> [0...999]	Mobile country code
	<mobile_network_code> [0...99]	Mobile network code
	<location_area_code> [0...65535]	Location area code
	<routing_area_code> [0...255]	
	<access technology>	
	0	GSM
	1	GPRS
	2	EGPRS
	3	EGPRS_PCR
	4	EGPRS_EPCR
	5	UMTS (unused)
	6	DTM
	7	EGPRS_DTM
	8	Undefined

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<u>Reference</u> GSM04.08	<u>Notes</u> - This command returns a dump of the cell environment, either as a one shot dump or as a periodic refreshed dump (5 seconds each), dependent on the command parameter <mode>. The displayed parameters depend on whether UMTS is supported (UMTS_SUPPORT exists) and if it is, depends on the currently supported RAT (GSM, UMTS). - This command will only work if feature FEAT_UTA_EM is enabled.

10.11. +CGEREP Command: GPRS Event Reporting

HL6528x and HL85xxx										
<i>Test command</i>										
<u>Syntax</u> AT+CGEREP=?	<u>Response</u> +CGEREP: (list of supported <mode> s),(list of supported <bfr> s) OK									
<i>Read command</i>										
<u>Syntax</u> AT+CGEREP?	<u>Response</u> +CGEREP: <mode> , <bfr> OK									
<i>Write command</i>										
<u>Syntax</u> AT+CGEREP= [<mode>[,<bfr>]]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><mode></td><td>0</td><td>buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.</td></tr><tr><td></td><td>1</td><td>discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE</td></tr><tr><td></td><td>2</td><td>buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE</td></tr></table>	<mode>	0	buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.		1	discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE		2	buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE
<mode>	0	buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.								
	1	discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE								
	2	buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE								

HL6528x and HL85xxx	
	<bfr> 0 MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered 1 MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes)
<u>Reference</u> [27.007] §10.1.18	<u>Notes</u> The unsolicited result codes supported are: • +CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>] • +CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>] • +CGEV: ME DETACH • +CGEV: NW DETACH In addition, the HL85xxx also supports the following result codes: • +CGEV: NW CLASS <class> • +CGEV: ME CLASS <class>

10.12. +CGAUTO Command: Automatic Response

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CGAUTO=?	<u>Response</u> +CGAUTO: (list of supported <n>s) OK

HL85xxx																
<i>Read command</i>																
<u>Syntax</u> AT+CGAUTO?	<u>Response</u> +CGAUTO: <n> OK															
<i>Read command</i>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <table><tr><td><n></td><td>0</td><td>Turn off automatic response for Packet Domain only. Packet Domains network requests are manually accepted or rejected by the +CGANS command.</td></tr><tr><td></td><td>1</td><td>Turn on automatic response for Packet Domain only; Packet Domain network requests are automatically accepted.</td></tr><tr><td></td><td>2</td><td>Modem compatibility mode, Packet Domain only. Automatic acceptance of Packet Domain network requests is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject Packet Domain requests (+CGANS may also be used). Incoming circuit switched calls can neither be manually nor automatically answered.</td></tr><tr><td></td><td>3</td><td>Modem compatibility mode, Packet Domain and circuit switched calls. Automatic acceptance of both Packet Domain network requests and incoming circuit switched calls is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject Packet Domain requests. (+CGANS may also be used.) Circuit switched calls are handled as described elsewhere in this specification.</td></tr><tr><td></td><td>4</td><td>Turn on automatic negative response for Packet Domain only; Packet Domain network requests are automatically rejected.</td></tr></table>	<n>	0	Turn off automatic response for Packet Domain only. Packet Domains network requests are manually accepted or rejected by the +CGANS command.		1	Turn on automatic response for Packet Domain only; Packet Domain network requests are automatically accepted.		2	Modem compatibility mode, Packet Domain only. Automatic acceptance of Packet Domain network requests is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject Packet Domain requests (+CGANS may also be used). Incoming circuit switched calls can neither be manually nor automatically answered.		3	Modem compatibility mode, Packet Domain and circuit switched calls. Automatic acceptance of both Packet Domain network requests and incoming circuit switched calls is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject Packet Domain requests. (+CGANS may also be used.) Circuit switched calls are handled as described elsewhere in this specification.		4	Turn on automatic negative response for Packet Domain only; Packet Domain network requests are automatically rejected.
<n>	0	Turn off automatic response for Packet Domain only. Packet Domains network requests are manually accepted or rejected by the +CGANS command.														
	1	Turn on automatic response for Packet Domain only; Packet Domain network requests are automatically accepted.														
	2	Modem compatibility mode, Packet Domain only. Automatic acceptance of Packet Domain network requests is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject Packet Domain requests (+CGANS may also be used). Incoming circuit switched calls can neither be manually nor automatically answered.														
	3	Modem compatibility mode, Packet Domain and circuit switched calls. Automatic acceptance of both Packet Domain network requests and incoming circuit switched calls is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject Packet Domain requests. (+CGANS may also be used.) Circuit switched calls are handled as described elsewhere in this specification.														
	4	Turn on automatic negative response for Packet Domain only; Packet Domain network requests are automatically rejected.														

HL85xxx	
<u>Examples</u>	at+cgauto=? +CGAUTO: (0-4) OK at+cgauto? +CGAUTO: 3 OK //Turn on automatic response for Packet Domain only at+cgauto=1 OK
<u>Notes</u>	• This command configures the device by disabling or enabling an automatic positive or negative response (auto-answer) to the receipt of a NW-initiated Request PDP Context Activation message from the network in UMTS/GPRS. • When the +CGAUTO=1 command is received, the MT shall attempt to perform a PS attach if it is not already attached. • Failure will result in ERROR or, if enabled, +CME ERROR being returned to the TE. Subsequently, when the MT announces a network request for PDP context activation by issuing the unsolicited result code RING or +CRING to the TE, this is followed by the intermediate result code CONNECT. The MT then enters V.250 online data state and follows the same procedure as it would after having received a +CGANS=1 with no <L2P> or <cid> values specified.

10.13. +CGPADDR Command: Show PDP Address

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CGPADDR=?	<u>Response</u> +CGPADDR: (list of supported <cid>s) OK	<u>Syntax</u> AT+CGPADDR=?	<u>Response</u> +CGPADDR: (list of supported <cid>s) OK

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CGPADDR= [,<cid>[,<cid> [,...]]]	<u>Response</u> +CGPADDR: <cid>, <PDP_addr> [+CGPADDR: <cid>, <PDP_addr> [...]] OK <u>Parameters</u> <PDP_addr> a string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT command when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. <PDP_address> is omitted if none is available " <n>.<n>.<n>.<n>" where <n>=0..255 <cid> a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT command)	<u>Syntax</u> AT+CGPADDR= [<cid> ,<cid> [,...]]]	<u>Response</u> +CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]] +CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]][...]] OK <u>Parameters</u> <PDP_addr_1>, <PDP_addr_2> Each is a string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT and +CGDSCONT commands when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. Both <PDP_addr_1> and <PDP_addr_2> are omitted if none are available. Both <PDP_addr_1> and <PDP_addr_2> are included when both Ipv4 and Ipv6 addresses are assigned, with <PDP_addr_1> containing the Ipv4 address and <PDP_addr_2> containing the Ipv6 address. The string is given as dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4 for Ipv4 and a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for Ipv6. <cid> a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands). If no <cid> is specified the addresses for all defined contexts are returned.

HL6528x		HL85xxx	
		<i>Execute command</i> <u>Syntax</u> AT+CGPADDR	<u>Response</u> +CGPADDR: <cid1>[,<PDP_addr_1>,<PDP_addr_2>] +CGPADDR: <cid2>[,<PDP_addr_1>,<PDP_addr_2>] : +CGPADDR: <cidn>[,<PDP_addr_1>,<PDP_addr_2>] OK <u>Parameters</u> <PDP_addr_1>, <PDP_addr_2>,<cidx> Same as the description in the write command above
<u>Example</u>	Ask for IP address according to cid=1 (identify the PDP context): AT+CGPADDR=1 +CGPADDR: 1, "10.20.30.40"		
<u>Reference</u> [27.007] §10.1.14	<u>Notes</u> The execution command returns a list of PDP addresses for the specified context identifiers	<u>Reference</u> [27.007] §10.1.14	<u>Notes</u> The execution command returns a list of PDP addressed for the specified context identifiers.

10.14. +CGQMIN Command: Quality of Service Profile (Minimum)

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CGQMIN=?	<u>Response</u> +CGQMIN: <PDP_type>,(list of supported <precedence>s), (list of supported <delay>s),(list of supported <reliability>s), (list of supported <peak>s),(list of supported <mean>s) [+CGQMIN:...] OK	<u>Syntax</u> AT+CGQMIN=?	<u>Response</u> +CGQMIN: <PDP_type>,(list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CGQMIN?	<u>Response</u> +CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean> [+CGQMIN: ...] OK	<u>Syntax</u> AT+CGQMIN?	<u>Response</u> +CGQMIN: <cid>, <precedence>, <delay>, <reliability>,<peak>, <mean> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CGQMIN= [<cid> [,<precedence> [,<delay> [,<reliability> [,<peak> [,<mean>]]]]]	<u>Response</u> OK <u>Parameters</u> <precedence> numeric parameter for the precedence class 0 network subscribed value 1 High Priority Service commitments shall be maintained ahead of precedence classes 2 and 3 2 Normal priority Service commitments shall be maintained ahead of precedence class 3 3 Low priority <delay> numeric parameter for the delay class <reliability> numeric parameter for the reliability class 0 network subscribed value 1 Non real-time traffic , error-sensitive application that cannot cope with data loss 2 Non real-time traffic, error-sensitive application that can cope with infrequent data loss	<u>Syntax</u> AT+CGQMIN= [<cid> [,<precedence> [,<delay> [,<reliability>] [,<peak> [,<mean>]]]]]	<u>Response</u> OK or ERROR <u>Parameters</u> <cid> numeric parameter which specifies a particular PDP context definition. Refer to the defined values under the +CGDCONT command. <precedence> numeric parameter for the precedence class <delay> numeric parameter for the delay class <reliability> numeric parameter for the reliability class

HL6528x		HL85xxx	
	3 Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS 4 Real-time traffic, error-sensitive application that can cope with data loss 5 Real-time traffic, error non-sensitive application that can cope with data loss <peak> numeric parameter for the peak throughput class 0 network subscribed value 1 Up to 1 000 (8 kbit/s) 2 Up to 2 000 (16 kbit/s) 3 Up to 4 000 (32 kbit/s) 4 Up to 8 000 (64 kbit/s) 5 Up to 16 000 (128 kbit/s) 6 Up to 32 000 (256 kbit/s) 7 Up to 64 000 (512 kbit/s) 8 Up to 128 000 (1 024 kbit/s) 9 Up to 256 000 (2 048 kbit/s) <mean> numeric parameter for the mean throughput class 0 network subscribed value 1 100 (~0.22 bit/s) 2 200 (~0.44 bit/s) 3 500 (~1.11 bit/s) 4 1 000 (~2.2 bit/s) 5 2 000 (~4.4 bit/s) 6 5 000 (~11.1 bit/s) 7 10 000 (~22 bit/s) 8 20 000 (~44 bit/s) 9 50 000 (~111 bit/s) 10 100 000 (~0.22 kbit/s) 11 200 000 (~0.44 kbit/s) 12 500 000 (~1.11 kbit/s) 13 1 000 000 (~2.2 kbit/s)		<peak> numeric parameter for the peak throughput class <mean> numeric parameter for the mean throughput class

HL6528x		HL85xxx	
	14 2 000 000 (~4.4 kbit/s) 15 5 000 000 (~11.1 kbit/s) 16 10 000 000 (~22 kbit/s) 17 20 000 000 (~44 kbit/s) 18 50 000 000 (~111 kbit/s) 31 best effort		
Reference [27.007] §10.1.7		Note	If a value is omitted for a particular class then the value is considered to be unspecified.

10.15. +CGEQMIN Command: 3G Quality of Service Profile (Minimum)

Note: For HL85xxx only.

HL85xxx	
Test command	
Syntax AT+CGEQMIN=?	Response +CGEQMIN: <PDP_type>, (list of supported <Traffic_class>es) ,(list of supported <Maximum_bitrate_UL>s) ,(list of supported <Maximum_bitrate_DL>s) ,(list of supported <Guaranteed_bitrate_UL>s) ,(list of supported <Guaranteed_bitrate_DL>s) ,(list of supported <Delivery_order>s) ,(list of supported <Maximum_SDU_size>s) ,(list of supported <SDU_error_ratio>s) ,(list of supported <Residual_bit_error_ratio>s) ,(list of supported <Delivery_of_erroneous_SDUs>s) ,(list of supported <Transfer_delay>s) ,(list of supported <Traffic_handling_priority>s) [(list of supported <Source_statistics_descriptor>s) ,(list of supported <Signalling_indication>s)] [<CR><LF> +CGEQMIN: <PDP_type>, (list of supported <Traffic_class>es) ,(list of supported <Maximum_bitrate_UL>s) ,(list of supported <Maximum_bitrate_DL>s) ,(list of supported <Guaranteed_bitrate_UL>s) ,(list of supported <Guaranteed_bitrate_DL>s) ,(list of supported <Delivery_order>s) ,(list of supported <Maximum_SDU_size>s) ,(list of supported <SDU_error_ratio>s) ,(list of supported <Residual_bit_error_ratio>s) ,(list of supported <Delivery_of_erroneous_SDUs>s) ,(list of supported <Transfer_delay>s) ,(list of supported <Traffic_handling_priority>s) [(list of supported <Source_statistics_descriptor>s) ,(list of supported <Signalling_indication>s)] [...]] ERROR

HL85xxx	
Read command	
<u>Syntax</u> AT+CGEQMIN?	<u>Response</u> +CGEQMIN: <cid>,<Traffic_class>,<Maximum_bitrate_UL>,<Maximum_bitrate_DL>,<Guaranteed_bitrate_UL>,<Guaranteed_bitrate_DL>,<Delivery_order>,<Maximum_SDU_size>,<SDU_error_ratio>,<Residual_bit_error_ratio>,<Delivery_of_erroneous_SDUs>,<Transfer_delay>,<Traffic_handling_priority> [<Source_statistics_descriptor>,<Signalling_indication>] [<CR><LF> +CGEQMIN: <cid>,<Traffic_class>,<Maximum_bitrate_UL>,<Maximum_bitrate_DL>,<Guaranteed_bitrate_UL>,<Guaranteed_bitrate_DL>,<Delivery_order>,<Maximum_SDU_size>,<SDU_error_ratio>,<Residual_bit_error_ratio>,<Delivery_of_erroneous_SDUs>,<Transfer_delay>,<Traffic_handling_priority> [<Source_statistics_descriptor>,<Signalling_indication>][...]] Error
Write command	
<u>Syntax</u> AT+CGEQMIN= [<cid> [<Traffic_class> [<Maximum_bitrate_UL> [<Maximum_bitrate_DL> [<Guaranteed_bitrate_UL> [<Guaranteed_bitrate_DL> [<Delivery_order> [<Maximum_SDU_size> [<SDU_error_ratio> [<Residual_bit_error_ratio> [<Delivery_of_erroneous_SDUs> [<Transfer_delay> [<Traffic_handling_priority>	<u>Response</u> OK or ERROR <u>Parameters</u> <cid> Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands). <Traffic_class> UMTS bearer service application type 0 Conversational 1 Streaming 2 Interactive 3 Background 4 Subscribed value Other values are reserved <Maximum_bitrate_UL> Numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) <Maximum_bitrate_DL> Numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...)

HL85xxx	
[,<Source_statistics_descriptor> ,<Signalling_indication>]	<Guaranteed_bitrate_UL> Numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) <Guaranteed_bitrate_DL> Numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) <Delivery_order> Numeric parameter that indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not 0 No 1 Yes 2 Subscribed value Other values are reserved <Maximum_SDU_size> Numeric parameter that indicates the maximum allowed SDU size in octets <SDU_error_ratio> string parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of 5.10-3 would be specified as '5E3' (e.g. AT+CGEQMIN=..., "5E3",...) <Residual_bit_error_ratio> string parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as 'mEe'. As an example a target residual bit error ratio of 5.10-3 would be specified as '5E3' (e.g. AT+CGEQMIN=..., "5E3",...) <Delivery_of_erroneous_SDUs> Numeric parameter that indicates whether SDUs detected as erroneous shall be delivered or not 0 No 1 Yes 2 No detect 3 Subscribed value Other values are reserved <Transfer_delay> Numeric parameter that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds <Traffic_handling_priority> Numeric parameter that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers

HL85xxx	
	<Source_Statistics_Descriptor> Supported in R7 P S a numeric parameter that specifies characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as conversational or streaming <u>0</u> Characteristics of SDUs is unknown 1 Charactersitics of SDUs correspond to a speech source Other values are reserved <Signalling_Indication> Supported in R7 P S a numeric parameter used to indicate content of submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as interactive <u>0</u> PDP context is not optimized 1 PDP context is optimized <PDP_type> Refer to +CGDCONT and +CGDSCONT commands.
Reference 3GPP TS 23.107 3GPP TS 24.008	<u>Notes</u> • If a value is omitted for a particular class then the value is considered to be unspecified. • A special form of the set command, +CGEQMIN=<cid>, causes the minimum acceptable profile for context number <cid> to become undefined. In this case, no check is made against the negotiated profile.

10.16. +CGQREQ Command: Request Quality of Service Profile

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CGQREQ=?	<u>Response</u> +CGQREQ: <PDP_type> , (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) [+CGQREQ: <PDP_type> , (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) [...]] OK	<u>Syntax</u> AT+CGQREQ=?	<u>Response</u> +CGQREQ: <PDP_type> , (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CGQREQ?	<u>Response</u> +CGQREQ: <cid> , <precedence> , <delay> , <reliability> , <peak> , <mean> [+CGQREQ: <cid> , <precedence> , <delay> , <reliability> , <peak> , <mean> [...]] OK	<u>Syntax</u> AT+CGQREQ?	<u>Response</u> +CGQREQ: <cid> , <precedence> , <delay> , <reliability> , <peak> , <mean> OK

HL6528x		HL85xxx	
<i>Write command</i> <u>Syntax</u> +CGQREQ= [<cid> [,<precedence> [,<delay> [,<reliability> [,<peak> [,<mean>]]]]]]	<u>Response</u> OK <u>Parameters</u> <cid> a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT command). <precedence> a numeric parameter which specifies the precedence class <delay> a numeric parameter which specifies the delay class <reliability> a numeric parameter which specifies the reliability class <peak> a numeric parameter which specifies the peak throughput class <mean> a numeric parameter which specifies the mean throughput class	<i>Write command</i> <u>Syntax</u> AT+CGQREQ = [<cid> [,<precedence> [,<delay> [,<reliability> [,<peak> [,<mean>]]]]]]	<u>Response</u> OK or ERROR <u>Parameters</u> <cid> a numeric parameter which specifies a particular PDP context definition. For <cid> refer to defined values under +CGDCONT command. <precedence> a numeric parameter which specifies the precedence class <delay> a numeric parameter which specifies the delay class <reliability> a numeric parameter which specifies the reliability class <peak> a numeric parameter which specifies the peak throughput class <mean> a numeric parameter which specifies the mean throughput class.
<u>Reference</u> [27.007] §10.1.4	<u>Notes</u> - This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network - If a value is omitted for a particular class then the value is considered to be unspecified		<u>Notes</u> - This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network - If a value is omitted for a particular class then the value is considered to be unspecified

10.17. +CGEQREQ Command: 3G Request Quality of Service Profile

Note: For HL85xxx only.

HL85xxx	
Test command	
<u>Syntax</u> AT+CGEQREQ=?	<u>Response</u> +CGEQREQ: <PDP_type>, (list of supported <Traffic_class>es) ,(list of supported <Maximum_bitrate_UL>s) ,(list of supported <Maximum_bitrate_DL>s) ,(list of supported <Guaranteed_bitrate_UL>s) ,(list of supported <Guaranteed_bitrate_DL>s) ,(list of supported <Delivery_order>s) ,(list of supported <Maximum_SDU_size>s) ,(list of supported <SDU_error_ratio>s) ,(list of supported <Residual_bit_error_ratio>s) ,(list of supported <Delivery_of_erroneous_SDUs>s) ,(list of supported <Transfer_delay>s) ,(list of supported <Traffic_handling_priority>s) [, (list of supported <Source_statistics_descriptor>s) ,(list of supported <Signalling_indication>s)] [<CR><LF>+CGEQREQ: <PDP_type>, (list of supported <Traffic_class>es) ,(list of supported <Maximum_bitrate_UL>s) ,(list of supported <Maximum_bitrate_DL>s) ,(list of supported <Guaranteed_bitrate_UL>s) ,(list of supported <Guaranteed_bitrate_DL>s) ,(list of supported <Delivery_order>s) ,(list of supported <Maximum_SDU_size>s) ,(list of supported <SDU_error_ratio>s) ,(list of supported <Residual_bit_error_ratio>s) ,(list of supported <Delivery_of_erroneous_SDUs>s) ,(list of supported <Transfer_delay>s) ,(list of supported <Traffic_handling_priority>s) [, (list of supported <Source_statistics_descriptor>s) ,(list of supported <Signalling_indication>s)] [...]]
Read command	
<u>Syntax</u> AT+CGEQREQ?	<u>Response</u> +CGEQREQ: <cid>, <Traffic_class>, <Maximum_bitrate_UL>, <Maximum_bitrate_DL>, <Guaranteed_bitrate_UL>, <Guaranteed_bitrate_DL>, <Delivery_order>, <Maximum_SDU_size>, <SDU_error_ratio>, <Residual_bit_error_ratio>, <Delivery_of_erroneous_SDUs>, <Transfer_delay>, <Traffic_handling_priority> [, <Source_statistics_descriptor>, <Signalling_indication>] [<CR><LF>+CGEQREQ: <cid>, <Traffic_class>, <Maximum_bitrate_UL>, <Maximum_bitrate_DL>, <Guaranteed_bitrate_UL>, <Guaranteed_bitrate_DL>, <Delivery_order>, <Maximum_SDU_size>, <SDU_error_ratio>, <Residual_bit_error_ratio>, <Delivery_of_erroneous_SDUs>, <Transfer_delay>, <Traffic_handling_priority> [, <Source_statistics_descriptor>, <Signalling_indication>][...]]
Write command	
<u>Syntax</u> AT+CGEQREQ= [<cid>[, <Traffic_class> [, <Maximum_bitrate_UL>	<u>Response</u> OK or ERROR

HL85xxx	
[,<Maximum_bitrate_DL> [,<Guaranteed_bitrate_UL> [,<Guaranteed_bitrate_DL> [,<Delivery_order> [,<Maximum_SDU_size> [,<SDU_error_ratio>[,<Residual_bit_error_ratio> [,<Delivery_of_erroneous_SDUs> [,<Transfer_delay> [,<Traffic_handling_priority> [,<Source_statistics_descriptor>, <Signalling_indication>]]]]]]]]]]]]]]]	<u>Parameters</u> <cid> numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands) <Traffic_class> UMTS bearer service application type 0 Conversational 1 Streaming 2 Interactive 3 Background Other values are reserved <Maximum_bitrate_UL> numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=...,32, ...) <Maximum_bitrate_DL> Numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=...,32, ...) <Guaranteed_bitrate_UL> Numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=...,32, ...) <Guaranteed_bitrate_DL> Numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=...,32, ...) <Delivery_order> Numeric parameter that indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not 0 No 1 Yes Other values are reserved <Maximum_SDU_size> Numeric parameter that indicates the maximum allowed SDU size in octets <SDU_error_ratio> string parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of 5.10-3 would be specified as '5E3' (e.g. AT+CGEQREQ=...,"5E3",...)

HL85xxx	
	<Residual_bit_error_ratio> string parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as 'mEe'. As an example a target residual bit error ratio of $5 \cdot 10^{-3}$ would be specified as '5E3' (e.g. AT+CGEQREQ=..., "5E3",...) <Delivery_of_erroneous_SDUs> Numeric parameter that indicates whether SDUs detected as erroneous shall be delivered or not 0 No 1 Yes 2 No detect 3 Subscribed value Other values are reserved <Transfer_delay> Numeric parameter that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds <Traffic_handling_priority> Numeric parameter that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers <Source_Statistics_Descriptor> Supported in R7 P S a numeric parameter that specifies characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as conversational or streaming 0 Characteristics of SDUs is unknown 1 Charactersitics of SDUs correspond to a speech source Other values are reserved <Signalling_Indication> Supported in R7 P S a numeric parameter used to indicate content of submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as interactive 0 PDP context is not optimized 1 PDP context is optimized <PDP_type> Refer to +CGDCONT and +CGDSCONT commands.
<u>Reference</u> 3GPP TS 23.107 3GPP TS 24.008	<u>Notes</u> If a value is omitted for a particular class then the value is considered to be unspecified.

10.18. +CGEQNEG Command: 3G Negotiated Quality of Service Profile

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CGEQNEG=?	<u>Response</u> +CGEQNEG: (list of <cid>s associated with active contexts)
<i>Write command</i>	
<u>Syntax</u> AT+CGEQNEG =[<cid>[,<cid> [,...]]]	<u>Response</u> +CGEQNEG: <cid> , <Traffic class> , <Maximum bitrate UL> , <Maximum bitrate DL> , <Guaranteed bitrate UL> , <Guaranteed bitrate DL> , <Delivery order> , <Maximum SDU size> , <SDU error ratio> , <Residual bit error ratio> , <Delivery of erroneous SDUs> , <Transfer delay> , <Traffic handling priority> [<CR><LF> +CGEQNEG: <cid> , <Traffic class> , <Maximum bitrate UL> , <Maximum bitrate DL> , <Guaranteed bitrate UL> , <Guaranteed bitrate DL> , <Delivery order> , <Maximum SDU size> , <SDU error ratio> , <Residual bit error ratio> , <Delivery of erroneous SDUs> , <Transfer delay> , <Traffic handling priority> [...]] <u>Parameters</u> <cid> numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands) <Traffic_class> UMTS bearer service application type 0 Conversational 1 Streaming 2 Interactive 3 Background Other values are reserved <Maximum_bitrate_UL> numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQNEG=...,32, ...) <Maximum_bitrate_DL> Numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQNEG=...,32, ...)

HL85xxx

<Guaranteed_bitrate_UL> Numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQNEG=...,32, ...)

<Guaranteed_bitrate_DL> Numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQNEG=...,32, ...)

<Delivery_order> Numeric parameter that indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not

0 No

1 Yes

Other values are reserved

<Maximum_SDU_size> Numeric parameter that indicates the maximum allowed SDU size in octets

<SDU_error_ratio> string parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of $5 \cdot 10^{-3}$ would be specified as '5E3' (e.g. AT+CGEQNEG=..., "5E3", ...)

<Residual_bit_error_ratio> string parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as 'mEe'. As an example a target residual bit error ratio of $5 \cdot 10^{-3}$ would be specified as '5E3' (e.g. AT+CGEQNEG=..., "5E3", ...)

<Delivery_of_erroneous_SDUs> Numeric parameter that indicates whether SDUs detected as erroneous shall be delivered or not

0 No

1 Yes

2 No detect

Other values are reserved

<Transfer_delay> Numeric parameter that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds

<Traffic_handling_priority> Numeric parameter that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers

HL85xxx	
<u>Reference</u> 3GPP TS 23.107 3GPP TS 24.008	<u>Notes</u> If a value is omitted for a particular class then the value is considered to be unspecified.

10.19. +CGREG Command: GPRS Network Registration Status

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+CGREG=?	<u>Response</u> +CGREG: (list of supported <n>s) OK	<u>Syntax</u> AT+CGREG=?	<u>Response</u> +CGREG: (list of supported <n>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+CGREG?	<u>Response</u> +CGREG: <n>,<stat>[,<lac>,<ci>] OK	<u>Syntax</u> AT+CGREG?	<u>Response</u> +CGREG: <n>,<stat>[,<lac>,<ci>[,<AcT>,<rac>]] OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+CGREG= [<n>]	<u>Response</u> OK <u>Parameters</u> <n> <u>0</u> disable network registration unsolicited result code	<u>Syntax</u> AT+CGREG= [<n>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <n> <u>0</u> disable network registration unsolicited result code

HL6528x		HL85xxx	
	1 enable network registration unsolicited result code +CGREG: <stat> 2 enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>] <stat> 0 not registered, ME is not currently searching an operator to register to The MS is in GMM state GMM-NULL or GMM-DEREGISTERED-INITIATED. The GPRS service is disabled, the MS is allowed to attach for GPRS if requested by the user. 1 registered, home network The MS is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED INITIATED on the home PLMN. 2 not registered, but ME is currently trying to attach or searching an operator to register to The MS is in GMM state GMM-DEREGISTERED or GMM-REGISTERED-INITIATED. The GPRS service is enabled, but an allowable PLMN is currently not available. The MS will start a GPRS attach as soon as an allowable PLMN is available. 3 registration denied The MS is in GMM state GMM-NULL. The GPRS service is disabled, the MS is not allowed to attach for GPRS if requested by the user. 4 unknown 5 registered, roaming The MS is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED on a visited PLMN <lac> string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)		1 enable network registration unsolicited result code +CGREG: <stat> 2 enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>[,<AcT>,<rac>]] <stat> 0 not registered, home network 1 registered, home network 2 not registered, but ME is currently searching for a new operator to register to 3 registration denied 4 unknown 5 registered, roaming <lac> string type; two byte location area code in hexadecimal format

HL6528x		HL85xxx															
	<ci> string type; two byte cell ID in hexadecimal format		<ci> string type; two byte cell ID in hexadecimal format for GSM, or four byte cell ID in hexadecimal format for UMTS <Act> <table><tr><td>0</td><td>GSM</td></tr><tr><td>1</td><td>GSM Compact</td></tr><tr><td>2</td><td>UTRAN</td></tr><tr><td>3</td><td>GSM with EGPRS</td></tr><tr><td>4</td><td>UTRAN with HSDPA</td></tr><tr><td>5</td><td>UTRAN with HSUPA</td></tr><tr><td>6</td><td>UTRAN with HSDPA and HSUPA</td></tr></table> <rac> string type; one byte routing area code in hexadecimal format	0	GSM	1	GSM Compact	2	UTRAN	3	GSM with EGPRS	4	UTRAN with HSDPA	5	UTRAN with HSUPA	6	UTRAN with HSDPA and HSUPA
0	GSM																
1	GSM Compact																
2	UTRAN																
3	GSM with EGPRS																
4	UTRAN with HSDPA																
5	UTRAN with HSUPA																
6	UTRAN with HSDPA and HSUPA																
<u>Reference</u> [27.007] §10.1.19	<u>Notes</u> The set command controls the presentation of an unsolicited result code +CGREG: <stat> when <n>=1 and there is a change in the MT's GPRS network registration status, or code +CGREG: <stat>[,<lac>,<ci>] when <n>=2 and there is a change of the network cell																

10.20. +CGSMS Command: Select Service for MO SMS Messages

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+CGSMS=?	<u>Response</u> +CGSMS: (list of currently available <service>s) OK
<i>Read command</i> <u>Syntax</u> AT+CGSMS?	<u>Response</u> +CGSMS: <service> OK
<i>Write command</i> <u>Syntax</u> AT+CGSMS= [<service>]	<u>Response</u> OK <u>Parameter</u> <service> A numeric parameter which indicates the service or service preference to be used. 0 Packet Domain <u>1</u> Circuit switched 2 Packet Domain preferred (use circuit switched if GPRS not available) 3 Circuit switched preferred (use Packet Domain if circuit switched not available)
<u>Reference</u> [27.007] § 10.1.20	<u>Notes</u> When <service> value is 2, the SMS is sent on GPRS network if already attached. Otherwise it is sent on circuit switched network. If an error occurs on the GPRS network, no further attempt is made

10.21. *PSGCNT Command: GPRS Counters

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT*PSGCNT=?	<u>Response</u> *PSGCNT: (list of supported <CiD>s)
<i>Read command</i>	Get counter values
<u>Syntax</u> AT*PSGCNT?	<u>Response</u> *PSGCNT: <CiD>, <Rx bytes> , <Tx bytes> [..] <CR><LF> *PSGCNT: <CiD> <Rx bytes> , <Tx bytes> > <u>Parameters</u> <Rxbytes> <Integer type> Number of received bytes <Txbytes> <Integer type> Number of transmitted bytes
<i>Write command</i>	Reset counter
<u>Syntax</u> AT*PSGCNT=<CiD>	<u>Response</u> OK <u>Parameter</u> <CiD> A numeric parameter which specifies a particular PDP context definition (see the +CGDCONT command); 0 = reset all counters
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The write command resets the counter of the <cid> given as parameter. (At switch on, all counters are reset.) - The read command returns the current received and transmitted bytes (Rx & Tx) for all possible CiDs.

10.22. +XDNS Command: Dynamic DNS Request

Note: For HL85xxx only.

HL85xxx									
<i>Test command</i> <u>Syntax</u> AT+XDNS=?	<u>Response</u> +XDNS: (list of supported <cid>s),(list of supported <mode>s) OK								
<i>Read command</i> <u>Syntax</u> AT+XDNS?	<u>Response</u> +XDNS: <cid>, <primary DNS>, <secondary DNS> [+XDNS: <cid>, <primary DNS>, <secondary DNS> [...]] OK								
<i>Write command</i> <u>Syntax</u> AT+XDNS=<cid>,<mode>	<u>Response</u> OK or CME ERROR: <error> <u>Parameters</u> <cid> Context ID <mode> <table> <tr> <td>0</td><td>Disable dynamic DNS request</td></tr> <tr> <td>1</td><td>Enable dynamic DNS request (IPv4)</td></tr> <tr> <td>2</td><td>Enable dynamic DNS request (IPv6)</td></tr> <tr> <td>3</td><td>Enable dynamic DNS request (IPv4v6)</td></tr> </table>	0	Disable dynamic DNS request	1	Enable dynamic DNS request (IPv4)	2	Enable dynamic DNS request (IPv6)	3	Enable dynamic DNS request (IPv4v6)
0	Disable dynamic DNS request								
1	Enable dynamic DNS request (IPv4)								
2	Enable dynamic DNS request (IPv6)								
3	Enable dynamic DNS request (IPv4v6)								

HL85xxx	
	Note that <mode> = 2 or 3 will only be supported if the feature FEAT_IPV6_SUPPORT is enabled. IPv4v6 (when <mode> = 3) is up to 3GPP Release 7 compliant. <primary DNS>, <secondary DNS> Strings representing the DNS addresses and given as dot-separated numeric parameters (0 – 255) in the form of: a1.a2.a3.a4 for IPv4 a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6 a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.a17.a18.a19.a20 for IPv4v6 (here a1 to a4 represent IPV4 and a5 to a20 represent IPv6) The DNS address is by default "0.0.0.0" which is not a valid address.

10.23. +XCEDATA Command: Establish ECM Data Connection

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+XCEDATA=?	<u>Response</u> +XCEDATA: (list of supported <cid>s),(list of supported <ECM_id>s) OK
<i>Read command</i> <u>Syntax</u> AT+XCEDATA?	<u>Response</u> +XCEDATA: [(mapped <cid> and <ECM_id> pair),][(mapped <cid> and <ECM_id> pair),][(mapped <cid> and <ECM_id> pair)] OK

HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+XCEDATA= <cid>,<ECM_id>	<u>Response</u> OK or CME ERROR: <error> <u>Parameters</u> <cid> Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands). Range of values is from 1 – 20. <ECM_id> Numeric parameter which specifies one of the three CDC EDM interfaces. These interfaces are supported as part of the datacard feature. Range of values is from 0 – 2.
<u>Notes</u>	This command is only available if CDC ECM is enabled.
<u>Examples</u>	<pre>// ECM data connection with PDP context 1 and CDC-ECM interface 0 // Check +KUSBCOMP=1; this means set to 3 CDC-ACM and 3 CDC-ECM mode AT+KUSBCOMP? +KUSBCOMP: 1 OK AT+CGDCONT=1,"IP","APN" OK // Before requesting dynamic DNS, context 1 should be deactivated; should receive +CGACT: 1,0 AT+CGACT? +CGACT: 1,0 OK // Enable context 1 dynamic DNS Request AT+XDNS=1,1 OK</pre>

HL85xxx	
	// Establish ECM data connection with PDP context 1 and CDC-ECM interface 0 AT+XCEDATA=1,0 OK

10.24. +WACCM Command: Set ACCM Value

Note: For HL6528x only.

HL6528x								
<i>Test command</i>								
<u>Syntax</u> AT+WACCM=?	<u>Response</u> +WACCM: (list of supported <ACCM value> s) OK							
<i>Read command</i>								
<u>Syntax</u> AT+WACCM?	<u>Response</u> +WACCM: <ACCM value> OK							
<i>Write command</i>								
<u>Syntax</u> AT+ WACCM= <ACCM value>	<u>Response</u> OK +CME ERROR <err>							
	<u>Parameters</u> <table><tr><td><ACCM value></td><td>0</td><td>ACCM set to 0x00000000</td></tr><tr><td></td><td>1</td><td>ACCM set to 0x000A0000</td></tr></table>		<ACCM value>	0	ACCM set to 0x00000000		1	ACCM set to 0x000A0000
<ACCM value>	0	ACCM set to 0x00000000						
	1	ACCM set to 0x000A0000						

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> • ACCM can be negotiated during the PPP negotiation phase by sending CONF-REQ messages; this is the recommended implementation. • Default value is 0x000A0000. • If 0x00000000 is needed as default (i.e. no CONF-REQ will be sent by the application), then +WACCM can be used to set this value. • This command is available when a SIM has been inserted, and the PIN code is entered.
<u>Examples</u>	AT+WACCM=? +WACCM: (0,1) OK AT+WACCM? +WACCM: 1 <i>//default ACCM value is 0x000A0000</i> OK AT+WACCM=0 <i>// Set ACCM value to 0x00000000</i> OK AT+WACCM? +WACCM: 0 <i>// ACCM value is 0x00000000</i> OK

>> 11. SIM Application Toolkit AT Commands

11.1. Preliminary Comments

- Sierra Wireless has developed a proprietary set of commands to allow a DTE to interface with the SIM Application Toolkit.
- Details about the implementation of the SIM Application Toolkit are provided in [STK].
- The following table gives the list of each SIM ToolKit *PSSTK command parameter and the *PSSTK URC Format.

Command Name	*PSSTK URC Format	*PSSTK Command Parameters List
COMMAND REJECTED	NULL	AT*PSSTK = "COMMAND REJECTED",CommandNumber, cause
NOTIFICATION	*PSSTK: "NOTIFICATION", <CommandNumber>, <TypeOfCommand>, <Presence>, <Alphabet>, <AlphaId>, <IconId>, <IconQualifier>	AT*PSSTK = "NOTIFICATION", CommandNumber, IconDisplay
SETUP CALL	*PSSTK: "SETUP CALL", <CommandNumber>,<TypeOfCommand>,<Confirmation>, <Presence1>,<Alphabet1>,<AlphaId1>,<IconId1>,<IconQualifier1>, <Presence2>,<Alphabet2>,<AlphaId2>,<IconId2>,<IconQualifier2>, <RepeatIndicator>	AT*PSSTK ="SETUP CALL", CommandNumber, IconDisplay
DISPLAY TEXT	*PSSTK: "DISPLAY TEXT", <CommandNumber>,<Priority>,<Clear>,<ImmediateResponse>, <Alphabet>,<Text>,<IconId>,<IconQualifier>	AT*PSSTK ="DISPLAY TEXT", CommandNumber, IconDisplay
GET INKEY	*PSSTK: "GET INKEY", <CommandNumber>, <ResponseFormat>, <ResponseAlphabet>, <HelpInfo>,<Alphabet>,<Text>,<IconId>, <IconQualifier>	AT*PSSTK ="GET INKEY", alphabet,Text,CommandNumber, IconDisplay, HelpRequest
GET INPUT	*PSSTK: "GET INPUT", <CommandNumber>, <ResponseFormat>,<ResponseAlphabet>,<HideEntry>, <AlphabetText>,<Text>,<IconId>,<IconQualifier>,<AlphabetDefault>, <DefaultText>,<MinLength>,<MaxLength>,<HelpInfo>	AT*PSSTK ="GET INPUT", CommandNumber,alphabet,Text, IconDisplay, HelpRequest

Command Name	*PSSTK URC Format	*PSSTK Command Parameters List
PLAY TONE	*PSSTK: "PLAY TONE", <Presence>, <Alphabet>, <Alphald>, <IconId>, <IconQualifier>, <CommandNumber>, <Tone>, <Duration>	AT*PSSTK ="PLAY TONE", CommandNumber, IconDisplay
SELECT ITEM	*PSSTK: "SELECT ITEM", <Presence>, <Alphald>, <Alphabet>, <IconId>, <IconQualifier>, <CommandNumber>, <DefaultItem>, <HelpInfo>, <NumberOfItem>	AT*PSSTK ="SELECT ITEM", CommandNumber, ItemIdentifier, IconDisplay, IconDisplay, HelpRequest
SETUP MENU	*PSSTK: "SETUP MENU", <Presence>, <Alphabet>, <Alphald>, <IconId>, <IconQualifier>, <CommandNumber>, <DefaultItem>, <HelpInfo>, <NumberOfItem>	AT*PSSTK ="SETUP MENU", CommandNumber, IconDisplay
REMOVE MENU	*PSSTK: "REMOVE MENU", <CommandNumber>	AT*PSSTK ="REMOVE MENU ", CommandNumber
MENU SELECTION	NULL	AT*PSSTK ="MENU SELECTION", ItemIdentifier
ALL CALLS DISCONNECTED	NULL	AT*PSSTK ="ALL CALLS DISCONNECTED "
USER ACTIVITY	NULL	AT*PSSTK ="USER ACTIVITY"
IDLE SCREEN AVAILABLE	NULL	AT*PSSTK ="IDLE SCREEN AVAILABLE"
SETUP CALL TERMINATED	NULL	AT*PSSTK ="SETUP CALL TERMINATED "
GET ITEM LIST	*PSSTK: "GET ITEM LIST", <Item_index>, <ItemIdentifier>, <Alphabet>, <p_Text>, <NextAction>, <IconId>, <IconQualifier>	AT*PSSTK ="GET ITEM LIST", NumberOfItems
LANGUAGE NOTIFICATION	*PSSTK: "LANGUAGE NOTIFICATION", <CommandNumber>, <SpecificLanguage>, <SimLanguage>	NULL
SETUP IDLE MODE TEXT	*PSSTK: "SETUP IDLE MODE TEXT", <CommandNumber>, <Alphabet>, <Text>, <IconId>, <IconQualifier>	AT*PSSTK ="SETUP IDLE MODE TEXT", CommandNumber, IconDisplay
REFRESH	*PSSTK: "REFRESH", <CommandNumber>, <RefreshType>	NULL
END CALL	*PSSTK: "ENDCALL", <CommandNumber>, <CauseSelect>, <Cause>, <CallId>	NULL
DISCONNECT	*PSSTK: "DISCONNECT", <CauseSelect>, <Cause>, <CallIdListStatus0>, <CallIdListStatus1>, <CallIdListStatus2>, <CallIdListStatus3>, <CallIdListStatus4>, <CallIdListStatus5>, <CallIdListStatus6>, <CallId>, <MaxNumberOfCallRepeatAttempts>, <RepeatCallAttemptWaitingTime>, <CallIdPreviousState>	NULL
PROCESSING	*PSSTK: "PROCESSING", <CommandNumber>	NULL
END SESSION	*PSSTK: "END SESSION"	NULL

Command Name	*PSSTK URC Format	*PSSTK Command Parameters List
ABORT SESSION	*PSSTK: "ABORT SESSION"	NULL
CONTROL BY SIM	*PSSTK: "CONTROL BY SIM", <TypeOfCommand>, <Presence>, <Alphabet>, <Alphald>	NULL

11.2. *PSSTKI Command: SIM ToolKit Interface Configuration

HL6528x			HL85xxx														
<i>Test command</i>			<i>Test command</i>														
<u>Syntax</u> AT*PSSTKI=?	<u>Response</u> *PSSTKI: (List of supported <mode>s) OK		<u>Syntax</u> AT*PSSTKI=?	<u>Response</u> *PSSTKI: (List of supported <mode>s) OK													
<i>Read command</i>			<i>Read command</i>														
<u>Syntax</u> AT*PSSTKI?	<u>Response</u> *PSSTKI:<mode> OK		<u>Syntax</u> AT*PSSTKI?	<u>Response</u> *PSSTKI:<mode> OK													
<i>Write command</i>			<i>Write command</i>														
<u>Syntax</u> AT*PSSTKI= <mode>	<u>Response</u> OK <u>Parameter</u> <table><tr><td><mode></td><td>0</td><td>No *PSSTK unsolicited result code will be sent to TE. TE won't send *PSSTK command to Module. This mode is useful for basic stk and certification process.</td></tr><tr><td></td><td>1</td><td>Manual mode. Any *PSSTK unsolicited result code will be sent to TE. TE has to acknowledge to *PSSTK notification.</td></tr></table>		<mode>	0	No *PSSTK unsolicited result code will be sent to TE. TE won't send *PSSTK command to Module. This mode is useful for basic stk and certification process.		1	Manual mode. Any *PSSTK unsolicited result code will be sent to TE. TE has to acknowledge to *PSSTK notification.	<u>Syntax</u> AT*PSSTKI= <mode>	<u>Response</u> OK <u>Parameter</u> <table><tr><td><mode></td><td>0</td><td>No unsolicited result code will be sent to TE. TE won't send proactive command to module.</td></tr><tr><td></td><td>1</td><td>Manual mode. Any unsolicited result code will be sent to TE. TE has to acknowledge to +STKPRO notification.</td></tr></table>		<mode>	0	No unsolicited result code will be sent to TE. TE won't send proactive command to module.		1	Manual mode. Any unsolicited result code will be sent to TE. TE has to acknowledge to +STKPRO notification.
<mode>	0	No *PSSTK unsolicited result code will be sent to TE. TE won't send *PSSTK command to Module. This mode is useful for basic stk and certification process.															
	1	Manual mode. Any *PSSTK unsolicited result code will be sent to TE. TE has to acknowledge to *PSSTK notification.															
<mode>	0	No unsolicited result code will be sent to TE. TE won't send proactive command to module.															
	1	Manual mode. Any unsolicited result code will be sent to TE. TE has to acknowledge to +STKPRO notification.															

HL6528x		HL85xxx	
	For example : URC: *PSSTK: "SETUP MENU",1,4,"SIMOP",0,0,1,0,0,6 TE answer: AT*PSSTK="SETUP MENU",1,0 2 Auto acknowledge mode. Module answers to STK without TE, any *PSSTK unsolicited result code will be sent to TE 3 Auto acknowledge mode without sending unsolicited result code to TE		2 Auto acknowledge mode. Module answers to STK without TE; any unsolicited result code will be sent to TE 3 Auto acknowledge mode without sending unsolicited result code to TE
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The aim of this AT command is to configure the AT interface for SIM ToolKit support	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The aim of this AT command is to configure the AT interface for SIM ToolKit support. - This command is only supported when a SIM card is present. - The setting of <mode> will be kept after module reboots. - If <mode>=0 (STK is deactivated) is set, the HL85xxx will restart automatically before the new mode takes effect. - if <mode>=0 (STK is deactivated), the setting of another <mode> (1, 2 or 3) needs a manual reboot before the new mode takes effect. <mode>=2 and <mode>=3 are only possible for a subset of STK proactive commands with user interaction - Where basic Yes/No responses are expected: - SEND SMS - SEND SS - SEND USSD - SET UP CALL - Where MMI action is needed and Yes/No responses are expected when done (for the display part) - SET UP IDLE MODE TEXT - DISPLAY TEXT

HL6528x		HL85xxx	
			- PLAY TONE - REFRESH
		<u>Examples</u>	<SIM card with STK application is inserted> AT*PSSTKI? // read current setting *PSSTKI: 0 OK AT*PSSTKI=? // check supported setting *PSSTKI: (0-3) OK At*psstki=1 // set STK manual mode OK //manual module reboot (as previous mode was 0) +STKPRO: 33,0,4,"4D6F62696C65204F4B",0 at+stctr=33,0 OK At*psstki=0 // deactivate STK OK +SIM: 1 // module resets +KSUP: 0 +PBREADY <Example: Manual Mode - proactive command SET UP MENU> At*psstki=1 // activate STK manual mode OK

HL6528x	HL85xxx
	<pre> //manual module reboot (as previous mode was 0) // SET UP MENU +STKPRO: 37,0,"GemXplore CASE",1,5, "User interaction",33,0,0 +STKPRO: 37,0,"GemXplore CASE",2,5, "Mobile interaction",33,0,0 +STKPRO: 37,0,"GemXplore CASE",3,5, "Network interaction",33,0,0 +STKPRO: 37,0,"GemXplore CASE",4,5, "Card interaction",33,0,0 +STKPRO: 37,0,"GemXplore CASE",128,5, "Common STK features",33,0,0 at+stktr=37,0 // Terminal Response for SET UP MENU // successful OK +STKCNF: 37,0,255,145 // [ACK] SET UP MENU successful, // session on-going at+stkenv=211,2,0 // Select menu item #2 +STKCNF: 129, 0, 255, 144 // [ACK] session end OK <Example: Manual Mode - proactive command SELECT ITEM> +STKPRO: 36,0,"Choose an item :",1,5,"Play tone",0,0,0,0 +STKPRO: 36,0,"Choose an item :",2,5,"Provide local info",0,0,0,0 +STKPRO: 36,0,"Choose an item :",3,5,"Refresh",0,0,0,0 +STKPRO: 36,0,"Choose an item :",4,5,"Timer management",0,0,0,0 +STKPRO: 36,0,"Choose an item :",5,5,"Launch browser",0,0,0,0 </pre>

HL6528x	HL85xxx
	<pre> at+stktr=36,0,0,0,0,"03" // Terminal Response SELECT // ITEM #3 OK +STKCNF: 36,0,255,145 // [ACK] SELECT ITEM successful +STKPRO: 36,0,"Choose an item :",1,2,"Init and file change",0,0,0,0 +STKPRO: 36,0,"Choose an item :",2,2,"Reset",0,0,0,0 at+stktr=36,0,0,0,0,"02" // Terminal Response SELECT // ITEM #2 OK +STKCNF: 36,0,255,145 // [ACK] SELECT ITEM successful <Example: Manual Mode - proactive command REFRESH> +STKPRO: 01,4,,0,,0 // proactive command: REFRESH - // SIM reset at+stktr=01,0 // Terminal Response for REFRESH OK +SIM: 0 // SIM reset +STKCNF: 144, 0 // [ACK] Reset completed +SIM: 1 +STKPRO: 33,0,4,"4D6F62696C65204F4B",0 +PBREADY <Example: Automatic Mode - proactive command REFRESH> At*psstki=2 // set STK automatic mode OK //Proactive command REFRESH is received +STKPRO: 01,4,,0,, 0 // proactive command: REFRESH - // SIM reset </pre>

HL6528x	HL85xxx
	+SIM: 0 // SIM reset +STKCNF: 144, 0 // [ACK] Reset completed +SIM: 1 +STKPRO: 33,0,4,"4D6F62696C65204F4B",0 +PBREADY <Example: Silent Mode - proactive command REFRESH> At*psstki=3 // set STK silent mode OK +SIM: 0 // SIM reset +SIM: 1 +PBREADY <SIM card is not inserted> at+cpin? +CME ERROR: 10 AT*PSSTKI? // read current setting +CME ERROR: 10 AT*PSSTKI=? // check supported setting +CME ERROR: 10 AT*PSSTKI=1 // deactivate STK +CME ERROR: 10

11.3. *PSSTK Command: SIM Toolkit

Note: For HL6528x only.

HL6528x		
Write command		
<u>Syntax</u> AT*PSSTK= <msg> , <parameter1> ,..., <parameterN>	<u>Response</u> OK	
	<u>Parameters</u>	
<msg>	1	Command requires a SIM Toolkit answer: "MENU SELECTION" "GET ITEM LIST"
	2	Command does not require a SIM Toolkit answer: "ALL CALLS DISCONNECTED" "USER ACTIVITY" "IDLE SCREEN AVAILABLE" "SETUP CALL TERMINATED"
	3	Command used to answer an unsolicited result code: "COMMAND REJECTED" "NOTIFICATION" "SETUP CALL " "DISPLAY TEXT" "GET INKEY" "GET INPUT" "PLAY TONE" "SELECT ITEM" "SETUP MENU" "REMOVE MENU" "SETUP IDLE MODE TEXT"
<parameter i> Depending on the value of <msg>, a parameter list is defined for each value of <msg>. For details about the parameter list, please see the table in section 11.1.		

HL6528x							
Unsolicited Notification	<u>Response</u> *PSSTK: <msg>,<parameter1>, ..., <parameterN> OK <u>Parameters</u> <table><tr><td><msg></td><td>1</td><td>Unsolicited result code not requiring an answer from DTE "LANGUAGE NOTIFICATION" "CONTROL BY SIM" "REFRESH" "END CALL" "DISCONNECT" "PROCESSING" "END SESSION" "ABORT SESSION"</td></tr><tr><td></td><td>2</td><td>Unsolicited result code requiring an answer from DTE "NOTIFICATION" "SETUP CALL" "DISPLAY TEXT" "GET INKEY" "GET INPUT" "PLAY TONE" "SELECT ITEM" "SETUP MENU" "REMOVE MENU" "SETUP IDLE MODE TEXT"</td></tr></table> <parameter i> Depending on the value of <msg>, a parameter list is defined for each value of <msg>. For details about the parameter list, please see the table in section 11.1.	<msg>	1	Unsolicited result code not requiring an answer from DTE "LANGUAGE NOTIFICATION" "CONTROL BY SIM" "REFRESH" "END CALL" "DISCONNECT" "PROCESSING" "END SESSION" "ABORT SESSION"		2	Unsolicited result code requiring an answer from DTE "NOTIFICATION" "SETUP CALL" "DISPLAY TEXT" "GET INKEY" "GET INPUT" "PLAY TONE" "SELECT ITEM" "SETUP MENU" "REMOVE MENU" "SETUP IDLE MODE TEXT"
<msg>	1	Unsolicited result code not requiring an answer from DTE "LANGUAGE NOTIFICATION" "CONTROL BY SIM" "REFRESH" "END CALL" "DISCONNECT" "PROCESSING" "END SESSION" "ABORT SESSION"					
	2	Unsolicited result code requiring an answer from DTE "NOTIFICATION" "SETUP CALL" "DISPLAY TEXT" "GET INKEY" "GET INPUT" "PLAY TONE" "SELECT ITEM" "SETUP MENU" "REMOVE MENU" "SETUP IDLE MODE TEXT"					
Reference Sierra Wireless Proprietary	<u>Notes</u> *PSSTK can be used in two different ways: • *PSSTK is an unsolicited result code received from SIM Toolkit application • *PSSTK is sent by the DTE to the ME (used as a normal AT command)						

11.4. +STKPRO Command: Display List of Supported Proactive Commands

Note: For HL85xxx only.

HL85xxx	
Test command	
<u>Syntax</u> AT+STKPRO=?	<u>Response</u> +STKPRO: (01,05,16,17,18,19,20,21,32,33,34,35,36,37,38,40,52,53,64,65,66,67) OK
<i>Unsolicited Notification</i>	<u>Response</u> +STKPRO: <proactive_cmd>... Details of which are as follows: • +STKPRO: 01, <type> • +STKPRO: 05, <event_number>, <event_list> • +STKPRO: 16, <number>, <subaddr>, <type>, <alpha_1>, <icon_id1>, <alpha_2>, <icon_id2> • +STKPRO: 17, <ss_data>, <alpha>, <icon_id>, <ref_number> • +STKPRO: 18, <dc>, <hex_string>, <alpha>, <icon_id>, <ref_number> • +STKPRO: 19, <alpha>, <icon_id>, <ref_number> • +STKPRO: 20, <alpha>, <icon_id>, <dtmf_string> • +STKPRO: 21, <URL>, <alpha>, <icon_id> • +STKPRO: 32, <tone>, <unit>, <interval>, <alpha>, <icon_id> • +STKPRO: 33, <type>, <dc>, <hex_string>, <icon_id> • +STKPRO: 34, <type>, <dc>, <hex_string>, <icon_id> • +STKPRO: 35, <type>, <dc>, <hex_string>, <max_rsp_len>, <min_rsp_len>, <defaulttext>, <icon_id> • +STKPRO: 36, <type>, <alpha>, <item_id>, <total_items>, <item_text>, <next_action>, <default_item>, <icon_id>, <icon_id_list_element> • +STKPRO: 37, <type>, <alpha>, <item_id>, <total_items>, <item_text>, <next_action>, <icon_id>, <icon_id_list_element> • +STKPRO: 38, <type> • +STKPRO: 40, <dc>, <hex_string>, <icon_id> • +STKPRO: 52, <type>, <alpha>, <icon_id> • +STKPRO: 53, <language>

HL85xxx

- **+STKPRO: 64**, <cmd_qualifier>, <alpha_id>, <icon_reference>, <dialing_number>, <reconnect_interval>, <reconnect_unit>, <idle_interval>, <idle_unit>, <bearer_type>, <bearer_parameter>, <buffer_size>, <login_dcs>, <login_text>, <password_dcs>, <password_text>, <transport_level>, <transport_port>, <sub_address>, <destination_address_type>, <destination_address>
- **+STKPRO: 65**, <cmd_qualifier>, <channel_id>, <alpha_id>
- **+STKPRO: 66**, <cmd_qualifier>, <channel_id>, <alpha_id>
- **+STKPRO: 67**, <cmd_qualifier>, <channel_id>, <alpha_id>, <data>

Parameters

<alpha>, **<alpha_1>**, **<alpha_2>**, **<item_text>**, **<default text>** Text string

<dsc> Data coding scheme

<default_item> Default items (s. item_id)

<event_number> Event number

<event_list> 04 User activity event
 05 Idle screen available event
 07 Language selection
 08 Browser termination event
 09 Data available

<hex_string> String containing data in hexadecimal format

<icon_id>, **<icon_id1>**, **<icon_id2>**, **<icon_id_list_element>** List containing icon IDs. For example, <icon_id1>, <icon_id2>

<interval> Time duration in number of units

<item_id> Item identifier (identifier of item chosen s. GSM 11.14)

<language> 2 Byte string indicating the language

<max rsp len> Maximum response length

HL85xxx		
	<min rsp len>	Minimum response length
	<next_action>	Next action
	<number>	Called party number
	<proactive_cmd>	00 Invalid command 01 Refresh 02 More time 03 Poll interval 04 Polling off 05 Set up event list 16 Set up call 17 Send SS 18 Send USSD 19 Send SMS 20 Send DTMF 21 Launch browser 32 Play tone 33 Display text 34 Get inkey 35 Get input 36 Select item 37 Set up menu 38 Language setting 39 Timer management 40 Set up idle mode text 48 Perform card APDU 48 Power on card 50 Power off card 51 Get reader status 52 Run AT command info 53 Language notification

HL85xxx		
	64	Open channel
	65	Close channel
	66	Receive data
	67	Send data
	68	Get channel status
	80	Set frames
	81	Get frames status
	129	End of the proactive session
	<ref_number>	Reference number
	<subaddr>	Called party subaddress
	<ss_data>	Data string
	<type>	Integer as command qualifier; possible value "4" means language
	<tone>	01 Dial tone 02 Call subscriber busy 03 Congestion 04 Radio path acknowledge 05 Radio path not available 06 Error/special information 07 Call waiting tone 08 Ringing tone 10 General beep 11 Positive acknowledgement tone 12 Negative acknowledgement or error tone
	<total items>	Total items
	<unit>	0 Minutes 1 Seconds 2 Tenth of a second

HL85xxx																					
	<URL> URL to be loaded <reconnect_interval> [1...255] Duration for reconnect tries. The interval specifies the time interval of the duration in multiples of the time unit used. The value "0" indicated a non-existing duration object. <reconnect_unit> Used with <reconnect_interval> <table> <tr><td>0</td><td>Minutes</td></tr> <tr><td>1</td><td>Seconds</td></tr> <tr><td>2</td><td>Tenth of a second</td></tr> </table> <idle_interval> [1...255] Defines the duration when an idle connection is released automatically. If not present, the terminal never shall releases a connection automatically. A value of "0" indicates a non-existing duration object. <idle_unit> Used with <idle_interval> <table> <tr><td>0</td><td>Minutes</td></tr> <tr><td>1</td><td>Seconds</td></tr> <tr><td>2</td><td>Tenth of a second</td></tr> </table> <bearer_type> <table> <tr><td>1</td><td>Circuit switched</td></tr> <tr><td>2</td><td>Packet switched</td></tr> <tr><td><u>3</u></td><td>Default</td></tr> <tr><td>255</td><td>Invalid</td></tr> </table> <bearer_parameter> Hex string that gived detailed information about the bearer type <buffer_size> Buffer the terminal shall allocate for channel data. The terminal may allocate less or more than this. <cmd_qualifier> Command qualifier <channel_id> Open channel ID <data> Data string	0	Minutes	1	Seconds	2	Tenth of a second	0	Minutes	1	Seconds	2	Tenth of a second	1	Circuit switched	2	Packet switched	<u>3</u>	Default	255	Invalid
0	Minutes																				
1	Seconds																				
2	Tenth of a second																				
0	Minutes																				
1	Seconds																				
2	Tenth of a second																				
1	Circuit switched																				
2	Packet switched																				
<u>3</u>	Default																				
255	Invalid																				

HL85xxx	
	<login_dcs> Data coding scheme of the text string. Text strings may be coded in 7-bit, 8-bit or UCS2 (16-bit) for user authentication data if requested by the bearer connection. <login_text> Specifies user authentication data is requested by the bearer connection. Coding based on <login_dcs>. <password_dcs> Data coding scheme of the text string. Text strings may be coded in 7-bit, 8-bit or UCS2 (16-bit) for user authentication data if requested by the bearer connection. <password_text> Specifies user authentication data if requested by the bearer connection. Coding based on <password_dcs>. <transport_level> Transport layer protocol of the UICC/terminal connection 1 UDP 2 TCP 255 Invalid; no transport protocol specified <transport_port> Integer that specifies the transport port <sub_address> Called party subaddress (for CS bearers only) <destination_address_type> 33 IP v4 IP address 87 IP v6 IP address 255 Invalid; unknown address type <destination_address> Hex string that specified the destination point of the connection

11.5. +STKTR Command: Enter Response

HL6528x		HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+STKTR=?	<u>Response</u> +STKTR: (64) OK	<i>Test command</i> <u>Syntax</u> AT+STKTR=?	<u>Response</u> +STKTR: (01,05,16,17,18,19,20,21,32,33,34,35,36,37,38,40,52,53,64,65, 66,67) OK
<i>Write command</i> <u>Syntax</u> AT+STKTR=64,0	<u>Response</u> OK or CME ERROR: <error> <i>Note:</i> Values other than 64 for <proactive_cmd> will return ERROR; values other than 0 to 61 for <result> will return ERROR.	<i>Write command</i> <u>Syntax</u> AT+STKTR=1,0	<u>Response</u> OK or CME ERROR: <error>
<i>Write command</i> <u>Syntax</u> AT+STKTR= <proactive_cmd> ,<result>	<u>Response</u> +STKTR: 64, <result>Open Channel	<i>Write command</i> <u>Syntax</u> AT+STKTR= <proactive_cmd> [,<result>, <add_result> [,<last_cmd>] [,<dc>] [,<hexstring>]]	<u>Response</u> Response depends on the proactive command • +STKTR: 01, <result>, [<add_result>] refresh • +STKTR: 05, <result> set up event list • +STKTR: 16, <result>, [<add_result>] set up call • +STKTR: 17, <result>, <add_result> send SS • +STKTR: 18, <result>, <add_result> send USSD • +STKTR: 19, <result>, <add_result> send SMS • +STKTR: 20, <result>,<add_result> send DTMF

HL6528x	HL85xxx
	• +STKTR: 21, <result> launch browser • +STKTR: 32, <result>, <add_result> play tone • +STKTR: 33, <result>, <add_result> display text • +STKTR: 34, <result>, <add_result>,0,<dc>, <hex_string> get inkey • +STKTR: 35, <result>, <add_result>,0,<dc>, <hex_string> get input • +STKTR: 36, <result>, <add_result>,0,<dc>, <hex_string> select item <i>Note:</i> That the "0" stands for the parameter <last_cmd> which is obsolete but not yet removed. • +STKTR: 37, <result>, <add_result> set up menu • +STKTR: 38, <language as integer, e.g.28261> language setting • +STKTR: 40, <result>, <add_result> set up idle mode text • +STKTR: 52, <result>, <add_result> run at cmd info • +STKTR: 53, <result>, <add_result> language notification <i>Note:</i> For general results (<result>) 32, 33, 38, 52, 53, 55, 56, 57 and 58, it is mandatory for the ME to provide a specific cause value as additional information. For others, additional information will be ignored. • +STKTR: 64, <result>[,<add_result>,<last_cmd>, <buffer_size>,<open_channel_id>,<link_status>, <channel_status_state>,<bearer_description_type>,<bearer_description_params>,<address_type>,<address>] open channel • +STKTR: 65, <result> close channel • +STKTR: 66, <result> receive data • +STKTR: 67, <result> send data

HL6528x			HL85xxx		
	<u>Parameters</u>			<u>Parameters</u>	
			<add_result>	Additional result	
			<dc>	Data coding scheme	
			<hex_string>	String in hexadecimal format	
			<last_cmd>	Last command	
	<proactive_cmd> Decimal code that indicates the proactive command (only Open Channel is handled, it's for some SIM certification tests use only as user's action is needed to change response in TERMINAL RESPONSE)		<proactive_cmd>	Decimal code that indicates the proactive command (refer to +STKPRO)	
	<result>		<result>	0	Command performed successfully
		0 Command performed successfully		1	Command performed with partial comprehension
		1 Command performed with partial comprehension		2	Command performed with missing information
		2 Command performed with missing information		3	Refresh performed with additional EFS read
		3 Refresh performed with additional EFS read		4	Command performed successfully, but requested icon could not be displayed
		4 Command performed successfully, but requested icon could not be displayed		5	Command performed but modified by call control by SIM
		5 Command performed but modified by call control by SIM		6	Command performed successfully, limited service
		6 Command performed successfully, limited service		7	Command performed with modification
		7 Command performed with modification		16	Proactive SIM session terminated by the user
		16 Proactive SIM session terminated by the user		17	Backward move in the proactive SIM session requested by the user
		17 Backward move in the proactive SIM session requested by the user		18	No response from user
		18 No response from user		19	Help information required by the user
		19 Help information required by the user			

HL6528x			HL85xxx		
	20	USSD or SS transaction terminated by the user		20	USSD or SS transaction terminated by the user
	32	ME currently unable to process command		32	ME currently unable to process command
	33	Network currently unable to process the command		33	Network currently unable to process the command
	34	User did not accept call set-up request		34	User did not accept call set-up request
	35	User cleared down call before connection or network release		35	User cleared down call before connection or network release
	36	Action in contradiction with the current timer state		36	Action in contradiction with the current timer state
	37	Interaction with call control by SIM, temporary problem		37	Interaction with call control by SIM, temporary problem
	38	Launch browser generic error code		38	Launch browser generic error code
	48	Command beyond ME's capabilities		48	Command beyond ME's capabilities
	49	Command type not understood by ME		49	Command type not understood by ME
	50	Command data not understood by ME		50	Command data not understood by ME
	51	Command number not known by ME		51	Command number not known by ME
	52	SS return error		52	SS return error
	53	SMS RP ERROR		53	SMS RP ERROR
	54	Error, required values are missing		54	Error, required values are missing
	55	USSD return error		55	USSD return error
	56	Multiple card command error (if class "a" is supported)		56	Multiple card command error (if class "a" is supported)
	57	Interaction with call control by SIM or MO short message control by SIM		57	Interaction with call control by SIM or MO short message control by SIM
	58	Bearer independent protocol error (if class "e" is supported)		58	Bearer independent protocol error (if class "e" is supported)
	59	Access technology unable to process command			
	60	Frames Error			
	61	MMS Error (not for OPEN CHANNEL normally)			
				<buffer size>	Size of the allocated buffer
				<open_channel_id>	[1...7] Channel ID
				0	Invalid

HL6528x	HL85xxx
	<link_status> Specifies whether link is established or packet data service is activated 1 Enabled 0 Disabled <channel_status_state> Link state 00 No further information can be given <bearer_description_type> Bearer type which can be used to decode the bearer description value 01 Circuit switched UTA_SIM_TK_BEARER 02 Packet switched UTA_SIM_TK_BEARER (GPRS) 03 Terminal default UTA_SIM_TK_BEARER 255 Invalid bearer value; indicates an unknown bearer type which is not supported by the interface version <bearer_description_params> Hex string; gives details information dependent on the bearer type <address_type> Type of address 33 IP v4 IP address 87 IP v6 IP address <address> Address data dependent on bearer type. IPv4 address representation shall follow the format x.x.x.x where 0<x≤255 IPv6 address representation shall follow the format x.x.x.x.x.x.x.x.x.x.x.x.x.x.x.x where 0<x≤255

11.6. +STKENV Command: Send a SIM APPL TK Envelope Command

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+STKENV=?	<u>Response</u> +STKENV: OK
<i>Write command</i> <u>Syntax</u> AT+STKENV= <envelope_cmd>, <optional_ENV_ data>	<u>Response</u> OK or CME ERROR: <error> <u>Parameters</u> <cause> 00 User termination 01 Error termination <envelope_cmd> Code 211 (hex: D3): Menu selection (needs) Code 214 (hex: D6): Event download (note that only one event can be included in the <event_list>) <item_id> Item identification <help_requested> 1 Help is requested 0 Help is not requested <language> Currently used language in the DTE (refer to +STKPROF) <call_id> Call ID

HL85xxx			
	<call_direction>	0	MT call
		1	MO call
	<optional_ENV_data>	D3	<item_identifier> (for code 211)
		D6	<event_list> (for code 214)

11.7. +STKPROF Command: Terminal Profile Data

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+STKPROF=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+STKPROF?	<u>Response</u> +STKPROF: <length>,<data> OK
<i>Write command</i>	
<u>Syntax</u> AT+STKPROF= <length>,<data>	<u>Response</u> OK or CME ERROR: <error>

HL85xxx	
	<u>Parameters</u> <length> Integer type; length of characters sent to TE in <data>. When set to "0", forces a reset to the default terminal profile stored in the ME <data> Terminal profile data in hexadecimal format

11.8. +STKCC Notification: SIM – APPL – TK Call Control

Note: For HL85xxx only.

HL85xxx									
Unsolicited result code	<u>Response</u> +STKCC: <cc_command>,<res_val>,<alpha>,<number>,<ton_npi>,<sc_addr>,<dest_addr> <u>Parameter</u> <cc_command> <table> <tr><td>1</td><td>Set up call</td></tr> <tr><td>2</td><td>Send SS</td></tr> <tr><td>3</td><td>Send USSD</td></tr> <tr><td>4</td><td>Send SM</td></tr> </table> <res_val> Call control result value <alpha> Text string <number> Called party number <ton_npi> Type of number and numbering plan <sc_addr> Service centre address <dest_addr> Destination address	1	Set up call	2	Send SS	3	Send USSD	4	Send SM
1	Set up call								
2	Send SS								
3	Send USSD								
4	Send SM								

11.9. +STKCNF Notification: SIM – APPL – TK Proactive Session Status

Note: For HL85xxx only.

HL85xxx	
Unsolicited result code	<u>Response</u> +STKCNF: <proactive_cmd>,<result>,<add_result>,<sw1>
	<u>Parameter</u>
	<proactive_cmd> Decimal code that indicates the command that was finished (refer to +STKPRO)
	<result> General result code
	<add_result> Additional result code
	<sw1> 0 Command to SIM was suppressed because of multiple terminal response or wrong client For other responses, refer to GSM 11.11

>> 12. Audio Commands

12.1. Preliminary Comments

The current "preliminary comments" section deals with AT commands: +VIP, +VGR, +VGT, +KVGR, +KVGT, +KECHO, +KNOISE, +KST, +KPC and +KSRAP.

12.1.1. General Behavior

The commands cited above and presented here after can be used to tune audio parameters such as gain (up and down), volume, side tone, modes (handset, hands free, etc.) and to activate some audio features such as noise reduction, echo cancellation and peak compressor. The following sections will indicate how to use the commands and with which parameters.

To explain briefly the global behavior, it is important to note that the audio parameters are stored in FLASH memory and loaded into RAM at each power up. The parameters are divided into organs, each configuration (handset, hands free) are in fact a couple of one RX organ and one TX organ. The command AT+VIP will allow to choose a configuration, so a couple of organs.

At the beginning of a call, selected organs are sent to the DSP.

The modifications done by the commands described after will modify audio parameter values in RAM. If the user does not save the values, they will be lost at the next power up. Nevertheless, a command allows the user to save values in FLASH and also allows restoring initial parameter values (the ones set prior to make any change on audio parameters).

12.1.2. Warning

The **AT+VIP** command has 2 purposes:

1. "Parameter change context" selects the current context (handset, hands free) for user modifications: This context lasts between 2 AT+VIP commands.
2. "Pre-selected communication context" pre-selects the context that will be sent to the DSP for a communication; This context lasts from the AT+VIP command to the end of a call.

As these 2 contexts may not have the same “time to live”, we recommend to resend AT+VIP command with the desired mode prior to make a call.

Example:

AT+VIP=1 Selects Hands free mode.
AT+KVGR="10" Set the Downlink gain to 10 dB for hands free mode.
ATDxxxxxxx; Make a call in hands free mode.
ATH Release the call: “parameter change context” is still hands free, "pre selected communication context" is reset (as AT+VIP=0,handset mode).
AT+KVGR="5" Set the Downlink gain to 5 dB for hands free mode.
ATDxxxxxxx; Make a call. It is in HANDSET mode.
AT+VIP=0 Selects handset mode.
AT+KVGt="-5" Set the Uplink gain to -5 dB for handset mode.

Note: To bypass this issue, use an AT+VIP command with the desired mode prior to make a call.

12.2. +CLVL Command: Loudspeaker Volume Level

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CLVL=?	<u>Response</u> +CLVL: (list of supported <level>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CLVL?	<u>Response</u> +CLVL: <level> OK

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+CLVL= <level>	<u>Response</u> OK <u>Parameter</u> <level> 0 – 10 Loudspeaker level; 0 = muting the speaker
<u>Reference</u> [27.007] § 8.23	<u>Examples</u> AT+CLVL=? +CLVL: (0-10) // Response for the HL6528x OK AT+CLVL? +CLVL: 4 OK AT+CLVL=1 // Turn to the lowest volume level OK AT+CLVL=10 // Turn to the loudest volume level OK AT+CLVL=0 // Mute the speaker OK

12.3. +VIP Command: Initialize Voice Parameters

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+VIP=?	<u>Response</u> (list of supported <n>s) OK	<u>Syntax</u> AT+VIP=?	<u>Response</u> +VIP: (list of supported <n>s),(list of supported <p>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+VIP?	<u>Response</u> +VIP:<n> OK	<u>Syntax</u> AT+VIP?	<u>Response</u> +VIP: <n>,<p> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+VIP=<n>	<u>Response</u> OK <u>Parameter</u> <n> Mode 0 Handset 1 Hands free 2 Handset raw 3 Ecall during voice transmission 4 Ecall during data transmission 23 PCM interface	<u>Syntax</u> AT+VIP=<n> [,<p>]	<u>Response</u> OK <u>Parameter</u> <n> Mode 0 Handset 1 Headset 2 Handsfree + back speaker 5 TTY 23 Basic (all audio filters are disabled) <p> Persistence 0 <n> will be reset to 0 1 <n> will not be reset to 0

HL6528x		HL85xxx	
<u>Reference</u> [27.007] § C.2.6	<u>Notes</u> - Level volume are accessible with AT+CLVL - Modes 3 and 4 are specific to ECALL and Sierra Wireless recommends NO modification to the audio settings for these modes. (See section 15.2 Audio Settings During eCall)	<u>Reference</u> [27.007] § C.2.6	<u>Notes</u> - Settings will take effect in the next call. Values are automatically reset after a call (return to 0). - This command does not require any SIM card to be inserted in the modem. <p> is not saved in non-volatile memory.
		<u>Examples</u>	AT+VIP? Shows the current configuration +VIP: 0,0 OK AT+VIP=23 Turn to basic profile OK AT+KECHO=1,110,110,0,0,0,2 Modify the echo cancellation parameters of the basic profile OK AT+VIP=0 Turn to handset profile OK AT+KECHO? +KECHO: 1,100,100,0,0,0,2 Parameters of the handset profile is unchanged OK

12.3.1. HL85xxx Audio Processing Blocks

The following figures show the audio processing blocks in the HL85xxx that are enabled or disabled in each profile.

