AirPrime HL6528RDx

AT Commands Interface Guide

SIERRA WIRELESS®

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Document History

Version	Date	Updates
1.0	September 01, 2015	Creation
1.1	September 09, 2015	Added: • 3.12 +CMUX Command: Enter Multiplexing Mode • 5.53 +KSLEEP Command: Power Management Control • 12.7 +KPCMCFG Command: Configure PCM/Digital Audio • 13.3 +WMRXPOWER Command: Test RF Rx • 14 SIM Application Toolkit Commands
		Updated: • 5.36 +KADC Command: Analog to Digital Converter • 13.1 +WMAUDIOLOOP Command: Audio Test
1.2	September 11, 2015	Added: • 2.30 X Command: Result Code Selection and Call Progress Monitoring Control • 6.10 +CHLD Command: Call Hold and Multiparty
		Updated: • 2.12 +IPR Command: Set Fixed Local/DTE Rate • 4.8 D Command: Mobile Originated Call to Dial a Number
1.3	October 06, 2015	Updated section 3.21 I Command: Request Identification Information
2.0	November 02, 2015	Added: • 2.1 &C Command: Set Data Carrier Detect (DCD) Function Mode • 2.2 &D Command: Set Data Terminal Ready (DTR) Function Mode • 2.3 &F Command: Restore Factory Settings • 2.4 &K Command: Flow Control Option • 2.6 &S Command: DSR Option • 2.8 &W Command: Save Stored Profile • 2.9 +++ Command: Switch from Data Mode to Command Mode • 2.13 A/ Command: Repeat Previous Command Line • 2.18 O Command: Switch from Command Mode to Data Mode • 2.21 S2 Command: Set Character for the Escape Sequence (Data to Command Mode) • 2.22 S3 Command: Command Line Termination Character • 2.23 S4 Command: Set Response Formatting Character • 2.24 S5 Command: Write Command Line Editing Character • 2.25 S6 Command: Pause before Blind Dialing • 2.27 S8 Command: Comma Dial Modifier Time • 2.28 S10 Command: Automatic Disconnect Delay • 2.31 Z Command: Reset to Default Configuration • 5.21 +CMER Command: Mobile Equipment Event Reporting • 5.32 +CSQ Command: Signal Quality • 6.11 +CLCC Command: List Current Calls • 10.4 +CGCLASS Command: GPRS Mobile Station Class

Version	Date	Updates
2.0	November 02, 2015	Updated: • 2.12 +IPR Command: Set Fixed Local/DTE Rate • 5.13 +CFUN Command: Set Phone Functionality • 5.36 +KADC Command: Analog to Digital Converter • 6.9 +CCWA Command: Call Waiting • 6.10 +CHLD Command: Call Hold and Multiparty • 6.16 +COLP Command: Connected Line Identification Presentation • 6.18 +COPS Command: Operator • 13.1 +WMAUDIOLOOP Command: Audio Test
	November 09, 2015	Added: • 2.11 +IFC Command: DTE-DCE Local Flow Control • 5.18 +CLAN Command: Set Language • 5.28 +CPWC Command: Power Class • 5.49 +KRIC Command: Ring Indicator Control • 15 NV Related Commands • 16 AVMS Commands • 20.1 Error Codes
		Updated: • 2.6 &S Command: DSR Option • 5.16 +CIND Command: Indicator Control • 5.58 +WEXTCLK Command: External Clocks Setting • 6.18 +COPS Command: Operator • 10.4 +CGCLASS Command: GPRS Mobile Station Class • 13.4 +WMTXPOWER Command: Test RF Tx
	November 13, 2015	Added: • 5.23 +CPAS Command: Phone Activity Status • 5.52 +KSIMSEL Command: SIM Selection • 5.54 +KSREP Command: Mobile Start-Up Reporting • 9 Data Commands • 10.5 +CGDCONT Command: Define PDP Context
		Updated: • 2.31 Z Command: Reset to Default Configuration • 5.53 +KSLEEP Command: Power Management Control • 10.7 +CGPADDR Command: Show PDP Address
	November 20, 2015	Added: • 2.7 &V Command: Display Current Configuration • 8.3 +CMGD Command: Delete SMS Message • 8.11 +CNMI Command: New SMS Message Indication • 8.14 +CSCB Command: Select Cell Broadcast Message Types • 10.5 +CGDCONT Command: Define PDP Context
	November 26, 2015	Added 5.51 +KSIMDET Command: SIM Detection
		Updated: • 2.12 +IPR Command: Set Fixed Local/DTE Rate • 2.22 S3 Command: Command Line Termination Character • 2.6 &S Command: DSR Option • 5.23 +CPAS Command: Phone Activity Status • 5.52 +KSIMSEL Command: SIM Selection

Version	Date	Updates
2.0	December 08, 2015	Added: • 6.15 +CNUM Command: Subscriber Number • 6.17 +COPN Command: Read Operator Name • 6.19 +CPLS Command: Select Preferred PLMN List • 6.21 +CPWD Command: Change Password
		Updated: • 2.8 &W Command: Save Stored Profile • 20.1 Error Codes
3.0	December 21, 2015	Added: • 3.13 +CSCS Command: Select TE Character Set • 5.4 +CACM Command: Accumulated Meter (ACM) Reset or Query • 5.7 +CAMM Command: Accumulated Call Meter Maximum (ACM Max) • 5.12 +CCWE Command: Call Meter Maximum Event • 5.19 +CMEC Command: Mobile Equipment Control Mode • 6.12 +CLCK Command: Facility Lock • 18 Protocol Specific Commands • 20.4 How to Use UDP Specific Commands
		Updated: • 2.3 &F Command: Restore Factory Settings • 2.31 Z Command: Reset to Default Configuration • 5.28 +CPWC Command: Power Class • 5.51 +KSIMDET Command: SIM Detection • 6.22 +CREG Command: Network Registration • 10.10 +CGREG Command: GPRS Network Registration Status • 10.11 +CGSMS Command: Select Service for MO SMS Messages • 10.12 +WPPP Command: Configure PDP Context Authentication (also moved this command from section 15 to section 10) • 13.3 +WMRXPOWER Command: Test RF Rx • 15 NV Related Commands • 16.10 +WDSS Command: Device Services Session
		Deleted 5.29 +KPWM Command: PWM Control
	December 30, 2015	Added: • 3.14 +CSNS Command: Single Numbering Scheme • 12.16 +VTS Command: DTMF and Tone Generation
		Updated: • 2.10 +GCAP Command: Request Complete TA Capability List • 6.18 +COPS Command: Operator Selection • 11.3 +KSIOCFG Command: Serial IO Configuration • 18 Protocol Specific Commands
	January 07, 2016	Added: • 5.25 +CPIN2 Command: • 5.31 +CSIM Command: Generic SIM Access • 12.14 +VIP Command: Initialize Voice Parameters

Version	Date	Updates
3.0	January 07, 2016	Updated: • 18 Protocol Specific Commands • 2.11 +IFC Command: DTE-DCE Local Flow Control • 2.7 &V Command: Display Current Configuration • 2.8 &W Command: Save Stored Profile • 2.10 +GCAP Command: Request Complete TA Capability List • 5.37 +KBCAP Command: Retrieve Bitmap Capabilities • 14 SIM Application Toolkit Commands
	January 14, 2016	Added 2.5 &R Command: RTS/CTS Option
		Updated: • 2.4 &K Command: Flow Control Option • 2.7 &V Command: Display Current Configuration • 2.12 +IPR Command: Set Fixed Local/DTE Rate • 6.15 +CNUM Command: Subscriber Number
	January 26, 2016	Updated: • 4.8 D Command: Mobile Originated Call to Dial a Number • Table 2 CME Error Codes
3.1	February 04, 2016	Added 20.1.6 CEER Error Codes
		Updated: • 4.1 +CEER Command: Extended Error Report • 8.4 +CMGF Command: Select SMS Message Format • 18.7.1 +KCGPADDR Command: Display PDP Address • 18.7.7 +KCNXUP Command: Bring the PDP Connection Up • 18.11.3 +KUDPCFG Command: UDP Connection Configuration
	February 11, 2016	Added 20.6 Sleep Mode Management
		Updated: • 5.53 +KSLEEP Command: Power Management Control • 5.58 +WEXTCLK Command: External Clocks Setting • 15.5 +NVBU: NV Backup Status and Control
	February 19, 2016	Moved +WMAUDIOLOOP from section 11 to section 13.1
		Updated: • 5.49 +KRIC Command: Ring Indicator Control • 14.2 *PSSTKI Command: SIM Toolkit Interface Configuration • 18.2 IP Address Format in AT Commands
4.0	March 04, 2016	Added: • 3.5 *PSSEAV Command: Service Availability • 4.5 +CVHU Command: Voice Hang Up Control • 5.1 *PSCPOF Command: Power Off • 5.8 +CCHC Command: Close Logical Channel • 5.9 +CCHO Command: Open Logical Channel • 5.14 +CGLA Command: Generic UICC Logical Channel Access • 5.26 +CPOF Command: Power Off • 5.46 +KNETSCAN Command: Network Scan • 5.56 +KTEMPMON Command: Temperature Monitor • 7 Phone Book Management Commands