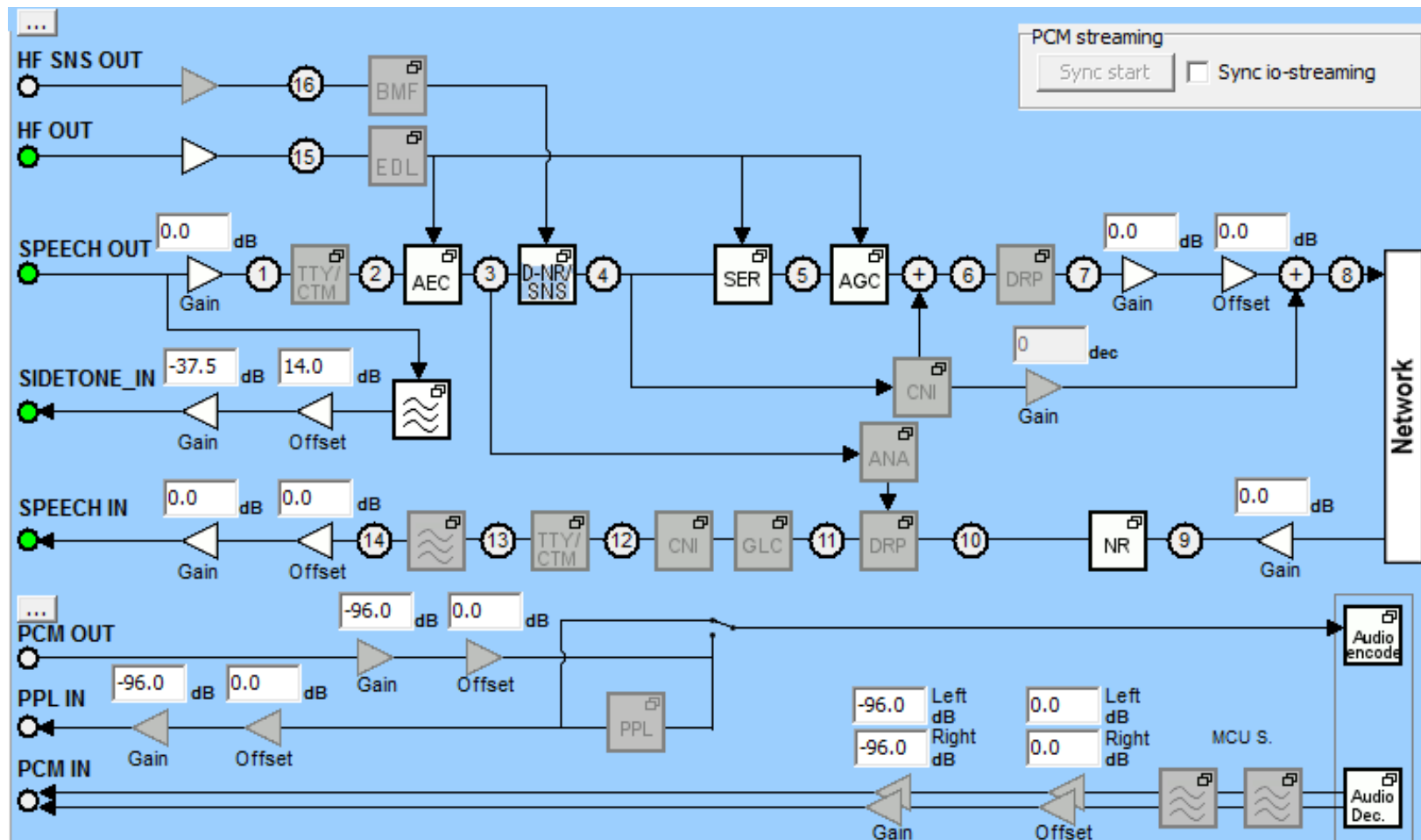


Figure 2. AT+VIP=0

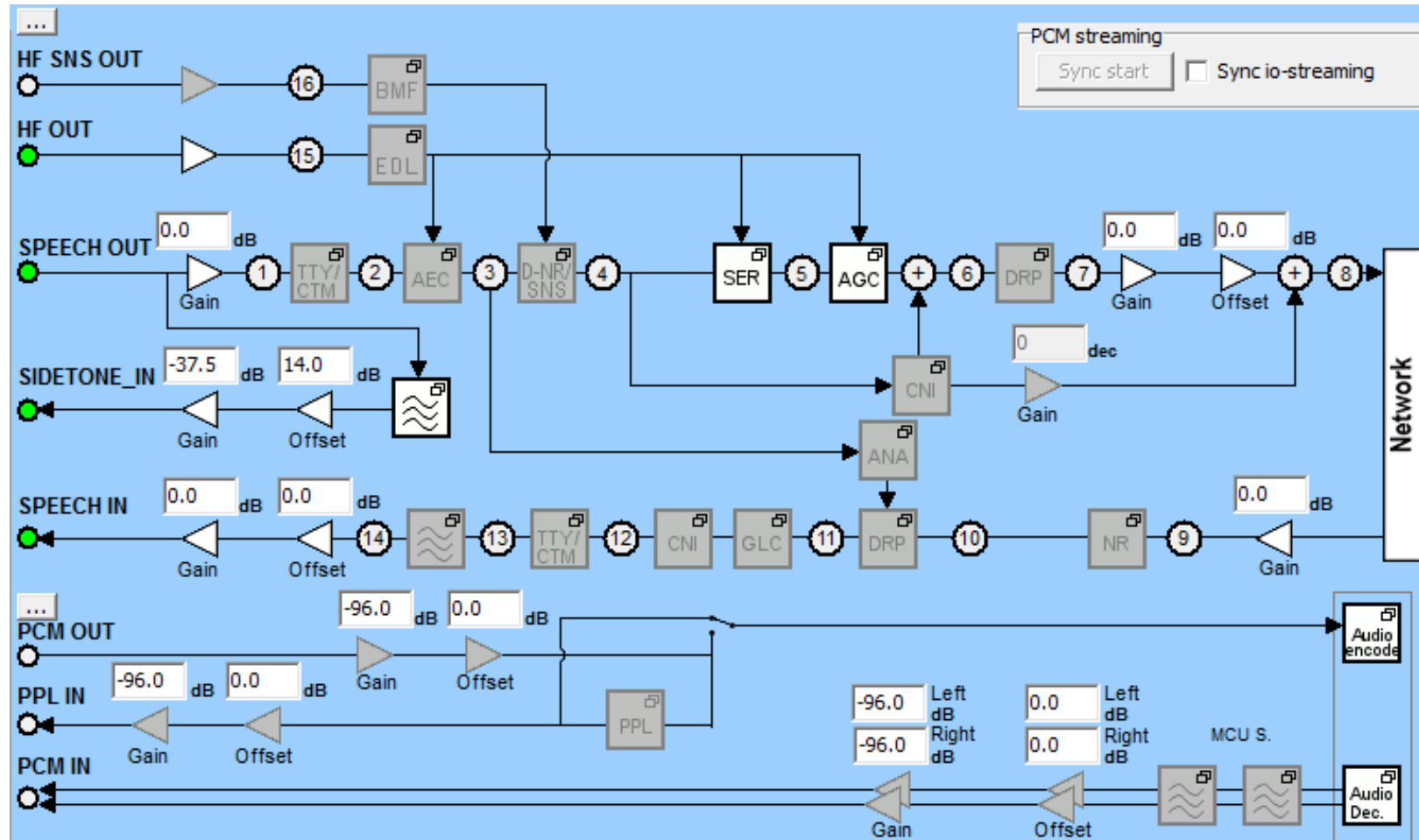


Figure 3. AT+VIP=1

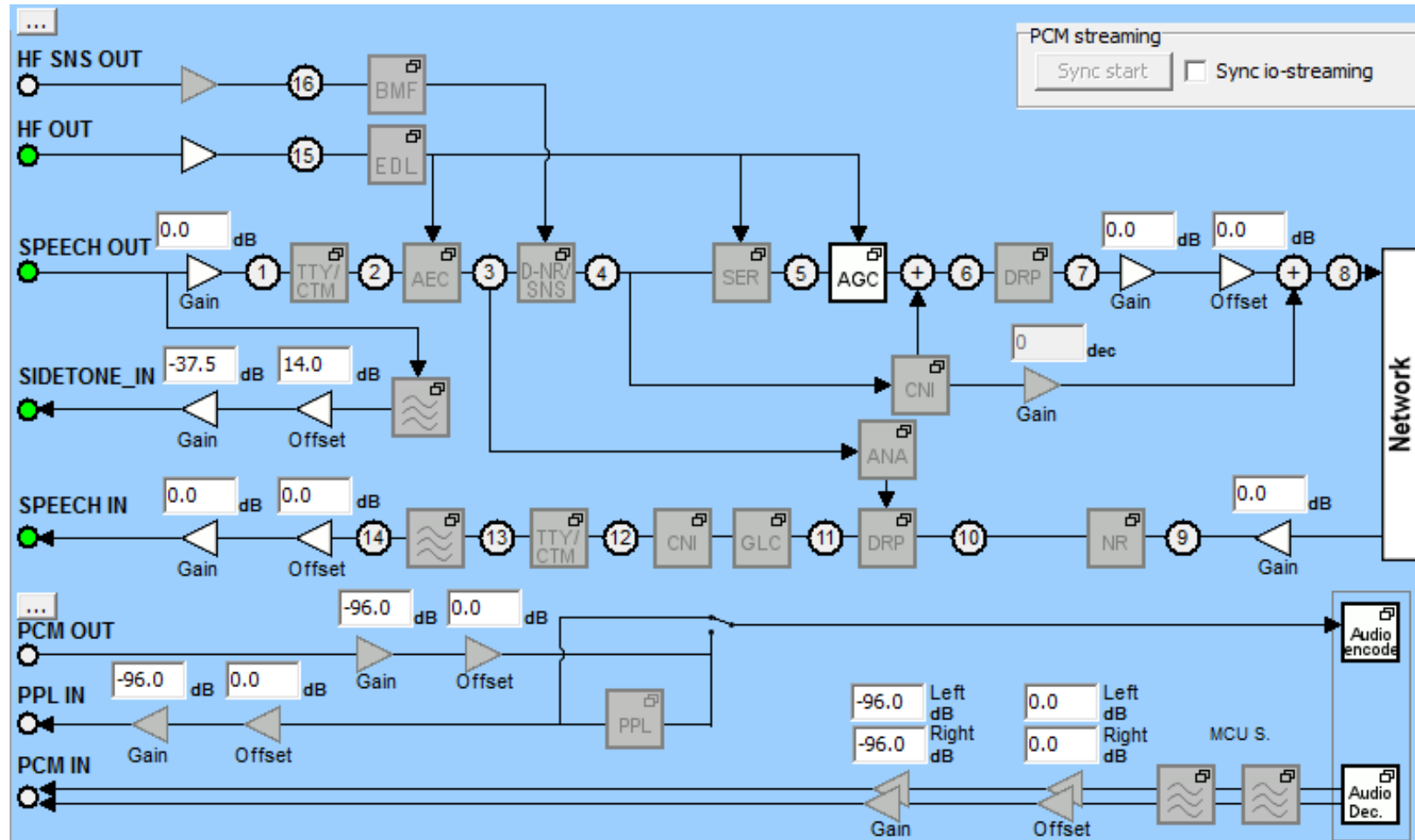


Figure 4. AT+VIP=2

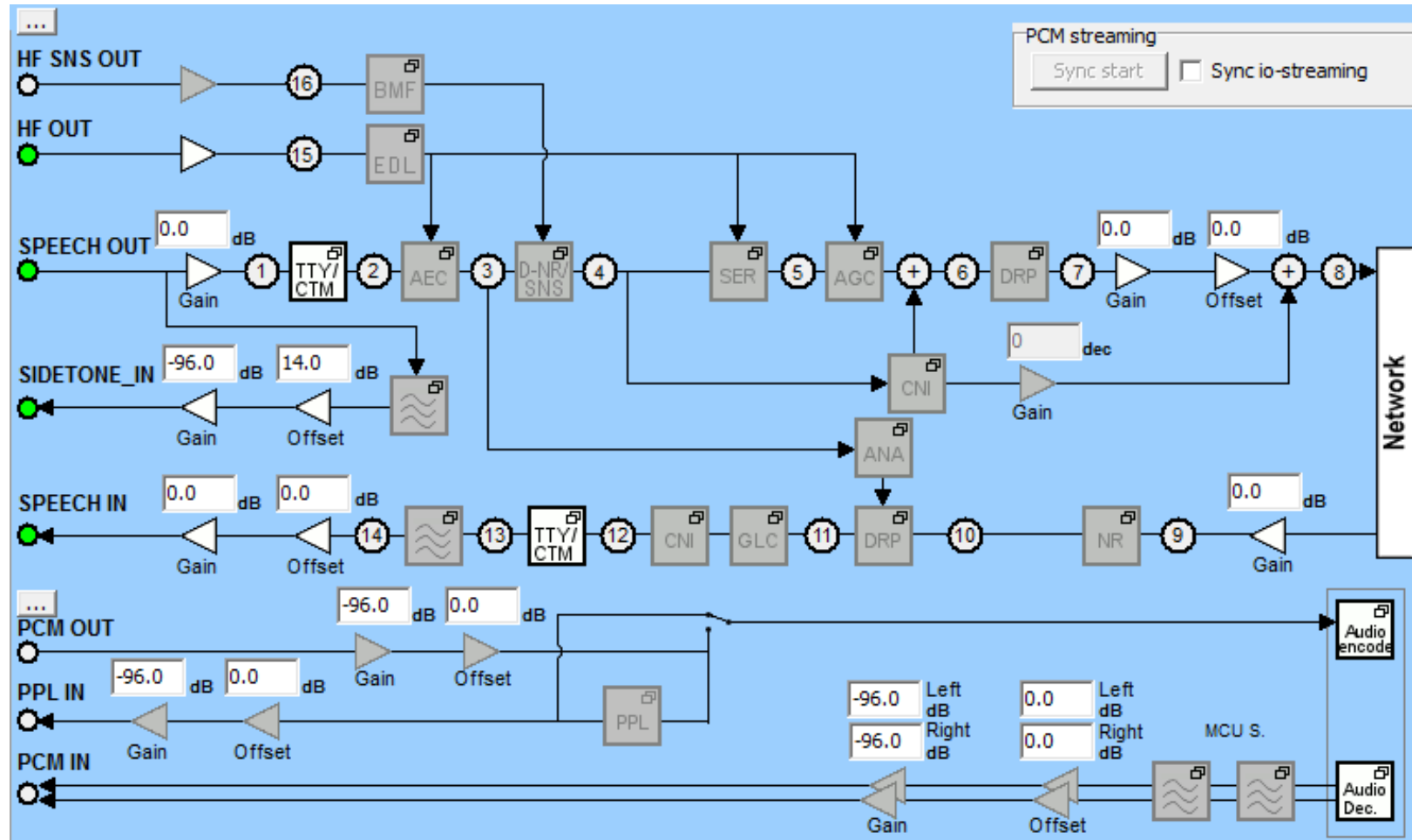


Figure 5. AT+VIP=5

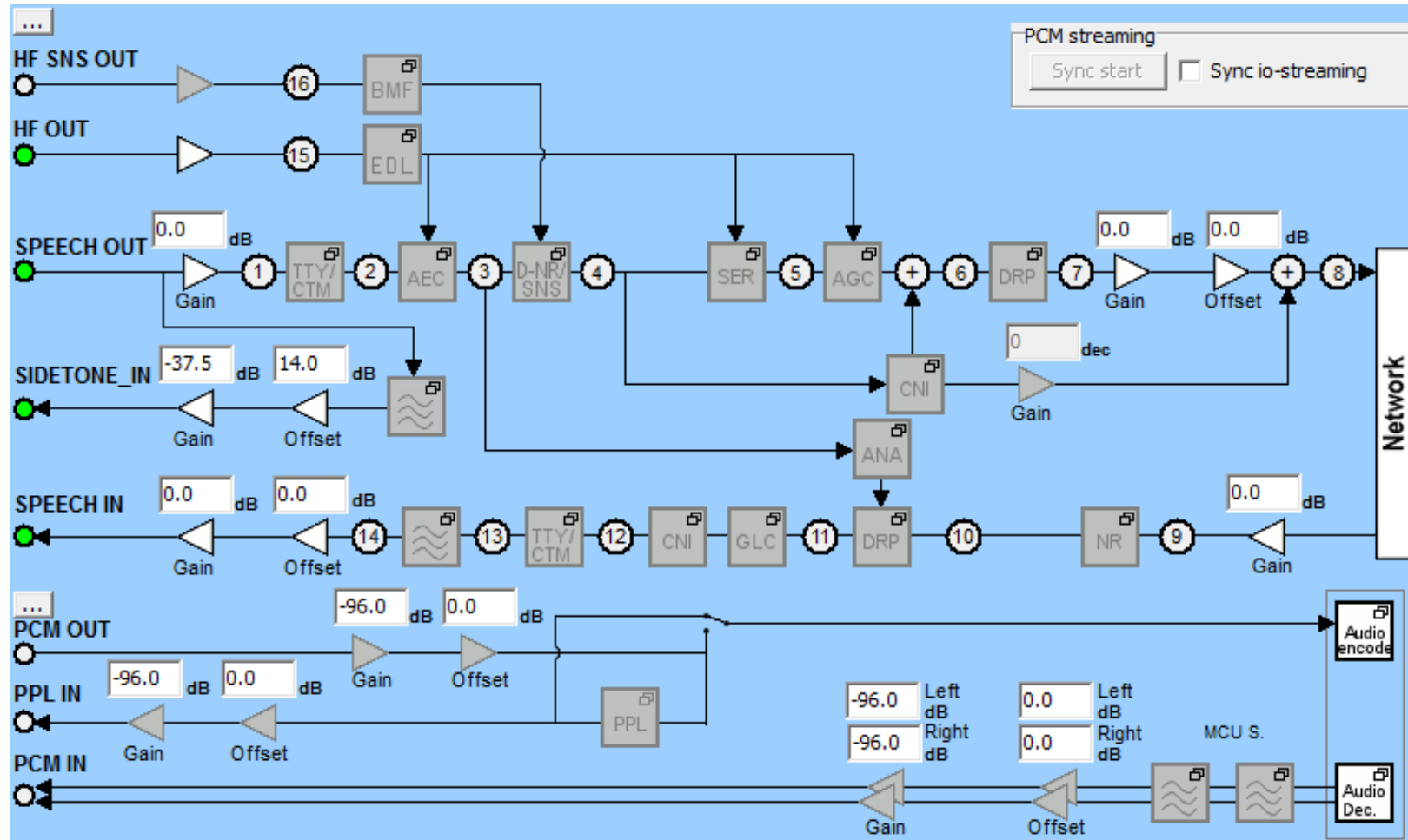


Figure 6. AT+VIP=23

12.4. +VTS Command: DTMF and Tone Generation

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+VTS=?	<u>Response</u> +VTS: (list of supported <tone1>s),(list of supported <tone2>s) ,(list of supported <duration>s) OK	<u>Syntax</u> AT+VTS=?	<u>Response</u> +VTS: (list of supported <DTMF>s) OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+VTS="<DTMF 1>,<DTMF2>, ..., <DTMFn>" Or AT+VTS="{<DTMF1>, <duration>, {<DTMF2>, <duration>,... {<DTMFn>, <duration>}"	<u>Response</u> OK <u>Parameters</u> <DTMFi> A single ASCII character in the set 0-9, #, *, A-D. This is interpreted as a single ASCII character whose duration is set by the +VTD command. DTMF tones can be issued only during a voice call. <tone1><tone2><duration> This is interpreted as a dual tone of frequencies <tone1> and <tone2>, lasting for a time <duration> (in 10 ms multiples). This does not operate in GSM. {<DTMF>,<duration>} This is interpreted as a DTMF tone of different duration from that mandated by the +VTD command. In GSM this operates only in voice mode.	<u>Syntax</u> AT+VTS="<DTMF>1, <DTMF>2, ..., <DTMF>n" Or AT+VTS="{<DTMF>1, <DURATION>1}, {<DTMF>2, <DURATION>2},... {<DTMF>n, <DURATION>n}"	<u>Response</u> OK <u>Parameters</u> <DTMF> A single ASCII character in the set 0-9, #, *, A-D. This is interpreted as a single ASCII character whose duration is set by the +VTD command. DTMF tones can be issued only during a voice call. <DURATION> This is interpreted as a DTMF tone of different duration from that mandated by the +VTD command. In GSM this only operates in voice mode.Values are in 1/10 second multiples.

HL6528x		HL85xxx	
<u>Reference</u> [27.007] § C.2.11	<u>Notes</u> The network shall ensure that the minimum length of tone and the minimum gap between two subsequent tones (according to ETR 206) is achieved. (In ETR 206 the minimum duration of a DTMF tone is 70ms ±5ms, the minimum gap between DTMF tones is 65ms). There is no defined maximum length to the tone, however, the operator may choose to put a pre-defined time limit on the duration of tones sent to line (refer to [23.014]). That means that with n<6, DTMF will be generated with a duration given by the network	<u>Reference</u> [27.007] § C.2.11	<u>Notes</u> The network shall ensure that the minimum length of tone and the minimum gap between two subsequent tones (according to ETR 206) is achieved. (In ETR 206 the minimum duration of a DTMF tone is 70ms ±5ms, the minimum gap between DTMF tones is 65ms). There is no defined maximum length to the tone, however, the operator may choose to put a pre-defined time limit on the duration of tones sent to line (refer to [23.014]). That means that with n<6, DTMF will be generated with a duration given by the network

12.5. +VTD Command: Tone Duration

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+VTD=?	<u>Response</u> +VTD: (list of supported <n>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+VTD?	<u>Response</u> +VTD: <n> OK

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+VTD=<n>	<u>Response</u> OK <u>Parameter</u> <n> 0 default setting (default duration of the tone is 7/10 second) 1-100 duration of the tone in 1/10 seconds
<u>Reference</u> [27.007] § C.2.12	<u>Notes</u> The network shall ensure that the minimum length of tone and the minimum gap between two subsequent tones (according to ETR 206) is achieved. (In ETR 206 the minimum duration of a DTMF tone is 70ms ±5ms, the minimum gap between DTMF tones is 65ms). There is no defined maximum length to the tone, however, the operator may choose to put a pre-defined time limit on the duration of tones sent to line (refer to [23.014]). That means that with n<6, DTMF will be generated with a duration given by the network.

12.6. +VGR Command: Receive Gain Selection

HL6528x		HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+VGR=?	<u>Response</u> (list of supported <n>s) OK	<i>Test command</i> <u>Syntax</u> AT+VGR=?	<u>Response</u> +VGR: (86-140) OK
<i>Read command</i> <u>Syntax</u> AT+VGR?	<u>Response</u> +VGR:<n> OK	<i>Read command</i> <u>Syntax</u> AT+VGR?	<u>Response</u> +VGR: <n> OK

HL6528x		HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+VGR=<n>	<u>Response</u> OK <u>Parameter</u> <n> <128 (128 - n) dB less than nominal gain (until -20 dB) 128 Nominal gain >128 (n-128) dB more than nominal gain (up to 18 dB)	<i>Write command</i> <u>Syntax</u> AT+VGR=<n>	<u>Response</u> OK <u>Parameter</u> <n> 86 ≤ n ≤ 140 < 128 (128 - n)/2 dB less than nominal gain (until -21dB) 128 Nominal gain > 128 (n – 128)/2 dB more than nominal gain (until +6dB)
<u>Reference</u> [27.007] § C.2.4	<u>Notes:</u> If the current or the requested value goes out of the gain range (-20 to 18 dB), the command returns an error	<u>Reference</u> [27.007] § C.2.4	<u>Notes</u> • Gain can be changed during a connection or outside a connection. • If the current or the requested value goes out of the gain range (-21 to 6 dB), the command returns error.
		<u>Examples</u>	at+vgr=86 //Receive gain is set to 21dB less than the //nominal gain OK at+vgr=85 //Input is out of range ERROR at+vgr=140 //Receive gain is set to 6dB more than the //nominal gain OK at+vgr=141 //Input is out of range ERROR

12.7. +VGT Command: Transmit Gain Selection

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+VGT=?	<u>Response</u> (list of supported <n>s) OK	<u>Syntax</u> AT+VGT=?	<u>Response</u> +VGT: (86-140) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+VGT?	<u>Response</u> +VGT:<n> OK	<u>Syntax</u> AT+VGT?	<u>Response</u> +VGT: <n> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+VGT=<n>	<u>Response</u> OK <u>Parameter</u> <n> <128 (128 - n) dB less than nominal gain (until -20 dB) 128 Nominal gain >128 (n-128) dB more than nominal gain (until 18 dB)	<u>Syntax</u> AT+VGT=<n>	<u>Response</u> OK <u>Parameter</u> <n> 86 ≤ n ≤ 140 < 128 (128 - n)/2 dB less than nominal gain (until -21dB) 128 Nominal gain > 128 (n – 128)/2 dB more than nominal gain (until +6dB)
<u>Reference</u> [27.007] § C.2.5	<u>Notes</u> If the current or the requested value goes out of the gain range (-20 to 18 dB), the command returns an error	<u>Reference</u> [27.007] § C.2.4	<u>Notes</u> - Gain can be changed during a connection or outside a connection. - If the current or the requested value goes out of the gain range (-43.5 to 6 dB), the command returns error.

HL6528x		HL85xxx	
		<u>Examples</u>	at+vgt=86 //Transmit gain is set to 21dB less than the //nominal gain OK at+vgt=85 //Input is out of range ERROR at+vgt=140 //Transmit gain is set to 6dB more than the //nominal gain OK at+vgt=141 //Input is out of range ERROR

12.8. +KVGR Command: Receive Gain Selection

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KVGR=?	<u>Response</u> (list of supported <n>s) OK	<u>Syntax</u> AT+KVGR=?	<u>Response</u> +KVGR: (-21-6) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KVGR?	<u>Response</u> +KVGR:<n> OK	<u>Syntax</u> AT+KVGR?	<u>Response</u> +KVGR: <n> OK

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KVGR=<n>	<u>Response</u> OK <u>Parameter</u> “<n>” Digital gain of the downlink path. Range: -20 to 18 in dB	<u>Syntax</u> AT+KVGR=<n>	<u>Response</u> OK <u>Parameter</u> <n> Digital gain of the downlink path. Range: -21 to 6 in dB <u>0</u> Default value
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The parameter is a string in order to accept negative values, so the value MUST be written between quotes ("xx")	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The value of <n> can be written between quotes ("xx") or without quotes. <n> can be changed during a connection or outside a connection.
		<u>Examples</u>	AT+KVGR="21" Receive gain is set to 21dB less than the nominal gain OK AT+KVGR="-22" Input is out of range ERROR AT+KVGR="6" Receive gain is set to 6dB more than the nominal gain OK AT+KVGR="7" Input is out of range ERROR

HL6528x		HL85xxx	
			AT+VGR=87 Receive gain is set to -20.5dB less than the nominal gain by +VGR at command OK AT+KVGR? +KVGR response truncates the decimal part of the actual gain +KVGR: -20 OK

12.9. +KVGT Command: Transmit Gain Selection

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KVGT=?	<u>Response</u> (list of supported <n>s) OK	<u>Syntax</u> AT+KVGT=?	<u>Response</u> +KVGT: (-21-6) OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KVGT?	<u>Response</u> +KVGT:<n> OK	<u>Syntax</u> AT+KVGT?	<u>Response</u> +KVGT: <n> OK

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KVGt=<n>	<u>Response</u> OK <u>Parameters</u> “<n>” Digital gain of the uplink path. Range: -20 to 18 in dB	<u>Syntax</u> AT+KVGt=<n>	<u>Response</u> OK <u>Parameters</u> <n> Digital gain of the uplink path. Range: -21 to 6 in dB <u>0</u> Default value
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The parameter is a string in order to accept negative values, so the value MUST be written between quotes ("xx")	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The value of <n> can be written between quotes ("xx") or without quotes. <n> can be changed during a connection or outside a connection.
		<u>Examples</u>	AT+KVGt="-21" Transmit gain is set to 43dB less than the nominal gain OK AT+KVGt="-22" Input is out of range ERROR AT+KVGt="6" Transmit gain is set to 6dB more than the nominal gain OK AT+KVGt="7" Input is out of range ERROR

HL6528x		HL85xxx	
			AT+VGT=87 Transmit gain is set to -20.5dB less than the nominal gain by +VGT at command OK AT+KVGT? +KVGT response truncates the decimal part of the actual gain +KVGT: -20 OK

12.10. +KECHO Command: Echo Cancellation

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KECHO=?	<u>Response</u> +KECHO: (list of supported <status>es) OK	<u>Syntax</u> AT+KECHO=?	<u>Response</u> +KECHO: (list of supported <mode>s) ,(list of supported <param>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KECHO?	<u>Response</u> +KECHO: <status> OK	<u>Syntax</u> AT+KECHO?	<u>Response</u> +KECHO: <status>,<param_1>,...,<param_n> OK

HL6528x			HL85xxx		
<i>Write command</i>			<i>Write command</i>		
<u>Syntax</u> AT+KECHO= <level>	<u>Response</u> OK		<u>Syntax</u> AT+KECHO= <mode> [,<param_1>,..., <param_n>]	<u>Response</u> OK	
	<u>Parameter</u> <status>	0 Deactivate echo cancellation 1 Echo cancellation 2 Echo cancellation and suppression UL path		<u>Parameter</u> <mode>	0 Deactivate echo cancellation 1 Activate echo cancellation
				<status>	0 Deactivated 1 Activated
				<param_n>	
				Number	Name

HL6528x		HL85xxx	
		<u>Examples</u>	AT+KECHO? //Shows the current //configuration +KECHO: 1,100,100,100,1,1,1,2 OK AT+KECHO=0 //Turn off the echo //cancellation OK AT+KECHO? +KECHO: 0,100,100,100,1,1,1,2 //Echo cancellation is //deactivated OK AT+KECHO=1,150,100,100,1,1,1,2 //Activate echo //cancellation again //and modify param_0 //to 150 +KECHO: 1,150,100,100,1,1,1,2 //The algorithm is //activated again with //new parameters OK AT+CFUN=1,1 OK AT+KECHO? +KECHO: 1,150,100,100,1,1,1,2 //Parameters are //retained after reset OK

12.11. +KNOISE Command: Noise Cancellation

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KNOISE=?	<u>Response</u> +KNOISE: (list of supported <Receive>s), (list of supported <Transmit>s) OK	<u>Syntax</u> AT+KNOISE=?	<u>Response</u> +KNOISE: (list of supported <rx_mode>s), (list of supported <tx_mode>s), (list of supported <rx_param_1>s), ..., (list of supported <rx_param_5>s), (list of supported <tx_param_1>s), ..., (list of supported <tx_param_5>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KNOISE?	<u>Response</u> +KNOISE: <Receive>,<Transmit> OK	<u>Syntax</u> AT+KNOISE?	<u>Response</u> +KNOISE: <rx_status>,<tx_status>,<rx_param_1>,...,<rx_param_5>,<tx_param_1>,...,<tx_param_5> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KNOISE= <Receive>, <Transmit>	<u>Response</u> OK <u>Parameters</u> <Receive> 0 OFF 1 ON <Transmit> 0 OFF 1 ON	<u>Syntax</u> AT+KNOISE= <rx_mode>, <tx_mode> [<rx_param_1>, ...,<rx_param_5>, <tx_param_1>,..., <tx_param_5>]	<u>Response</u> OK <u>Parameters</u> <rx_mode> Receive mode 0 Deactivate downlink noise suppression 1 Activate downlink noise suppression <tx_mode> Transmit mode 0 Deactivate uplink noise suppression 1 Activate uplink noise suppression

HL6528x		HL85xxx	
			<rx_status> Receive noise suppression status 0 Deactivated 1 Activated <tx_status> Transmit noise suppression status 0 Deactivated 1 Activated <rx_param_1> 0-65535 Minimum attenuation Default value: 6000 <rx_param_2> 0-65535 Over-estimation factor for band 0. Default value: 8000 <rx_param_3> 0-65535 Over-estimation factor for all other bands. Default value: 8000 <rx_param_4> 0-65535 Exponent factor of the NR Default value: 1000 <rx_param_5> 0-65535 Maximum gain limit of the NR. Default value: 19660 <tx_param_1> 0-65535 Minimum Attenuation Default value: 6000 <tx_param_2> 0-65535 Over-estimation factor for band 0. Default value: 8000 <tx_param_3> 0-65535 Over-estimation factor for all other bands. Default value: 8000 <tx_param_4> 0-65535 Exponent factor of the NR Default value: 1000

HL6528x		HL85xxx	
			<tx_param_5> 0-65535 Maximum gain limit of the NR. Default value: 19660
<u>Reference</u> Sierra Wireless Proprietary		<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Parameter values are automatically saved and kept after reset - This command does not require any SIM card to be inserted in the modem
		<u>Examples</u>	AT+KNOISE=? +KNOISE: (0-1),(0-1),(0-65535),(0-65535),(0-65535),(0-65535),(0-65535),(0-65535),(0-65535),(0-65535) OK AT+KNOISE? +KNOISE: 1,1,6000,8000,8000,1000,1966 0, 6000,8000,8000,1000,19660 OK AT+KNOISE=0,0 OK AT+KNOISE=1,1,6500,8000,8000,1000,19660,6800,8000,8000,1000,19660 OK AT+CFUN=1,1 OK Shows the current configuration Disable uplink and downlink noise suppression Enable uplink and downlink noise suppression with new parameters

HL6528x		HL85xxx	
			AT+KNOISE? +KNOISE: 1,1,6500,8000,8000,1000,1966 0, 6800,8000,8000,1000,19660 OK

Parameters are retained
after reset

12.12. +KST Command: Side Tone

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KST=?	<u>Response</u> +KST: (list of supported <level>s) OK	<u>Syntax</u> AT+KST=?	<u>Response</u> +KST: (list of supported <level>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KST?	<u>Response</u> +KST: <level> OK <u>Parameter</u> <level> 0,...,16 Side tone value 20 Side tone disable	<u>Syntax</u> AT+KST?	<u>Response</u> +KST: <level> OK <u>Parameter</u> <level> 0,...,16 Side tone value 20 Side tone disable
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KST=<level>	<u>Response</u> OK	<u>Syntax</u> AT+KST=<level>	<u>Response</u> OK

HL6528x			HL85xxx		
	<u>Parameter</u> <level> 0...16 Side tone value (side tone gain from -26dB o 6dB by steps of 2) 20 Disable side tone		<u>Parameter</u> <level> 0,...,16 Side tone value (side tone gain from -26dB o 6dB by steps of 2) 20 Disable side tone		
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Volume must be set to 5 (AT+CLVL = 5) • Values cannot be modified on the fly (only disable on the fly). To observe the changes, AT+CLVL=5 must be sent again. • When modifying the side tone, double check to have set the right VIP value prior to redial (see section 12.1.2 Warning)	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Values take effect immediately • Parameter values are automatically saved and kept after reset • When modifying the side tone, double check to have set the right VIP value prior to redial (see section 12.1.2 Warning) • This command does not require any SIM card to be inserted in the modem		
		<u>Examples</u>	AT+KST=? +KST: (0-16, 20) OK AT+KST? Shows the current value +KST: 8 OK AT+KST=0 Set side tone gain to -26dB OK AT+KST=20 Disable side tone OK AT+CFUN=1,1 OK AT+KST? +KST: 20 Parameters are retained after reset OK		

12.13. +KPC Command: Peak Compressor

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KPC=?	<u>Response</u> +KPC: (list of supported <level>s) OK	<u>Syntax</u> AT+KPC=?	<u>Response</u> +KPC: (list of supported <rx_mode>s), (list of supported <tx_mode>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KPC?	<u>Response</u> +KPC: <level> OK	<u>Syntax</u> AT+KPC?	<u>Response</u> +KPC: <rx_mode>,<tx_mode> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KPC=<level>	<u>Response</u> OK <u>Parameter</u> <level> 0 Disable 1 Enable	<u>Syntax</u> AT+KPC= <rx_mode>, <tx_mode>	<u>Response</u> OK <u>Parameters</u> <rx_mode> 0 Disable 1 Enable <tx_mode> 0 Disable 1 Enable
<u>Reference</u> Sierra Wireless Proprietary		<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Parameter values are automatically saved and kept after reset - This command does not require any SIM card to be inserted in the modem

HL6528x		HL85xxx	
		<u>Examples</u>	AT+VIP? Check the current audio profile +VIP: 0 OK AT+KPC=? +KPC: (0-1),(0-1) OK AT+KPC? Shows the current value +KPC: 0,0 OK AT+KPC=1,0 Activate the rx peak compressor OK AT+KPC? +KPC: 1,0 OK AT+VIP=1 Switch to headset profile OK AT+KPC? +KPC: 0,0 Peak compressor status is different in different audio profiles

12.14. +KSRAP Command: Save or Restore Audio Parameters

HL6528x and HL85xxx										
<i>Test command</i>										
<u>Syntax</u> AT+KSRAP=?	<u>Response</u> +KSRAP: (list of supported <level> s) OK									
<i>Write command</i>										
<u>Syntax</u> AT+KSRAP= <level>	<u>Response</u> OK <u>Parameter</u> <table><tr><td><level></td><td>0</td><td>Save Audio Parameter in EEPROM (not supported in the HL85xxx)</td></tr><tr><td></td><td>1</td><td>Restore Initial Audio Parameter(not supported in the HL85xxx)</td></tr><tr><td></td><td>2</td><td>Restore Audio Parameters in RAM and save in EEPROM</td></tr></table>	<level>	0	Save Audio Parameter in EEPROM (not supported in the HL85xxx)		1	Restore Initial Audio Parameter(not supported in the HL85xxx)		2	Restore Audio Parameters in RAM and save in EEPROM
<level>	0	Save Audio Parameter in EEPROM (not supported in the HL85xxx)								
	1	Restore Initial Audio Parameter(not supported in the HL85xxx)								
	2	Restore Audio Parameters in RAM and save in EEPROM								
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Initial Audio Parameters are the ones before any parameter modification done by these AT commands.									

12.15. +KDSPTX Command: Read TX Audio Parameters

Note: For HL6528x only.

HL6528x	
<i>Read command</i>	
<u>Syntax</u> AT+KDSPTX?	<u>Response</u> (list of supported audio parameters) OK
<u>Reference</u> Sierra Wireless Proprietary	

12.16. +KDSPRX Command: Read RX Audio Parameters

Note: For HL6528x only.

HL6528x	
<i>Read command</i>	
<u>Syntax</u> AT+KDSPRX?	<u>Response</u> (list of supported audio parameters) OK
<u>Reference</u> Sierra Wireless Proprietary	

12.17. +KPCMCFG Command: Configure PCM Digital Audio

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KPCMCFG=?	<u>Response</u> (list of supported <mode>s, <Length>,<DataCfg>,<SamplingCtrl> [,<BitClk>s]) OK	<u>Syntax</u> AT+KPCMCFG=?	<u>Response</u> +KPCMCFG: (list of <Mode>s),(list of <SamplingCtrl>s),(list of <BitClk>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KPCMCFG?	<u>Response</u> +KPCMCFG: <mode>,<Length>,<DataCfg>,<SamplingCtrl> [,<BitClk>] OK	<u>Syntax</u> AT+KPCMCFG?	<u>Response</u> +KPCMCFG: <Mode>,<SamplingCtrl>,<BitClk> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KPCMCFG= <mode>, <Length>, <DataCfg>, <SamplingCtrl> [,<BitClk>]	<u>Response</u> OK <u>Parameters</u> <mode> PCM Mode 0 Slave 1 Master <Length> PCM data word length 0 8 bits 1 16 bits <DataCfg> Serial data configuration 0 LSB first 1 MSB first	<u>Syntax</u> AT+KPCMCFG= <Mode>, <SamplingCtrl> [, <BitClk>]	<u>Response</u> OK <u>Parameters</u> <Mode> PCM Mode 0 Master 1 Slave

HL6528x		HL85xxx	
	<SamplingCtrl> Sampling clock edge control 0 Falling edge 1 Rising edge <BitClk> PCM bit clock (if Master mode selected) 0 1000 KHz (default) 1 500 KHz – do not use 2 333 KHz – do not use 3 250 KHz – do not use 4 200 KHz – do not use 5 166,667 KHz – do not use 6 142,857 KHz – do not use 7 125 KHz – do not use 8 111,111 KHz – do not use 9 100 KHz – do not use 10 90,909 KHz – do not use 11 83,333 KHz – do not use 12 76.923 KHz – do not use		<SamplingCtrl> Sampling clock edge control 0 Rising edge 1 Falling edge <BitClk> PCM bit clock 0 256 kHz 1 384 kHz 2 512 kHz
<u>Reference</u> Sierra Wireless proprietary	<u>Notes</u> • <BitClk> must be set to 1MHz in order to accommodate the 8kS/s source/sink mechanism on the DSP side, as well as the 125μs frame length. • The Linear law and Frame clock at 8 KHz PCM configuration is used and cannot be modified by user. • In the master mode, the PCM interface generates the PCM clock and frame synchronization signal. • In the slave mode, the PCM interface accepts the PCM clock and frame synchronization signal. • The values are saved and kept after reboot • Level volumes can be modified using +VGT, +VGR, +KVGT, +KVGR commands.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Parameter values are automatically saved and kept after reset. • The sampling rate is fixed to 8kS/s. • Only 16-bit linear PCM mode supported. A-law and μ-law compression modes are not supported. • Only long frame sync is supported. • In slave mode, the acceptable PCM clock is also determined by parameter <BitClk>. • No SIM card is required for this command.

HL6528x		HL85xxx	
		<u>Examples</u>	AT+KPCMCFG? //Shows the current configuration +KPCMCFG: 0,1,2 //Master mode, rising edge and PCM clock //is 512 kHz OK AT+KPCMCFG=1,0 //Turn to slave mode and falling edge //latched. As parameter <BitClk> is //omitted, old <BitClk> value will be used in //the new configuration. OK AT+KPCMCFG? +KPCMCFG: 1,0,2 //Slave mode, falling edge and PCM clock //is 512 kHz OK AT+KPCMCFG=0,1 //Turn back to master mode and rising //edge latched. OK AT+KPCMCFG? +KPCMCFG: 0,1,2 OK

12.18. +KMAP Command: Microphone Analog Parameters

Note: For HL6528x only.

HL6528x																			
<i>Test command</i>																			
<u>Syntax</u> AT+KMAP=?	<u>Response</u> +KMAP: (list of supported <mute>s) [,<coarse_gain >] [,<fine_gain>] OK																		
<i>Read command</i>																			
<u>Syntax</u> AT+KMAP?	<u>Response</u> +KMAP: <mute>, coarse_gain , fine_gain OK																		
<i>Write command</i>																			
<u>Syntax</u> AT+KMAP =<mute> [,<coarse_gain>] [,<fine_gain>]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><mute></td><td><u>0</u></td><td>unmute</td></tr><tr><td></td><td>1</td><td>mute</td></tr></table> <table><tr><td><coarse_gain></td><td>0</td><td>-6dB</td></tr><tr><td></td><td><u>1</u></td><td>0dB</td></tr><tr><td></td><td>2</td><td>20dB</td></tr><tr><td></td><td>3</td><td>30dB</td></tr></table>	<mute>	<u>0</u>	unmute		1	mute	<coarse_gain>	0	-6dB		<u>1</u>	0dB		2	20dB		3	30dB
<mute>	<u>0</u>	unmute																	
	1	mute																	
<coarse_gain>	0	-6dB																	
	<u>1</u>	0dB																	
	2	20dB																	
	3	30dB																	

HL6528x		
	<fine_gain>	0 0dB 1 2dB 2 4dB 3 6dB 4 8dB 5 10dB 6 12dB 7 14dB 8 16dB 9 18dB 10 20dB
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes:</u> Total gain = coarse_gain + fine_gain coarse_gain and fine_gain: • Are stored in a volatile memory • If a parameter is missed, no change will be applied.	

12.19. +CODECINFO Command: Display Audio Codec Information

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+CODECINFO =?	<u>Response</u> +CODECINFO: (list of supported <MODE>s) OK

HL85xxx	
<i>Read command</i> <u>Syntax</u> AT+CODECINFO ?	<u>Response</u> +CODECINFO: <MODE> OK
<i>Write command</i> <u>Syntax</u> AT+CODECINFO =<MODE>	<u>Response</u> OK <u>Parameter</u> <MODE> 0 Disable codec info unsolicited message 1 Enable codec info unsolicited message
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <MODE> is stored in non-volatile memory immediately when a valid write command is entered; <MODE> is retained after reset • <MODE> is effective without resetting the module • This command is available with or without a SIM card • If <MODE> = 1, +CODECINFO: x unsolicited message will be displayed in the format below: +CODECINFO: 0 GSM_FR +CODECINFO: 1 GSM_HR +CODECINFO: 2 GSM_EFR +CODECINFO: 3 FR_AMR +CODECINFO: 4 HR_AMR +CODECINFO: 5 UMTS_AMR +CODECINFO: 6 UMTS_AMR2 +CODECINFO: 10 UMTS_AMR_WB

HL85xxx		
<u>Examples</u>	AT+CODECINFO=? +CODECINFO: (0-1) OK AT+CODECINFO=1 OK AT+CODECINFO? +CODECINFO: 1 OK AT+WVR? +WVR: 5,2 OK RING +CODECINFO: 10	Read the available options Read the current setting Check audio codec selection An incoming call UMTS_AMR_WB is chosen

12.20. +WVR Command: Voice Codec Selection

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+WVR=?	<u>Response</u> +WVR: (list of supported <aud_coding_type>s) OK	<u>Syntax</u> AT+WVR=?	<u>Response</u> +WVR: (list of supported <aud_coding_type_2G>s), (list of supported <aud_coding_type_3G>s) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+WVR?	<u>Response</u> +WVR: <aud_coding_type> OK	<u>Syntax</u> AT+WVR?	<u>Response</u> +WVR: <aud_coding_type_2G>, <aud_coding_type_3G> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+WVR=<aud_coding_type>	<u>Response</u> OK <u>Parameters</u> <aud_coding_type> 0 FR 1 FR, EFR 2 FR, HR 3 EFR, HR 4 EFR, AMR-FR, AMR-HR 5 FR, EFR, HR, AMR-FR, AMR-HR 6 FR, AMR-FR, AMR-HR 7 HR, AMR-FR, AMR-HR 8 AMR-FR, AMR-HR 9 FR, HR, AMR-FR, AMR-HR <u>10</u> AMR-HR, AMR-FR, EFR, FR, HR (default)	<u>Syntax</u> AT+WVR=[<aud_coding_type_2G>][,<aud_coding_type_3G>]	<u>Response</u> OK <u>Parameters</u> <aud_coding_type_2G> 0 FR 1 FR, EFR 2 FR, HR 3 EFR, HR 4 EFR, AMR-FR, AMR-HR 5 FR, EFR, HR, AMR-FR, AMR-HR 6 FR, AMR-FR, AMR-HR 7 HR, AMR-FR, AMR-HR 8 AMR-FR, AMR-HR 9 FR, HR, AMR-FR, AMR-HR <aud_coding_type_3G> 0 UMTS AMR v1 1 UMTS AMR v1, UMTS AMR v2 2 UMTS AMR v1, UMTS AMR v2, UMTS, AMR-WB

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command allows the configuration of the supported 2G voice codec of the device; however, the final codec decision is actually made by the network. No call would be established and no sound would be heard if the list of supported codecs set in the device does not match the network decision. <aud_coding_type> are stored in non-volatile memory immediately when a valid write command is entered - This command is available with or without a SIM card	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command allows the configuration of the supported 2G/3G voice codec of the device; however, the final codec decision is actually made by the network. No call would be established and no sound would be heard if the list of supported codecs set in the device does not match the network decision. <aud_coding_type_2G> and <aud_coding_type_3G> are stored in non-volatile memory immediately when a valid write command is entered - This command is available with or without a SIM card
<u>Example</u>	AT+WVR=? //Read available options +WVR: (0-10) OK AT+WVR=1 //Set FR and EFR as the only codecs //available OK AT+WVR? //Read the current setting +WVR: 1 OK	<u>Example</u>	AT+WVR=? // Read available options +WVR: (0-9),(0-2) OK AT+WVR=1,1 //Set FR and EFR as the only 2G codecs //available, set UMTS AMR v1 and UMTS //AMR v2 as the only 3G codecs available OK AT+WVR=,2 //Retain the previous 2G codec setting, set //UMTS AMR v1, UMTS AMR v2 and //UMTS AMR WB as the 3G codecs //available OK AT+WVR? //Read the current setting +WVR: 1,2 OK

12.21. +WDDM Command: Downlink DTMF Detection

Note: For HL6528x only.

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+WDDM=?	<u>Response</u> +WDDM: (list of supported <modes>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+WDDM?	<u>Response</u> +WDDM: <mode> OK
<i>Write command</i>	
<u>Syntax</u> AT+WDDM= <mode>	<u>Response</u> OK <u>Parameters</u> <mode> Downlink DTMF detection activation 0 DTMF detection deactivated 1 DTMF detection activated
<i>Unsolicited Notification</i>	<u>Response</u> +WDDI: <char>,<duration> <u>Parameters</u> <char> [0_9],[A-D],*,# Detected DTMF character <duration> 200 – 1200000 Duration of the incoming character in milliseconds; note that this value is limited by network capabilities

HL6528x	
<u>Notes</u>	The <mode> parameter is stored in non-volatile memory using the AT&W command. The default value can be restored using AT&F.
<u>Examples</u>	AT+WDDM=? // Read available options +WDDM: (0-1) OK AT+WDDM? // Read current mode +WDDM: 0 // Current mode is DTMF detection deactivated OK AT+WDDM=1 // Activate DTMF detection OK AT+WDDM? // Read current mode +WDDM: 1 // Current mode is DTMF detection activated OK During a call +WDDI: “*”,90 // DTMF “*” character with a duration of 90ms was detected

12.22. +WPCM Command: PCM On/Off

Note: For HL854xx only.

HL854xx	
<i>Test command</i>	
<u>Syntax</u> AT+WPCM=?	<u>Response</u> +WPCM: (list of supported <mode>s) OK

HL854xx													
Read command													
<u>Syntax</u> AT+WPCM?	<u>Response</u> +WPCM: <mode>,<reset_req> OK												
Write command													
<u>Syntax</u> AT+WPCM= <mode>	<u>Response</u> OK <u>Error case</u> ERROR or +CME ERROR: 3 <u>Parameters</u> <table><tr><td><mode></td><td>0</td><td>PCM clk and sync signals are activated when there is a voice call ongoing.</td></tr><tr><td></td><td>1</td><td>PCM clk and sync signals are always activated even when there is no voice call</td></tr></table> <table><tr><td><reset_req></td><td>0</td><td>No reset required</td></tr><tr><td></td><td>1</td><td>Reset required</td></tr></table>	<mode>	0	PCM clk and sync signals are activated when there is a voice call ongoing.		1	PCM clk and sync signals are always activated even when there is no voice call	<reset_req>	0	No reset required		1	Reset required
<mode>	0	PCM clk and sync signals are activated when there is a voice call ongoing.											
	1	PCM clk and sync signals are always activated even when there is no voice call											
<reset_req>	0	No reset required											
	1	Reset required											
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The value of +WPCM can be altered anytime, but would only be effective at the next power up. - The DSP and PCM interface are permanently active when mode = 1, and will cause power consumption to increase.												

>> 13. Protocol Specific Commands

13.1. Preliminary Comments

Sierra Wireless has developed a set of proprietary AT Commands to simplify data exchanges with different protocols:

- FTP
- TCP/IP
- UDP
- SMTP
- POP3
- HTTP
- HTTPS

13.2. IP Address Format in AT Commands

Unless specified elsewhere, the following format is used for IP address field in AT commands described in this chapter when using the HL85xxx:

- IPv4 address: Consists of dot-separated decimal (0-255) parameters of the form a1.a2.a3.a4
- IPv6 address: Consists of colon-separated hexadecimal (0-ffff) parameters of the form a1:a2:a3:a4:a5:a6:a7:a8 with abbreviations

13.3. Session ID

Note: For HL85xxx only.

Protocol specific AT commands share the same range of session IDs. Session ID <session_id> is a unique number and ranges from 1 to 32.

13.4. Connection of PDP Contexts

Note: For HL85xxx only.

A PDP connection will be started when a session becomes active (e.g. +KTCPCNX), and it will be stopped only if all sessions are closed or all sessions requested to stop the connection. In case of session errors, the behavior of PDP connection deactivation can be configured by +KIPOPT with <option_id>=3. The default setting after module boot-up is that a PDP connection is requested to stop only when a session was closed by an Internet AT command (e.g. +KTCPCLOSE).

Up to 5 PDP contexts can be activated simultaneously on the HL854xx.

Up to 3 PDP contexts can be activated simultaneously on the HL8518, HL8528 and HL8529.

13.5. Buffer Length of AT Command

Note: For HL85xxx only.

In AT command mode, the maximum length of an AT command is 1023 characters; any input longer than this limit will produce an error response. If the maximum length of a parameter is not specified in this manual, it may vary but would still be bounded by this limit.

In AT data mode, the terminal receive buffer size is limited to 32000 bytes; the terminal driver will stop the receive flow at 16000 bytes if hardware handshaking is used.

13.6. Parameter Format of AT Commands

Note: For HL85xxx only.

Double quotation marks are optional in the parameter input of protocol specific AT commands.

If the AT command does not meet the following conditions, the AT parser will regard it as an error and will not go to the corresponding AT command handler. It will immediately return +CME ERROR: 3. This means that it will not process any action further or return any specific error code.

- If double quotation marks are used to enclose parameters, double quotation marks must appear at both the head and tail of the parameter.
- The total number of parameter input (including empty parameters) in the AT commands must be within the minimum and maximum required number of parameters.

13.7. Connection Configuration

13.7.1. +KCNXCFG Command: GPRS Connection Configuration

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KCNXCFG=?	<u>Response</u> +KCNXCFG: (list of possible <cnx conf>s) OK	<u>Syntax</u> AT+KCNXCFG=?	<u>Response</u> +KCNXCFG: (list of possible <cnx conf>s),"GPRS", (range of possible length of <apn>),(range of possible length of <login>),(range of possible length of <password>),<af>,<ip>,<dns1>,<dns2>,<ipv6>,<dns1v6>,<dns2v6> OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KCNXCFG?	<u>Response</u> +KCNXCFG: <cnx cnf>, "GPRS", <apn>,<login>,<password>,<ip>,<dns1>,<dns2>[,,<cnx_sustained>] +KCNXCFG: <cnx cnf>,"GPRS",<apn>,<login>,<password>,<ip>,<dns1>,<dns2>[,,<cnx_sustained>] [...] OK	<u>Syntax</u> AT+KCNXCFG?	<u>Response</u> +KCNXCFG: <cnx cnf>, "GPRS", <apn>,<login>,<password>,<af>,<ip>,<dns1>,<dns2>[,,<ip_v6>,<dns1_v6>,<dns2_v6>],<state> [...] OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KCNXCFG= <cnx cnf>, "GPRS",<apn> [, [<login>]], [<password>]], [<ip>]], [<dns1>] [, <dns2>], [, <cnx_sustained>]]]]	<u>Response</u> OK <u>Parameters</u> <cnx cnf> [0...7] (PDP context configuration) a numeric parameter which specifies a particular PDP context configuration	<u>Syntax</u> AT+KCNXCFG= <cnx cnf>, "GPRS",<apn> [, [<login>]], [<password>]] [, <af>] [, <ip>] [, <dns1>]	<u>Response</u> OK <u>Parameters</u> <cnx cnf> 1 – 5 PDP context configuration; numeric parameter which specifies a particular PDP context configuration.

HL6528x	HL85xxx
<apn> (Access Point Name) a string parameter (max size 63 bytes), logical name used to select the GGSN or the external packet data network. <login> string type (max size 24 bytes), indicates the user name of the cnx <password> string type (max size 24 bytes), indicates the password of the cnx <ip> String type. Consists of dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4, if the mobile is supposed to work with a static address. For dynamic address the value is "0.0.0.0" or an empty string. Displayed value with read command will be "0.0.0.0" for dynamic address. Note that with an empty value in the write command the previously stored value will be used. <dns1>, <dns2> String type. Consists of dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4, if the mobile is supposed to work with static DNS addresses. For dynamic addresses the value is "0.0.0.0" or an empty string. Displayed value with read command will be "0.0.0.0" for dynamic address. Note that with an empty value in the write command the previously stored value will be kept.	[,<dns2>]]]] [,<ip_v6>] [,<dns1_v6>] [,<dns2_v6>]]]]] Note that for the HL8518, HL8528 and HL8529, the maximum number of connections is limited to 3. <apn> (Access Point Name) a string parameter (max size 63 bytes), logical name used to select the GGSN or the external packet data network. <login> string type (max size 24 bytes), indicates the user name of the cnx <password> string type (max size 24 bytes), indicates the password of the cnx <af> Address family used for the connection <u>IPV4</u> IPv4 only IPV6 IPv6 only IPV4V6 IPv4 and IPv6 Note that IPV4v6 is up to 3GPP Release 7 compliant <ip> String type. If the mobile is supposed to work with a dynamic address, the value should be "0.0.0.0" or an empty string. <dns1>, <dns2> String type. If the mobile is supposed to work with dynamic DNS addresses, the value should be "0.0.0.0" or an empty string. <ip_v6> IPV6 String type. If the mobile is supposed to work with a dynamic address, the value should be "::" or an empty string. <dns1_v6>, <dns2_v6> IPV6 String type. If the mobile is supposed to work with dynamic DNS addresses, the value should be "::" or an empty string.

HL6528x		HL85xxx	
	<cnx_sustained> Sustain PDP context <u>0</u> PDP context not sustained: when the connection is closed, if there is no open sockets; the PDP context is closed 1 PDP context is sustained: when the connection is closed, even if there is no open sockets, the PDP context is kept open		<state> Connection state 0 Disconnected 1 Connecting 2 Connected 3 Idle, down counting for disconnection 4 Disconnecting
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This AT command is used to configure the bearer to be used for the future IP Services - By default, the IP and DNS address are dynamic (those values would be affected by the network during the GSM or GPRS connection) - This connection will be used by the Module to access to the IP services described on the following chapters. The AT+KCNXCFG command is only defined to set the current parameters. The defined connection will be automatically opened when needed by the IP services. (e.g. UDP service) - The <cnx_sustained> parameter is displayed by the read command only if it has been set once by the write command. This leads to full retrocompatibility with existing use cases: if <cnx_sustained> is not set, there will be no change in AT interface (write/read)	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This AT command is used to configure the bearer to be used for the future IP Services - By default, the IP and DNS address are dynamic (those values would be affected by the network during the PDP connection) - This connection will be used by the module to access to the IP services described on the following chapters. The AT+KCNXCFG command is only defined to set the current parameters. The defined connection will be automatically opened when needed by the IP services. (e.g. UDP service) - The use of IPV4 and/or IPV6 addresses is configured by PDP context configuration <cnx_cfg> values 1 to 5 correspond to PDP context ID 1 to 5 respectively, e.g. <cnx_cfg>=3 corresponds to CID=3 in +CGDCONT/+CGACT - When the connection is up, the read command returns the actual values used by the connection interface

13.7.2. +KCNXTIMER Command: Connection Timer Configuration

HL6528x		HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+KCNXTIMER =?	<u>Response</u> +KCNXTIMER: (list of supported <cnx cnf>s),(list of supported <tim1>s),(list of supported <nbrtrial>s),(list of supported <tim2>s) OK	<i>Test command</i> <u>Syntax</u> AT+KCNXTIMER =?	<u>Response</u> +KCNXTIMER: (list of supported <cnx cnf>s),(list of supported <tim1>s),(list of supported <nbrtrial>s),(list of supported <tim2>s) ,(list of supported <idletime>s) OK
<i>Read command</i> <u>Syntax</u> AT+KCNXTIMER ?	<u>Response</u> +KCNXTIMER: <cnx cnf>,<tim1>,<nbrtrial>,<tim2> [<CR><LF> +KCNXTIMER: <cnx cnf>,<tim1>,<nbrtrial>,<tim2>[...] OK	<i>Read command</i> <u>Syntax</u> AT+KCNXTIMER?	<u>Response</u> +KCNXTIMER: <cnx cnf>,<tim1>,<nbrtrial>,<tim2>,<idletime> [...] OK
<i>Write command</i> <u>Syntax</u> AT+KCNXTIMER =<cnx cnf>[[<tim1>][[<nbrtrial>] [,<tim2>]]] AT+KCNXTIMER =<cnx cnf>[[<tim1>][[<nbrtrial>] [,<tim2>]]] attempts and with an interval of <tim1>	<u>Response</u> OK <u>Parameters</u> <cnx cnf> [0...7] (PDP context configuration) a numeric parameter which specifies a particular PDP context configuration <tim1> 1 - 120s (30s by default) If module fails to activate the PDP context, a timer of <tim1> will be started. When this timer expires, it will try to activate the PDP context again. <nbrtrial> Attempt times from 1-4 (2 by default). Module will try to activate the PDP context with max <nbrtrial>	<i>Write command</i> <u>Syntax</u> AT+KCNXTIMER= <cnx cnf>[[<tim1>][[<nbrtrial>] [,<tim2>] [,<idletime>]]]	<u>Response</u> OK <u>Parameters</u> <cnx cnf> [1...5] (PDP context configuration) a numeric parameter which specifies a particular PDP context configuration <tim1> 1 - 120s (30s by default) If module fails to activate the PDP context, a timer of <tim1> will be started. When this timer expires, it will try to activate the PDP context again. <nbrtrial> Attempt times from 1-4 (2 by default) Module will try to activate the PDP context with max <nbrtrial>

HL6528x		HL85xxx	
	<tim2> 0 - 300s (60s by default). 0 deactivated (connection will not close by itself) When module is functioning as a client, module will try to connect to the server within <tim2>s, if <tim2> expires, it will give up the connection.		<tim2> 0 - 300s (60s by default). 0 Deactivated (connection will not close by itself) For client sockets, module will try to connect to the server within <tim2>s, if <tim2> expires, it will give up the connection. <idletime> 0 - 1800s (30s by default) When all sessions are closed, the idle timer starts with the idle time. When this timer expires, it will try to deactivate the PDP context. Before the timer expires, connecting any session will stop this timer and the PDP context is reused.
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command will only have impact on TCP/UDP specific commands (+KTCPCNX, +KTCPSTART, +KUDPCFG)	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command will only have impact on TCP/UDP specific commands (+KTCPCNX, +KTCPSTART, +KUDPCFG) - This command has impact on TCP, UDP, FTP, HTTP, HTTPS specific commands

13.7.3. +KCNXPROFILE Command: Current Profile Connection Configuration

HL6528x and HL85xxx	
<u>Test command</u> <u>Syntax</u> AT+KCNXPROFILE=?	(Only available in the HL85xxx) <u>Response</u> +KCNXPROFILE: (list of possible <cnx cnf>s) OK

HL6528x and HL85xxx	
<i>Read command</i> <u>Syntax</u> AT+KCNXPROFILE?	<u>Response</u> +KCNXPROFILE: <cnx cnf> OK
<i>Write command</i> <u>Syntax</u> AT+KCNXPROFILE=<cnx cnf>	<u>Response</u> OK <u>Parameters</u> <cnx cnf> PDP context configuration – a numeric parameter which specifies a particular PDP context configuration 0 – 7 for HL6528x 1 – 5 for HL85xxx
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - For the HL6528x, the current profile will be overridden after KTCPCNX, KUDPCFG, etc. with specified <cnx cnf>. - For the HL85xxx, this command sets the default PDP context configuration ID for KTCPCFG, KUDPCFG, KFTPCFG, KHTTPCFG and KHTTPSCFG, if the <cnx cnf> parameter is not given in these commands.

13.7.4. +KCGPADDR Command: Display PDP Address

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KCGPADDR=?	<u>Response</u> +KCGPADDR: (list of possible <cnx cnf>s) OK

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KCGPADDR	<u>Response</u> +KCGPADDR: <cnx cnf>, <PDP_addr> OK <u>Parameters</u> <cnx cnf> PDP context configuration – a numeric parameter which specifies a particular PDP context configuration. Range = 0 – 7 <PDP_addr> A string that identifies the MT in the address space applicable to the PDP	<u>Syntax</u> For all <cnx_cnf>s: AT+KCGPADDR For specific <cnx_cnf>s: AT+KCGPADDR=<cnx_cnf>	<u>Response</u> +KCGPADDR: <cnx cnf>, <PDP_addr_1> [[+KCGPADDR: <cnx cnf>, <PDP_addr_2>] ...] OK <u>Parameters</u> <cnx cnf> PDP context configuration – a numeric parameter which specifies a particular PDP context configuration. Range = 1 – 5 <PDP_addr> A string that identifies the MT in the address space applicable to the PDP
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This AT command can be used after KTCPCNX, KUDPCFG, etc. to display the local IP address of the module	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This AT command can be used after KTCPCNX, KUDPCFG, etc. to display the local IP address of the module - For IPv6, more than one PDP addresses corresponding to the interface may be displayed

13.7.5. +KCNX_IND Notification: Connection Status Notification

Note: For HL85xxx only.

HL85xxx	
<i>Unsolicited Notification</i>	<u>Response</u> +KCNX_IND: <cnx cnf>,<status>,<af> (for <status> = 0, 1) +KCNX_IND: <cnx cnf>,<status>,<attempt>,<nbtrial>,<tim1> (for <status> = 2) +KCNX_IND: <cnx cnf>,<status> (for <status> = 3,6)

HL85xxx	
	+KCNX_IND: <cnx cnf>,<status>,<attempt> (for <status> = 4) +KCNX_IND: <cnx cnf>,<status>,<idletime> (for <status> = 5) <u>Parameters</u> <cnx cnf> [1...5] (PDP context configuration) a numeric parameter which specifies a particular PDP context configuration <status> PDP connection status 0 Disconnected due to network 1 Connected 2 Failed to connect, <tim1> timer is started if <attempt> is less than <nbtrial> 3 Closed 4 Connecting 5 Idle time down counting started for disconnection 6 Idle time down counting canceled <af> 0 IPV4 1 IPV6 <tim1> Refer to +KCNXTIMER <attempt> Current attempt of bringing up of PDP connection <nbtrial> Refer to +KCNXTIMER <idletime> Refer to +KCNXTIMER
<u>Reference</u> Sierra Wireless Proprietary	

13.7.6. +KCNXUP Command: Bring the PDP Connection Up

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KCNXUP=?	<u>Response</u> +KCNXUP: (list of possible <cnx_cnf>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+KCNXUP= <cnx_cnf>	<u>Response</u> OK <u>Parameters</u> <cnx_cnf> 1 – 5 PDP context configuration – a numeric parameter which specifies a particular PDP context configuration
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This command activates the PDP context and reserves the activated PDP connection (i.e. keeps the PDP connection up even after the last session is closed) • If this command is not used, the PDP context will be brought down after the last session is closed unless +KCNXDOWN is used

13.7.7. +KCNXDOWN Command: Bring the PDP Connection Down

Note: For HL85xxx only.

HL85xxx	
Test command	
<u>Syntax</u> AT+KCNXDOWN =?	<u>Response</u> +KCNXDOWN: (list of possible <cnx_cnf>s),(list of possible <mode>s) OK
Write command	
<u>Syntax</u> AT+KCNXDOWN =<cnx_cnf> [,<mode>]	<u>Response</u> OK <u>Parameters</u> <cnx_cnf> 1 – 5 PDP context configuration – a numeric parameter which specifies a particular PDP context configuration <mode> 0 Cancels the reservation of the activated PDP connection previously configured by +KCNXUP 1 Similar to 0, but deactivates the PDP connection even if an active session exists
<u>Reference</u> Sierra Wireless Proprietary	

13.8. Common Configuration

13.8.1. +KPATTERN Command: Custom End of Data Pattern

HL6528x and HL85xxx	
<i>Test command</i>	(Only available in the HL85xxx)
<u>Syntax</u> AT+KPATTERN =?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+KPATTERN?	<u>Response</u> +KPATTERN: <EOF pattern> OK
<i>Write command</i>	
<u>Syntax</u> AT+KPATTERN = <EOF pattern>	<u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <EOF pattern> String type (max size 128 bytes). This is a pattern used to notify the end of data (or file) during data or file transfer. This string doesn't have to be human-readable (Not printable characters are allowed)

HL6528x and HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The default value of the pattern is: "--EOF--Pattern--" - It is the responsibility of the user to select an appropriate pattern according to the data transferred. (i.e. Numeric pattern for text files and Readable string for binary files) - Additionally for the HL85xxx: - The <EOF pattern> pattern is detected with 100ms or higher timeout and without data following. The timeout value is equal to <wait_time> of +KIPOPT. - Received data is stored with buffer size <send size v4> or <send size v6> so that the <EOF pattern> with size larger than it is not detected. The user application should ensure that the value of <send size v4> or <send size v6> is larger than the size of the <EOF pattern>.

13.8.2. +KURCCFG Command: Enable or Disable the URC from Protocol Commands

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KURCCFG=?	<u>Response</u> +KURCCFG: (list of supported <protocol>s),(list of supported <active>s) OK	<u>Syntax</u> AT+KURCCFG=?	<u>Response</u> +KURCCFG: (list of supported <protoopt>s),(list of supported <noti_act>s),(list of supported <indi_act>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KURCCFG?	<u>Response</u> +KURCCFG: list of supported (<protocol>,<active>) OK	<u>Syntax</u> AT+KURCCFG?	<u>Response</u> +KURCCFG: list of supported (<protoopt>,<noti_act>,<indi_act>) OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KURCCFG= <protocol>, <active>	<u>Response</u> OK	<u>Syntax</u> AT+KURCCFG= <protoopt>,	<u>Response</u> OK

HL6528x		HL85xxx	
	<u>Parameters</u> <protocol> "TCP" only <active> <u>1</u> enable URC 0 disable URC	<noti_act> [,<indi_act>]	<u>Parameters</u> <protoopt> Protocol option to enable/disable URC "TCPC" TCP client session "TCPS" TCP server session "UDPC" UDP client session "UDPS" UDP server session "FTP" FTP client session "HTTP" HTTP client session "HTTPS" HTTPS client session "TCP" Both TCP client and TCP server sessions "UDP" Both UDP client and UDP server sessions <noti_act> <u>1</u> Enable URC (like +KTCP_NOTIF, +KFTP_ERROR) 0 Disable URC <indi_act> <u>1</u> Enable URC (like KTCP_SRVREQ, +KTCP_IND, +KTCP_DATA, +KUDP_DATA, +KUDP_RCV, +KFTP_IND) 0 Disable URC
<u>Examples</u>	To disable URC: AT+KURCCFG="TCP",0 OK Test and read command: AT+KURCCFG=? +KURCCFG: ("TCP"),(0,1) OK AT+KURCCFG? +KURCCFG: ("TCP",0) OK	<u>Examples</u>	To disable URC: AT+KURCCFG="TCP",0 OK Test and read command: AT+KURCCFG=? +KURCCFG: ("TCPC","TCPS","UDPC","UDPS","FTP", "HTTP","HTTPS","TCP","UDP"),(0-1),(0-1) OK

HL6528x		HL85xxx	
			AT+KURCCFG? +KURCCFG: "TCPC",1,1 +KURCCFG: "TCPS",1,1 +KURCCFG: "UDPC",1,1 +KURCCFG: "UDPS",1,1 +KURCCFG: "FTP",1,1 +KURCCFG: "HTTP",1,1 +KURCCFG: "HTTPS",1,1 OK
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Enable/Disable +KTCP_NOTIF unsolicited messages, this is useful to use only a polling mode with +KTCPSTAT • If "disable", URCs are discarded and not stored • Can be used in 07.10 multiplexer	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Enable/Disable +KTCP_NOTIF unsolicited messages, this is useful to use only a polling mode with +KTCPSTAT • If "disable", URCs are discarded and not stored • Can be used in 07.10 multiplexer

13.8.3. +KIOPT Command: General Options Configuration

HL6528x		HL85xxx	
<u>Test command</u> <u>Syntax</u> AT+KIOPT=?	<u>Response</u> +KIOPT: 0,"TCP",(0-100),(0,8-1460) OK	<u>Test command</u> <u>Syntax</u> AT+KIOPT=?	<u>Response</u> +KIOPT: 0,<UDP>,(1-100),(8-1472),(8-1452) +KIOPT: 0,<TCP-based>,(0-100),(0,8-1460),(0,8-1440) +KIOPT: 1,(0-1) +KIOPT: 2,(0-255) +KIOPT: 3,(0-1),(0-1) +KIOPT: 4,(list of <ssl_ver>s) +KIOPT: 5,(0-1) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KIOPT?	<u>Response</u> +KIOPT: 0,"TCP",<wait time>,<send size v4> OK	<u>Syntax</u> AT+KIOPT?	<u>Response</u> +KIOPT: 0,<proto>,<wait time>,<send size v4>,<send size v6>] [...] +KIOPT: 1,<http_chunked> +KIOPT: 2,<http_max_redirect> +KIOPT: 3,<stop_on_error>,<stop_on_peer> +KIOPT: 4,<ssl_ver> +KIOPT: 5,<verify_hostname> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KIOPT= <option_id>,<proto>,<wait time> [,<send size v4>]	<u>Response</u> OK +CME ERROR<err> <u>Parameters</u> <option_id> Option ID 0 Wait time, send size threshold configuration <proto> Protocol, string type "TCP" Both TCP client and TCP server sessions	<u>Syntax</u> If <option_id>=0 AT+KIOPT= <option_id>,<proto>,<wait time> [,<send size v4> [,<send size v6>]] If <option_id>=1 AT+KIOPT= <option_id>,<http_chunked> If <option_id>=2 AT+KIOPT= <option_id>,<http_max_ redirect>	<u>Response</u> OK +CME ERROR<err> <u>Parameters</u> <option_id> Option ID 0 Wait time, send size threshold configuration 1 HTTP chunked transfer encoding 2 HTTP maximum redirection 3 PDP connection deactivated behavior 4 SSL version for use in KHTTPS 5 Verify hostname in HTTPS connection <proto> Protocol, string type "TCPC" TCP client session "TCPS" TCP server session "UDPC" UDP client session "UDPS" UDP server session "FTP" FTP client session

HL6528x	HL85xxx
<wait time> Timeout for sending buffered data to peer; it specifies the timeout between two receptions of data from the AT terminal after which the buffered data received from the AT terminal will be sent to the peer irrespective of data packet size. Value is in 100 ms units. Range for TCP: 0 – 100, default value = <u>1</u>. <send size v4> Data size threshold for IPv4 sessions. When the buffered data received from the AT terminal reaches this threshold, the data is sent to the socket layer. Range for TCP: 0, 8 – 1460, default value = <u>0</u> (disabled)	If <option_id>=3 AT+KIOPT= <option_id>, <stop_on_error>, <stop_on_peer> If <option_id>=4 AT+KIOPT= <option_id>, <ssl_ver> If <option_id>=5 AT+KIOPT= <option_id>, <verify_> hostname> “HTTP” HTTP client session “HTTPS” HTTPS client session “TCP” Both TCP client and TCP server sessions “UDP” Both UDP client and UDP server sessions <wait time> Timeout for sending buffered data to peer; it specifies the timeout after which the buffered data received from the AT terminal will be sent to the peer irrespective of data packet size. Value is in 100 ms units. Range: For UDP: 1 – 100, default value = 2 For TCP: 0 – 100, default value = 1. Note that value = 0 has the same effect as having value = 1 due to the limitation from +KPATTERN detection timing <send size v4> Data size threshold for IPv4 sessions. When the buffered data received from the AT terminal reaches this threshold, the data is sent to the socket layer. Range: For UDP: 8 – 1472, default value = 1020 For TCP: 0, 8 – 1460, default value = 0 (disabled) <send size v6> Data size threshold for IPv6 sessions. When the buffered data received from the AT terminal reaches this threshold, the data is sent to the socket layer. Range: For UDP: 8 – 1452, default value = 1020 For TCP: 0, 8 – 1440, default value = 0 (disabled) <http_chunked> “Chunked” transfer encoding for HTTP POST <u>0</u> Data sent with HTTP POST are not encoded 1 Data sent with HTTP POST are automatically encoded using “chunked” transfer encoding

HL6528x		HL85xxx	
			<http_max_redirect> Maximum redirection allowed for HTTP GET. Range: 8 – 255; default value = 0 <stop_on_error> PDP connection deactivation behavior when a session is closed due to any error 0 Do not request to stop the connection 1 Request to stop the connection <stop_on_peer> PDP connection deactivation behavior when a session is closed by a peer/server 0 Do not request to stop the connection 1 Request to stop the connection <ssl_ver> SSL version for use in KHTTPS 0 TLS version 1.1 1 TLS version 1.0 2 TLS version 1.2 <verify_hostname> Verify hostname in HTTPS connection 0 Do not verify hostname against the server certificate 1 Verify hostname against the server certificate
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - If both <wait_time> and <send_size_v4> are not 0, data is sent to server if the number of buffered data received from the AT terminal is more than <send_size_v4> or if no data has been received from the AT terminal since <wait_time>. - If at least one either <wait_time> or <send_size_v4> is 0, data is sent to the server as soon as they have been received from the AT terminal.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> "chunked" transfer encoding for HTTP POST is applicable and effective only for HTTP version 1.1 - The default setting of <option_id>=3 is (<stop_on_error>=0, <stop_on_peer>=0) after module boot-up; this means that a PDP connection is requested to stop only when a session is closed by an Internet AT command (e.g. +KTCPCLOSE) <send size v4> and <send size v6> control the maximum size of data received from the AT terminal to be buffered within timeout <wait time>. When the threshold is reached, or after timeout, the buffered data are sent to the socket layer for transmission. For UDP, data are sent as a UDP packet.