Version	Date	Updates
4.0	March 04, 2016	Added: • 11.4 +WCARRIER Command: Show Carrier Name • 12.4 +KECHO Command: Echo Cancellation • 12.6 +KNOISE Command: Noise Cancellation • 12.10 +KVGR Command: Receive Gain Selection • 12.11 +KVGT Command: Transmit Gain Selection • 12.12 +VGR Command: Receive Gain Selection • 12.13 +VGT Command: Transmit Gain Selection • 12.17 +WDDM Command: DTMF Decoder Mode • 17 Location Service Commands • 18.9 TCP Specific Commands • 18.14 HTTP Client Specific Commands • 20.2 How to Use TCP Specific Commands • 20.5 How to Use HTTP Client Specific Commands
		Updated: • 5.53 +KSLEEP Command: Power Management Control • 18.7.1 +KCGPADDR Command: Display PDP Address • 18.7.7 +KCNXUP Command: Bring the PDP Connection Up • 18.8.1 +KIPOPT Command: General Options Configuration • 18.8.3 +KURCCFG Command: Enable or Disable the URC from Protocol Commands • 18.11.3 +KUDPCFG Command: UDP Connection Configuration • 20.6 Sleep Mode Management
	May 05, 2016	Added: • 5.40 +KCELLSCAN Command: Cell Scan • 5.45 +KMCLASS Command: Change GPRS Multislot Class • 6.1 *PSGAAT Command: GPRS Automatic Attach • 12.1 +CLVL Command: Loudspeaker Volume Level • 12.5 +KMAP Command: Microphone Analog Parameters • 18.10 FTP Client Specific Commands • 20.1.4 FTP Reply Codes • 20.3 How to Use FTP Specific Commands
		Updated: • 2.6 &S Command: DSR Option • 2.18 O Command: Switch from Command Mode to Data Mode • 3.12 +CMUX Command: Enter Multiplexing Mode • 8.16 +CSMP Command: Set SMS Text Mode Parameters • 12.4 +KECHO Command: Echo Cancellation • 12.6 +KNOISE Command: Noise Cancellation • 17.5 +GPSCORE Command: Report GNSS Receiver Core Information • 17.7 +GPSNMEA Command: Configure the NMEA Frames Flow • 17.8 +GPSPVT Command: Configure PVT Frames Flow • 18.14.2 +KHTTPCFG Command: HTTP Connection Configuration
4.1	May 06, 2016	Updated 5.46 +KNETSCAN Command: Network Scan
4.2	May 16, 2016	Updated: • 17.7 +GPSNMEA Command: Configure the NMEA Frames Flow • 17.8 +GPSPVT Command: Configure PVT Frames Flow
4.3	May 25, 2016	Updated 5.58 +WEXTCLK Command: External Clocks Setting

Version	Date	Updates
5.0	June 14, 2016	Added: • 2.15 L Command: Monitor Speaker Loudness • 2.16 M Command: Monitor Speaker Mode • 2.17 N Command: Negotiate Handshake Option • 3.6 *PSSMPH Command: SIM Phase • 3.15 +FCLASS Command: Operating Mode • 4.4 +CSTA Command: Select Type of Address • 6.2 *PSHPLMN Command: Home PLMN • 6.5 *PSOPNM Command: Operator Name • 11.1 +KGNSSAD Command: GNSS Antenna Detection • 11.2 +KGSMAD Command: GSM Antenna Detection • 12.2 +CODECINFO Command: Display Audio Codec Information • 12.18 +WVR Command: Voice Codec Selection • 13.2 +WMGNSSTEST Command: GNSS Test • 16.3 +WDSD Command: Device Services Local Download • 17.13 +GPSSUPLCFG Command: GPS SUPL Configuration • 18.15 HTTPS Client Specific Commands • 18.16 SSL Certificate Manager • 20.7 Using Location Service
		Updated: • 5.40 +KCELLSCAN Command: Cell Scan • 5.46 +KNETSCAN Command: Network Scan • 12.14 +VIP Command: Initialize Voice Parameters • Table 1 STK Command Usage • 14.2 *PSSTKI Command: SIM Toolkit Interface Configuration • 18.8.1 +KIPOPT Command: General Options Configuration
	July 06, 2016	Added: • 3.1 *PSCIPH Command: Ciphering Notification • 3.3 *PSFSNT Command: Field Strength Notification with Threshold • 5.2 *PSPRAS Command: Remaining PIN Attempt Status • 5.15 +CGST Command: Greeting Text • 6.3 *PSNTRG Command: Network Registration • 6.4 *PSNWID Command: Network Identity • 6.6 *PSUTTZ Command: Universal Time and Time Zone • 10.1 *PSGCNT Command: GPRS Counters
		Updated: • 18.8.1 +KIPOPT Command: General Options Configuration • 18.8.3 +KURCCFG Command: Enable or Disable the URC from Protocol Commands • 18.9.6 +KTCPCFG Command: TCP Connection Configuration • 18.10.2 +KFTPCFG Command: FTP Configuration • 18.15.2 +KHTTPSCFG Command: HTTPS Connection Configuration
	July 13, 2016	Updated: • 12.4 +KECHO Command: Echo Cancellation • 12.6 +KNOISE Command: Noise Cancellation
	September 21, 2016	Updated 2.12 +IPR Command: Set Fixed Local/DTE Rate

Version	Date	Updates
6.0	February 21, 2017	Added: • 3.2 *PSCSCN Command: Call State Change Notification • 3.4 *PSLOCUP Command: Location Update for Mobile Station • 4.6 +KATH Command: Select Call Disconnect Cause • 5.5 +CALA Command: Set Alarm • 5.6 +CALD Command: Delete Alarm • 5.43 +KGSMBOOT Command: GSM Stack Boot Mode • 5.44 +KJAM Command: Jamming Detection • 5.47 +KPLAYAMR Command: Play AMR File • 5.48 +KPLAYSOUND Command: Play Audio File • 5.50 +KRST Command: Module Reset Period • 12.3 +CRSL Command: Ringer Sound Level • 12.8 +KSRAP Command: Save or Restore Audio Parameters • 12.9 +KST Command: Side Tone • 12.15 +VTD Command: Tone Duration • 17.1 +CMTLR Command: Mobile Terminated Location Request Notification • 17.2 +CMTLRA Command: Mobile Terminated Location Request Disclosure Allowance • 18.12 POP3 Client Specific Commands • 18.13 SMTP Client Specific Commands • 19 Flash Commands
		Updated: • 2.4 &K Command: Flow Control Option • 3.10 +CGSN Command: Request Product Serial Number Identification (IMEI) • 3.19 +GSN Command: Request Product Serial Number (IMEI) • 5.1 *PSCPOF Command: Power Off • 5.25 +CPIN2 Command: PIN2 Authentication • 5.26 +CPOF Command: Power Off • 6.3 *PSNTRG Command: Network Registration • 6.9 +CCWA Command: Call Waiting • 7.3 +CPBS Command: Select Phonebook Memory Storage • 8.12 +CPMS Command: Preferred Message Storage • 13.2 +WMGNSSTEST Command: GNSS Test • 17.13 +GPSSUPLCFG Command: GPS SUPL Configuration • 18.8.1 +KIPOPT Command: General Options Configuration • 18.8.3 +KURCCFG Command: Enable or Disable the URC from Protocol Commands • 18.15.2 +KHTTPSCFG Command: HTTPS Connection Configuration • Table 5 FTP Reply Codes • Table 8 SUPL Error Codes • Table 14 Other Associated Events
	June 19, 2017	Added: • 5.57 +WESHDOWN Command: Emergency Shutdown • 6.26 +PHYR Command: Physical Randomization

Version	Date	Updates
6.0	June 19, 2017	Updated: • 2.2 &D Command: Set Data Terminal Ready (DTR) Function Mode • 3.12 +CMUX Command: Enter Multiplexing Mode • 5.13 +CFUN Command: Set Phone Functionality • 14.1 STK Command Usage • 14.2 *PSSTKI Command: SIM Toolkit Interface Configuration • 14.5 +STKENV Command: Send STK Envelope • 14.9 +STKTR Command: STK Terminal Response • 20.6.2 Sleep States • 20.7.3 Supported NMEA Sentences
	July 05, 2017	Added 18.17 SSL Configuration
		Updated: • 18.9.6 +KTCPCFG Command: TCP Connection Configuration • 18.15.2 +KHTTPSCFG Command: HTTPS Connection Configuration
	August 15, 2017	Added 5.35 +ICF Command: DTE-DCE Character Framing
		Updated: • 5.49 +KRIC Command: Ring Indicator Control • 5.52 +KSIMSEL Command: SIM Selection • 12.14 +VIP Command: Initialize Voice Parameters • 18.9.6 +KTCPCFG Command: TCP Connection Configuration • 18.14.2 +KHTTPCFG Command: HTTP Connection Configuration • 18.17.2 +KSSLCRYPTO Command: Cipher Suite Configuration
7.0	October 26, 2017	Updated: • 5.35 +ICF Command: DTE-DCE Character Framing • 5.52 +KSIMSEL Command: SIM Selection • 18.15.2 +KHTTPSCFG Command: HTTPS Connection Configuration • 18.17.2 +KSSLCRYPTO Command: Cipher Suite Configuration
8.0	July 26, 2018	Added 5.29 +CRMP Command: Ring Melody Playback
		Updated 5.13 +CFUN Command: Set Phone Functionality
9.0	May 28, 2019	Updated 18.17.1 +KSSLCFG Command: SSL Configuration

Contents

List of Tables

1. Overview

This manual provides information about the AT command set used with the AirPrime HL6528RDx. The HL6528RDx series consists of:

- HL6528RD
- HL6528RD-G
- HL6528RD-2.8V
- HL6528RD-G2.8V

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

1.1. 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

1.2. Reference Configuration

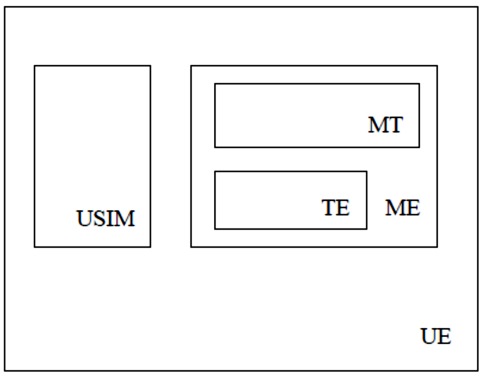


Figure 1. Reference Configuration

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.

1.3. 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 range of value 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

1.3.1. Parameters

Default parameters are underlined, and 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.

1.3.2. Command Responses

There is always a response sent by the TA to an AT Command line (except for when setting up TA for no answer).

The response is always terminated by an indication of success or failure; however, the returned response may vary.

Classical messages: **OK** or **ERROR**

Extended error message (see **AT+CMEE**): **+CME ERROR: <n>**

Numeric Mode (see **ATV**): **<n>** with: **<n>** = 0 ↔ **OK** or **<n>** is an error code

1.3.3. Multiple AT Commands on the Same Command Line

Several AT commands may be entered on the same line to eliminate the need to type the "AT" or "at" prefix before each command and to wait for the answer for each command. The main advantage of using multiple AT commands per line is avoiding losing bandwidth on the link between the 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 the TA will return **ERROR**.

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

Example:

```
ATZ&K3+CLAN="en";+CLAN?
+CLAN: "en"
OK
```

1.3.4. AT Commands on Separate Lines

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

1.4. Unsolicited Result Codes (URCs)

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

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

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

1.5. Document Modification

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

Information provided for the commands are subject to change without notice.

1.6. 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
AT	Attention; Hayes Standard AT command set
BCCH	Broadcast Channel
BER	Bit Err Rate
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

Abbreviation	Definition
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
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
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

Abbreviation	Definition
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
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
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

Abbreviation	Definition
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
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 Commands

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

HL6528RDx	
Execute command Syntax **AT&C<value>**	 Response **OK** Parameter **<value>** 0 DCD line is always active 1 DCD line is active in the presence of data carrier only
Reference V.25Ter	Notes Configuration is saved using **AT&W**.

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

HL6528RDx	
Execute command Syntax **AT&D<value>**	 Response **OK** Parameter **<value>** 0 TA ignores status on DTR 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.
Reference V.25Ter	Notes The command **AT&D** only applies to data calls. For voice calls, **AT&D** will only apply if **AT+CVHU=2** has been previously set.

2.3. &F Command: Restore Factory Settings

HL6528RDx	
Execute command Syntax **AT&F[<value>]**	 Response **OK** Parameter **<value>** 0 or Omitted Restore parameters to factory settings
Reference V.25Ter	Notes • Also see **AT&V**. • Restore factory settings to the active profile. • **AT&F** also restores the settings of AVMS services indication **+WDSI** (if the AVMS feature is applicable), **+CREG**, **+CGREG**, **+CRC**, **+CR**, **+CMEE**, **+CLIP**, **+COLP**, **+CMGF**, **+CSMS**.
Examples	**AT&F** **OK** **AT&F0** **OK** **AT&F1** **ERROR**

2.4. &K Command: Flow Control Option

HL6528RDx	
Execute command Syntax **AT&K<mode>**	 Response **OK** Parameter **<mode>** 0 Disable all flow control 3 Enable bi-directional hardware flow control 4 Enable XON/XOFF flow control
Reference V.25Ter	Notes • Use **AT&V0** to display the current flow control setting. • The use of hardware flow control is recommended. • Software flow control is supported if the data to be transmitted is coded in ASCII (in this case XON/XOFF controls and the ESC character (0x1B) are not included in the data), or the data uses the following escape sequence to transmit special characters. XON → ESC + ~XON = 0x1B 0xEE XOFF → ESC + ~XOFF = 0x1B 0xEC ESC → ESC + ~ESC = 0x1B 0xE4

2.5. &R Command: RTS/CTS Option

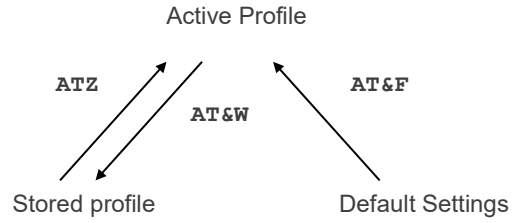
HL6528RDx	
Execute command Syntax **AT&R <option>**	Response **OK** Parameter **<option>** 1 In sync mode, CTS is always ON (RTS transitions are ignored). In async mode, CTS will only drop if required by the flow control.
Notes	This selects how the modem controls CTS. CTS operation is modified if hardware flow control is selected (see **&K** command).

2.6. &S Command: DSR Option

HL6528RDx	
Execute command Syntax **AT&S <override>**	Response **OK** Parameter **<override>** 0 or 1 DSR signal is always ON (0 is the default value) 2 DSR signal is always OFF 3 DSR signal is ON when the module is not in sleep mode; OFF when the module is in sleep mode

2.7. &V Command: Display Current Configuration

HL6528RDx	
Execute command Syntax **AT&V[<value>]**	Response **ACTIVE PROFILE: <current configuration>** **STORED PROFILE 0: <user default configuration>** **STORED PROFILE 1: <manufactory configuration>** **OK** Parameter **<value>** 0 Profile number

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • 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 manufacture, the product and the user setup. • **AT&V** lists **+IFC** and **S01** parameters which are directly editable. The **+IFC** answer reflects the flow control parameters set by **AT&K**.
Examples	**E1 Q0 V1 X4 &C1 &D1 &R1 &S0 +IFC= 0,0 &K0** **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: 

2.8. &W Command: Save Stored Profile

HL6528RDx			
Execute command Syntax **AT&W[<value>]**	Response **OK** Parameter <value>	0 or Omitted 1	Save in STORED PROFILE 0 Save in STORED PROFILE 1
Reference Sierra Wireless Proprietary	Notes • Also see **AT&V**. • This command saves the current configuration in a non-erasable place. • The default stored profile may be adapted for customer needs. • Configurations saved are: ▪ **&C** DCD control ▪ **&D** DTR behavior ▪ **&K** Flow control ▪ **&R** RTS control ▪ **&S** DSR control ▪ **E** Echo ▪ **Q** Set result code presentation mode ▪ **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 ▪ **S7** Set number of seconds to wait for connection completion		

HL6528RDx	
	▪ **S8** Comma dial modifier time ▪ **S10** Automatic disconnect delay ▪ **V** Verbose ▪ **X** Extended result code

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

HL6528RDx	
Execute command Syntax **+++**	 Response **OK**
Reference V.25Ter	Notes • 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 a terminating character). • The "+" character may be changed with the **ATS2** command. • The **+++** characters are not transmitted in the data flow.

2.10. +GCAP Command: Request Complete TA Capability List

HL6528RDx	
Execute command Syntax **AT+GCAP**	 Response **+GCAP:** list of **<name>**s **OK** Parameter **<name>** +CGSM
Reference V.25ter	Example **+GCAP: +CGSM** **OK**

2.11. +IFC Command: DTE-DCE Local Flow Control

HL6528RDx	
Test command Syntax **AT+IFC=?**	 Response **+IFC:** (list of supported **<DCE_by_DTE>**s), (list of supported **<DTE_by_DCE>**s) **OK**
Read command Syntax **AT+IFC?**	 Response **+IFC: <DCE_by_DTE>,<DTE_by_DCE>** **OK**
Write command Syntax **AT+IFC=** **[<DCE_by_DTE>** **[,<DTE_by_DCE>** **]]**	 Response **OK** Parameters **<DCE_by_DTE>** 0 Disable all flow control 1 Enable XON/XOFF flow control 2 Enable bi-directional hardware flow control **<DTE_by_DCE>** 0 Disable all flow control 1 Enable XON/XOFF flow control 2 Enable bi-directional hardware flow control
Reference V.25Ter	Notes • <DCE_by_DTE> and <DTE_by_DCE> must have the same value. • Flow control is not supported via the USB AT command port. <DCE_by_DTE> and <DTE_by_DCE> must be set to 0 when using USB; using another value will have no effect on the USB port.
Examples	**AT+IFC=?** **+IFC: (0-2),(0-2)** **OK** **AT+IFC?** **+IFC: 0,0** **OK** **AT+IFC=1,1** **OK** **AT+IFC?** **+IFC: 1,1** **OK** **AT+IFC=** **OK** **AT+IFC?** **+IFC: 0,0** **OK** **AT+IFC=1,1** // On a USB command port **ERROR**

2.12. +IPR Command: Set Fixed Local/DTE Rate

HL6528RDx	
Test command Syntax **AT+IPR=?**	 Response **+IPR: (**list of supported **<rate>**s**)**
Read command Syntax **AT+IPR?**	 Response **+IPR: <rate>**
Write command Syntax **AT+IPR=<rate>**	 Response **OK** Parameter **<rate>** Bit rate per second 0, 300, 600, 1200, 2400, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, 115200, 230400, 460800, 921600
Reference V.25Ter	Notes • If <rate> is set to 0, the module must be powered OFF and then powered ON again in order to use new the baud-rate. Also, all URCs will not be displayed because the baud-rate has not been set until the first AT command has been sent. • For an 8-wire UART design, the new baud-rate can be set by toggling DTR OFF and ON again after <rate> has been set to 0, followed by an AT command to detect the new baud-rate. • Supported auto-detectable <rate> values and fixed-only <rate> values are the same.