HL6528x		HL85xxx	
			For TCP based protocol, data are copied to socket first-in-first-out buffer for transmission but packet segmentation is not guaranteed to be <send size>. • For TCP based protocol, when <send size v4> and <send size v6> are disabled (= 0), threshold = 4000 is used internally. • The maximum transmission unit (MTU) is 1500 bytes. • After starting a connection or running SSL Certificate write commands, <ssl_ver> is fixed and cannot be changed until the module is rebooted. • <send size v4> and <send size v6> impacts the detection of <EOF pattern>; refer to the notes of +KPATTERN for more information. • The <wait time> parameter set using +KIPOPT is used when EOF pattern is not sent along with the data. In this case, it will wait for <wait time> set using +KIPOPT before sending the data. While if the EOF pattern is sent along with data, it will not wait as per wait time set and send the data immediately as the socket will be closed when the EOF pattern is received.

13.9. TCP Specific Commands

13.9.1. +KTCPCFG Command: TCP Connection Configuration

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KTCPCFG=?	<u>Response</u> +KTCPCFG: (list of possible <mode>s) OK	<u>Syntax</u> AT+KTCPCFG=?	<u>Response</u> For HL8518, HL8528 and HL8529: +KTCPCFG: (list of possible <cnx_cnf>s),(list of possible <mode>s),<remote-name/ip>,(list of possible <tcp_port >s), (list of possible <source_port>s),(list of possible <data_mode>s),(list of possible <URC-ENDTCP-enable>s), (list of possible <af>s) OK For HL854xx: +KTCPCFG: (list of possible <cnx_cnf>s),(list of possible <mode>s),<remote-name/ip>,(list of possible <tcp_port >s), (list of possible <source_port>s),(list of possible <data_mode>s),(list of possible <URC-ENDTCP-enable>s), (list of possible <af>s, list of possible<cipher_index>es) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KTCPCFG?	<u>Response</u> +KTCPCFG: <session_id>,<status>,<cnx cnf>,<mode> [,<serverID>],<tcp remote address>,<tcp_port>,<source_port>,<data_mode>,<URC-ENDTCP-enable> <CR><LF> +KTCPCFG: <session_id>,<status>,<cnx cnf>,<mode> [,<serverID>],<tcp remote address>,<tcp_port>,<source_port>,<data_mode>,<URC-ENDTCP-enable>[...]]	<u>Syntax</u> AT+KTCPCFG?	<u>Response</u> For HL8518, HL8528 and HL8529: +KTCPCFG: <session_id>,<status>,<cnx cnf>,<mode> [,<serverID>],<tcp remote address>,<tcp_port>,<source_port>,<data_mode>,<URC-ENDTCP-enable>,<af> [...]] For HL854xx: +KTCPCFG: <session_id>,<status>,<cnx cnf>,<mode> [,<serverID>],<tcp remote address>,<tcp_port>,<source_port>,<data_mode>,<URC-ENDTCP-enable>,<af>,<cipher_index> [...]]
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KTCPCFG= [<cnx cnf>],<mode>,<tcp remote address>,<tcp_port>[,<source_port>],[,<data_mode>],<URC-ENDTCP-enable>]]]	<u>Response</u> +KTCPCFG: <session_id> OK <u>Parameters</u> <cnx cnf> Index of a set of parameters for configuring one TCP session (see KCNXCFCG) <session_id> TCP session index <mode> 0 Client 1 Server 2 Child (Generated by server sockets) <tcp remote address> Dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4 or explicit name of the remote server. For a server configuration, this parameter is left blank	<u>Syntax</u> For HL8518, HL8528 and HL8529: AT+KTCPCFG= [<cnx cnf>],<mode>,<tcp remote address>,<tcp_port>[,<source_port>],[,<data_mode>],<URC-ENDTCP-enable>]]],<af>]	<u>Response</u> +KTCPCFG: <session_id> OK <u>Parameters</u> <cnx cnf> Index of a set of parameters for configuring one TCP session (see KCNXCFCG) <session_id> TCP session index <mode> 0 Client 1 Server 2 Child (Generated by server sockets) 3 Secure client

HL6528x	HL85xxx
<tcp_port> Numeric parameter (0-65535) <status> Connection state of the selected socket (0-1) respectively (disconnected - connected) <serverID> Server session ID index. Only for socket in mode CHILD <source_port> Numeric parameter (0-65535). Specify the local TCP client port number <data_mode> <u>0</u> Do not display <data> in URC (Default setting) 1 Display <data> in URC <URC-ENDTCP-enable> <u>0</u> Do not display URC "+KTCP_ACK" (Default setting) 1 Display URC "+KTCP_ACK"	For HL854xx: AT+KTCPCFG= [<cnx cnf>], <mode>, [<tcp remote address>], <tcp_port>[[, [<source_port>],[<data_mode>], [<URC-ENDTCP-enable>]]],<af>],[<cipher_index>] <tcp remote address> IP address string or explicit name of the remote server. For a server configuration, this parameter is left blank <tcp_port> TCP peer port; numeric parameter (1-65535). For a server configuration, this parameter is the listening port. <status> Connection state of the selected socket (0-1) respectively (disconnected - connected) <serverID> Server session ID index. Only for socket in mode CHILD <source_port> Numeric parameter (0-65535). Specifies the local TCP port number. For a server configuration, this parameter is left blank. <data_mode> <u>0</u> Do not display <data> in URC (Default setting) 1 Display <data> in URC <URC-ENDTCP-enable> <u>0</u> Do not display URC "+KTCP_ACK" (Default setting) 1 Display URC "+KTCP_ACK" <af> Address family used for the connection. <u>0</u> IPV4 1 IPV6 <cipher_index> Cipher suite profile index to use for a secured socket; defined by +KSSLCRYPTO.

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - If the socket is defined as a <CLIENT> socket, <tcp_port> and <tcp remote address> define the port and the IP address of the remote server we want to connect - Maximum <session_id> is 200 - For child session, the property <data_mode> will be kept the same as the server socket's setting - See section 23.6.6 for use cases of AT+KTCPCNINFO and <URC-ENDTCP-enable> option of AT+KTCPCFG	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - If the socket is defined as a <CLIENT> socket, <tcp_port> and <tcp remote address> define the port and the IP address of the remote server we want to connect - Maximum <session_id> is 32 - For child session, the property <data_mode> will be kept the same as the server socket's setting - See section 23.6.6 for use cases of AT+KTCPCNINFO and <URC-ENDTCP-enable> option of AT+KTCPCFG - This AT command can be used before setting up +KCNXCFG configuration. But the latter is required to start the connection properly - The connection timeout for TCP socket is about 9 seconds with 3 retransmissions with a 3-second delay

13.9.2. +KTCPCNX Command: Start TCP Connection

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KTCPCNX=?	<u>Response</u> +KTCPCNX: (list of possible <session_id>s) OK

HL6528x		HL85xxx	
Write command		Write command	
<u>Syntax</u> AT+KTCPCNX= <session_id>	<u>Response</u> OK or NO CARRIER +CME ERROR: <err> +KTCP_NOTIF: <session_id>, <tcp_notif> <u>Parameters</u> <session_id> TCP session index <tcp_notif> Integer type. Indicates the cause of the TCP connection failure 0 Network error 1 No more sockets available; max. number already reached 2 Memory problem 3 DNS error 4 TCP disconnection by the server or remote client 5 TCP connection error 6 Generic error 7 Fail to accept client request's 8 Data sending is OK but KTCPSND was waiting more or less characters 9 Bad session ID 10 Session is already running 11 All sessions are used	<u>Syntax</u> AT+KTCPCNX= <session_id>	<u>Response</u> OK or +CME ERROR: <err> +KTCP_NOTIF: <session_id>, <tcp_notif> <u>Parameters</u> <session_id> TCP session index <tcp_notif> Integer type. Indicates the cause of the TCP connection failure 0 Network error 1 No more sockets available; max. number already reached 2 Memory problem 3 DNS error 4 TCP disconnection by the server or remote client 5 TCP connection error 6 Generic error 7 Fail to accept client request's 8 Data sending is OK but KTCPSND was waiting more or less characters 9 Bad session ID 10 Session is already running 11 All sessions are used 12 Socket connection timer timeout 13 Control socket connection timer timeout

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command is used for connecting to a remote server or listening to a bound port, depending on the selected mode of <session_id> - When more than two different APNs are used in +KCNXCFG, only one of them can be used in TCP or UDP services	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command is used for connecting to a remote server or listening to a bound port, depending on the selected mode of <session_id> - When using “+++” to abort sending TCP data, URC “+KTCP_NOTIF: <session_id>,8” could be displayed

13.9.3. +KTCPRCV Command: Receive Data through a TCP Connection

HL6528x and HL85xxx	
<i>Test command</i>	(Only available in the HL85xxx)
<u>Syntax</u> AT+KTCPRCV=?	<u>Response</u> +KTCPRCV: (list of possible <session_id>s),(list of possible <ndata>s) OK
<i>Write command</i> <u>Syntax</u> AT+KTCPRCV= <session_id>, <ndata>	<u>Response</u> CONNECT ...<EOF pattern> OK or +KTCP_NOTIF: <session_id>,<tcp_notif> <u>Parameters</u> <session_id> TCP session index <ndata> Number of bytes the device wants to receive (max value 4294967295)

HL6528x and HL85xxx	
	<tcp_notif> See command AT+KTCPCNX
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This function is used to receive <ndata> data bytes through a previously opened TCP socket • <ndata> indicates the max data number that the terminal wishes to receive. If the TCP socket contains more data than <ndata> bytes then only <ndata> bytes will be received. If the TCP socket contains less data than <ndata> bytes then only TCP socket's data will be received • <EOF pattern> would be added at the end of data automatically • When <ndata> (max value) bytes or only available data in the TCP socket have been received, the module returns to command state and returns OK • Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3 • The behavior of DTR drop meets with AT&D

13.9.4. +KTCPSND Command: Send Data through a TCP Connection

HL6528x and HL85xxx	
<i>Test command</i>	(Only available in the HL85xxx)
<u>Syntax</u> AT+KTCPSND=?	<u>Response</u> +KTCPSND: (list of possible <session_id>s),(list of possible <ndata>s) OK
<i>Write command</i> <u>Syntax</u> AT+KTCPSND= <session_id>, <ndata>	<u>Response</u> CONNECT OK or NO CARRIER +CME ERROR: <err> +KTCP_NOTIF: <session_id>,<tcp_notif>

HL6528x and HL85xxx	
	<u>Parameters</u> <session_id> TCP session index <ndata> Number of bytes (max value 4294967295) <tcp_notif> See command AT+KTCPCNX
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • User must use <EOF pattern> to finish sending, then module returns to command mode. • All the data will be sent out ignoring <ndata>. If data sent is not equal to <ndata> then KTCP_NOTIF would appear. • <ndata> is the data size without <EOF pattern> • Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3 • The behavior of DTR drop meets with AT&D • Using "+++" can abort sending data and using ATO[n] to return back to data mode • In the HL85xxx, if sending is suspended or aborted using +++ or by toggling DTR, "+KTCP_NOTIF: <session_id>,8" is displayed

13.9.5. +KTCPCLOSE Command: Close Current TCP Operation

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KTCPCLOSE =?	<u>Response</u> +KTCPCLOSE: (list of possible <session_id>s), (list of possible <closing_type>s) OK

HL6528x		HL85xxx	
<i>Write command</i> <u>Syntax</u> AT+KTCPCLOSE =<session_id>,<closing_type>	<u>Response</u> OK or +CME ERROR: <err> NO CARRIER +KTCP_NOTIF: <session_id>, <tcp_notif> <u>Parameters</u> <session_id> TCP session index <closing_type> 0 Abort. Fast closing of the TCP connection. 1 The TCP connection is properly closed, which means that data sent to the module by AT+KTCPSND will be sent to the TCP server and acknowledged before the socket is closed. <tcp_notif> See command AT+KTCPCNX	<i>Write command</i> <u>Syntax</u> AT+KTCPCLOSE =<session_id>[,<closing_type>]	<u>Response</u> OK or +CME ERROR: <err> NO CARRIER +KTCP_NOTIF: <session_id>, <tcp_notif> <u>Parameters</u> <session_id> TCP session index <closing_type> 0 Abort. Fast closing of the TCP connection (not supported). 1 The TCP connection is properly closed, which means that data sent to the module by AT+KTCPSND will be sent to the TCP server and acknowledged before the socket is closed. <tcp_notif> See command AT+KTCPCNX
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This function first closes the TCP socket and if there is no other session running then the PDP context is released - You can use AT+KTCPDEL=<session_id> to delete the socket configuration after close	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This function first closes the TCP socket and if there is no other session running then the PDP context is released - AT+KTCPDEL=<session_id> can be used to delete the socket configuration after close

13.9.6. +KTCPDEL Command: Delete a Configured TCP Session

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KTCPDEL=?	<u>Response</u> +KTCPDEL: (list of possible <session_id>s) OK
<i>Write command</i> <u>Syntax</u> AT+KTCPDEL= <session_id>	<u>Response</u> OK or +CME ERROR: <err> +KTCP_NOTIF: <session_id>, <tcp_notif> <u>Parameters</u> <session_id> TCP session index <tcp_notif> See command AT+KTCPCNX	<i>Write command</i> <u>Syntax</u> AT+KTCPDEL= <session_id>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <session_id> TCP session index
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The session must be closed (using +KTCPCLOSE) before using this command	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The session must be closed (using +KTCPCLOSE) before using this command

13.9.7. +KTCP_SRVREQ Notification: Incoming Client Connection Request

HL6528x		HL85xxx	
<i>Unsolicited Notification</i>	<u>Response</u> +KTCP_SRVREQ: <session_id>,<subsession_id>,<client_ip>,<client_port> <u>Parameters</u> <session_id> TCP session index <subsession_id> Newly created TCP session index <client_ip> Dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4, the ip address of the incoming client <client_port> Numeric parameter (0-65535), the port of the incoming client	<i>Unsolicited Notification</i>	<u>Response</u> +KTCP_SRVREQ: <session_id>,<subsession_id>,<client_ip>,<client_port> <u>Parameters</u> <session_id> TCP session index <subsession_id> Newly created TCP session index <client_ip> IP address string of the incoming socket <client_port> Numeric parameter (0-65535), the port of the incoming client
<u>Examples</u>	Configure HL6528x to TCP servers AT&K3+KCNXCFG=0,"GPRS","szsjmc.gd"; +KTCPCFG=0,1,,179 +KTCPCFG: 1 OK AT&K3+KCNXCFG=0,"GPRS","szsjmc.gd"; +KTCPCFG=0,1,,180 +KTCPCFG: 2 OK Start the TCP servers AT+KTCPCNX=1 //listen on the port 179 OK AT+KTCPCNX=2 //listen on the port 180 OK	<u>Examples</u>	Configure the module to TCP servers AT+KCNXCFG=0,"GPRS","szsjmc.gd"; +KTCPCFG=0,1,,179 +KTCPCFG: 1 OK AT+KCNXCFG=0,"GPRS","szsjmc.gd"; +KTCPCFG=0,1,,180 +KTCPCFG: 2 OK Start the TCP servers AT+KTCPCNX=1 //listen on the port 179 OK AT+KTCPCNX=2 //listen on the port 180 OK

HL6528x	HL85xxx
Show the HL6528xTCP servers' IP address AT+KCGPADDR +KCGPADDR: 0,"192.168.1.49" OK Incoming connection request from remote client, shows ip address and port of remote client +KTCP_SRVREQ: 1,3,"192.168.0.32",4614 //incoming a connection request from "192.168.0.32" via //HL6528x listening port 179, the remote port is 4614 +KTCP_SRVREQ: 2,4,"10.10.10.110",4665 //incoming a connection request from "10.10.10.110" via //HL6528x listening port 180, the remote port is 4665 +KTCP_SRVREQ: 2,5,"10.10.10.110",4668 //incoming a connection request from the same ip via the same //listening port, the remote port is 4668 +KTCP_SRVREQ: 1,6,"192.168.1.117",1739 //incoming a connection request from "192.168.1.117" via //HL6528x listening port 179, the remote port is 1739 +KTCP_NOTIF: 4,4 //the connection of sub session id 4 (on listening port 180) is //closed. +KTCP_SRVREQ: 2,4,"10.10.10.8",4672 //incoming a connection request from "10.10.10.8" via HL6528x //listening port 180, the remote port is 4672	Show the TCP servers' IP address AT+KCGPADDR +KCGPADDR: 0,"192.168.1.49" OK Incoming connection request from remote client, shows ip address and port of remote client +KTCP_SRVREQ: 1,3,"192.168.0.32",4614 //incoming a connection request from "192.168.0.32" via //listening port 179, the remote port is 4614 +KTCP_SRVREQ: 2,4,"10.10.10.110",4665 //incoming a connection request from "10.10.10.110" via //listening port 180, the remote port is 4665 +KTCP_SRVREQ: 2,5,"10.10.10.110",4668 //incoming a connection request from the same ip via the same //listening port, the remote port is 4668 +KTCP_SRVREQ: 1,6,"192.168.1.117",1739 //incoming a connection request from "192.168.1.117" via //listening port 179, the remote port is 1739 +KTCP_NOTIF: 4,4 //the connection of sub session id 4 (on listening port 180) is //closed. +KTCP_SRVREQ: 2,4,"10.10.10.8",4672 //incoming a connection request from "10.10.10.8" via listening //port 180, the remote port is 4672

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This notification is sent when a client requests a connection to the server. The connection is automatically accepted - The created session is driven as any other TCP session with its own session ID. Use KTCPSND, KTCPCRCV, KTCPCLOSE, etc. to provide the service associated to this TCP server - The TCP server corresponding to the session ID is still able to receive connection requests from other clients. These requests are notified with KTCP_SRVREQ - The client ip address and port can also be checked by "AT+KTCPCFG?" after client is connected to HL6528x TCP server	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This notification is sent when a client requests a connection to the server. The connection is automatically accepted - The created session is driven as any other TCP session with its own session ID. Use KTCPSND, KTCPCRCV, KTCPCLOSE, etc. to provide the service associated to this TCP server - The TCP server corresponding to the session ID is still able to receive connection requests from other clients. These requests are notified with KTCP_SRVREQ - The client IP address and port can also be checked by "AT+KTCPCFG?" after client is connected to the TCP server

13.9.8. +KTCP_DATA Notification: Incoming Data through a TCP Connection

HL6528x		HL85xxx	
<i>Unsolicited Notification</i>	<u>Response</u> +KTCP_DATA: <session_id>,<ndata available>[,<data>] <CR><LF> <u>Parameters</u> <session_id> TCP session index <ndata available> Maximum number of bytes to be read <data> Data in octet. The length of data is specified by <ndata_available>	<i>Unsolicited Notification</i>	<u>Response</u> +KTCP_DATA: <session_id>,<ndata available>[,<data>] <u>Parameters</u> <session_id> TCP session index <ndata available> for <data_mode> = 0, maximum number of bytes to be read in the TCP receive buffer for <data_mode> = 1, maximum number of bytes to be read in <data> <data> Data in octet. The length of data is specified by <ndata_available>

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • +KTCP_DATA will indicate the accumulated number of bytes to be read by the next AT+KTCPCRV. • As soon as the connection is established, the module can receive data through the TCP socket. This notification is sent when data are available in the receive buffer • This notification is sent for each TCP packet received • When <data_mode> is set to 1, <ndata_available> will range from 1 to 1500 in the URC. If the user application sends over 1500 bytes of data to the module, the module will display those data with several URCs • See section 23.8.3 for use cases for KTCP_DATA and KUDP_DATA	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This notification is sent when data is available in the receive buffer. When <data_mode> is set to 0 (Do not display data in URC), it will only be sent once. The controlling software must read the buffer with +KTCPCRV in order to activate the notification again. • To determine the accumulated number of bytes to be read by the next AT+KTCPCRV, use AT+KTCPSTAT. • As soon as the connection is established, the module can receive data through the TCP socket. This notification is sent when data is available in the receive buffer. • This notification is sent for each TCP packet received. • When <data_mode> is set to 1, <ndata_available> will range from 1 to 1500 in the URC. If the user application sends over 1500 bytes of data to the module, the module will display those data with several URCs. • See section 23.8.3 for use cases for KTCP_DATA and KUDP_DATA.

13.9.9. +KTCP_IND Notification: TCP Status

Note: For HL85xxx only.

HL85xxx	
<i>Unsolicited Notification</i>	<u>Response</u> +KTCP_IND: <session_id>,<status> <u>Parameters</u> <session_id> TCP session index <status> Status of the TCP session. 1 session is set up and ready for operation
<u>Reference</u> Sierra Wireless Proprietary	

13.9.10. +KTCPSTAT Command: Get TCP Socket Status

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+KTCPSTAT=?	<u>Response</u> OK	<u>Syntax</u> AT+KTCPSTAT=?	<u>Response</u> OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KTCPSTAT?	<u>Response</u> OK	<u>Syntax</u> AT+KTCPSTAT?	<u>Response</u> OK

HL6528x		HL85xxx	
<i>Write command</i>		<i>Execute command</i>	
<u>Syntax</u> AT+KTCPSTAT= <session_id>	<u>Response</u> +KTCPSTAT: <status>,<tcp_notif>,<rem_data>,<rcv_data> OK	<u>Syntax</u> For all TCP session IDs: AT+KTCPSTAT or AT+KTCPSTAT= <session_id>	<u>Response</u> +KTCPSTAT: <session_id>,<status>,<tcp_notif>,<rem_data>,<rcv_data> [...] OK
	<u>Parameters</u> <session_id> TCP session index <status> value to indicate TCP socket state 0 socket not defined, use KTCPCFG to create a TCP socket 1 socket is only defined but not used 2 socket is opening and connecting to the server, cannot be used 3 connection is up, socket can be used to send/receive data 4 connection is closing, it cannot be used, wait for status 5 5 socket is closed <tcp_notif> -1 if socket/connection is OK , <tcp_notif> if an error has happened <rem_data> remaining bytes in the socket buffer, waiting to be sent <rcv_data> received bytes, can be read with +KTCPRCV command		<u>Parameters</u> <session_id> TCP session index <status> value to indicate TCP socket state 0 socket not defined, use KTCPCFG to create a TCP socket 1 socket is only defined but not used 2 socket is opening and connecting to the server, cannot be used 3 connection is up, socket can be used to send/receive data 4 connection is closing, it cannot be used, wait for status 5 5 socket is closed <tcp_notif> -1 if socket/connection is OK , <tcp_notif> if an error has happened <rem_data> remaining bytes in the socket buffer, waiting to be sent <rcv_data> received bytes, can be read with +KTCPRCV command

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Socket buffer size is 1460 bytes - This command returns +CME ERROR: 910 (Bad Session ID) for undefined <session_id>s	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Size of socket buffer for sending is 17520 bytes - This command returns +CME ERROR: 910 (Bad Session ID) for undefined <session_id>s

13.9.11. +KTCPSTART Command: Start a TCP Connection in Direct Data Flow

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KTCPSTART =?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+KTCPSTART ?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+KTCPSTART =<session_id>	<u>Response</u> CONNECT OK or +CME ERROR: an error occurs, syntax error +KTCP_NOTIF: <session_id>,<tcp_notif> : an error occurs <u>Parameters</u> <session_id> TCP session index

HL6528x and HL85xxx	
	<tcp_notif> See command AT+KTCPCNX
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This function is used to send and receive data bytes through a TCP socket • Before using this command, it is highly recommended to configure the module for hardware flow control, using the command AT&K3 • The behavior of DTR drop meets with AT&D • +++ can be used to switch in command mode • ATO<session_id> can be used to switch back in data mode • Only 1 KTCPSTART session can be used • Can be used in 07.10 multiplexer • If the session is successfully connected by +KTCPCNX, this command does not restart the connection and the module will enter direct data flow directly

13.9.12. +KTCP_ACK Notification: Status Report for Latest TCP Data

HL6528x and HL85xxx					
<i>Unsolicited notification</i>	<u>Response</u> +KTCP_ACK: <session_id>,<result> <CR><LF>				
	<u>Parameters</u> <session_id> TCP session index				
	<result> <table> <tr> <td>0</td> <td>Data sent failure: not all data has been received by remote side</td> </tr> <tr> <td>1</td> <td>Data sent success: all the data has already been received by the remote side</td> </tr> </table>	0	Data sent failure: not all data has been received by remote side	1	Data sent success: all the data has already been received by the remote side
0	Data sent failure: not all data has been received by remote side				
1	Data sent success: all the data has already been received by the remote side				
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This URC is enabled or disabled by parameter <URC-ENDTCP-enable> of command ""+KTCPCFG". The URC is disabled by default • See section 23.6.6 for use cases for AT+KTCPACKINFO and <URC-ENDTCP-enable> option				

13.9.13. +KTCPACKINFO Command: Poll ACK Status for the Latest Data

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KTCPACKINFO=?	<u>Response</u> OK
		<i>Read command</i> <u>Syntax</u> AT+KTCPACKINFO?	<u>Response</u> OK
<i>Write command</i> <u>Syntax</u> AT+KTCPACKINFO=<session_id>	<u>Response</u> +KTCPACKINFO: <session_id>,<result> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> TCP session index <result> 0 Data sent failure: not all data has been received by remote side. 1 Data sent success: all the data has already been received by the remote side 2 The status is unknown yet	<i>Execute command</i> <u>Syntax</u> For all TCP session IDs with <URC-ENDTCP-enable>=1: AT+KTCPACKINFO or AT+KTCPACKINFO=<session_id>	<u>Response</u> +KTCPACKINFO: <session_id>,<result> [...] OK or +KTCPACKINFO: <session_id>,<result> OK +CME ERROR: <err> <u>Parameters</u> <session_id> TCP session index <result> 0 Data sent failure: not all data has been received by remote side. 1 Data sent success: all the data has already been received by the remote side; or no data transfer has happened yet 2 The status is unknown yet

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The command will return ERROR if <URC-ENDTCP-enable> of command "+KTCPCFG" is 0 - Before the first AT+KTCPSEND of the session, AT+KTCPACKINFO returns 2	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The command will return ERROR if <URC-ENDTCP-enable> of command "+KTCPCFG" is 0 - After the TCP session is connected and before any data transfer, AT+KTCPACKINFO returns 1

13.10. FTP Client Specific Commands

13.10.1. +KFTPCFG Command: FTP Configuration

HL6528x		HL85xxx	
		<i>Test command</i>	
		<u>Syntax</u> AT+KFTPCFG=?	<u>Response</u> +KFTPCFG: (list of possible <cnx cnf>s),<server-name/ip>,(range of possible length of <login>),(range of possible length of <password>),(list of possible <port_number>s),(list of possible <mode>s),(list of possible <start>s),(list of possible <af>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KFTPCFG?	<u>Response</u> +KFTPCFG: <cnx cnf>,<server_name>,<login>,<password>,<port_number>,<mode>	<u>Syntax</u> AT+KFTPCFG?	<u>Response</u> +KFTPCFG: <session_id>,<cnx cnf>,<server_name>,<login>,<password>,<port_number>,<mode>,<started>,<af>

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KFTPCFG= [<cnx cnf >], <server_name> [,<login> [, <password> [,<port_number> [,<mode>]]]]	<u>Response</u> +KFTPCFG:<session_id> OK <u>Parameters</u> <cnx cnf> [0...7] (PDP context configuration) a numeric parameter which specifies a particular PDP context configuration <session_id> FTP session index <server_name> string type. Consists of a dot-separator numeric (0-255) parameters on the form a1.a2.a3.a4, to identify the ftp server or domain name of the server <login> string type, indicates the user name to be used during the FTP connection <password> string type, indicates the password to be used during the FTP connection <port_number> numeric parameter (0-65535). Indicates the remote command port (21 by default) <mode> numeric number. Indicates the initiator of the FTP connection. 0 Active. The server is initiator of the FTP data connection 1 Passive. The client is initiator of the FTP data connection in order to avoid the proxy filtrate. The passive data transfer process "listens" on the data port for a	<u>Syntax</u> AT+KFTPCFG= [<cnx cnf>], <server_name> [,<login> [, <password> [,<port_number> [,<mode>] [,<start>] [,<af>]]]]	<u>Response</u> +KFTPCFG:<session_id> OK or +KFTP_ERROR: <session_id>,<ftp cause> <u>Parameters</u> <cnx cnf> 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration <session_id> FTP session index <server_name> IP address string of the ftp server or domain name of the server <login> string type, indicates the user name to be used during the FTP connection <password> string type, indicates the password to be used during the FTP connection <port_number> numeric parameter (1-65535). Indicates the remote command port (21 by default) <mode> numeric number. Indicates the initiator of the FTP connection. 0 Active. The server is initiator of the FTP data connection 1 Passive. The client is initiator of the FTP data connection in order to avoid the proxy filtrate. The passive data transfer process "listens" on the data port for a

HL6528x	HL85xxx
connection from the active transfer process in order to open the data connection. Note that only passive mode is currently supported, active mode is internally switched to passive	connection from the active transfer process in order to open the data connection Note that only passive mode is currently supported, active mode is internally switched to passive <start> Specifies whether to start the FTP connection immediately. 0 Start the FTP connection later by +KFTPCNX 1 Start the FTP connection immediately <started> Specifies whether to the FTP connection has been started 0 FTP connection hasnot been started yet 1 FTP connection has been started <af> Address family used for the connection. 0 IPV4 1 IPV6 <ftp_cause> Integer type. Indicates the cause of the FTP connection failure. 0 the sending or the retrieving was impossible due to request timeout 1 it is impossible to connect to the server due to DNS resolution failure 2 it is impossible to download a file due to connection troubles 3 the download was impossible due to connection timeout 4 no network available 5 flash access trouble 6 flash memory full 7 network error XXX three digits, reply codes from FTP server. See section 23.2.4 FTP Reply Codes

HL6528x		HL85xxx	
<u>Example</u>	AT+KFTPCFG=0,"ftp.connect.com","username", "password",21,0	<u>Example</u>	AT+KFTPCFG=1,"ftp.connect.com","username", "password",21,0
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Execution command sets the server name, the login, the password, the port number and the mode for ftp operations - Only one ftp session is currently supported, <session_id> is always 0	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Execution command sets the server name, the login, the password, the port number and the mode for ftp operations. - This command (with <start> = 0) can be used before setting up +KCNXCFG configuration. Note however that the latter is required to start the connection properly. - The connection timeout for TCP socket is about 9 seconds with 3 retransmissions with a 3-second delay. - The result of the FTP connection is indicated by URC.

13.10.2. +KFTPCNX Command: Start FTP Connection

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KFTPCNX=?	<u>Response</u> +KFTPCNX: (list of possible <session_id>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+KFTPCNX= <session_id>	<u>Response</u> OK

HL85xxx	
	or NO CARRIER +CME ERROR: <err> +KFTP_ERROR: <session_id>,<ftp cause> <u>Parameters</u> <session_id> FTP session index <ftp_cause> Integer type. Indicates the cause of the FTP connection failure. 0 the sending or the retrieving was impossible due to request timeout 1 it is impossible to connect to the server due to DNS resolution failure 2 it is impossible to download a file due to connection troubles 3 the download was impossible due to connection timeout 4 no network available 5 flash access trouble 6 flash memory full 7 network error XXX three digits, reply codes from FTP server. See section 23.2.4 FTP Reply Codes
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This command is used for start the FTP connection created by +KFTPCFG with <start>=0. • +KFTPCV, +KFTPSND, +KFTPDEL automatically starts the connection if has not been started using AT+KFTPCNX. • The result of the FTP connection is indicated by URC.

13.10.3. +KFTPRCV Command: Receive FTP Files

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KFTPRCV=?	<u>Response</u> +KFTPRCV: (list of possible <session_id>s),<local_uri>,<server_path>,<file_name>,(list of possible <type_of_file>s),(list of possible <offset>s) OK
<i>Write command</i> <u>Syntax</u> AT+KFTPRCV= <session_id>, [<local_uri>], [<server_path>], <file_name> [, <type_of_file> [,<offset>]]	<u>Response</u> CONNECT <EOF_pattern> OK or +CME ERROR<err> +KFTP_RCV_DONE: <session_id> NO CARRIER +KFTP_ERROR :<session_id>, <ftp cause> <u>Parameters</u> <session_id> FTP session index <local_uri> String type. Indicates the URI of the destination file. It shall start with "/". An empty string or no string indicates that the data will be transmitted to the serial link in data mode - CONNECT/OK. If this string is present, the file will be silently downloaded to this destination, as the download is finish the module notifies the user - +KFTP_RCV_DONE <server_path> string type. Indicates the path of the file to be downloaded. An empty string or no string indicates the	<i>Write command</i> <u>Syntax</u> AT+KFTPRCV= <session_id>, [<local_uri>], [<server_path>], <file_name> [, <type_of_file> [,<offset>]]	<u>Response</u> CONNECT <EOF_pattern> OK or +CME ERROR<err> NO CARRIER +KFTP_ERROR: <session_id>,<ftp cause> <u>Parameters</u> <session_id> FTP session index <local_uri> This argument must be empty. It is reserved for compatibility of command syntax. <server_path> String type. Indicates the path of the file to be downloaded. An empty string or no string indicates the downloading is done from the path given by the FTP server

HL6528x	HL85xxx
downloading is done from the path given by the <server_name> parameter <file_name> string type. Indicates the name of the file to download <type_of_file> Numeric type. Indicates the type of file (ASCII or binary) to transfer 0 Binary 1 ASCII <offset> Integer type(0-4294967295). Indicates the offset to "resume transfer". See section 23.7.3 "FTP Resume" Use Case. When downloading file and transmitting to serial link, module will use the <offset> value and "resume transfer" from this position. When downloading file to flash, the <offset> should be set to non-zero. Then the Module will automatically detect the real size of the file in file system. The real size will be used as the real <offset> for resuming transfer. <EOF_pattern> End of file notification. See +KPATTERN for values <ftp_cause> Integer type. Indicates the cause of the FTP connection failure 0 the sending or the retrieving was impossible due to request timeout 1 it is impossible to connect to the server due to DNS resolution failure 2 it is impossible to download a file due to connection troubles. 3 the download was impossible due to connection timeout 4 no network available 5 flash access trouble 6 flash memory full	<file_name> string type. Indicates the name of the file to download <type_of_file> Numeric type. Indicates the type of file (ASCII or binary) to transfer 0 Binary (default value) 1 ASCII <offset> Integer type(0-4294967295). Indicates the offset to "resume transfer". See 23.7.3 "FTP Resume" Use Case. When downloading file and transmitting to serial link, module will use the <offset> value and "resume transfer" from this position. When downloading file to flash, the <offset> should be set to non-zero. Then the Module will automatically detect the real size of the file in file system. The real size will be used as the real <offset> for resuming transfer. <EOF_pattern> End of file notification. See +KPATTERN for value <ftp_cause> Integer type. Indicates the cause of the FTP connection failure 0 the sending or the retrieving was impossible due to request timeout 1 it is impossible to connect to the server due to DNS resolution failure 2 it is impossible to download a file due to connection troubles. 3 the download was impossible due to connection timeout 4 no network available 5 flash access trouble

HL6528x		HL85xxx	
	XXX three digits, reply codes from FTP server. See section 23.2.4 FTP Reply Codes		6 flash memory full 7 network error XXX three digits, reply codes from FTP server. See section 23.2.4 FTP Reply Codes
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Before using this command an FTP connection must have been achieved using AT+KFTPCFG - The only valid <local_uri> is "/filename". Note that the file will be written as "/ftp/<local_uri>" - After sending the +KFTPCV command, the user will receive the entire data stream - The user can abort the download by sending any character from the host. In this case, the module will end the transfer by transmitting the EOF followed by ERROR - If set AT&D2, the user can terminate the download by turning DTR off. The module will then return: NO CARRIER - AT&D1 is not available for this command +++ is not available for this command - If set AT&C1, DCD will be ON after CONNECT, and DCD will be OFF after download done "Resume transfer" feature shall be supported by the FTP server to be used. - See section 23.7.3 "FTP Resume" Use Case - If the FTP server does not support the resume feature, module will output KFTP_ERROR. The <ftp_cause> will be in the sets {500, 501, 502, 421, 530}. See section 23.2.4 FTP Reply Codes for error codes	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Before using this command an FTP connection must have been achieved using AT+KFTPCFG - After sending the +KFTPCV command, the user will receive the entire data stream - The user can abort the download by sending the "end of data pattern" from the host. In this case, the module will end the transfer by transmitting the EOF followed by NO CARRIER - Download can also be aborted (disconnected) by +++ or DTR as specified in section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table - If set AT&C1, DCD will be ON after CONNECT, and DCD will be OFF after the download is done "Resume transfer" feature shall be supported by the FTP server to be used. - See section 23.7.3 "FTP Resume" Use Case - If the FTP server does not support the resume feature, module will output KFTP_ERROR. The <ftp_cause> will be in the sets {500, 501, 502, 421, 530}. See section 23.2.4 FTP Reply Codes for error codes

13.10.4. +KFTPSND Command: Send FTP Files

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KFTPSND=?	<u>Response</u> +KFTPSND: (list of possible <session_id>s),<local_uri>,<server_path>,<file_name>, (list of possible <type of file>s), (list of possible <append>s) OK
<i>Write command</i> <u>Syntax</u> AT+KFTPSND= <session_id>, [<local_uri>], [<server_path>], <file_name> [,<type of file>] [,<append>]	<u>Response</u> CONNECT data ... OK <EOF pattern> OK +KFTP_SND_DONE: <session_id> or +CME ERROR <err> NO CARRIER +KFTP_ERROR : <session_id>,<ftp cause> <u>Parameters</u> <session_id> FTP session index <local_uri> String type. Indicates the URI of the file to upload. An empty string or no string indicates that the data will be transmitted to the serial link in data mode - CONNECT/OK. If this string is present, the file will be silently uploaded to this destination, as the upload is finish the module notifies the user - +KFTP_SND_DONE	<i>Write command</i> <u>Syntax</u> AT+KFTPSND= <session_id>, [<local_uri>], [<server_path>], <file_name> [,<type of file>] [,<append>]	<u>Response</u> CONNECT data ... OK <EOF pattern> OK +KFTP_SND_DONE: <session_id> or +CME ERROR <err> NO CARRIER +KFTP_ERROR: <session_id>,<ftp cause> <u>Parameters</u> <session_id> FTP session index <local_uri> This argument must be empty. It is reserved for compatibility of command syntax.

HL6528x	HL85xxx
<server_path> string type. Indicates the path of the file to be uploaded. An empty string or no string indicates the uploading is done from the path given by the <server_name> parameter <file_name> string type. Indicates the name of the file to upload <type of file> Numeric type. Indicates the type of file (ASCII or binary) to transfer <u>0</u> Binary 1 ASCII <append> Numeric type. Indicates using "append" or not when uploading. <u>0</u> Do not use "append". (default value) If the file already exists then the file will be overridden 1 Use "append". If the file already exists then the data will be appended at the end of the file; otherwise the file will be created <EOF pattern> End of file notification. See KPATTERN for values <ftp_cause> Integer type. Indicates the cause of the FTP connection failure 0 the sending or the retrieving was impossible due to request timeout 1 it is impossible to connect to the server due to DNS resolution failure 2 it is impossible to upload a file due to connection troubles 3 the upload was impossible due to connection timeout 4 no network available 5 flash access trouble	<server_path> string type. Indicates the path of the file to be uploaded. An empty string or no string indicates the uploading is done from the path given by the FTP server <file_name> string type. Indicates the name of the file to upload <type of file> Numeric type. Indicates the type of file (ASCII or binary) to transfer <u>0</u> Binary 1 ASCII <append> Numeric type. Indicates using "append" or not when uploading. <u>0</u> Do not use "append". (default value) If the file already exists then the file will be overridden 1 Use "append". If the file already exists then the data will be appended at the end of the file; otherwise the file will be created <EOF pattern> End of file notification. See KPATTERN for values <ftp_cause> Integer type. Indicates the cause of the FTP connection failure. 0 the sending or the retrieving was impossible due to request timeout 1 it is impossible to connect to the server due to DNS resolution failure 2 it is impossible to download a file due to connection troubles. 3 the download was impossible due to connection timeout 4 no network available 5 flash access trouble

HL6528x		HL85xxx	
	XXX three digits, reply codes from FTP server. See section 23.2.4 FTP Reply Codes		6 flash memory full 7 network error XXX three digits, reply codes from FTP server. See section 23.2.4 FTP Reply Codes
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Before using this command an FTP connection must have been achieved using AT+KFTPCFG - The only valid <local_uri> is "/filename" - After sending the +KFTPSND command, the host must send the entire data stream of the file - If set AT&D2, the user can terminate the upload by turning DTR off. The module will then return NO CARRIER - ATO is not available for this command - If AT&C1 is set, DCD will be ON after CONNECT, and it will be OFF after the upload done	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Before using this command an FTP connection must have been achieved using AT+KFTPCFG - After sending the +KFTPSND command, the host must send the entire data stream of the file - Upload can also be ended (disconnected) by +++ or DTR as specified in section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table - ATO is not available for this command - If AT&C1 is set, DCD will be ON after CONNECT, and it will be OFF after the upload is done

13.10.5. +KFTPDEL Command: Delete FTP Files

HL6528x		HL85xxx	
		<i>Test command</i>	
		<u>Syntax</u> AT+KFTPDEL=?	<u>Response</u> +KFTPDEL: (list of possible <session_id>s),<server_path>,<file_name>,(list of possible <type>s) OK

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KFTPDEL= <session_id> , [<server_path>] , <file_name> [,<type>]	<u>Response</u> OK or +CME ERROR <err> NO CARRIER +KFTP_ERROR : <session_id>,<ftp cause> <u>Parameters</u> <session_id> FTP session index <server_path> string type. Indicates the path of the file to be deleted. An empty string or no string indicates the deleting is done from the path given by the <server_name> parameter <file_name> string type. Indicates the name of the file to delete <type> Numeric type. Indicates the type of file (ASCII or binary) to transfer 0 Binary 1 ASCII <ftp_cause> Integer type. Indicates the cause of the FTP connection failure 0 the sending or the retrieving was impossible due to request timeout 1 it is impossible to connect to the server due to DNS resolution failure 2 it is impossible to delete a file due to connection troubles 3 the deleting was impossible due to connection timeout 4 no network available	<u>Syntax</u> AT+KFTPDEL= <session_id> , [<server_path>] , <file_name> [,<type>]	<u>Response</u> OK or +CME ERROR <err> NO CARRIER +KFTP_ERROR: <session_id>,<ftp cause> <u>Parameters</u> <session_id> FTP session index <server_path> string type. Indicates the path of the file to be deleted. An empty string or no string indicates the deleting is done from the path given by the FTP server <file_name> string type. Indicates the name of the file to delete <type> Numeric type. Indicates the type of file (ASCII or binary) to transfer 0 Binary 1 ASCII <ftp_cause> Integer type. Indicates the cause of the FTP connection failure 0 the sending or the retrieving was impossible due to request timeout 1 it is impossible to connect to the server due to DNS resolution failure 2 it is impossible to delete a file due to connection troubles 3 the deleting was impossible due to connection timeout 4 no network available

HL6528x		HL85xxx	
	XXX three digits, reply codes from FTP server. See section 23.2.4 FTP Reply Codes		XXX three digits, reply codes from FTP server. See section 23.2.4 FTP Reply Codes
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Before using this command an FTP connection must have been achieved using AT+KFTPCFG	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Before using this command an FTP connection must have been achieved using AT+KFTPCFG - The result of the delete operation is indicated by URC

13.10.6. +KFTP_IND Notification: FTP Status

Note: For HL85xxx only.

HL85xxx	
<i>Unsolicited Notification</i>	<u>Response</u> +KFTP_IND: <session_id>,<status>[,<data_len>] <u>Parameters</u> <session_id> FTP session index <status> Status of the FTP session 1 Session is set up and ready for operation 2 The last FTP command is executed successfully <data_len> Byte length of data downloaded/uploaded to/from the terminal (+KFTPCV/+KFTPSND)
<u>Reference</u> Sierra Wireless Proprietary	

13.10.7. +KFTPCLOSE Command: Close Current FTP Connection

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KFTPCLOSE =?	<u>Response</u> +KFTPCLOSE: (list of possible <session_id>s), (list of possible <keep_cfg>s) OK
<i>Write command</i> <u>Syntax</u> AT+KFTPCLOSE = <session_id>	<u>Response</u> OK <u>Parameters</u> <session_id> FTP session index	<i>Write command</i> <u>Syntax</u> AT+KFTPCLOSE = <session_id> [,<keep_cfg>]	<u>Response</u> OK <u>Parameters</u> <session_id> FTP session index <keep_cfg> Specifies whether to delete the session configuration after closing it <u>0</u> Delete the session configuration <u>1</u> Keep the session configuration
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command will close the connection to the FTP server	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command will close the connection to the FTP server

13.10.8. +KFTPCFGDEL Command: Delete a Configured FTP Session

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KFTPCFGDEL=?	<u>Response</u> +KFTPCFGDEL: (list of possible <session_id>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+KFTPCFGDEL= <session_id>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> FTP session index
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The session must be closed (using +KFTPCLOSE) before using this command

13.11. FTP Server Specific Commands

Note: All commands in this sub-section are applicable to the HL6528x only.

13.11.1. +KFTPDCFG Command: FTP Server Configuration

HL6528x	
Read command	
<u>Syntax</u> AT+KFTPDCFG?	<u>Response</u> +KFTPDCFG: <cnx cnf>,<mode>,<root fs>,<password>,<port number> OK
Write command	
<u>Syntax</u> AT+KFTPDCFG= [<cnx cnf >,<mode>,<root fs>,<password>,<port number>]	<u>Response</u> OK <u>Parameters</u> <cnx cnf> 0 – 7 PDP context configuration; numeric parameter which specifies a particular PDP context configuration <root fs> Root directory of the assigned to the FTP server. <password> String type, indicates the password to be used during the FTP connection. <port number> Numeric parameter (0-65535). Indicates the remote command port (21 by default) <mode> Numeric number. Indicates the initiator of the FTP connection. 0 active. The server is initiator of the FTP data connection (Currently not supported. Active mode is internally switched to passive mode.) 1 passive. The client is initiator of the FTP data connection in order to avoid the proxy filtrate. The passive data transfer process “listens” on the data port for a connection from the active transfer process in order to open the data connection.

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Execution command configures the server. See KFTPDRUN for server activation • Only one ftp server session is currently supported • The only valid <root fs> is "/ftp" • When logging in the ftp server, only password is required, username is not required

13.11.2. +KFTPSTAT Command: FTP Server Status

HL6528x	
<i>Read command</i>	
<u>Syntax</u> AT+KFTPSTAT ?	<u>Response</u> +KFTPSTAT: <state>,<nb_users>,<notif> OK <u>Parameters</u> <state> Status of the server 0 Deactivated. The FTP service is not available 1 Activated. The FTP service is ready <nb_users> Number of users currently connected <notif> Activation of unsolicited notification KFTPSTAT_NOTIF 0 Disable. Event of the server are not sent to V24 1 Enable. Event of the server are sent to V24 with KFTPSTAT_NOTIF

HL6528x	
<i>Write command</i>	
<u>Syntax</u> AT+KFTPSTAT =<notif>	<u>Response</u> OK <u>Parameter</u> <notif> Activation of unsolicited notification KFTP_STAT_NOTIFY 0 Disable. Event of the server are not sent to V24 1 Enable. Event of the server are sent to V24 with KFTP_STAT_NOTIFY
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Execution command configures the server. See KFTPDRUN for server activation • Only one ftp user is currently supported, <nb_users> is always 0

13.11.3. +KFTPDRUN Command: Run FTP Server

HL6528x	
<i>Write command</i>	
<u>Syntax</u> AT+KFTPDRUN= <notif>	<u>Response</u> +KFTPDRUN:<server ip> OK or +CME ERROR <err> NO CARRIER +KFTPDRUN_ERROR : <ftp cause> <u>Parameters</u> <server ip> IP address of the ftp server

HL6528x	
	<notif> Activation of unsolicited notification KFTPD_NOTIF 0 Disable. Event of the server are not sent to V24 1 Enable. Event of the server are sent to V24 with KFTPD_NOTIF <ftpd_cause> Integer type. Indicates the cause of the FTP connection failure 0 Not enough resource available 1 No network available
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - When the command returns OK, the server is activated and ready for FTP clients. Status of the server can be monitored with KFTPDSTAT - The kick out timer is defined by parameter <tim1> in AT+KCNXTIMER

13.11.4. +KFTPD_NOTIF Notification: Server Event Notification

HL6528x											
<i>Unsolicited Notification</i>	<u>Response</u> +KFTPD_NOTIF: <event>, <client ip>[,<uri>] <u>Parameters</u> <event> <table> <tr><td>0</td><td>Incoming connection from client <ip></td></tr> <tr><td>1</td><td>The client <ip> is uploading the file <uri></td></tr> <tr><td>2</td><td>The client <ip> is downloading the file <uri></td></tr> <tr><td>3</td><td>The client <ip> is deleting the file <uri></td></tr> <tr><td>4</td><td>Disconnection from client <ip></td></tr> </table> <ip> IP address of the client that is responsible of the event <uri> File concerned by the event (Only notification 1-3)	0	Incoming connection from client <ip>	1	The client <ip> is uploading the file <uri>	2	The client <ip> is downloading the file <uri>	3	The client <ip> is deleting the file <uri>	4	Disconnection from client <ip>
0	Incoming connection from client <ip>										
1	The client <ip> is uploading the file <uri>										
2	The client <ip> is downloading the file <uri>										
3	The client <ip> is deleting the file <uri>										
4	Disconnection from client <ip>										
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> These notifications can be disabled, the server still runs in silent mode										

13.11.5. +KFTPDKICK Command: Kick User from FTP Server

HL6528x	
<i>Write command</i>	
<u>Syntax</u> AT+KFTPDKICK= <ip>	<u>Response</u> OK <u>Parameters</u> <ip> IP address of the client to disconnect
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The client is only kicked from the server, not banned. He will be able to request another connection to the server. A blacklist of users and IP addresses could be added in a future evolution

13.11.6. +KFTPDCLOSE Command: Close FTP Server

HL6528x	
<i>Write command</i>	
<u>Syntax</u> AT+ KFTPDCLOSE	<u>Response</u> OK
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command will close the FTP server

13.12. UDP Specific Commands

13.12.1. +KUDPCFG Command: UDP Connection Configuration

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KUDPCFG=?	<u>Response</u> +KUDPCFG: (list of possible <cnx cnf>s),(list of possible <mode>s),(list of possible <port>s),(list of possible <data_mode>s),<remote-name/ip>,(list of possible <udp_port>s),(list of possible <af>s) OK
<i>Read command</i> <u>Syntax</u> AT+KUDPCFG?	<u>Response</u> +KUDPCFG: <session_id>,<cnx cnf>,<mode>,<port>,<data_mode> <CR><LF> +KUDPCFG: <session_id>,<cnx cnf>,<mode>,<port>,<data_mode>[...] OK	<i>Read command</i> <u>Syntax</u> AT+KUDPCFG?	<u>Response</u> +KUDPCFG: <session_id>,<cnx cnf>,<mode>,<port>,<data_mode>,<udp remote address>,<udp_port>,<af> [...] OK
<i>Write command</i> <u>Syntax</u> AT+KUDPCFG= <cnx cnf>,<mode>[,<port>][,<data_mode>]	<u>Response</u> +KUDPCFG: <session_id> OK or NO CARRIER +CME ERROR: <err> +KUDP_NOTIF: <session_id>,<udp_notif>	<i>Write command</i> <u>Syntax</u> AT+KUDPCFG= <cnx cnf>,<mode>[,<port>][,<data_mode>],[<udp remote address>],<udp_port>,<af>]	<u>Response</u> +KUDPCFG: <session_id> OK or NO CARRIER +CME ERROR: <err> +KUDP_NOTIF: <session_id>,<udp_notif>

HL6528x	HL85xxx
<u>Parameters</u> <session_id> UDP session index <mode> 0 Client 1 Server <port> (0-65535) Numeric parameter <cnx cnf> 0 – 7 PDP context configuration; numeric parameter which specifies a particular PDP context configuration (see section 13.7.1 +KCNXCFG Command: GPRS Connection Configuration). <udp_notif> Integer type. Indicates the cause of the UDP connection failure. 0 Network error 1 No more sockets available; max number already reached 2 Memory problem 3 DNS error 5 UDP connection error(Host unreachable) 6 Generic error 8 Data sending is OK but KUDPSND was waiting more or less characters 9 Bad session ID 10 Session is already running 11 All sessions are used <data_mode> 0 Do not display <data> in URC (Default setting) 1 Display <data> in URC	<u>Parameters</u> <session_id> UDP session index <mode> 0 Client 1 Server <port> Numeric parameter (0-65535) Default value is 0 (random) <cnx cnf> 1 – 5 PDP context configuration; numeric parameter which specifies a particular PDP context configuration (see section 13.7.1 +KCNXCFG Command: GPRS Connection Configuration). Note that for the HL8518, HL8528 and HL8529, the maximum number of connections is limited to 3. <udp_notif> Integer type. Indicates the cause of the UDP connection failure. 0 Network error 1 No more sockets available; max number already reached 2 Memory problem 3 DNS error 5 UDP connection error(Host unreachable) 6 Generic error 8 Data sending is OK but KUDPSND was waiting more or less characters 9 Bad session ID 10 Session is already running 11 All sessions are used <data_mode> 0 Do not display <data> in URC (Default setting) 1 Display <data> in URC <udp remote address> IP address string or explicit name of the remote host, Default is empty (given by +KUDPSND).

HL6528x		HL85xxx	
			<udp_port> UDP peer port; numeric parameter (0-65535). Default value is 0 (given by +KUDPSND). <af> Address family used for the connection. 0 IPV4 1 IPV6
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - For UDP socket in server mode, it is bound to a defined port number, incoming connection are notified by KUDP_DATA - Maximum <session_id> is 200 - When more than two different APN are used in +KCNXCFG, only one of them can be used in TCP or UDP services	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - For UDP socket in server mode, it is bound to a defined port number, incoming connection are notified by KUDP_DATA. If remote address and port are given, they are saved for use in +KUDPSND. - Maximum <session_id> is 32 +KCNXCFG configuration should be set up in order to start the connection properly. - When using “+++” to abort sending UDP data, URC “+KUDP_NOTIF: <session_id>,8” could be displayed.

13.12.2. +KUDP_DATA Notification: Incoming Data through a UDP Connection

HL6528x		HL85xxx	
<i>Unsolicited Notification</i>	<u>Response</u> +KUDP_DATA: <session_id>,<ndata available>[,<udp remote address>,<udp remote port>,<data>]<CR><LF> <u>Parameters</u> <session_id> UDP session index <ndata available> Number of bytes to be read	<i>Unsolicited Notification</i>	<u>Response</u> +KUDP_DATA: <session_id>,<ndata available>[,<udp remote address>,<udp remote port>,<data>] <u>Parameters</u> <session_id> UDP session index <ndata available> Number of bytes to be read

HL6528x		HL85xxx	
	<udp remote address> Dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4 <udp remote port> Numeric parameter (0-65535) <data> Data in octet. The length of data is specified by <ndata_available>		<udp remote address> IP address string of the remote host <udp remote port> Numeric parameter (0-65535) <data> Data in octet. The length of data is specified by <ndata_available>.
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - As soon as the UDP socket is created, the module can receive data through this socket. This notification is sent when data are available in the receive buffer - This notification will be sent one time. When <data_mode> was set to 0 (Do not display data in URC), the controlling software must read the buffer with KUDPRCV in order to activate the notification again - When <data_mode> was set to 1, <ndata_available> will range 1~1500 in the URC. In this case, user application should control the max-length of the UDP packet. The max-length should be less than 1500 bytes, or some data will be discarded - When <data_mode> was set to 1, URC "+KUDP_RCV" will not be displayed after "+KUDP_DATA" - When <data_mode> was set to 1, the fields <udp remote address> and <udp remote port> will be displayed in URC "+KUDP_DATA". When <data_mode> was set to 0, they will be displayed in URC "+KUDP_RCV" - See section 23.8.3 for use cases for KTCP_DATA and KUDP_DATA	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - As soon as the UDP socket is created, the module can receive data through this socket. This notification is sent when data are available in the receive buffer - This notification will be sent one time. When <data_mode> is set to 0 (Do not display data in URC), the controlling software must read the buffer with KUDPRCV in order to activate the notification again - When <data_mode> is set to 1, <ndata_available> will range from 1~1500 in the URC. If the user application sends over 1500 bytes of data to the module, the module will display those data with several URCs. It is possible for other applications (e.g. Windows) to send more than 1472 bytes of UDP packet to the module but the packet will be segmented and then reassembled by the network stack. - When <data_mode> is set to 1, URC "+KUDP_RCV" will not be displayed after "+KUDP_DATA" - When <data_mode> is set to 1, the fields <udp remote address> and <udp remote port> will be displayed in URC "+KUDP_DATA". When <data_mode> is set to 0, they will be displayed in URC "+KUDP_RCV" - See section 23.8.3 for use cases for KTCP_DATA and KUDP_DATA

13.12.3. +KUDPCLOSE Command: Close Current UDP Operation

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KUDPCLOSE =?	<u>Response</u> +KUDPCLOSE: (list of possible <session_id>s), (list of possible <keep_cfg>s) OK
<i>Action command</i> <u>Syntax</u> AT+KUDPCLOSE =<session_id>	<u>Response</u> OK or +KUDP_NOTIF: <session_id>, <udp_notif> <u>Parameters</u> <session_id> UDP session index <udp_notif> See command AT+KUDPCFG	<i>Action command</i> <u>Syntax</u> AT+KUDPCLOSE =<session_id> [,<keep_cfg>]	<u>Response</u> OK or +KUDP_NOTIF: <session_id>, <udp_notif> <u>Parameters</u> <session_id> UDP session index <udp_notif> See command AT+KUDPCFG <keep_cfg> Specifies whether to delete the session configuration after closing it <u>0</u> Delete the session configuration <u>1</u> Keep the session configuration
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This function closes the UDP session. If there is no other session running, the PDP context would be released - This function will delete the session configuration also	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This function closes the UDP session. If there is no other session running, the PDP context would be released - This function will delete the session configuration if <keep_cfg> = 0

13.12.4. +KUDPDEL Command: Delete a Configured UDP Session

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KUDPDEL=?	<u>Response</u> +KUDPDEL: (list of possible <session_id>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+KUDPDEL= <session_id>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> UDP session index
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The session must be closed (using +KUDPCLOSE) before using this command

13.12.5. +KUDP_IND Notification: UDP Status

Note: For HL85xxx only.

HL85xxx	
Unsolicited Notification	<u>Response</u> +KUDP_IND: <session_id>,<status> <u>Parameters</u> <session_id> UDP session index <status> Status of the UDP session. 1 session is set up and ready for operation
Reference Sierra Wireless Proprietary	

13.12.6. +KUDPSND Command: Send Data through a UDP Connection

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KUDPSND=?	<u>Response</u> +KUDPSND: (list of possible <session_id>s),<remote-name/ip>,(list of possible <udp_port>s),(list of possible <ndata>s) OK

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KUDPSND= <session id> , <udp remote address> , <udp_port> , <ndata>	<u>Response</u> CONNECT OK or NO CARRIER +CME ERROR: <err> +KUDP_NOTIF: <session_id>,<udp_notif> <u>Parameters</u> <session_id> UDP session index <udp remote address> Dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4 or explicit name of the remote server <udp_port> Numeric parameter (0-65535) <ndata> Number of bytes (max value 4294967295). In fact, only 1472 bytes can be sent successfully at one time. <udp_notif> See command AT+KUDPCFG	<u>Syntax</u> AT+KUDPSND= <session id> , <udp remote address> , <udp_port> , <ndata>	<u>Response</u> CONNECT OK or NO CARRIER +CME ERROR: <err> +KUDP_NOTIF: <session_id>,< udp_notif> <u>Parameters</u> <session_id> UDP session index <udp remote address> IP address string or explicit name of the remote host <udp_port> UDP peer port; numeric parameter (1-65535) <ndata> Number of bytes (max value 4294967295). <udp_notif> See command AT+KUDPCFG

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - User must use <EOF pattern> to finish sending, then module returns to command mode - All the data will be sent out ignoring <ndata>. If data sent is not equal to <ndata> then KUDP_NOTIF would appear <ndata> is the data size without <EOF pattern> - Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3 - The behavior of DTR drop meet with AT&D - Using “+++” can abort sending data and using ATO[n] to return back to data mode - The maximum transmission unit (MTU) is 1500 Bytes	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - User must use <EOF pattern> to finish sending, then module returns to command mode - All data will be sent out ignoring <ndata>. If data sent is not equal to <ndata> then KUDP_NOTIF would appear <ndata> is the data size without <EOF pattern> - Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3 - The behavior of DTR drop meets with AT&D - Using “+++” can abort sending data and using ATO[n] to return back to data mode - The maximum transmission unit (MTU) is 1500 Bytes - The <udp remote address> and <udp_port> are saved internally such that they can be omitted in subsequent calls of +KUDPSND - The packet segmentation is controlled by +KIPOPT with <option_id>=0 and the maximum UDP packet size is limited by <send size v4> (1472 bytes) or <send size v6> (1452 bytes); default value for both parameter is 1020 bytes. - If sending is suspended or aborted using +++ or by toggling DTR, "+KUDP_NOTIF: <session_id>,8" is displayed - All URCs are not buffered while AT commands are being entered in an AT port and before entering data mode. Some URCs are not buffered while the AT port is in data mode except for proprietary AT commands (of the form AT+Kxxx), SMS AT commands, GNSS AT commands and Internet AT commands.

13.12.7. +KUDPRCV Command: Receive Data through a UDP Connection

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KUDPRCV=?	<u>Response</u> +KUDPRCV: (list of possible <session_id>s),(list of possible <ndata>s) OK
<i>Write command</i> <u>Syntax</u> AT+KUDPRCV= <session_id>, <ndata>	<u>Response</u> CONNECT ...<EOF pattern> OK +KUDP_RCV: <udp remote address>,<udp remote port> or NO CARRIER +CME ERROR: <err> +KUDP_NOTIF: <session_id>, <udp_notif> +KUDP_DATA_MISSED: <session_id>, <ndata missed> <u>Parameters</u> <session_id> UDP session index <ndata> Number of bytes the device wants to receive (max value 4294967295) <udp remote address> Dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4 <udp remote port> Numeric parameter (0-65535)	<i>Write command</i> <u>Syntax</u> AT+KUDPRCV= <session_id>, <ndata>	<u>Response</u> CONNECT ...<EOF pattern> OK +KUDP_RCV: <udp remote address>,<udp remote port>, <ndata available> or NO CARRIER +CME ERROR: <err> +KUDP_NOTIF: <session_id>, <udp_notif> +KUDP_DATA_MISSED: <session_id>, <ndata missed> <u>Parameters</u> <session_id> UDP session index <ndata> Number of bytes the device wants to receive (max value 4294967295) <udp remote address> Dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4 <udp remote port> Numeric parameter (0-65535)

HL6528x		HL85xxx	
	<udp_notif> See command AT+KUDPCFG <ndata missed> Number of bytes left in the UDP socket		<ndata available> Number of bytes to be read in first received packet <udp_notif> See command AT+KUDPCFG <ndata missed> Number of bytes left (and definitely lost!) in the UDP socket
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This function is used to receive <ndata> data bytes through a previously opened UDP socket • <ndata> indicates the max data number that the terminal wishes to receive. If the UDP socket contains more data than <ndata> bytes then only <ndata> bytes will be received • <EOF pattern> would be added at the end of data automatically • When <ndata> (max value) bytes or only available data in the UDP socket have been received, the module returns to command mode • Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3 • The behavior of DTR drop meet with AT&D	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This function is used to receive <ndata> data bytes through a previously opened UDP socket • <ndata> indicates the max data number that the terminal wishes to receive. If the UDP socket contains more data than <ndata> bytes then only <ndata> bytes will be received; more data can be read by running this command again • <EOF pattern> would be added at the end of data automatically • When <ndata> (max value) bytes or only available data in the UDP socket have been received, the module returns to command mode • Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3 • The behavior of DTR drop meet with AT&D

13.13. SMTP Specific Commands

Note: All commands in this sub-section are applicable to the HL6528x only.

13.13.1. +KSMTPPARAM Command: Connection Configuration

HL6528x	
<i>Test command</i> <u>Syntax</u> AT+KSMTPPARAM=?	<u>Response</u> +KSMTPPARAM: <server>, <port>, <sender> OK
<i>Read command</i> <u>Syntax</u> AT+KSMTPPARAM?	<u>Response</u> +KSMTPPARAM: <server>, <port>, <sender> OK
<i>Write command</i> <u>Syntax</u> AT+KSMTPPARAM= <server>,<port>,<sender>	<u>Response</u> OK <u>Parameters</u> <server> String type (max size 255 bytes). Indicates the basic name of the SMTP server. This name must either integrate SMTP URL schemes separate from the server name by "." or an IPV4 address e.g.: smtp.163.com or 123.125.50.135 <port> Numeric type [0-65535]. Indicates the SMTP server port. <sender> String type (max size 255 bytes). Indicates sender's mail address e.g.: mo200_xxx@163.com

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Usual SMTP default port is 25 • Between two emails sending, the <server > and <sender> fields are kept on inside the ME, therefore if the same identifier accesses the same SMTP server, those parameters do not need to be reloaded

13.13.2. +KSMTPPWD Command: Authentication Configuration

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KSMTPPWD= ?	<u>Response</u> +KSMTPPWD: <login>, <password> OK
<i>Read command</i>	
<u>Syntax</u> AT+KSMTPPWD?	<u>Response</u> +KSMTPPWD: <login>, <password> OK
<i>Write command</i>	
<u>Syntax</u> AT+KSMTPPWD= <login> , <password>	<u>Response</u> OK <u>Parameters</u> <login> String type (max size 24 bytes). Indicates the user name to be used during the SMTP connection <password> String type (max size 24 bytes). Indicates the password to be used during the SMTP connection

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - If the dedicated SMTP server does not need authentication, <login> and <password> can be left empty - The SMTP client only supports LOGIN authentication - Between two emails sending, the <login> and <password> fields are kept on inside the ME, therefore if the same identifier accesses the same SMTP server, those parameters do not need to be reloaded

13.13.3. +KSMTPPTO Command: Receivers Configuration

HL6528x	
<i>Test command</i> <u>Syntax</u> AT+KSMTPPTO=?	<u>Response</u> +KSMTPPTO: <to1> [, <to2> [, <cc1> [, cc2>]]] OK
<i>Read command</i> <u>Syntax</u> AT+KSMTPPTO?	<u>Response</u> +KSMTPPTO: <to1> [, <to2> [, <cc1> [, cc2>]]] OK
<i>Write command</i> <u>Syntax</u> AT+KSMTPPTO = <to1>[,<to2> [,<cc1>[,<cc2>]]]	<u>Response</u> OK <u>Parameters</u> <to1> String type. Indicates the name of the first receiver of the mail <to2> String type. Indicates the name of the second receiver of the mail <cc1> String type. Indicates the name of the first copy receiver of the mail

HL6528x	
	<cc2> String type. Indicates the name of the second copy receiver of the mail
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <to1>, <to2>, <cc1>, <cc2> strings max length 255 • These fields are deleted after each successful mail sent

13.13.4. +KSMTPSUBJECT Command: Subject Configuration

HL6528x	
<i>Test command</i> <u>Syntax</u> AT+KSMTPSUBJECT=?	<u>Response</u> +KSMTPSUBJECT: <subject> OK
<i>Read command</i> <u>Syntax</u> AT+KSMTPSUBJECT?	<u>Response</u> +KSMTPSUBJECT: <subject> OK
<i>Write command</i> <u>Syntax</u> AT+KSMTPSUBJECT = <subject>	<u>Response</u> OK <u>Parameters</u> <subject> String type (max size 255 bytes). Indicates the subject of the mail. Must use US-ASCII charset

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This field is deleted after each successful mail sent - Must use US-ASCII charset

13.13.5. +KSMTPUL Command: Send Message

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KSMTPUL=?	<u>Response</u> +KSMTPUL: <mode>, <size> OK
<i>Write command</i>	
<u>Syntax</u> AT+KSMTPUL= <mode>, <size>	<u>Response</u> +KSMTPUL: <session_id> CONNECT (The ME waits for the data to be sent) OK or +CME ERROR: <err> NO CARRIER <u>Parameters</u> <mode> Numeric type. Indicates the transfer mode (header closed or not) 1 Normal mode. The mail header is minimal, the user only send the mail body. This is use for simple mails without attachment 0 Complex mode. The mail header minimal part is still handled by the AT command but the header is not closed. The user is responsible for completing and closing the mail header. This is use for mails with attachment or complex headers

HL6528x	
	<size> Numeric type. Amount of data transferred within the CONNECT <err> See 13.13.7 Specific Error Codes for SMTP Commands <session_id> Indicate the session id of current SMTP connection
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • If the GSM or GPRS connection is not up, before uploading the file the ME will automatically open the predefined GSM or GPRS link • At the end of the SMTP transfer, whether it succeeds, the parameters associated with the current mail (recipients, subjects) will be set to the NULL value • Hardware flow control (AT&K3) is required for serial link • User can use <EOF pattern> to stop transfer. See AT+KPATTERN • The behavior of DTR drop meet with AT&D • Using “+++” can abort sending data and using ATO[n] to return back

13.13.6. +KSMTPCLEAR Command: Clear Parameters

HL6528x	
<u>Action command</u> <u>Syntax</u> AT+KSMTPCLEAR	<u>Response</u> OK
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command deletes all SMTP parameters

13.13.7. Specific Error Codes for SMTP Commands

Code of <err>	Meaning
3000	Invalid SMTP server name
3001	Invalid address identification
3002	Invalid configuration. Parameter(s) is missing
3003	Invalid data size - with KSMTPUL
3004	SMTP session ID is not available
3010	The login or the password got an invalid value
3011	Invalid authentication method
3012	Invalid mail sender
3020	Invalid receivers of the mail TO1
3021	Invalid receivers of the mail TO2
3022	Invalid receivers of the mail CC1
3023	Invalid receivers of the mail CC2
3040	The SMTP transfer failed due to connection (GSM or GPRS) fails
3041	The SMTP transfer failed due to TCP connection troubles
3042	The SMTP transfer failed due to server TCP connection error
3043	The SMTP download failed due to Request time out
3044	The SMTP transfer failed due to SMTP protocol error
3045	The SMTP transfer failed due to DTR drop
3049	The SMTP transfer download failed due to internal error
3050	The SMTP transfer failed due to SMTP server trouble
3051	The SMTP transfer failed due to internal memory not available
3052	SMTP connection time out
3053	SMTP Raw Data upload to Module time out
3054	DNS Server address error or failed to resolve the host address
3055	SMTP client need Hardware flow control

13.14. POP3 Specific Commands

Note: All commands in this sub-section are applicable to the HL6528x only.

13.14.1. +KPOPCNX Command: Connection Configuration

HL6528x	
Test command	
<u>Syntax</u> AT+KPOPCNX=?	<u>Response</u> +KPOPCNX: <server>, <port>, <login>, <password> OK
Read command	
<u>Syntax</u> AT+KPOPCNX?	<u>Response</u> +KPOPCNX: <server>, <port>, <login>, <password> OK
Write command	
<u>Syntax</u> AT+KPOPCNX= <server>,<port>,<login>,<password>	<u>Response</u> +KPOPCNX: <session_id> OK <u>Parameters</u> <server> String type (max size 255 bytes). Indicates the basic name of the POP3 server. This name must either integrate POP3 URL schemes separate from the server name by "." or an IPV4 address. e.g.: pop.163.com or 123.125.50.29 <port> Numeric type (0-65535). Indicates the POP3 server port <login> String type (max size 24 bytes). Indicates the user name to be used during the POP3 connection <password> String type (max size 24 bytes). Indicates the password to be used during the POP3 connection

HL6528x	
	<session_id> Indicate the session id of current POP3 connection
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Usual POP3 default port is 110 • Once the command returns OK, the module is connected to the POP3 server • This connection will be maintained until the KPOPQUIT command is sent or the POP3 server closes the communication (Inactivity time out)

13.14.2. +KPOPLIST Command: List Available Mail

HL6528x	
<i>Read command</i>	
<u>Syntax</u> AT+KPOPLIST?	<u>Response</u> +KPOPLIST: <N> messages (<size> octets) OK
<i>Action command</i> <u>Syntax</u> AT+KPOPLIST	<u>Response</u> +KPOPLIST: <N> messages (<size> octets) +KPOPLIST: <n1>,<size1>[<CR><LF>] +KPOPLIST: <n2>,<size2>[...]] OK <u>Parameters</u> <N> Numeric type. Indicates the number of available messages <size> Numeric type. Indicates the total size of the messages <n#> Numeric type. Indicates the message index <size#> Numeric type. Indicates the size in octet of the message #

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command lists available mail in the POP3 server

13.14.3. +KPOPREAD Command: Download a Mail

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KPOPREAD= ?	<u>Response</u> +KPOPREAD: <index> OK
<i>Write command</i>	
<u>Syntax</u> AT+KPOPREAD= <index>	<u>Response</u> CONNECT Dataflow with <EOF pattern> at the end OK or +CME ERROR: <err> NO CARRIER <u>Parameters</u> <index> Numeric type. Indicates the index of the mail to read <EOF pattern> Set AT+KPATTERN

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Whether the asked mail ID is wrong the command returns the associated error code nonetheless the connection with the server is maintained - Whether an error is detected during the mail transfer, the connection with the server is closed - Hardware flow control(AT&K3) is required for serial link - The behavior of DTR drop meet with AT&D - Using "+++" can abort sending data and using ATO[n] to return back

13.14.4. +KPOPDEL Command: Delete a Mail

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KPOPDEL=?	<u>Response</u> +KPOPDEL: <index> OK
<i>Write command</i>	
<u>Syntax</u> AT+KPOPDEL= <index>	<u>Response</u> OK <u>Parameter</u> <index> Numeric type. Indicates the index of the mail to delete
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Whether the asked mail ID is wrong the command returns the associated error code nonetheless the connection with the server is maintained - The mail actually deleted by the server after the KPOPQUIT command

13.14.5. +KPOPQUIT Command: Close Connection

HL6528x	
Action command	
<u>Syntax</u> AT+KPOPQUIT	<u>Response</u> OK
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command closes the connection

13.14.6. Specific Error Codes for POP3 Commands

As an error can occur while there is no command in progress, an unsolicited notification is sent **+KPOPNOTIF: <err>**

For solicited and unsolicited notifications, error codes will have the following meanings:

Code of <err>	Meaning
3100	Invalid POP server name
3101	Not connected to the server
3104	POP session ID is not available
3110	The login or the password got an invalid value or the server is busy
3111	Invalid mail index
3140	The POP transfer failed due to connection (GSM or GPRS) fails
3141	The POP transfer failed due to TCP connection troubles
3142	The TCP connection timeout
3143	The POP download failed due to Request time out
3145	The POP transfer failed due to DTR drop
3149	The POP transfer download failed due to internal error

Code of <err>	Meaning
3150	The POP transfer failed due to POP server trouble
3151	DNS Server address error or failed to resolve the host address

13.15. HTTP Client Specific Commands

13.15.1. +KHTTPCFG Command: HTTP Connection Configuration

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KHTTPCFG =?	<u>Response</u> +KHTTPCFG: (list of possible <cnx_cnf>s),<server-name/ip>,(list of possible <http_port>s),(list of possible <http_version>s),(range of possible length of <login>),(range of possible length of <password>),(list of possible <started>s),(list of possible <af>s,(list of <cipher_index>)) OK
<i>Read command</i> <u>Syntax</u> AT+KHTTPCFG?	<u>Response</u> +KHTTPCFG: <cnx cnf>,<http_server>,<http_port> [<CR><LF>]	<i>Read command</i> <u>Syntax</u> AT+KHTTPCFG?	<u>Response</u> +KHTTPCFG: <session_id>,<cnx cnf>,<http_server>,<http_port>,<http_version>,<login>,<password>,<started>,<af>,<cipher_index> OK
<i>Write command</i> <u>Syntax</u> AT+KHTTPCFG= [<cnx cnf>,<http_server>,<http_port>,<http_version>,<login>,<password>,<started>,<af>,<cipher_index>]	<u>Response</u> +KHTTPCFG: <session_id> OK	<i>Write command</i> <u>Syntax</u> AT+KHTTPCFG= [<cnx cnf>,<http_server>,<http_port>,<http_version>,<login>,<password>,<started>,<af>,<cipher_index>]	<u>Response</u> +KHTTPCFG: <session_id> OK

HL6528x	HL85xxx
<http_server> [,<http_port> [,<http_version> [,<login> [,<password>]]]] or +CME ERROR: <err> <u>Parameters</u> <cnx cnf> 0 – 7 PDP context configuration; numeric parameter which specifies a particular PDP context configuration (see KCNXCFCG) <session_id> HTTP session index <http_server > Dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4 or explicit name of the remote server. <http_port> Numeric parameter (0-65535), <u>80</u> by default <http_version> <u>0</u> HTTP 1.1 1 HTTP 1.0 <login> string type, indicates the user name to be used during the HTTP connection <password> string type, indicates the password to be used during the HTTP connection	For HL8518, HL8528 and HL8529: AT+KHTTPCFG= [<cnx cnf>,<http_server> [,<http_port> [,<http_version> [,<login> [,<password>] [,<start>] [,<af>]]]] For HL854xx: AT+KHTTPCFG= [<cnx cnf>,<http_server> [,<http_port> [,<http_version> [,<login> [,<password>] [,<start>] [,<af>] [,<cipher_index>]]]] or +CME ERROR: <err> <u>Parameters</u> <cnx cnf> 1 – 5 PDP context configuration; numeric parameter which specifies a particular PDP context configuration (see +KCNXCFCG) Note that for the HL8518, HL8528 and HL8529, the maximum number of connections is limited to 3. <session_id> HTTP session index <http_server> IP address string or explicit name of the remote server <http_port> Numeric parameter (1-65535), 80 by default <http_version> <u>0</u> HTTP 1.1 (by default) 1 HTTP 1.0 2 HTTP 1.1 over TLS (HTTPS). 3 HTTP 1.0 over TLS (HTTPS). <login> string type, indicates the user name to be used during the HTTP connection <password> string type, indicates the password to be used during the HTTP connection <start> specifies whether to start the HTTP connection immediately or not <u>0</u> Start the HTTP connection later using +KTTPCNX <u>1</u> Start the HTTP connection immediately

HL6528x		HL85xxx	
			<started> specifies whether the HTTP connection has been started 0 The HTTP connection has not been started yet 1 The HTTP connection has already been started <af> address family used for the connection. Default is IPV4. 0 IPV4 1 IPV6 <cipher_suite> Cipher suite profile index to use for a secured socket; defined by +KSSLCRYPTO.
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <http_port> and <http_server> define the port and the IP address of the remote server one wants to connect • <session_id> is always 0	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <http_port> and <http_server> define the port and the IP address of the remote server one wants to connect • The connection timeout for the TCP socket is about 9 seconds with 3 retransmissions with a 3-second delay • This command can be used before setting up +KCNXCFG configuration. Note however that the latter is required to start the connection properly • For <af> = 1 (IPV6), server address (<http_server>) in IP address string format can be optionally quoted with square brackets "[]", e.g. [FEDC:BA98:7654:3210:FEDC:BA98:7654:3210]

13.15.2. +KHTTPCNX Command: Start the HTTP Connection

Note: For HL85xxx only.

HL85xxx	
Test command	
<u>Syntax</u> AT+KHTTPCNX= ?	<u>Response</u> +KHTTPCNX: (list of possible <session_id>s) OK
Write command	
<u>Syntax</u> AT+KHTTPCNX= <session_id>	<u>Response</u> OK or +CME ERROR: <err> +KHTTP_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTP session index <http_notif> Integer type. Indicates the cause of the HTTP connection failure 4 DNS error 5 HTTP connection error due to internal trouble 6 HTTP connection timeout 7 Flash access trouble 8 Flash memory full 9 Triple plus (+++) error (switch to command mode) 10 HTTP has no data 11 HTTP has partial data
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command is used to start the HTTP connection created by +KHTTPCFG with <start>=0 +KHTTPGET, +KHTTPHEAD, +KHTTPPOST automatically starts the connection if it has not been started before using AT+KHTTPCNX

13.15.3. +KHTTPHEADER Command: Set the HTTP Request Header

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KHTTPHEADER=?	<u>Response</u> +KHTTPHEADER: (list of possible <session_id>s),<local_uri> OK
<i>Read command</i> <u>Syntax</u> AT+KHTTPHEADER?	<u>Response</u> +KHTTPHEADER: <CR><LF> [...] 	<i>Read command</i> <u>Syntax</u> AT+KHTTPHEADER?	<u>Response</u> +KHTTPHEADER: <session_id>,<count> [...]
<i>Write command</i> <u>Syntax</u> AT+KHTTPHEADER= <session_id> [,<local_uri>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> HTTP session index <local_uri> "<file name>". If local_uri is empty, data will be input from serial link	<i>Write command</i> <u>Syntax</u> AT+KHTTPHEADER= <session_id> [,<local_uri>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> HTTP session index <local_uri> "<file name>". If local_uri is empty, data will be input from serial link <local_uri> This argument must be empty. It is reserved for compatibility of command syntax. <count> Count of HTTP headers

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <session_id> is always 0 • File (local_uri) should be put into the directory "/ftp" • User must use <EOF pattern> to finish sending; then the module will return to command mode	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> User must use <EOF pattern> to finish sending; then the module will return to command mode

13.15.4. +KHTTPGET Command: Get HTTP Server Information

HL6528x		HL85xxx	
		<i>Test command</i>	
		<u>Syntax</u> AT+KHTTPGET =?	<u>Response</u> +KHTTPGET: (list of possible <session_id>s),<request_uri >, (list of possible <show_resp>s) OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KHTTPGET= <session_id>,<request_uri>	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTP_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTP session index	<u>Syntax</u> AT+KHTTPGET= <session_id>,<request_uri> [,<show_resp>]	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTP_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTP session index

HL6528x		HL85xxx	
	<request_uri> string type, indicates the information url to get during the HTTP connection <http_notif> Integer type. Indicates the cause of the HTTP connection failure 4 DNS error 5 HTTP connection error due to internal trouble 6 HTTP connection timeout 7 Flash access trouble 8 Flash memory full 9 Triple plus (+++) error (switch to command mode) 10 HTTP got no data 11 HTTP got partial data		<request_uri> string type, indicates the information url to get during the HTTP connection <http_notif> Integer type. Indicates the cause of the HTTP connection failure 4 DNS error 5 HTTP connection error due to internal trouble 6 HTTP connection timeout 7 Flash access trouble 8 Flash memory full 9 Triple plus (+++) error (switch to command mode) 10 HTTP got no data 11 HTTP got partial data <show_resp> Whether to show HTTP response and HTTP headers 0 Do not show response and headers 1 Show response and headers (default)
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <session_id> is always 0 • HTTP does not support ATO	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • The user can abort the download by sending “End of Data pattern” from the host. In this case, the module will end the transfer by transmitting the EOF followed by NO CARRIER • Download can also be aborted (disconnected) by +++ or DTR as specified in section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table

13.15.5. +KHTTPHEAD Command: Get HTTP Headers

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+KHTTPHEAD =?	(Only available in the HL85xxx) <u>Response</u> +KHTTPHEAD: (list of possible <session_id>s),<request_uri> OK
<i>Write command</i> <u>Syntax</u> AT+KHTTPHEAD =<session_id>,<request_uri>	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTP_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTP session index <request_uri> String type, indicates the information URL to get during HTTP connection <http_notif> Refer to +KHTTPGET
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This method is identical to GET except that the server MUST NOT return a message-body in the response. The meta-information contained in the HTTP headers in response to a HEAD request SHOULD be identical to the information sent in response to a GET request - Additionally for the HL6528x: <session_id> is always 0 - HTTP does not support ATO - Additionally for the HL85xxx: - HTTP does not support DTR1

13.15.6. +KHTTPPOST Command: Send Data to HTTP Server

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KHTTPPOST =?	<u>Response</u> +KHTTPPOST: (list of possible <session_id>s),<local_uri>,<request_uri>,(list of possible <show_resp>s) OK
<i>Write command</i> <u>Syntax</u> AT+KHTTPPOST = <session_id>,<local_uri>,<request_uri>	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTP_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTP session index <local_uri> "<file name>". If local_uri is empty, data will be input from serial link <request_uri> string type, indicates the program handling the data during the HTTP connection	<i>Write command</i> <u>Syntax</u> AT+KHTTPPOST = <session_id>,<local_uri>,<request_uri> [,<show_resp>]	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTP_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTP session index <local_uri> This argument must be empty. It is reserved for compatibility of command syntax. <request_uri> string type, the request data of the HTTP connection <http_notif> Refer to +KHTTPGET

HL6528x		HL85xxx	
			<show_resp> Whether to show HTTP response and HTTP headers 0 Do not show HTTP response and headers <u>1</u> Show HTTP response and headers (default)
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <session_id> is always 0 • HTTP doesn't support ATO • File (local_uri) should be put into the directory "/ftp" • Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3 • Upload can be ended (disconnected) by +++ or DTR as specified in section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table • ATO is not available for this command

13.15.7. +KHTTP_IND Notification: HTTP Status

Note: For HL85xxx only.

HL85xxx	
<i>Unsolicited Notification</i>	<u>Response</u> +KHTTP_IND: <session_id>,<status>[,<data_len>,<st_code>,<st_reason>] <u>Parameters</u> <session_id> HTTP session index <status> Status of the HTTP session 1 Session is set up and ready for operation 3 The last HTTP command is executed successfully <data_len> Byte length of data downloaded/uploaded to/from the terminal (using +KHTTPHEAD, +KHTTPGET, or +KHTTPPOST)

HL85xxx	
	<st_code> HTTP response status code <st_reason> HTTP response status reason string
Reference Sierra Wireless Proprietary	

13.15.8. +KHTTPCLOSE Command: Close an HTTP Connection

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KHTTPCLOSE=?	<u>Response</u> +KHTTPCLOSE: (list of possible <session_id>s), (list of possible <keep_cfg>s) OK
<i>Write command</i> <u>Syntax</u> AT+KHTTPCLOSE=<session_id>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> HTTP session index	<i>Write command</i> <u>Syntax</u> AT+KHTTPCLOSE=<session_id>[,<keep_cfg>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> HTTP session index <keep_cfg> 0 Delete the session configuration 1 Keep the session configuration

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <session_id> is always 0	<u>Reference</u> Sierra Wireless Proprietary	

13.15.9. +KHTTPDEL Command: Delete a Configured HTTP Session

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KHTTPDEL=?	<u>Response</u> +KHTTPDEL: (list of possible <session_id>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+KHTTPDEL=<session_id>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <session_id> HTTP session index
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The HTTP session must be closed (using +KHTTPCLOSE) before using this command.

13.15.10. +KHTTTPUT Command: Perform HTTP PUT

Note: For HL854xx only.

HL854xx	
<i>Test command</i>	
<u>Syntax</u> AT+KHTTTPUT= ?	<u>Response</u> +KHTTTPUT: (list of possible <session_id>s),<local_uri>,<request_uri>,(list of possible <show_resp>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+KHTTTPUT= <session_id>, <local_uri>, <request_uri> [,<show_resp>]	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTP_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTP session index <local_uri> This parameter must be empty; it is reserved for compatibility of command syntax <request_uri> String type, request data of the HTTP connection <http_notif> Refer to +KHTTPGET <show_resp> Indicated whether to show HTTP response and HTTP headers 0 Do not show 1 Show

HL854xx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Before using this command, it is highly recommended to configure the module for hardware flow control using command AT&K3. - Uploading can be ended (disconnected) using +++ or DTR as per section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table. - ATO is not available for this command.

13.15.11. +KHTTPDELETE Command: Perform HTTP Delete

Note: For HL854xx only.

HL854xx	
<u>Test command</u> <u>Syntax</u> AT+KHTTPDELETE=?	<u>Response</u> +KHTTPDELETE: (list of possible <session_id>s),<request_uri>,(list of possible <show_resp>s) OK
<u>Write command</u> <u>Syntax</u> AT+KHTTPDELETE=<session_id>,<request_uri>[,<show_resp>]	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTP_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTP session index

HL854xx	
	<request_uri> String type, indicates the information URL to get during the HTTP connection <http_notif> Refer to +KHTTPGET <show_resp> Indicates whether to show HTTP response and HTTP headers 0 Do not show 1 Show
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The user can abort downloading by sending “End of Data pattern” from the host. In this case, the module will end the transfer by transmitting the EOF followed by NO CARRIER. - Downloading can also be aborted (disconnected) using +++ or DTR as per section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table.

13.16. HTTPS Client Specific Commands

13.16.1. +KHTTPSCFG Command: HTTPS Connection Configuration

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KHTTPSCFG =?	<u>Response</u> +KHTTPSCFG: (list of possible <cnf_cnf>s),<server-name/ip>,(list of possible <http_port>s),(list of possible <http_version>s),(list of possible <cipher_suite>s) ,(list of possible <sec_level>s) ,(range of possible length of <login>),(range of possible length of <password>),(list of possible <started>s), (list of possible <af>s) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
Syntax AT+KHTTPSCFG?	Response +KHTTPSCFG: <cnx cnf>, <http_server>,<https_port>,<http_version>, <cipher_suite>,<sec_level>,<login>,<password><CR><LF> OK	Syntax AT+KHTTPSCFG?	Response +KHTTPPCFG: <session_id>,<cnx cnf>, <http_server>,<https_port>,<http_version>, <cipher suite>,<sec_level>,<login>,<password>,<started> <af> OK
<i>Write command</i>		<i>Write command</i>	
Syntax AT+KHTTPSCFG=[<cnx cnf>,
<http_server>,
[,<https_port>,
<http_version>,
[,<cipher_suite>,
[,<sec_level>,
[,<login>,
[,<password>]]]])]	Response +KHTTPPCFG: <session_id> OK or +CME ERROR: <err> Parameters <cnx cnf> [0...7] (PDP context configuration) a numeric parameter which specifies a particular PDP context configuration (see +KCNXCFG). <session_id> HTTP session index <http_server> Dot-separated numeric (0-255) parameters on the form a1.a2.a3.a4 or explicit name of the remote server. <https_port> Numeric parameter (0-65535), <u>443</u> by default. <http_version> <u>0</u> HTTP 1.1 <u>1</u> HTTP 1.0	Syntax AT+KHTTTPCFG=[<cnx cnf>,
<http_server>,
[,<https_port>,
[,<http_version>,
[,<cipher_suite>,
[,<sec_level>,
[,<login>,
[,<password>]
[,<start>],
[,<af>]]]])]	Response +KHTTTCFG: <session_id> OK or +CME ERROR: <err> Parameters <cnx cnf> 1 – 5 PDP context configuration; numeric parameter which specifies a particular PDP context configuration (see +KCNXCFG). Note that for the HL8518, HL8528 and HL8529, the maximum number of connections is limited to 3. <session_id> HTTPS session index <http_server> IP address string or explicit name of the remote server <https_port> Numeric parameter (1-65535), <u>443</u> by default. <http_version> <u>0</u> HTTP 1.1 <u>1</u> HTTP 1.0

HL6528x	HL85xxx
<cipher_suite> 0 TLS_RSA_CHOOSE_BY_SERVER 1 TLS_RSA_WITH_RC4_128_MD5 2 TLS_RSA_WITH_RC4_128_SHA 3 TLS_RSA_WITH_DES_CBC_SHA 4 TLS_RSA_WITH_3DES_EDE_CBC_SHA 5 TLS_RSA_EXPORT1024_WITH_DES_CBC_SHA 6 TLS_RSA_WITH_AES_128_CBC_SHA 7 TLS_RSA_WITH_AES_256_CBC_SHA <sec_level> <u>1</u> No authentication 2 Manage server authentication 3 Manage server and client authentication if requested by remote server <login> string type, indicates the user name to be used during the HTTPS connection. <password> string type, indicates the password to be used during the HTTPS connection.	<cipher_suite> 0 TLS_RSA_CHOOSE_BY_SERVER 1 TLS_RSA_WITH_RC4_128_MD5 2 TLS_RSA_WITH_RC4_128_SHA 3 TLS_RSA_WITH_DES_CBC_SHA (not supported) 4 TLS_RSA_WITH_3DES_EDE_CBC_SHA (not supported) 5 TLS_RSA_EXPORT1024_WITH_DES_CBC_SHA (not supported) 6 TLS_RSA_WITH_AES_128_CBC_SHA 7 TLS_RSA_WITH_AES_256_CBC_SHA 8 TLS_RSA_WITH_AES_128_GCM_SHA256 <sec_level> <u>1</u> No authentication 2 Manage server authentication (this option is not fully functional in the HL85xxx; re-negotiation of client certificate is not supported.) 3 Manage server and client authentication if requested by remote server (this option is not fully functional in the HL85xxx; re-negotiation of client certificate is not supported.) <login> string type, indicates the user name to be used during the HTTPS connection. <password> string type, indicates the password to be used during the HTTPS connection. <start> specifies whether to start the HTTPS connection immediately or not 0 Start the HTTPS connection later using +KHTTPSCNX <u>1</u> Start the HTTPS connection immediately

HL6528x		HL85xxx	
			<started> specifies whether the HTTPS connection has been started 0 The HTTPS connection has not been started yet 1 The HTTPS connection has already been started <af> Address family used for the connection 0 IPV4 1 IPV6
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <https_port> and <http_server> define the port and the IP address of the remote server one wants to connect. • <session_id> is always 0. • For <sec_level>:2, 3, it must load certificates or private key from file system. See SSL Certificate Manager for more information. • Any certificates referenced in HTTPS feature should be DER encoded • Any private key referenced in HTTPS feature should be DER- PKCS#8 encoded.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <https_port> and <http_server> define the port and the IP address of the remote server one wants to connect. • The connection timeout for the TCP socket is about 9 seconds with 3 retransmissions with a 3-second delay • For <sec_level>:2, 3, certificates or private key must be loaded from internal storage. See SSL Certificate Management for more information. • Any certificates referenced in HTTPS feature should be PEM encoded. • Any private key referenced in HTTPS feature should be RSA PEM encoded. • This command can be used before setting up +KCNXCFG configuration. Note however that the latter is required to start the connection properly. • For <af> = 1 (IPV6), server address (<http_server>) in IP address string format can be optionally quoted with square brackets "[]", e.g. [FEDC:BA98:7654:3210:FEDC:BA98:7654:3210] • SSL version is TLS 1.2 by default, refer to <ssl_ver> of +KIPOPT for configuration

13.16.2. +KHTTPSCNX Command: Start HTTPS Connection

Note: For HL85xxx only.

HL85xxx	
Test command	
<u>Syntax</u> AT+KHTTPSCNX =?	<u>Response</u> +KHTTPSCNX: (list of possible <session_id>s) OK
Write command	
<u>Syntax</u> AT+KHTTPSCNX =<session_id>	<u>Response</u> OK or +CME ERROR: <err> +KHTTPS_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTPS session index <http_notif> Integer type. Indicates the cause of the HTTPS connection failure 4 DNS error 5 HTTPS connection error due to internal trouble 6 HTTPS connection timeout 7 Flash access trouble 8 Flash memory full 9 Triple plus (+++) error (switch to command mode) 10 HTTPS got no data 11 HTTPS got partial data
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This command is used to start the HTTPS connection created by +KHTTPSCFG with <start>=0 +KHTTPSGET, +KHTTPSHEAD, +KHTTPSPOST automatically starts the connection if it has not been started using AT+KHTTPSCNX

13.16.3. +KHTTPSHEADER Command: Set the HTTPS Request Header

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KHTTPSHEADER=?	<u>Response</u> +KHTTPSHEADER: (list of possible <session_id>s), <local_uri> OK
<i>Read command</i> <u>Syntax</u> AT+KHTTPSHEADER?	<u>Response</u> +KHTTPSHEADER: <CR><LF> [...] <u>Parameters</u> <session_id> HTTPS session index <local_uri> "<file name>". If local_uri is empty, data will be input from serial link.	<i>Read command</i> <u>Syntax</u> AT+KHTTPSHEADER?	<u>Response</u> +KHTTPSHEADER: <session_id>,<count> [...] <u>Parameters</u> <session_id> HTTPS session index <count> HTTPS header count
<i>Write command</i> <u>Syntax</u> AT+KHTTPSHEADER=<session_id>[,<local_uri>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> HTTPS session index <local_uri> "<file name>". If local_uri is empty, data will be input from serial link.	<i>Write command</i> <u>Syntax</u> AT+KHTTPSHEADER=<session_id>[,<local_uri>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> HTTPS session index <local_uri> This argument must be empty. It is reserved for compatibility of command syntax. <count> HTTPS header count

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <session_id> is always 0. • File (local_uri) should be put into the directory “/ftp”. • User must use <EOF pattern> to finish sending, then module returns to command mode.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> User must use <EOF pattern> to finish sending, then module returns to command mode.

13.16.4. +KHTTPSGET Command: Perform HTTPS Get

HL6528x		HL85xxx	
		<i>Test command</i>	
		<u>Syntax</u> AT+KHTTPSGET =?	<u>Response</u> +KHTTPSGET: (list of possible <session_id>s), <request_uri >,(list of possible <show_resp>s) OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KHTTPSGET =<session_id>,<request_uri>	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTPS_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTPS session index	<u>Syntax</u> AT+KHTTPSGET =<session_id>,<request_uri> [,<show_resp>]	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTPS_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTPS session index

HL6528x		HL85xxx	
	<request_uri> String type, indicates the information URL to get during HTTPS connection <http_notif> Integer type. Indicates the cause of the HTTPS connection failure 4 DNS error 5 HTTP connection error due to internal trouble 6 HTTP connection timeout 7 Flash access trouble 8 Flash memory full 9 Triple plus (+++) error (switch to command mode) 10 HTTP got no data 11 HTTP got partial data 12 Validate server's certificate error 13 Initialize SSL error		<request_uri> String type, indicates the information URL to get during HTTPS connection <http_notif> Integer type. Indicates the cause of the HTTPS connection failure 4 DNS error 5 HTTP connection error due to internal trouble 6 HTTP connection timeout 7 Flash access trouble 8 Flash memory full 9 Triple plus (+++) error (switch to command mode) 10 HTTP got no data 11 HTTP got partial data 12 Validate server's certificate error 13 Initialize SSL error <show_resp> Defines whether HTTPS response and HTTPS headers are shown 0 Do not show HTTPS response and headers 1 Show HTTPS response and headers
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <session_id> is always 0. • HTTPS does not support ATO	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • The user can abort the download by sending "End of Data pattern" from the host. In this case, the module will end the transfer by transmitting the EOF followed by NO CARRIER • Download can also be aborted (disconnected) by +++ or DTR as specified in section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table

13.16.5. +KHTTPSHEAD Command: Retrieve HTTPS Headers

HL6528x and HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+KHTTPSHEAD=?	(Only available in the HL85xxx) <u>Response</u> +KHTTPSHEAD: (list of possible <session_id>s),<request_uri> OK
<i>Write command</i> <u>Syntax</u> AT+KHTTPSHEAD=<session_id>,<request_uri>	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTPS_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTPS session index <request_uri> String type, indicates the information URL to get during HTTPS connection
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This method is identical to GET except that the server MUST NOT return a message-body in the response. The meta-information contained in the HTTP headers in response to a HEAD request SHOULD be identical to the information sent in response to a GET request. - Additionally for HL6528x: <session_id> is always 0 - HTTPS does not support ATO - Additionally for HL85xxx: - HTTPS does not support DTR1

13.16.6. +KHTTPSPOST Command: Perform HTTPS Post

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KHTTPSPOST=?	<u>Response</u> +KHTTPSPOST: (list of possible <session_id>s),<local_uri>,<request_uri>,(list of possible <show_resp>s) OK
<i>Write command</i> <u>Syntax</u> AT+KHTTPSPOST= <session_id>,<local_uri>,<request_uri>	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTPS_ERROR: <session_id>, <http_notif> <u>Parameters</u> <session_id> HTTPS session index <local_uri> "<file name>". If local_uri is empty, data will be input from serial link. <request_uri> String type, indicates the programme handling the data during the HTTPS connection	<i>Write command</i> <u>Syntax</u> AT+KHTTPSPOST= <session_id>,<local_uri>,<request_uri>[,<show_resp>]	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTPS_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTPS session index <local_uri> This argument must be empty. It is reserved for compatibility of command syntax. <request_uri> String type, indicates the request data of the HTTPS connection <http_notif> Refer to +KHTTPSGET

HL6528x		HL85xxx	
			<show_resp> Defines whether HTTPS response and HTTP headers are shown 0 Do not show HTTPS response and headers <u>1</u> Show HTTPS response and headers
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • <session_id> is always 0 • HTTPS doesn't support ATO • File (local_uri) should be put into the directory "/ftp" • Before using this command, it is highly recommended to configure the module for hardware flow control, using the command AT&K3	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Before using this command, it is highly recommended to configure the module for hardware flow control, using the command AT&K3 • Download can also be aborted (disconnected) by +++ or DTR as specified in section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table • ATO is not available for this command

13.16.7. +KHTTPSCLOSE Command: Close an HTTPS Connection

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KHTTPSCLOSE=?	<u>Response</u> +KHTTPSCLOSE: (list of possible <session_id>s), (list of possible <keep_cfg>s) OK
<i>Write command</i> <u>Syntax</u> AT+KHTTPSCLOSE=<session_id>	<u>Response</u> OK or +CME ERROR: <err>	<i>Write command</i> <u>Syntax</u> AT+KHTTPSCLOSE=<session_id>[,<keep_cfg>]	<u>Response</u> OK or +CME ERROR: <err>

HL6528x		HL85xxx	
	<u>Parameters</u> <session_id> HTTPS session index		<u>Parameters</u> <session_id> HTTPS session index <keep_cfg> Specifies whether to delete the session configuration after closing it 0 Delete the session configuration 1 Keep the session configuration
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <session_id> is always 0 for the HL6528x.		

13.16.8. +KHTTPSDEL Command: Delete a Configured HTTPS Session

Note: For HL85xxx only.

HL85xxx	
<i>Test command</i> <u>Syntax</u> AT+KHTTPSDEL =?	<u>Response</u> +KHTTPSDEL: (list of possible <session_id>s) OK
<i>Write command</i> <u>Syntax</u> AT+KHTTPSDEL =<session_id>	<u>Response</u> OK or +CME ERROR: <err>

HL85xxx	
	<u>Parameter</u> <session_id> HTTPS session index
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The session must be closed (using +KHTTPSCLOSE) before using this command

13.16.9. +KHTTPS_IND Notification: HTTPS Status

Note: For HL85xxx only.

HL85xxx	
<i>Unsolicited Notification</i>	<u>Response</u> +KHTTPS_IND: <session_id>,<status>[,<data_len>] <u>Parameters</u> <session_id> HTTPS session index <status> Status of the HTTPS session 1 Session is set up and ready for operation 3 The last HTTPS command is executed successfully <data_len> Byte length of data downloaded/uploaded to/from the terminal (using +KHTTPSHEAD, +KHTTPSGET, or +KHTTPSPPOST)
<u>Reference</u> Sierra Wireless Proprietary	

13.16.10. +KHTTPSPUT Command: Perform HTTPS PUT

Note: For HL854xx only.

HL854xx	
Test command	
<u>Syntax</u> AT+KHTTPSPUT =?	<u>Response</u> +KHTTPSPUT: (list of possible <session_id>s),<local_uri>,<request_uri>,(list of possible <show_resp>s) OK
Write command	
<u>Syntax</u> AT+KHTTPSPUT =<session_id>,<local_uri>,<request_uri>[,<show_resp>]	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTPS_ERROR: <session_id>,<http_notif> <u>Parameters</u> <session_id> HTTPS session index <local_uri> This parameter must be empty; it is reserved for compatibility of command syntax <request_uri> String type, request data of the HTTPS connection <http_notif> Refer to +KHTTPSGET <show_resp> Indicated whether to show HTTP response and HTTP headers 0 Do not show 1 Show

HL854xx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Before using this command, it is highly recommended to configure the module for hardware flow control using command AT&K3. - Uploading can be ended (disconnected) using +++ or DTR as per section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table. - ATO is not available for this command.

13.16.11. +KHTTPSDELETE Command: Perform HTTPS Delete

Note: For HL8518, HL8528, HL8529 and HL854xx only.

HL8518, HL8528, HL8529 and HL854xx	
<u>Test command</u>	
<u>Syntax</u> AT+KHTTPSDELETE=?	<u>Response</u> +KHTTPSDELETE: (list of possible <session_id>s),<request_uri>,(list of possible <show_resp>s) OK
<u>Write command</u>	
<u>Syntax</u> AT+KHTTPSDELETE=<session_id>,<request_uri>[,<show_resp>]	<u>Response</u> CONNECT ...<EOF pattern> OK or NO CARRIER +CME ERROR: <err> +KHTTPS_ERROR: <session_id>,<http_notif>
	<u>Parameters</u> <session_id> HTTPS session index

HL8518, HL8528, HL8529 and HL854xx	
	<request_uri> String type, indicates the information URL to get during the HTTPS connection <http_notif> Refer to +KHTTPSGET <show_resp> Indicates whether to show HTTP response and HTTP headers 0 Do not show 1 Show
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The user can abort downloading by sending “End of Data pattern” from the host. In this case, the module will end the transfer by transmitting the EOF followed by NO CARRIER. - Downloading can also be aborted (disconnected) using +++ or DTR as per section 23.16 Switch Data/Command Mode DTR +++ ATO Behavior Table.

13.17. SSL Certificate Manager

13.17.1. +KCERTSTORE Command: Store Root CA and Local Certificates to File System

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KCERTSTORE=?	<u>Response</u> +KCERTSTORE: (list of possible <data_type>s),(range of possible length of <NbData>), (list of possible <index>s) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+ KCERTSTORE?	<u>Response</u> +KCERTSTORE [<i>root_cert</i> , <i><NbData></i> <CR><LF> < <i>File_data</i> ><CR><LF>] [<i>local_cert</i> , <i><index></i> , <i><NbData></i> <CR><LF> < <i>File_data</i> > <CR><LF>] [...] OK or +CME ERROR: <err>	<u>Syntax</u> AT+ KCERTSTORE?	<u>Response</u> +KCERTSTORE [<i>root_cert</i> , <i><index></i> , <i><NbData></i> <CR><LF> < <i>File_data</i> ><CR><LF>] [<i>local_cert</i> , <i><index></i> , <i><NbData></i> <CR><LF> < <i>File_data</i> > <CR><LF>] [...] OK or +CME ERROR: <err>
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+ KCERTSTORE= <data_type>, <NbData> [,<index>]	<u>Response</u> CONNECT OK or +CME ERROR: <err> <u>Parameters</u> <data_type> 0 Root certificate 1 Local certificate <NbData> Number of bytes to read/write (mandatory for both reading and writing). Value range: 1-3000. <index> Stored local certificate index Value range: 0-2. If a local certificate is already stored at the index, it will be overloaded. <u>0</u> by default.	<u>Syntax</u> AT+ KCERTSTORE= <data_type> [,<NbData> [,<index>]]	<u>Response</u> CONNECT OK or +CME ERROR: <err> <u>Parameters</u> <data_type> 0 Root certificate 1 Local certificate <NbData> Number of bytes to read/write. Value range: 1-3000. <index> Stored root/local certificate index If a root/local certificate is already stored at the index, it will be overloaded. <u>0</u> by default. Value range:

HL6528x		HL85xxx	
			If <data_type> = 0: 0 (for HTTPS or Secure Socket in HL85xxx) 1 (for GNSS SUPL in HL854x-G) If <data_type> = 1: 0 – 2 (for HTTPS or Secure Socket in HL85xxx) 3 – 5 (for GNSS SUPL in HL854x-G)
	<File_data> File data in bytes.		<File_data> File data in bytes.
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The <index> parameter is the link between a local certificate and a private key (refer to +KPRIVKSTORE and +KCERTDELETE for more information).	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The <index> parameter is the link between a local certificate and a private key (refer to +KPRIVKSTORE and +KCERTDELETE for more information). - If <NbData> is not given, the input should be terminated by +++ or DTR signal

13.17.2. +KPRIVKSTORE Command: Store Private Key Associated to a Local Certificate

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KPRIVKSTORE =?	<u>Response</u> +KPRIVKSTORE: (list of possible <index>s),(range of possible length of <NbData>) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+KPRIVKSTORE?	<u>Response</u> +KPRIVKSTORE private_key,<index>,<NbData><CR><LF> <File_data> <CR><LF> OK or +CME ERROR: <err>	<u>Syntax</u> AT+KPRIVKSTORE?	<u>Response</u> +KPRIVKSTORE private_key,<index>,<NbData><CR><LF> <File_data> <CR><LF> OK or +CME ERROR: <err>
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KPRIVKSTORE= <index>,<NbData>	<u>Response</u> CONNECT OK or +CME ERROR: <err> <u>Parameters</u> <index> Index of the stored local certificate associated to this private key <NbData> Number of bytes to read/write (mandatory for both reading and writing). Value range: 1-3000. <File_data> File data in bytes.	<u>Syntax</u> AT+KPRIVKSTORE= <index> [,<NbData>]	<u>Response</u> CONNECT OK or +CME ERROR: <err> <u>Parameters</u> <index> Index of the stored local certificate associated to this private key. Value range: 0 – 2 (for HTTPS or Secure Socket in HL85xxx) 3 – 5 (for GNSS SUPL in HL854x-G) <NbData> Number of bytes to read/write (mandatory for both reading and writing). Value range: 1-3000. <File_data> File data in bytes.
<u>Reference</u> Sierra Wireless Proprietary		<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> If <NbData> is not given, the input should be terminated by +++ or DTR signal.

13.17.3. +KCERTDELETE Command: Delete Local Certificate from the Index

HL6528x		HL85xxx	
		<i>Test command</i> <u>Syntax</u> AT+KCERTDELETE=?	<u>Response</u> +KCERTDELETE: (list of possible <data_type>s), (list of possible <index>s) OK
<i>Read command</i> <u>Syntax</u> AT+KCERTDELETE?	<u>Response</u> +KCERTDELETE: OK or +CME ERROR: <err>	<i>Read command</i> <u>Syntax</u> AT+KCERTDELETE?	<u>Response</u> +KCERTDELETE: OK or +CME ERROR: <err>
<i>Write command</i> <u>Syntax</u> AT+KCERTDELETE= <data_type> [,<index>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <data_type> 0 Root certificate 1 Local certificate <index> Stored local certificate index Value range: 0-2. Default value = 0.	<i>Write command</i> <u>Syntax</u> AT+KCERTDELETE= <data_type> [,<index>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <data_type> 0 Root certificate 1 Local certificate <index> Stored local certificate index Default value = 0. Value range: If <data_type> = 0: 0 (for HTTPS or Secure Socket in HL85xxx) 1 (for GNSS SUPL in HL854x-G)

HL6528x		HL85xxx	
			If <data_type> = 1: 0 – 2 (for HTTPS or Secure Socket in HL85xxx) 3 – 5 (for GNSS SUPL in HL854x-G)
<u>Reference</u> Sierra Wireless Proprietary		<u>Reference</u> Sierra Wireless Proprietary	

13.17.4. +KPRIVKDELETE Command: Delete Private Key from the Index

HL6528x		HL85xxx	
		<i>Test command</i>	
		<u>Syntax</u> AT+KPRIVKDELETE=?	<u>Response</u> +KPRIVKDELETE: (list of possible <index>es) OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+KPRIVKDELETE=<index>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <index> Stored private key index. Value range: 0-2.	<u>Syntax</u> AT+KPRIVKDELETE=<index>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <index> Stored private key index. Value range: 0 – 2 (for HTTPS or Secure Socket in HL85xxx) 3 – 5 (for GNSS SUPL in HL854x-G)

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary		<u>Reference</u> Sierra Wireless Proprietary	

13.18. SSL Configuration

Note: All commands in this sub-section are applicable to the HL85xxx only.

13.18.1. +KSSLCRYPTO Command: Cipher Suite Configuration

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+KSSLCRYPTO=?	<u>Response</u> +KSSLCRYPTO: <profile_id>,<mkey_Algo>,<auth_algo>,<enc_algo>,<mac_algo>,<tls_ver>,<auth>,<tls_ver>,<auth> OK
<i>Read command</i>	
<u>Syntax</u> AT+KSSLCRYPTO?	<u>Response</u> + KSSLCRYPTO: <profile_id>,<mkey_algo>,<auth_algo>,<enc_algo>,<mac_algo>,<tls_ver>,<auth>
<i>Write command</i>	
<u>Syntax</u> AT+KSSLCRYPTO= <profile_id>,<mkey_Algo>,<auth_algo>,<enc_algo>,<mac_algo>,<tls_ver>,<auth>,<tls_ver>,<auth>	<u>Response</u> OK <u>Parameters</u> <profile_id> Index of a set of parameters for configuring one SSL profile

HL85xxx	
<enc_algo>,<mac_algo>,<tls_ver>,<auth>	<mkey_algo> Key exchange algorithm selection 1 RSA key exchange <auth_algo> Authentication algorithm selection 1 RSA authentication <enc_algo> Encryption algorithm selection 4 RC4 64 AES 128 128 AES 256 8192 AES128GCM <mac_algo> Message authentication code algorithm selection 1 MD5 2 SHA1 64 AEAD <tls_ver> Cipher suite version selection. 1 TLS 1.0 4 TLS 1.2 <auth> Authentication 0 No authentication 1 Authenticate server 2 Provide client certificate to server 3 Authenticate server and provide client certificate to server

HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The cipher suite profiles supported can be displayed using AT+KSSLCRYPTO? which are follows: +KSSLCRYPTO: 0,1,1,8388,67,5,0 (TLS_RSA_CHOOSE_BY_SERVER) +KSSLCRYPTO: 1,1,1,4,1,5,0 (TLS_RSA_WITH_RC4_128_MD5) +KSSLCRYPTO: 2,1,1,4,2,5,0 (TLS_RSA_WITH_RC4_128_SHA) +KSSLCRYPTO: 3,1,1,64,2,5,0 (TLS_RSA_WITH_AES_128_CBC_SHA) +KSSLCRYPTO: 4,1,1,128,2,5,0 (TLS_RSA_WITH_AES_256_CBC_SHA) +KSSLCRYPTO: 5,1,1, 8192,64,5,0 (TLS_RSA_WITH_AES_128_GCM_SHA256) - For each cipher suite profile, the security level can be configured with the parameter <auth>. - When <auth> = 1, 2 or 3, certificates or private key must be loaded from internal storage. See section 13.17 SSL Certificate Manager for more information. Note that these options are not fully functional; renegotiation of client certificate is not supported. - Any certificates referenced in HTTPS and TCP secured features should be PEM encoded. - Any private key referenced in HTTPS and TCP secured features should be RSA PEM encoded.

13.18.2. +KSSLCFG Command: SSL Configuration

HL85xxx	
<u>Test command</u> <u>Syntax</u> AT+KSSLCFG=?	<u>Response</u> +KSSLCFG:<option id>,<option> OK
<u>Read command</u> <u>Syntax</u> AT+KSSLCFG?	<u>Response</u> +KSSLCFG:0,<TLS Version> +KSSLCFG:2,<Session Mode> OK

HL85xxx																												
Write command																												
<u>Syntax</u> AT+KSSLCFG =<option id>,<option>	<u>Response</u> If <option_id> = 0: AT+KSSLCFG=<option_id>,<TLS Version> OK If <option_id> = 1: AT+KSSLCFG=<option_id>,<Random Seed> OK If <option_id> = 2: AT+KSSLCFG=<option_id>,<Session Mode> OK <u>Parameters</u> <table><tr><td><option id></td><td>0</td><td>Specify a TLS version to be used for hand shake</td></tr><tr><td></td><td>1</td><td>Setup random seed</td></tr><tr><td></td><td>2</td><td>Specify session mode</td></tr></table> <table><tr><td><TLS Version></td><td>0</td><td>Highest possible</td></tr><tr><td></td><td>1</td><td>TLS 1.0</td></tr><tr><td></td><td>3</td><td>TLS 1.2</td></tr></table> <table><tr><td><Random Seed></td><td colspan="2">String to be added into the entropy of the random number generator</td></tr></table> <table><tr><td><Session Mode></td><td>0</td><td>Automatic</td></tr><tr><td></td><td>1</td><td>Always start a new session (not supported)</td></tr></table>	<option id>	0	Specify a TLS version to be used for hand shake		1	Setup random seed		2	Specify session mode	<TLS Version>	0	Highest possible		1	TLS 1.0		3	TLS 1.2	<Random Seed>	String to be added into the entropy of the random number generator		<Session Mode>	0	Automatic		1	Always start a new session (not supported)
<option id>	0	Specify a TLS version to be used for hand shake																										
	1	Setup random seed																										
	2	Specify session mode																										
<TLS Version>	0	Highest possible																										
	1	TLS 1.0																										
	3	TLS 1.2																										
<Random Seed>	String to be added into the entropy of the random number generator																											
<Session Mode>	0	Automatic																										
	1	Always start a new session (not supported)																										
<u>Reference</u> Sierra Wireless Proprietary	<u>Note</u> After starting a connection or running the write command, <TLS Version> is fixed and cannot be changed until the module is rebooted.																											

>> 14. Specific Flash Commands

Note: All commands listed in this section are for HL6528x only as of this release.

14.1. +KFSFILE Command: Flash File Operation Command

HL6528x																			
Test command																			
<u>Syntax</u> AT+KFSFILE =?	<u>Response</u> +KFSFILE: (0,1,2,3,4,5),(URI),(SIZE),(Offset) OK																		
Write command																			
<u>Syntax</u> AT+KFSFILE= <action>,<url> [[,<NbData>]][,<of fset>]]	<u>Response</u> CONNECT OK +KFSFILE: <entity type> <name> <size> +KFSFILE: <size> bytes free <u>Parameters</u> <table><tr><td><action></td><td>0</td><td>Write file</td></tr><tr><td></td><td>1</td><td>Read file</td></tr><tr><td></td><td>2</td><td>Delete file</td></tr><tr><td></td><td>3</td><td>Return file size</td></tr><tr><td></td><td>4</td><td>List directory and file information</td></tr><tr><td></td><td>5</td><td>Write at the end of file (Append mode)</td></tr></table> <uri> "/"<directory name>/<file name>" (warning: the "/" is important)	<action>	0	Write file		1	Read file		2	Delete file		3	Return file size		4	List directory and file information		5	Write at the end of file (Append mode)
<action>	0	Write file																	
	1	Read file																	
	2	Delete file																	
	3	Return file size																	
	4	List directory and file information																	
	5	Write at the end of file (Append mode)																	

HL6528x	
	<NbData> Number of bytes to read/write (mandatory for writing; mandatory for reading if offset is present) <offset> Offset in bytes <entity type> F File D Directory <name> File name or directory name <size> File size or free size of the directory
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • The minimum reserved memory is 100 Kbytes • The user can abort read/write operation by DTR or +++ • When in Append mode: ▪ If the target file of <url> does not exist, it will create a new file and write ▪ If the target file of <url> exists, it will append data to the end of file • Currently user can only use <data>, <ftp>, <gps> and <app> directories • CME error 20 will be reported, if memory is full when writing • CME error 23 will be reported, when module start up, because of boot up of file system • When <action>=1, if NbData is greater than (File size – offset), then only (File size – offset) bytes are read.
<u>Examples</u>	To add a file: AT+KFSFILE=0,"/data/dummyfile.bin",1024 CONNECT The module is ready to receive the file. Once received, the answer is: OK To read the newly added file: AT+KFSFILE=1,"/data/dummyfile.bin",1024 CONNECT <lists file content...> OK

HL6528x

To read the newly added file from byte 800 to 900:

AT+KFSFILE=1,"/data/dummyfile.bin", 100, 800

CONNECT

<lists file content...>

OK

To read the newly added file, from byte 800 to 1024:

AT+KFSFILE=1,"/data/dummyfile.bin", 224, 800

CONNECT

<lists file content...>

OK

To delete the file:

AT+KFSFILE=2,"/data/dummyfile.bin"

OK

To list the size of the file:

AT+KFSFILE=3,"/data/dummyfile.bin"

+KFSFILE: 1024

OK

To list the information of directory and file:

AT+KFSFILE=4,"/data/"

+KFSFILE: <F> dummyfile.bin 1024

+KFSFILE: 1048004 bytes free

OK

To list the information of root directory:

AT+KFSFILE=4,"/"

+KFSFILE: <D> ftp 0

+KFSFILE: <D> data 1024

+KFSFILE: 1048004 bytes free

OK

HL6528x

To add bytes to an existing file Append mode):

AT+KFSFILE=5,"/data/dummyfile.bin",128

CONNECT

The module is ready to receive the new 128 bytes. Once received, the answer is:

OK

Now the size is 1152 (1024+128):

AT+KFSFILE=3,"/data/dummyfile.bin"

+KFSFILE: 1152

OK

15. eCall Commands

Note: All commands listed in this section are for HL6528x only as of this release.

eCall is an optional feature, for further information please contact your FAE.

See reference document [26.267] 3GPP 26.267 (10.0.0) – eCall Data Transfer - In-band modem solution.

15.1. System Overview

15.1.1. eCall

In the event of a vehicle collision, the eCall is an automatically or manually established emergency voice call from the vehicle via the cellular network to the local emergency agencies). Thanks to in-band modem solution, a data message is transferred from the IVS to the PSAP. This message is contains the information stored in the Minimum Set of Data (MSD).

eCall can be included in the “In Vehicle System (IVS). Emergency agencies can use the Public Safety Answering Point (PSAP) networks.

15.1.2. Minimum Set of Data (MSD)

For more details about the MSD format, see section 23.17 Minimum Set of Data (MSD) Format.

Unsupported fields

Optional fields that are not supported are:

- Additional data

Supported fields

All mandatory fields and the following optional fields:

- Recent vehicle location n-1
- Recent vehicle location n-2
- Number of passengers

Stored internal information

The following information is stored in NVM so can be written only once:

- Vehicle type
- VIN
- Propulsion type

15.2. Audio Settings During eCall

During an Ecall the audio settings change automatically to improve the data transmission.

Ecall State	Current Audio Settings	VIP
Before Ecall	Audio settings 0 (<i>customer default configuration</i>)	V*
Calling PSAP	Audio settings 1 (<i>Disable Echo Cancellation and Noise Suppression, Mute audio input and output</i>)	4
MSD transmission	Audio settings 1 (<i>Disable Echo Cancellation and Noise Suppression, Mute audio input and output</i>)	4
Switch to audio call	Audio settings 2 (<i>active Echo Cancellation, Noise Suppression, audio input and output</i>)	3
PSAP request of MSD transmission	Audio settings 1 (<i>Disable Echo Cancellation and Noise Suppression, Mute audio input and output</i>)	4
End of Ecall	Audio settings 0 (<i>customer default configuration</i>)	V*

* V means the current VIP set by the user among 0, 1 or 2

During an eCall, no other audio session can be opened (PCM, AMR, etc).

15.3. +KECALLCFG Command: Emergency Call Configuration

15.3.1. Description

KECALLCFG command is used to configure some fields of the MSD.

As the configuration is stored in non-volatile memory, it is not reset each time the module/NAD is powered on.

To be sure that the transmission and the stored data are correct, the set command returns the parameters that have been sent in the response.

If the GNSS current position is provided, the recent positions n-1 and n-2 should also be provided. If they are not provided the module/NAD sets their values to 0.

15.3.2. Syntax

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+ KECALLCFG=?	<u>Response</u> +KECALLCFG: 1, (list of supported <vehicle_type>s), <VIN> , (list of supported <propulsion_storage>s) +KECALLCFG: 2, (number of passenger) <Nb of passenger> +KECALLCFG: 3, <Current Latitude> , <Current Longitude> , <Current Direction> , <Confidence> [, <Recent Latitude n-1> , <Recent Longitude n-1> [, <Recent Latitude n-2> , <Recent Longitude n-2>]] +KECALLCFG: 4, (value of the timer) <T-EA1> +KECALLCFG: 5, (value of object identifier) <OID> , <Additional_Data> OK

HL6528x	
Read command	
<u>Syntax</u> AT+KECALLCFG ?	<u>Response</u> +KECALLCFG: 1, <vehicle_type>,<VIN>,<propulsion_storage> +KECALLCFG: 2, <Nb of passenger> +KECALLCFG: 3, <Current Latitude>,<Current Longitude>,<Current Direction>,<Confidence>,<Recent Latitude n-1>,<Recent Longitude n-1>,<Recent Latitude n-2>,<Recent Longitude n-2> +KECALLCFG: 4, <T-EA1> +KECALLCFG: 5, <OID>,<Additional_data> OK
Write command	
<u>Syntax</u> AT+KECALLCFG =1, [,<vehicle_type> [,<VIN>[,<propulsion_ storage>]]]]] AT+KECALLCFG =2, <Nb of passenger> AT+KECALLCFG =3,<Current Latitude>,<Current Longitude>,<Current Direction>,<Confidence>,<Recent Latitude n-1>,<Recent Longitude n-1>	<u>Response</u> If AT+KECALLCFG=1 is used: +KECALLCFG: <vehicle_type>,<VIN>,<propulsion_storage> OK If AT+KECALLCFG=2 is used: +KECALLCFG: <Nb of passenger> OK If AT+KECALLCFG=3 is used: +KECALLCFG: <Current Latitude>,<Current Longitude>,<Current Direction>,<Confidence>,<Recent Latitude n-1>,<Recent Longitude n-1>,<Recent Latitude n-2>,<Recent Longitude n-2> OK If AT+KECALLCFG=4 is used: +KECALLCFG: <T-EA1> OK If AT+KECALLCFG=5 is used: +KECALLCFG: <OID>,<Additional_data> OK

HL6528x	
[,<Recent Latitude n-2> [,<Recent Longitude n-2>]]]]]]]] AT+KECALLCFG=4,<T-EA1> AT+KECALLCFG=5,<OID>,<Additional_data>	<u>Parameters</u> <vehicle_type> Integer type 1 passenger vehicle (class M1) 2 buses and coaches (class M2) 3 buses and coaches (class M3) 4 light commercial vehicles (class N1) 5 heavy duty vehicles (class N2) 6 heavy duty vehicles (class N3) 7 motorcycles (class L1e) 8 motorcycles (class L2e) 9 motorcycles (class L3e) 10 motorcycles (class L4e) 11 motorcycles (class L5e) 12 motorcycles (class L6e) 13 motorcycles (class L7e) If omitted no action on vehicle type configuration <VIN> String type of 17 characters, Vehicle identification number according to ISO 3779. It consists of the World Manufacturer Index (WMI), the Vehicle Type Descriptor (VDS) and the Vehicle Identification Sequence (VIS). If omitted no action on VIN configuration <propulsion_storage> Integer type; to set several type sum up the values: 1 gasoline tank 2 diesel tank 4 compress natural gas (CNG) 8 liquid propane gas (LPG) 16 electric energy storage (with more than 42V and 100 Ah) 32 hydrogen storage If omitted no action on test mode configuration <NB of passenger> Integer type, minimum known number of fastened seatbelts, to be set to the default value of 255 if no information available. <Current Latitude> String type, Latitude as extracted from NMEA frame (format: ddmm.mmmmmm,[N S])

HL6528x	
	<Current Longitude> String type, Longitude as extracted from NMEA frame (format: ddmm.mmmmmm,[E W]) <Current Direction> Integer type, Direction of travel in 2°degrees steps from magnetic north (0-358, clockwise) <Confidence> Integer type 1 Position can be trusted 0 No confidence in position <Recent Latitude n-1> String type, Latitude Delta with respect the <Current Latitude> (format: m.mmmmmm,[N S]) <Recent Longitude n-1> String type, Longitude Delta with respect the <Current Longitude> (format: m.mmmmmm,[E W]) <Recent Latitude n-2> String type, Latitude Delta with respect the <Recent Latitude n-1> (format: m.mmmmmm,[N S]) <Recent Longitude n-2> String type, Longitude Delta with respect the <Recent Longitude n-1> (format: m.mmmmmm,[E W]) <T-EA1> Integer type. Value of the Timer T-EA1 in ms. The default value is 2000 (2 seconds) <OID> Object identifier which uniquely identifies the format and meaning of the data which follows <Additional_data> Transparent additional data. The format of this field must be compliant with EN ISO 24978
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • The size of oid+Optional_data must not exceed 97 bytes. • Default configuration is vehicle_type = 1, VIN =0, propulsion_storage=1 • Up to 6 digits after the dot can be used for latitude and longitude values for the set command. Nevertheless, values returned by the read command are truncated to significant digits for the MSD • Current latitude and current longitude formats returned by read command are truncated to 4 digits after the dot • Recent latitude and recent longitude formats returned by read command are truncated to 2 digits after the dot • The positions (current, n-1, n-2) answered by AT+KECALLCFG? are coming from previous AT+KECALLCFG=3 set commands and NOT from built-in GNSS

HL6528xExamplesGiven

<vehicle_type>: passenger vehicle (class M1)

<VIN>: AAAAAAAAAAAAAAAAAA

<propulsion_storage>: diesel tank

<Nb of passenger>: 3

<Current Latitude>: 48°49.35' North

<Current Longitude>: 2°33.37' East

<Current Direction>: 14°degrees steps from magnetic north

<Confidence>: Position can be trusted

<Recent Latitude n-1>: 0.28' North of Current Latitude

<Recent Longitude n-1>: 0.13' East of Current Longitude

<Recent Latitude n-2>: 0.04' South of Recent Latitude n-1

<Recent Longitude n-2>: 0.07' West of Recent Longitude n-1

<T-EA1> is 2 seconds

<OID>: 1.2.125

<Additional_data>: 30304646

AT+KECALLCFG?

+KECALLCFG: 1,1,"AAAAAAAAAAAAAAAA",2

+KECALLCFG: 2,3

+KECALLCFG: 3,"4849.35,N","233.37,E",14,0,"0.28,N","0.13,E","0.04,S","0.07,W"

+KECALLCFG: 4,2000

+KECALLCFG: 5,"1.2.125","30304646"

OK

Set the Vehicle type, VIN and propulsion storage:

(light commercial vehicles class N1, liquid propane gas)

AT+KECALLCFG=1,4,"AAAAAAAAAAAAAAAA",8

+KECALLCFG: 4,"AAAAAAAAAAAAAAAA",8

OK

HL6528x	
	Set the number of passengers: AT+KECALLCFG=2,3 +KECALLCFG: 3 OK Set Timer T-EA1: AT+KECALLCFG=4,1500 +KECALLCFG: 1500 OK Set Optional Additional Data: AT+KECALLCFG=5,"1.2.125","30304646" +KECALLCFG: "1.2.125","30304646" OK

15.4. +KECALL Command: Initiate Emergency Call

15.4.1. Description

KECALL command is used to dial an eCall emergency call.

About the MSD to be sent during eCall (+KECALL or +KAECALL):

Considering a module/NAD with built-in GNSS:

- If the KECALLCFG=3 command is used, the GNSS positions provided replace the ones coming from the built-in GNSS. This is true until the next module reboot.
- If the KECALLCFG=3 command is not used, the GNSS positions comes from the built-in GNSS.

The fields “recent vehicle location n-1” and “recent vehicle location n-2” are the last 2 positions saved in the dynamic memory by the command AT+KGNSSHIST (see AT commands document for built-in GNSS). If the command AT+KGNSSHIST does not save the positions, the fields “recent vehicle location n-1” and “recent vehicle location n-2” are set to 0 in the MSD.

It is recommended not to send demanding AT commands (such as AT+KECALLMSD) before end of eCall (URC +KECALL: 13 received) else some notifications may be missing.

Moreover, no new AT+KECALL request must be sent if a previous eCall is not terminated yet (See notifications for “end of ecall” in +KECALL command description)

15.4.2. Syntax

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KECALL=?	<u>Response</u> +KECALL: (list of supported <test mode>),[<number>],[<activation mode>],[<call mode>] OK
<i>Read command</i>	
<u>Syntax</u> AT+KECALL?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+KECALL= <test_mode>, [<number>],[[<activation mode>],[call mode]]]	<u>Response</u> OK +KECALL: <status> <u>Parameters</u> <test_mode> <u>0</u> Deactivate test mode 1 Activate test mode <number> String type. Emergency number to dial. If omitted, dial number 112

HL6528x	
	<activation mode> Integer type 0 Manual activation 1 Automatic activation. Default value If omitted. <call mode> Integer type 1 Push mode. Default value if omitted.
Unsolicited Notification	<u>Response</u> +KECALL: <status> <u>Parameter</u> <status> Integer type 1 Calling PSAP 2 Call has been picked up (by PSAP) 3 PUSH message sent to PSAP 4 "Send MSD" message received 5 "LL-ACK" message has been received 6 "AL-ACK" message received, issued by module/NAD when the "AL-ACK" has been received 7 "Clear down" request received: "AL-ACK" received with status="transaction ended": End of eCall 11 No network. There is no network coverage: End of eCall 12 Call drop. Internal Network error: End of eCall 13 The PSAP has ended the call: End of eCall 14 An eCall is already in progress: End of eCall 21 Busy. The PSAP line is busy: End of eCall 41 "Send MSD" message reception timed out: "Send MSD" message not received before T5 expiry: switch to audio call. 42 Timer T-EA1 timed out: PSAP has required to send the MSD message but no new position has been received from the external GNSS (from the command +KECALLCFG=3...) before T-EA1 expiry so the previous GNSS position is used. This timer is used only when the PSAP asks to resend the MSD. 51 "LL-ACK" message reception timed out: no "LL-ACK" received before T7 expiry: switch to audio call. 61 "AL-ACK" message reception timed out: no "AL-ACK" received before T6 expiry: switch to audio call. 71 Call Clear down timed out: triggered by the T2 expiry: End of eCall
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> When AT+KECALL is used all the voice and CSD calls are automatically terminated.

HL6528xExamples

1- A normal eCall on the AT interface

AT+KECALL=0,"112",1

OK

+KECALL: 1 *(the module/NAD is calling the PSAP)*

+KECALL: 2 *(call is established)*

+KECALL: 3 *(the module/NAD sends the PUSH message)*

+KECALL: 4 *(the module/NAD has received the "Send MSD" order)*

+KECALL: 5

+KECALL: 6

+KECALL: 7 *(end of eCall the "AL-ACK" "Clear down" request has been received)*

2- An Ecall with no network coverage

AT+KECALL=0,"112",1

OK

+KECALL: 11 *(End of eCall, use AT+KECALL to retry)*

3- The PSAP hangs up

AT+KECALL=0,"112",1

OK

+KECALL: 1 *(the module/NAD is calling the PSAP)*

+KECALL: 2 *(call is established)*

+KECALL: 3 *(the module/NAD sends the PUSH message)*

+KECALL: 13 *(End of eCall, use AT+KECALL to retry)*

4- "Send MSD" message reception timed out

AT+KECALL=0,"112",1

OK

+KECALL: 1 *(the module/NAD is calling the PSAP)*

+KECALL: 2 *(call is established)*

+KECALL: 3 *(the module/NAD sends the PUSH message)*

+KECALL: 41 *(the module/NAD did not receive the "Send MSD" order, the module/NAD switches to a normal audio call)*

+KECALL: 13 *(End of eCall, the PSAP has ended the call)*

HL6528x

5- Use an external GNSS and PSAP asks to resend the MSD twice
AT+KECALLCFG=3,"4849.35,N","233.37,E",14,0,"0.28,N","0.13,E","0.04,S","0.07,W"
+KECALLCFG: "4849.35,N","233.37,E",14,0,"0.28,N","0.13,E","0.04,S","0.07,W"
OK

AT+KECALLCFG=4,2000
+KECALLCFG: 2000
OK

AT+KECALL=0,"112",1
OK

+KECALL: 1
+KECALL: 2
+KECALL: 3
+KECALL: 4
+KECALL: 5
+KECALL: 6
+KECALL: 4

AT+KECALLCFG=3,"4849.55,N","233.00,E",14,0,"0.28,N","0.13,E","0.04,S","0.07,W"
+KECALLCFG: "4849.35,N","233.37,E",14,0,"0.28,N","0.13,E","0.04,S","0.07,W"
OK
+KECALL: 5
+KECALL: 6
+KECALL: 4
+KECALL: 42
+KECALL: 5
+KECALL: 6
+KECALL: 7

15.5. +KAECALL Command: Answer an Emergency Call

15.5.1. Description

KAECALL command is used to answer to an incoming eCall coming from the PSAP. The PSAP can ask to the module/NAD to send an MSD.

For more information about the MSD sent during an eCall, see section 15.4 +KECALL Command: Initiate Emergency Call.

15.5.2. Syntax

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KAECALL=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+KAECALL?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+KAECALL	<u>Response</u> OK +KECALL: <status>
<i>Unsolicited Notification</i>	<u>Response</u> +KECALL: <status> <u>Parameter</u> <status> Integer type. Same values as +KECALL command

HL6528x	
<u>Reference</u> Sierra Wireless Proprietary	<u>Example</u> // A PSAP calls the module/NAD RING (incoming call coming from the PSAP) RING AT+KAECALL OK +KECALL: 4 (the module/NAD has received the "Send MSD" order) +KECALL: 5 +KECALL: 6 +KECALL: 7

15.6. +KECALLMSD Command: MSD Configuration

15.6.1. Description

KECALLMSD command returns the last MSD generated.

The MSD is stored in a non-volatile memory so that it can be read after a reboot.

15.6.2. Syntax

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KECALLMSD =?	<u>Response</u> +KECALLMSD: (list of supported <mode>s) OK

HL6528x	
<i>Read command</i>	
<u>Syntax</u> AT+KECALLMSD ?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+KECALLMSD = <mode>	<u>Response</u> +KECALLMSD: <MSD> OK <u>Parameters</u> <mode> integer type 0 MSD is returned coded according to the standard (e.g. ASN.1) 1 MSD is returned not coded <MSD> string type, MSD in hexadecimal format (big endian)
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The MSD is stored in non-volatile memory so it can be read even after a reboot
<u>Example</u>	// Return the last MSD sent AT+KECALLMSD=1 +KECALLMSD: "A0B45894914F4.....DF991" OK

15.7. +KECALLVSN Command: Emergency Call Version

15.7.1. Description

The +KECALLVSN command returns the ECall stack and ASN.1 versions used in the module/NAD.

15.7.2. Syntax

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KECALLVSN =?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+KECALLVSN ?	<u>Response</u> +KECALLVSN: <Ecall Version>,<ASN.1 Version> OK <u>Parameters</u> <Ecall Version>,<ASN.1 Version> string type
<u>Reference</u> Sierra Wireless Proprietary	<u>Example</u> // eCall version used AT+KECALLVSN? +KECALLVSN: "10.0.0", "15722:2011" OK

15.8. +KECALLONLY Command: Configure eCall Only Feature

HL6528x							
<i>Test command</i>							
<u>Syntax</u> AT+ KECALLONLY=?	<u>Response</u> +KECALLONLY: (0-1) OK						
<i>Read command</i>							
<u>Syntax</u> AT+ KECALLONLY?	<u>Response</u> +KECALLONLY: <mode> OK						
<i>Write command</i>							
<u>Syntax</u> AT+ KECALLONLY= <mode>	<u>Response</u> OK <u>Parameters</u> <table><tr><td><mode></td><td>0</td><td>eCall only is not active (normal calls +eCall)</td></tr><tr><td></td><td>1</td><td>eCall only active</td></tr></table>	<mode>	0	eCall only is not active (normal calls +eCall)		1	eCall only active
<mode>	0	eCall only is not active (normal calls +eCall)					
	1	eCall only active					
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <mode> is stored in non-volatile memory so it retains its last setting even after the module is restarted.						

>> 16. DSDS Commands

Note: All commands listed in this section are for HL6528x only as of this release.

16.1. +KSS Command: Switch SIM

HL6528x	
<i>Write command</i> <u>Syntax</u> AT+KSS	<u>Response</u> OK Error case: +CME ERROR: <err> <u>Parameter</u> <err> 3 operation not allowed
<u>Notes</u>	• Sierra Wireless recommends using +KSDS instead of +KSS for TCP/UDP commands. • This command switches SIM card to non-default SIM card. After +KSS, the next AT command is routed to non-default SIM card. • +KSS is needed before each command on non-default SIM card. • If only 1 SIM card is inserted, or no SIM card is inserted, AT+KSS should return ERROR.

16.2. +KSDS Command: Select Default SIM

HL6528x																
Test command																
<u>Syntax</u> AT+KSDS=?	<u>Response</u> +KSDS: <default SIM n>, <number of SIMs> OK <u>Parameter</u> <table><tr><td><n></td><td>0</td><td>Not available</td></tr><tr><td></td><td>1</td><td>SIM1 card</td></tr><tr><td></td><td>2</td><td>SIM2 card</td></tr></table> <table><tr><td><err></td><td>3</td><td>operation not allowed</td></tr><tr><td></td><td>100</td><td>unknown</td></tr></table>	<n>	0	Not available		1	SIM1 card		2	SIM2 card	<err>	3	operation not allowed		100	unknown
<n>	0	Not available														
	1	SIM1 card														
	2	SIM2 card														
<err>	3	operation not allowed														
	100	unknown														
Read command																
<u>Syntax</u> AT+KSDS?	<u>Response</u> +KSDS: <default SIM n> OK															
Write command																
<u>Syntax</u> AT+KSDS=<n>	<u>Response</u> OK Error case +CME ERROR: <err>															

HL6528x	
Notes	• This command sets SIM card <n> to be the default SIM card. • If only one SIM card is inserted, whichever the slot it is inserted in, it will be detected at boot up time, and be set as the default SIM card. Then AT+KSDS? should return this default SIM card n. • By default, the usual AT command is routed to the default SIM card. • If only 1 SIM card is inserted, or no SIM card is inserted, AT+KSDS=<empty SIM card> should return ERROR. • The default SIM card <n> is saved in the flash. • After set command for +KSDS, there is no need to reboot HL6528x to let the default SIM card be effective. • The read command is does not return the slot of the SIM but returns the default SIM. In case there are 2 SIMs inserted, the default SIM can be set as the SIM from either slot. In case there is only 1 SIM inserted, then the default SIM is wherever the SIM is present regardless of slot. Also, when only 1 SIM is inserted, the response to AT+KSDS will be +KSDS:1.

16.3. +KCCDN Command: Call Connection and Disconnection Notification

HL6528x								
Test command								
<u>Syntax</u> AT+KCCDN=?	<u>Response</u> +KCCDN: (list of supported <mode> s), (list of supported <status> s) OK							
Read command								
<u>Syntax</u> AT+KCCDN?	<u>Response</u> +KCCDN: <mode> OK							
	<u>Parameter</u> <table><tr><td><mode></td><td><u>0</u></td><td>Disable notification</td></tr><tr><td></td><td>1</td><td>Enable notification</td></tr></table>		<mode>	<u>0</u>	Disable notification		1	Enable notification
<mode>	<u>0</u>	Disable notification						
	1	Enable notification						

HL6528x	
<i>Write command</i> <u>Syntax</u> AT+KCCDN= <mode>	<u>Response</u> OK <u>Error case</u> +CME ERROR: <err> <u>Parameter</u> <err> 3 operation not allowed
<i>Unsolicited Notification</i>	<u>Response</u> +KCALL: <Call Id>,<Status> [,<Number>] <u>Parameters</u> <call id> 0 Waiting call (alerting, no call id assigned yet) 1...7 Speech call ID > 8 Data call id <status> 0 Disconnected 1 Connected <numbr> String type. Phone number (when <status> =1)
<u>Notes</u>	• This command allows presentation of information about connection or disconnection of a CS call (either MT or MO). This URC allows TE to exactly know which call is being connected or disconnected (NO CARRIER urc is not sufficient to discriminate calls id) • Set command enables/disables the presentation of notification result code from ME to TE. • When <mode>=1, +KCALL result code is sent to TE on connection or disconnection of call <Call Id>. • Special case: to inform that current waiting call has been disconnected: +KCALL: 0,0 is sent. • The +CLCC command can be used to get more information about a specific call. • <mode> is saved in non-volatile memory.

16.4. +KSIMSLOT Command: SIM2 Slot Configuration

HL6528x	
Test command	
<u>Syntax</u> AT+KSIMSLOT=?	<u>Response</u> +KSIMSLOT: (list of supported <mode>s) OK
Read command	
<u>Syntax</u> AT+KSIMSLOT?	<u>Response</u> +KSIMSLOT: <mode> OK
Write command	
<u>Syntax</u> AT+KSIMSLOT = <mode>	<u>Response</u> OK <u>Parameter</u> <mode> Specifies whether SIM2 is activated or not 0 SIM2 deactivated (PWM) 1 SIM2 activated
<u>Notes</u>	• <mode> is saved in non-volatile memory • The module should be rebooted after executing AT+KSIMSLOT=<mode> Important: When the second SIM slot is active (+KSIMSLOT:1), GPIO2 is mandatorily assigned to the SIM2 power supply and will not be available for other GPIO using commands (+KSIMDET, +KJAMDET, +KJAM, +KSYNC, +KTEMPMON, +KGSMAD).

16.5. +KDSIMEI Command: IMEI Slot2 Configuration

HL6528x	
<i>Test command</i>	
<u>Syntax</u> AT+KDSIMEI=?	<u>Response</u> +KDSIMEI: ([0-9]{14}) OK
<i>Read command</i>	
<u>Syntax</u> AT+KDSIMEI?	<u>Response</u> +KDSIMEI: <Slot2 IMEI> OK
<i>Write command</i>	
<u>Syntax</u> AT+KDSIMEI= <Slot2 IMEI>	<u>Response</u> OK <u>Parameter</u> <Slot2 IMEI> 14 digit IMEI to be associated to slot2
<u>Notes</u>	• The set command returns an error if a valid IMEI is already assigned to slot2. <Slot2 IMEI> can only be set if current IMEI is 00...00 or the default IMEI 35005050002235. • If the TAC number starts with "0", <Slot2 IMEI> must be encapsulated with "character: AT+KDSIMEI="05005050002235"

>> 17. AVMS Commands

Note: Avoid powering the module down during an AVMS FOTA update (or during a local update using +WDSD), especially between +WDSI:14 and the module's reboot.

For the HL6528x, the maximum time for a local download (between +WDSD and +WDSI:3) is 3 minutes; and the maximum flashing time (upgrade duration between +WDSI:14 and +WDSI:16) is 8 minutes.

17.1. +WDSA Command: Change Account for DM Connection

HL6528x and HL85xxx	
Test command	
<u>Syntax</u> AT+WDSA=?	<u>Response</u> +WDSA: (list of supported <ServerId>s) OK
Read command	
<u>Syntax</u> AT+WDSA?	<u>Response</u> +WDSA: <ServerId> OK
Write command	
<u>Syntax</u> AT+WDSA= <serverId>	<u>Response</u> OK +CME ERROR <err> <u>Parameter</u> <ServerId> String type – Server ID associated with the account.

HL6528x and HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> This command is available when the embedded module has finished the Device Services initialization (see +WDSI) and when the AVMS services are in activated state (see +WDSG).
<u>Examples</u>	AT+WDSA=? +WDSA: ("Cingular", "Cingularlab", "WAVECOM-RDMS-SERVER) OK AT+WDSA="WAVECOM-RDMS-SERVER" OK AT+WDSA? +WDSA: "WAVECOM-RDMS-SERVER" OK

17.2. +WDSC Command: Device Services Configuration

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+WDSC=?	<u>Response</u> +WDSC: (0-2), (list of supported <State>s) +WDSC: 3, (list of supported <State>s) +WDSC: 4, (list of supported <Timer_n>s) OK

HL6528x and HL85xxx	
Read command	
<u>Syntax</u> AT+WDSC?	<u>Response</u> +WDSC: 0,<State> +WDSC: 1,<State> +WDSC: 2,<State> +WDSC: 3,<State> +WDSC: 4,<Timer_1>[[,<Timer_2>]...[,<Timer_n>]] OK
Write command	
<u>Syntax</u> For <Mode>= 0, 1, 2 or 3 AT+WDSC=<Mode>,<State> For <Mode>= 4 AT+WDSC=<Mode>,<timer_1>[[,<Timer_2>]...[,<Timer_n>]]	<u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <Mode> Integer type 0 User agreement for connection When this mode is activated and when a notification SMS is received by the embedded module, an indication (see +WDSI indication for more information) is returned by the embedded module to request for an agreement before connecting to the AirPrime Management Services server 1 User agreement for package download When this mode is activated, an indication (see +WDSI indication for more information) is returned by the embedded module to request for an agreement before downloading any package 2 User agreement for package install When this mode is activated, an indication (see +WDSI indication for more information) is returned by the embedded module to request for an agreement before installing any package 3 Polling mode The embedded module will initiate a connection to the Device Services server according to the defined timer 4 Retry mode If an error occurs during a connection to the Device Services server (GPRS establishment failed, http error code received), the embedded module will initiate a new connection according to the defined timers. This mechanism is persistent to the reset.

HL6528x and HL85xxx	
	<State> Integer type – Status of the mode For <Mode> = 0, 1 or 2 0 Disabled (default value) 1 Enabled For <Mode> = 3 Value in range [0-525600] (units:min) 0 The polling mode is deactivated <Timer_1> Timer between the first failed connection and the next attempt. Value in range [0 to 20160] (units: min). 0 The retry mode is deactivated 15 Default value <Timer_n> Timer between the nth failed attempt connection and the (n+1)th connection (n<=7). Value in range [1 to 20160] (units: min) Default values: <Timer_2>=60 <Timer_3>=240 <Timer_4>=960 <Timer_5>=2880 <Timer_6>=10080 <Timer_7>=10080
<u>Examples</u>	AT+WDSC=? +WDSC:(0-2),(0-1) +WDSC:3,(0-525600) +WDSC:4,(0-20160),(1-20160),(1-20160),(1-20160),(1-20160),(1-20160),(1-20160) OK AT+WDSC? <i>// All modes are deactivated except retry mode which is used with default timers</i> +WDSC: 0,0 +WDSC: 1,0 +WDSC: 2,0 +WDSC: 3,0 +WDSC: 4,15,60,240,960,2880,10080,10080 OK

HL6528x and HL85xxx	
	AT+WDSC=0,1 OK AT+WDSC? +WDSC: 0,1 +WDSC: 1,0 +WDSC: 2,0 +WDSC: 3,0 +WDSC: 4,15,60,240,960,2880,10080,10080 OK
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> - This command is available when the embedded module has finished the Device Services initialization (see +WDSI) and when the AVMS services are in prohibited state (see +WDSG). - Parameters <State> and <Timer_1> to <Timer_n> are stored in non-volatile memory without sending the &W command. The &F command has no impact on these values. - The network registration is considered as “failed” when all connections configured by the retry mode have failed. This registration is forbidden while the APN is not set by the +WDSS command.