2.13. A/ Command: Repeat Previous Command Line

HL6528RDx	
Execute command Syntax **A/**	 Response Depends on the previous command
Reference V.25Ter	Notes Line does not need to end with a terminating character.

2.14. E Command: Enable Echo

HL6528RDx	
Execute command Syntax **ATE[<value>]**	 Response **OK** Parameter **<value>** 0 Echo mode off 1 Echo mode on
Reference V.25Ter	Notes This setting determines whether the TA echoes characters received from TE during the command state.

2.15. L Command: Monitor Speaker Loudness

HL6528RDx	
Execute command Syntax **ATL[<volume>]**	 Response **OK** Parameter **<volume>** 0 – 9
Reference ITU-T V.250 § 6.3.13	Notes The response of this command is compliant with recommendations, but this command has no effect.

2.16. M Command: Monitor Speaker Mode

HL6528RDx	
Execute command Syntax **ATM[<mode>]**	 Response **OK** Parameter **<mode>** 0 – 9
Reference ITU-T V.250 § 6.3.14	Notes The response of this command is compliant with recommendations, but this command has no effect.

2.17. N Command: Negotiate Handshake Option

HL6528RDx	
Execute command Syntax **ATN[<option>]**	 Response **OK** Parameter **<option>** 0 – 9
Notes	The response for this command is compliant with recommendations, but this command has no effect.

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

HL6528RDx	
Execute command Syntax **ATO[<n>]**	 Response TA returns to data mode from command mode: **CONNECT <text>** If connection is not successfully resumed: **NO CARRIER** Parameter **<n>** 0 Switch from command mode to data mode 1 – 25 Session ID. See section 18 Protocol Specific Commands for usage
Reference V.25Ter	Notes **ATO** is the alternative command to the **+++** escape sequence described in section 2.1. 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.

2.19. Q Command: Set Result Code Presentation Mode

HL6528RDx	
Execute command Syntax **ATQ[<n>]**	 Response **OK** (if <n> = 0) Nothing (if <n> = 1) Parameter **<n>** 0 Result codes are transmitted by TA 1 No result codes are transmitted by TA
Reference V.25Ter	Notes Specifies whether the TA transmits any result code to the TE. Information text transmitted in response is not affected by this setting.

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

HL6528RDx	
Read command Syntax **ATS0?**	 Response **<n>** **OK**
Write command Syntax **ATS0=<n>**	 Response **OK** Parameter **<n>** 0 Automatic answering deactivated 1 – 255 Number of rings before automatically answering
Reference V.25Ter	Notes In data mode (after any CONNECT), automatic call answering does not work. This means that incoming calls are not automatically answered during data mode.

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

HL6528RDx	
Read command Syntax **ATS2?**	 Response **<n>** **OK**
Write command Syntax **ATS2=<n>**	 Response **OK** Parameter **<n>** Only 43 ("+") is supported
Reference V.25Ter	Notes The default character is "+" (043) and cannot be changed.

2.22. S3 Command: Command Line Termination Character

HL6528RDx	
Read command Syntax **ATS3?**	 Response **<n>** **OK**
Write command Syntax **ATS3=<n>**	 Response **OK** Parameter **<n>** 13 Command line termination character <CR>: carriage return
Reference V.25Ter	Notes • This parameter determines the character recognized by the TA to terminate an incoming command line (13 = <CR> by default). The value cannot be changed. • See data stored by **AT&W** for the default value.

2.23. S4 Command: Set Response Formatting Character

HL6528RDx	
Read command Syntax **ATS4?**	 Response **<n>** **OK**
Write command Syntax **ATS4=<n>**	 Response **OK** Parameter **<n>** 0 – 127 Response formatting character
Reference V.25Ter	Notes • This parameter determines the character recognized by the TA to terminate the answer line (10 = <LF> by default). • See data stored by **AT&W** for the default value.

2.24. S5 Command: Write Command Line Editing Character

HL6528RDx	
Read command Syntax **ATS5?**	 Response **<n>** **OK**
Write command Syntax **ATS5=<n>**	 Response **OK** Parameter **<n>** 0 – 127 Command line editing character
Reference V.25Ter	Notes • This parameter determines the character recognized by the TA to delete the immediately preceding character from the command line (8 = <backspace> by default). • See data stored by **AT&W** for the default value

2.25. S6 Command: Pause before Blind Dialing

HL6528RDx	
Read command Syntax **ATS6?**	 Response **<time>** **OK**
Write command Syntax **ATS6=<time>**	 Response **OK** Parameters **<time>** 2 – 10
Reference ITU-T V.250 § 6.3.9	Notes The responses of this command are compliant with command recommendations, but this command has no effect.

2.26. S7 Command: Set Delay for Connection Completion

HL6528RDx	
Read command Syntax **ATS7?**	 Response **<n>** **OK**
Write command Syntax **ATS7=<n>**	 Response **OK** Parameter **<n>** 1 – 255 Number of seconds to wait for connection completion
Reference V.25Ter	Notes In data mode (after any CONNECT), automatic call answering does not work. This means that incoming calls are not automatically answered during data mode.

2.27. S8 Command: Comma Dial Modifier Time

HL6528RDx	
Read command Syntax **ATS8?**	 Response **<time>** **OK**
Write command Syntax **ATS8=<time>**	 Response **OK** Parameter **<time>** 0 – 255 See data stored by **AT&W** for the default value
Reference ITU-T V.250 § 6.3.11	Notes Since commas are ignored in the **D** command, this command has no effect.

2.28. S10 Command: Automatic Disconnect Delay

HL6528RDx	
Read command Syntax **ATS10?**	 Response **<time>** **OK**
Write command Syntax **ATS10=<time>**	 Response **OK** Parameters **<time>** 1 – 254 See data stored by **AT&W** for the default value
Reference ITU-T V.250 § 6.3.12	Notes The responses of this command are compliant with command recommendations, but this command has no effect.

2.29. V Command: TA Response Format

HL6528RDx	
Execute command Syntax **ATV[<value>]**	 Response **0** (When numeric mode is activated) **OK** (When verbose mode is activated) Parameter **<value>** 0 Short result code format: <numeric code> 1 Long result code format: <verbose code>
Reference	V.25Ter

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

HL6528RDx	
Execute command Syntax **ATX[<value>]**	 Response **OK** Parameter **<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
Reference V.25Ter	Notes This command defines the result code to be returned, as well as sets the dial tone or busy detection features.
Examples	**ATX0** **OK** **ATX4** **OK** **ATX5** **ERROR** **ATX10** **ERROR**

2.31. Z Command: Reset to Default Configuration

HL6528RDx	
Execute command Syntax **ATZ[<value>]**	Response **OK** Parameter **<value>** 0 Reset and restore user configuration with profile 0 1 Reset and restore user configuration with profile 1
Reference V.25Ter	Notes Also see **AT&V**.

3. General Commands

3.1. *PSCIPH Command: Ciphering Notification

HL6528RDx	
Test command Syntax **AT*PSCIPH=?**	 Response ***PSCIPH:** (list of supported **<mode>**s), (list of supported **<Ciphering status>**es)
Read command Syntax **AT*PSCIPH?**	Get current state Response ***PSCIPH: <mode>, <Ciphering status>** Parameters **<mode>** 0 Disable ciphering notification 1 Enable ciphering notification **<Ciphering status>** 0 Ciphering is OFF 1 Ciphering is ON
Write command Syntax **AT*PSCIPH= <mode>**	Set mode Response **OK**
Unsolicited Notification	Response ***PSCP: <Ciphering status>** Example ***PSCP: 1**
Reference Sierra Wireless Proprietary	Notes The write command is used to enable or disable the presentation of ciphering status notification (**`*PSCP`**). Notification is sent each time the ciphering status changes.

3.2. *PSCSCN Command: Call State Change Notification

HL6528RDx	
Read command Syntax **AT*PSCSCN?**	 Response ***PSCSCN: <mode>** **OK**

HL6528RDx

Write command

Syntax
AT*PSCSCN= <mode>

Response
OK

Parameters

<Mode> 0 Disable presentation of the notification
1 Enable presentation of the notification when the state of a call changes

<Call Id> Number of the call
0 Call ID not yet assigned
1 – 7 Speech calls
> 8 Data calls

<State> State of the call
0 MO call SETUP
1 – 2 RFU
3 MO call PROCEED
4 MO call ALERT (at distance)
5 MO call CONNECT (with distance)
6 – 9 RFU
10 MT call SETUP
11 MT call SETUP ACCEPTED (bearer capabilities accepted by the ME)
12 RFU
13 MT call ALERT
14 MT call CONNECT (ME has successfully accepted the call)
15 – 19 RFU
20 Call DISCONNECT BY NETWORK
21 Call DISCONNECT BY USER
22 RFU

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

States related to call error, rejection or SIM handling are not supported.

<Status> 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)

<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> Line indication
1 Line 1
2 Auxiliary Line

HL6528RDx	
	<CauseSelect> Cause Select (used in error case or network disconnection) 67 Call Control (protocol) **<Cause>** Cause. Refer to section 20.1.6 CEER Error Codes for more information **<Bearer>** Bearer capability in hexadecimal character format (for data calls only) (not supported)
Reference Sierra Wireless Proprietary	Notes • This command allows the presentation of information about CS call states. • This command does note replace the **+CLCC** command. TE is notified whenever a call state changes to avoid the TE from using polling mechanism with the **+CLCC** command to know the states of each call. • The write command enables (or disables) the presentation of ***PSCSC: <Call Id>, <State>, <Status>, [<Number>], [<type>], [<Line Id>], [<CauseSelect>], [<Cause>], [<Bearer>]** every time the states of a call changes. The optional fields of the URC are filled only when information is available (i.e. depending of the state of the call), otherwise they are left empty.

3.3. *PSFSNT Command: Field Strength Notification with Threshold

HL6528RDx	
Read command Syntax **AT*PSFSNT?**	Response ***PSFSNT: <mode>** **OK**
Write command Syntax **AT*PSFSNT= <mode>**	Response **OK** Parameters **<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
Reference Sierra Wireless Proprietary	Notes • The values of this command are not the same values as **+CSQ**. • This command allows the presentation of field strength notification. • The write command enables or disables the presentation of ***PSFS: <Field strength>** each time the field strength increases or decreases by 5 dBm.

3.4. *PSLOCUP Command: Location Update for Mobile Station

HL6528RDx	
Execute command Syntax **AT*PSLOCUP**	 Response **OK** or **+CME ERROR <err>**
Reference Sierra Wireless Proprietary	Notes This command generates a location update of the MS; and is not available when a voice call is on-going.

3.5. *PSSEAV Command: Service Availability

HL6528RDx	
Test command Syntax **AT*PSSEAV=?**	 Response ***PSSEAV:** (list of supported **<mode>**s),(list of supported **<service>**s) **OK**
Read command Syntax **AT*PSSEAV?**	 Response ***PSSEAV: <mode>** **OK**
Write command Syntax **AT*PSSEAV= <mode>**	 Response **OK** or **+CME ERROR: <err>** Parameters **<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
Notes	The write command enables or 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.

3.6. *PSSMPH Command: SIM Phase

HL6528RDx	
Test command Syntax **AT*PSSMPH=?**	 Response ***PSSMPH:** (list of supported **<phase>**s) **OK**
Read command Syntax **AT*PSSMPH?**	Get supported SIM phase Response ***PSSMPH: <phase>** **OK** or **+CME ERROR: <err>** Parameter **<phase>** 0 Unknown 1 Phase 1 2 Phase 2 3 Phase 2+ 4 Phase 3G
Reference Sierra Wireless Proprietary	Notes This command is used to get the current (U)SIM phase.

3.7. +CGMI Command: Request Manufacturer Identification

HL6528RDx	
Test command Syntax **AT+CGMI=?**	 Response **OK**
Execute command Syntax **AT+CGMI**	 Response **(manufacturer identification text)** **OK**
Reference [27.007] § 5.1	Example **AT+CGMI** **Sierra Wireless** **OK**

3.8. +CGMM Command: Request Model Identification

HL6528RDx	
Test command Syntax **AT+CGMM=?**	 Response **OK**
Execute command Syntax **AT+CGMM**	 Response **(manufacturer identification text)** **OK**
Reference	[27.007] § 5.2

3.9. +CGMR Command: Request Revision Identification

HL6528RDx	
Test command Syntax **AT+CGMR=?**	 Response **OK**
Execute command Syntax **AT+CGMR**	 Response **(model revision identification text)** **OK**
Reference	[27.007] § 5.3

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

HL6528RDx	
Test command Syntax **AT+CGSN=?**	 Response **OK**

HL6528RDx	
Execute command Syntax **AT+CGSN**	 Response **<IMEI>** **OK** Parameter **<IMEI>** Identification text for determination of the individual ME
Reference	[27.007] § 5.4

3.11. +CIMI Command: Request International Subscriber Identity

HL6528RDx	
Test command Syntax **AT+CIMI=?**	 Response **OK**
Execute command Syntax **AT+CIMI**	 Response **<IMSI>** **OK** Parameter **<IMSI>** International Mobile Subscriber Identity
Reference	[27.007] § 5.6

3.12. +CMUX Command: Enter Multiplexing Mode

HL6528RDx	
Test command Syntax **AT+CMUX=?**	 Response **+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**

HL6528RDx	
Read command Syntax **AT+CMUX?**	Response **+CMUX: <mode>,[<subset>],<port_speed>,<N1>,<T1>, <N2>,<T2>,<T3>[,<k>]** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+CMUX= <mode> [,<subset> [,<port_speed> [,<N1>[,<T1> [,<N2>[,<T2> [,<T3>[,<k>]]]]]]]]**	Response **OK** Parameters **<mode>** Multiplexer Transparency Mechanism 0 Basic option **<subset>** Multiplexer control channel setup 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 3 38 400 bit/s 4 57 600 bit/s 5 115 200 bit/s 6 230 400 bit/s 7 406 800 bit/s 8 921 600 bit/s **<N1>** 31 – 1540 Maximum frame size (payload size) **<T1>** 1 – 254 Acknowledgement timer in units of ten milliseconds. Default value = 10 (100 ms) **<N2>** 0 – 100 Maximum number of re-transmissions. Default value = 30 (see notes below) **<T2>** 2 – 255 Response timer for the multiplexer control channel in units of ten milliseconds. Default value = 30 (300 ms) **<T3>** 1 – 255 Wake up response timer in seconds. Default value = 10 **<k>** Window size, for advanced operation with Error Recovery options 0 Not supported
Reference [27.007] § 5.7	Notes • Multiplexer protocol is described in 3GPP TS 27.010. • Retransmissions from the module is not supported; any entered value is ignored.

3.13. +CSCS Command: Select TE Character Set

HL6528RDx	
Test command Syntax **AT+CSCS=?**	 Response **+CSCS:** (list of supported **<chset>**) **OK**
Read command Syntax **AT+CSCS?**	 Response **+CSCS: <chset>** **OK**
Write command Syntax **AT+CSCS= <chset>**	 Response **OK** Parameter **<chset>** "GSM" GSM 7-bit default alphabet (GSM 03.38 sub clause 6.2.1) "UCS2" 16-bit universal multiple-octet coded character set (ISO/IEC 10646) "IRA" International Reference Alphabet
Reference [27.007] §5.5	Notes This command selects the character set used for all string types (phonebook entries, SMS data, etc.)

3.14. +CSNS Command: Single Numbering Scheme

HL6528RDx	
Test command Syntax **AT+CSNS=?**	 Response **+CSNS:** (list of supported **<mode>**) **OK** or **+CME ERROR: <error>**
Read command Syntax **AT+CSNS?**	 Response **+CSNS: <mode>** **OK** or **+CME ERROR: <error>**

HL6528RDx	
Write command Syntax **AT+CSNS=** **[<mode>]**	 Response **OK** or **+CME ERROR: <error>** Parameter **<mode>** 0 Voice
Reference	[27.007] § 6.19

3.15. +FCLASS Command: Operating Mode

HL6528RDx	
Test command Syntax **AT+FCLASS=?**	 Response **+FCLASS:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+FCLASS?**	 Response **+FCLASS: <n>** **OK**
Write command Syntax **AT+FCLASS=** **<n>**	 Response **OK** Parameter **<n>** 0, 1 Allowed values
Reference [27.007] Annex C	Notes The responses of this command are compliant with the recommendation, but this command has no effect.

3.16. +GMI Command: Request Manufacturer Identification

HL6528RDx	
Test command Syntax **AT+GMI=?**	 Response **OK**

HL6528RDx	
Execute command Syntax **AT+GMI**	 Response **(manufacturer identification text)** **OK**
Reference V.25ter	Notes See also **AT+CGMI**.
Example	**AT+GMI** **Sierra Wireless** **OK**

3.17. +GMM Command: Request Model Identification

HL6528RDx	
Test command Syntax **AT+GMM=?**	 Response **OK**
Execute command Syntax **AT+GMM**	 Response **(manufacturer identification text)** **OK**
Reference V.25ter	Notes See also **AT+CGMM**.

3.18. +GMR Command: Request Revision Identification

HL6528RDx	
Test command Syntax **AT+GMR=?**	 Response **OK**
Execute command Syntax **AT+GMR**	 Response **(model identification text)** **OK**
Reference V.25ter	Notes See also **AT+CGMR**.

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

Note: This command is identical to +CGSN.

HL6528RDx	
Test command Syntax **AT+GSN=?**	 Response **OK**
Execute command Syntax **AT+GSN**	 Response **<IMEI>** **OK** Parameter **<IMEI>** Identification text for determination of the individual ME
Reference V.25ter	Notes See also **AT+CGSN**.