17.3. +WDSD Command: Device Services Local Download

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+WDSD=?	<u>Response</u> +WDSD: (list of supported <Size>s) OK	<u>Syntax</u> AT+WDSD=?	<u>Response</u> +WDSD: (list of supported <Size>s) OK

HL6528x		HL85xxx	
<i>Write command</i>	<u>Syntax</u> AT+WDSD= <Size> <u>Response</u> <NACK> // User sends data OK or +CME ERROR <err> <u>Parameter</u> <Size> Package size in bytes. Value in range [0 to 491520]	<i>Write command</i>	<u>Syntax</u> AT+WDSD= <Size> <u>Response</u> <NACK> // User sends data OK or +CME ERROR <err> <u>Parameter</u> <Size> Package size in bytes. Value in range [0 to 13578240]
<u>Examples</u>	AT+WDSD=? +WDSD: (0-491520) OK AT+WDSD=1000 //download a 1kBytes package <NACK> //the device is ready to receive data //Send Data OK //All data are well received by the module +WDSI: 3 //A package is ready to install (see +WDSI //and +WDSR commands)	<u>Examples</u>	AT+WDSD=? +WDSD: (0-13578240) OK AT+WDSD=1024 //download a 1kBytes package <NACK> //the device is ready to receive data //Send Data OK //All data are well received by the module +WDSI: 3 //A package is ready to install (see +WDSI //and +WDSR commands)
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> • This command is available when the embedded module has finished its initialization. • The flow control of the TE has to be set to 'Hardware' • This command will automatically activate the user agreement for install (see +WDSC command description). • No reset is made during the package download. • A timeout will happen (and a +CME ERROR: 3 is returned) if no data is sent to the device in 5 minutes.	<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> • This command is available when the embedded module has finished its initialization. • The response to the AT+WDSD=<Size> command is the <NACK> character when the device is ready to receive data using the 1K-Xmodem protocol • The flow control of the TE has to be set to 'Hardware' • This command will automatically activate the user agreement for install (see +WDSC command description). • No reset is made during the package download.

HL6528x		HL85xxx	
			A timeout will happen (and a +CME ERROR: 3 is returned) if no data is sent to the device in 5 minutes.

17.4. +WDSE Command: Device Services Error

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+WDSE	<u>Response</u> [+WDSE:<HTTP_Status>] OK +CME ERROR <err>
	<u>Parameters</u> <HTTP_Status> Integer type – Last HTTP response received by the Module
	100 Continue 101 Switching Protocols 200 OK 201 Created 202 Accepted 203 Non-Authoritative Information 204 No Content 205 Reset Content 206 Partial content 300 Multiple Choices 301 Moved Permanently 302 Found 303 See Other 304 Not Modified 305 Use Proxy

HL6528x and HL85xxx	
	307 Temporary Redirect 400 Bad Request 401 Unauthorized 402 Payment Required 403 Forbidden 404 Not Found 405 Method Not Allowed 406 Not Acceptable 407 Proxy Authentication Required 408 Request time-out 409 Conflict 410 Gone 411 Length Required 412 Precondition Failed 413 Request Entity too large 414 Request URI too large 415 Unsupported Media type 416 Request range unsatisfiable 417 Expectation failed 500 Internal server error 501 Not implemented 502 Bad Gateway 503 Service unavailable 504 Gateway time-out 505 HTTP version not supported If no session was made with the server, AT+WDSE only returns OK, without +WDSE: <HTTP_Status> intermediary response.
<u>Examples</u>	AT+WDSS=1,1 //A session was made with the server OK AT+WDSE +WDSE: 200 //The last HTTP response received is "OK" OK

HL6528x and HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> This command is available when the embedded module has finished the Device Services initialization (see +WDSI) and when the AVMS services are in activated state (see +WDSG).

17.5. +WDSF Command: Device Services Fallback

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+WDSF=?	<u>Response</u> +WDSF: (list of supported <Mode>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+WDSF?	<u>Response</u> +WDSF: 1,<FallbackInfo> +WDSF: 2,<EraseInfo> OK
<i>Write command</i>	
<u>Syntax</u> AT+WDSF= <Mode>	<u>Response</u> OK +CME ERROR <err> <u>Parameters</u> <Mode> Integer type 1 Downgrade to a previous installation 2 Delete the downloaded package which contains the reverse patch

HL6528x and HL85xxx	
	<FallbackInfo> Integer type – Indicates the presence of the previous package 0 Previous package is not present 1 Previous package is present <EraseInfo> Integer type – Indicate if a package can be deleted. Be careful, erasing the package will disable the possibility to make any recovery or manual fallback 0 The package cannot be deleted 1 The package can be deleted
<u>Examples</u>	AT+WDSF? //a reverse package is present, deletion impossible +WDSF: 1,1 +WDSF: 2,0 OK AT+WDSF=1 //downgrade to the previous installation OK +WDSI: 17,1 //downgrade the package successfully done, displayed only if //+WDSI indication is activated
Reference Sierra Wireless Proprietary Command	<u>Notes</u> • This command is available when the embedded module has finished the Device Services initialization (see +WDSI). • If an explicit firmware fallback operation is performed, a synchronization sequence should follow. • When AT+WDSF=1,1 is executed manually, the final version is not sent back to the AVMS server. • Manual synchronization is needed to avoid inconsistent versions between the module and the server.

17.6. +WDSG Command: Device Services General Status

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+WDSG=?	<u>Response</u> OK

HL6528x and HL85xxx	
<i>Write command</i>	
<u>Syntax</u> AT+WDSG	<u>Response</u> +WDSG: <Indication>,<State> [+WDSG: <Indication>,<State>[...]] OK or +CME ERROR <err> <u>Parameters</u> <Indication> Integer type 0 Device services activation state 1 Session and package indication <State> Status of indication For <Indication>=0 0 Device services are prohibited. Devices services will never be activated. 1 Device services are deactivated. Connection parameters to a device services have to be provisioned. 2 Device services have to be provisioned. NAP parameters have to be provisioned. 3 Device services are activated. If a device has never been activated (first use of device services on this device), <State> is set to 1. The connection parameters are automatically provisioned, no action is needed from the user. For <Indication>=1 0 No session or package 1 A session is under treatment 2 A package is available on the server. 3 A package was downloaded and ready to install When a package was installed or a recovery was made, <State> is set to 0.
<u>Examples</u>	AT+WDSG=? OK

HL6528x and HL85xxx	
	AT+WDSG +WDSG: 0,3 //Device services are activated, +WDSG: 1,0 //No session to the server, no patch to download or to install OK
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> This command is available when the embedded module has finished the Device Services initialization (see +WDSI).

17.7. +WDSI Command: Device Services Indications

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+WDSI=?	<u>Response</u> +WDSI: (list of supported <Level>s) OK	<u>Syntax</u> AT+WDSI=?	<u>Response</u> +WDSI: (list of supported <Level>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+WDSI?	<u>Response</u> [+WDSI: <Level>] OK	<u>Syntax</u> AT+WDSI?	<u>Response</u> [+WDSI: <Level>] OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+WDSI= <Level>	<u>Response</u> OK or +CME ERROR <err>	<u>Syntax</u> AT+WDSI= <Level>	<u>Response</u> OK or +CME ERROR <err>

HL6528x	HL85xxx
<u>Parameters</u> <Level> Indication level, bit field (default value = 0) Bit set to 0 Indication deactivated Bit set to 1 Indication activated 0 No indication 1 Activate the initialization end indication (<Event> = 0) 2 Activate the server request for a user agreement indication (<Event>=1, 2 & 3) 4 Activate the authentication indications (<Event> = 4 & 5) 8 Activate the session start indication (<Event> = 6, 7 & 8) 16 Activate the package download indications (<Event> = 9, 10 & 11) 32 Activate the certified downloaded package indication (<Event> = 12 & 13) 64 Activate the update indications (<Event> = 14, 15 & 16) 128 Activate the fallback indication (<Event> = 17) 256 Activate download progress indication (<Event> = 18) 512 Reserved 1024 Reserved 2048 Activate provisioning indication (<Event>=21) 4096 Reserved <Event> 0 Device services are initialized and can be used. Devices services are initialized when the SIM PIN code is entered and a dedicated NAP is configured (see +WDSS command) 1 The Device Services server requests the device to make a connection. The device requests a user agreement to allow the embedded module to make the connection. The response can be sent using +WDSR command and this indication can be returned by the device if the user has activated the user agreement for	<u>Parameters</u> <Level> Indication level, bit field (default value = 0) Bit set to 0 Indication deactivated Bit set to 1 Indication activated 0 No indication 1 Activate the initialization end indication (<Event> = 0) 2 Activate the server request for a user agreement indication (<Event>=1, 2 & 3) 4 Activate the authentication indications (<Event> = 4 & 5) 8 Activate the session start indication (<Event> = 6, 7, 8 & 23) 16 Activate the package download indications (<Event> = 9, 10 & 11) 32 Activate the certified downloaded package indication (<Event> = 12 & 13) 64 Activate the update indications (<Event> = 14, 15 & 16) 128 Activate the fallback indication (<Event> = 17) 256 Activate download progress indication (<Event> = 18) 512 Reserved 1024 Reserved 2048 Activate provisioning indication (<Event>=21) 4096 Reserved <Event> 0 Device services are initialized and can be used. Devices services are initialized when the SIM PIN code is entered and a dedicated NAP is configured (see +WDSS command) 1 The Device Services server requests the device to make a connection. The device requests a user agreement to allow the embedded module to make the connection. The response can be sent using +WDSR command and this indication can be returned by the device if the user has activated the user agreement

HL6528x		HL85xxx	
	connection (see +WDSC command for more information) 2 The Device Services server requests the device to make a package download. The device requests a user agreement to allow the embedded module to make the download. The response can be sent using +WDSR command and this indication can be returned by the device if the user has activated the user agreement for download (see +WDSC command for more information). 3 The device has downloaded a package. The device requests a user agreement to install the downloaded package. The response can be sent using +WDSR command and this indication can be returned by the device if the user has activated the user agreement for install (see +WDSC command for more information). 4 The embedded module starts sending data to the server 5 Authentication with the server failed 6 Authentication has succeeded, a session with the server started 7 Session with the server failed 8 Session with the server is finished 9 A package is available on the server and can be downloaded by the embedded module. A <Data> parameter is returned indicating the package size in kB 10 A package was successfully downloaded and stored in flash 11 An issue happens during the package download. If the download has not started (+WDSI: 9 indication was not returned), this indication indicates that there is not		for connection (see +WDSC command for more information) 2 The Device Services server requests the device to make a package download. The device requests a user agreement to allow the embedded module to make the download. The response can be sent using +WDSR command and this indication can be returned by the device if the user has activated the user agreement for download (see +WDSC command for more information). 3 The device has downloaded a package. The device requests a user agreement to install the downloaded package. The response can be sent using +WDSR command and this indication can be returned by the device if the user has activated the user agreement for install (see +WDSC command for more information). 4 Try to connect to a server; the server replies (not necessarily the AVMS server) 5 Authentication with the server failed 6 A job has been detected on the AVMS server 7 Session with the server failed 8 Session with the server is finished 9 A package is available on the server and can be downloaded by the embedded module. A <Data> parameter is returned indicating the package size in kB 10 A package was successfully downloaded and stored in flash 11 An issue happens during the package download. If the download has not started (+WDSI: 9 indication was not returned), this indication indicates that there is not

HL6528x		HL85xxx	
	enough space in the device to download the update package. If the download has started (+WDSI: 9 indication was returned), a flash problem implies that the package has not been saved in the device 12 Downloaded package is certified to be sent by the AirPrime Management Services server 13 Downloaded package is not certified to be sent by the AirPrime Management Services server 14 Update will be launched 15 OTA update client has finished unsuccessfully 16 OTA update client has finished successfully 17 A fallback mechanism was launched 18 Download progress. This event is returned without <Data> parameter to indicate that a download starts. During the download, a percentage progress is indicated in <Data> parameter 19 Reserved 20 Reserved 21 A provision was made by the AirPrime Management Services server 22 Reserved <Data> Specific data for some <Event> For<Event>=9, <Data> indicates the package size in bytes, which will be downloaded For<Event>=17, <Data> indicates if the fallback was asked by the user or applied because a recovery was necessary automatic recovery (a recovery mechanism was made) fallback asked by the user (see +WDSF for more information)		enough space in the device to download the update package. If the download has started (+WDSI: 9 indication was returned), a flash problem implies that the package has not been saved in the device 12 Downloaded package is certified to be sent by the AirPrime Management Services server 13 Downloaded package is not certified to be sent by the AirPrime Management Services server 14 Update will be launched 15 OTA update client has finished unsuccessfully 16 OTA update client has finished successfully 17 A fallback mechanism was launched 18 Download progress. This event is returned without <Data> parameter to indicate that a download starts. During the download, a percentage progress is indicated in <Data> parameter 19 Reserved 20 A Bootstrap SMS was received and a User Pin is requested 21 A provision was made by the AirPrime Management Services server 22 Reserved <Data> Specific data for some <Event> For<Event>=9, <Data> indicates the package size in bytes, which will be downloaded For<Event>=17, <Data> indicates if the fallback was asked by the user or applied because a recovery was necessary 0 Automatic recovery (a recovery mechanism was made)

HL6528x		HL85xxx	
	For<Event>=18, <Data> indicates the download progress in percentage For <Event>=21, <Data> indicates the provisioned parameters (see +WDSC command for more information) Other values reserved		1 Fallback asked by the user (see +WDSF for more information) For<Event>=18, <Data> indicates the download progress in percentage For<Event>=21, <Data> indicates the provisioned parameters 0 Reserved 1 Alarm (see +CALA command) 2 Reserved 3 Greeting (see +CGMI command) 4 Preferred PLMN (see +CPOL command) 5 PDP context (see +CGDCONT and +WDSS commands) 6 SIM PIN code activation state (see +CLCK command) 7 Reserved 8 GPRS class (see +CGCLASS command) 9 Device Service Polling mode (see +WDSC command for more information) 10 Network selection (see + COPS command for more information) 11 Reserved 12 Retry mode (see +WDSC command for more information (mode 4)) 13 MSISDN (see +CPBS command for more information)
<u>Examples</u>	AT+WDSI=? +WDSI: (0-4095) OK AT+WDSI? +WDSI: 0 // All indications are deactivated OK AT+WDSI=207 OK	<u>Examples</u>	AT+WDSI=? +WDSI: (0-2047) OK AT+WDSI? +WDSI: 0 // All indications are deactivated OK AT+WDSI=207 OK

HL6528x			HL85xxx		
	+WDSI: 1 <i>// The devices services server // request a connection to the // embedded module</i>			+WDSI: 1 <i>// The devices services server // request a connection to the // embedded module</i>	
	AT+WDSR=1 OK +WDSI: 4 <i>// The embedded module will send // the first data to the AirPrime //Management Services server</i>	<i>// Accept the connection</i>		AT+WDSR=1 OK +WDSI: 4 <i>// The embedded module will send // the first data to the AirPrime //Management Services server</i>	<i>// Accept the connection</i>
	+WDSI: 6 +WDSI: 8 <i>// The authentication succeeded // The session with the server is // over</i>			+WDSI: 6 +WDSI: 8 <i>// The authentication succeeded // The session with the server is // over</i>	
	+WDSI: 9,1000 <i>// A package will be downloaded, // the size is 1kbytes</i>			+WDSI: 9,1000 <i>// A package will be downloaded, // the size is 1kbytes</i>	
	+WDSI: 18,"1%" +WDSI: 18,"100%" <i>// 1% was downloaded // The whole package was // downloaded</i>			+WDSI: 18,"1%" +WDSI: 18,"100%" <i>// 1% was downloaded // The whole package was // downloaded</i>	
	+WDSI: 10 <i>// The whole package was stored in // flash</i>			+WDSI: 10 <i>// The whole package was stored in // flash</i>	
Unsolicited Notification	<u>Response</u> +WDSI: <Event>[,<Data>]		Unsolicited Notification	<u>Response</u> +WDSI: <Event>[,<Data>]	

HL6528x		HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> - This command is available when the embedded module has finished its initialization. - To receive +WDSI indications, the Device Services should be in activated state (see +WDSG for more information). - The <Level> parameter is stored in non-volatile memory without using AT&W command. The default value can be restored using AT&F. - Updates are launched after +WDSI: 14. The HL6528x then needs to reboot, after which notifications to indicate the progress of the install are displayed. Two more reboots afterwards are necessary to complete the process. Possible messages during install are: - START Start of the update - CONTINUE The update continues after it has been stopped (by a power down, for example) - END: 0 The update is successful - END: 1 The update failed - END: 2 The update failed with a fatal error	<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> - This command is available when the embedded module has finished its initialization. - To receive +WDSI indications, the Device Services should be in activated state (see +WDSG for more information). - The <Level> parameter is stored in non-volatile memory without using AT&W command. The default value can be restored using AT&F.

17.8. +WDSR Command: Device Services Reply

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+WDSR=?	<u>Response</u> +WDSR: (list of supported <Reply>s),(list of supported <Timer>s) OK

HL6528x and HL85xxx	
Write command	<u>Syntax</u> AT+WDSR= <Reply> [,<Timer>] <u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <Reply> Reply to user agreement request (see +WDSI) 0 Delay or refuse the connection to the server 1 Accept the connection to the server 2 Delay or refuse the download 3 Accept the download 4 Accept the install 5 Delay the install <timer> Timer until a new User agreement request is returned by the module. This parameter is only available for <Reply>=0, 2 or 5. Units: minutes. Range is from 0 to 1440. Default value = <u>30</u>. Value 0 indicates that the application refuses the user agreement (impossible when <Reply>=5).
<u>Examples</u>	AT+WDSR=? +WDSR: (0-5),(0-1440) OK +WDSI: 1 <i>//The device Services server requests the device to make a connection to the server. The user is requested to allow the connection.</i> AT+WDSR=1 OK +WDSI: 3 <i>//A user agreement is requested to install a package</i> AT+WDSR=5,10 <i>//A delay of 10 minutes is requested</i> OK +WDSI: 3 <i>//10 minutes later, a new user agreement is requested to install a package</i> AT+WDSR=4 <i>//The install is requested</i> OK

HL6528x and HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> - This command is available when the embedded module has finished the Device Services initialization (see +WDSI) and when the AVMS services are in activated state (see +WDSG) - It is not possible to refuse an install request (AT+WDSR=5,0), and will return +CME ERROR: 3. - After an install delay if the embedded module is powered down until after the delay, it is not powered on and the new user agreement request should be returned at the newt start up. - Additionally for the HL6528x, when installing the package, the module needs to reboot after which notifications to indicate the progress of the install are displayed. Two more reboots afterwards are necessary to complete the process. Possible messages during install are: START Start of the update CONTINUE The update continues after it has been stopped (by a power down, for example) END: 0 The update is successful END: 1 The update failed END: 2 The update failed with a fatal error

17.9. +WDSS Command: Device Services Session

HL6528x and HL85xxx	
<u>Test command</u>	
<u>Syntax</u> AT+WDSS=?	<u>Response</u> +WDSS: 0 , (Max length for <Apn>), (Max length for <User>), (Max length for <Pwd>) +WDSS: 1 , (list of supported <Action>s for this <Mode>) OK
<u>Read command</u>	
<u>Syntax</u> AT+WDSS?	<u>Response</u> [+WDSS: 0,<Apn>,<User>] [+WDSS: 1,<Action>] OK

HL6528x and HL85xxx	
<i>Write command</i> <u>Syntax</u> For <Mode>=0 AT+WDSS= <Mode>,<Apn>[, <User>[,<Pwd>]] For <Mode>=1 AT+WDSS= <Mode>,<Action>	<u>Response</u> OK +CME ERROR <err> <u>Parameters</u> <Mode> Integer type 0 PDP context configuration for Device Services 1 User Initiated connection to the Device services server <Apn> Access Point Name for Devices Services. String type up to 50 characters <User> Login for the APN. String type, up to 30 characters <Pwd> Password for the APN. String type, up to 30 characters <Action> For <Mode>=1 only 0 Release the current connection to the Device Services Server 1 Establish a connection to the Device Services Server
<u>Examples</u>	For HL6528x: AT+WDSS=? +WDSS: 0, 50,30,30 +WDSS: 1,(0-1) OK AT+WDSS? OK //No APN defined AT+WDSS=0,"Sierra Wireless" //Define the APN for the Device Services OK //Sierra Wireless

HL6528x and HL85xxx

```

AT+WDSS?
+WDSS: 0,"Sierra Wireless"
+WDSS: 1,0
OK

AT+WDSS=1,1           //Initiation of a connection to the Device Services server
OK
AT+WDSS=1,0           //Release connection to the Device Services server
OK

For HL85xxx:
AT+WDSS?
OK                      //No APN defined

AT+WDSS=?
+WDSS: 0, 50,30,30
OK

AT+WDSS=0,"Sierra Wireless" //Define the APN for the Device Services
OK                          //Sierra Wireless

AT+WDSS=?
+WDSS: 0, 50,30,30
+WDSS: 1,(0-1)
OK

AT+WDSS?
+WDSS: 0,"Sierra Wireless"
+WDSS: 1,0
OK

AT+WDSS=1,1           //Initiation of a connection to the Device Services server
OK

```

HL6528x and HL85xxx	
	AT+WDSS=1,0 <i>//Release connection to the Device Services server</i> OK
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> • This command is available when the embedded module has finished the Device Services initialization (see +WDSI) • <Apn>, <User> and <Pwd> parameters are stored in flash without using AT&W command. AT&F has no effect on these parameters. • AT+WDSS? command only returns OK if no APN is defined. • When a request is sent to the embedded module to resume an inexistent or unsuspended session, +CME ERROR: 3 is returned. • When a request is sent to the embedded module to release an inexistent session, +CME ERROR: 3 is returned. • Depending on +WDSM configuration, when no dedicated NAP is defined using +WDSS command and a session is asked (by AT command or notify by SMS), the embedded module will use a NAP defined by +CGDCONT command to activate the dedicated PDP context. This NAP will be recorded to configure the NAP Device Services and it will be used to activate the dedicated PDP context for the next sessions. • When the PDP context cannot be activated because of bad AirPrime Management Services NAP configuration, the embedded module will use a NAP defined by +CGDCONT command to activate the dedicated PDP context (but the initial NAP configuration is not erased). • The activation is done if the embedded module is registered on the network. If the embedded module is not registered when the command is performed, the activation will be done at the next network registration (even if the embedded module resets). • No GPRS connection to the AirPrime Management Services server is possible when a registration is not completed. • HL85xxx uses CID 5 for AVMS PDP activation

17.10. +WDSM Command: Manage Device Services

HL6528x and HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+WDSM=?	<u>Response</u> +WDSM: (list of supported <Mode>s),(list of supported <State>s) OK

HL6528x and HL85xxx	
Read command	
<u>Syntax</u> AT+WDSM?	<u>Response</u> +WDSM: 0,<State> +WDSM: 1,<State> OK
Write command	
<u>Syntax</u> AT+WDSM= <Mode>,<State>	<u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <Mode> APN backup 0 If AVMS APN (filled with +WDSS command) is incorrect, the module will use the APN defined by +CGDCONT command. 1 If AVMS APN has not been filled with +WDSS command, the module will use the APN defined by +CGDCONT command. Each APN will be used until successful session activation. If an AVMS session succeeds, the corresponding APN is copied in the +WDSS command and remains after the AVMS session ends. <State> status of <Mode> 0 Disable 1 Enable (default value)
<u>Examples</u>	AT+WDSM=? +WDSM: (0-1),(0-1) OK AT+WDSM? +WDSM: 0,1 +WDSM: 1,1 OK // all modes are activated

HL6528x and HL85xxx	
	AT+WDSM=0,0 OK AT+WDSM? +WDSM: 0,0 +WDSM: 1,1 OK
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> <State> is stored in non-volatile memory without sending AT&W command. AT&F command has no impact on these values.

17.11. +WPPP Command: PDP Context Authentication Configuration

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+WPPP=?	<u>Response</u> +WPPP: (list of supported <Auth>s),[(list of supported <cid>s)] OK	<u>Syntax</u> AT+WPPP=?	<u>Response</u> +WPPP: (list of supported <Auth>s),[(list of supported <cid>s)] OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+WPPP?	<u>Response</u> +WPPP: <Auth>,<cid>,<username>,<password> OK	<u>Syntax</u> AT+WPPP?	<u>Response</u> +WPPP: <Auth>,<cid>,<username>,<password> OK

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+WPPP= <Auth>,[<cid>], [<username>], [<password>]	<u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <Auth> Type of authentication supported <u>1</u> PAP (default) <cid> PDP context identifier used in +CGDCONT. If omitted, the configuration is set for all PDP contexts. Range: 1 – 2 <username> Login for the APN. String type, up to 30 characters <password> Password for the APN. String type, up to 30 characters	<u>Syntax</u> AT+WPPP= <Auth>,[<cid>], [<username>], [<password>]	<u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <Auth> Type of authentication supported 0 None 1 PAP <u>2</u> CHAP (default) <cid> PDP context identifier used in +CGDCONT. If this parameter is omitted, the <Auth> setting applies to all PDP contexts and the setting is saved to non-volatile memory. To change the <Auth> setting to all PDP contexts, there must be at least one PDP context defined in AT+CGDCONT. Else, if this parameter is present, the <Auth> setting applies to a particular PDP context and the setting is not saved to non-volatile memory. Range: 1 – 20 <username> Login for the APN. String type, up to 64 characters <password> Password for the APN. String type, up to 64 characters

HL6528x		HL85xxx	
<u>Examples</u>	AT+WPPP=? +WPPP: (1),(1-2) OK AT+WPPP=1,1,"myusername","mypassword" OK AT+WPPP? +WPPP: 1,1,"myusername","mypassword" OK	<u>Examples</u>	AT+WPPP=? +WPP: (0-2),(1-20) OK AT+WPPP=1,1,"myusername","mypassword" OK AT+WPPP? +WPPP: 1,1,"myusername","mypassword" OK
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> +WPPP is available when SIM has been inserted and the pin code is entered.	<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> +WPPP is available when SIM has been inserted and the pin code is entered.

>> 18. Location Service Commands

18.1. +GPSSTART Command: Start or Restart the Location Service

HL6528-G		HL854x-G	
<i>Test command</i> <u>Syntax</u> AT+GPSSTART=?	<u>Response</u> +GPSSTART: (list of supported <starting_mode>s) OK	<i>Test command</i> <u>Syntax</u> AT+GPSSTART=?	<u>Response</u> +GPSSTART: (list of supported <starting_mode>s) OK
<i>Read command</i> <u>Syntax</u> AT+GPSSTART?	<u>Response</u> +GPSSTART: <starting_mode> OK <u>Parameter</u> <starting_mode> Starting mode of the last successfully initiated GNSS session. The values returned are described in the write command.	<i>Read command</i> <u>Syntax</u> AT+GPSSTART?	<u>Response</u> +GPSSTART: <starting_mode> OK
<i>Write command</i> <u>Syntax</u> AT+GPSSTART=<starting_mode>	<u>Response</u> OK <u>Parameter</u> <starting_mode> Specifies the GPS starting mode of the application; used for test purposes 0 "AUTO" start with all previous NV stored data 1 "TEST WARM" start with previous NV stored data except Broadcasted Ephemeris	<i>Write command</i> <u>Syntax</u> AT+GPSSTART=<starting_mode>	<u>Response</u> OK <u>Parameter</u> <starting_mode> Specifies the GPS starting mode of the application; used for test purposes 0 "AUTO" start. The GNSS platform automatically chooses a start mode according to the initial state. This start mode should be used for normal operation.

HL6528-G		HL854x-G	
	2 "TEST COLD" start with NO previous NV store data except calibration data, updated Almanac, and Extended Ephemeris if available. Time and last location are unknown 3 "TEST FACTORY" start with Factory Default Data instead of previous run data 255 No GNSS session started yet		1 "HOT" start. For testing purposes only. The GNSS platform attempts make a hot start. It executes a Software Reset without clearing non-volatile memory. 2 "WARM" start. For testing purposes only. The GNSS platform makes a warm start. 3 "COLD" start. For testing purposes only. The GNSS platform makes a cold start. It clears stored ephemeris, RTC Time and stored MS location from nonvolatile memory and then executes a software reset.
<i>Unsolicited Notification</i>	<u>Response</u> +GPSEVSTART: <status> <u>Parameter</u> <status> Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed	<i>Unsolicited Notification</i>	<u>Response</u> +GPSEVSTART: <status> <u>Parameter</u> <status> Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed
<u>Notes</u>	- Please refer to the starting mode description in GPS receiver capabilities and restrictions chapter for more information. - GPS data are stored to non-volatile memory during specific Location Services Application transition. Please refer to GNSS data management for more information.		
<u>Examples</u>	AT+GPSSTART=1 // Starts GPS in "TEST WARM" mode OK +GPSEVSTART: 1 //or +GPS ERROR: X // For the list of possible values of X, please refer to section 23.2.6 GNSS Error Codes. AT+GPSSTART=? +GPSSTART: (0-3) OK	<u>Examples</u>	AT+GPSSTART=1 OK +GPSEVSTART: 1 // or +CME ERROR: <error> AT+GPSSTART=? +GPSSTART: (0-3) OK

HL6528-G		HL854x-G	
	AT+GPSSTART? +GPSSTART: 1 // The current starting mode is "TEST // WARM" start OK		AT+GPSSTART? +GPSSTART: 1 //The current starting mode is "HOT" start OK

18.2. +GPSSLEEP Command: Put GPS Receiver to the Specified GPS Sleep Mode

HL6528-G and HL854x-G	
<i>Test command</i> <u>Syntax</u> AT+GPSSLEEP=?	<u>Response</u> +GPSSLEEP: (list of supported <sleep_mode>s) OK
<i>Read command</i> <u>Syntax</u> AT+GPSSLEEP?	<u>Response</u> +GPSSLEEP: <sleep_mode> OK
<i>Write command</i> <u>Syntax</u> AT+GPSSLEEP=<sleep_mode>	<u>Response</u> OK <u>Parameters</u> <sleep_mode> GPS sleep mode 0 GPS Idle Mode (activates push-to-fix mode on the HL6528-G; not supported on the HL854x-G) 1 GPS Hibernate 2 GPS Deep Sleep (not supported)

HL6528-G and HL854x-G	
<i>Unsolicited Notification</i>	<u>Response</u> +GPSEVSLEEP: <status> <u>Parameter</u> <status> Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed
<u>Examples</u>	For HL6528-G: <pre> AT+GPSSLEEP=1 OK +GPSEVSLEEP: 1 //or +GPS ERROR: X //For the list of possible values of X, please refer to section 23.2.6 GNSS Error Codes. AT+GPSSLEEP=? +GPSSLEEP: (0,1) OK AT+GPSSLEEP? +GPSSLEEP: 1 OK </pre> For HL854x-G: <pre> AT+GPSSLEEP=1 OK +GPSEVSLEEP: 1 // or +CME ERROR: <error> AT+GPSSLEEP=? +GPSSLEEP: (1) OK </pre>

HL6528-G and HL854x-G	
	AT+GPSSLEEP? +GPSSLEEP: 1 OK

18.3. +GPSSTOP Command: Stop the Location Service

HL6528-G and HL854x-G	
<i>Test command</i>	
<u>Syntax</u> AT+GPSSTOP=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+GPSSTOP?	<u>Response</u> +GPSSTOP: <status> OK
<i>Write command</i>	
<u>Syntax</u> AT+GPSSTOP	<u>Response</u> OK
<i>Unsolicited Notification</i>	<u>Response</u> +GPSEVSTOP: <status> <u>Parameter</u> <status> Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed

HL6528-G and HL854x-G	
Examples	For HL6528-G: <pre> AT+GPSSTOP OK +GPSEVSTOP: 1 //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description. AT+GPSSTOP=? OK </pre> For HL854x-G: <pre> AT+GPSSTOP OK +GPSEVSTOP: 1 // or +CME ERROR: <error> AT+GPSSTOP=? OK </pre>

18.4. +GPSINIT Command: Initialization of the Location Service

HL6528-G		HL854x-G	
Test command		Test command	
<u>Syntax</u> AT+GPSINIT=?	<u>Response</u> +GPSINIT: (list of supported <hw>s) OK	<u>Syntax</u> AT+GPSINIT=?	<u>Response</u> +GPSINIT: (list of supported <hw>s) OK

HL6528-G		HL854x-G	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+GPSINIT?	<u>Response</u> +GPSINIT: <hw> OK	<u>Syntax</u> AT+GPSINIT?	<u>Response</u> +GPSINIT: <hw> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+GPSINIT =<hw>	<u>Response</u> OK <u>Parameters</u> <hw> Hardware type or configuration for initialization. This parameter gets the last known value within the current session if omitted. 41 HL6528-G integrating SiRFVe GNSS receiver (factory default value)	<u>Syntax</u> AT+GPSINIT =<hw>	<u>Response</u> OK <u>Parameters</u> <hw> Hardware type or configuration for initialization. This parameter gets the last known value within the current session if omitted. 41 HL854x-G integrating SiRFVe GNSS receiver (factory default value)
<i>Unsolicited Notification</i>	<u>Response</u> +GPSEVINIT: <status> <u>Parameter</u> <status> Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed	<i>Unsolicited Notification</i>	<u>Response</u> +GPSEVINIT: <status> <u>Parameter</u> <status> Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed
<u>Examples</u>	AT+GPSINIT=41 //Initialize GNSS device OK +GPSEVINIT: 1 //or +GPS ERROR: X //For more information about X value, //please refer to Location AT commands //error codes description.	<u>Examples</u>	AT+GPSINIT=41 //Inititalize GNSS device OK +GPSEVINIT: 1 // or +CME ERROR: <error> AT+GPSINIT=? //The current settings are saved. +GPSINIT: (41) OK

HL6528-G		HL854x-G	
	AT+GPSINIT=? //The current settings are saved. +GPSINIT: (41) OK AT+GPSINIT? //The current settings are saved. +GPSINIT: 41 OK		AT+GPSINIT? //The current settings are saved. +GPSINIT: 41 OK

18.5. +GPSNMEA Command: Configure the NMEA Frames Flow

HL6528-G		HL854x-G	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+GPSNMEA=?	<u>Response</u> +GPSNMEA: (list of supported <output>s),(list of supported <rate>s), (list of supported <nmea_mask>s), (list of supported <nmea_profile>s) OK	<u>Syntax</u> AT+GPSNMEA=?	<u>Response</u> +GPSNMEA: (list of supported <output>s),(list of supported <rate>s), (list of supported <nmea_mask>s), (list of supported <nmea_profile>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+GPSNMEA?	<u>Response</u> +GPSNMEA: <output>,<rate>,<nmea_mask>,<nmea_profile> OK	<u>Syntax</u> AT+GPSNMEA?	<u>Response</u> +GPSNMEA: <output>,<rate>,<nmea_mask>,<nmea_profile> OK

HL6528-G		HL854x-G	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+GPSNMEA= <output> [,<rate>] [,<nmea_mask>], [<nmea_profile>]]	<u>Response</u> OK <u>Parameters</u> <output> Specifies the port which will be used by the application to transmit NMEA frames. This port can also be used simultaneously as the PVT sentence output port if needed. This parameter is a hexadecimal value and is entered without the prefix "0x" 0x00 NMEA frames are not output 0x01 NMEA frames output on UART1 0x02 NMEA frames output on UART2 (not supported) 0x03 NMEA frames output on USB (not supported on the HL6528-G) 0x04 NMEA frames output on port where the +GPSNMEA command was received 0x101 NMEA frames output on I ² C <rate> Defines the NMEA frames update rate in seconds Range: 0.2 – 65535 <u>1</u> Factory default value	<u>Syntax</u> AT+GPSNMEA= <output> [,<rate>] [,<nmea_mask>], [<nmea_profile>]]	<u>Response</u> OK <u>Parameters</u> <output> Specifies the port which will be used by the application to transmit NMEA frames. This port can also be used simultaneously as the PVT sentence output port if needed. This parameter is a hexadecimal value and is entered without the prefix "0x" 0x00 NMEA frames are not output 0x01 NMEA frames output on UART1 0x02 NMEA frames output on UART2 (not supported) For USB composition mode 0 (+kusbcomp=0): 0x030 NMEA frames output on USB0 0x33 NMEA frames output on USB3 0x34 NMEA frames output on USB4 0x35 NMEA frames output on USB5 For USB composition mode 1 (+kusbcomp=1): 0x31 NMEA frames output on USB1 For USB composition mode 2 (+kusbcomp=2): 0x31 NMEA frames output on USB1 0x34 NMEA frames output on USB4 0x35 NMEA frames output on USB5 0x04 NMEA frames output on port where the +GPSNMEA command was received <u>0x101</u> NMEA frames output on I ² C <rate> 0.2, <u>1</u> Defines the rate in terms of time duration between each NMEA frame update in seconds. <nmea_mask> Defines the NMEA sentences encode mask. This parameter is a hexadecimal value and is entered

HL6528-G			HL854x-G		
	<nmea_mask> Defines the NMEA sentences encode mask. This parameter is a hexadecimal value and is entered without the prefix "0x". Range: 0x0 - 0xFFFF. This parameter gets the last known value within the current session if omitted. 0xFFFF Factory default value (0x0) <i>GPS_NMEA_NONE_EN</i> All NMEA frames output are disabled (1 << 0) <i>GPS_NMEA_GGA_EN</i> (NMEA \$GPGGA) GPS Fix Data (1 << 1) <i>GPS_NMEA_GGSA_EN</i> (NMEA \$--GSA GNSS) DOPS and Active Satellites (1 << 2) <i>GPS_NMEA_RMC_EN</i> (NMEA \$--RMC) Recommended Minimum GNSS Sentence (1 << 3) <i>GPS_NMEA_VTG_EN</i> (NMEA \$--VTG) Course Over Ground and Ground Speed (1 << 4) <i>GPS_NMEA_GLL_EN</i> (NMEA \$--GLL) Geographic Position - Latitude, Longitude (1 << 5) <i>GPS_NMEA_GST_EN</i> (NMEA \$--GST) GNSS Pseudorange Error Statistics (1 << 6) <i>GPS_NMEA_GSV_EN</i> (NMEA \$--GSV) GNSS Satellites in View (1 << 7) <i>GPS_NMEA_ZDA_EN</i> (NMEA \$--ZDA) Time & Date (1 << 8) <i>GPS_NMEA_GNS_EN</i> (NMEA \$--GNS) GNSS Fix Data. The GPS Proprietary diagnostics data output are enabled (0xFFFF) <i>GPS_NMEA_ALL_EN</i> All NMEA frames output supported by			without the prefix "0x". Range: 0x0 - 0xFFFF. This parameter gets the last known value within the current session if omitted. 0xFFFF Factory default value (0x0) <i>GPS_NMEA_NONE_EN</i> All NMEA frames output are disabled (1 << 0) <i>GPS_NMEA_GGA_EN</i> (NMEA \$GPGGA) GPS Fix Data (1 << 1) <i>GPS_NMEA_GGSA_EN</i> (NMEA \$--GSA GNSS) DOPS and Active Satellites (1 << 2) <i>GPS_NMEA_RMC_EN</i> (NMEA \$--RMC) Recommended Minimum GNSS Sentence (1 << 3) <i>GPS_NMEA_VTG_EN</i> (NMEA \$--VTG) Course Over Ground and Ground Speed (1 << 4) <i>GPS_NMEA_GLL_EN</i> (NMEA \$--GLL) Geographic Position - Latitude, Longitude (1 << 5) <i>GPS_NMEA_GST_EN</i> (NMEA \$--GST) GNSS Pseudorange Error Statistics (1 << 6) <i>GPS_NMEA_GSV_EN</i> (NMEA \$--GSV) GNSS Satellites in View (1 << 7) <i>GPS_NMEA_ZDA_EN</i> (NMEA \$--ZDA) Time & Date (1 << 8) <i>GPS_NMEA_GNS_EN</i> (NMEA \$--GNS) GNSS Fix Data. The GPS Proprietary diagnostics data output are enabled (0xFFFF) <i>GPS_NMEA_ALL_EN</i> All NMEA frames output supported by	

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	the GPS receiver are enabled <nmea_profile> Defines the profile on which <nmea_mask> will be applied. Range: 0x0 – 0xFF. This parameter gets the last known value within the current session if omitted. <u>0xFF</u> Factory default value (0x0) <i>GPS_NMEA_PROFILE_NONE</i> No NMEA profile (1 << 0) <i>GPS_NMEA_PROFILE_GPS</i> “<nmea_mask> is applied to “\$GP” NMEA frames” (1 << 1) <i>GPS_NMEA_PROFILE_GLONASS</i> “<nmea_mask> is applied to “\$GL” NMEA frames” (1 << 7) <i>GPS_NMEA_PROFILE_GNSS</i> “<nmea_mask> is applied to “\$GN” NMEA frames” (0xFF) <i>GPS_NMEA_PROFILE_ALL</i> All NMEA profiles		the GPS receiver are enabled <nmea_profile> Defines the profile on which <nmea_mask> will be applied. Range: 0x0 – 0xFF. This parameter gets the last known value within the current session if omitted. <u>0xFF</u> Factory default value (0x0) <i>GPS_NMEA_PROFILE_NONE</i> No NMEA profile (1 << 0) <i>GPS_NMEA_PROFILE_GPS</i> “<nmea_mask> is applied to “\$GP” NMEA frames” (1 << 1) <i>GPS_NMEA_PROFILE_GLONASS</i> “<nmea_mask> is applied to “\$GL” NMEA frames” (1 << 7) <i>GPS_NMEA_PROFILE_GNSS</i> “<nmea_mask> is applied to “\$GN” NMEA frames” (0xFF) <i>GPS_NMEA_PROFILE_ALL</i> All NMEA profiles
<u>Notes</u>	- The HL6528-G supports both 1Hz and 5Hz navigation. 1Hz navigation is the default navigation, while 5Hz navigation is automatically activated when a less than 1s rate is applied. 5Hz navigation automatically activates full power mode and does not support alternative power modes. - Fractional part in rates < 1s accept up to 3 digits i.e. an acceptable entry to activate 5Hz mode is 0.xyz (minimum value for <rate> is 0.2s i.e synchronous to 5Hz navigation mode). - All NMEA frames may not be supported depending on GPS receiver type. Refer to Supported NMEA sentences for more information - After AT+GPSNMEA=1... (UART1), switching to command mode is done by either sending a ‘+++’ string or by dropping DTR in AT&D1 configuration. Return to NMEA flow is done with ATO	<u>Notes</u>	- NMEA frames update rate can be set to 0.2 or 1 second. After changing the rate, location service must be restarted for changes to take effect if the location service is already running. - All NMEA frames may not be supported depending on GPS receiver type. Refer to Supported NMEA sentences for more information

HL6528-G		HL854x-G	
<u>Examples</u>	AT+GPSNMEA=2 //Starts GPS in WARM mode OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description.	<u>Examples</u>	AT+GPSNMEA=? +GPSNMEA: 101,1,FFFF,FF OK AT+GPSNMEA=? +GPSNMEA: (0-1,30,33-35,4,101)(0-4,101),(0.2,1),(0-FFFF),(0-FF) AT+GPSNMEA=,,, OK AT+GPSNMEA? +GPSNMEA: 101,1, FFFF,FF OK
	AT+GPSNMEA=1,5 //Request NMEA frames output on UART1 port. OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description.		
	AT+GPSNMEA=1,1,FFFF //Request all NMEA frames output on UART1 with an update rate of 1 second. OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description.		
	AT+GPSNMEA=1,1,FFFF,3 //Request all NMEA frames output on UART1 with an update rate of 1 second, but only for GPS and GLONASS constellation (no GN NMEA sentences will be displayed). OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description.		
	AT+CMUX=0,0,5,6 OK		
			//Example for switching the rate from 1s to 0.2s AT+GPSSTOP OK AT+GPSNMEA=34,0.2 OK AT+GPSNMEA? +GPSNMEA: 34,0.2,FFFF,FF OK AT+GPSSTART=1 OK

HL6528-G	HL854x-G
AT+GPSNMEA=4,1,FFFF,3 //Request all NMEA frames output on virtual port with an update rate of 1 second, bt only for GPS and GLONASS constellation (no GN NMEA sentences will be displayed). OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description. AT+GPSNMEA=,60,19 //Request VTG+GGA+GLL NMEA sentence output on default port with an update rate of 60 seconds. OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description. AT+GPSNMEA=, ,19 //Request VTG+GGA+GLL NMEA sentence output on default port with default update rate. OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description. AT+GPSNMEA=1,0.5,1 // Requests GGA sentences to be output on UART1 at 2Hz (ie rate = 0.5s), 5Hz navigation is automatically activated OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description.	

HL6528-G		HL854x-G	
	AT+GPSNMEA=? +GPSNMEA: (0=4,101),(1-65535),(0-FFFF),(0-FF) OK AT+GPSNMEA? +GPSNMEA: 1,1,FFFF,FF OK		

18.6. +GPSPVT Command: Configure PVT Frames Flow

HL6528-G		HL854x-G	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+GPSPVT=?	<u>Response</u> +GPSPVT: (list of supported <output>s), (list of supported <rate>s), (list of supported <pvt_mask>s) OK	<u>Syntax</u> AT+GPSPVT=?	<u>Response</u> +GPSPVT: (list of supported <output>s), (list of supported <rate>s), (list of supported <pvt_mask>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+GPSPVT?	<u>Response</u> +GPSPVT: <output>,<rate>,<pvt_mask> OK	<u>Syntax</u> AT+GPSPVT?	<u>Response</u> +GPSPVT: <output>,<rate>,<pvt_mask> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+ GPSPVT= <output> [, [<rate>] [, <pvt_mask>]]	<u>Response</u> OK	<u>Syntax</u> AT+ GPSPVT= <output> [, [<rate>] [, <pvt_mask>]]	<u>Response</u> OK

HL6528-G	HL854x-G
<u>Parameters</u> <output> Specifies the port to be used by the application to transmit PVT sentences. This port can also be used simultaneously as the NMEA frames output port if needed. This parameter is a hexadecimal value and is entered without the prefix "0x". 0x00 PVT frames are not output 0x01 PVT frames output on UART1 0x02 PVT frames output on UART2 (not supported) 0x03 PVT frames output on USB (not supported) 0x04 PVT frames output on port where the +GPSPVT command was received. 0x101 PVT frames output on I²C <rate> Defines the PVT sentence update rate in seconds and activates the proper navigation mode (1Hz or 5Hz). Range: 0 – 65535. 0.2 – 1 Rate values activating 5Hz navigation <u>1</u> Factory default value 1 – 65535 Rate values activating 1Hz navigation This parameter gets the last known value within the current session if omitted.	<u>Parameters</u> <output> Specifies the port to be used by the application to transmit PVT sentences. This port can also be used simultaneously as the NMEA frames output port if needed. This parameter is a hexadecimal value and is entered without the prefix "0x". 0x00 PVT frames are not output 0x01 PVT frames output on UART1 0x02 PVT frames output on UART2 (not supported) For USB composition mode 0 (+kusbcomp=0): 0x030 NMEA frames output on USB0 0x33 NMEA frames output on USB3 0x34 NMEA frames output on USB4 0x35 NMEA frames output on USB5 For USB composition mode 1 (+kusbcomp=1): 0x31 NMEA frames output on USB1 For USB composition mode 2 (+kusbcomp=2): 0x31 NMEA frames output on USB1 0x34 NMEA frames output on USB4 0x35 NMEA frames output on USB5 0x04 PVT frames output on port where the +GPSPVT command was received. 0x101 PVT frames output on I²C If omitted, this parameter gets the last known value within the current session. <rate> Defines the rate in terms of the time duration between each PVT sentence update in seconds. Range: 0, 0.2, 1-65535. This parameter gets the last known value within the current session if omitted. Refer to Diagram for Settings Management for more information. <u>1</u> Factory default value

HL6528-G	HL854x-G																																												
<pvt_mask> Defines the PVT sentences encode mask. The PVT sentence includes the header +GPSPVT: X with x as the PVT sentence identifier. All fields are separated by a comma. This parameter is a hexadecimal value and is entered without the prefix "0x". Range: 0x0 - 0xFFFF. This parameter gets the last known value within the current session if omitted. <u>0xFFFF</u> Factory default value <table><tr><td rowspan="8">0</td><td colspan="2">PVT sentence including main GPS position information. Fields included in the sentence are described below.</td></tr><tr><td>Header</td><td>+GPSPVT: 0</td></tr><tr><td>1</td><td>UTC of position fix in HH:MM:SS format</td></tr><tr><td>2</td><td>Date in dd/mm/yyyy format</td></tr><tr><td>3</td><td>GPS position fix state: "NO FIX", "ES FIX" (Estimated Fix), "2D FIX" or "3D FIX"</td></tr><tr><td>4</td><td>Latitude: Direction ('N' North or 'S' South) and the Latitude in DD MM'SS.SS"</td></tr><tr><td>5</td><td>Longitude: Direction ('E' East or 'W' West) and the Longitude in DDD MM'SS.SS"</td></tr><tr><td>6</td><td>Altitude above Mean Sea Level in meters in +/-mmmm format</td></tr></table> Example: +GPSPVT: 0,08:17:32,27/04/2010,3D FIX,N 48 34'52.90",E 002 21'58.65",+0010m <table><tr><td rowspan="2">1</td><td colspan="2">PVT sentence including course and speed over ground. Fields included in the sentence are described below.</td></tr><tr><td>Header</td><td>+GPSPVT: 1</td></tr></table>	0	PVT sentence including main GPS position information. Fields included in the sentence are described below.		Header	+GPSPVT: 0	1	UTC of position fix in HH:MM:SS format	2	Date in dd/mm/yyyy format	3	GPS position fix state: "NO FIX", "ES FIX" (Estimated Fix), "2D FIX" or "3D FIX"	4	Latitude: Direction ('N' North or 'S' South) and the Latitude in DD MM'SS.SS"	5	Longitude: Direction ('E' East or 'W' West) and the Longitude in DDD MM'SS.SS"	6	Altitude above Mean Sea Level in meters in +/-mmmm format	1	PVT sentence including course and speed over ground. Fields included in the sentence are described below.		Header	+GPSPVT: 1	<pvt_mask> Defines the PVT sentences encode mask. The PVT sentence includes the header +GPSPVT: X with x as the PVT sentence identifier. All fields are separated by a comma. This parameter is a hexadecimal value and is entered without the prefix "0x". Range: 0x0 - 0xFFFF. This parameter gets the last known value within the current session if omitted. <u>0xFFFF</u> Factory default value <table><tr><td rowspan="8">0x0001</td><td colspan="2">PVT sentence including main GPS position information. Fields included in the sentence are described below.</td></tr><tr><td>Header</td><td>+GPSPVT: 0</td></tr><tr><td>1</td><td>UTC of position fix in HH:MM:SS format</td></tr><tr><td>2</td><td>Date in dd/mm/yyyy format</td></tr><tr><td>3</td><td>GPS position fix state: "NO FIX", "ES FIX" (Estimated Fix), "2D FIX" or "3D FIX"</td></tr><tr><td>4</td><td>Latitude: Direction ('N' North or 'S' South) and the Latitude in DD MM'SS.SS"</td></tr><tr><td>5</td><td>Longitude: Direction ('E' East or 'W' West) and the Longitude in DDD MM'SS.SS"</td></tr><tr><td>6</td><td>Altitude above Mean Sea Level in meters in +/-mmmm format</td></tr></table> Example: +GPSPVT: 0,08:17:32,27/04/2010,3D FIX,N 48 34'52.90",E 002 21'58.65",+0010m <table><tr><td rowspan="2">0x0002</td><td colspan="2">PVT sentence including course and speed over ground. Fields included in the sentence are described below.</td></tr><tr><td>Header</td><td>+GPSPVT: 1</td></tr></table>	0x0001	PVT sentence including main GPS position information. Fields included in the sentence are described below.		Header	+GPSPVT: 0	1	UTC of position fix in HH:MM:SS format	2	Date in dd/mm/yyyy format	3	GPS position fix state: "NO FIX", "ES FIX" (Estimated Fix), "2D FIX" or "3D FIX"	4	Latitude: Direction ('N' North or 'S' South) and the Latitude in DD MM'SS.SS"	5	Longitude: Direction ('E' East or 'W' West) and the Longitude in DDD MM'SS.SS"	6	Altitude above Mean Sea Level in meters in +/-mmmm format	0x0002	PVT sentence including course and speed over ground. Fields included in the sentence are described below.		Header	+GPSPVT: 1
0		PVT sentence including main GPS position information. Fields included in the sentence are described below.																																											
		Header	+GPSPVT: 0																																										
		1	UTC of position fix in HH:MM:SS format																																										
		2	Date in dd/mm/yyyy format																																										
		3	GPS position fix state: "NO FIX", "ES FIX" (Estimated Fix), "2D FIX" or "3D FIX"																																										
		4	Latitude: Direction ('N' North or 'S' South) and the Latitude in DD MM'SS.SS"																																										
		5	Longitude: Direction ('E' East or 'W' West) and the Longitude in DDD MM'SS.SS"																																										
	6	Altitude above Mean Sea Level in meters in +/-mmmm format																																											
1	PVT sentence including course and speed over ground. Fields included in the sentence are described below.																																												
	Header	+GPSPVT: 1																																											
0x0001	PVT sentence including main GPS position information. Fields included in the sentence are described below.																																												
	Header	+GPSPVT: 0																																											
	1	UTC of position fix in HH:MM:SS format																																											
	2	Date in dd/mm/yyyy format																																											
	3	GPS position fix state: "NO FIX", "ES FIX" (Estimated Fix), "2D FIX" or "3D FIX"																																											
	4	Latitude: Direction ('N' North or 'S' South) and the Latitude in DD MM'SS.SS"																																											
	5	Longitude: Direction ('E' East or 'W' West) and the Longitude in DDD MM'SS.SS"																																											
	6	Altitude above Mean Sea Level in meters in +/-mmmm format																																											
0x0002	PVT sentence including course and speed over ground. Fields included in the sentence are described below.																																												
	Header	+GPSPVT: 1																																											

HL6528-G				HL854x-G			
		1	Dimensional Course Over Ground in degrees in ddd.d format [0-359.9]			1	Dimensional Course Over Ground in degrees in ddd.d format [0-359.9]
		2	Dimensional Speed Over Ground in meter per second in sss format			2	Dimensional Speed Over Ground in meter per second in sss format
	Example: +GPSPVT: 1,087.5deg,021m/s			Example: +GPSPVT: 1,087.5deg,021m/s			
	2	PVT sentence including main satellites information. Fields included in the sentence are described below.		0x0004	PVT sentence including main satellites information. Fields included in the sentence are described below.		
		Header	+GPSPVT: 2		Header	+GPSPVT: 2	
		1	Satellites in View used for Navigation followed by “SV”		1	Satellites in View used for Navigation followed by “SV”	
		2	HDOP (Horizontal Dilution of Precision) followed by “HDOP”		2	HDOP (Horizontal Dilution of Precision) followed by “HDOP”	
		3	Satellites in View Maximum Signal To Noise Ratio [dBHz, integer value]		3	Satellites in View Maximum Signal To Noise Ratio [dBHz, integer value]	
		4	Satellites in View Average Signal To Noise Ratio [dBHz, 1 decimal value]		4	Satellites in View Average Signal To Noise Ratio [dBHz, 1 decimal value]	
	Example: +GPSPVT: 2,05SV,1.7HDOP,23,12.0			Example: +GPSPVT: 2,05SV,1.7HDOP,23,12.0			
	3	PVT sentence including detailed satellite information. There are a maximum of 6 satellites per sentence, therefore there may be several sentences in one cycle. Fields included in the sentence are described below.		0x0008	PVT sentence including detailed satellite information. There are a maximum of 6 satellites per sentence, therefore there may be several sentences in one cycle. Fields included in the sentence are described below.		
		Header	+GPSPVT: 3		Header	+GPSPVT: 3	
		1	Total number of messages of this type in this cycle		1	Total number of messages of this type in this cycle	
		2	Message number in this cycle		2	Message number in this cycle	
		3	Satellites in View SV id number [PRN]				

HL6528-G				HL854x-G								
Example for 7 satellites: +GPSPVT: 3,2,1,[13,U,36],[18,U,8],[29,U,24],[21,U,14],[03,U,40],[07,U,14] +GPSPVT: 3,2,2,[08,U,18]		4	Satellite status: "U" for Used for Navigation or "N" for Not used for Navigation			3	Satellite information and status; packed as follows: Bits 15-13: Constellation 0 = GPS 2 = GLONASS Bits 12 - 8: Other info For GPS, it is reserved (zero filled) For GLONASS, this field reports Frequency Channel -7 to 6 Bits 7 - 0: ID For GPS, this field reports PRN For GLONASS, this field reports Slot Number 1-24					
		5	Satellites in View Signal To Noise Ratio [dBHz, integer value]				4	Satellite status: "U" for Used for Navigation or "N" for Not used for Navigation				
		6-8	Information about second SV, same format as fields 3-5					5	Satellites in View Signal To Noise Ratio [dBHz, integer value]			
		9-11	Information about third SV, same format as fields 3-5						6-8	Information about second SV, same format as fields 3-5		
		12-14	Information about fourth SV, same format as fields 3-5							9-11	Information about third SV, same format as fields 3-5	
		15-17	Information about fifth SV, same format as fields 3-5								12-14	Information about fourth SV, same format as fields 3-5
		18-20	Information about sixth SV, same format as fields 3-5									15-17
							18-20	Information about sixth SV, same format as fields 3-5	Example for 7 satellites: +GPSPVT: 3,2,1,[13,U,36],[18,U,8],[29,U,24],[21,U,14],[03,U,40],[07,U,14] +GPSPVT: 3,2,2,[08,U,18]			

HL6528-G		HL854x-G	
<u>Notes</u>	- If <rate>=0, PVT sentences will only be sent once with the last PVT information - The HL6528-G supports both 1Hz and 5Hz navigation. 1Hz is the default navigation, while 5Hz navigation is automatically activated a non-zero, less than 1s rate is applied. Note that 5Hz navigation only operates in full power mode. - After AT+GPSPVT=1,... (UART1), switching to command mode is done by either sending a '+++' string or by dropping DTR in AT&D1 configuration. Return to NMEA flow is done with ATO	<u>Notes</u>	If <rate>=0, PVT sentences will only be sent once with the last PVT information.
<u>Examples</u>	AT+GPSPVT=1 // Request PVT sentence output on // UART1 OK //or +GPS ERROR: X // For more information about X // value, please refer to Location AT // commands error codes // description. AT+GPSPVT=1,5 // Request PVT sentence output on // UART1 with an update rate of 5 // seconds. OK //or +GPS ERROR: X // For more information about X // value, please refer to Location AT // commands error codes // description. AT+GPSPVT=1,1,FFFF // Request all PVT sentence output // on UART1 with an update rate of // 1 second. OK //or	<u>Examples</u>	AT+GPSPVT=1 // Request PVT sentence output on // UART1 OK // or +CME ERROR: <error> AT+GPSPVT=1,5 // Request PVT sentence output on // UART1 with an update rate of 5 // seconds OK AT+GPSPVT=1,1,FFFF // Request all PVT sentence output // on UART1 with an update rate of // 1 second. OK AT+GPSPVT=1,0,FFFF // Return the last PVT sentence. OK +GPSPVT: 0,08:17:32,27/04/2010,3D FIX,N 48 34'52.90", E 002 21'58.65",+0010m AT+GPSPVT=? +GPSPVT: (0-1,30,33-35,4,101),(0,0.2,1-65535),(0-FFFF) OK

HL6528-G		HL854x-G	
	+GPS ERROR: X // For more information about X // value, please refer to Location AT // commands error codes // description. AT+GPSPVT=1,0,FFFF // Return the last PVT sentence. +GPSPVT: 0,08:17:32,27/04/2010,3D FIX,N 48 34'52.90",E 002 21'58.65",+0010m OK //or +GPS ERROR: X // For more information about X // value, please refer to Location AT // commands error codes // description. AT+GPSPVT=? +GPSPVT: (0-4,101),(0,0.2-65535),(0-FFFF) OK AT+GPSPVT=? +GPSPVT: 1,1,FFFF OK		AT+GPSPVT=? +GPSPVT: 0,1,FFFF OK

18.7. +GPSTTFF Command: Report Calculated TTFF of the Last Run

HL6528-G and HL854x-G	
<i>Test command</i>	
<u>Syntax</u> AT+GPSTTFF=?	<u>Response</u> OK

HL6528-G and HL854x-G	
<i>Read command</i>	
<u>Syntax</u> AT+GPSTTFF?	<u>Response</u> +GPSTTFF: <2D_time>,<3D_time> OK <u>Parameters</u> <2D_time> 2-dimensional position time to first fix, defined in ms <3D_time> 3-dimensional position time to first fix, defined in ms
<u>Examples</u>	For HL6528-G: <pre>AT+GPSTTFF? +GPSTTFF: 32051,32051 OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description.</pre> AT+GPSTTFF? +GPSTTFF: -30,-30 //The current run is not fixed OK AT+GPSTTFF=? OK For HL854x-G: <pre>AT+GPSTTFF? +GPSTTFF: 32051,32051 OK // or +CME ERROR: <error></pre>

HL6528-G and HL854x-G	
	AT+GPSTTFF? +GPSTTFF: -30,-30 //The current run is not fixed OK AT+GPSTTFF=? OK

18.8. +GPSVERS Command: Report Software Version of Location Patch Version

Note: For HL6528-G only.

HL6528-G	
<i>Test command</i>	
<u>Syntax</u> AT+GPSVERS=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+GPSVERS?	<u>Response</u> +GPSVERS: <version> OK <u>Parameters</u> <version> Patch version of location library

HL6528-G	
<u>Examples</u>	AT+GPSVERS? +GPSVERS: "GNSS patch version" OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description. AT+GPSVERS=? OK

18.9. +GPSCONF Command: Configure the Location Service and GPS Receiver

HL6528-G		HL854x-G	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+GPSCONF=?	<u>Response</u> +GPSCONF: <config_type>,(list of supported <config_value>s) [+GPSCONF: <config_type>,(list of supported <config_value>s)] OK	<u>Syntax</u> AT+GPSCONF=?	<u>Response</u> +GPSCONF: <config_type>,(list of supported <config_value_1>s) [+GPSCONF: <config_type>,(list of supported <config_value_1>s),(list of supported <config_value_2>s)] OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+GPSCONF?	<u>Response</u> +GPSCONF: <config_type>, <config_value> [+GPSCONF: <config_type>,<config_value>] OK	<u>Syntax</u> AT+GPSCONF?	<u>Response</u> +GPSCONF: <config_type>, <config_value_1> [+GPSCONF: <config_type>,<config_value_1>,<config_value_2>] OK

HL6528-G		HL854x-G	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+GPSCONF= <config_type>[, <config_value>]	<u>Response</u> OK <u>Parameters</u> <config_type> This parameter specifies the configuration type on which the configuration value is applied. 0 Sets GPS navigation low power modes. Reduces power consumption while in GPS_RUNNING state without impacting update rate, but at the expense of GPS accuracy degradation 1 Sets the LNA type 7 Defines CW Removal configuration (Jamming) 10 Enable/Disable GPS or GPS/GLONASS <config_value> Requested value of configuration type. For <config_type>=0: 0 Full power navigation mode 1 Medium power navigation mode (NOT SUPPORTED) 3 Low power navigation mode (NOT SUPPORTED) 4 Very low power navigation mode (NOT SUPPORTED) If omitted, this parameter gets the last known value within the current session. For <config_type>=1: 0 Internal LNA set to high gain and GPS receiver LNA_EN output signal is automatically driven 1 Internal LNA set to low gain and GPS receiver LNA_EN output signal is automatically driven 2 Internal LNA set to high gain and GPS receiver LNA_EN output signal is always OFF 3 Internal LNA set to low gain and GPS receiver LNA_EN output signal is always OFF	<u>Syntax</u> AT+GPSCONF= <config_type>, <config_value_1> [,<config_value_2 >]	<u>Response</u> OK <u>Parameters</u> <config_type> This parameter specifies the configuration type on which the configuration value is applied. 0 Sets GPS navigation low power modes. Reduces power consumption while in GPS_RUNNING state without impacting update rate, but at the expense of GPS accuracy degradation 1 Sets the LNA type 10 Enable/Disable GPS, GPS/GLONASS or GPS/GLONASS/SBAS/QZSS 11 Sets horizontal/vertical accuracy values <config_value_1> Requested value 1 of the configuration type For <config_type>=0: 0 Full power navigation mode 1 Medium power navigation mode 3 Low power navigation mode 4 Very low power navigation mode For <config_type>=1: 0 Internal LNA set to High Gain and GPS receiver LNA_EN output signal is automatically driven 1 Internal LNA set to Low Gain and GPS receiver LNA_EN output signal is automatically driven 2 Internal LNA set to High Gain and GPS receiver LNA_EN output signal is always OFF 3 Internal LNA set to Low Gain and GPS receiver LNA_EN output signal is always OFF

HL6528-G		HL854x-G	
	If omitted, this parameter gets the last known value within the current session. For <config_type>=7, this defines CW Removal configuration. 0 Disabled 1 Enabled If omitted, this parameter gets the last known value within the current session. For <config_type>=10, this enable/disable GPS or GPS/GLONASS features 0 GPS 1 GPS/GLONASS If omitted, this parameter gets the last known value within the current session.		For <config_type>=10 (enable/disable GPS, GPS/GLONASS or GPS/GLONASS/SBAS/QZSS features): 0 GPS 1 GPS/GLONASS 2 GPS/GLONASS/SBAS/QZSS For <config_type>=11 (set horizontal and vertical accuracy parameters – location information NMEA sentence \$GPGLL will only be output if the estimated position fix is within this accuracy range): 1 – 30600 Horizontal accuracy in meters <config_value_2> Requested value 2 of the configuration type. Only used when <config_type>=11. 1 – 200 Horizontal accuracy in meters
<u>Notes</u>	For <config_type>=7, the setting of CW removal is automatically disabled every time the state machine goes to GPS_RUNNING. The user has to set it again a few seconds after starting the event.	<u>Notes</u>	Parameters are immediately stored into non-volatile memory and are effective at the next power on.
<u>Examples</u>	AT+GPSCONF=0,0 OK // or +GPS ERROR: X // For more information about X value, // please refer to Location AT commands // error codes description. AT+GPSCONF=? +GPSCONF: 0,0 +GPSCONF: 1,(0-3) +GPSCONF: 7,(0-1) +GPSCONF: 10,(0-1) OK	<u>Examples</u>	AT+GPSCONF=0,0 OK // or +CME ERROR: <error> AT+GPSCONF=? +GPSCONF: 0,(0-1,3-4) +GPSCONF: 1,(0-3) +GPSCONF: 10,(0-2) +GPSCONF: 11,(1-30600),(1-200) OK

HL6528-G		HL854x-G	
	AT+GPSCONF? +GPSCONF: 0,0 +GPSCONF: 1,3 +GPSCONF: 7,0 +GPSCONF: 10,0 OK		AT+GPSCONF? +GPSCONF: 0,0 +GPSCONF: 1,2 +GPSCONF: 10,1 +GPSCONF: 11,200,200 OK

18.10. +GPSRELEASE Command: Power the GPS Chipset Off

HL6528-G and HL854x-G	
<i>Test command</i>	
<u>Syntax</u> AT+ GPSRELEASE=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+ GPSRELEASE?	<u>Response</u> +GPSRELEASE: <status> OK
<i>Write command</i>	
<u>Syntax</u> AT+ GPSRELEASE	<u>Response</u> OK

HL6528-G and HL854x-G	
<i>Unsolicited Notification</i>	<u>Response</u> +GPSEVRELEASE: <status> <u>Parameter</u> <status> Event status 0 The action has failed. Application state is unchanged 1 The action has been successfully completed
<u>Notes</u>	- This command allows switching the navigation chipset off when the device is in the GPS_INITIALIZED state. Issuing +GPSRELEASE in any other state has no effect and returns an error event. Bear in mind that the device has to be brought to GPS_INITIALIZED state first (using +GPSSTOP when coming from either GPS_RUNNING or GPS_SLEEP state for instance) before +GPSRELEASE can be issued. - Please note that some early HL6528-G platforms do not support powering off the navigation chipset; hardware compatibility of the device with this command should be checked first. An error event will be returned to a +GPSRELEASE request if the platform is not capable of powering the navigation chipset off.
<u>Examples</u>	For HL6528-G: <pre>AT+GPSRELEASE? OK +GPSEVRELEASE: 1 //or +GPS ERROR: X //For the list of possible values of X, please refer to section 23.2.6 GNSS Error Codes. AT+GPSRELEASE=? OK</pre> For HL854x-G: <pre>AT+GPSRELEASE? OK +GPSEVRELEASE: 1 // or +CME ERROR: <error> AT+GPSRELEASE=? OK</pre>

HL6528-G and HL854x-G	
	AT+GPSRELEASE OK +GPSEVRELEASE: 1

18.11. +GPSAID Command: GNSS Aiding Management

Note: For HL6528-G only.

HL6528-G	
<i>Test command</i>	
<u>Syntax</u> AT+GPSAID=?	<u>Response</u> AT+GPSAID=? +GPSAID: 0 ,(list of supported <aee_mode>s) +GPSAID: 1 ,(list of supported <dee_mode>s),(list of supported <dee_period>s),(list of supported <dee_server_address>s),(list of supported <dee_server_port>s), (list of supported <dee_server_code>s),(list of supported <dee_socket_type>s),(list of supported <dee_timeout>s) +GPSAID: 2 ,(list of supported <dee_command>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+GPSAID?	<u>Response</u> +GPSAID: 0 ,<aee_mode> +GPSAID: 1 ,<dee_mode>,<dee_period>,<dee_server_address>,<dee_server_port>,<dee_server_code>,<dee_socket_type>,<dee_timeout> +GPSAID: 2 ,<dee_command> OK

HL6528-G*Write command*Syntax

For

<config_type>=0

AT+GPSAID=**<config_type>[,
<aee_mode>]**

For

<config_type>=1

AT+GPSAID=**<config_type>[,
[<dee_mode>],
[<dee_period>],
[<dee_server_
address>],
[<dee_
server_port>],
[<dee_server_
code>],
[<dee_
socket_type>],
[<dee_timeout>],
[<dee_pdp_
context>]]]]]]]**

For

<config_type>=2

AT+GPSAID=**<config_type>[,
<dee_command>]**Response**OK**Parameters**<config_type>** This parameter specifies the configuration type on which the configuration is applied.

0 AEE configuration

1 DEE configuration

2 DEE command

<aee_mode > This parameter specifies the AEE (Autonomous Extended Ephemeris) mode
If omitted, this parameter takes the last known value within the current session.

0 AEE is deactivated

1 AEE is enable

<dee_mode > This parameter specifies the DEE (Downloaded Extended Ephemeris) mode
If omitted, this parameter takes the last known value within the current session.

0 DEE is deactivated

1 DEE is enable

<dee_period > 0-65535 DEE period in day(s)
If omitted, this parameter takes the last known value within the current session.
Factory default value: 3**<dee_server_address >** DEE server address

This can either be a DNS address, or a numeric one in the form "xxx.xxx.xxx.xxx". Maximum 80 bytes string. If omitted, this parameter takes the last known value within the current session.

Factory default value: ""

<dee_server_port > 0-65535 Port of the DEE server socket to connect to
If omitted, this parameter takes the last known value within the current session.
Factory default value: 0

HL6528-G	
	<dee_server_code> DEE access authorization code DEE access authorization code in the form "XXXXXXXXXX". Maximum 80 bytes string. If omitted, this parameter takes the last known value within the current session. Factory default value: "" <dee_socket_type> DEE communication socket type Maximum 10 bytes string. If omitted, this parameter takes the last known value within the current session. Factory default value: "TCP" (for TCP communication socket) <dee_timeout > 0-65535 Socket connection timeout value in second(s) If omitted, this parameter takes the last known value within the current session. Factory default value: 10 <dee_pdp_context> 0-7 Identifier of the PDP context used for DEE over GPRS Factory default value: 0 <dee_command > DEE command number controlling the EE downloader If omitted, this parameter takes the last known value within the current session. 0 This command has no effect, but indicates that no command is pending. On HL6, the age of the EE file is also displayed in a +GPSEVAID event 1 This command requests EE file download and injection 2 This command stops EE download/injection if any ongoing 3 This command forces EE file download and injection. This command is used only for test purpose 4 This command forces EE file injection
Notes	- If <dee_period> is not supported, the error GPS_ERR_INVALID_PARAMETER (-4) is returned. - Before <dee_command> configuration <dee_mode> should be activated <dee_server_xxxx> parameters should be configured <dee_command>=1 allows DEE file update as described below: <dee_command> is automatically configured to 0 when the DEE file is updated. If the command is pending, for example in GPS_OFF state, the read of this parameter returns the last entered DEE command. - If a newer DEE file is available on DEE server, DEE file download is performed. If no updated DEE file is available on the DEE server, DEE file download is aborted. Consequently, the following event is received: +GPSEVAID event will be received informing that DEE download is aborted with abort cause equal to GPS_AIDING_DEE_NACK_ERROR.