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

HL6528RDx	
Test command Syntax **AT+KGSN=?**	 Response **+KGSN:** (list of supported **<number type>**s) **OK**
Write command Syntax **AT+KGSN=<number type>**	 Response If **<number type>** = 0: **+KGSN: <IMEI>** **OK** If **<number type>** = 1: **+KGSN: <IMEISV>** **OK** If **<number type>** = 2: **+KGSN: <IMEISV_STR>** **OK** If **<number type>** = 3: **+KGSN: <SN>** **OK**

HL6528RDx	
	If **<number type>** = 4: **+KGSN: <SN-BB>** **OK** Parameters **<IMEI>** 15-digit IMEI <8 digits for TAC + 6 digits for SNR>-<1 check digit> **<IMEISV>** 16-digit 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-digit Serial Number **<SN-BB>** 16-digit Serial Number + BB
Reference Sierra Wireless Proprietary	Notes This command has been developed to provide the IMEI SV and Serial Number through an AT Command.
Examples	**AT+KGSN=0** **+KGSN: 351578000023006** **OK** **AT+KGSN=1** **+KGSN: 3515780000230001** **OK**

3.21. I Command: Request Identification Information

HL6528RDx	
Execute command Syntax **ATI[<value>]**	Response If <value> = 0 or omitted: **<model>** **OK** If <value> = 3: **<model identification text>** **OK** Parameters **<model>** Model identifier **<model identification text>** Model and software version
Reference V.25ter	Notes See also **AT+GMR**, **AT+CGMR**.

4. Call Control Commands

4.1. +CEER Command: Extended Error Report

HL6528RDx	
Test command Syntax **AT+CEER=?**	 Response **OK**
Execute command Syntax **AT+CEER**	 Response **+CEER: <cause>,<report>** **OK** Parameters **<cause>** Contains a number representing the error cause sent internally or by the network. Refer to section 20.1.6 CEER Error Codes for more information. **<report>** Verbose string containing the textual representation of <cause>. Refer to section 20.1.6 CEER Error Codes for more information.
Reference	[27.007] § 6.10

4.2. +CHUP Command: Hang Up a Call

HL6528RDx	
Test command Syntax **AT+CHUP=?**	 Response **OK**
Execute command Syntax **AT+CHUP**	 Response **OK**
Reference [27.007] § 6.5	Notes This command hangs up waiting or active MT and MO calls.

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

HL6528RDx	
Test command Syntax **AT+CRC=?**	 Response **+CRC:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+CRC?**	 Response **+CRC: <mode>** **OK**
Write command Syntax **AT+CRC=** **[<mode>]**	 Response **OK** Parameters **<mode>** 0 Disable extended format 1 Enable extended format
Reference [27.007] § 6.11	Notes 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).

4.4. +CSTA Command: Select Type of Address

HL6528RDx	
Test command Syntax **AT+CSTA=?**	 Response **+CSTA:** (list of supported **<type>**s) **OK**
Read command Syntax **AT+CSTA?**	 Response **+CSTA: <type>** **OK**
Write command Syntax **AT+CSTA=** **[<type>]**	 Response **OK** or **+CME ERROR: <err>**

HL6528RDx	
	Parameter **<type>** 129 National type of address 145 International type of address: dialing string includes international access code character "+"
Reference	[27.007] § 6.1

4.5. +CVHU Command: Voice Hang Up Control

HL6528RDx	
Test command Syntax **AT+CVHU=?**	Response **+CVHU:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+CVHU?**	Response **+CVHU: <mode>** **OK**
Execute command Syntax **AT+CVHU=** **[<mode>]**	Response **OK** Parameter **<mode>** 0 "Drop DTR" is ignored but **OK** response is given. **ATH** disconnects 1 "Drop DTR" and **ATH** are ignored but **OK** response is given 2 "Drop DTR" behavior according to **&D** setting. **ATH** disconnects
Reference [27.007] § 6.20	Notes If the DTR signal is inactive (if DTR is not a pulse), then “Drop DTR” does not respond with "OK".

4.6. +KATH Command: Select Call Disconnect Cause

HL6528RDx	
Test command Syntax **AT+KATH=?**	Response **+KATH:** (list of supported **<num>**) **OK**

HL6528RDx	
Read command Syntax **AT+KATH?**	 Response **+KATH: <num>** **OK**
Write command Syntax **AT+KATH=<num>**	 Response **OK** Parameter **<num>** 0 Default (user busy) 17 User busy 18 No user responding 19 No answer 21 Call rejected 27 Destination out of order
Reference Sierra Wireless Proprietary	Notes • This command selects the disconnect cause sent to network when the disconnection cause is “User Busy (17)”. • For normal call disconnection with cause “Normal call clearing (16)”, **+KATH** setting will not be used. • These values follow 24.008 3GPP specification (Table 10.5.123).

4.7. A Command: Answer a Call

HL6528RDx	
Execute command Syntax **ATA**	 Response **CONNECT[<text>]** Data connection established **OK** Voice connection established, or if cancellation of the command **ERROR** Response if no connection
Reference	V.25Ter

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

HL6528RDx	
Test command Syntax **ATD=?**	 Response **1 2 3 4 5 6 7 8 9 0 * # + A B C D T W ,** **OK**

HL6528RDx	
Read command Syntax **ATD?**	 Response **1 2 3 4 5 6 7 8 9 0 * # + A B C D T W ,** **OK**
Execute command Syntax **ATD[<n>][;]**	 Response **BUSY** **CONNECT [<text>]** Data connection successfully connected **NO CARRIER** The connection cannot be established **OK** If successfully connected and voice call **ERROR** Parameters **<n>** String of dialing digits, and optionally, V.25ter modifiers (dialing digits): 0-9, *, #, +, ,, A, B, C, D, T, W (maximum length = 20 characters) **<;>** Only required to set up voice calls. TA remains in command mode
Reference V.25Ter	Notes • The command may be aborted generally when receiving an **ATH** command during execution • OK answer may arrive just after the **ATD** command or after the call is active (see **AT+COLP**) • <n>: “,” or “W” are ignored

4.9. H Command: Disconnect Existing Connection

HL6528RDx	
Execute command Syntax **ATH**	 Response **NO CARRIER** **OK**

5. Mobile Equipment Control and Status Commands

5.1. *PSCPOF Command: Power Off

HL6528RDx	
Execute command Syntax **AT*PSCPOF**	 Response **OK**
Notes	• This command allows for the module to be switched off. Note that the "OK" result code will appear immediately if the command is accepted and power off will occur afterwards. Unexpected random characters may also be issued when the module is switched off. • If there is a USB connection between the module and a host controller, the module will be powered up again after the power off sequence regardless of the power on signal pin (PWR_ON_N) level.

5.2. *PSPRAS Command: Remaining PIN Attempt Status

HL6528RDx	
Test command Syntax **AT*PSPRAS=?**	 Response ***PSPRAS: (**list of supported **<code>**s**)** **OK**
Read command Syntax **AT*PSPRAS?**	 Response ***PSPRAS: <pin1>,<puk1>,<pin2>,<puk2>** **OK** or **+CME ERROR: <err>**
Execute command Syntax **AT*PSPRAS**	 Response **OK** Parameters **<pin1>** 0 – 3 Integer type value indicating the number of false presentations remaining for PIN1; 0 = PIN1 is blocked **<puk1>** 0 – 10 Integer type value indicating the number of false presentations remaining for PUK1; 0 = PUK1 is blocked

HL6528RDx	
	<pin2> 0 – 3 Integer type value indicating the number of false presentations remaining for PIN2; 0 = PIN2 is blocked **<puk2>** 0 – 10 Integer type value indicating the number of false presentations remaining for PUK2; 0 = PUK2 is blocked **<code>** "SIM PIN1", "SIM PUK1", "SIM PIN2", "SIM PUK2"
Reference Sierra Wireless Proprietary	Notes This command returns information about the number of pin code attempts remaining.

5.3. *PSRDBS Command: Change Frequency Band

HL6528RDx	
Test command Syntax **AT*PSRDBS=?**	 Response ***PSRDBS:** (list of supported **<mode>**s), (list of supported **<GSM band>**s) **OK**
Read command Syntax **AT*PSRDBS?**	 Response ***PSRDBS: <GSM band>** **OK**
Write command Syntax **AT*PSRDBS= <mode>, <GSMband>**	 Response **OK** Parameter **<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
Reference Sierra Wireless Proprietary	Notes GSM 900 is included into E-GSM band so the module answers 29 to **`AT*PSRDBS?`**

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

HL6528RDx	
Test command Syntax **AT+CACM=?**	 Response **OK**
Read command Syntax **AT+CACM?**	 Response **+CACM: <acm>** (current acm value) **OK** or **+CME ERROR: <error>**
Write command Syntax **AT+CACM= <password>**	 Response **OK** or **+CME ERROR: <error>** Parameter **<password>** SIM PIN2
Reference [27.007] §8.25	Notes • The write command resets the password value. • This AT command needs SIM and a network where AOC is allowed.

5.5. +CALA Command: Set Alarm

HL6528RDx	
Test command Syntax **AT+CALA=?**	 Response **+CALA: <time>,**(list of supported **<n>**s) **OK**
Read command Syntax **AT+CALA?**	 Response **[+CALA: <time>,<n>]** **OK**

HL6528RDx	
Write command Syntax **AT+CALA=<time>[,<n>]**	Response **OK** or **+CME ERROR: <error>** Parameters **<time>** Internal clock (refer to **+CCLK**). String type in format "yy/mm/dd,hh:mm:ss" **<n>** Alarm index
Examples	**AT+CCLK="14/05/16,12:00:00+0"** // Set the date and time **OK** **AT+CALA="14/05/16,12:00:10"** // 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**
Reference [27.007] §8.16	Notes • Only one alarm can be set at a time; therefore <n> must always be 1. • When an alarm is timed out and executed, the unsolicited result code **+CALV: 1** is returned. • This command can be used without a SIM card.

5.6. +CALD Command: Delete Alarm

HL6528RDx	
Test command Syntax **AT+CALD=?**	Response **+CALD:** (list of supported **<n>**s) **OK**
Write command Syntax **AT+CALD=<n>**	Response **OK** or **+CME ERROR: <error>** Parameter **<n>** Alarm index

HL6528RDx	
Reference [27.007] §8.38	Notes • The execute command deletes an alarm in the MT. • Only one alarm can be set at a time; therefore, <n> must always be 1. • This command can be used without SIM.

5.7. +CAMM Command: Accumulated Call Meter Maximum (ACM Max)

HL6528RDx	
Test command Syntax **AT+CAMM=?**	 Response **OK**
Read command Syntax **AT+CAMM?**	 Response **+CACM: <acmmax>** **OK** or **+CME ERROR: <error>**
Write command Syntax **AT+CAMM=** **[<acmmax>** **[,<passwd>]]**	 Response **+CAMM: <acmmax>** **OK** or **+CME ERROR: <error>** Parameters **<acmmax>** String type; three bytes of the max ACM value in hexadecimal format 0 Disables ACMmax feature **<passwd>** SIM PIN2
Reference [27.007] § 8.26	Notes This AT command needs SIM and a network where AOC is allowed.

5.8. +CCHC Command: Close Logical Channel

HL6528RDx	
Test command Syntax **AT+CCHC=?**	 Response **OK**

HL6528RDx	
Write command Syntax **AT+CCHC= <session_id>**	 Response **OK** or **+CME ERROR: <err>** Parameters **<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)
Reference	[27.007] §8.46

5.9. +CCHO Command: Open Logical Channel

HL6528RDx	
Test command Syntax **AT+CCHO=?**	 Response **OK**
Write command Syntax **AT+CCHO= <dfname>**	 Response **<session_id>** **OK** or **+CME ERROR: <err>** Parameters **<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)
Reference [27.007] §8.45	Notes The write command gives the <session_id> when it receives the SIM application response. Status words are 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

5.10. +CCID Command: Request SIM Card Identification

HL6528RDx	
Test command Syntax **AT+CCID=?**	 Response **OK**
Read command Syntax **AT+CCID?**	 Response **+CCID: <ICCID>** **OK** or **+CME ERROR: <error>**
Execute command Syntax **AT+CCID**	 Response **+CCID: <ICCID>** **OK** or **+CME ERROR: <error>** Parameter **<ICCID>** Integrated Circuit Card ID of the SIM card

5.11. +CCLK Command: Real Time Clock

HL6528RDx	
Test command Syntax **AT+CCLK=?**	 Response **OK**
Read command Syntax **AT+CCLK?**	 Response **+CCLK: <time>** **OK**

HL6528RDx	
Write command Syntax **AT+CCLK= <time>**	Response **OK** Parameter **<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 to +96). E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"
Reference [27.007] § 8.15	Notes NITZ information is taken into account when available.

5.12. +CCWE Command: Call Meter Maximum Event

HL6528RDx	
Test command Syntax **AT+CCWE=?**	Response **+CCWE:** (list of supported **<mode>**s) **OK** or **+CME ERROR: <error>**
Read command Syntax **AT+CCWE?**	Response **+CCWE: <mode>** **OK** or **+CME ERROR: <error>**
Write command Syntax **AT+CCWE= <mode>**	Response **OK** or **+CME ERROR: <error>** Parameter **<mode>** 0 Disable the call meter warning event 1 Enable the call meter warning event
Reference [27.007] §8.28	Notes • When enabled, a notification (**+CCWV**) is sent shortly (approx. 30s) before the ACM max is reached. • This AT command needs SIM and a network where AOC is allowed.

5.13. +CFUN Command: Set Phone Functionality

HL6528RDx	
Test command Syntax **AT+CFUN=?**	 Response **+CFUN: (**list of supported **<fun>**s**), (**list of supported **<rst>**s**)** **OK** or **+CME ERROR: <err>**
Read command Syntax **AT+CFUN?**	 Response **+CFUN: <fun>** **OK**
Write command Syntax **AT+CFUN=[<fun>[,<rst>]]**	 Response **OK** or **+CME ERROR: <err>** Parameters **<fun>** 0 Minimal functionality; turn off radio and SIM power 1 Full functionality 4 Disable phone (both transmit and receive RF circuits) **<rst>** Reset setting. This parameter is only used when <fun> = 1 or 4 0 Do not reset the module before setting it to the <fun> power level 1 Reset the module before setting it to the <fun> power level
Reference [27.007] § 8.2	Notes • If <rst>=1, open CMUX channels will not be closed before the module resets and the “OK” result code is returned before reset. • It is recommended to close and re-open the UART port after issuing **AT+CFUN** so that the UART driver is initialized properly. • The PWR_ON_N pin must be connected to GND when issuing AT+CFUN=1,1.

5.14. +CGLA Command: Generic UICC Logical Channel Access

HL6528RDx	
Test command Syntax **AT+CGLA=?**	 Response **OK**

HL6528RDx	
Write command Syntax **AT+CGLA= <sessionid>, <length>, <command>**	Response **+CGLA: <length>,<response>** **OK** or **+CME ERROR: <err>** Parameters **<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**).
Reference	[27.007] §8.43

5.15. +CGST Command: Greeting Text

HL6528RDx	
Test command Syntax **AT+CSGT=?**	Response **+CSGT:** (list of supported **<mode>**s), **<ltext>** **OK** or **+CME ERROR: <err>**
Read command Syntax **AT+CSGT?**	Response **+CSGT: <text>,<mode>** **OK** or **+CME ERROR: <err>**

HL6528RDx	
Write command Syntax **AT+CSGT= <mode>[,<text>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<text>** String type; manufacturer specific free text that can be displayed. The text cannot include <CR> **<mode>** 0 Turn off greeting text 1 Turn on greeting text **<ltext>** Integer type; maximum number of characters in <text>
Reference [27.007] § 8.32	Notes • 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), and ▪ the read command returns 1 if and only if the saved text is not empty (if `+CSGT=1`, then `+CSGT?` returns 0). • This command handles the greeting text in non-volatile memory.

5.16. +CIND Command: Indicator Control

HL6528RDx	
Test command Syntax **AT+CIND=?**	Response **+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 Syntax **AT+CIND?**	Response **+CIND: <battchg>,<signal>,<service>,<message>,<call>,<roam>,<smsfull>** **OK** Parameters **<battchg>** 0 – 5 Battery charge level 0 Low level 5 High level **<signal>** 0 – 5 Signal quality 0 Low level signal 5 High level signal **<service>** 0 – 1 Service availability

HL6528RDx	
	<message> 0 – 1 Message received **<call>** 0 – 1 Call in progress **<roam>** Roaming indicator 0 Home network 1 Roaming **<smsfull>** SMS memory storage 0 Memory available 1 Memory full
Reference	[27.007] § 8.9

5.17. +CLAC Command: List Available AT Commands

HL6528RDx	
Execute command Syntax **AT+CLAC**	 Response List of all supported AT Commands **+CLAC: <CR> <LF>** **<AT Command1><CR> <LF>** **<AT Command2><CR> <LF> […]]** **OK**
Reference [27.007] § 8.37	Notes This command provides the AT command list available for the user.

5.18. +CLAN Command: Set Language

HL6528RDx	
Test command Syntax **AT+CLAN=?**	 Response **+CLAN:** (list of supported **<code>**s) **OK**
Read command Syntax **AT+CLAN?**	 Response **+CLAN: <code>** **OK**

HL6528RDx	
Write command Syntax **AT+CLAN=<code>**	 Response **OK** Parameter **<code>** Two letter abbreviation of the language. The language codes, as defined in ISO 639, consists of two characters, e.g. "sv", "en", etc. “auto” Automatic “en” English
Reference	[27.007] § 8.30

5.19. +CMEC Command: Mobile Equipment Control Mode

HL6528RDx	
Test command Syntax **AT+CMEC=?**	 Response **+CMEC:** (list of supported **<keyp>**s),(list of supported **<disp>**s),(list of supported **<ind>**s) **OK**
Read command Syntax **AT+CMEC?**	 Response **+CMEC: <keyp>,<disp>,<ind>** **OK**
Write command Syntax **AT+CMEC=[<keyp>[,<disp>[,<ind>]]]**	 Response **OK** Parameters **<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)
Notes	The write command selects the equipment which operates the ME keypad, writes to ME display and sets ME indicators.

5.20. +CMEE Command: Report Mobile Termination Error

HL6528RDx	
Test command Syntax **AT+CMEE=?**	 Response **+CMEE:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CMEE?**	 Response **+CMEE: <n>** **OK**
Write command Syntax **AT+CMEE=[<n>]**	 Response **OK** Parameter **<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
Reference [27.007] § 9.1	Notes See data impacted by **AT&F** for default values.

5.21. +CMER Command: Mobile Equipment Event Reporting

HL6528RDx	
Test command Syntax **AT+CMER=?**	 Response **+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**
Read command Syntax **AT+CMER?**	 Response **+CMER: <mode>,<keyp>,<disp>,<ind>,<bfr>** **OK**
Write command Syntax **AT+CMER=[<mode>[,<keyp>[,<disp>[,<ind>[,<bfr>]]]]]**	 Response **OK**

HL6528RDx	
	Parameters **<mode>** 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 Discard unsolicited result codes when TA-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 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 Forward unsolicited result codes directly to the TE; TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode **<keyp>** 0 No keypad event reporting **<disp>** 0 No display event reporting **<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 the indicator. Only those indicator events, which are not caused by **+CIND** shall be indicated by the TA to the TE 2 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 to 3 is entered 1 TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode>=1 to 3 is entered (OK response shall be given before flushing the codes)
Reference [27.007] § 8.10	Notes This command can work with or without a SIM card.