HL6528-G	
	- The age of the EE files is provided in the form of a +GPSEVAID event when <dee_command> 0 is issued. Absence of EE files or obsolete files can be found out as a 0 minute validity is returned. AT+GPSAID=2,4 only works in GPS_RUNNING state as the GNSS chipset has to be active in order to process the EE files. Issuing the command in another state results in an error. - For <dee_command>=4, the local sources for EE file injection are to be found in the /location repository and shall fulfil the XXX_YY.dee name convention with - XXX representing the constellation such as "GPS" for the GPS constellation "GLO" for the GLONASS constellation - YY shall match the <dee_period> definition with an eventual left filling zero
<u>Examples</u>	<pre> AT+GPSAID=0,1 OK // or +GPS ERROR: X AT+GPSAID=1,1 OK // or +GPS ERROR: X AT+GPSAID=2,1 OK // or +GPS ERROR: X AT+GPSAID=? +GPSAID: 0,(0-1) +GPSAID: 1,(0-1),(0-65535),"",(0-65535),"",("TCP"),(0-65535) +GPSAID: 2,(0-2) +GPSAID: 3,1,"","" +GPSAID: 3,2,"", "", "" OK </pre>

HL6528-G	
	AT+GPSAID? +GPSAID: 0,0 +GPSAID: 1,1,3,"ServerAddress",0,"ServerAuthCode",TCP,10 +GPSAID: 2,0 OK

18.12. +GPSCORE Command: Report GNSS Receiver Core Information

HL6528-G		HL854x-G	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+GPSCORE=?	<u>Response</u> +GPSCORE: (list of supported <output>s) ,(list of supported <rate>s),(list of supported <core_info>s) OK	<u>Syntax</u> AT+GPSCORE=?	<u>Response</u> +GPSCORE: (list of supported <output>s) ,(list of supported <rate>s),(list of supported <core_info>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+GPSCORE?	<u>Response</u> +GPSCORE: <output> , <rate> , <core_info> OK	<u>Syntax</u> AT+GPSCORE?	<u>Response</u> +GPSCORE: <output> , <rate> , <core_info> OK
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+GPSCORE= [<output>],[<rate>] [,<core_info>]]	<u>Response</u> OK <u>Parameters</u> <output> Port to be used by the application to transmit the core information. If omitted, this parameter takes the last known value within the current session. 0 Core information output disabled	<u>Syntax</u> AT+GPSCORE= <output> [,<rate>] [,<core_info>]]	<u>Response</u> OK <u>Parameters</u> <output> Port to be used by the application to transmit the core information. If omitted, this parameter takes the last known value within the current session. 0 Core information output disabled

HL6528-G		HL854x-G	
1	Core information output on UART 1	1	Core information frames output on UART 1
4	Core information output on port where the +GPSCORE command was received	4	Core information frames output on port where the +GPSCORE command was received
		30	NMEA frames output on USB0
		31	NMEA frames output on USB1
		33	NMEA frames output on USB3
		34	NMEA frames output on USB4
		35	NMEA frames output on USB5
		Note that: • USB composition mode 0 (+kusbcomp=0) uses <output>=30, 33, 34, 35 • USB composition mode 1 (+kusbcomp=1) uses <output>=31 • USB composition mode 2 (+kusbcomp=2) uses <output>=31, 34, 35	
	<rate> 0-65535 Core information update rate in seconds. If omitted, this parameter takes the last known value within the current session. Factory default value: <u>1</u>	<rate> <u>1</u> Core frames update rate in seconds. Fixed value.	
	<core_info> Core information list encode mask. Encoded as a hexadecimal value without "0x" prefix. If omitted, this parameter takes the last known value within the current session.	<core_info> Core information list encode mask. Encoded as a hexadecimal value without "0x" prefix. If omitted, this parameter takes the last known value within the current session.	
<u>0</u>	Core information data output disabled	<u>0</u>	Core information data output disabled
1	Information about jammers detection activated	1	GPS jamming detection report
		2	GLONASS jamming detection report
		3	GPS and GLONASS jamming detection report

HL6528-G		HL854x-G	
<i>Unsolicited Notification</i>	<u>Response</u> For core_info = 1: +GPSEVCORE: <core_info>,<jam_freq_1>,<jam_lev_1>,<jam_freq_2>,<jam_lev_2>,<jam_freq_3>,<jam_lev_3>,<jam_freq_4>,<jam_lev_4>,<jam_freq_5>,<jam_lev_5>,<jam_freq_6>,<jam_lev_6>,<jam_freq_7>,<jam_lev_7>,<jam_freq_8>,<jam_lev_8> <u>Parameters</u> <jam_freq_n> Frequency of peak n in MHz with n ranging from 1 to 8 <jam_lev_n> Signal to noise ratio of peak n in dB-Hz with n ranging from 1 to 8	<i>Unsolicited Notification</i>	<u>Response</u> For core_info = 1 or core_info = 2: +GPSEVCORE: <core_info>,<jam_freq_1>,<jam_lev_1>,<jam_freq_2>,<jam_lev_2>,<jam_freq_3>,<jam_lev_3>,<jam_freq_4>,<jam_lev_4>,<jam_freq_5>,<jam_lev_5>,<jam_freq_6>,<jam_lev_6>,<jam_freq_7>,<jam_lev_7>,<jam_freq_8>,<jam_lev_8> <u>Parameters</u> <jam_freq_n> Frequency of peak n in MHz with n ranging from 1 to 8 <jam_lev_n> Signal to noise ratio of peak n in dB-Hz with n ranging from 1 to 8
<u>Notes</u>	- If the GNSS receiver is set up for GPS reception only (see +GPSCONF command), only one report will be displayed, if the GNSS receiver set up for both GPS and GLONASS constellations, two reports, one for GPS and the other for GLONASS, will be periodically displayed. - If <rate> = 0, the core information event is sent once and follows the internal detection of GNSS jamming	<u>Notes</u>	- CORE frames update rate is fixed at 1 per second. - This command can be run without any SIM card
<u>Examples</u>	AT+GPSCORE=1,1,1 // request jamming detection information output on port 1. OK //or +GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description. AT+GPSCORE=0 // Disable core information output OK //or	<u>Examples</u>	AT+GPSCORE=1,1,1 OK // or +CME ERROR: <error> AT+GPSCORE=0 OK // or +CME ERROR: <error> AT+GPSCORE=? +GPSCORE: (0-1,30-31,33-35,4),1,(0-3) OK

HL6528-G		HL854x-G	
	+GPS ERROR: X //For more information about X value, please refer to Location AT commands error codes description. AT+GPSCORE=? +GPSCORE: (0,1,4),(1-65535),(0-1) OK AT+GPSCORE? // Allow to retrieve the current default configuration +GPSCORE: 0,1,0 OK		AT+GPSCORE? +GPSCORE: 0,1,1 OK

18.13. +GPSAUTOINIT Command: Select GPS State at Power Up

Note: For HL854x-G only.

HL854x-G	
<i>Test command</i> <u>Syntax</u> AT+GPSAUTOINIT=?	<u>Response</u> +GPSAUTOINIT: (list of supported <state>s) OK
<i>Read command</i> <u>Syntax</u> AT+GPSAUTOINIT?	<u>Response</u> +GPSAUTOINIT: <state> OK

HL854x-G	
<i>Write command</i>	
<u>Syntax</u> AT+GPSAUTOINIT=<state>	<u>Response</u> OK <u>Parameters</u> <state> 0 GPS will not be initialized at power up 1 GPS will be initialized at power up
<u>Examples</u>	AT+GPSAUTOINIT=? +GPSAUTOINIT: (0-1) OK AT+GPSAUTOINIT? +GPSAUTOINIT: 1 OK AT+GPSAUTOINIT=0 OK // or +CME ERROR: <error>

18.14. +GPSPTFC Command: Configure Push-to-Fix Mode

Note: For HL6528-G only.

HL6528-G	
<i>Test command</i> <u>Syntax</u> AT+GPSPTFC=?	<u>Response</u> +GPSPTFC: <rate range>,<max search time range>,<max off time range>,<velocity adaptation options>,<uart connection mode options> OK
<i>Read command</i> <u>Syntax</u> AT+GPSPTFC?	<u>Response</u> +GPSPTFC: <rate>,<max search time>,<max off time>,<velocity adaptation>,<uart connection mode> OK
<i>Write command</i> <u>Syntax</u> AT+GPSPTFC= [<rate>][,<max search time>] [,<max off time>] [,<velocity adaptation>] [,<uart connection mode>]	<u>Response</u> OK <u>Parameters</u> <rate> 30 – 86400 Wake up period (in seconds, decimal value). Factory default value = <u>1800</u> <max search time> 30 – 7200 Max satellite search when awake (in seconds, decimal value). Factory default = <u>60</u> <max off time> 30 – 7200 Max off time when satellite search failed (in seconds, decimal value). Factory default = <u>120</u> <velocity adaptation> Velocity adaptation algorithm activation status. Factory default = 0 <u>0</u> Velocity adaptation disabled <u>1</u> Velocity adaptation enabled <uart connection mode> Status of the connection to the internal GNSS device. Factory default = 0 <u>0</u> UART connection with GNSS device closed (asynchronous mode) <u>1</u> UART connection follows GNSS wake-up activity (synchronous mode)

HL6528-G	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Refer to section 23.22.8 Push-to-Fix Mode for more details on the push-to-fix feature.
<u>Examples</u>	AT+GPSPTFC? +GPSPTFC: 1800,30,120,0,0 OK Changing period only: AT+GPSPTFC=60 OK Changing max off time only: AT+GPSPTFC=,,300 OK

18.15. +KIICADDR Command: Configure the I²C Device

Note: For HL6528-G only.

HL6528-G	
<i>Test command</i>	
<u>Syntax</u> AT+KIICADDR=?	<u>Response</u> +KIICADDR: (range of supported <device address>es) OK

HL6528-G	
<i>Read command</i>	
<u>Syntax</u> AT+KIICADDR?	<u>Response</u> +KIICADDR: <device address> OK <u>Parameters</u> <device address> [0-127] Address of the I ² C device (in decimal value). Factory default value = <u>34</u> .
<i>Write command</i>	
<u>Syntax</u> AT+KIICADDR= <device address>	<u>Response</u> OK <u>Parameters</u> <device address> Address of the I ² C device (in decimal value)
<u>Examples</u>	AT+KIICADDR? +KIICADDR: 34 OK

18.16. +GPSSUPLCFG Command: GPS SUPL Configuration

Note: For HL854x-G only.

HL854x-G	
<i>Test command</i> <u>Syntax</u> AT+ GPSSUPLCFG=?	Response +GPSSUPLCFG: (list of supported <mode>s) OK
<i>Read command</i> <u>Syntax</u> AT+ GPSSUPLCFG?	Response +GPSSUPLCFG: 0, <SUPL-host>,<SUPL-port>,<SUPL-ver>,<NI-SUPL-sm> +GPSSUPLCFG: 1, <SUPL-TLS-cipher>,<SUPL-TLS-auth>,<SUPL-TLS-ver> OK
<i>Write command</i> <u>Syntax</u> For <mode>=0: AT+ GPSSUPLCFG=0, [<SUPL-host>] [,<SUPL-port>] [,<SUPL-ver>] [,<NI-SUPL-sm>] For <mode>=1: AT+ GPSSUPLCFG=1, [<SUPL-TLS- cipher>][,<SUPL- TLS-auth>] [,<SUPL-TLS- ver>]	Response +CME ERROR <err> OK <u>Parameters</u> For <mode>=0; configure SUPL server: <SUPL-host> IP address string or explicit name of the SUPL server. Factory default = "supl.google.com " <SUPL-port> TCP port of the SUPL server. Numeric value with range 0-65535. Factory default = 7276. If this parameter is omitted, the last known value is preserved. <SUPL-ver> SUPL version 0 SUPL disable 1 Support SUPL1.0 (factory default) 2 Support SUPL1.0 and SUPL2.0

HL854x-G	
	<NI-SUPL-sm> NI SUPL start mode 0 Auto start (factory default) 1 Hot start 2 Warm start 3 Cold start For <mode>=1; configure SUPL TLS connection: <SUPL-TLS-cipher> Disable TLS or TLS cipher options -1 Do not use TLS [factory default] 0 TLS_RSA_CHOOSE_BY_SERVER 1 TLS_RSA_WITH_RC4_128_MD5 (not supported) 2 TLS_RSA_WITH_RC4_128_SHA 3 TLS_RSA_WITH_DES_CBC_SHA (not supported) 4 TLS_RSA_WITH_3DES_EDE_CBC_SHA (not supported) 5 TLS_RSA_EXPORT1024_WITH_DES_CBC_SHA (not supported) 6 TLS_RSA_WITH_AES_128_CBC_SHA 7 TLS_RSA_WITH_AES_256_CBC_SHA <SUPL-TLS-auth> TLS authentication options 1 No authentication [factory default] 2 Manage server authentication (this option is not fully functional in the HL854x-G; re-negotiation of client certificate is not supported.) 3 Manage server and client authentication if requested by remote server (this option is not fully functional in the HL854x-G; re-negotiation of client certificate is not supported.) <SUPL-TLS-ver> TLS version options 0 TLS v.1.0 1 TLS v. 1.1 (factory default)
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • This command can work with or without a SIM card. • The SUPL configurations are loaded when GPS is started the first time after boot (e.g. by AT+GPSINIT, AT+GPSAUTOINIT, SUPL NI). Hence, it is recommended to reboot the modem after changing the configurations. • For SSL certificates and private keys, refer to SSL Certificate Manager for AT commands (AT+KCERTSTORE, AT+KCERTDELETE, AT+KPRIVKSTORE, AT+KPRIVKDELETE). • <SUPL-TLS-auth> is effective only if <SUPL-TLS-cipher> is enabled (>=0)

HL854x-GExamples

ensure RTC time is correct for SSL time check

AT+CCLK="14/05/27,13:42:00+0"**OK**

read current configurations

AT+GPSSUPLCFG?**+GPSSUPLCFG: 0,"supl.google.com",7276,1,0****+GPSSUPLCFG: 1,-1,1,1****OK**

Enable TLS. Configure to use a SUPL server with TLS support

AT+GPSSUPLCFG=0,"supl.google.com",7275**OK**

Enable TLS socket (SUPL-TLS-cipher=0), server authentication (SUPL-TLS-auth=2) and TLS version = 1.1

AT+GPSSUPLCFG=1,0,2,1**OK**

Test with server authentication

AT+KCERTSTORE=0,,1

paste your trusted CA list, terminated by +++

OK

may read it back

AT+KCERTSTORE?

...

root_cert,1,2876**-----BEGIN CERTIFICATE-----...-----END CERTIFICATE-----****-----BEGIN CERTIFICATE-----...-----END CERTIFICATE-----**

...

OK

HL854x-G

```
# reboot once to ensure configurations are loaded by AT+GPSINIT
AT+CFUN=1,1
OK

AT+GPSINIT=41
OK
+GPSEVINIT: 1

AT+GPSSTART=1
OK
+GPSEVSTART: 1

# Disable TLS (SUPL-TLS-cipher=-1) and server authentication(SUPL-TLS-auth=don't care)
AT+GPSSUPLCFG=1,-1
OK

# configure to a SUPL server without TLS support
AT+GPSSUPLCFG=0,"supl.google.com",7276,1
OK

# reboot once to ensure configurations are loaded by AT+GPSINIT
AT+CFUN=1,1
OK

AT+GPSINIT=41
OK
+GPSEVINIT: 1

AT+GPSSTART=1
OK
+GPSEVSTART: 1
```

18.17. +CMTLR Command: Mobile Terminated Location Request Notification

Note: For HL854x-G only.

HL854x-G	
<i>Test command</i> <u>Syntax</u> AT+CMTLR=?	Response +CMTLR: (0-3) OK
<i>Read command</i> <u>Syntax</u> AT+CMTLR?	<u>Response</u> +CMTLR: <subscribe> OK
<i>Write command</i> <u>Syntax</u> AT+CMTLR= <subscribe>	<u>Response</u> OK or CME ERROR: <error> <u>Parameters</u> <subscribe> 0 Disables reporting and positioning 1 Notifications of MT-LR over control plane 2 Notifications of MT-LR over SUPL 3 Notifications of MT-IR over control plane and SUPL
<i>Unsolicited Notification</i>	<u>Response</u> +CMTLR: <handle_id>,<notification_type>,<location_type>,<client_external_id>,<requestor_id>,<client_name>,<plane> <u>Parameters</u> <handle_id> 0 – 255

HL854x-G			
	<notification_type>	0	The subscription may stipulate that positioning the user by a third party is allowed and the network may choose to inform the user as a matter of courtesy.
		1	Locating the user is permitted if the user ignores the notification.
		2	Locating the user is forbidden if the user ignores the notification.
	<location_type>	0	Current location
		1	Current or last known location
		2	Initial location
	<client_external_id>	String type	
	<requestor_id>	String type	
	<client_name>	String type	
	<plane>	0	Control plane
		1	Secure user plane (SUPL)

18.18. +CMTLRA Command: Mobile Terminated Location Request Disclosure Allowance

Note: For HL854x-G only.

HL854x-G	
<i>Test command</i>	
<u>Syntax</u> AT+CMTLRA=?	Response +CMTLRA: (0,1) OK

HL854x-G	
<i>Read command</i>	
<u>Syntax</u> AT+CMTLRA?	<u>Response</u> +CMTLRA: <allow>,<handle_id> OK
<i>Write command</i>	
<u>Syntax</u> AT+CMTLRA= <allow>, <handle_id>	<u>Response</u> OK or CME ERROR: <error> <u>Parameters</u> <allow> <u>0</u> Location disclosure allowed 1 Location disclosure not allowed <handle_id> 0 – 255. Default value = <u>0</u>

18.19. +CMOLR Command: Mobile Originated Location Request

Note: For HL854x-G only.

HL854x-G	
<i>Test command</i> <u>Syntax</u> AT+CMOLR=?	<u>Response</u> +CMOLR: (list of supported <enable>s), (list of supported <method>s), (list of supported <hor_acc_set>s), (list of supported <hor_acc>s), (list of supported <ver_req>s), (list of supported <ver_acc_set>s), (list of supported <ver_acc>s), (list of supported <vel_req>s), (list of supported <interval>s), (list of supported <shape_rep>s), (list of supported <plane>s) OK
<i>Read command</i> <u>Syntax</u> AT+CMOLR?	<u>Response</u> +CMOLR: <enable>,<method>,<hor_acc_set>,[<hor_acc>],<ver_req>,[<ver_acc_set>],[<ver_acc>],<vel_req>,<rep_mode>,<timeout>,[<interval>],<shape_rep>,<plane>,[<third_party_address>] OK or CME ERROR: <error>
<i>Write command</i> <u>Syntax</u> AT+CMOLR= <enable> [,<method> [,<hor_acc_set> [,<hor_acc> [,<ver_req> [,<ver_acc_set> [,<ver_acc> [,<vel_req> [,<rep_mode> [,<timeout> [,<interval>	<u>Response</u> OK or CME ERROR: <error> <u>Parameters</u> <enable> Enables and disables reporting location as a result of an MO-LR. Only one <method> can be enabled at any given time. 0 Disables reporting and positioning

HL854x-G		
[,<shape_rep> [,<plane> [,<third_party_address>]]]]]]]]]]]]]	2	Enables reporting of GAD shapes by URC +CMOLRG: <location_parameters>. Lack of data at each timeout is indicated by unsolicited result code +CMOLRE. Note that the string of <location_parameters> intended for +CMOLR can be split into multiple unsolicited result codes in order to prevent the string in the unsolicited result code from becoming too long.
<method>	Method for MO-LR.	
	0	Unassisted GPS. Autonomous GPS only, no use of assistance data
	1	Assisted GPS
<hor_acc_set>	0	Horizontal accuracy set set/specified
	1	Horizontal accuracy set in parameter <hor_acc>
<hor_acc>	Integer type. Requested accuracy as horizontal uncertainty exponent (refer to 3GP P TS 23.032 [76] subclause 6.2). The value range is 0-127.	
<ver_req>	0	Vertical coordinate (altitude) is not requested; 2D location fix is acceptable. The parameters <ver_acc_set> and <ver_acc> do not apply.
	1	Vertical coordinate (altitude) is requested; 3D location fix is required.
<ver_acc_set>	0	Vertical accuracy not set/specified
	1	Vertical accuracy set/specified in parameter <ver_acc>
<ver_acc>	Integer type. Requested accuracy as vertical uncertainty exponent (refer to 3GPP TS 23.032 [76] subclause 6.4). The value range is 0-127.	
<vel_req>	0	Velocity not required
	1	Horizontal velocity requested
	2	Horizontal velocity and vertical velocity requested
	3	Horizontal velocity with uncertainty requested
	4	Horizontal velocity with uncertainty and vertical velocity with uncertainty requested
Note that this is currently not supported as REL8 integer type.		
<rep_mode>	0	Single report, the timeout for the MO-LR response request is specified by <timeout>
	1	Periodic reporting, the timeout for the MO-LR response request is specified by <timeout> and the interval between each MO-LR is specified by <interval>

HL854x-G	
	<timeout> Integer type. Indicates how long the MS will wait for a response after a MO-LR request. The value range is in seconds from 1 to 65535. Note that this is currently not supported as REL8 integer type. <interval> Integer type. This parameter is applicable to periodic reporting only and determines the interval between periodic MO-LRs. The value range is in seconds from 1 to 65535, and must be greater than or equal to <timeout>. <shape_rep> Integer type. This parameter is a sum of integers each representing a certain GAD shape that will be accepted in the unsolicited result code <location_parameters>. Note that only one GAD shape is present per unsolicited result code. 1 Ellipsoid point 2 Ellipsoid point with uncertainty circle 4 Ellipsoid point with uncertainty ellipse 8 Polygon 16 Ellipsoid point with altitude 32 Ellipsoid point with altitude and uncertainty ellipsoid 64 Ellipsoid arc <plane> 0 Control plane <third_party_address> String type. This parameter is applicable to reporting to third party only, and specifies the address to the third party. This parameter has to be specified when <method> value is set to 5. <location_parameters> String type in UTF-8. This parameter provides XML-formatted strings of GADshape positioning data as defined in cpos XML DTD. This parameter shall not be subject to conventional character conversion as per +CSCS. The XML according to the DTD in cpos XML DTD may be provided in one or multiple unsolicited result codes.
Notes	• <hor_acc>, <ver_acc_set>, <ver_acc> and <plane> are only applicable in certain configurations. The parameter <interval> is only applicable if periodic reporting is specified. The parameter <third-party-address> is only applicable if reporting to third party is specified. • <vel_req> and <timeout> are not supported currently. But the order is maintained. Input will be as below sample example (<vel_req>,<timeout> shall be left empty): AT+CMOLR=2,1,1,122,1,1,100,,1,,1000,64,1,"123456789"

18.20. +CMOLRE Command: Mobile Originated Location Request Error

Note: For HL854x-G only.

HL854x-G								
<i>Test command</i>								
<u>Syntax</u> AT+CMOLRE=?	Response +CMOLRE: (list of supported <enable> s) OK							
<i>Read command</i>								
<u>Syntax</u> AT+CMOLRE?	Response +CMOLRE: <enable> OK or CME ERROR: <error>							
<i>Write command</i>								
<u>Syntax</u> AT+CMOLRE= <enable>	Response OK or CME ERROR: <error> <u>Parameters</u> <table><tr><td><enable></td><td><u>0</u></td><td>Numeric display</td></tr><tr><td></td><td>1</td><td>String display</td></tr></table>		<enable>	<u>0</u>	Numeric display		1	String display
<enable>	<u>0</u>	Numeric display						
	1	String display						

18.21. Location Service Command Example

AT+GPSNMEA=0

OK

AT+GPSPVT=1

OK

AT+GPSSTART=1

OK

+GPSEVSTART: 1

+GPSEVPOS: 0

+GPSPVT: 0,00:00:00,00/00/0000,NO FIX,N 00 00'00.00",E 00 00'00.00",-0047m

+GPSPVT: 1,000.0deg,000m/s

+GPSPVT: 2,06SV,0.0HDOP,04,3.5

+GPSPVT: 3,1,1,[02,U,03],[04,U,04],[09,U,04],[12,U,04],[14,U,03],[32,U,03]

+GPSPVT: 0,00:00:00,00/00/0000,NO FIX,N 00 00'00.00",E 00 00'00.00",-0047m

+GPSPVT: 1,000.0deg,000m/s

+GPSPVT: 2,06SV,0.0HDOP,28,19.7

+GPSPVT: 3,1,1,[02,U,11],[04,U,19],[09,U,16],[12,U,23],[14,U,28],[32,U,21]

...

Note: The +GPSEVSTART: 1 event is only sent if the GPS ROM update has been successfully loaded, which may take several seconds.

>> 19. Test Commands

The following commands are used for testing purposes.

19.1. +WMTXPOWER Command: Test RF Tx

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+ WMTXPOWER=?	<u>Response</u> + WMTXPOWER= (list of supported <BAND>s), (list of supported <CHANNEL>s ranges),(supported <MULTISLOT> values) OK	<u>Syntax</u> AT+ WMTXPOWER=?	<u>Response</u> + WMTXPOWER: (list of supported 2G <BAND>s), (list of supported 2G <CHANNEL>s),(supported <MULTISLOT>s) + WMTXPOWER: (list of supported 3G <BAND>s), (list of supported 3G <CHANNEL>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+ WMTXPOWER?	<u>Response</u> + WMTXPOWER=<ENABLE>[,<BAND>,<CHANNEL>,<POWER_LEVEL>,<MULTISLOT>] OK Note that parameters [,<BAND>,<CHANNEL>,<POWER_LEVEL>,<MULTISLOT>] are only available if <ENABLE>=1.	<u>Syntax</u> AT+ WMTXPOWER?	<u>Response</u> + WMTXPOWER: <ENABLE>[,<BAND>,<CHANNEL>,<POWER_LEVEL>[,<MULTISLOT>]] OK Note that parameters [,<BAND>,<CHANNEL>,<POWER_LEVEL>,<MULTISLOT>] are only available if <ENABLE>=1.

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+ WMTXPOWER= <ENABLE> [,<BAND>, <CHANNEL>, <POWER_ LEVEL>] [, <MULTISLOT>]	<u>Response</u> OK <u>Parameters</u> <ENABLE> 0 Stop the burst emission 1 Start the burst emission <BAND> Tx burst band emission. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. 850 GSM850 band 900 GSM900 band 1800 DCS band 1900 PCS band <CHANNEL> Tx burst channel emission. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. If <BAND>=850 128 – 251 If <BAND>=900 0 – 124 975 – 1023 If <BAND>=1800 512 – 885 If <BAND>=1900 512 – 810	<u>Syntax</u> AT+ WMTXPOWER= <ENABLE> [,<BAND>, <CHANNEL>, <POWER_ LEVEL> [, <MULTISLOT>]]	<u>Response</u> OK <u>Parameters</u> <ENABLE> 0 Stop the burst emission 1 Start the burst emission <BAND> Tx burst band emission. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. For GSM: 850 GSM850 band 900 GSM900 band 1800 DCS band 1900 PCS band For UMTS: 1 Band I (2100 band) 2 Band II (1900 band) 5 Band V (850 band) 6 Band VI (800 band) 8 Band VIII (900 band) 19 Band XIX (800 band) <CHANNEL> Tx burst channel emission. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. For GSM: If <BAND>=850 128 – 251 If <BAND>=900 0 – 124 975 – 1023 If <BAND>=1800 512 – 885 If <BAND>=1900 512 – 810

HL6528x	HL85xxx
<POWER_LEVEL> Tx burst power. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. If <BAND>=850 or <BAND>=900, 5 (33 dBm) to 19 (5 dBm) If <BAND>=1800 or <BAND>=1900, 0 (30 dBm) to 15 (0 dBm) <MULTISLOT> Defines which slot is used in Tx burst emissions. This parameter is not allowed if <ENABLE>=0. <u>0</u> Emit on one time slot (GSM) 1 Emit on two time slots (GPRS compliant)	For UMTS: If <BAND>=1 9612 – 9888 If <BAND>=2 9262 – 9538, 12, 37, 62, 87, 112, 137, 162, 187, 212, 237, 262, 287 If <BAND>=5 4132 – 4233, 782, 787, 807, 812, 837, 862 If <BAND>=6 4162 – 4188, 812, 837 If <BAND>=8 2712 – 2863 If <BAND>=19 312 – 363, 387, 412, 437 <POWER_LEVEL> Tx burst power. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. For GSM: If <BAND>=850 or <BAND>=900, 5 (33 dBm) to 19 (5 dBm) If <BAND>=1800 or <BAND>=1900, 0 (30 dBm) to 15 (0 dBm) For UMTS: For all <BAND>s, 0 (23 dBm) to 73 (-50 dBm) <MULTISLOT> Defines which slot is used in Tx burst emissions. This parameter is not allowed if <ENABLE>=0. <u>0</u> Emit on one time slot (GSM) 1 Emit on two time slots (GPRS compliant) 2 Emit on three time slots 3 Emit on four time slots This parameter is not applicable for UMTS.

HL6528x		HL85xxx	
<u>Notes</u>	- Before using this command, the module must be set to flight mode (refer to command +CFUN) - Burst must be sent on all TDMA frames. - If a burst emission is active, a new AT+WMTXPOWER command just modifies the emission parameters and does not stop the emission. Only one burst can be emitted at a time. - This AT command is available even if AT+WMRXPOWER and AT+WMAUDIOLOOP are enabled.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - Burst must be sent on all TDMA frames. - If emission parameters need to be modified while a burst emission is already active, the emission should first be stopped (AT+WMTXPOWER=0) and then restarted with a new AT+WMTXPOWER with the required emission parameters. Only one burst can be emitted at a time. - This AT command is available even if AT+WMAUDIOLOOP is enabled. - This AT command is not available if AT+WMRXPOWER is enabled. - The module must be restarted after using this command.
<u>Example</u>	at+wmtxpower? +WMTXPOWER: 255 // +WMTXPOWER not yet started OK at+wmtxpower=? +WMTXPOWER: (850,900,1800,1900),(128-251,0-124,975-1023,512-885,512-810),(0-1) OK at+wmtxpower=1,850,192,6,1 // emits a Tx burst (31 dBm) // on band 850, uarfcn=192, // time slot=3 OK at+wmtxpower? +WMTXPOWER: 1,850,192,6,1 OK	<u>Example</u>	at+wmtxpower? +WMTXPOWER: 255 // +WMTXPOWER not yet started OK at+wmtxpower=? +WMTXPOWER: (850,900,1800,1900),(128-251,0-124,975-1023,512-885,512-810),(0-3) +WMTXPOWER: (1,2,5,6,8,19),(9612-9888,9262-9538,12,37,62,87,112,137,162,187,212,237,262,287,4132-4233,782,787,807,812,837,862,4162-4188,812,837,2712-2863,312-363,387,412,437) OK at+wmtxpower=1,1,9750,3 // emits a Tx burst (20 dBm) // on band 1, uarfcn=9750 OK at+wmtxpower? +WMTXPOWER: 1,1,9750,3 OK

HL6528x		HL85xxx	
			at+wmtxpower=1,850,192,6,2 // emits a Tx burst (31 dBm) // on band 850, uarfcn=192, // time slot=3 OK at+wmtxpower? +WMTXPOWER: 1,850,192,6,2 OK

19.2. +WMRXPOWER Command: Test RF Rx

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+WMRXPOWER=?	<u>Response</u> +WMRXPOWER=(list of supported <BAND>s), (list of supported <CHANNEL>s ranges) OK	<u>Syntax</u> AT+WMRXPOWER=?	<u>Response</u> +WMRXPOWER: (list of supported 2G <BAND>s), (list of supported 2G <CHANNEL>s) +WMRXPOWER: (list of supported 3G <BAND>s), (list of supported 3G <CHANNEL>s) OK
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+WMRXPOWER?	<u>Response</u> +WMRXPOWER: <ENABLE>[,<BAND>,<CHANNEL>,<EXP_POWER>] OK Note that parameters [,<BAND>,<CHANNEL>,<EXP_POWER>] are only available if <ENABLE>=1.	<u>Syntax</u> AT+WMRXPOWER?	<u>Response</u> +WMRXPOWER: <ENABLE>[,<BAND>,<CHANNEL>,<EXP_POWER>] OK Note that parameters [,<BAND>,<CHANNEL>,<EXP_POWER>] are only available if <ENABLE>=1.

HL6528x		HL85xxx	
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+WMRXPOWER= <ENABLE> [,<BAND>, <CHANNEL>, <EXP_POWER>]	<u>Response</u> +WMRXPOWER=<POWER> OK <u>Parameters</u> <ENABLE> 0 Stop the Rx measurement 1 Start the Rx measurement <BAND> Rx band to read. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. 850 GSM850 band 900 GSM900 band 1800 DCS band 1900 PCS band <CHANNEL> Rx channel to read. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. If <BAND>=850 128 – 251 If <BAND>=900 0 – 124 975 – 1023 If <BAND>=1800 512 – 885 If <BAND>=1900 512 – 810	<u>Syntax</u> AT+WMRXPOWER= <ENABLE> [,<BAND>, <CHANNEL>, <EXP_POWER>]	<u>Response</u> +WMRXPOWER: <POWER> OK <u>Parameters</u> <ENABLE> 0 Stop the Rx measurement 1 Start the Rx measurement <BAND> Rx band to read. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. For GSM: 850 GSM850 band 900 GSM900 band 1800 DCS band 1900 PCS band For UMTS: 1 Band I (2100 band) 2 Band II (1900 band) 5 Band V (850 band) 6 Band VI (800 band) 8 Band VIII (900 band) 19 Band XIX (800 band) <CHANNEL> Rx channel to read. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. For GSM: If <BAND>=850 128 – 251 If <BAND>=900 0 – 124 975 – 1023 If <BAND>=1800 512 – 885 If <BAND>=1900 512 – 810 For UMTS:

HL6528x		HL85xxx	
	<EXP_POWER> Expected power in dBm. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. <POWER> Received power in dBm.		If <BAND>=1 10562 – 10838 If <BAND>=2 9662 – 9938 If <BAND>=5 4357 – 4458, 1007, 1012 If <BAND>=6 4387 – 4413 If <BAND>=8 2937 – 3088 If <BAND>=19 712 – 763 <EXP_POWER> Expected power in dBm. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. <POWER> Received power in dBm.
<u>Notes</u>	- Before using this command, the module must be set to flight mode (refer to command +CFUN). - This AT command is available even if AT+WMRXPOWER and AT+WMAUDIOLOOP are enabled.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - This AT command is available even if AT+WMAUDIOLOOP is enabled. - This AT command is not available if AT+WMRXPOWER is enabled. - The module must be restarted after using this command.
<u>Example</u>	<pre>at+wmrxpower? +WMRXPOWER: 255 OK at+wmrxpower=? +WMRXPOWER: (850,900,1800,1900),(128-251,0-124,975-1023,512-885,512-810) OK at+wmrxpower=1,850,192,"-30" // read GSM850 uarfcn=192 +WMRXPOWER: -31.0 // Rx power -31 dBm OK</pre>	<u>Example</u>	<pre>at+wmrxpower? +WMRXPOWER: 255 OK at+wmrxpower=? +WMRXPOWER: (850,900,1800,1900),(128-251,0-124,975-1023,512-885,512-810) +WMRXPOWER: (1,2,5,6,8,19),(10562-10838,9662-9938,4357-4458,1007,1012,4387-4413,2937-3088,712-763) OK at+wmrxpower=1,850,192,-30 // read GSM850 uarfcn=192 +WMRXPOWER: -31.0 // Rx power -31 dBm OK</pre>

HL6528x		HL85xxx	
	at+wmrxpower? +WMRXPOWER: 1,850,192,-30 OK		at+wmrxpower? +WMRXPOWER: 1,850,192,-30 OK
	at+wmrxpower=1,1800,711,"-27" // read GSM1800, // urafcn=711 +WMRXPOWER: -27.1 // Rx power -27.1 dBm OK		at+wmrxpower=1,1,10562,-40 // read band 1, urafcn=10562 +WMRXPOWER: -41.5 // Rx power -41.5 dBm OK
	at+wmrxpower=1,1900,661,"-40" // read GSM1900, // urafcn=661 +WMRXPOWER: -41.1 // Rx power -41.1 dBm OK		at+wmrxpower? +WMRXPOWER: 1,1,10562,-40 OK
			at+wmrxpower=1,1800,711,-27 // read GSM1800, urafcn=711 +WMRXPOWER: -27.1 // Rx power -27.1 dBm OK
			at+wmrxpower=1,1900,661,-40 // read GSM1900, urafcn=661 +WMRXPOWER: -41.1 // Rx power -41.1 dBm OK

19.3. +WMAUDIOLOOP Command: Audio Test

HL6528x		HL85xxx	
<i>Test command</i>		<i>Test command</i>	
<u>Syntax</u> AT+ WMAUDIOLOOP =?	<u>Response</u> +WMAUDIOLOOP=(list of supported <TXORGAN>s),(list of supported <RXORGAN>s) OK	<u>Syntax</u> AT+ WMAUDIOLOOP =?	<u>Response</u> +WMAUDIOLOOP: (list of supported <ENABLE>s),(list of supported <TXORGAN>s),(list of supported <RXORGAN>s) OK

HL6528x		HL85xxx	
<i>Read command</i>		<i>Read command</i>	
<u>Syntax</u> AT+ WMAUDIOLOOP ?	<u>Response</u> +WMAUDIOLOOP=<ENABLE>[,<TXORGAN>,<RXORGAN>] OK Note that parameters [<TXORGAN>,<RXORGAN>] are only available if <ENABLE>=1.	<u>Syntax</u> AT+ WMAUDIOLOOP ?	<u>Response</u> +WMAUDIOLOOP: <ENABLE>[,<TXORGAN>,<RXORGAN>] OK Note that parameters [<TXORGAN>,<RXORGAN>] are only available if <ENABLE>=1.
<i>Write command</i>		<i>Write command</i>	
<u>Syntax</u> AT+ WMAUDIOLOOP =<ENABLE> [,<TXORGAN>] [,<RXORGAN>]	<u>Response</u> OK or +CME ERROR:4 if the AT command tries to control a <TXORGAN> or <RXORGAN> that isn't supported. <u>Parameters</u> <ENABLE> Enable or disable audio loop 0 Disable audio loop 1 Enable audio loop <TXORGAN> Audio input used as reference for audio loop. This parameter is not allowed if <ENABLE>=0. 0 Main microphone (default value) 1-3 Reserved for future use <RXORGAN> Audio output used to loop audio input. This parameter is not allowed if <ENABLE>=0. 0 Main speaker (default value) 1-6 Reserved for future use	<u>Syntax</u> AT+ WMAUDIOLOOP =<ENABLE>, [,<TXORGAN>, <RXORGAN>]	<u>Response</u> OK or +CME ERROR:4 if the AT command tries to control a <TXORGAN> or <RXORGAN> that isn't supported. <u>Parameters</u> <ENABLE> Read or write command 0 Stop the audio loop test 1 Execute the audio loop <TXORGAN> Audio input used as reference for audio loop. This parameter is not allowed if <ENABLE>=0. 0 PCM in 1 Reserved for future use <RXORGAN> Audio output used to loop audio input. This parameter is not allowed if <ENABLE>=0. 0 PCM out 1 Reserved for future use

HL6528x		HL85xxx	
<u>Notes</u>	- The HL6528x only supports main microphone and main speaker. Specifying any other values for <TXORGAN> or <RXORGAN> will return a CME ERROR 4 (operation not supported). - The AT command used to drive GPIOs can be used after this command without restarting the module. - Audio loop works for both analog and digital audio at the same time. - This AT command is available even if AT+WMTXPOWER and AT+WMRXPOWER are enabled.	<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> - The AT command used to drive GPIOs can be used after this command without restarting the module. - The audio loop activation involves some restrictions on the use of other AT commands: - Audio loop mode must not be enabled when communications is active - Audio loop mode must not be enabled when a tone is under generation - Audio loop must be disabled (if active) before opening communication - Tone generation and sidetone modification must not be possible when the audio loop is active
		<u>Example</u>	AT+WMAUDIOLOOP=? +WMAUDIOLOOP: (0-1),(0-1),(0-1) OK AT+WMAUDIOLOOP? +WMAUDIOLOOP: 0 OK AT+WMAUDIOLOOP=1,0,0 OK Started audio loop AT+WMAUDIOLOOP? +WMAUDIOLOOP: 1,0,0 OK AT+WMAUDIOLOOP=0,0,0 OK Stopped audio loop

19.4. +WMGNSSTEST Command: GNSS Test

HL6528-G and HL854x-G	
<i>Test command</i> <u>Syntax</u> AT+WMGNSSTEST=?	Response +WMGNSSTEST: (list of supported <mode>s)[,(list of supported <option>s)] OK
<i>Read command</i> <u>Syntax</u> AT+WMGNSSTEST=?	Response +WMGNSSTEST: <mode>[,<option>] OK
<i>Write command</i> <u>Syntax</u> AT+WMGNSSTEST= <mode> [,<option>]	Response OK <u>Parameters</u> <mode> GNSS test mode 0 Deactivate GNSS test mode (default value) 1 Activate GNSS test mode 4 Start GNSS continuous wave test (not supported on HL6528-G) <option> svID (if <mode>=1) 0 – 32 Satellite ID

HL6528-G and HL854x-G	
<i>Unsolicited Notification</i>	<u>Response</u> When <mode>=1: +WMGNSSTEST: <SvID>,<Period> <Bit sync Time>,<Bit Count> <Poor Status>,<Good Status> <Parity Error Count> <Lost VCO Count> <Frame Sync Time>,<C/No Mean> <CNo Sigma>,<Clock Drift Change> <Clock Drift>,<Bad 1 kHz Bit Count> <Abs 120 ms>,<Abs q20ms>,<Phase lock>,<RTC freq>,<e/acq ratio>,<t_sync_agc_gain>,<tm 5 ready>,<ClkDriftUnc> When <mode>=4: +WMGNSSTEST: <max_spur_frequency>,<max_spur_sig_to_noise>
<u>Notes</u>	- This command works with or without a SIM card - The test mode setting is not persistent - The GNSS continuous wave test works by feeding a CW (eg, 1575.32 MHz at -116dBm) into the GPS RF connector and output the detected maximum spur frequency and its S/N periodically over time. Choose a spur frequency with the highest S/N. Correspondingly, Clkoffset for +wmgnsclkoffset = 96250 - (Fo - Fi). Fo is the chosen max_spur frequency and Fi is the input CW whose suggested values are 1575.32 MHz, 1575.42 MHz or 1575.52 MHz.
<u>Examples</u>	AT+WMGNSSTEST=? +WMGNSSTEST: (0,1,4),(0-32) //For HL854x-G +WMGNSSTEST: (0,1),(0-32) //For HL6528-G OK AT+WMGNSSTEST=1,31 //Start GNSS test mode (<mode> = 1) with svID 31 OK +GPSEVSTART: 1 AT+WMGNSSTEST=0 //Stop GNSS test mode OK +GPSEVSTOP: 1

19.5. +XOMADMALERT Command: Send Generic Alert to OMA DM Server

Note: For HL854xx only.

HL854xx																							
<i>Test command</i>																							
<u>Syntax</u> AT+XOMADMALERT=?	<u>Response</u> +XOMADMALERT: (list of supported <mode>) OK																						
<i>Read command</i>																							
<u>Syntax</u> AT+XOMADMALERT?	<u>Response</u> ERROR																						
<i>Write command</i>																							
<u>Syntax</u> AT+XOMADMALERT=<mode>[,<source-uri>[,<target-uri>[,<alert-data>[,<alert-type>[,<alert-format>]]]]	<u>Response</u> OK <u>Parameters</u> <table><tr><td><mode></td><td>0</td><td>Terminate OMA DM generic alert and stop OMA DM client session</td></tr><tr><td></td><td>1</td><td>Start an OMA DM generic alert</td></tr><tr><td><source-uri></td><td></td><td>String type; source URI of an OMA DM generic alert. Default = ./DevDetail</td></tr><tr><td><target-uri></td><td></td><td>String type; target URI of an OMA DM generic alert. Default = (empty string)</td></tr><tr><td><alert-data></td><td></td><td>String type; alert data of an OMA DM generic alert. Default = (empty string)</td></tr><tr><td><alert-type></td><td></td><td>String type; alert type of an OMA DM generic alert. Default = org.openmobilealliance.dm.firmwareupdate.devicerequest</td></tr><tr><td><alert-format></td><td></td><td>String type; alert format of an OMA DM generic alert. Default = null</td></tr></table>		<mode>	0	Terminate OMA DM generic alert and stop OMA DM client session		1	Start an OMA DM generic alert	<source-uri>		String type; source URI of an OMA DM generic alert. Default = ./DevDetail	<target-uri>		String type; target URI of an OMA DM generic alert. Default = (empty string)	<alert-data>		String type; alert data of an OMA DM generic alert. Default = (empty string)	<alert-type>		String type; alert type of an OMA DM generic alert. Default = org.openmobilealliance.dm.firmwareupdate.devicerequest	<alert-format>		String type; alert format of an OMA DM generic alert. Default = null
<mode>	0	Terminate OMA DM generic alert and stop OMA DM client session																					
	1	Start an OMA DM generic alert																					
<source-uri>		String type; source URI of an OMA DM generic alert. Default = ./DevDetail																					
<target-uri>		String type; target URI of an OMA DM generic alert. Default = (empty string)																					
<alert-data>		String type; alert data of an OMA DM generic alert. Default = (empty string)																					
<alert-type>		String type; alert type of an OMA DM generic alert. Default = org.openmobilealliance.dm.firmwareupdate.devicerequest																					
<alert-format>		String type; alert format of an OMA DM generic alert. Default = null																					

HL854xx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Examples</u> // Trigger a generic alert with default values AT+XOMADMALERT=1 OK AT+XOMADMALERT=1,"./DevDetail","", "", "org.openmobilealliance.dm.firmwareupdate.devicerequest", "null" OK



20. NV Commands

Note: All commands in this section are for HL85xxx only.

20.1. Auto Generation of NV Backup Files

There are 3 NV partitions in flash used by the Firmware:

- Static Calibrated NV partition
- Static Fixed NV partition
- Dynamic NV partition

NV backup is per partition based, with one NV backup file per partition. These are labelled with <file id>=0, 1, 2 in the NV log and by firmware design.

The firmware automatically generates NV backup files from existing NV data at ~8 seconds after boot if one of the following conditions are met:

- NV backup of a partition does not exist, or it has been corrupted unexpectedly
- NV backup files exist, but the firmware version has changed while IMEI has not changed, in comparison to the records in the backup file
- NV backup files exist, but the firmware version has changed and a valid IMEI has been updated, in comparison to the records in the backup file

An automatic backup file generation is notified with +NVBU_IND with <status>=0 on all AT ports.

20.2. Auto Recovery from Backup NV Files

NV recovery is automatically done if an NV corruption is detected during NV initialization at boot.

The firmware automatically recovers NV data from available NV backup when one or more NV items are corrupted. This is notified with +NVBU_IND with <status>=3 on all AT ports.

Manual NV data restores all data from the backup file to the original NV partition.

The firmware will try to recover corrupted or missing NV data items instead of all NV data items (partial restore) if possible; otherwise, the firmware restores all NV data items (full restore).

If the firmware crashes with 10 consecutive loops and a full restore has not been performed before, the firmware performs a full restore of all NV data items. Only consecutive crashes that happened within 8 seconds after the module boots is counted for this reset loop detection.

20.3. +NVBU Command: NV Backup Status and Control

HL85xxx	
<i>Test command</i>	
<u>Syntax</u> AT+NVBU=?	<u>Response</u> +NVBU: (0-2) OK
<i>Read command</i>	Returns list of NV backup with the format: +NVBU: <file id>,<backup date>,<backup firmware version>
<u>Syntax</u> AT+NVBU?	<u>Response</u> [+NVBU: 0,<backup date>,<backup firmware version>] [+NVBU: 1,<backup date>,<backup firmware version>] [+NVBU: 2,<backup date>,<backup firmware version>] OK <u>Parameters</u> <file id> Backup file ID corresponding to one NV partition in non-volatile memory <backup date> Generation date of the NV backup <backup firmware version> Firmware version used to generate the NV backup

HL85xxx	
<i>Write command</i>	
<u>Syntax</u>	<u>Response</u>
For <mode>=0 or 1:	For <mode>=0 or 1:
AT+NVBU=	OK
<mode>	For <mode>=2 and <clear>=0:
[,<parti_id>]	<log data 0>
	[<log data 1>]
For <mode>=2:	...
AT+NVBU=	[<log data n>]
<mode>[,<clear>]	OK
	For <mode>=2 and <clear>=1:
	OK
	<u>Parameters</u>
<mode>	0 Generate backup of all NV data to NV backup partition
	1 Restore all NV data from the NVM backup partition
	2 List logs of NV backup operations
<log data>	NV backup operations log data
<parti_id>	0 Static Calibrated NV
	1 Static Fixed NV partition
	2 Dynamic NV partition
	3 All NV partitions
<clear log>	0 Read log
	1 Clear log

HL85xxx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> • Status of operations for <mode>=0 and <mode>=1 is notified by +NVBU_IND unsolicited notifications with <status>=0 and <status>=1 respectively on the AT port executed the write command. • Execution of the write command with <mode>=1 is followed by a modem reboot automatically; NVs are restored to their default values on booting. • The number of lines of <log data> ranges from 1 to 2142 lines. • NO SIM card is required for this command. • <mode>=2 is for retrieving log for R&D analysis and not fully documented; generally: ▪ USER=0 for operations triggered by the firmware ▪ USER=1 for manual operations
<u>Examples</u>	<pre># automatic backup files generation after FW upgrade, notified by +NVBU_IND +NVBU_IND: 0,0,"2015/07/22 04:23:33","RHL85xx.5.5.20.0.201510232050.x6250_1" +NVBU_IND: 0,1,"2015/07/22 04:23:33","RHL85xx.5.5.20.0.201510232050.x6250_1" +NVBU_IND: 0,2,"2015/07/22 04:23:33","RHL85xx.5.5.20.0.201510232050.x6250_1" # manual generation of backup files from existing NV partitions AT+NVBU=0,3 OK +NVBU_IND: 0,0,"2015/07/22 04:23:39","RHL85xx.5.5.20.0.201510232050.x6250_1" +NVBU_IND: 0,1,"2015/07/22 04:23:39","RHL85xx.5.5.20.0.201510232050.x6250_1" +NVBU_IND: 0,2,"2015/07/22 04:23:39","RHL85xx.5.5.20.0.201510232050.x6250_1" # manual restore of backup files to original NV partitions AT+NVBU=1,3 OK +NVBU_IND: 1,0,"2015/07/22 04:23:39","RHL85xx.5.5.20.0.201510232050.x6250_1" +NVBU_IND: 1,1,"2015/07/22 04:23:39","RHL85xx.5.5.20.0.201510232050.x6250_1" +NVBU_IND: 1,2,"2015/07/22 04:23:39","RHL85xx.5.5.20.0.201510232050.x6250_1" <module reboots automatically></pre>

HL85xxx	
	# to retrieve the list of NV related operations done by the Firmware at+nvbu=2 [2015/07/22 04:02:49] BULO: MDM-RHL85xx.5.5.20.0.201510232050.x6250_1 [2015/07/22 04:02:49] BUFL: GENERATE USER=0 FILE=3 LAS=0,0,0 [2015/07/22 04:02:49] BUFM: ENCODE F=0 REF=0 CNT=15/15 41 [2015/07/22 04:02:49] BUFM: ENCODE F=1 REF=0 CNT=16/16 31 [2015/07/22 04:02:49] BUFM: ENCODE F=2 REF=42 CNT=41/41 57 [2015/07/22 04:23:39] BUFL: GENERATE USER=1 FILE=3 LAS=0,0,0 [2015/07/22 04:23:39] BUFM: ENCODE F=0 REF=0 CNT=15/15 41 [2015/07/22 04:23:39] BUFM: ENCODE F=1 REF=0 CNT=16/16 31 [2015/07/22 04:23:39] BUFM: ENCODE F=2 REF=42 CNT=41/41 57 [2015/07/22 04:23:43] BUFL: RESTORE USER=1 FILE=3 LAS=0,0,0 [2015/07/22 04:23:43] BUFM: DECODE-2 F=0 REF=1 CNT=15/15 15,41 [2015/07/22 04:23:43] BUFM: DECODE-2 F=1 REF=1 CNT=16/16 16,31 [2015/07/22 04:23:43] BUFM: DECODE-2 F=2 REF=43 CNT=41/41 41,57 OK

20.4. +NVBU_IND Notification: NV Backup Status Notification

HL85xxx	
<i>Unsolicited Notification</i>	<u>Response</u> +NVBU_IND: <status>,<file id>,... For <status>=0: +NVBU_IND: <status>,<file id>,<backup date>,<backup firmware version> For <status>=1: +NVBU_IND: <status>,<file id>,<backup date used for restore>,<backup firmware version used for restore>

HL85xxx	
	For <status>=2: +NVBU_IND: <status>,<file id>,<backup date used for restore>,<backup firmware version used for restore>,<num NV> <NV ID 1>[<NV ID 2>...[<NV ID 16><CR><LF>]] ... <u>Parameters</u> <status> NV backup status 0 NV backup generation completed 1 NV backup restore completed 2 Backup data restored (when NV corruption is detected during NV initialization) <backup date> NV backup generation date <backup firmware version> Firmware version used to generate the NV backup <backup date used for restore> Generation date of the NV backup that was used for the NV restore <backup firmware version used for restore> Firmware version used to generate the NV backup that was used for the NV restore <num NV> Total number of NV items restored <NV ID> List of NV item IDs with data restored, expressed in hexadecimal numbers delimited by spaces, and delimited by <CR><LF> every 16 digits
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The list of <NV ID> is expressed in 16 hexadecimal numbers per line.
<u>Examples</u>	# recovery in calibrated NV partition after Firmware boot # note that the data is also logged by NV log (i.e. AT+NVBU=2) +NVBU_IND: 2,0,"2015/07/22 04:23:39","RHL85xx.5.5.20.0.201510232050.x6250_1",15 10034900 10034901 10034401 10034402 10034902 10035400 10035401 10035402 10035403 10035500 10035501 10035502 10050000 10310000 10370000

>> 21. M2M Service Optimization Commands

Note: All commands in this section are for HL854xx only.

21.1. +SWITRC Command: Set MSO Tracing

HL854xx			
Test command			
<u>Syntax</u> AT+SWITRC=?	<u>Response</u> OK		
Read command			
<u>Syntax</u> AT+SWITRC?	<u>Response</u>		
	group	mask	port
	GLOBAL-0	0xFFFFFFFF	0
	SAL-1	0xFFFFFFFF	0
	AT-2	0xFFFFFFFF	0
	GNSS-3	0xFFFFFFFF	0
	WIPLIB-4	0xFFFFFFFF	0
	WIPADP-5	0xFFFFFFFF	0
	ATIP-6	0xFFFFFFFF	0
	CSR-7	0xFFFFFFFF	0
	AVMS_OMC-8	0xFFFFFFFF	0
	AVMS_TAS-9	0xFFFFFFFF	0
	SMSPU-10	0xFFFFFFFF	0
	BIP-11	0xFFFFFFFF	0
	MSO-12	0xFFFFFFFF	0
	OK		

HL854xx	
<i>Write command</i>	
<u>Syntax</u> AT+SWITRC=1, 12,<mask>	<u>Response</u> OK <u>Parameter</u> <mask> 0xFFFFFFFF Tracing off Bit 0 Error and Warning messages Bit 1 MSO Task messages Bit 2 MSO List messages Bit 3 MSO Event Log messages Bit 4 MSO Configuration messages Bit 5 MSO Time messages Bit 6 MSO Rule Set messages Bit 7 MSO Service Class messages Bit 8 MSO Network Event messages Bit 9 MSO Location messages Bit 10 MSO Time-of-Day (ToD) messages Bit 11 MSO Retry messages Bit 12 MSO CS-Registration messages Bit 13 MSO GPRS Attach messages Bit 14 MSO MO-SMS messages Bit 15 MSO PDP Activation messages Bit 16 MSO Bearer messages Bit 17 MSO Reset messages Bit 18 MSO Provision messages Bit 19 MSO Measured Event messages Bit 20 MSO AVMS messages Bit 21 MSO Service Class Mapping messages Bit 22 MSO Socket messages Bit 23 MSO DNS messages
<u>Note</u>	MSO tracing levels are stored in non-volatile memory along with other tracing settings.

HL854xx	
<u>Example</u>	AT+SWITRC=1,12,0 // Turns on all tracing for the MSO module OK

21.2. +MSOSTATUS Command: Operating Status

HL854xx	
<i>Test command</i>	
<u>Syntax</u> AT+MSOSTATUS =?	<u>Response</u> +MSOSTATUS: (list of all supported <status>es) OK
<i>Read command</i>	
<u>Syntax</u> AT+MSOSTATUS ?	<u>Response</u> [+MSOSTATUS: "SWT",<parameter1>,<parameter2>] [+MSOSTATUS: "MWT",<parameter1>,<parameter2>] [+MSOSTATUS: "SC",<parameter1>,<parameter2>,<parameter3>,<parameter4>] [+MSOSTATUS: "RULE",<parameter1>,<parameter2>,<parameter3>] [+MSOSTATUS: "COND",<parameter1>,<parameter2>,<parameter3>] +MSOSTATUS: <status> OK
<i>Write command</i>	
<u>Syntax</u> AT+MSOSTATUS =<status>	<u>Response</u> OK or +CME ERROR: <err>

HL854xx	
	<u>Parameters</u> <status> <u>0</u> MSO disabled 1 MSO enabled <parameter1> SC Service Class name SWT Spreading Wait Time (expiry time if timer has started) MWT Maximum Wait Time (expiry time if timer has started) RULE Rule Type (Block/Retry/Switch Network) RWT Random Wait Time (expiry time if timer has started) COND Rule Condition Type <parameter2> SC Network Access (Accept/Deny) SWT Reset counter and reset expiry time if timer has started MWT Reset counter and reset expiry time if timer has started RULE Rule Status COND Rule Condition Status (True/False) <parameter3> COND Radio Access Technology for RAT conditions COND Measured Event item name/value/comparison for Measured Event conditions COND Network Event item name/value/comparison for Network Event conditions
<u>Notes</u>	The MSO operating status is stored in non-volatile memory.
<u>Examples</u>	AT+MSOSTATUS=0 // Disables the MSO module OK AT+MSOSTATUS? +MSOSTATUS: 0 OK AT+MSOSTATUS=1 // Enables the MSO module OK

HL854xx	
	AT+MSOSTATUS? +MSOSTATUS: "SC","All","ACCEPT" +MSOSTATUS: "SC","Reset","ACCEPT" +MSOSTATUS: "SC","SMS","ACCEPT" +MSOSTATUS: "SC","PDP","ACCEPT" +MSOSTATUS: "SC","GPRS","ACCEPT" +MSOSTATUS: "SC","CREG","ACCEPT" +MSOSTATUS: "RULE","RETRY","FALSE" +MSOSTATUS: "COND","NETEVT","FALSE","PDP",">=",5,"COUNT:0,0,0,0,0" +MSOSTATUS: 1 OK

21.3. +MSORTCSTATUS Command: Display Trust RTC Status

HL854xx	
<i>Test command</i>	
<u>Syntax</u> AT+MSORTCSTATUS=?	<u>Response</u> +MSORTCSTATUS: (list of supported <status>es) OK
<i>Read command</i>	
<u>Syntax</u> AT+MSORTCSTATUS?	<u>Response</u> +MSORTCSTATUS: <status> OK

HL854xx	
<i>Write command</i> <u>Syntax</u> AT+MSORTCSTATUS=<status>	<u>Response</u> +MSORTCSTATUS: 1 OK or +CME ERROR: <err> <u>Parameter</u> <status> <u>0</u> MSO gets local time using RTC, and NITZ time zone if available 1 MSO gets local time from the RTC
<u>Notes</u>	- Local time is required in MSO for ToD rules and rules with fixed window network events. If the local time is not available, then all ToD rules and rules with fixed window network events are ignored. - The MSO RTC status is stored in non-volatile memory.
<u>Examples</u>	AT+MSORTCSTATUS=1 // MSO uses the RTC for local time OK AT+MSORTCSTATUS=0 // MSO uses NITZ for local time (if available) OK

21.4. +MSOPOLICY Command: Update MSO Policies

HL854xx	
<i>Test command</i> <u>Syntax</u> AT+MSOPOLICY=?	<u>Response</u> OK

HL854xx	
<i>Read command</i>	
<u>Syntax</u> AT+MSOPOLICY ?	<u>Response</u> [+MSOPOLICY:] [<policy data> OK
<i>Write command</i>	
<u>Syntax</u> AT+MSOPOLICY =<mode>	<u>Response</u> <policy data><CTRL-Z> OK or +CME ERROR: <err> <u>Parameter</u> <mode> 1 Update MSO policy <policy> MSO policy data base64 encoded (up to 4000 ASCII characters)
<u>Notes</u>	- Previously written policies to the device are erased during this operation. Policies are generated using the MSO Policy Editor Tool (MPET). Additionally, note that MSO is disabled while the policy is being updated. An MSO policy update will enable the MSO module status after the operation completes successfully; else, MSO will clear the policies on the device and disable the MSO module status. The device requires a reset after a new MSO policy is written to it. - The maximum policy size is based on the maximum sizes of all the SCs, rules and schedules. - The MSO policy status is stored in non-volatile memory.

HL854xxExample**AT+MSOPOLICY=1** // MSO updates the policy and starts executing

```

b4f1b8df0002010017020003010a010a1401141e010103010a030a1401141e010201f301000100012a1100010000010401c00200000000000100010500
0200030005000600080009001600160022002201010000010401c001000000000001000103000200030006000600080009002010001010401c00100000
000000100010300070007001000100016001603010002010401c00000000000000100010400080008001a001b001d00230026002604010001010401c0
00000000000001000101001c001c05010002010401c000000000000001000201002700270601000402010900000401c002000000000001000101000b0
00b0701000602010900000401c001000000000001000102000b000b000e000e0801000402010a00000401c002000000000001000102000c000c000d00
0d0901000602010a00000401c001000000000001000102000c000c000d000d0a01000402010b00000401c002000000000001000101000f000f0b010006
02010b00000401c001000000000001000101000f000f0c010007010401c00400000000000100010a00080008000a000a00150016001c001e0026002600
29002a002f002f0032003200450045005100510d010007010401c00400000000000100010200110011001500150e02010401c000000000000001000101
002200220f01010001040190020000000000010002010011001110010101010401900100000000000100020100110011<CTRL-Z>

```

OK

AT+MSOPOLICY? // MSO returns the current policy data**+MSOPOLICY:**

```

b4f1b8df0002010017020003010a010a1401141e010103010a030a1401141e010201f301000100012a1100010000010401c00200000000000100010500
0200030005000600080009001600160022002201010000010401c001000000000001000103000200030006000600080009002010001010401c00100000
000000100010300070007001000100016001603010002010401c00000000000000100010400080008001a001b001d00230026002604010001010401c0
00000000000001000101001c001c05010002010401c000000000000001000201002700270601000402010900000401c002000000000001000101000b0
00b0701000602010900000401c001000000000001000102000b000b000e000e0801000402010a00000401c002000000000001000102000c000c000d00
0d0901000602010a00000401c001000000000001000102000c000c000d000d0a01000402010b00000401c002000000000001000101000f000f0b010006
02010b00000401c001000000000001000101000f000f0c010007010401c00400000000000100010a00080008000a000a00150016001c001e0026002600
29002a002f002f0032003200450045005100510d010007010401c00400000000000100010200110011001500150e02010401c000000000000001000101
002200220f01010001040190020000000000010002010011001110010101010401900100000000000100020100110011

```

OK

21.5. +MSORETRYINFO Command: Read Retry Information

HL854xx	
<i>Test command</i> <u>Syntax</u> AT+MSORETRYINFO=?	<u>Response</u> +MSORETRYINFO: (list of supported <mode>s),(list of supported <rule>s),(list of supported <cid>s) OK
<i>Read command</i> <u>Syntax</u> AT+MSORETRYINFO?	<u>Response</u> [+MSORETRYINFO: <rule>,<cid>,<obj>,< time >,<count>,<error>] OK
<i>Write command</i> <u>Syntax</u> AT+MSORETRYINFO=<mode>,<rule>[,<cid>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <cid> 1 – 5 PDP context ID <count> Number of request attempts count <error> Last error code received for the request <mode> 0 Resets given retry schedule <obj> 0 CREG (all) 1 GPRS Attach (all)

HL854xx	
	2 PDP Activation 3 CREG (manual) 4 CREG (auto) 5 GPRS Attach (manual) 6 GPRS Attach (auto) 7 MO-SMS <rule> 0 CREG (all) 1 GPRS Attach (all) 2 PDP Activation 3 CREG (manual) 4 CREG (auto) 5 GPRS Attach (manual) 6 GPRS Attach (auto) 7 MO-SMS 8 LTE Attach 9 Socket Connection 10 DNS Query <time> Time until requests will not be blocked. Value ranges from 1 to a maximum value that is dependent on the retry schedule defined in the policy
<u>Notes</u>	- This command shows all of the rules with objects that currently blocked due to a retry schedule. Additionally, this command can also be used to reset any outstanding MSO retry schedules. - The MSO retry schedule states are stored in non-volatile memory.
<u>Examples</u>	AT+MSORETRYINFO? // MSO displays all active retry schedules 0,1,2,1,29,17 OK AT+MSORETRYINFO=0 // MSO uses resets given the retry schedule OK

21.6. +MSOMONITOR Command: MSO Monitoring Status

HL854xx	
Test command	
<u>Syntax</u> AT+MSOMONITOR=?	<u>Response</u> OK
Read command	
<u>Syntax</u> AT+MSOMONITOR?	<u>Response</u> [+MSOMONITOR: <mode>,<value>,<period>] OK
Write command	
<u>Syntax</u> AT+MSOMONITOR= <mode> [,<value>,<period>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <mode> 0 MSO monitoring disabled 1 MSO monitoring enabled <value> 1 – 4294967295 Number of monitored value periods <period> 0 Minute 1 Hour 2 Day
<u>Notes</u>	- The MSO monitoring period is the time period which upon expiry all monitored values are reset to zero. - The MSO monitoring state is stored in non-volatile memory.

HL854xx	
<u>Examples</u>	AT+MSOMONITOR=1,1,1 // MSO updates the current monitoring configuration OK AT+MSOMONITOR? +MSOMONITOR: 1,1,1 // MSO displays the current monitoring configuration OK

21.7. +MSOMONITORVALUE Command: Read Monitor Data

HL854xx	
<i>Test command</i>	
<u>Syntax</u> AT+MSO MONITORVALUE =?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+MSO MONITORVALUE ?	<u>Response</u> OK or +CME ERROR: <err>

HL854xx	
<i>Write command</i>	
<u>Syntax</u>	<u>Response</u>
For <id> = 0 – 14, 16 – 22:	+MONITORVALUE: <value>
AT+MSO	OK
MONITORVALUE	
=<id>	or
	+CME ERROR: <err>
For <id> = 15:	<u>Parameters</u>
AT+MSO	<id> 0 CREG request count
MONITORVALUE	1 CREG success count
=<id>,<cid>	2 CREG error count
	3 CREG blocked count
For <id> = 23–26:	4 CREG duration (seconds)
AT+MSO	5 GPRS attach request count
MONITORVALUE	6 GPRS attach success count
=<id>,<sc>	7 GPRS attach error count
	8 GPRS attach blocked count
	9 GPRS attach duration (seconds)
	10 PDP request count
	11 PDP success count
	12 PDP error count
	13 PDP blocked count
	14 PDP duration (seconds)
	15 PDP status
	16 MO-SMS request count
	17 MO-SMS success count
	18 MO-SMS error count
	19 MO-SMS blocked count
	20 MO-SMS bytes sent
	21 Device reset count
	22 Device reset time

HL854xx	
	23 Socket send request count 24 Socket send block count 25 Socket send bytes 26 Socket receive bytes <cid> 1 – 20 PDP context identifier <sc> 0 Global service class 16 – 31 User defined service class <value> 0 – 4294967295 Monitored value count
<u>Note</u>	• The MSO monitored values are stored in non-volatile memory. • The MSO feature can monitor all 20 PDPs for reporting, but only the first 5 PDPs are monitored for network events.
<u>Examples</u>	AT+MSOMONITORVALUE=15,1 // Read PDP status of context ID 1 +MONITORVALUE: 1 // MSO retrieves the current PDP status OK AT+MSOMONITORVALUE=23,1 // Read PDP activation success count for context ID 1 +MONITORVALUE: 3 // MSO retrieves the current PDP activation success count for context ID 1 OK AT+MSOMONITORVALUE=25,16 // Read UL data count for user defined service class 16 +MONITORVALUE: 150 // MSO retrieves the current number of UL data bytes assigned to user defined service class 16 OK

21.8. +MSOEVLOGSTATUS Command: Event Log Status

HL854xx										
Test command										
<u>Syntax</u> AT+MSOEVLOGSTATUS=?	<u>Response</u> +MSOEVLOGSTATUS: (list of supported <cmd>s) OK									
Read command										
<u>Syntax</u> AT+MSOEVLOGSTATUS?	<u>Response</u> +MSOEVLOGSTATUS: <cmd> OK									
Write command	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <table><tr><td><cmd></td><td>0</td><td>Disable MSO event logging</td></tr><tr><td></td><td>1</td><td>Enable MSO event logging (no overwrite when full)</td></tr><tr><td></td><td>2</td><td>Enable MSO event logging (overwrite buffer)</td></tr></table>	<cmd>	0	Disable MSO event logging		1	Enable MSO event logging (no overwrite when full)		2	Enable MSO event logging (overwrite buffer)
<cmd>	0	Disable MSO event logging								
	1	Enable MSO event logging (no overwrite when full)								
	2	Enable MSO event logging (overwrite buffer)								
<u>Note</u>	The MSO event log state is stored in non-volatile memory.									
<u>Examples</u>	AT+MSOEVLOGSTATUS? +MSOEVLOGSTATUS: 1 // MSO displays the current event logging configuration OK AT+MSOEVLOGSTATUS=1 // MSO updates the current event logging configuration OK									

21.9. +MSOEVTLGPPUSH Command: Event Log Push

HL854xx							
<i>Test command</i>							
<u>Syntax</u> AT+MSOEVTLGPUSH=?	<u>Response</u> +MSOEVTLGPUSH: (list of supported <cmd>s) OK						
<i>Read command</i>							
<u>Syntax</u> AT+MSOEVTLGPUSH?	<u>Response</u> +MSOEVTLGPUSH: <cmd> OK						
<i>Write command</i>							
<u>Syntax</u> AT+MSOEVTLGPUSH=<cmd>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <table><tr><td><cmd></td><td>0</td><td>Disable MSO event log push to console</td></tr><tr><td></td><td>1</td><td>Enable MSO event log push to console</td></tr></table>	<cmd>	0	Disable MSO event log push to console		1	Enable MSO event log push to console
<cmd>	0	Disable MSO event log push to console					
	1	Enable MSO event log push to console					
<u>Note</u>	The MSO event log push to console state is stored in non-volatile memory.						
<u>Examples</u>	AT+MSOEVTLGPUSH? +MSOEVTLGPUSH: 1 // MSO displays the current event log push to console configuration OK AT+MSOEVTLGPUSH=1 // MSO updates the current event log push to console configuration OK						

21.10. +MSOEVTLLOG Command: Event Log

HL854xx	
<i>Test command</i>	
<u>Syntax</u> AT+MSOEVTLLOG =?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+MSOEVTLLOG ?	<u>Response</u> [+MSOEVTLLOG:] [<data>] OK
<u>Note</u>	This command retrieves up to 100 of the oldest MSO event log records since the last event log record read.
<u>Example</u>	AT+MSOEVTLLOG? +MSOEVTLLOG: Up5LfwAAAAr////+AAAAAQAAAAEAAAAAAAAAAAAAAAAAAAAAAAAAAAAAHdtX21zb19zb2NrQ3JIYXRlAAAAAAAAAAAAAAAAAAAA Up5LgAAAAr////+AAAAAQAAAAEAAAAAAAAAAAAAAAAAAAAAAAAAAAAAHdtX21zb19zb2NrQ3JIYXRlAAAAAAAAAAAAAAAAAAAA Up5LhgAAAAYAAAABAAAAAAAAAAQAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG1zb19wZHBfY3R4X2FjdGl2X3JzcAAAAAAAAAAAAAAAAA Up3bBwAAABtSndsHUp3bBwAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG1zb190aW1lX3N5bmNfdXBkYXRlAAAAAAAAAAAAAAAA Up3bBwAAABEAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG1zb19ncm91cF9hZGRyX3Jlc3RvcnUAAAAAAAAAAAAAAAAA Up3bBwAAABEAAABAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG1zb19ncm91cF9hZGRyX3Jlc3RvcnUAAAAAAAAAAAAAAAAA Up3bBwAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG1zb19zY19yZXN0b3JlAAAAAAAAAAAAAAAAAAAAAAAAAAAA Up3bBwAAAAAAAAADAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG1zb19zY19yZXN0b3JlAAAAAAAAAAAAAAAAAAAAAAAAAAAA Up3bBwAAAAAAAAFAAAAAAAAAHgAAAAAAAAAAAAAAAAAAAAAAAAAG1zb19zY19yZXN0b3JlAAAAAAAAAAAAAAAAAAAAAAAAAAAA Up3bBwAAAAAAAAAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG1zb19zY19yZXN0b3JlAAAAAAAAAAAAAAAAAAAAAAAAAAAA Up3bBwAAAAEAAAAAAAAAAAAAAAAAAEAAAAAAAAAAQAAAAAAAAABAAAAAG1zb19uYXJfcjVzdG9yZQAAAAAAAAAAAAAAAAAAAA Up3bBwAAAAQAAAAABAAACwAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG1zb19kcGlfcHJvY2Vzc19zb2NrZXRfdG9fc2MAAAAA Up3bBwAAAAQAAAAAAACwAAAAAAAAAAAAAAAAAAAAAAAAAAAAAG1zb19kcGlfcHJvY2Vzc19zb2NrZXRfdG9fc2MAAAAA OK // MSO displays up to the latest 100 base64 encoded records to the console. The results above can be saved to a file which can then be parsed using // the MSO event log decoding python application to output a text version of the event logs.

>> 22. AT&T Commands

22.1. +KI2CFREQ Command: I²C_CLK Frequency

HL854xx	
<i>Test command</i>	
<u>Syntax</u> AT+KI2CFREQ=?	<u>Response</u> +KI2CFREQ: (0-1) OK
<i>Read command</i>	
<u>Syntax</u> AT+KI2CFREQ?	<u>Response</u> +KI2CFREQ: <freq index>,<reset_flag> OK
<i>Write command</i>	
<u>Syntax</u> AT+KI2CFREQ= <freq index>	<u>Response</u> OK or +CME ERROR: 4 <u>Parameters</u> <freq index> Indicates frequency/mode 0 100 KHz (Standard Mode) 1 400 KHz (Fast Mode) <reset_flag> Indicates if a reset is required for the specified change to occur 0 Reset not needed; setting already in place 1 Reset is required to take the new setting into account

HL854xx	
<u>Notes</u>	• This command is used to configure the frequency of the I²C bus to either Standard Mode (100 KHz) or Fast Mode (400 KHz) which is then used to initialize the I²C block that sends out GPS NMEA frames. • Settings take effect after module reset. • &F and &W have no effect on this command.
<u>Examples</u>	AT+KI2CFREQ=? +KI2CFREQ: (0-1) OK AT+KI2CFREQ? +KI2CFREQ: 0,0 OK AT+KI2CFREQ=1 // Set Fast Mode on I²C OK AT+KI2CFREQ? +KI2CFREQ: 1,1 OK // Reset is needed to take new settings into account AT+KI2CFREQ? +KI2CFREQ: 1,0 // I²C bus is working in Fast Mode (400KHz) OK

>> 23. Appendix

23.1. Result Codes and Unsolicited Messages

Verbose Result Code	Numeric	Type	Description
+CCCM: <ccm>	like verbose	Unsolicited	
+CCWA: <number>,<type>,<class>[,<alpha>]	like verbose	Unsolicited	
+CLIP: <number>,<type>[,<subaddr>,<satype>[,<alpha>]]	like verbose	Unsolicited	
+CME ERROR: <err>	like verbose	Final	
+CMS ERROR: <err>	like verbose	Final or unsolicited	
+CMTI	like verbose	Unsolicited	
+CBM	like verbose	Unsolicited	
+CDS	like verbose	Unsolicited	
+COLP: <number>,<type>[,<subaddr>,<satype>[,<alpha>]]	like verbose	Intermediate	
+CR: <type>	like verbose	Intermediate	
+CREG: <stat>[,<lac>,<ci>]	like verbose	Unsolicited	
+CRING: <type>	like verbose	Unsolicited	
+CSSI: <code1>[,<index>]	like verbose	Intermediate	
+CSSU: <code2>[,<index>[,<number>,<type>[,<subaddr>,<satype>]]]	like verbose	Unsolicited	
+CUSD: <m>[,<str>,<dcs>]	like verbose	Unsolicited	
BUSY	6	Final	
CONNECT	1	Intermediate	connection has been established
CONNECT <text>	manufacturer specific	Intermediate	like CONNECT but manufacturer specific <text> gives additional information (e.g. connection data rate)
ERROR	4	Final	command not accepted
NO ANSWER	7	Final	connection completion timeout
NO CARRIER	3	Final	connection terminated
NO DIALTONE	5	Final	no dial tone detected
OK	0	Final	acknowledges execution of a command line
RING	2	Unsolicited	incoming call signal from network

23.2. Error Codes

23.2.1. CME Error Codes

Code of <err>	Meaning
0	Phone failure
1	No connection to phone
2	Phone-adaptor link reserved
3	Operation not allowed; invalid number of parameters
4	Operation not supported; parameter is out of range
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	Incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	Memory full
21	Invalid index
22	Not found
23	Memory failure
24	Text string too long
25	Invalid characters in text string
26	Dial string too long
27	Invalid characters in dial string
30	No network service
31	Network timeout
32	Network not allowed - emergency call only
40	Network personalization PIN required
41	Network personalization PUK required
42	Network subset personalization PIN required
43	Network subset personalization PUK required
44	Service provider personalization PIN required
45	Service provider personalization PUK required
46	Corporate personalization PIN required
47	Corporate personalization PUK required
50	Incorrect Parameters
99	Resource limitation

Code of <err>	Meaning
100	Unknown
107	GPRS services not allowed
111	PLMN not allowed
112	Location area not allowed
113	Roaming not allowed in this location area
132	Service option not supported
133	Requested service option not subscribed
134	Service option temporarily out of order
148	Unspecified GPRS error
149	PDP authentication failure
150	Invalid mobile class
545	CMUX already open
902	No more sockets available; the maximum number has been reached
903	Memory problem
904	DNS error
905	TCP disconnection by the server
906	TCP/UDP connection error
907	Generic error
908	Fail to accept client request's
909	Data send by KTCPSND/KUDPSND are incoherent
910	Bad session ID
911	Session is already running
912	No more sessions can be used (maximum session is 32 for HL85xxx)
913	Socket connection timer timeout
914	Control socket connection timer timeout
915	A parameter is not expected
916	A parameter has an invalid range of values
917	A parameter is missing
918	Feature is not supported
919	Feature is not available
920	Protocol is not supported
921	Error due to invalid state of bearer connection
922	Error due to invalid state of session
923	Error due to invalid state of terminal port data mode
924	Error due to session busy, retry later
925	Failed to decode HTTP header's name, missing ':'
926	Failed to decode HTTP header's value, missing 'cr/lf'
927	HTTP header's name is an empty string
928	HTTP header's value is an empty string
929	Format of input data is invalid
930	Content of input data is invalid or not supported
931	The length of a parameter is invalid
932	The format of a parameter is invalid

23.2.2. CMS Error Codes

Code number in <err>	Meaning
1	Unassigned (unallocated) number
8	Operator determined barring
10	Call barred
21	Short message transfer rejected
27	Destination out of service
28	Unidentified subscriber
29	Facility rejected
30	Unknown subscriber
38	Network out of order
41	Temporary failure
42	Congestion
47	Resources unavailable, unspecified
50	Requested facility not subscribed
69	Requested facility not implemented
81	Invalid short message transfer reference value
95	Invalid message, unspecified
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message not compatible with short message protocol state
99	Information element non-existent or not implemented
111	Protocol error, unspecified
127	Interworking, unspecified
128	Telematic interworking not supported
129	Short message Type 0 not supported
130	Cannot replace short message
143	Unspecified TP-PID error
144	Data coding scheme (alphabet) not supported
145	Message class not supported
159	Unspecified TP-DCS error
160	Command cannot be executed
161	Command unsupported
175	Unspecified TP-Command error
176	TPDU not supported
192	SC busy
193	No SC subscription
194	SC system failure
195	Invalid SME address
196	Destination SME barred
197	SM Rejected-Duplicate SM
198	TP-VPF not supported
199	TP-VP not supported

Code number in <err>	Meaning
208	D0 SIM SMS storage full
209	No SMS storage capability in SIM
210	Error in MS
211	Memory Capacity Exceeded
212	SIM Application Toolkit Busy
213	SIM data download error
255	Unspecified error cause
300	ME failure
301	SMS service of ME reserved
302	Operation not allowed
303	Operation not supported
304	Invalid PDU mode parameter
305	Invalid text mode parameter
310	SIM not inserted
311	SIM PIN required
312	PH-SIM PIN required
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	SIM PUK2 required
320	Memory failure
321	Invalid memory index
322	Memory full
330	SMSC address unknown
331	no network service
332	Network timeout
340	NO +CNMA ACK EXPECTED
500	Unknown error

23.2.3. GPRS Error Codes

Code number in <err>	Meaning
Errors related to a failure to perform an Attach	
103	Illegal MS (#3)
106	Illegal ME (#6)
107	GPRS services not allowed (#7)
111	PLMN not allowed (#11)
112	Location area not allowed (#12)
113	Roaming not allowed in this location area (#13)

Code number in <err>	Meaning
Errors related to a failure to activate a Context	
132	service option not supported (#32)
133	requested service option not subscribed (#33)
134	service option temporarily out of order (#34)
Other GPRS Errors	
149	PDP authentication failure
148	unspecified GPRS error
150	invalid mobile class

Values in parentheses are TS 24.008 cause codes.

Other values in the range 101 - 150 are reserved for use by GPRS.

23.2.4. FTP Reply Codes

FTP Reply Code	Meaning
110	Restart marker reply
120	Service ready in nnn minutes
125	Data connection already open: transfer starting
150	File status okay; about to open data connection
200	Command okay
202	Command not implemented, superfluous at this site
211	System status or system help reply
212	Directory status
213	File status
214	Help message
215	NAME system type
220	Service ready for new user
221	Service closing control connection. Logged out if appropriate. Unassigned (unallocated) number
225	Data connection open; no transfer in progress
226	Closing data connection. Requested file action successful (for example, file transfer or file abort)
227	Entering Passive Mode (<comma-separated IP address>,<comma-separated port>)
22	User logged in, proceed
250	Requested file action okay, completed
257	"PATHNAME" created
331	User name okay, need password
332	Need account for login
350	Requested file action pending further information
421	Service not available, closing control connection. This may be a reply to any command if the service knows it must shut down
425	Can't open data connection
426	Connection closed; transfer aborted

FTP Reply Code	Meaning
450	Requested file action not taken. File unavailable (e.g., file busy)
451	Requested action aborted: local error in processing
452	Requested action not taken. Insufficient storage space in system
500	Syntax error, command unrecognized. This may include errors such as command line too long
501	Syntax error in parameters or arguments
502	Command not implemented
503	Bad sequence of commands
504	Command not implemented for that parameter
530	Not logged in
532	Need account for storing files
550	Requested action not taken. File unavailable (e.g., file not found, no access)
551	Requested action aborted: page type unknown
552	Requested file action aborted. Exceeded storage allocation (for current directory or dataset)
553	Requested action not taken. File name not allowed

23.2.5. AVMS Error Codes

Code num	Meaning
3	Parameter is out of range; Device Services is not in a good state
24	Parameters <APN>, <User> or <Pwd> are too long
650	General error
651	Communication error
652	Session in progress
654	AVMS services are in DEACTIVATED state (see +WDSG)
655	AVMS services are in PROHIBITED state (see +WDSG)
656	AVMS services are in TO BE PROVISIONED state (see +WDSG)

23.2.6. GNSS Error Codes

23.2.6.1. General Errors

Error Code	Error Name	Description
-1	GPS_ERR_BAD_STATE	The function has been called in an unauthorized application state
-2	GPS_ERR_STATE_ALREADY	The requested action has been already performed and the target application state is currently activated.
-3	GPS_ERR_INVALID_PARAMETER	Invalid input parameter

Error Code	Error Name	Description
-4	GPS_ERR_NOT_AVAILABLE	This feature or configuration is not available for software and/or hardware version
-5	GPS_ERR_STATE_TRANSITION	A state transition is in progress
-10	GPS_ERR_PORTING_LAYER_INIT	The initialization of the porting layer failed (Internal error)
-11	GPS_ERR_INIT	Application initialization error
-12	GPS_ERR_IO_INIT	IO initialization error
-13	GPS_ERR_BUS_INIT	Bus initialization error
-14	GPS_ERR_SCHED_INIT	Scheduler initialization error
-15	GPS_ERR_CORE_INIT	Application core software initialization error
-16	GPS_ERR_NV_MEMORY_INIT	Non-Volatile memory initialization error
-20	GPS_ERR_SCHED_TASK	Application task schedule error
-21	GPS_ERR_BUS	Bus error
-22	GPS_ERR_IO_MNGT	IO management error
-23	GPS_ERR_CORE_LIB	Application core software error
-24	GPS_ERR_NV_DATA_ACCESS	Non-Volatile store media (Embedded Module FLASH memory) access error for the GPS Non-Volatile data
-25	GPS_ERR_INTERNAL	Internal error
-26	GPS_ERR_SERVICE	The asked service is not performed
-27	GPS_ERR_TIMEOUT	Timeout error
-30	GPS_ERR_GPS_POS_NOT_FIXED	The current run is not fixed
-40	GPS_ERR_ABORT_INTERNAL	Internal abort
-41	GPS_ERR_ABORT_NMEA	NMEA update rate Watchdo
-42	GPS_ERR_ABORT_RESET	Reset Watchdog
-60	GPS_AT_ERR_INTERNAL	Application internal error
-61	GPS_AT_ERR_INVALID_PARAMETER	Application invalid input parameter
-62	GPS_AT_ERR_FLASH_DATA_ACCESS	Application Flash access error
-63	GPS_AT_ERR_PORT	Application port configuration error
-64	GPS_AT_ERR_APPLI_LED	Application Led management error
-65	GPS_AT_ERR_SCHED_TASK	Application task schedule error

23.2.6.2. Aiding Errors

Error Code	Error name	Description
0	GPS_AIDING_OK	No error has been detected
-1	GPS_AIDING_AEE_ERROR	AEE error has been detected
-10	GPS_AIDING_DEE_SOCKET_ERROR	Error from communication socket
-11	GPS_AIDING_DEE_WRITE_ERROR	Write error from DEE downloader
-12	GPS_AIDING_DEE_READ_ERROR	Read error from DEE downloader
-13	GPS_AIDING_DEE_SERVER_ERROR	DEE server error
-14	GPS_AIDING_DEE_FILE_ERROR	DEE file format error
-15	GPS_AIDING_DEE_TIMEOUT_ERROR	DEE timeout error

Error Code	Error name	Description
-16	GPS_AIDING_DEE_NACK_ERROR	The update of DEE file is rejected by the Location Library
-17	GPS_AIDING_DEE_ACK_TIMEOUT_ERROR	The DEE file acknowledgment is not received
-18	GPS_AIDING_DEE_INTERNAL_ERROR	DEE internal error has been detected
-19	GPS_AIDING_DEE_ONGOING_ERROR	DEE service already ongoing (retry)
-20	GPS_AIDING_DEE_NOT_STARTED_ERROR	DEE service not yet started (retry)

23.2.6.3. SUPL Errors

Error Code	Error name	Description
-1	GPS_SUPL_PDP_ACTIVATION_ERROR	SUPL PDP activation failed
-2	GPS_SUPL_DNS_RESOLVE_ERROR	Fail to resolve the SUPL domain name
-3	GPS_SUPL_TCP_CONNECTION_ERROR	SUPL TCP connection error

23.2.7. CEER Error Codes

Table 1. Generic CEER Error Codes

<cause>	<description>
0	No cause information available
1	Unassigned (unallocated) number
3	No route destination
6	Channel unacceptable
8	Operator determined barring
16	Normal call clearing
17	User busy
18	No user responding
19	User alerting, no answer
21	Call rejected
22	Number changed
26	Non selected user clearing
27	Destination out of order
28	Invalid number format (incomplete number)
29	Facility rejected
30	Response to STATUS ENQUIRY
31	Normal, unspecified
34	No circuit / channel available
38	Network out of order
41	Temporary failure
42	Switching equipment congestion
43	Access information discarded

<cause>	<description>
44	Requested circuit / channel not available
47	Resources unavailable, unspecified
49	Quality of service unavailable
50	Requested facility not subscribed
55	Incoming calls barred with in the CUG
57	Bearer capability not authorized
58	Bearer capability not presently available
63	Service or option not available, unspecified
65	Bearer service not implemented
68	ACM equal to or greater than AC Mmax
69	Requested facility not implemented
70	Only restricted digital information bearer capability is available
79	Service or option not implemented, unspecified
81	Invalid transaction identifier value
87	User not member of CUG
88	Incompatible destination
91	Invalid transit network selection
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message type not compatible with protocol state
99	Information element non-existent or not implemented
100	Conditional IE error
101	Message not compatible with protocol state
102	Recovery on timer expiry
103	Illegal MS
106	Illegal ME
107	GPRS service not allowed
111	Protocol error, unspecified
112	Location area not allowed
113	Roaming not allowed in this location area
124	MBMS bearer capabilities insufficient for the service
125	LLC or SNDSCP failure
126	Insufficient resources
127	Missing or unknown APN
128	Unknown PDP address or PDP type
129	User authentication failed
130	Activation rejected by GGSN
131	Activation reject,unspecified
132	Service not supported
133	Requested service option not subscribed
134	Service option temporarily out of order
135	NSAPI already used
136	Regular PDP context deactivation

<cause>	<description>
137	QoS not accepted
138	Network failure
139	Reactivation requested
140	Feature not supported
141	Semantic error in the TFT operation
142	Syntactical error in the TFT operation
143	Unknown PDP context
144	Semantic errors in packet filter(s)
145	Syntactical errors in packet filter(s)
146	PDP context without TFT already activated
148	Unspecified GPRS error
149	PDP authentication error
212	APN restriction
256	Internal unspecified
257	Out of memory
258	Invalid parameters
259	Data call active
260	Speech call active
262	Missing ACM information
263	Temporary forbidden
264	Called party is blacklisted
265	Blacklist is full
266	No service
267	Limited service
268	Client conflict
269	Dual Service call active
271	Unknown SIM error
274	Active client is gone
277	SIM status failure
278	Rejected by call control
279	FDN failed
280	BDN failed
283	CCBS possible
284	Invalid alternate service line
285	LND overview
287	MM network failure unspecified
288	MM no service
289	MM access class barred
290	MM RR no resource
291	MM ME busy
292	MM unspecified
301	MMI not registered
303	Rejected by user
304	Rejected due to time out

<cause>	<description>
306	Disconnected due to SIM TK call setup
307	Pending SIM TK call setup
310	SIM reset
340	MM sapi3 release
341	MM lower layer failure
342	MM authentication failure
343	MM PS reject
344	MM service rejected
345	MM abort by network
346	MM timeout
347	MM detach
348	MM RR connection release
349	MM not registered
350	MM reestablishment failure
351	Failure due to handover
352	Link establishment failure
353	Random access failure
354	Radio link aborted
355	Lower layer failure in Layer 1
356	Immediate assignment reject
357	Failure due to paging
358	Abnormal release unspecified
359	Abnormal release channel unacceptable
360	Abnormal release timer expired
361	Abnormal release no act on radio path
362	Preemptive release
363	UTRAN configuration unknown
364	Handover impossible
365	Channel mode unacceptable
366	Frequency not implemented
367	Originator leaving call group area
368	Lower layer failure from network
369	Call already cleared
370	Semantically incorrect message
371	Invalid mandatory info
372	Message type non existing
373	Message type incompatible in state
374	Conditional information element error
375	No cell allocation available
376	Protocol error unspecified
377	Normal event
378	Unspecified
379	Preemptive release
380	Congestion

<cause>	<description>
381	RE establishment reject
382	Directed sig conn establishment
383	User inactivity
384	Lower layer failure downlink
385	Lower layer failure uplink
386	Cell barred due to authentication failure
387	Signalling connection release
388	CS connection release triggered by MM
389	RRC connection establishment failure
390	RRC connection establishment re-ject with redirection
391	Resource conflict
392	Layer 2 sequence error
393	Layer 2 T200 exp N200 plus 1 times
394	Layer 2 unsolicited DM resp MFES
395	Layer 2 contention resolution
396	Layer 2 normal cause
397	RR connection release due to BAND change (2G)
400	MM RR connection error while release
500	User disconnected
510	Remote user / NW disconnected for call status rather than call proceeding
511	Remote user / NW disconnected for call status is call proceeding
512	Request rejected, BCM violation

Aside from the error codes listed above, the HL85xxx also supports additional error codes as listed in the table below.

Table 2. CEER Error Codes Specific to the HL85xxx

<cause>	<description>
152	Single address bearers only allowed
153	ESM information not received
154	PDN connection does not exist
155	Multiple PDN connections for a given APN not allowed
156	Collision with network initiated request
181	Invalid PTI value
187	Last PDN disconnection not allowed
188	PDN type IPv4 only allowed
189	PDN type IPv6 only allowed

23.2.8. Error Case Examples

Note: For HL85xxx only.

Internet AT commands return specific error codes if parameter verification fails. The following table enumerates some examples to demonstrate specific error cases.

Table 3. Error Case Examples

Error Codes	Corresponding Examples
+CME ERROR: 907 Generic error/Unsupported read command	AT+KHTTPHEAD? AT+KHTTPGET? AT+KHTTPREAD? AT+KHTTPPOST? AT+KHTTPCLOSE? AT+KHTTPSGET? AT+KHTTPSHHEAD? AT+KHTTPSPPOST? AT+KHTTPSPCLOSE? AT+KFTPCNX? AT+KFTPCLOSE? AT+KFTPCFGDEL? AT+KFTPCRV? AT+KFTPSND? AT+KFTPDEL? AT+KTCPSND? AT+KTCPCRV? AT+KUDPDEL? AT+KUDPCLOSE? AT+KUDPCRV? AT+KUDPSND? AT+KTCPCNX? AT+KTCPCLOSE? AT+KTCPDEF? AT+KTCPDEL? AT+KTCPCLOSE?
+CME ERROR: 912 No more sessions can be used	Create a UDP client session repeatedly until 32 sessions are created: AT+KUDPCFG=1,0,1033,"10.10.10.10" Then try to create a TCP server session (33rd session) AT+KTCPCFG=1,1,,80
+CME ERROR: 915 A parameter is not expected	AT+KHTTPHEADER=1,0 AT+KHTTPHEADER=1,"file"
	AT+KHTTPPOST=1,0,"/" AT+KHTTPPOST=1,"file","/"
	AT+KHTTPSPPOST=1,0,"/" AT+KHTTPSPPOST=1,1,"/" AT+KHTTPSPPOST=1,"file","/"
	AT+KHTTPSHHEADER=1,0 AT+KHTTPSHHEADER=1,1 AT+KHTTPSHHEADER=1,"file"
	AT+KFTPCRV=1,0,,"/sample.txt" AT+KFTPCRV=1,1,,"/sample.txt" AT+KFTPCRV=1,"file",,"/sample.txt"

Error Codes	Corresponding Examples
+CME ERROR: 916 A parameter has an invalid range of values	AT+KHTTPGET=0,"/"
	AT+KHTTPGET=1,"/",2
	AT+KHTTPHEADER=0
	AT+KHTTPHEAD=0,"/"
	AT+KHTTPCLOSE=0
	AT+KHTTPCLOSE=1,-1
	AT+KHTTPPOST=0,"/"
	AT+KHTTPPOST=1,"/",2
	AT+KHTTPCFG=0,"www.example.com"
	AT+KHTTPCFG=1,"www.example.com",65536
	AT+KHTTPCFG=1,"www.example.com",,,,,,2
	AT+KHTTPSCFG=0,"www.kernel.org"
	AT+KHTTPSCFG=-1,"www.kernel.org"
	AT+KHTTPSCFG=1,"www.kernel.org",65536
	AT+KHTTPSCFG=1,"www.kernel.org",-1
	AT+KHTTPSCFG=1,"www.kernel.org",,2
	AT+KHTTPSCFG=1,"www.kernel.org",,,8
	AT+KHTTPSCFG=1,"www.kernel.org",,-1
	AT+KHTTPSCFG=1,"www.kernel.org",,,,4
	AT+KHTTPSCFG=1,"www.kernel.org",,,,,,2
	AT+KHTTPSCFG=1,"www.kernel.org",,,,,,-1
	AT+KHTTPSGET=0,"/"
	AT+KHTTPSGET=-1,"/"
	AT+KHTTPSGET=1,"/",2
	AT+KHTTPSGET=1,"/",-1
	AT+KHTTPSHHEAD=0,"/"
	AT+KHTTPSHHEAD=-1,"/"
	AT+KHTTPSPPOST=0,"/"
	AT+KHTTPSPPOST=-1,"/"
	AT+KHTTPSPPOST=1,"/",2
	AT+KHTTPSPPOST=1,"/",-1
	AT+KHTTPSHHEADER=0
	AT+KHTTPSHHEADER=-1
	AT+KHTTPSCLOSE=0
	AT+KHTTPSCLOSE=-1
	AT+KHTTPSCLOSE=1,2
	AT+KHTTPSCLOSE=1,-1
	AT+KFTPCFG=0,"ftp.kernel.org"
	AT+KFTPCFG=1,"ftp.kernel.org",,,65536
	AT+KFTPCFG=1,"ftp.kernel.org",,-1
	AT+KFTPCFG=1,"ftp.kernel.org",,,,2
	AT+KFTPCFG=1,"ftp.kernel.org",,-1
	AT+KFTPCFG=1,"ftp.kernel.org",,,,2
	AT+KFTPCFG=1,"ftp.kernel.org",,,,,10
	AT+KFTPCFG=1,"ftp.kernel.org",,,,,,-1
	AT+KFTPCNX=0
	AT+KFTPCNX=99
	AT+KFTPCNX=-1
	AT+KFTPCLOSE=0
	AT+KFTPCLOSE=1,2
	AT+KFTPCLOSE=1,-1
	AT+KFTPCFGDEL=0
	AT+KFTPCFGDEL=-1

Error Codes	Corresponding Examples
+CME ERROR: 916 A parameter has an invalid range of values	AT+KFTPRCV=0,,,"/sample.txt" AT+KFTPRCV=-1,,,"/sample.txt" AT+KFTPRCV=1,,,"/sample.txt",2 AT+KFTPRCV=1,,,"/sample.txt",-1 AT+KFTPSND=0,,,"/sample.txt" AT+KFTPSND=-1,,,"/sample.txt" AT+KFTPSND=1,,,"/sample.txt",2 AT+KFTPSND=1,,,"/sample.txt",-1 AT+KFTPDEL=0,,,"/sample.txt" AT+KFTPDEL=-1,,,"/sample.txt" AT+KFTPDEL=1,,,"/sample.txt",2 AT+KFTPDEL=1,,,"/sample.txt",-1 AT+KTCPSND=1,0 AT+KTCPRCV=1,0 AT+KUDPSND=1,"116.66.221.43",5043,0 AT+KUDPRCV=1,0
+CME ERROR: 917 A parameter is missing	AT+KHTTPGET=,"/" AT+KHTTPGET=1, AT+KHTTPGET=, AT+KHTTPHEADER=, AT+KHTTPHEAD=,"/" AT+KHTTPHEAD=1, AT+KHTTPHEAD=, AT+KHTTPCLOSE=, AT+KHTTPPOST=,"/" AT+KHTTPPOST=1,, AT+KHTTPCFG=1, AT+KHTTPCFG=, AT+KHTTPSCFG=1, AT+KHTTPSCFG=, AT+KHTTPSGET=,"/" AT+KHTTPSGET=1, AT+KHTTPSGET=, AT+KHTTPSHHEAD=,"/" AT+KHTTPSHHEAD=1, AT+KHTTPSHHEAD=, AT+KHTTPSPPOST=,"/" AT+KHTTPSPPOST=1,, AT+KHTTPSHHEADER=, AT+KHTTPSCLOSE=, AT+KFTPCFG=1, AT+KFTPCFG= AT+KFTPCLOSE=, AT+KFTPRCV=1,,, AT+KFTPSND=1,,, AT+KFTPDEL=1,, AT+KFTPDEL=,,
+CME ERROR: 918 Feature is not supported	AT+KHTTPSCFG=1,"www.kernel.org",,3
+CME ERROR: 919 Feature is not available	AT+KTCPACKINFO=1

Error Codes	Corresponding Examples
+CME ERROR: 932 Format of a parameter is invalid	AT+KHTTPGET=a,"/"
	AT+KHTTPHEADER=a
	AT+KHTTPHEAD=a,"/"
	AT+KHTTPCLOSE=a
	AT+KHTTPCLOSE=1,?
	AT+KHTTTPPOST=a,"/"
	AT+KHTTTPPOST=1,"/",?
	AT+KHTTPCFG=a,"www.example.com"
	AT+KHTTPCFG=1,"www.example.com",,?
	AT+KHTTPCFG=1,"www.example.com",a
	AT+KHTTPCFG=1,"www.example.com",,,,?
	AT+KHTTPSCFG=a,"www.kernel.org"
	AT+KHTTPSCFG=1,"www.kernel.org",a
	AT+KHTTPSCFG=1,"www.kernel.org",,?
	AT+KHTTPSCFG=1,"www.kernel.org",,,,?
	AT+KHTTSPGET=a,"/"
	AT+KHTTSPGET=1,"/",?
	AT+KHTTSPHEAD=a,"/"
	AT+KHTTSPPOST=a,"/"
	AT+KHTTSPPOST=1,"/",?
	AT+KHTTSPHEADER=a
	AT+KHTTSPCLOSE=a
	AT+KHTTSPCLOSE=1,?
	AT+KFTPCFG=a,"ftp.kernel.org"
	AT+KFTPCFG=1,"ftp.kernel.org",,,,?
	AT+KFTPCFG=1,"ftp.kernel.org",,,,,?
	AT+KFTPCNX=a
	AT+KFTPCNX=#
	AT+KFTPCLOSE=b
	AT+KFTPCLOSE=1,?
	AT+KFTPCFGDEL=C
	AT+KFTPCFGDEL=#
	AT+KFTPRCV=D,,,"/sample.txt"
	AT+KFTPRCV=#,,,"/sample.txt"
	AT+KFTPRCV=1,,,"/sample.txt",?
	AT+KFTPSND=E,,,"/sample.txt"
	AT+KFTPSND=#,,,"/sample.txt"
	AT+KFTPSND=1,,,"/sample.txt",?
	AT+KFTPSND=1,,,"/sample.txt",,?
	AT+KFTPDEL=f,"/sample.txt"
	AT+KFTPDEL=#,"/sample.txt"
	AT+KFTPDEL=1,"/sample.txt",?
	AT+KCGPADDR=a

23.3. Commands without Pin Code Requirement

Most AT Commands are rejected (i.e. an error is returned to the DTE) if the valid PIN Code has not been entered.

The **main** commands which can be sent without the PIN code include:

- ATD (emergency calls)
- AT+CPIN
- ATI
- AT+CGMI, AT+GMI
- AT+CGMM, AT+GMM
- AT+CGMR, AT+GMR
- AT+CGSN, AT+GSN
- AT+GCAP
- AT+CPAS
- AT+CIND
- AT+CMEE
- AT+KSREP
- AT+IPR
- ATE, ATV, ATS, ATZ
- AT&F, AT&K, AT&D, AT&C
- AT+CBST,
- AT+CLVL

This list may be modified in case of special needs from the customer (contact Sierra Wireless directly to treat this kind of request)

Note: *Some commands require the PIN2 code.*

23.4. GSM 27.010 Multiplexing Protocol

Main Options	BASIC	YES
	ADVANCED	YES
	advanced WITH ERROR RECOVERY	NO
Frames	SABM	YES
	UA	YES
	DM	YES
	DISC	YES
	I (ERM)	NO
	RR (ERM)	NO
	RNR (ERM)	NO
	REJ (ERM)	NO
	UI	YES
	UIH	YES
Multiplexer Controls	DLC parameters negotiation (PN) (optional)	YES
	Power Saving control (PSC)	YES
	Multiplexer Close Down (CLD)	YES
	Test Command (Test)	YES
	Flow control On Command (Fcon)	YES
	Flow control Off Command (Fcoff)	YES
	Modem Status Command (MSC)	YES
	Non Supported Command response (NSC)	YES
	Remote Port Negotiation (RPN). (optional)	NO
	Remote Line Status command (RLS).(optional)	YES
	Service Negotiation Command (SNC)	NO
Convergence Layers	Type 1 - Unstructured Octet Stream	YES
	Type 2 - Unstructured Octet Stream with flow control, break signal handling and transmission of v24 signal states	YES
	Type 3 – Uninterruptible Framed Data	NO
	Type 4 - Interruptible Framed Data	NO
CMUX Parameters	Link speed	9600, 19200, 38400, 57600, 115200
	Maximum frame size	1540
	Acknowledgment timer	100
	Maximum number of retransmissions	100
	Response timer for control channel	30
	Wake up response timer	10 seconds
Others	Wake up procedure (see [RE2] sub clause 5.4.7)	YES
	Priority management	YES
	DLCI number limitation	8

23.5. Command Timeout and Other Information

The following table provides additional information for commands supported by the HL6528x and HL85xxx modules.

Cells in the following table are color-coded to indicate the **recommended** timeout for AT commands; note that time is subject to change depending on SIM cards and networks.

	2 seconds
	5 seconds
	30 seconds
	60 seconds
	120 seconds
	no advised timeout: Data size dependent

Aside from timeout recommendations, the following table also provides information on whether a command can be supported with or without a SIM card, as well as if a command can be stored in non-volatile memory.

Legend:

- Command can be supported even without SIM card
- ⦿ Command cannot be supported without SIM card
- ↓ Command can be written in non-volatile memory

Chapter	AT Commands	HL6528x	HL85xxx
V25TER AT Commands			
2.1	A/ Command: Repeat previous command line	●	
2.2	+++ Command: Switch from data mode to command mode	⦿	
2.3	O Command: Switch from command mode to data mode	⦿	
2.4	E Command: Enable command echo	● ↓	
2.5	Q Command: Set result code presentation mode	● ↓	
2.6	S0 Command: Set number of rings before automatically answering the call	●	
2.7	S2 Command: Set character for the escape sequence (data to command mode)	●	
2.8	S3 Command: Command line termination character	●	
2.9	S4 Command: Set response formatting character	●	
2.10	S5 Command: Write command line editing character	●	
2.11	S7 Command: Set number of seconds to wait for connection completion	●	
2.12	V Command: TA response format	● ↓	
2.13	X Command: Result code selection and call progress monitoring control	●	
2.14	&C Command: Set circuit Data Carrier Detect (DCD) function mode	●	
2.15	&D Command: Set circuit Data Terminal Ready (DTR) function mode	●	
2.16	&F Command: Restore manufactory configuration	●	
2.17	&W Command: Save stored profile	● ↓	
2.18	&V Command: Display current configuration	●	
2.19	+IPR Command: Set fixed local rate	● ↓	

Chapter	AT Commands	HL6528x	HL85xxx
2.20	B Command: Data rate selection	●	
2.21	\N Command: Data transmission mode	●	
2.22	&K Command: Flow control option	●	
2.23	L Command: Monitor speaker loudness	●	
2.24	M Command: Monitor speaker mode	●	
2.25	S6 Command: Pause before blind dialing	●	
2.26	S8 Command: Comma dial modifier time	●	
2.27	S10 Command: Automatic disconnect delay	●	
2.28	N Command: Negotiate handshake option	●	
2.29	S1 Command: Ring count	●	
2.30	S11 Command: DTMF dialing speed	●	
2.31	W Command: Extended result code	●	
2.32	&S Command: DSR Option	●	
2.33	&R Command: RTS/CTS option	●	
2.34	+ICF Command: DTE-DCE character framing		
General AT Commands			
3.1	I Command: Request Identification Information	●	
3.2	Z Command: Reset and restore user configuration	●	
3.3	+CGMI Command: Request manufacturer identification	●	
3.4	+CGMM Command: Request model identification	●	
3.5	+CGMR Command: Request revision identification	●	
3.6	+CGSN Command: Request product serial number identification (IMEI)	● ↓	
3.7	+KGSN Command: Request product serial number identification and Software Version	●	●
3.8	+CSCS Command: Set TE character set	⊙ ↓	
3.9	+CIMI Command: Request international subscriber identity	⊙ ↓	
3.10	+GCAP Command: Request complete TA capability list	⊙	
3.11	+GMI Command: Request manufacturer identification	●	
3.12	+GMM Command: Request model identification	●	
3.13	+GMR Command: Request revision identification	●	
3.14	+GSN Command: Request product serial number identification (IMEI)	●	●
3.15	+CMUX Command: Multiplexing mode	●	
3.16	#CLS Command: Service Class	⊙	
3.17	*PSLOCUP Command: Generates a location update of MS	⊙	
3.18	*PSCSCN Command: Call State Change Notification	● ↓	
3.19	*PSFSNT Command: Field Strength Notification with Threshold	⊙ ↓	
3.20	*PSSSURC Command: Enable additional result code	●	
3.21	*PSALS Command: Alternate Line Service	⊙ ↓	
3.22	*PSDCIN Command: Diverted Call Indicator Notification	⊙ ↓	
3.23	*PSMBNB Command: Mailbox Numbers	⊙	
3.24	*PSCSP Command: Customer Service Profile	⊙	
3.25	*PSSEAV Command: Service Availability	● ↓	

Chapter	AT Commands	HL6528x	HL85xxx
3.26	*PSCHRU Command: Channel Registration URC	⊙	
3.27	*PSCSSC Command: Call Successful setup control	● ↓	
3.28	*PSSMPH Command: SIM Phase	⊙	
3.29	*PSCIPH Command: Ciphering notification	⊙ ↓	
3.30	+KCIPHER Command: Set Ciphering and Integrity		⊙
3.31	+KODIS Command: Access ODIS Information		
3.32	+WIMEI Command: IMEI Write and Read		
3.33	+WCARRIER Command: Show Carrier Name		
3.34	+KGEA Command: Select Encryption Algorithm		
Call Control Commands			
4.1	A Command: Answer a Call	⊙ ↓	
4.2	H Command: Disconnect Existing Connection	●	
4.3	D Command: Mobile Originated Call to Dial a Number	● ↓	
4.4	D> Command: Direct Dialing from Phonebook	⊙	
4.5	+CHUP Command: Hang Up Call	⊙	
4.6	+CRC Command: Set Cellular Result Codes for Incoming Call Indication	● ↓	
4.7	+CSTA Command: Select Type of Address	⊙ ↓	
4.8	+CMOD Command: Call Mode	● ↓	
4.9	+CEER Command: Extended Error Report	●	
4.10	+CVHU Command: Voice Hang Up Control	⊙ ↓	
4.11	+KFILTER Command: Make a Filter on Incoming Call	⊙ ↓	
4.12	+CSNS Command: Single Numbering Scheme	⊙ ↓	
4.13	+KATH Command: Choose ATH Mode	⊙ ↓	
4.14	+XCALLSTAT Command: Set Reporting Call Status		
Mobile Equipment Control and Status Commands			
5.1	+CACM Command: Accumulated Call Meter (ACM) Reset or Query	⊙	
5.2	+CAMM Command: Accumulated Call Meter Maximum (ACM max)	⊙	
5.3	+CCWE Command: Call Meter Maximum Event	⊙	
5.4	+CALA Command: Set Alarm Time	● ↓	●
5.5	+CALD Command: Delete Alarm	● ↓	●
5.6	+CCLK Command: Real Time Clock	●	
5.7	*PSCPOF Command: Power Off	●	
5.8	+CPOF Command: Power Off		
5.9	+CIND Command: Indicator Control	●	
5.10	+CLAC Command: List all Available AT Commands	⊙	
5.11	+CMEC Command: Mobile Equipment Control Mode	●	
5.12	+CFUN Command: Set Phone Functionality	● ↓	
5.13	+CMER Command: Mobile Equipment Event Reporting	● ↓	●
5.14	+CMEE Command: Report Mobile Termination Error	● ↓	
5.15	+CMUT Command: Mute Control	⊙	
5.16	+CCID Command: Request SIM Card Identification		

Chapter	AT Commands	HL6528x	HL85xxx
5.17	+CPIN Command: Enter Pin	⊙	
5.18	+CPIN2 Command: Send Password to MT		
5.19	*PSPRAS Command: Pin Remaining Attempt Status	⊙	
5.20	+CPUC Command: Price per Unit and Currency Table	⊙	
5.21	+CPWC Command: Power Class	⊙ ↓	
5.22	*PSRDBS Command: Change Frequency Band Class	● ↓	
5.23	+CPAS Command: Phone Activity Status	●	
5.24	+CSQ Command: Signal Quality	●	
5.25	\$CSQ Command: Signal Quality		
5.26	+KRIC Command: Ring Indicator Control	● ↓	● ↓
5.27	+KSREP Command: Mobile Start-Up Reporting	● ↓	
5.28	+KGPIO Command: Hardware IO Control	● ↓	● ↓
5.29	+KSLEEP Command: Power Management Control	● ↓	● ↓
5.30	+KCELL Command: Cell Environment Information	● ↓	⊙
5.31	+CRMP Command: Ring Melody Playback	●	
5.32	*PSVMWN Command: Voice Message Waiting Notification	● ↓	
5.33	+KPWM Command: PWM Control	● ↓	● ↓
5.34	+KGPIOCFG Command: User GPIO Configuration	● ↓	● ↓
5.35	+KADC Command: Analog Digital Converter	●	●
5.36	+CSIM Command: Generic SIM Access	⊙	
5.37	+CALM Command: Alert Sound Mode	⊙ ↓	
5.38	+CRSL Command: Ringer Sound Level	● ↓	
5.39	+CLAN Command: Set Language	⊙ ↓	
5.40	+CCHO Command: Open Logical Channel		
5.41	+CCHC Command: Close Logical Channel		
5.42	+CGLA Command: Generic UICC Logical Channel Access		
5.43	+CRLA Command: Restricted UICC Logical Channel Access		
5.44	+CUAD Command: UICC Application Discovery		
5.45	+CRSM Command: SIM Restricted Access	⊙	
5.46	+CEAP Command: EAP Authentication		
5.47	+CERP Command: EAP Retrieve Parameters		
5.48	+CSGT Command: Greeting Text		
5.49	+CSVM Command: Set Voice Mail Number	⊙	
5.50	+KGSMAD Command: Antenna Detection	● ↓	
5.51	+KGNSSAD Command: GNSS Antenna Detection		
5.52	+KMCLASS Command: Change GPRS and EGPRS Multislot class	⊙ ↓	⊙ ↓
5.53	+KTEMPMON Command: Temperature Monitor	● ↓	
5.54	+KSIMDET Command: SIM Detection	● ↓	● ↓
5.55	+KSIMSEL Command: SIM Selection	↓	● ↓
5.56	+KSYNC Command: Generation of Application synchronization signal	● ↓	● ↓
5.57	+KBND Command: Current GSM Networks Band Indicator	●	●
5.58	+KNETSCAN Command: Network scan functionality	●	●

Chapter	AT Commands	HL6528x	HL85xxx
5.59	+KCELLSCAN Command: Cell scan functionality	●	
5.60	+KJAMDET Command: Jamming Detection	⊙ ↓	
5.61	+KJAM Command: Jamming Detection	⊙ ↓	⊙ ↓
5.62	+KUART Command: Set number of bits for UART	● ↓	
5.63	+KPLAYSOUND Command: Play Audio File	●	
5.64	+KBCAP Command: Retrieve Bitmap Capabilities	●	
5.65	+KRST Command: Module reset periodically	● ↓	
5.66	+KPLAYAMR Command: Play AMR File	●	
5.67	+KSRAT Command: Set Radio Access Technology		● ↓
5.68	+CTZU Command: Automatic Time Zone Update	● ↓	
5.69	+CTZR Command: Time Zone Reporting	● ↓	
5.70	+KGSMBOOT Command: GSM Stack Boot Mode	● ↓	
5.71	+WMUSBVCC Command: USB VCC Detection Setting		● ↓
5.72	+WEXTCLK Command: External Clocks Setting		● ↓
5.73	+KUSBCOMP Command: Set USB Composition		● ↓
5.74	+XPINCNT Command: Get Remaining SIM PIN Attempts		
5.75	+XCONFIG Command: Configure DLCs (Data Logical Channels)		
5.76	+COREDUMP Command: Configure Core Dump Collection		
5.77	+XSVM Command: Set Voice Mail Number		
5.78	+CPWROFF Command: Switch MS Off		
5.79	*PSTACS Command: Timing advance measurement		
5.80	+KNTP Command: Network Time Protocol	⊙	
5.81	+WESHUTDOWN Command: Emergency Shutdown	⊙ ↓	
5.82	+KRFMUTE Command: Mute 2G/3G TX		
5.83	+OMADMST Command: Configure OMADM Status URC		
Network Service Related Commands			
6.1	+CAOC Command: Advice of Charge Information	⊙	
6.2	+CCFC Command: Call Forwarding Number and Conditions Control	⊙	
6.3	+CCWA Command: Call Waiting	⊙	
6.4	+CHLD Command: Call Hold and Multiparty	⊙	
6.5	+CUSD: Unstructured Supplementary Service Data	⊙ ↓	
6.6	+CLCC Command: List Current Call	⊙	
6.7	+CLCK Command: Facility Lock	⊙	
6.8	+CLIP Command: Calling Line Identification Presentation	⊙ ↓	
6.9	+CLIR Command: Calling Line Identification Restriction	⊙ ↓	
6.10	+CNUM Command: Subscriber Number	⊙	
6.11	+COLP Command: Connected Line Identification Presentation	⊙ ↓	
6.12	+COPN Command: Read Operator Name	⊙	
6.13	+COPS Command: Operator Selection	● ↓	
6.14	+CPOL Command: Preferred PLMN List	⊙	
6.15	+CPWD Command: Change Password	⊙ ↓	
6.16	+CREG Command: Network Registration	● ↓	

Chapter	AT Commands	HL6528x	HL85xxx
6.17	+CSSN Command: Supplementary Service Notification	● ↓	
6.18	+CPLS Command: Selection of Preferred PLMN List	⊙ ↓	
6.19	+CTFR Command: Call Deflection	⊙	
6.20	+KAAT Command: GPRA Automatic Attach		⊙ ↓
6.21	*PSOPNM Command: Operator Name	⊙	
6.22	*PSNTRG Command: Network Registration	⊙ ↓	
6.23	*PSHZNT Command: Home Zone Notification	⊙ ↓	
6.24	*PSUTTZ Command: Universal Time and Time Zone	⊙ ↓	
6.25	*PSHPLMN Command: Home PLMN	⊙	
6.26	*PSGAAT Command: GPRS Automatic Attach	⊙ ↓	
6.27	*PSNWID Command: Network Identity	⊙ ↓	
6.28	+PHYR Command: Physical Randomization	⊙ ↓	
Phone Book Management			
7.1	+CPBF Command: Find Phonebook Entries	⊙ ↓	
7.2	+CPBR Command: Read Current Phonebook Entries	⊙ ↓	
7.3	+CPBS Command: Select Phonebook Memory Storage	⊙ ↓	
7.4	+CPBW Command: Write Phonebook Entries	⊙ ↓	
SMS AT Commands			
8.3	+CMGD Command: Delete SMS Message	⊙	
8.4	+CMGF Command: Select SMS Message Format	● ↓	
8.5	+CMGL Command: List SMS Messages from Preferred Storage	⊙	
8.6	+CMGR Command: Read SMS Message	⊙	
8.7	+CMGS Command: Send SMS Message	⊙	
8.8	+CMGW Command: Write SMS Message to Memory	⊙	
8.9	+CMSS Command: Send SMS Message from Storage	⊙	
8.10	+CNMI Command: New SMS Message Indication	⊙ ↓	
8.11	+CSCB Command: Select Cell Broadcast Message	⊙	
8.12	+CSCA Command: SMS Service Center Address	⊙	
8.13	+CSMP Command: Set SMS Text Mode Parameters	⊙ ↓	
8.14	+CSMS Command: Select Message Service	⊙ ↓	
8.15	+CPMS Command: Preferred Message Storage	⊙ ↓	
8.16	+CSDH Command: Show Text Mode Parameters	⊙ ↓	
8.17	+CSAS Command: Save Settings	⊙ ↓	
8.18	+CRES Command: Restore Settings	⊙ ↓	
8.19	+CMT Notification: Received SMSPP Content	⊙	
8.20	*PSMEMCAP Command: SMS Memory Capacity	⊙ ↓	
Data AT Commands			
9.1	+CBST Command: Select Bearer Service Type	●	
9.2	+CRLP Command: Select Radio Link Protocol Parameter	● ↓	
9.3	+CR Command: Service Reporting Control	● ↓	
9.4	+FMI Command: Manufacturer Identification	●	
9.5	+FMM Command: Model Identification	●	

Chapter	AT Commands	HL6528x	HL85xxx
9.6	+FMR Command: Revision identification	●	
GPRS AT Commands			
10.1	+CGATT Command: PS Attach or Detach	⊙	
10.2	+CGACT Command: PDP Context Activate or Deactivate	⊙	
10.3	+CGANS Command: PDP Context Activation Manual Response		
10.4	+CGCMOD Command: Modify PDP Context		
10.5	+CGTFT Command: Traffic Flow Template		
10.6	+CGCLASS Command: GPRS mobile Station Class		
10.7	+CGDCONT Command: Define PDP Context	⊙ ↓	
10.8	+CDGSCONT Command: Define Secondary PDP Context		
10.9	+CGDATA Command: Enter Data State	↓	
10.10	+CGED Command: GPRS Cell Environment		
10.11	+CGEREP Command: GPRS Event Reporting	⊙ ↓	
10.12	+CGAUTO Command: Automatic Response		
10.13	+CGPADDR Command: Show PDP Address	⊙	
10.14	+CGQMIN Command: Quality of Service Profile (minimum)	⊙	
10.15	+CGEQMIN Command: 3G Quality of Service Profile (minimum)		
10.16	+CGQREQ Command: Request Quality of Service Profile	⊙ ↓	
10.17	+CGEQREQ Command: 3G Request Quality of Service Profile		
10.18	+CGEQNEG Command: 3G Negotiated Quality of Service profile		
10.19	+CGREG Command: GPRS Network Registration Status	● ↓	
10.20	+CGSMS Command: Select Service for MO SMS Messages	⊙	
10.21	*PSGCNT Command: GPRS Counters	⊙	
10.22	+XDNS Command: Dynamic DNS Request		
10.23	+XCEDATA Command: Establish ECM Data Connection		
10.24	+WACCM Command: Set ACCM Value	⊙ ↓	
SIM Application Toolkit AT Commands			
11.2	*PSSTKI Command: SIM ToolKit Interface Configuration	⊙	⊙ ↓
11.3	*PSSTK Command: SIM Toolkit Command	⊙	
11.4	+STKPRO Command: Display List of Supported Proactive Commands		
11.5	+STKTR Command: Enter Response		
11.6	+STKENV Command: Send a SIM APPL TK Envelope Command		
11.7	+STKPROF Command: Terminal Profile Data		
11.8	+STKCC Notification: SIM – APPL – TK Call Control		
11.9	+STKCNF Notification: SIM – APPL – TK Proactive Session Status		
Audio Commands			
12.2	+CLVL Command: Loudspeaker Volume Level	● ↓	
12.3	+VIP Command: Initialize Voice Parameters	⊙ ↓	●
12.3.1	+VTS Command: DTMF and Tone Generation	⊙	
12.5	+VTD Command: Tone Duration	● ↓	
12.6	+VGR Command: Receive Gain Selection	⊙ ↓	

Chapter	AT Commands	HL6528x	HL85xxx
12.7	+VGT Command: Transmit Gain Selection	⊙ ↓	
12.8	+KVGR Command: Receive Gain Selection	⊙ ↓	
12.9	+KVGTT Command: Transmit Gain Selection	⊙ ↓	
12.10	+KECHO Command: Echo Cancellation	⊙ ↓	●
12.11	+KNOISE Command: Noise Cancellation	⊙ ↓	● ↓
12.12	+KST Command: Side Tone	⊙ ↓	● ↓
12.13	+KPC Command: Peak Compressor	⊙ ↓	● ↓
12.14	+KSRAP Command: Save Restore Audio Parameters	⊙ ↓	↓
12.15	+KDSPTX Command: Read TX Audio Parameters	⊙	
12.16	+KDSPRX Command: Read RX Audio Parameters	⊙	
12.17	+KPCMCFG Command: Configure PCM digital audio	● ↓	● ↓
12.18	+KMAP Command: Microphone Analog Parameters		
12.19	+CODECINFO Command: Display Audio Codec Information		● ↓
12.20	+WVR Command: Voice Codec Selection		● ↓
12.21	+WDDM Command: Downlink DTMF Detection	⊙	
12.22	+WPCM Command: PCM On/Off		
Protocol Specific Commands			
13.7.1	+KCNXCFG Command: GPRS Connection Configuration	⊙	
13.7.2	+KCNXTIMER Command: Connection Timer Configuration	⊙	
13.7.3	+KCNXPROFILE Command: Connection Current Profile Configuration	⊙	
13.7.4	+KCGPADDR Command: Show PDP Address	⊙	
13.7.5	+KCNX_IND Notification: Connection Status Notification		
13.7.6	+KCNXUP Command: Bring the PDP Connection Up		
13.7.7	+KCNXDOWN Command: Bring the PDP Connection Down		
End Of Data Pattern			
13.8.1	+KPATTERN Command: Custom End Of Data Pattern	⊙	
13.8.2	+KURCCFG Command: Enable or disable the URC from TCP commands	⊙	
13.8.3	+KIPOPT Command: General Options Configuration		
TCP Specific Commands			
13.9.1	+KTCPCFG Command: TCP Connection Configuration	⊙	
13.9.2	+KTCPCNX Command: TCP Connection	⊙	
13.9.3	+KTCPRCV Command: Receiving data through a TCP Connection	⊙	
13.9.4	+KTCPSEND Command: Sending data through a TCP Connection	⊙	
13.9.5	+KTCPCLOSE Command: Closing current TCP operation	⊙	
13.9.6	+KTCPDEL Command: Delete a configured TCP session	⊙	
13.9.7	+KTCP_SRVREQ Notification: Incoming client's connection request	⊙	
13.9.8	+KTCP_DATA Notification: Incoming Data through a TCP Connection	⊙	
13.9.9	+KTCP_IND Notification: TCP Status		
13.9.10	+KTCPSTAT Command: Get TCP socket status	⊙	
13.9.11	+KTCPSTART Command: Start a TCP connection in direct data flow	⊙	
13.9.12	+KTCP_ACK Command: Status Report for Latest TCP	⊙	

Chapter	AT Commands	HL6528x	HL85xxx
13.9.13	+KTCPACKINFO Command: Poll ACK Status for the Latest	⊙	
FTP Client Specific Commands			
13.10.1	+KFTPCFG Command: FTP configuration	⊙	
13.10.2	+KFTPCNX Command: Start FTP Connection		
13.10.3	+KFTPRCV Command: Receive FTP files	⊙	
13.10.4	+KFTPSND Command: Send FTP files	⊙	
13.10.5	+KFTPDEL Command: Delete FTP files	⊙	
13.10.6	+KFTP_IND Notification: FTP Status		
13.10.7	+KFTPCLOSE Command: Close Current FTP Connection	⊙	
13.10.8	+KFTPCFGDEL Command: Delete a Configured FTP Session		
FTP Server Specific Commands			
13.11.1	+KFTPCDFG Command: FTP Server Configuration	⊙	
13.11.2	+KFTPDSTAT Command: FTP Server Status	⊙	
13.11.3	+KFTPDRUN Command: Run FTP server	⊙	
13.11.4	+KFTPD_NOTIF Notification: Server's Event Notification	⊙	
13.11.5	+KFTPDKICK Command: Kick user from FTP server	⊙	
13.11.6	+KFTPCDLOSE Command: Close FTP Server	⊙	
UDP Specific Commands			
13.12.1	+KUDPCFG Command: UDP Connection Configuration	⊙	
13.12.2	+KUDP_DATA Notification: Incoming data through a UDP Connection		
13.12.3	+KUDPCLOSE Command: Close current UDP operation	⊙	
13.12.4	+KUDPDEL Command: Delete a Configured UDP Session		
13.12.5	+KUDP_IND Notification: UDP Status		
13.12.6	+KUDPSND Command: Send data through an UDP Connection	⊙	
13.12.7	+KUDPRCV Command: Receive data through an UDP Connection	⊙	
SMTP Specific Commands			
13.13.1	+KSMTTPARAM Command: Connection Configuration	⊙	
13.13.2	+KSMTTPWD Command: Authentication Configuration	⊙	
13.13.3	+KSMTPTO Command: Receivers Configuration	⊙	
13.13.4	+KSMTPSUBJECT Command: Subject Configuration	⊙	
13.13.5	+KSMTTPUL Command: Send Message	⊙	
13.13.6	+KSMTPCLEAR Command: Clear Parameters	⊙	
POP3 Specific Commands			
13.14.1	+KPOPCNX Command: Connection Configuration	⊙	
13.14.2	+KPOPLIST Command: List Available Mail	⊙	
13.14.3	+KPOPREAD Command: Download A Mail	⊙	
13.14.4	+KPOPDEL Command: Delete a Mail	⊙	
13.14.5	+KPOPQUIT Command: Close Connection	⊙	
HTTP Client Specific Commands			
13.15.1	+KHTTPCFG Command: HTTP Connection Configuration	⊙	
13.15.2	+KHTTPCNX Command: Start the HTTP Connection		

Chapter	AT Commands	HL6528x	HL85xxx
13.15.3	+KHTTPHEADER Command: Set the Header of the Request	⊙	
13.15.4	+KHTTPGET Command: Get Information from HTTP Server	⊙	
13.15.5	+KHTTPHEAD Command: Get the Head of the Information from HTTP Server	⊙	
13.15.6	+KHTTPPOST Command: Send Data to HTTP Server	⊙	
13.15.7	+KHTTP_IND Notification: HTTP Status		
13.15.8	+KHTTPCLOSE Command: Close a HTTP Connection	⊙	
13.15.9	+KHTTPDEL Command: Delete a Configured HTTP Session		
13.15.10	+KHTTPPUT Command: Perform HTTP PUT		
13.15.11	+KHTTPDELETE Command: Perform HTTP Delete		
HTTPS Client Specific Commands			
13.16.1	+KHTTPSCFG Command: HTTPS Connection Configuration	⊙	
13.16.2	+KHTTPSCNX Command: Start HTTPS Connection		
13.16.3	+KHTTPSHEADER Command: Set the header of the request	⊙	
13.16.4	+KHTTPSGET Command: Get information from HTTP server	⊙	
13.16.5	+KHTTPSHEAD Command: Get the head of the information from HTTP server	⊙	
13.16.6	+KHTTPSPOST Command: Send data to HTTP server	⊙	
13.16.7	+KHTTPSCLOSE Command: Close a HTTPS connection	⊙	
13.16.8	+KHTTPSDEL Command: Close an HTTPS Connection		
13.16.9	+KHTTPS_IND Notification: HTTPS Status		
13.16.10	+KHTTPSPUT Command: Perform HTTPS PUT		
13.16.11	+KHTTPSDELETE Command: Perform HTTPS Delete		
SSL Certificate Manager			
13.17.1	+KCERTSTORE Command: Store root CA and local certificates to file system	●	
13.17.2	+KPRIVKSTORE Command: Store private key associated to local certificate	●	
13.17.3	+KCERTDELETE Command: Delete local certificate from the index	●	
13.17.4	+KPRIVKDELETE Command: Delete private key from the index		
SSL Configuration			
13.18.1	+KSSLCRYPTO Command: Cipher Suite Configuration		
13.18.2	+KSSLCFG Command: SSL Configuration		
Specific Flash Commands			
14.1	+KFSFILE Command: Flash file operation command	●	
eCall Commands			
15.3	+KECALLCFG Command: Emergency call configuration	● ↓	
15.4	+KECALL Command: Initiate emergency call	⊙ ↓	
15.5	+KAECALL Command: Answer an emergency call	⊙	
15.6	+KECALLMSD Command: MSD configuration	● ↓	
15.7	+KECALLVSN Command: Emergency call version	●	
15.8	+KECALLONLY Command: Configure eCall only feature	↓	
DSDS (Dual SIM Dual Standby) Commands			

Chapter	AT Commands	HL6528x	HL85xxx
16.1	+KSS Command: Switch SIM	⊙	
16.2	+KSDS Command: Select default SIM	⊙	
16.3	+KCCDN Command: Call connection and disconnection notification	⊙ ↓	
16.4	+KSIMSLOT Command: SIM2 slot configuration	↓	
16.5	+KDSIMEI Command: IMEI Slot2 Configuration	● ↓	
AVMS Commands			
17.1	+WDSA Command: Change Account for DM Connection	⊙	
17.2	+WDSC Command: Device Services Configuration	⊙ ↓	↓
17.3	+WDS Command: Device Services Local Ddownload	⊙	
17.4	+WDSE Command: Device Services Error	⊙	
17.5	+WDSF Command: Device Services Fallback	⊙	
17.6	+WDSG Command: Device Services General Status	⊙	
17.7	+WDSI Command: Device Services Indications	⊙ ↓	↓
17.8	+WDSR Command: Device Services Reply	⊙	
17.9	+WDSS Command: Device Services Session	⊙ ↓	↓
17.10	+WDSM Command: Manage Device Services	⊙ ↓	↓
17.11	+WPPP Command: PDP Context Authentication Configuration	⊙	⊙
Location Service Commands			
18.1	+GPSSTART Command: Start or Restart the Location Service		
18.2	+GPSSLEEP Command: Put GPS Receiver to Specified GPS Sleep Mode		
18.3	+GPSSTOP Command: Stop the Location Service		
18.4	+GPSINIT Command: Initialization of the Location Service		
18.5	+GPSNMEA Command: Configure NMEA Frames Flow		
18.6	+GPSPVT Command: Configure PVT Frames Flow		
18.7	+GPSTTFF Command: Report Calculated TTFF of Last Run		
18.8	+GPSVERS Command: Report Software Version of Location Patch Version		
18.9	+GPSCONF Command: Configure the Location Service and GPS Receiver		↓
18.10	+GPSRELEASE Command: Power the GPS Chipset Off		
18.11	+GPSAID Command: GNSS Aiding Management		
18.12	+GPS CORE Command: Report GNSS Receiver Core Information		●
18.13	+GPSAUTOINIT Command: Select GPS State at Power Up		
18.14	+KIICADDR Command: Configure the I ² C Device	⊙ ↓	
18.16	+GPSSUPLCFG Command: GPS SUPL Configuration		●
18.17	+CMTLR Command: Mobile Terminated Location Request Notification		
18.18	+CMTLRA Command: Mobile Terminated Location Request Disclosure Allowance		
18.19	+CMOLR Command: Mobile Originated Location Request		
18.20	+CMOLRE Command: Mobile Originated Location Request Error		

Chapter	AT Commands	HL6528x	HL85xxx
Test Commands			
19.1	+WMTXPOWER Command: Test RF Tx		
19.2	+WMRXPOWER Command: Test RF Rx		
19.3	+WMAUDIOLOOP Command: Audio test		
19.4	+WMGNSSTEST Command: GNSS test		●
19.5	+XOMADMALERT Command: Send Generic Alert to OMA DM Server		
NV Commands			
20.3	+NVBU Command: NV Backup Status and Control		
20.4	+NVBU_IND Notification: NV Backup Status Notification		

23.6. How to Use TCP Commands

23.6.1. Client Mode

AT&K3 OK AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0", "0.0.0.0","0.0.0.0" OK AT+KTCPCFG=1,0,"www.google.com",80 +KTCPCFG: 1 OK AT+KTCPCNX=1 OK AT+KTCPSND=1,18 CONNECT ...Data send... OK +KTCP_DATA: 1,1380 AT+KTCPRCV=1, 1380 CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 ... a lot of data... --EOF--Pattern-- OK +KTCP_DATA: 1,1380	Hardware flow control activation Set GPRS parameters (APN, login, password) Set IP address and port number Returns session ID Initiate the connection Send data with KPATTERN string at the end. e.g. "GET / HTTP/1.0 --EOF--Pattern--" DATA read +KTCP_DATA notification

AT+KTCPRCV=1,1380 CONNECT er{padding-bottom:7px !important}#gbar,#guser{font- ... a lot of data... --EOF--Pattern-- OK +KTCP_DATA: 1,1380 AT+KTCPCLOSE=1,1 OK AT+KTCPDEL=1 OK AT+KTCPCFG? OK	DATA read Close session 1 Delete session 1 No session is available

23.6.2. Server Mode

In this simple example we emulate a daytime server. This server listens to port 13 and for each connection it returns the date.

AT&K3 OK AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0", "0.0.0.0","0.0.0.0" OK AT+KTCPCFG=1,1,,13 +KTCPCFG: 1 OK AT+KTCPCNX=1 OK AT+KCGPADDR +KCGPADDR: 0,"10.35.125.89" OK +KTCP_SRVREQ: 1,2 AT+KTCPSND=2,15 CONNECT ...Date and time... OK +KTCP_SRVREQ: 1,3 +KTCP_NOTIF: 2, 4 AT+KTCPSND=3,15	Hardware flow control activation Set GPRS parameters (APN, login, password) Set TCP listener and port number Returns session ID Initiate the server Get the IP address to initiate a connection request with a client A client requests a connection (session ID 2) DATA sent to the client read Another client requests a connection (session ID 3) CHILD mode for session 3 Client (session 2) closes the connection

CONNECT ...Date and time... OK AT+KTCPCLOSE=3,1 OK AT+KTCPCLOSE=1,1 OK AT+KTCPDEL=1 OK	DATA sent to the client Close client session 3 and then session 3 is deleted automatically (CHILD mode for session 3) Close server: session 1 Delete session 1

23.6.2.1. Server Mode in Transparent Mode

AT&K3 OK AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0","0.0.0.0","0.0.0.0" OK AT+KTCPCFG=1,1,,401 +KTCPCFG: 1 OK AT+KTCPCNX=1 OK AT+KCGPADDR +KCGPADDR: 1, "80.125.192.18" OK +KTCP_SRVREQ: 1,2,"213.41.22.62",1062 AT+KTCPSTART=2 CONNECT ... +++ OK	Hardware flow control activation Set GPRS parameters (APN, login, password) Set TCP listener and port number Returns session ID Initiate the server Get the IP address to initiate a connection request with a client A client requests a connection (subsession ID 2) Open server mode with session ID equal to the subsession ID from KTCP_SRVREQ Exchange data with client in transparent mode

23.6.3. Polling for the Status of a Socket

AT&K3	Hardware flow control activation
OK	
AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0","0.0.0.0","0.0.0.0"	Set GPRS parameters (APN, login, password)
OK	
AT+KTCPCFG=1,0,"www.google.com",80	Set TCP Server address and port number
+KTCPCFG: 1	Returns the session ID
OK	
AT+KURCCFG="TCP",0	Disable TCP unsolicited messages
OK	
AT+KTCPCNX=1	Initiate the connection, use session 1
OK	
AT+KTCPSTAT=1	Poll the connection status
+KTCPSTAT : 3,-1,0,0	Connection is UP
OK	
AT+KTCPSND=1,3000	Send data on socket 1, we expect to send 3000 bytes but you can send less.
CONNECT	You can send data after CONNECT
...Data send...	To finish send the KPATTERN (EOF), you can define this with +KPATTERN command.
OK	
AT+KTCPSTAT=1	Poll the connection status
+KTCPSTAT : 3,-1,1234,0	Connection is UP, there are 1234 bytes not yet sent
OK	
AT+KTCPSTAT=1	Poll the connection status
+KTCPSTAT : 3,-1,100,0	Connection is UP, there are 100 bytes not yet sent
OK	
AT+KTCPSTAT=1	Poll the connection status
+KTCPSTAT : 3,-1,0,0	Connection is UP, all bytes have been sent
OK	
AT+KTCPSTAT=1	Poll the connection status
+KTCPSTAT : 3,-1,0,320	Connection is UP, 320 bytes are available for reading
OK	
AT+KTCPCRCV=1,320	Read 320 bytes on socket 1
CONNECT	

... a lot of data... --EOF--Pattern-- OK AT+KTCPCLOSE=1,1 OK AT+KTCPDEL=1 OK	Data are sent after CONNECT Receive KPATTERN Close session 1 Delete session 1

23.6.4. End to End TCP Connection

AT&K3 OK AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0", "0.0.0.0","0.0.0.0" OK AT+KTCPCFG=1,0,"www.google.com",80 +KTCPCFG: 1 OK AT+KTCPSTART=1 CONNECT ...Data sent.....Data received.....Data sent... ...Data sent.....Data received.....Data sent... +++ OK ATO1 CONNECT ...Data sent.....Data received.....Data sent... ...Data sent.....Data received.....Data sent... OK AT+KTCPCLOSE=1,1 OK AT+KTCPDEL=1 OK	Hardware flow control activation Set GPRS parameters (APN, login, password) Set TCP Server address and port number Returns session ID Initiate the connection, use session 1 Message CONNECT : connection to server is established, you can send data Use +++ to enter in command mode Use ATO<session_id> to switch back in data mode Toggle DTR (if AT&D1 or AT&D2 configuration) to enter in command mode Use KTCPCLOSE to close the session Delete the configured session

23.6.5. Error Case for End to End TCP Connection

AT+KTCPSTART=1 NO CARRIER +KTCP_NOTIF: 1,<tcp_notif> AT+KTCPSTART=1 CONNECT ...Data sent.....Data received.....Data sent... ...Data sent.....Data received.....Data sent... NO CARRIER +KTCP_NOTIF: 1,<tcp_notif>	Try to initiate the connection Connection fails, see the value of <tcp_notif> Initiate the connection Exchange some data An error occurs during connection (network lost, server closed, etc.)

23.6.6. Use Cases for AT+KTCPACKINFO and <URC-ENDTCP-enable> Option

This section describes the behavior of AT+KTCPACKINFO when the <URC-ENDTCP > option is used with AT+KTCPCFG.

23.6.6.1. <URC-ENDTCP-enable> is Disabled (default setting)

AT+KCNXCFG=1,"GPRS","CMNET" OK AT+KTCPCFG=1,0,"202.170.131.76",2000 +KTCPCFG: 1 OK AT+KTCPCFG? +KTCPCFG: 1,0,0,0,, "202.170.131.76",2000,,0,0 OK AT+KTCPCNX=1 OK AT+KTCPSND=1,10 CONNECT OK AT+KTCPACKINFO=1 +CME ERROR: operation not allowed	<URC-ENDTCP-enable> is disabled Connect to TCP server Use command to send 10 bytes write to serial: 0123456789--EOF--Pattern-- The URC "+KTCP_ACK" is not displayed Since <URC-ENDTCP-enable> is disabled, this returns error

23.6.6.2. <URC-ENDTCP-enable> is Enabled

<pre> AT+KCNXCFG=1,"GPRS","CMNET" OK AT+KTCPCFG=1,0,"202.170.131.76",2000,,,1 +KTCPCFG: 1 OK AT+KTCPCFG? +KTCPCFG: 1,0,0,0,"202.170.131.76",2000,,0,1 OK AT+KTCPCNX=1 OK AT+KTCPSEND=1,10 CONNECT OK +KTCP_ACK: 1, 1 AT+KTCPACKINFO=1 +KTCPACKINFO: 1, 1 OK AT+KTCPSEND=1,1000 CONNECT OK ... AT+KTCPACKINFO=1 +KTCPACKINFO: 1, 2 OK ... +KTCP_ACK: 1, 0 </pre>	Set <URC-ENDTCP-enable> to 1, enable URC "+KTCP_ACK" <URC-ENDTCP-enable> is enabled Connect to TCP server Use command to receive those 10 bytes write to serial: 0123456789--EOF--Pattern-- Only after a short time, URC "+KTCP_ACK" tells us the latest TCP data arrived remote side We can use this command to poll the status of the latest TCP data Use command to send 1000 bytes write to serial: 1000bytes and --EOF--Pattern-- URC "+KTCP_ACK" not got yet After a few seconds, this command can be used to poll the status of the latest TCP data The status of the latest TCP data is unknown Since the "OK" of the latest "+KTCPSEND", 64 seconds elapsed URC "+KTCP_ACK" indicates that data has not arrived on remote side yet Network may be too bad

AT+KTCPACKINFO=1 +KTCPACKINFO: 1, 0 OK	We can use this command to poll the status of the latest TCP data The status of the latest TCP data is "failure": not all data has been received by remote side

23.7. How to Use FTP Specific Commands

23.7.1. Client Mode

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password",,, OK	Set GPRS parameters (APN, login, password)
AT+KFTPCFG=1,"ftp.test.fr","userlogin","userpassword",21,0 OK	Set FTP server address, login, password and port number
AT+KPATTERN="--EOF--Pattern--" OK	Custom End Of File pattern
AT+KFTPSND=0,"Dir","TestFile.txt",0 CONNECT ...send Data send<--EOF--Pattern>... OK	Send data, store them in "TestFile.txt" file. After "CONNECT". Do not forget send the EOF string
AT+KFTPRCV=0,"Dir","Testfile.txt",0 CONNECT F6E6E656374696F6E207465737442E--EOF--Pattern-- OK	Read the file named "TestFile.txt" from ftp server, data are sent and end by EOF string
AT+KFTPRCV=0,"/flashfile.ext","Dir","fsfile.txt",0 OK +KFTP_RCV_DONE:0	Get file "fsfile.txt" from ftp server, and store it in flash directory "/flashfile.ext"
AT+KFTPSND=0,"/flashfile.ext","Dir","fsfile.txt",0 OK +KFTP_SND_DONE:0	Send flash file "/flashfile.txt" to ftp server, store it in "Dir" directory

AT+KFTPDEL=0,"Dir","TestFile.txt" OK AT+KFTPCLOSE=0 OK	Delete the file called "TestFile.txt" in ftp server Then you can close the connection

23.7.2. Server Mode

AT&K3 OK AT+KCNXCFG=0,"GPRS","APN","log","password",,, OK AT+KFTPDCFG=0,1,"/ftp","IEUser@",21 OK AT+KFTPDRUN=1 +KFTPDRUN:"192.168.1.44" OK AT+KFTPDCLOSE OK	Hardware flow control activation Set GPRS parameters (APN, login, password, etc.) Set FTP root path, password and port number Run FTP server You can connect to HL6528x ftp server now. If you need to access the HL6528x ftp server in programming, please see RFC959. Close the ftp server

23.7.3. "FTP Resume" Use Case

23.7.3.1. Resume Feature when Transmitting Data to Serial Link

AT+KCNXCFG=1,"GPRS","CMNET" OK AT+KFTPCFG=1,"202.170.131.76","administrator","8ik,(OL>" ,21,0 +KFTPCFG: 1 OK AT+KFTPRCV=1,,,"111111.txt",0 CONNECT 750aaaaaaaaa..... aaaaa250bbbbbbb--EOF--Pattern--	Count the total data from serial link, it is 760

+KFTP_ERROR: 1,421 Try to resume transfer as follows AT+KFTPRCV=0,,,"111111.txt",0,760 bbbbbb.....bbbbbbend--EOF--Pattern-- OK Combine the data from the two downloads. As a result, we will get the complete file "111111.txt" AT+KFTPRCV=0,,,"111111.txt",0,119111 CONNECT --EOF--Pattern-- OK	The result code indicates that the download met some problems, it may be due to control or data connection lost Already got 760 bytes totally, so set it as offset to resume transfer Count the total data from serial link, it is 240 This indicates that the download was successful Try to set an invalid offset Nothing can be got because server has no corresponding error code and it answers that transfer is finished

23.7.3.2. Resume Feature when Downloading Data to File System

AT+KFSFILE=4,"/ftp" +KFSFILE: 1048407 bytes free OK AT+KCNXCFG=0,"GPRS","CMNET" OK AT+KFTPCFG=0,"202.170.131.76","administrator","8ik,(OL>" ,21,0 +KFTPCFG: 0 OK Download is starting AT+KFTPRCV=0,"/11",,"111111.txt" OK AT+KFSFILE=4,"/ftp" +KFSFILE: <F> 11 760 +KFSFILE: 1042921 bytes free OK +KFTP_ERROR: 0, 2 AT+KFTPRCV=0,"/11",,"111111.txt",0,1 OK	The target file does not exist in flash Has 760 bytes in total Some problems caused the transfer to break Transfer not finished, try to resume To resume transfer file in flash, we only have to set the offset to non-zero. Then the module will detect the real size of the file in file system automatically. The real size will be used as the real <offset> to resume transfer

AT+KFSFILE=4,"/ftp" +KFSFILE: <F> 11 1000 +KFSFILE: 1042921 bytes free OK +KFTP_RCV_DONE:0 +KFTP_ERROR: 0, 421 AT+KFSFILE=4,"/ftp" +KFSFILE: <F> 11 1000 +KFSFILE: 1042921 bytes free OK	So far, has 1000 bytes in total This URC indicate that transfer is finished Server kicked off the connection

23.7.3.3. Use Case when FTP Server does not Support the Resume Feature

AT+KCNXCFG=1,"GPRS","CMNET" OK AT+KFTPCFG=1,"202.170.131.76","administrator","8ik,(OL>" ,21,0 +KFTPCFG: 1 OK AT+KFTPRCV=1,,,"111111.txt",0 CONNECT 750aaaaaaaaa..... aaaaaa250bbbbbbb--EOF--Pattern-- +KFTP_ERROR: 0,421 AT+KFTPRCV=1,,,"111111.txt",0,760 CONNECT --EOF--Pattern-- +KFTP_ERROR: 1,502	Count the total data from serial link, it is 760 The result code indicates that the download met some problems, it may be due to control or data connection lost ERROR 502 means that some commands in the procedure are not supported by server

23.8. How to Use UDP Specific Commands

23.8.1. Client Mode

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password",,, OK	Set GPRS parameters (APN, login, password)
AT+KUDPCFG=1,0 +KUDPCFG: 1 OK	Create a new UDP socket (returned session 1) with the parameters associated to the connection profile id number 0
AT+KUDPSND= 1,"82.234.17.52",32,18 CONNECT ...Data sent... --EOF--Pattern-- OK	Send UDP data after "CONNECT"
+KUDP_DATA: 1,35 AT+KUDPRCV=1, 35 CONNECT This is a simple UDP Protocol test -EOF--Pattern-- OK	Received notification that indicates the presence of 35 bytes in the socket Try to read 35 bytes from session 1
+KUDP_RCV: "82.234.17.52",32 +KUDP_DATA: 1,35 AT+KUDPRCV=1, 16 CONNECT This is a simple -EOF--Pattern-- OK	Received notification that indicates the presence of 35 bytes in the socket Same test but try to read 16 bytes from session 1
+KUDP_DATA_MISSED: 1,19 AT+KUDPCLOSE=1 OK	There are 19 unread bytes left and missed in the UDP socket Definitely close the UDP session and at the same time session is deleted
AT+KUDPCFG? OK	No sessions are available now

23.8.2. Server Mode

AT&K3	Hardware flow control activation
OK	
AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0", "0.0.0.0","0.0.0.0"	Set GPRS parameters (APN, login, password)
OK	
AT+KUDPCFG=1,1,3000	Set UDP listener(Port 3000). Initiate the server.
+KUDPCFG: 1	Returns session ID
OK	
AT+KUDPCFG?	Check if the server is initiated
+KUDPCFG: 1,0,1,3000	
OK	
AT+KCGPADDR	Get local IP address and let client know
+KCGPADDR: 0, "192.168.0.71"	
OK	
+KUDP_DATA: 1,9	Data comes in from some client
AT+KUDPRCV=1,9	Receive data and display
CONNECT	
DATA TEST--EOF--Pattern--	
OK	
+KUDP_RCV: "10.10.10.5",1111	This data was from "10.10.10.5"(Port:1111)
AT+KUDPSND=1,"10.10.10.5",3100,18	Send 18Bytes to a remote server(Port:3100) Some data with "-EOF--Pattern--" in the end
CONNECT	
OK	
AT+KUDPCLOSE=1	Close the UDP server and at the same time session is deleted
OK	
AT+KUDPCFG?	No sessions are available now
OK	

1) Previous features are kept (ascending compatibility of the AT commands) - Client mode

2) Previous features are kept (ascending compatibility of the AT commands) - Server mode

AT+KTCPCFG=1,1,,13 +KTCPCFG: 1 OK	Configure a TCP server socket
AT+KTCPCNX=1 OK	Open the listen port
AT+KCGPADDR +KCGPADDR: 0,"10.35.125.89" OK +KTCP_SRVREQ: 1,2 +KTCP_SRVREQ: 1,3 +KTCP_DATA: 2,10	Session 2 is set Session 3 is set URC tells us that 10 bytes arrived in session 2

+KTCP_DATA: 3,8 AT+KTCPCRV=2,10 CONNECT 0123456789--EOF--Pattern-- OK AT+KTCPCRV=3,8 CONNECT 01234567--EOF--Pattern-- OK AT+KUDPCFG=0,1,3000 +KUDPCFG: 4 OK +KUDP_DATA: 4,8 AT+KUDPCRV=4,8 CONNECT 01234567--EOF--Pattern-- OK +KUDP_RCV: "202.170.131.76",2001	URC tells us that 8 bytes arrived in session 3 Use command to receive those 10 bytes in session 2 Use command to receive the 8 bytes in session Open a UDP socket, server mode URC tells us that 8 bytes arrived Use command to receive those 8 bytes

3) New optional feature: URC takes out the data - Client mode

AT+KCNXCFG=1,"GPRS","CMNET" OK AT+KTCPCFG=0,0,"202.170.131.76",2000,,1 +KTCPCFG: 1 OK AT+KTCPCNX=1 OK +KTCP_DATA: 1,10,0123456789 AT+KUDPCFG=0,0,3000,1 +KUDPCFG: 2 OK +KUDP_DATA: 2,8,"202.170.131.76",2001,01234567	Extend a parameter for the new feature When setting to 1, data will be received by the URC "+KTCP_DATA:" Connect to TCP server 10 bytes arrived. The URC takes them out directly Extend a parameter for the new feature When setting to 1, data will be received by the URC "+KUDP_DATA:" 8 bytes arrived. The URC takes them out directly

4) New optional feature: URC takes out the data - Server mode

AT+KTCPCFG=1,1,,13,1 +KTCPCFG: 1 OK AT+KTCPCNX=1 OK AT+KCGPADDR +KCGPADDR: 1,"10.35.125.89" OK +KTCP_SRVREQ: 1,2 +KTCP_SRVREQ: 1,3 +KTCP_DATA: 2,10,0123456789 +KTCP_DATA: 3,8,01234567 AT+KUDPCFG=1,1,3000,1 +KUDPCFG: 4 OK +KUDP_DATA: 4,8,"202.170.131.76",2001,01234567	Extend a parameter for the new feature. When setting to 1, all child connection will display data in URC mode. Data will be received by the URC "+KTCP_DATA:" Open the listen port 10 bytes arrived. The URC takes them out directly 8 bytes arrived. The URC takes them out directly Open a UDP socket, server mode Extend a parameter for the new feature. Data will be received by the URC "+KUDP_DATA:" 8 bytes arrived. The URC takes them out directly

23.9. How to Use Mail Specific Commands

23.9.1. Mail Overview

The aim of this overview is to give several bases about how to build a mail body with or without attachment. For a better understanding of mail transfer we recommend the reading of the following RFCs:

- RFC 2822 or STD11: Internet Message Format
- RFC 2045: Multipurpose Internet Mail Extensions Part 1
- RFC 2046: Multipurpose Internet Mail Extensions Part 2
- RFC 2047: Multipurpose Internet Mail Extensions Part 3
- RFC 2049: Multipurpose Internet Mail Extensions Part 5

23.9.1.1. Mail Layout

Messages are divided into lines of characters. These lines are delimited with the two characters carriage-return and line-feed; that is, the carriage return (CR) character (ASCII value 13) followed immediately by the line feed (LF) character (ASCII value 10). The carriage-return/line-feed pair will be written in this document as CRLF.)

A message consists of header fields (collectively called "the header of the message") followed by a body. The header is a sequence of lines of characters with special syntax that are used to describe the mail environment (from whom, for whom, when, subject, body format ...). The body is simply a sequence of characters that follows the header and is separated from the header by an empty line (i.e., a line with nothing preceding the CRLF).

Note: From the RFC, There are two limits that this standard places on the number of characters in a single line. Each line of characters must be no more than 998 characters, and should be no more than 78 characters, excluding the CRLF.

23.9.1.2. Mail Header

Header fields are lines composed of a field name, followed by a colon (":"), followed by a field body, and terminated by CRLF. The header must only be composed of US-ASCII characters. Here is an example of field presents in a mail header:

```
MIME-Version: 1.0<CRLF>
to: first.receiver@a.domain.com, second.receiver@a.domain.com<CRLF>
cc: first.copy@a.domain.com<CRLF>
from: sender@another.domain.com<CRLF>
subject: mail example<CRLF>
<CRLF>
```

The first field is to assume conformity with the MIME specification. The others fields will be parsed by the mail application to present the message.

The header is closed by the last empty line, each character behind will be considered as part of the body.

23.9.1.3. Mail Body

The body of a message is simply lines of US-ASCII characters. The only two limitations on the body are as follows:

- CR and LF MUST only occur together as CRLF; they MUST NOT appear independently in the body.
- Lines of characters in the body MUST be limited to 998 characters, and SHOULD be limited to 78 characters, excluding the CRLF.

Note: The mail attachments are encapsulated in the body and defined with specific header fields of the header, these are called multipart messages (see section 23.9.2.1 Multipart Message).

Here is the example of a simple mail:

```
MIME-Version: 1.0<CRLF>
to: first.receiver@a.domain.com<CRLF>
cc: first.copy@a.domain.com<CRLF>
```

```
from: sender@another.domain.com<CRLF>
subject: Simple mail example<CRLF>
<CRLF>
Hello,<CRLF>
<CRLF>
This is a mail example<CRLF>
<CRLF>
BR. <CRLF>
<CRLF>
```

23.9.2. Mail Attachment

23.9.2.1. Multipart Message

As we have seen before, attachments are enclosed in the message body. This kind of message is called multipart messages. Multipart messages are defined by a field in the header, the usual format is:

```
Content-type: multipart/mixed; boundary=<some text or hash><CRLF>
```

This field “*Content-Type*” defines the body as a suite of part separated by boundaries – Note that with MIME 1.0 specifications the field “*Content-type*” can be omitted and the default value is “*Content-type : text/plain; charset=us-ascii*” which means a simple body in US-ASCII characters.

Boundaries format is a double hyphen, “--”, followed by the boundary value defined in the header field and the CRLF pair. In order to signify the end of the body, we use a special form of the boundary that format is a double hyphen followed by the boundary value, another double hyphen and the CRLF pair.

Each part is structured as a regular internet message with a header that describes the content and the body. The content of each part is also described by the field “*Content-type*”.

Here is an example of two part message:

```
MIME-Version: 1.0<CRLF>
to: first.receiver@a.domain.com<CRLF>
from: sender@another.domain.com<CRLF>
subject: Multipart mail example<CRLF>
Content-type: multipart/mixed; boundary=myboundary<CRLF>
<CRLF>
--myboundary<CRLF>
Content-type : text/plain; charset=us-ascii<CRLF>
<CRLF>
this is the first part<CRLF>
<CRLF>
--myboundary<CRLF>
<CRLF>
This is the second part<CRLF>
<CRLF>
```

```
--myboundary--<CRLF>
```

In the first part, the content type of the body is specified and, as the second part does not specify anything, both are US-ASCII text.

23.9.2.2. Attachment Format

As the body must only embed US-ASCII characters, the payload attached can be encoded. The encoding algorithm is signified in the part's header with the field "*Content-transfer-encoding*". The commonly used encoding algorithm is Base64

The MIME type of attachment is described by the "*Content-type*" field in the part's header. For example, to send the image file landscape.jpg, build the following message:

```
MIME-Version: 1.0<CRLF>
to: first.receiver@a.domain.com<CRLF>
from: sender@another.domain.com<CRLF>
subject: Image example<CRLF>
Content-type: multipart/mixed; boundary=myboundary<CRLF>
<CRLF>
--myboundary<CRLF>
Content-type : text/plain; charset=us-ascii<CRLF>
<CRLF>
Hello,<CRLF>
Here is the image I was talking about :<CRLF>
<CRLF>
--myboundary<CRLF>
Content-type: image/jpeg; name="landscape.jpg"<CRLF>
Content-transfer-encoding: base64<CRLF>
<CRLF>
"base64 encoded file"<CRLF>
<CRLF>
--myboundary--<CRLF>
```

23.9.3. How to Use SMTP Specific Commands

23.9.3.1. Simple Mode

We send the following mail to *receiver.addr@domain* and *copy.addr@domain*:

```
Hello,<CRLF>
<CRLF>
This is a mail example<CRLF>
<CRLF>
```

BR. <CRLF>
<CRLF>

And another mail to receiver.addr@domain only:

Hello,<CRLF>
<CRLF>
I forgot to tell...<CRLF>
< CRLF>

AT&K3	Hardware flow control activation
OK	
AT+KCNXCFG=0,"GPRS","APN","log","password",,,	Set GPRS parameters (APN, login, password)
OK	
AT+KCNXTIMER=0,60,2,70	Set Timers
OK	
AT+KCNXPROFILE=0	Activate GPRS profile
OK	
AT+CGATT=1	Be sure to attach to the network
OK	
AT+KSMTPPARAM="smtp.domain.com", 580, "sender.addr@domain"	Fill in the connection parameters, the SMTP server URL is smtp.domain.com at port 580
+KSMTPPARAM: "smtp.domain.com", 580, "sender.addr@domain"	
OK	
AT+KSMTPPWD="mylogin", "mypassword"	Fill in the authentication parameters
+KSMTPPWD: "mylogin", "mypassword"	
OK	
AT+KSMTPPTO="receiver.addr@domain","", "copy.addr@domain",,,	Fill in the receiver parameters, one direct and a copy
+KSMTPPTO: "receiver.addr@domain",,, "copy.addr@domain",	
OK	
AT+KSMTPSUBJECT="Simple mail example"	Fill in the subject parameter
+KSMTPSUBJECT: "Simple mail example"	
OK	
AT+KSMTPPUL=1,46	Send the mail in simple mode, we send 46 bytes to the module. The module connect the SMTP server and send the header:

+KSMTPUL: 1 CONNECT <CRLF> Hello,<CRLF> <CRLF> This is a mail example<CRLF> <CRLF> BR. <CRLF> <CRLF> OK AT+KSMTPPTO="receiver.addr@domain",,"",,"" +KSMTPPTO: "receiver.addr@domain",,, OK AT+KSMTPSUBJECT="Second mail example" +KSMTPSUBJECT: "Second mail example" OK AT+KSMTPPUL=1,36 CONNECT <CRLF> Hello,<CRLF> <CRLF> I forgot to tell...<CRLF> <CRLF> OK AT+KSMTPPCLEAR OK	MIME-Version: 1.0<CRLF> to: receiver.addr@domain<CRLF> cc: copy.addr@domain<CRLF> from: sender.addr@domain<CRLF> subject: Simple mail example<CRLF> <CRLF> "1" is the session id of current SMTP connection During uploading, --EOF--Pattern-- can be used to terminate current uploading The mail is successfully sent We prepare to send the second mail Fill in the receiver parameter Fill in the subject parameter Send the mail in simple mode, we send 36 bytes to the module. The module connect the SMTP server and send the header: MIME-Version: 1.0<CRLF> to: receiver.addr@domain<CRLF> from: sender.addr@domain<CRLF> subject: Second mail example<CRLF> <CRLF> During uploading, --EOF--Pattern-- can be used to terminate current uploading The mail is successfully sent Clear the parameter's set

23.9.3.2. Complex Mode

To send a mail to *receiver.addr@domain* with the image *landscape.jpg* attached. In complex mode the first part of the header is handled by the module thus we will send the following data through the KSMTPUL Command:

```
Content-type: multipart/mixed; boundary=myboundary<CRLF>
<CRLF>
--myboundary<CRLF>
<CRLF>
Hello,<CRLF>
<CRLF>
Here is the image I was talking about :<CRLF>
<CRLF>
--myboundary<CRLF>
Content-type: image/jpeg; name="landscape.jpg"<CRLF>
Content-transfer-encoding: base64<CRLF>
<CRLF>
AR15qfGTmlk[...]AAADJqdf462==<CRLF>
<CRLF>
--myboundary--<CRLF>
```

Note: The encoded file in this example is not complete. We assume that the final size of the whole data block to send is 15360.

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=0,"GPRS","APN","log","password",,, OK	Set GPRS parameters (APN, login, password)
AT+KCNXTIMER=0,60,2,70 OK	Set Timers
AT+KCNXPROFILE=0 OK	Activate GPRS profile
AT+CGATT=1 OK	Be sure to attach to the network
AT+KSMTPPARAM="smtp.domain.com", 580, "sender.addr@domain" +KSMTPPARAM: "smtp.domain.com", 580, "sender.addr@domain" OK	Fill in the connection parameters, the SMTP server URL is smtp.domain.com at port 580

<pre> AT+KSMTTPWD="mylogin","mypassword" +KSMTTPWD: "mylogin", "mypassword" OK AT+KSMTPTO="receiver.addr@domain", "", "", "" +KSMTPTO: "receiver.addr@domain", "", "", "" OK AT+KSMTPSUBJECT="Complex mail example" +KSMTPSUBJECT: "Complex mail example" OK AT+KSMTTPUL=0,15360 +KSMTTPUL: 1 CONNECT Content-type:multipart/mixed; boundary=myboundary<CRLF> <CRLF> --myboundary<CRLF> <CRLF> Hello,<CRLF> <CRLF> Here is the image I was talking about :<CRLF> <CRLF> --myboundary<CRLF> Content-type: image/jpeg; name="landscape.jpg"<CRLF> Content-transfer-encoding: base64<CRLF> <CRLF> AR15qfGTmk[...]AAADJqdf462==<CRLF> <CRLF> --myboundary--<CRLF> OK AT+KSMTPCLEAR OK </pre>	Fill in the authentication parameters Fill in the receiver parameters, one direct and a copy Fill in the subject parameter Send the mail in simple mode, we send 15360 bytes to the module. The module connect the SMTP server and send the first part of the header: <pre> MIME-Version: 1.0<CRLF> to: receiver.addr@domain<CRLF> from: sender.addr@domain<CRLF> subject: Complex mail example<CRLF> </pre> "1" is the session id of current SMTP connection During uploading, --EOF--Pattern-- can be used to terminate current uploading The mail is successfully sent Clear the parameter's set

23.9.4. How to Use POP3 Specific Commands

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=0,"GPRS","APN","log","password",,, OK	Set GPRS parameters (APN, login, password)
AT+KCNXTIMER=0,60,2,70 OK	Set Timers
AT+KCNXPROFILE=0 OK	Activate GPRS profile
AT+CGATT=1 OK	Be sure to attach to the network
AT+KPOPCNX="pop.domain.com",580,"mylogin", "mypassword" +KPOPCNX: 1 OK	Connect the POP3 server URL is pop.domain.com at port 580. 1 is the session id of current POP3 connection ... <i>Connection established</i> ...
AT+KPOPLIST +KPOPLIST: 7 messages (214222 octets) +KPOPLIST: 1,1566 +KPOPLIST: 2,146257 +KPOPLIST: 3,7081 +KPOPLIST: 4,1190 +KPOPLIST: 5,28034 +KPOPLIST: 6,1191 +KPOPLIST: 7,28036 OK	Checkout available messages
AT+KPOPREAD=6 CONNECT	Download mail #6
<i>X-Apparently-To: receiver.addr@domain via 217.146.182.108; Fri, 04 May 2007 01:48:13 -0700<CRLF> [...] MIME-Version: 1.0<CRLF> from: mailmodule@yahoo.fr<CRLF> subject: TEST SMTP in MODE : SIMPLE<CRLF> to: receive.addrr@domain <CRLF> cc: copy.addr@domain<CRLF> <CRLF> <CRLF> Hello. This is a dummy MAIL text.<CRLF> If you read this, test is successful<CRLF> <CRLF> <EOF> OK</i>	Note that header is modified by the SMTP server, this might induce heavier payload ... Start of body ... <EOF> as the end of mail downloading

AT+KPOPDEL=6 OK	Delete mail #6
AT+KPOPLIST +KPOPLIST: 6 messages (213031 octets) +KPOPLIST: 1,1566 +KPOPLIST: 2,146257 +KPOPLIST: 3,7081 +KPOPLIST: 4,1190 +KPOPLIST: 5,28034 +KPOPLIST: 7,28036 OK	Check out list again Mail #6 has been marked as deleted
AT+KPOPQUIT OK	Close the connection with the POP3 server ... Connection closed ...

23.10. How to Use HTTP Client Specific Commands

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0", "0.0.0.0","0.0.0.0" OK	Set GPRS parameters (APN, login, password)
AT+KCNXTIMER=1,60,2,70 OK	Set Timers
AT+KCNXPROFILE=0 OK	Activate GPRS profile
AT+CGATT=1 OK	Be sure to attach to network
AT+KHTTPCFG=1,"www.google.com",80,1 +KHTTPCFG: 1 OK	Set HTTP address, port number and http version
AT+KHTTPHEADER=1 CONNECT	Set the header of the request Send HTTP data after "CONNECT". Do not forget the PATTERN characters. For example : "Data flow --EOF--Pattern--"
Accept : text/html If-Modified-Since : Saturday, 15-January-2000 14:37:11 GMT OK	

AT+KHTTPGET=0, "/index.html" CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 Date: Tue, 24 Jun 2008 02:11:35 GMT Expires: -1 Content-Type: text/html; charset=ISO-8859-1 Set-Cookie: PREF=ID=ae1c663417e7799e:NW=1:TM=1214273495:LM=1214273495:S=5Uq9kExK4aTEv_cx; expires=Thu, 24-Jun-2010 02:11:35 GMT; path=/; domain=.google.com Server: gws Connection: Close <html><head><meta http-equiv="content-type" ... a lot of data... --EOF--Pattern-- OK	Get web page HTTP server response
AT+KHTTPHEAD=1, "/index.html" CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 Date: Tue, 24 Jun 2008 02:11:35 GMT Expires: -1 Content-Type: text/html; charset=ISO-8859-1 Set-Cookie: PREF=ID=ae1c663417e7799e:NW=1:TM=1214273495:LM=1214273495:S=5Uq9kExK4aTEv_cx; expires=Thu, 24-Jun-2010 02:11:35 GMT; path=/; domain=.google.com Server: gws Connection: Close OK	Get the head of the web page HTTP server response
AT+KHTTPHEADER=1 CONNECT Accept : text/html Context-Length: 64 OK	Send the data to the HTTP server Length of HTTP 1.0 POST data should be specified by HTTP header field Context-Length, otherwise HTTP server may not expect any data to be uploaded and should close the connection.
AT+KHTTPPOST=0,, "/get.cgi" CONNECT (...Data send...) HTTP/1.0 200 OK Content-Type: text/plain Context-Length: 37 Your data have been accepted. OK	Send the data to the HTTP server Send HTTP data after "CONNECT" HTTP server response

23.11. How to Use SIM Toolkit

AT+CPIN="1234" OK *PSSTK:"SETUP MENU",1,4,"SIMMAX",0,0,1,0,0,6 AT*PSSTK="SETUP MENU",1,0 OK *PSSTK: "END SESSION" AT*PSSTK="GET ITEM LIST",6 *PSSTK: "GET ITEM LIST",1,16,4,"Switch Number",0,0,0 *PSSTK: "GET ITEM LIST",2,17,4,"Utilities",0,0,0 *PSSTK: "GET ITEM LIST",3,18,4,"Auto Switch",0,0,0 *PSSTK: "GET ITEM LIST",4,19,4,"Hidden Phone Book",0,0,0 *PSSTK: "GET ITEM LIST",5,20,4,"IP Call",0,0,0 *PSSTK: "GET ITEM LIST",6,22,4,"Product Info.",0,0,0 OK AT*PSSTK="MENU SELECTION",22 OK *PSSTK: "SELECT ITEM",0,0,"",0,0,1,0,0,2 AT*PSSTK="GET ITEM LIST",2 *PSSTK: "GET ITEM LIST",1,1,4,"Customer service",0,0,0 *PSSTK: "GET ITEM LIST",2,2,4,"LOT",0,0,0 OK AT*PSSTK="SELECT ITEM",1,1,0,0 OK *PSSTK: "DISPLAY TEXT",1,0,1,0,4,"http://www.sim-max.com/",0,0 AT*PSSTK="DISPLAY TEXT",1,0 OK *PSSTK: "END SESSION"	Enter PIN CODE Soon the module sends an unsolicited message *PSSTK:"SETUP MENU" , it is the STK Setup menu There are 6 items in STK menu. Give response to URC "SETUP MENU". "1" is the Command Number. URC for Session Status : End of STK session Use "GET ITEM LIST" command to get the list of items Item 1: "Switch number". Item 2: "Utilities" Item 3: "Auto Switch" Item 4: "Hidden Phone Book" Item 5: "IP Call" Item 6: "Product Info" Select menu 6, whose ItemIdentifier is 22. After this operation, it will enter into submenu of menu item 6. Totally 2 menus in this level Item 1 is "Customer service", no more sub menus Item 2 is "LOT", no more sub menus Select item 1 "Customer service", whose ItemIdentifier is 1 URC "DISPLAY TEXT" info will be shown with customer information, "http://www.sim-max.com/" You have to use "DISPLAY TEXT" command to give a response to STK URC for session status

23.12. How to Switch from Data Mode to Command Mode

AT+CPIN="0000" OK	Enter PIN CODE
AT+CGDCONT=1,"IP","APN","0.0.0.0",0,0 OK	Configure the GPRS parameters
ATD*99***1# CONNECT	Dial up to have a data connection
~ÿ#Ä!}!} }2!}\$%Ü"}&} } }#}\$Ä#kZ~~ÿ#Ä!}!} }2!}\$%Ü"}&} } } }#}\$Ä#dJ~~ÿ#Ä!}!} }2!}\$%Ü"}&} } } }#}\$Ä#uz~ -----	DATA exchanges (PPP)
OK	Send "+++" characters
AT OK	Switch to command mode is done It is possible to use AT commands
ATO	Switch to data mode, resume the data connection
CONNECT ~ÿ#Ä!}!}#} }2!}\$%Ü"}&} } }#}\$Ä#zj~~ÿ#Ä!}!} }2!}\$%Ü"}&} } } }#}\$Ä#W}:~~ÿ#Ä!}!} }2!}\$%Ü"}&} } } }#}\$Ä#X}*~~ÿ#Ä!}!}&} }2!}\$%Ü"}&} } }#}\$Ä#I:~~ÿ#Ä!}!} }2!}\$%Ü"}&} } } }#}\$Ä#F*~~ÿ#Ä!}!} }2!}\$%Ü"}&} } }#}\$Ä#3U~~ÿ#Ä!}!} }2!}\$%Ü"}&} } }#}\$Ä#<É~~ÿ#Ä!}!}* }2!}\$%Ü"}&} } } }#}\$Ä#}-ú~ NO CARRIER	DATA exchanges continue End of connection

23.13. How to Build an Audio File

The audio file (.snd) is a binary file. It contains two elements: note and duration (in ms). Sierra Wireless has defined 110 notes (tones) as following:

Note A2 , 110.00 Hz	Note 0x1	Note A6 , 1760.0 Hz	Note 0x31
Note A2# , 116.54 Hz	Note 0x2	Note A6# , 1864.7 Hz	Note 0x32
Note B2 , 123.47 Hz	Note 0x3	Note B6 , 1975.5 Hz	Note 0x33
Note C3 , 130.81 Hz	Note 0x4	Note C7 , 2093.0 Hz	Note 0x34
Note C3# , 138.59 Hz	Note 0x5	Note C7# , 2217.5 Hz	Note 0x35
Note D3 , 146.83 Hz	Note 0x6	Note D7 , 2349.3 Hz	Note 0x36
Note D3# , 155.56 Hz	Note 0x7	Note D7# , 2489.0 Hz	Note 0x37
Note E3 , 164.81 Hz	Note 0x8	Note E7 , 2637.0 Hz	Note 0x38
Note F3 , 174.61 Hz	Note 0x9	Note F7 , 2793.0 Hz	Note 0x39
Note F3# , 185.00 Hz	Note 0xa	Note F7# , 2960.0 Hz	Note 0x3a
Note G3 , 196.00 Hz	Note 0xb	Note G7 , 3136.0 Hz	Note 0x3b
Note G3# , 207.65 Hz	Note 0xc	Note G7# , 3322.4 Hz	Note 0x3c
Note A3 , 220.00 Hz	Note 0xd	Note A7 , 3520.0 Hz	Note 0x3d

Note A3# , 233.08 Hz	Note 0xe	Note A7# , 3729.3 Hz	Note 0x3e
Note B3 , 246.94 Hz	Note 0xf	Note B7 , 3951.1 Hz	Note 0x3f
Note C4 , 261.63 Hz	Note 0x10	Reserved for DTMF	Note 0x40~0x4f
Note C4# , 277.18 Hz	Note 0x11	Note, 425 Hz	Note 0x50
Note D4 , 293.67 Hz	Note 0x12	Note, 526 Hz	Note 0x51
Note D4# , 311.13 Hz	Note 0x13	Note, 1040 Hz	Note 0x52
Note E4 , 329.63 Hz	Note 0x14	Note, 1800 Hz	Note 0x53
Note F4 , 349.23 Hz	Note 0x15	Note, 1961 Hz	Note 0x54
Note F4# , 369.99 Hz	Note 0x16	Note, 2081 Hz	Note 0x55
Note G4 , 392.00 Hz	Note 0x17	Note, 480 Hz	Note 0x56
Note G4# , 415.30 Hz	Note 0x18	Note, 1400 Hz	Note 0x57
Note A4 , 440.00 Hz	Note 0x19	Note, 662 Hz	Note 0x58
Note A4# , 466.16 Hz	Note 0x1a	Note, 697 Hz	Note 0x59
Note B4 , 493.88 Hz	Note 0x1b	Note, 708 Hz	Note 0x5a
Note C5 , 523.25 Hz	Note 0x1c	Note, 770 Hz	Note 0x5b
Note C5# , 554.37 Hz	Note 0x1d	Note, 836 Hz	Note 0x5c
Note D5 , 587.33 Hz	Note 0x1e	Note, 852 Hz	Note 0x5d
Note D5# , 622.25 Hz	Note 0x1f	Note, 927 Hz	Note 0x5e
Note E5 , 659.26 Hz	Note 0x20	Note, 941 Hz	Note 0x5f
Note F5 , 698.46 Hz	Note 0x21	Note, 944 Hz	Note 0x60
Note F5# , 739.99 Hz	Note 0x22	Note, 950 Hz	Note 0x61
Note G5 , 783.99 Hz	Note 0x23	Note, 980 Hz	Note 0x62
Note G5# , 830.61 Hz	Note 0x24	Note, 999 Hz	Note 0x63
Note A5 , 880.00 Hz	Note 0x25	Note, 1212 Hz	Note 0x64
Note A5# , 932.33 Hz	Note 0x26	Note, 1307 Hz	Note 0x65
Note B5 , 987.77 Hz	Note 0x27	Note, 1324 Hz	Note 0x66
Note C6 , 1046.5 Hz	Note 0x28	Note, 2370 Hz	Note 0x67
Note C6# , 1108.7 Hz	Note 0x29	Note, 2613 Hz	Note 0x68
Note D6 , 1174.7 Hz	Note 0x2a	Note, 2831 Hz	Note 0x69
Note D6# , 1244.5 Hz	Note 0x2b	Note, 2998 Hz	Note 0x6a
Note E6 , 1318.5 Hz	Note 0x2c	Note, 3185 Hz	Note 0x6b
Note F6 , 1396.9 Hz	Note 0x2d	Note, 403 Hz	Note 0x6c
Note F6# , 1480.0 Hz	Note 0x2e	Note, 360 Hz	Note 0x6d
Note G6 , 1568.0 Hz	Note 0x2f	Silent Note	Note 0xff
Note G6# , 1661.2 Hz	Note 0x30		

To build up an audio file, just need to pick up a note, write into the audio file, next add a duration (convert it into HEX format) into the audio file. Just add like this pair by pair, until finish building. There is no space or tab between the note and the duration. So an audio file will be viewed as following (in HEX format):

31C833C8FFC8XX.....

↑ ↑ ↑

note silent note

duration:

200 ms

The range value of the duration of a note is: 0x1-0xff (that is, max 255ms).

Note: Only note 0x1-0x3f and 0x50-0x6d can be played, other invalid note will be ignored when playing.

Audio file is a binary file. Add the data (in HEX format) into the audio file, do not add the char in ASCII into the text file.

23.14. Q and A for Advanced AT Commands

Q: How many sessions can be opened at the same time?

A: 8 sessions can be opened at the same time. But you can only have 1 FTP session at the same time.

For example: 1 FTP session, 1 FTP server and 6 TCP/UDP connections.

Q: Is it possible to have 1 UDP server and 1 TCP connection at the same time?

A: Yes.

Q: Is it possible to open 1 TCP server and 1 UDP server and 1 FTP server at the same time?

A: Yes. They can be opened at the same time.

Q: Is it possible to have FTP/SMTP/TCP/UDP session together?

A: Yes.

Q: Is it impossible to send a MMS when using FTP and TCP/UDP.

A: Yes

23.15. ATH Command Behavior Table

ATH	Channel Specified (CMUX)	Voice Call		Data Call		GPRS Call (at*99***1#; at+CGDATA)		SMTP/TCP/UDP/POP3/FTP	
		Active	Waiting	Active	Waiting	Active	Waiting	Active	Waiting
ATH/ATH0	OK	OK	OK	OK	OK	OK	OK	NOK	NOK
ATH1	All channels (CMUX)	OK	OK	OK	OK	OK	OK	NOK	NOK
ATH2	OK	NOK	NOK	OK	OK	NOK	NOK	NOK	NOK
ATH3	OK	NOK	NOK	NOK	NOK	OK	OK	NOK	NOK
ATH4	OK	OK	NOK	OK	NOK	NOK	NOK	NOK	NOK
ATH5	OK	NOK	OK	NOK	OK	NOK	OK	NOK	NOK

23.16. Switch Data/Command Mode DTR +++ ATO Behavior Table

The table shows the behavior when trying to switch mode:

- Case1: "+++" is used to switch from data mode to command mode, and the service is suspended.
- Case2: if AT&D1 is set, "DTR drop" is used to switch from data mode to command mode, but the service is suspended.
- Case3: if AT&D2 is set, "DTR drop" is used to switch from data mode to command mode, and the service is stopped.
- Case4: if AT&D0 is set, "DTR drop" has no any impact on the mode switch.
- Case5: ATO[n] is used to switch from command mode to data mode.

	Case1/Case5 +++/ATO[n]	Case2/Case5 DTR1/ATO[n]	Case3/Case5 DTR2/ATO[n]	Case4/Case5 DTR0
TCP/UDP: +KTCPSND: Send data +KTCPRCV: Receive data +KUDPSND: Send data +KUDPRCV: Receive data +KTCPSTART: Direct data flow	OK/CONNECT	OK/CONNECT	NO CARRIER/NO CARRIER (disconnect)	NO IMPACT
SMTP/POP3: +KSMTPL: Send a Mail +KPOPREAD: Download a Mail	OK/CONNECT	OK/CONNECT	NO CARRIER/NO CARRIER (disconnect)	NO IMPACT
FTP: +KFTPRCV: Download FTP files +KFTPSND: Upload FTP files	OK/NO CARRIER (disconnect)	OK/NO CARRIER (disconnect)	NO CARRIER/NO CARRIER (disconnect)	NO IMPACT
HTTP: +KHTTPGET: Get information +KHTTPHEAD: Get head of information +KHTTPPOST: Send data +KHTTPHEADER: Set the HTTP Request Header (for HL85xxx only)	OK/NO CARRIER (disconnect)	OK/NO CARRIER (disconnect)	NO CARRIER/NO CARRIER (disconnect)	NO IMPACT
+KFSFILE: Flash file operation	OK/NO CARRIER (abort)	OK/NO CARRIER (abort)	NO CARRIER/NO CARRIER (abort)	NO IMPACT
Data mode ATD*99... (use ATO or ATO0)	OK/CONNECT	OK/CONNECT	NO CARRIER/NO CARRIER (disconnect)	NO IMPACT

	Case1/Case5 +++ /ATO[n]	Case2/Case5 DTR1/ATO[n]	Case3/Case5 DTR2/ATO[n]	Case4/Case5 DTR0
HTTPS: +KHTTPSGET: Get information +KHTTPSHEAD: Get head of information +KHTTPSPOST: Send data +KHTTPSHEADER: Set the HTTPS Request Header (for HL85xxx only)	OK/NO CARRIER (disconnect)	OK/NO CARRIER (disconnect)	NO CARRIER/NO CARRIER (disconnect)	NO IMPACT
SSL: +KCERTSTORE: Store root CA +KPRIVKSTORE: Store private key	OK/NO CARRIER (abort)	OK/NO CARRIER (abort)	NO CARRIER/NO CARRIER (abort)	NO IMPACT

23.17. Minimum Set of Data (MSD) Format

MSD format is defined in specification DD CEN/TS 15722:2011. MSD frame will be sent, presented in Abstract Syntax

Notation, ASN.1 Packed encoding rules (PER unaligned).

The following table describes the contents of the MSD frame.

M= Mandatory data field

0 = Optional data field, must be included even if no information is included.

Block No.	Name	Type	Unit		Description
1	ID	Integer		M	MSD format version set to 1 to discriminate from later MSD formats. Later versions have to be backwards compatible with existing versions. Systems receiving an MSD shall support all standardized MSD versions, which are each uniquely identified using an MSD format version parameter which shall always be contained in the first byte of all (current and future) MSD versions.
2	Message identifier	Integer		M	Message identifier, starting with 1 for each new eCall session and has to be incremented with every application layer MSD retransmission following a new 'send MSD' request after the incident event.

Block No.	Name	Type	Unit		Description
3	Control	Bit sequence		M	Bit 7: 1=Automatic activation 0=Manual activation Bit 6: 1=Test call 0=Emergency Bit 5: 1=Position can be trusted 0=No confidence in position Bit 4-0: Vehicle type encoding, e.g. 00001 = passenger vehicle (Class M1) 00010 = buses and coaches (Class M2) 00011 = buses and coaches (Class M3) 00100 = light commercial vehicles (Class N1) 00101 = heavy duty vehicles (Class N2) 00110 = heavy duty vehicles (Class N3) 00111 = motorcycles (Class L1e) 01000 = motorcycles (Class L2e) 01001 = motorcycles (Class L3e) 01010 = motorcycles (Class L4e) 01011 = motorcycles (Class L5e) 01100 = motorcycles (Class L6e) 01101 = motorcycles (Class L7e) Vehicle definitions class M, N according to directive 2007/46/EC; class L according to directive 2002/24/EC. The position confidence bit is to be set to "Low confidence in position" if the position is not within the limits of +/- 150m with 95% confidence.
4	Vehicle identification	String		M	VIN number according ISO 3779 World Manufacturer Index (WMI) Vehicle Type Descriptor (VDS) Vehicle Identification Sequence (VIS)

Block No.	Name	Type	Unit		Description
5	Vehicle Propulsion storage type	Integer		M	These parameters identify the type of vehicle energy storage(s) present. 0 = indicates a type of storage not present 1 = indicates type of storage which is present All bits set to zero indicate an unknown type of energy storage. Bit 7: unused Bit 6: unused Bit 5: 1 = hydrogen storage Bit 4: 1 = electric energy storage (with more than 42V and 100 Ah) Bit 3: 1 = liquid propane gas (LPG) Bit 2: 1 = compressed natural gas (CNG) Bit 1: 1 = diesel tank present Bit 0: 1 = gasoline tank present This information may be unreliable if there has been a change of vehicle propulsion type (e.g. from gasoline to CNG). More than one bit may be set if there is more than one type of energy storage present.
6	Timestamp	Integer	UTC sec	M	Timestamp of incident event. Seconds elapsed since midnight January 1st, 1970 UTC. Failure value for time stamp set to "0".
7	Vehicle location	Integer	Milliseconds	M	Position latitude (WGS84) Value range (-324000000 to 324000000) Maximum value Latitude = 90°00'00.00" = 90*60*60.000" = 324000.000" = 324 000 000 Milliseconds = 0x134FD900 Minimum value Latitude = -90°00'00.00" = -90*60*60.000" = -324000.000" = -324 000 000 Milliseconds = 0xECB02700 Example 48°18'1.20" N = 48.3003333 lat = (48*3600)+(18*60)+1.20"=173881,200" Which encodes to the following value: = 173881200d=0x0A5D3770 If latitude is invalid or unknown, the value 0x7FFFFFFF shall be transmitted.

Block No.	Name	Type	Unit		Description
7	Vehicle location	Integer	Milliseconds	M	Position longitude (WGS84) Value range (-648000000 to 648000000) Maximum value Longitude = 180°00'00.00" = 180*60*60.000" = 648000.000" = 648 000 000 Milliseconds = 0x269FB200 Minimum value Longitude = -180°00'00.00" = -180*60*60.000" = -648000.000" = -648 000 000 Milliseconds = 0xD9604E00 Example 11°37'2.52" E = 11.6173666 long = (11*3600)+(37*60)+2.52"=41822.520" Which encodes to the following value: = 41822520d=0x027E2938 If longitude is invalid or unknown, the value 0x7FFFFFFF shall be transmitted.
8	Vehicle direction	Integer	2 degree	M	Direction of travel in 2 degrees steps from magnetic north (0-358, clockwise). If direction of travel is invalid or unknown, the value 0xFF shall be used.
9	Recent vehicle location n-1	Integer	100 milliseconds	O	Latitude delta (+ for North and – for South) with respect to Current Vehicle position in Block 7. 1 Unit = 100 milliseconds (WGS84), which is approximately 3m. Coded value range (-512..511) representing - 51 200 to +51 100 milliseconds, or from 51,2"S to 51,1"N from the current position. Longitude delta (+ for East and – for West) with respect to Current Vehicle position in Block 7. 1 Unit = 100 milliseconds (WGS84), which is approximately 3m. Coded value range (-512..511) representing - 51 200 to +51 100 milliseconds, or from 51,2"W to 51,1"E from the current position.

Block No.	Name	Type	Unit		Description
10	Recent vehicle location n-2	Integer	100 milliseconds	O	Latitude delta (+ for North and – for South) with respect to Recent Vehicle position n-1 in Block 9. 1 Unit = 100 milliseconds (WGS84), which is approximately 3m. Coded value range (-512..511) representing - 51 200 to +51 100 milliseconds, or from 51,2"S to 51,1"N from the location represented by Recent Vehicle Location n-1.
					Longitude delta (+ for East and – for West) with respect to Recent Vehicle position in Block 9. Coded value range (-512..511) representing - 51 200 to +51 100 milliseconds, or from 51,2"W to 51,1"E from the location represented by Recent Vehicle Location n-1.
11	No. of passengers	Integer		O	Minimum known number of fastened seatbelts, to be set to 0xFF or the optional parameter omitted if no information is available. Note This information is indicative only as it may be not always be reliable in providing exact information about the number of passengers (e.g. because seatbelts may not be fastened by passengers or for other reasons).
12	Optional additional data	String	Tbd	O	Further 103 bytes of data encoded as in ASN.1 definition. ASN.1 provides already the indication of whether optional data is included by simply identifying the optional additional data field as optional. Additional Data field may include an address where other relevant related data or functions are available.

Some fields of the MSD are set due to information from the DTE, others are set due to internal information of the module/NAD.

23.18. Sleep Mode Management

23.18.1. What is Sleep Mode?

Sleep mode allows the module to be placed in a state of low energy consumption.

There are two levels of sleep mode:

- The first level is a high layers sleep mode. It means that the module cannot receive any AT commands.
- The second level is the deep sleep: it is when the module is turned off (use +CPOF or *PSCPOF AT commands) and only the real-time clock (RTC) is running (all GPIOs and signals are inactive). The module can be waking up by the start hardware signal (pok-in) or by an alarm (see +CALA command). Note that the module is still power supplied by the host.

23.18.2. Determining if the Module is in Sleep Mode

When the module is in sleep mode the CTS signal is inactive.

The module is in deep sleep when all signals are inactive.

23.18.3. Sleep States

+KSLEEP configures the way the UART allows the activation of sleep. When the USB is plugged, this is managed by selective suspend commands sent from the host.

	+KSLEEP=0 (DTR control sleep)		+KSLEEP=1 (Auto sleep)	+KSLEEP=2 (Sleep forbidden)
	DTR active	DTR inactive		
USB is active (power on)	Sleep	Sleep	Sleep	Sleep
After module starts up	No sleep	Sleep after minimum 5s	Sleep after minimum 5s	No sleep
No activity on the AT channels (even if a PDP context is opened or a channel is in data mode)	No sleep	Sleep	Sleep	No sleep
GPS active	No sleep	No sleep	No sleep	No sleep
Audio playback	No sleep	No sleep	No sleep	No sleep
No activity on Mux 07.10	No sleep	Sleep	Sleep	No sleep

23.18.4. Events that Wake the Module Up

	+KSLEEP=0 (DTR control sleep)		+KSLEEP=1 (Auto sleep)	+KSLEEP=2 (Sleep forbidden)
	DTR active	DTR inactive		
Any URCs sent (voice call ring, sms, alarm, network, etc.)	No sleep	For HL6528x: sleep, the URC is not sent For HL85xxx: wake up, the URC is sent	Wake up, the URC is sent	No sleep
Sent 0x00 character on the UART or USB ¹	No sleep	Sleep	Wake up ³	No sleep
Data received on the AT channels (data call, TCP, UDP, etc.)	No sleep	Sleep	Wake up	No sleep
Toggle RTS signal (inactive to active or active to inactive)	No sleep	Sleep	Wake up ²	No sleep
Toggle DTR inactive to active	Wake up	Sleep	Wake up	No sleep
Toggle DTR active to inactive	-	Sleep	Sleep	No sleep

1 After 0x00 wait for 100ms before sending any AT command.

2 Not available on the HL85xxx.

3 Not in the case of a 2-wire application on the HL8518, HL8528 or HL8529.

When the HL6528x use AT+KSLEEP=1 (sleep mode auto) and hardware flow control AT&K3, the only way to wake it up is to toggle the RTS signal.

Neither the HL6528x nor the HL854x can be woken up by sending the character "0x00" on the UART because the CTS signal is inactive so it is blocked by flow control. Due to this limitation, AT&K3 and AT+KSLEEP=1 must not be used together on the HL854xx as the module cannot be woken up from sleep mode.

In case of a 2-wire application on the HL8518, HL8528 and HL8529, the "0x00" character cannot wake the module up from sleep mode (after AT+KSLEEP=1) without the RTS signal asserted to logic high.

23.18.5. Signal Behavior

23.18.5.1. GPIO Signals

During sleep mode GPIO signals configured with +KSYNC are still generated.

23.18.5.2. RI Signal

During sleep mode Ri signal state changes according to +KRIC command.

23.18.5.3. DCD Signal

DCD is active when a data call (CSD call, GPRS/3G, data on MUX, TCP, FTP, UDP...) is in progress even if the module is in sleep mode. After a "+++" DCD is INACTIVE, after ATO it becomes ACTIVE (if the data call is still active).

DCD is inactive if there is no data call at all.

23.18.5.4. CTS Signal

CTS signal is always active when the module is not in sleep mode.

CTS signal is inactive when the module is in sleep mode.

23.18.5.5. DSR Signal

DSR signal is always active when the module is power on.

23.18.5.6. Signals Table

Signal	No Sleep	Sleeping State
CTS	active	inactive
DSR	active	active
DCD	Active or inactive*	Active or inactive*
RI	Active or inactive*	Active or inactive*
GPIO	Active or inactive*	Active or inactive*

* The sleep mode state does not change the status of this signal.

23.18.6. Management of DTR Signal and AT&D Option

Note: +KSLEEP=0 (DTR control sleep)

	AT&D0	AT&D1	AT&D2
Any Voice calls in progress, Toggle DTR active to inactive	All voice calls are still active for the HL6528x; all voice calls depend on AT+CVHU command settings for the HL85xxx. The module goes in sleep mode. CTS signal is inactive. AT commands are not received.	All voice calls are still active for the HL6528x; all voice calls depend on AT+CVHU command settings for the HL85xxx. The module goes in sleep mode. CTS signal is inactive. AT commands are not received.	All voice calls are still active for the HL6528x; all voice calls depend on AT+CVHU command settings for the HL85xxx. The module goes in sleep mode. CTS signal is signal inactive. AT commands are not received.
Any data calls in progress, Toggle DTR active to inactive	All data calls are still active. The module goes in sleep mode. CTS signal is inactive. AT commands are not received.	All data calls are still active. "OK" is sent. Module is in command mode. The module goes in sleep mode. CTS signal is inactive. AT commands are not received.	All data calls are disconnected. "NO CARRIER" or disconnection URCs are sent. Module is in command mode. The module goes in sleep mode. CTS signal is inactive. AT commands are not received.

23.19. How to Use HTTPS Client Specific Commands

AT&K3	Hardware flow control activation
OK	
AT+KCNXCFG=0,"GPRS","APN","log","password","0.0.0.0","0.0.0.0","0.0.0.0"	Set GPRS parameters (APN, login, password)
OK	
AT+KCNXTIMER=0,60,2,70	Set Timers
OK	
AT+KCNXPROFILE=0	Activate GPRS profile
OK	
AT+CGATT=1	Be sure to attach to network
OK	
AT+KHTTPSCFG=0,"www.coursera.org",443,,,1	Set HTTPS address, port number, security level. It is suggested to use security level 1 in most cases (security level 1 means only encrypt data)
+KHTTPSCFG: 0	
OK	

AT+KHTTPSHEADER=0 CONNECT Accept : text/html If-Modified-Since : Saturday, 15-January-2000 14:37:11 GMT OK	Set the header of the request Send HTTP data after "CONNECT". Do not forget the PATTERN characters. For example : "Data flow --EOF--Pattern--"
AT+KHTTPSGET=0, "/" CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 Date: Tue, 24 Jun 2008 02:11:35 GMT Expires: -1 Content-Type: text/html; charset=ISO-8859-1 Set-Cookie: PREF=ID=ae1c663417e7799e:NW=1:TM=1214273495:LM=1214273495:S=5Uq9kExK4aTEv_cx; expires=Thu, 24-Jun-2010 02:11:35 GMT; path=/; domain=.google.com Server: gws Connection: Close <html><head><meta http-equiv="content-type" ... a lot of data... OK	Get the web page HTTPS server response
AT+KHTTPSHEAD=0, "/" CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 Date: Tue, 24 Jun 2008 02:11:35 GMT Expires: -1 Content-Type: text/html; charset=ISO-8859-1 Set-Cookie: PREF=ID=ae1c663417e7799e:NW=1:TM=1214273495:LM=1214273495:S=5Uq9kExK4aTEv_cx; expires=Thu, 24-Jun-2010 02:11:35 GMT; path=/; domain=.google.com Server: gws Connection: Close OK	Get the head of the web page HTTPS server response
AT+KHTTPSPOST=0,, "/get.cgi" CONNECT (...Data send...) HTTP/1.0 200 OK Content-Type: text/plain Context-Length: 37 Your data have been accepted. OK	Send the data to the HTTPS server Send HTTP data after "CONNECT" HTTPS server response

AT+KHTTPSCFG=0,"www.coursera.org ",443,,,2 +KHTTPSCFG: 0 OK AT+CCLK? +CCLK: "12/10/30,14:18:00+00" OK AT+KCERTSTORE=0,462 CONNECT OK AT+KHTTPSHEADER=0 CONNECT Accept : text/html If-Modified-Since : Saturday, 15-January-2000 14:37:11 GMT OK AT+KHTTPSGET=0, "/" CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 Date: Tue, 24 Jun 2008 02:11:35 GMT Expires: -1 Content-Type: text/html; charset=ISO-8859-1 Set-Cookie: PREF=ID=ae1c663417e7799e:NW=1:TM=1214273495:LM=1214273495:S=5Uq9kExK4aTEv_cx; expires=Thu, 24-Jun-2010 02:11:35 GMT; path=/; domain=.google.com Server: gws Connection: Close <html><head><meta http-equiv="content-type" ... a lot of data... OK AT+KHTTPSHEAD=0, "/" CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 Date: Tue, 24 Jun 2008 02:11:35 GMT Expires: -1 Content-Type: text/html; charset=ISO-8859-1	Set HTTPS address, port number, security level. Security level 2 means check server's certification and encrypt data. Set clock to current or we will fail to check the server's certification Input your root certification. It will be used to check server's certification. Set the header of the request Send HTTP data after "CONNECT". Do not forget the PATTERN characters. For example : "Data flow --EOF--Pattern--" Get the web page HTTPS server response Get the head of the web page HTTPS server response

Set-Cookie: PREF=ID=ae1c663417e7799e:NW=1:TM=1214273495:LM=1214273495:S=5Uq9kExK4aTEv_cx; expires=Thu, 24-Jun-2010 02:11:35 GMT; path=/; domain=.google.com Server: gws Connection: Close OK AT+KHTTSPPOST=0,, "/get.cgi" CONNECT (...Data send...) HTTP/1.0 200 OK Content-Type: text/plain Content-Length: 37 Your data has been accepted. OK	 Send the data to the HTTPS server Send HTTP data after "CONNECT" HTTPS server response

23.20. Cause Select Values for AT*PSCSN

Cause Select	Definition
0x00	No defined cause
0x10	Telecom stack internal cause (minor)
0x18	Telecom stack internal cause (blocking)
0x11	Terminal Equipment connected cause
0x19	Data Call Manager cause
0x1A	IP stack cause
0xB4	Telecom stack Data cause
0x41	Local cause (protocol)
0x42	Mobility Management cause (protocol)
0x43	Call Control (protocol)
0x44	Deregistration cause (protocol)
0x45	Radio Protocol cause
0x46	CP cause
0x47	SIM card cause
0x48	Hardware cause
0x49	Problem in GPRS PDP activation
0xA1	Invocation message
0xA3	SS return error message
0x80	SS reject general problem
0x81	SS reject invoke problem
0x82	SS reject result problem
0x83	SS reject error problem

Note: Many "cause" values can be associated with each "CauseSelect" value.. All "cause" values cannot be described in this document.

23.21. SIM Toolkit Feature Overview

The HL6528x's SIM Toolkit requirements are compliant with the following documents:

1. **3GPP TS 51.010-04** 3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Mobile Station (MS) conformance specification; Part 4: Subscriber Identity Module (SIM) application toolkit conformance test specification
2. **3GPP TS 31.124** "3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Mobile Equipment (ME) conformance test specification; Universal Subscriber Identity Module Application Toolkit (USAT) conformance test specification"

23.22. Using Location Service

This section provides an introduction and a high level description of the Location Service features, and supplements the AT command set listed in section 18 Location Service Commands.

23.22.1. Features Description

The Location Service and its associated AT command set allow users to:

- Control the Location feature and the GNSS receiver.
- Output the NMEA frames on a specified port (UART, I²C, or CMUX virtual port), to configure the NMEA rate and to select the NMEA sentences
- Output the PVT sentences on a specified port (UART, I²C, or CMUX virtual port), to configure the PVT rate and to select the PVT sentences
- Be notified of the GNSS fix events such as 3D fix obtained or fix lost
- Configure and control GNSS receiver low power modes
- Get the TTFF value
- Configure and control Aiding modes
- Retrieve more information version and debug information

In addition, Location Services allows the driving of several signals such as antenna supply enable signal or PPS signal.

23.22.2. Start Location Service

23.22.2.1. Default Factory Configuration

The default configuration used by the application is specified in the following table.

Configuration	Default Factory Value	Use Command to Change
NMEA mode	UART number 1 All supported NMEA frames are displayed, 1 second NMEA frames update	AT+GPSNMEA
Starting mode	"AUTO" start with all previous NV stored data	AT+GPSSTART

To start Location Services for the first time, if default factory settings are not to be used, settings must be specified using advanced AT commands described in section 18 Location Service Commands.

23.22.2.2. AT Command Sequence

The AT command sequence to start receiving NMEA frames on the specified port is:

1. **AT+GPSNMEA=<output>** (only if the default factory configuration should be changed)
2. **AT+GPSSTART=0** (Starts the GNSS receiver)

After few seconds, NMEA frames will be received every second on the requested port.

23.22.3. GNSS Receiver Capabilities and Restrictions

23.22.3.1. Supported NMEA Sentences

The following table presents all supported NMEA sentences and which are applicable to HL6/8 GNSS solution in both the single (GPS) and the multiple constellation (GNSS with GPS and GLONASS constellations) scenarii.

The table is filled with the following indicators.

●: Fully supported.

●: Partially supported or with specific behavior.

●: Not supported.

Description	HL6528-G		HL854x-G
	GPS Mode	GNSS Mode	
\$GPGGA NMEA frame (GPS Fix Data)	●	●	●
\$GPGSA NMEA frame (GPS DOPS and Active Satellites)	●	●	●
\$GNGGA NMEA frame (GNSS Fix Data)	●	●	
\$GLGSA NMEA frame (GLONASS DOPS and Active Satellites)	●	●	●
\$GNGSA NMEA frame (GNSS DOPS and Active Satellites)	●	●	●
\$GPRMC NMEA frame (Recommended Minimum GNSS Sentence)	●	●	●
\$GNRMC NMEA frame (Recommended Minimum GNSS Sentence)	●	●	
\$GPVTG NMEA frame (Course Over Ground and Ground Speed)	●	●	●
\$GNVTG NMEA frame (Course Over Ground and Ground Speed)	●	●	
\$GPGLL NMEA frame (Geographic Position - Latitude, Longitude)	●	●	●
\$GNGLL NMEA frame (Geographic Position - Latitude, Longitude)	●	●	
\$GPGST NMEA frame	●	●	●
\$GPGSV NMEA frame (GPS Satellites in View)	●	●	●

Description	HL6528-G		HL854x-G
	GPS Mode	GNSS Mode	
\$GLGSV NMEA frame (GLONASS Satellites in View)	●	●	●
\$GNGSV NMEA frame (GNSS Satellites in View)	●	●	●
\$GNGNS NMEA frame (GNSS fix data)	●	●	
\$GPZDA NMEA frame	●	●	●
\$PSWI, SA NMEA frame (Proprietary sentence providing Solution Accuracy parameters)	●	●	●

23.22.3.2. Proprietary NMEA Sentences

“PSWI” is the NMEA sentences ID for Sierra Wireless’ Proprietary NMEA sentences.

This NMEA sentence is activated through the +GPSNMEA AT command with <nmea_mask> encode mask parameter GPS_NMEA_PROP_EN (1 << 15) activated.

The “PSWI,SA” message provides information about the accuracy of the positioning solution.

A typical “PSWI,SA” sentence structure is: \$PSWI,SA,1,4,1,5.0,7.5*27

But for the HL6528-G, a typical “PSWI,SA” sentence structure is: \$PSWI,SA,1,0,5,77,149,12,12*07

The following table describes the different fields that build the PSWI_SA sentence:

Field	Description
1	PSWI sentence description: “SA”
2	Message number
3	Position determination status: 0: Solution is not overdetermined 1: Solution is overdetermined Validated solution means that at some point at least 5 satellites were used in the solution and the navigation software determined that all 5 were consistent with each other (solution was overdetermined).
4	Fix type as described hereunder: 0: No navigation solution 1: 1 satellite degraded solution 2: 2 satellites degraded solution 3: 3 satellites solution (2D KF) 4: More than 3 satellites solution (3D KF) 5: 3 satellites least square solution (2D LSQ) 6: More than 3 satellites least square solution (3D LSQ) 7: Dead reckoning
5	Estimated Horizontal Position Error (meters)
6	Estimated Vertical Position Error (meters)
7	Automatic Gain Control (AGC) value for GPS (HL6528-G only)
8	Automatic Gain Control (AGC) value for GLONASS (HL6528-G only)

While only using GPS constellation, these fields can give an indication on the reliability of the fix. As the GNSS engine is a 3σ statistical process, the indication cannot be 100% accurate. The criteria are:

1. The AGC value (field 7) must be less than 25. If the AGC value is higher, the fix information is not reliable. In this case the radio path must be checked to comply with the GNSS Antenna Recommendations section of the module's product technical specification.
2. If the AGC value is acceptable, then the other fields can help in determining the fix reliability.

Table 4. Indicative Fix Reliability

Field 7 (AGC)	Field 3 (Position Determination)	Field 4 (Fix Type)	Field 5 (EHPE)	Fix Reliability
< 25	1	4 (3D KF)	< 30m	Good
< 25	X	3 or 4 (2D KF or 3D KF)	< 120m	OK
< 25	X	6 (3D LSQ)	< 500m	Poor
< 25	X	5 (2D LSQ)	> 500m	No fix
> 25	-	-	-	Not reliable

Note: Only the 3D KF fix type can give good reliability.

23.22.4. HL6528-G Capabilities and Restrictions

23.22.4.1. Start-Up Time

The startup time is the duration between the +GPSSTART command and the +GPSEVSTART event. After the +GPSEVSTART event, the Location Service has been correctly started, GNSS receiver hardware and software resources are activated, and GPS/GLONASS acquisition phase is starting.

The startup time includes the GNSS receiver update time if applicable.

The HL6528-G's GNSS receiver update takes place after GNSS receiver ON or after GNSS receiver reset. ROM update will then occur after initial AT+GPSSTART sequence.

The startup time is < 2 seconds without GNSS receiver ROM update, < 6 seconds with update.

23.22.4.2. Starting Mode

Starting modes are used only for test purposes and allow start performance measurement.

A Start mode parameter is specified with each instance of the +GPSSTART AT command. One parameter (the "Auto" parameter) is designed for normal GNSS operation, the others (war/cold/factory modes) are designed for test purpose.

The "auto" start mode behaves as a best effort mode: the GNSS chip will make full use of its own GNSS context to minimize the time to first fix. Depending on the conditions, the GNSS chip may have to rebuild part or the entirety of its GNSS context at start-up resulting in a wide range of TTFF results. The TTFF can typically range from less than one second (e.g. the GNSS chipset returns from sleep state with a valid GNSS context) to performances similar to a cold start if the GNSS context is not valid and has to be rebuilt entirely. Services such as DEE can improve TTFF performances accelerating the re-building of a valid GNSS context.

Various test modes (warm/cold/factory) are also supported to help with automated tests providing explicitly degraded GNSS contexts:

- Warm test is a test mode that explicitly erases the satellite ephemerides in the GNSS chip's memory. The satellite context and the GNSS time remain valid. Warm test mode has to be applied to a valid GNSS context for consistent results.
- Cold test is a test mode that explicitly erases most of the GNSS context (time, satellites, broadcast ephemerides, etc.) The patch applied to the GNSS chip at start-up is maintained and doesn't have to be applied again but the whole GNSS context has to be rebuilt.
- Factory test is a test mode that explicitly erases the whole memory in the GNSS chipset. The patch has to be applied again at start-up and the whole GNSS context rebuilt.

The following table defines the **minimum** required data for each starting mode:

Starting Mode	Broadcasted Ephemeris	Extended Ephemeris	Approximate Time and Position	Almanac	Calibration Data
AUTO	X	Used*	X	Updated	X
WARM TEST		Used*	X	Updated	X
COLD TEST		Used*		Updated	X
FACTORY TEST				Factory	X

* Extended Ephemeris data (AEE/DEE) are used if data are available and valid. Extended Ephemeris data are removed when FACTORY start is requested

A valid GNSS context provides the necessary conditions for “HOT” start. It is not a “starting mode” per se but a result of favorable conditions. “HOT” start is the best performance “AUTO” mode can provide.

Broadcasted Ephemeris data are used if data are available and valid. For example, HOT start performed without broadcasted ephemeris will be treated as a WARM start.

The following table describes supported starting mode(s) from each Location Services application state.

Description	From GPS_OFF State	From GPS_RUNNING State
Supported start performances	AUTO COLD FACTORY	AUTO WARM COLD FACTORY

23.22.4.3. GNSS Data Management

GNSS Data are required to improve next GNSS start performances. GNSS data are mainly made up of:

- Ephemeris data (Broadcasted and Extended)
- Time and Position
- Broadcasted Almanac
- Calibration data

The resilience status of the GNSS data is described in the following table.

Location Library State Transition	GNSS Data Stored to NV Memory
GPS_OFF to GPS_RUNNING state (+GPSSTART)	N/A
GPS_OFF to GPS_INITIALIZED state (+GPSINIT)	N/A
GPS_INITIALIZED to GPS_RUNNING state (+GPSSTART)	N/A
GPS_RUNNING to GPS_SLEEP state (+GPSSLEEP)	YES
GPS_SLEEP to GPS_RUNNING state (+GPSSTART)	YES
GPS_RUNNING to GPS_INITIALIZED state (+GPSSTOP)	YES
GPS_SLEEP to GPS_INITIALIZED state (+GPSSTOP)	YES

Please refer to section 25.1.4.1 State Machine for more information about state transitions.

23.22.4.4. Navigation Aiding

Two non exclusive modes run the Extended Ephemeris (EE) feature: the Autonomous Extended Ephemeris (AEE) and the Downloaded Extended Ephemeris (DEE) modes.

AEE does not involve extra hardware, connectivity requirement or additional cost. If activated, the Autonomous Extended Ephemeris feature will automatically compute EE for each newly received satellite Broadcast Ephemeris. The associated GNSS Data are stored to NV memory during specific Location Services Application transition.

DEE improves start-up GPS performance using Extended Ephemeris data that outlast the standard broadcast ephemeris data. Two source options are available for EE files update: a remote source (i.e. the EE file distribution server) or a local source (i.e. HL6/8's own file system). The data from the source file are then injected in the GNSS chip and used until they are no longer or they are explicitly replaced by a newer set.

The bearer supporting the network connection during remote DEE should be set up through the network set of AT commands.

The communication socket is managed by the Location service. Related errors are returned by the +GPSEVAID and +GPSEVAIDERROR events.

GNSS Data are stored to NV memory during specific Location Services Application transition.

The GNSS aiding service shows some specific restrictions regarding configuration and GNSS states as described in the following table:

Option	GPS_OFF	GPS_RUNNING	GPS_SLEEP
<config_type> = 0 (AEE configuration)	Allowed	Not allowed	Allowed
<config_type> = 1 (DEE configuration)	Allowed	Not allowed	Allowed
<config_type> = 2 (DEE command)	Authorized*	Allowed	- AT+GPSAID=2, <dee_command> is not allowed when <dee_command>=0 or 4 (answers +GPS ERROR: -1) - AT+GPSAID=2, <dee_command> is authorized when <dee_command>=1, 2 or 3

* In this state, the AT command is authorized but the configuration will only become effective in "Allowed" state.

23.22.5. Location Services States

This section provides information of the Location Services states, their transitions and allowed AT commands for each state.

23.22.5.1. State Machine

The following figure details the diagram of states and state transitions in the Location Services application.

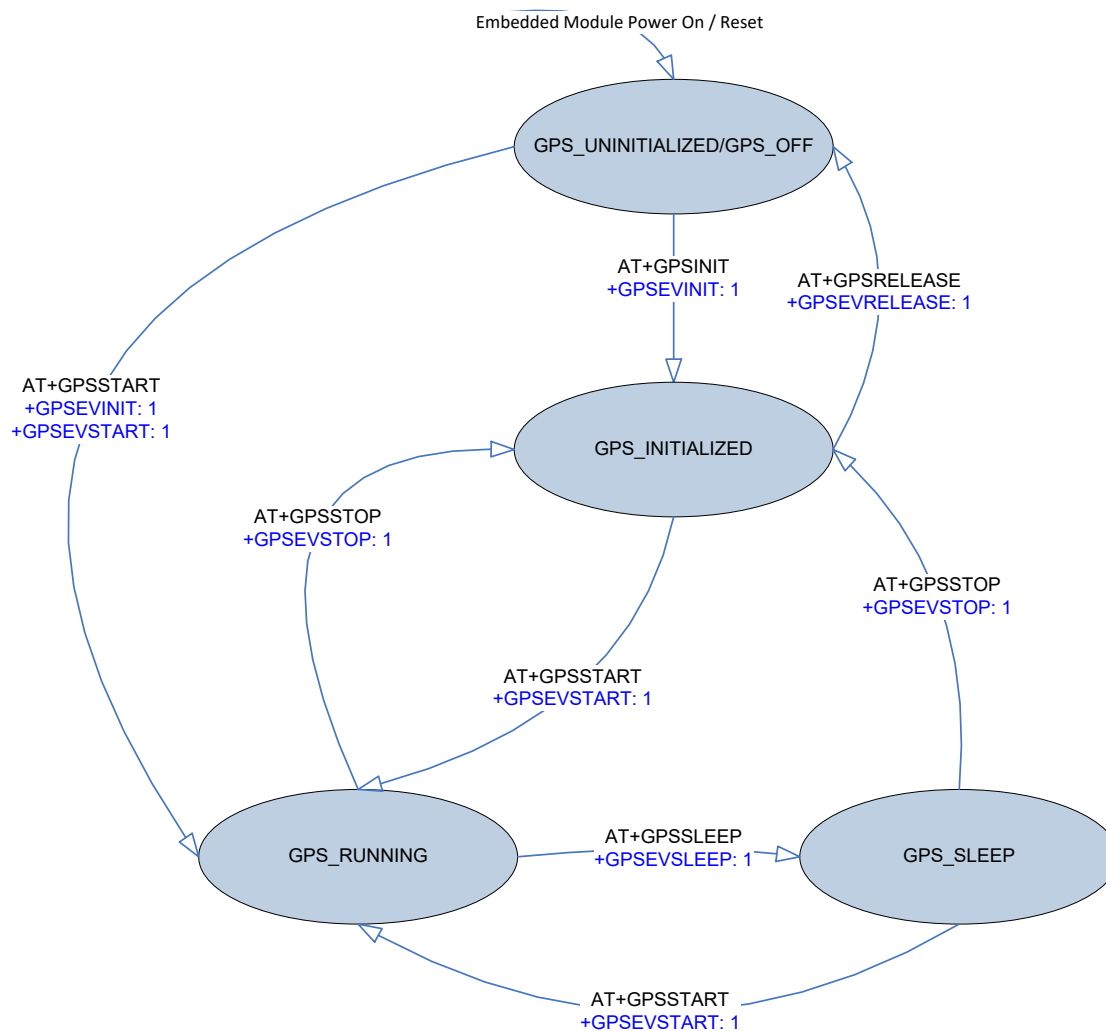


Figure 7. Location Services State Diagram

23.22.5.2. AT Commands Calls Requirements

The following table shows the prerequisites when using the Location AT commands.

‘X’ means the AT Command is authorized in the corresponding state.

‘-’ means the AT Command is NOT authorized in the corresponding state.

Table 5. Location AT Command Prerequisites

Function	GPS_OFF/ GPS_UNINITIALIZED	GPS_INITIALIZED	GPS_RUNNING	GPS_SLEEP
AT+GPSSTART	X	X	-	X
AT+GPSSTOP	-	-	X	X
AT+GPSSLEEP	-	-	X	-
AT+GPSINIT	X	-	-	-
AT+GPSCONF	X (only for the HL854x-G)	X	X	X
AT+GPSVERS	X	X	X	X
AT+GPSNMEA	X	X	X	X
AT+GPSPVT	X	X	X	X
AT+GPSTTFF	-	X	X	X
AT+GPSAID	*	*	*	*
AT+GPSRELEASE	-	X	-	-

* Refer to section 25.1.3.4 Navigation Aiding

23.22.6. Asynchronous Events

Asynchronous events provide information about the current status of the location service. The user is notified of any change of status through various events. Most events are associated to navigation and aiding services.

The following asynchronous events can be received as unsolicited responses:

- +GPSEVAID – describes Aiding events and related information.
- +GPSEVAIDERROR – an error has been detected for Aiding modes. Please refer to section 23.2.6.2 Aiding Errors for more details.

Other events are associated with +GPSSTART and +GPSSTOP AT Commands.

Table 6. Asynchronous Events

Unsolicited Response	Description and Parameter Values
+GPSEVPOS: <pos_event>	Notifies the status of the satellite fix changed. <pos_event> Event status 0 The GNSS fix position has been detected lost 1 GNSS fix state has been changed to estimated (i.e. forward predicted) Position 2 GNSS fix state has been changed to 2-dimensional position 3 GNSS fix state has been changed to 3-dimensional position 4 GNSS fix state has been changed to invalid position
+GPSEVSTART: <status>	Notifies the result of the GNSS chipset activation. <status> Event status 0 The action has failed. Application state is unchanged 1 The action has been successfully completed

Unsolicited Response	Description and Parameter Values
GPSEVSTOP: <status>	Notifies the result of the GNSS session termination. <status> Event status 0 The action has failed. Application state is unchanged 1 The action has been successfully completed
GPSEVINIT: <status>	Notifies the result of the GNSS session initiation (internal GNSS context setup, does not include GNSS chipset activation). <status> Event status 0 The action has failed. Application state is unchanged 1 The action has been successfully completed
GPSEVSLEEP: <status>	Notifies the result of the transition to sleep mode. <status> Event status 0 The action has failed. Application state is unchanged 1 The action has been successfully completed
+GPSEVAID: <aid_mode>,<aid_event> For <aid_mode>=0 and <aid_event>=2 +GPSEVAID: <aid_mode>,<aid_event>,<aee_svid>,<aee_svValidity> For <aid_mode>=1 and <aid_event>=3 +GPSEVAID: <aid_mode>,<aid_event>,<dee_abort_cause> For <aid_mode>=1 and <aid_event>=4 and <dee_validity_format>=0 +GPSEVAID: <aid_mode>,<aid_event>,<dee_validity_format>,<dee_validity_duration> For <aid_mode>=1 and <aid_event>=4 and <dee_validity_format>=1 +GPSEVAID: <aid_mode>,<aid_event>,<dee_validity_format>,<dee_validity_start>,<dee_validity_end>	Provides information regarding the current status of the aiding operation. Depending on the mode and the event, additional information may be provided. <aid_mode> GNSS Aiding mode 0 Autonomous Extended Ephemeris 1 Downloaded Extended Ephemeris <aid_event> GNSS Aiding mode For <aid_mode>=0 0 AEE calculation has been stopped 1 AEE calculation has been started 2 AEE information For <aid_mode>=1 0 DEE has been stopped 1 DEE has been started 2 DEE is valid 3 DEE has been aborted 4 DEE validity information <aee_svid> Satellites Identifier of the last calculated Autonomous Extended Ephemeris <aee_svValidity> AEE validity in minutes <dee_validity_format> Defines DEE validity format indicated by <dee_validity_duration> or <dee_validity_start> / <dee_validity_end> fields. 0 DEE Validity indicated in minutes through <dee_validity_duration> field 1 DEE Validity indicated with <dee_validity_start> and <dee_validity_end> timestamps <dee_validity_duration> DEE validity in minutes Available for <dee_validity_format>=0 <dee_validity_start> DEE Validity Start timestamp with the format: "yy/MM/dd,hh:mm:ss" Available for <dee_validity_format>=0

Unsolicited Response	Description and Parameter Values
	<dee_validity_end> DEE Validity End timestamp with the format "yy/MM/dd,hh:mm:ss" Available for <dee_validity_format>=0 <dee_abort_cause> DEE abort cause
+GPSEVAIDERROR: <aid_error>,<aid_ext_error>	Provides information regarding an error that occurred while operating the aiding service. <aid_error> Error number <aid_ext_error> Extended error code depending on <aid_error> parameter. For <aid_error>=-10 (GPS_AIDING_DEE_SOCKET_ERROR), the extended error code parameter returns the related Internet Library socket error code.
+GPSEVSUPL: <supl_event>	Provides information regarding the current status of the SUPL operation. <supl_event> SUPL event 1 SUPL connection has been started 2 SUPL connection has been successful
+GPSEVSUPLERROR: <supl_error>	Provides information regarding an error that occurred while operating the SUPL service. <supl_error> Error number (see section 23.2.6.3 SUPL Errors)

23.22.7. GNSS Aiding Example

23.22.7.1. EE Update from Remote Source

The following sequence has to be issued from the GPS_OFF state:

```

/*** List host storage space content ***/

/*** Setup bearer connection ***/
AT+KCNXCFG=0,"GPRS","1337APN"
OK

/*** Enable aiding service and setup distribution server access ***/
AT+GPSAID=1,1,3,"my.distribserver.com",80,"mysecuredpswd","TCP",10,0
OK

/*** Network attached notification ***/
+CREG: 1

/*** Start GNSS platform ***/
AT+GPSSTART=0
OK

```

```
+GPSEVINIT: 1
+GPSEVSTART: 1
+GPSEVPOS: 0
+GPSEVPOS: 3
...
```

The following sequence as to be issued from the GPS_RUNNING state:

```
/** Initiate forced remote EE update **/
AT+GPSAID=2,3
OK
+GPSEVAID: 1,1          /* DEE operations have started */
+GPSEVAID: 1,2          /* DEE data are valid */
+GPSEVAID: 1,4,0,4276   /* DEE data are valid for the next 4276 minutes */

/** List host storage space after EE update **/
AT+KFSFILE=4,"/gnss"

+KFSFILE: <F> SiRFHostVStorage21.sns 512
+KFSFILE: <F> SiRFHostVStorage24.sns 448
+KFSFILE: <F> SiRFHostVStorage25.sns 17280
+KFSFILE: <F> SiRFHostVStorage23.sns 30360
+KFSFILE: <F> SiRFHostVStorage11.sns 512
+KFSFILE: <F> SiRFHostVStorage14.sns 1792
+KFSFILE: <F> SiRFHostVStorage15.sns 30240
+KFSFILE: <F> SiRFHostVStorage13.sns 30360
+KFSFILE: 826371 bytes free
```

23.22.7.2. EE Update from Local Source

The following example uses two input files as source of EE update, one for the GPS constellation and another one for GLONASS. In this example, the source files were downloaded separately and are transferred to the HL6/8 using the +KFSFILE command.

The source files are for GPS and GLONASS constellations and both have a 3 days long validity. As a result, they will be stored in the /location repository with the names GPS_03.dee and GLO_03.dee.

Note that early update attempts may fail as the GNSS chip makes early access to the EE files and it has priority over EE file access.

```
/** File transfer to HL6/8's file system **/
AT+KFSFILE=0,"/location/GPS_03.dee",31973
CONNECT
OK
AT+KFSFILE=0,"/location/GLO_03.dee",24716
CONNECT
OK
```

```
/** List /location repository's content (optional)*/
AT+KFSFILE=4,"/location/"
+KFSFILE: <F> GLO_03.dee 24716
+KFSFILE: <F> GPS_03.dee 31973
+KFSFILE: 821046 bytes free
OK

/** Enable DEE service (in GPS_OFF) */
AT+GPSAID=1,1
OK

/** Start GNSS platform */
AT+GPSSTART=0

OK
+GPSEVINIT: 1
+GPSEVSTART: 1
+GPSEVPOS: 0
+GPSEVPOS: 3

/** Initiate EE file update from local source (GPS_RUNNING) */
AT+GPSAID=2,4
OK
+GPSEVAID: 1,1          /* DEE service has started */
+GPSEVAID: 1,2          /* DEE data are valid */
+GPSEVAID: 1,4,0,4164   /* DEE data are valid for the next 4164 mminutes */
```

23.22.8. Push-to-Fix Mode

Note: For HL6528-G only.

The push-to-fix mode is a power mode for the GNSS device that allows the user to design duty cycles that fit its application. The internal GNSS device will then automatically alternate between sleep and active intervals enabling the baseband part of the HL6528-G to sleep synchronously with the GNSS device or regardless of the GNSS activity.

The push to fix mode is configured by the **AT+GPSPTFC** command and activated by the **AT+GPSSLEEP** command.

23.22.8.1. Configuration

The **AT+GPSPTFC** command accepts five parameters to custom design the duty cycle of the GNSS device and how its activity impacts the baseband chipset.

The **<rate>** parameter describes the length of the sleep interval. It is provided in seconds and automatically rounded to the immediate superior multiple of 30 seconds. The minimum value is 30 seconds once automatically rounded and, by design, the maximum value is 86400 seconds. The typical validity for broadcasted ephemerides is 7200 seconds so there's a trade off to be found when using bigger **<rate>** values.

The **<max search time>** refers to the maximum interval spent searching for satellite signals during a GNSS device active cycle. It is provided in seconds and automatically rounded to the immediate superior multiple of 30 seconds. Once elapsed, the GNSS device will automatically enter a sleep cycle for **<max off time>** seconds. During normal situations, the GNSS device will use up to **<max search time>** seconds to update its satellite context. The active intervals are not constant in time as the GNSS device applies its own satellite context update logic which may, for instance, involve AEE data update.

The **<max off time>** is the maximum interval spent in a sleep cycle that follows a failure to update its satellite context during the previous active cycle. It is provided in seconds and automatically rounded to the immediate superior multiple of 30 seconds.

The **<velocity adaptation>** algorithm can be enabled as an option. When enabled, the velocity of the system will impact the push-to-fix period as follows:

- If **<rate>** is greater than 300 seconds but less than or equal to 600 seconds, then while the speed exceeds 5m/s, **<rate>** is temporarily adjusted to 60 seconds
- If **<rate>** is greater than 30 seconds but less than or equal to 300 seconds, then while the speed exceeds 5m/s, **<rate>** is temporarily adjusted to 30 seconds
- If the speed is below 5m/s, **<rate>** is not adjusted
- If **<rate>** is greater than 600 seconds, **<velocity adaptation>** is ignored.

The **<uart connection mode>** parameter describes how the GNSS duty cycle impacts the baseband part of the HL6528-G. In asynchronous mode, the UART connection is closed regardless of the activity of the GNSS device ensuring the baseband will not be awakened by the navigation chip and resulting in minimal power consumption from the baseband part. In synchronous mode, the baseband will follow the GNSS duty cycle, waking up when the navigation chip does and returning to its own sleep logic when the GNSS device turns to sleep.

Please note that the **<uart connection mode>** will impact the access to the ephemerid files stored in the host (AEE and DEE data) resulting in a longer time to fix when the GNSS device wakes up. This is balanced by a lesser power consumption as the baseband chip does not wake-up with the GNSS chip. This also only really applies for **<rate>** values greater than 7200 seconds when the broadcast ephemerides are considered obsolete. Otherwise, the broadcast ephemerides are still available to the GNSS device and the time to fix should not be impacted.

23.22.8.2. Activation

Activation of the push-to-fix mode is performed through **AT+GPSSLEEP=0** in GPS_RUNNING mode. Switching to idle sleep mode activates push-to-fix feature. The HL6528-G will then gather the information it needs before the GNSS device enters a duty cycle based on the current configuration for push-to-fix mode (refer to the **AT+GPSPTFC?** command to retrieve current configuration). Based on the status of the uart connection mode, the baseband part will notify the navigation status during each active cycle (synchronous mode) or not (asynchronous mode).

In order to retrieve a position information, the user issues a regular **AT+GPSSTART=0** command which makes the GNSS device immediately leave push-to-fix mode for full power navigation mode. In order to return to push-to-fix mode, issue **AT+GPSSLEEP=0** again.