5.22. +CMUT Command: Mute Control

HL6528RDx	
Test command Syntax **AT+CMUT=?**	 Response **+CMUT:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CMUT?**	 Response **+CMUT: <n>** **OK**

HL6528RDx	
Write command Syntax **AT+CMUT=<n>**	 Response **OK** Parameter **<n>** 0 Mute off 1 Mute on
Reference [27.007] § 8.24	Notes This command can only be used during voice calls.

5.23. +CPAS Command: Phone Activity Status

HL6528RDx	
Test command Syntax **AT+CPAS=?**	 Response **+CPAS:** (list of supported **<pas>**s) **OK**
Execute command Syntax **AT+CPAS**	 Response **+CPAS: <pas>** **OK** or **+CME ERROR: <err>** Parameter **<pas>** 0 Ready (ME allows commands from TA/TE) 1 Unavailable (ME does not allow commands from TA/TE) 3 Ringing (ME is ready for commands from TA/TE, but the ringer is active) 4 Call in progress (ME is ready for commands from TA/TE, but a call is in progress)
Reference	[27.007] § 8.1

5.24. +CPIN Command: Enter PIN

HL6528RDx	
Test command Syntax **AT+CPIN=?**	 Response **OK**

HL6528RDx	
Read command Syntax **AT+CPIN?**	 Response **+CPIN: <code>** **OK**
Write command Syntax **AT+CPIN=<pin> [,<newpin>]**	 Response **OK** Parameters **<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 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 **<pin>, <newpin>** String type value (8 characters max.)
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 within a maximum of 30 seconds. • SIM PIN and SIM PIN2 are between 4 and 8 digits long. • SIM PUK and SIM PUK2 are 8 digits long.

5.25. +CPIN2 Command: PIN2 Authentication

HL6528RDx	
Test command Syntax **AT+CPIN2=?**	 Response **OK**
Read command Syntax **AT+CPIN2?**	 Response **+CPIN2: <code>** **OK**

HL6528RDx	
	or **+CME ERROR: <err>** Parameter **<code>** READY — PIN2 can be verified SIM PUK2 — PIN2 is blocked SIM BLOCKED — PIN2 and PUK2 are blocked
Write command Syntax **AT+CPIN2= <pin2>** or **AT+CPIN2= <puk2>, <newpin2>**	Response **OK** or **+CME ERROR: <err>** Parameters **<puk2>**, **<newpin2>, <pin2>** — String type values
Notes	• To verify PIN2, enter **AT+CPIN2=<pin2>**. • To unblock PIN2, enter **AT+CPIN2=<puk2>,<newpin2>**.

5.26. +CPOF Command: Power Off

HL6528RDx	
Execute command Syntax **AT+CPOF**	Response **OK**
Notes	• This command allows for the module to be switched off. Note that the "OK" result code will appear immediately if the command is accepted and power off will occur afterwards. Unexpected random characters may also be issued when the module is switched off. • If there is a USB connection between the module and a host controller, the module will be powered up again after the power off sequence regardless of the power on signal pin (PWR_ON_N) level.

5.27. +CPUC Command: Price per Unit and Currency

HL6528RDx	
Test command Syntax **AT+CPUC=?**	Response **OK**

HL6528RDx	
Read command Syntax **AT+CPUC?**	 Response **+CPUC: <currency>,<ppu>** **OK**
Write command Syntax **AT+CPUC= <currency>, <ppu> [,<passwd>]**	 Response **OK** Parameters **<currency>** String type; three-character currency code (e.g. GBP, DEM) **<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
Reference [27.007] § 8.27	Notes This AT command needs SIM and network where AOC are allowed.

5.28. +CPWC Command: Power Class

HL6528RDx	
Test command Syntax **AT+CPWC=?**	 Response **+CPWC:** list of supported (**<band>**,(list of **<class>**)) pairs **OK**
Read command Syntax **AT+CPWC?**	 Response **+CPWC: <curr_class1>,<def_class1>,<band1>[,<curr_class2>,<def_class2>,<band2>[...]]** **OK**
Write command Syntax **AT+CPWC= [<class> [,<band>]]**	 Response **OK** or **+CME ERROR: <err>** Parameters **<class>, <curr_classn>, <def_classn>** 0 Default value (not applicable to <curr_class>s or <def_classn>s) 1 MS output power class as in 3GPP TS 45.005 [38]

HL6528RDx	
	<band>, <bandn> 0 GSM900 1 GSM1800 2 GSM1900
Reference [27.007] § 8.29	Notes The module must be rebooted for the selection to be effective.

5.29. +CRMP Command: Ring Melody Playback

HL6528RDx	
Test command Syntax **AT+CRMP=?**	 Response **+CRMP:** (list of supported **<call type>**s),(list of supported **<volume>**s),(list of supported **<type>**s),(list of supported **<index>**s) **OK**
Read command Syntax **AT+CRMP?**	 Response **+CRMP: <call type>,<volume>,<type>,<index>** **OK**
Write command Syntax **AT+CRMP=<call type>, <volume>, <type>,<index>**	 Response **OK** Parameters **<call type>** 0 Incoming call **<volume>** 1 – 3 Volume **<type>** 0 Deactivates the feature 1 Activates the feature **<index>** 1 – 10 Melody index
Examples	**AT+CRMP=?** **+CRMP: (0), (1-3), (0,1), (1-10)** // Possible values **OK** **AT+CRMP=0,2,0,1** // New values **OK** **AT+CRMP?** **+CRMP: 0,2,0,1** // Current values **OK**

5.30. +CRSM Command: Restricted SIM Access

HL6528RDx	
Test command Syntax **AT+CRSM=?**	 Response **OK**
Write command Syntax **AT+CRSM= <command> [,<fileid>[,<P1>, <P2>,<P3> [,<data>]]]**	 Response **+CRSM: <sw1>,<sw2>[,<response>]** **OK** Parameters **<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. **<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 **<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. **<response>** Response of a successful completion of the command previously issued (hexadecimal character format; refer to **+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.

HL6528RDx	
Reference [27.007] § 8.18	Notes • For 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 command READ_RECORD, only mode <P2>="04" (absolute) is supported in SAP. (Other modes don't seem to be useful) • For command UPDATE_BINARY, only <P1>="00" and <P2>="00" is possible in SAP. (Other modes don't seem to be useful). • For command UPDATE_RECORD, as mentioned in the GSM 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 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
Example	Read EF_{ICCID} (ICC Identification, unique identification number of the SIM): **AT+CRSM=176,12258,0,0,10** **+CRSM: 144,0,"89330126239181282150"** ICC number is 98331062321918821205.

5.31. +CSIM Command: Generic SIM Access

HL6528RDx	
Test command Syntax **AT+CSIM =?**	 Response **OK**
Write command Syntax **AT+CSIM= <length>, <command>**	 Response **+CSIM: <length>,<response>** **OK** or **+CME ERROR: <error>** Parameters **<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 ME to the SIM in the format described in GSM 11.11 (hexadecimal character format; refer to **+CSCS**) **<response>** Response to the command passed on by the SIM to the ME in the format described in GSM 11.11 (hexadecimal character format; refer **+CSCS**)

HL6528RDx	
Reference [27.007] § 8.17	Notes 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 TE/ME (by interpreting the <command> parameter). In case the 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.

5.32. +CSQ Command: Signal Quality

HL6528RDx	
Test command Syntax **AT+CSQ=?**	 Response **+CSQ:** (list of supported **<rssi>**s),(list of supported **<ber>**s) **OK**
Execute command Syntax **AT+CSQ**	 Response **+CSQ: <rssi>,<ber>** **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 – 7 As RXQUAL values in the table in GSM 05.08 [20] sub clause 8.2.4 99 Not known or not detectable
Reference	[27.007] § 8.5

5.33. +CTZR Command: Time Zone Reporting

HL6528RDx	
Test command Syntax **AT+CTZR=?**	 Response **+CTZR: (**list of supported **<onoff>**s**)** **OK**

HL6528RDx	
Read command Syntax **AT+CTZR?**	 Response **+CTZR: <onoff>** **OK**
Write command Syntax **AT+CTZR =<onoff>**	 Response **OK** Parameter **<onoff>** Integer type 0 Disable time zone change event reporting 1 Enable time zone change event reporting
Reference [27.007] §8.41	Notes • Time Zone reporting is not affected by the Automatic Time Zone setting command **+CTZU**. • If the reporting is enabled the MT returns the unsolicited result code **+CTZV: <tz>** whenever the time zone is changed.

5.34. +CTZU Command: Automatic Time Zone Update

HL6528RDx	
Test command Syntax **AT+CTZU=?**	 Response **+CTZU: (**list of supported **<onoff>**s**)** **OK**
Read command Syntax **AT+CTZU?**	 Response **+CTZU: <onoff>** **OK**
Write command Syntax **AT+CTZU =<onoff>**	 Response **OK** Parameter **<onoff>** Integer type 0 Disable automatic time zone update via NITZ 1 Enable automatic time zone update via NITZ
Reference	[27.007] §8.40

5.35. +ICF Command: DTE-DCE Character Framing

HL6528RDx	
Test command Syntax **AT+ICF?**	 Response **+ICF: (**list of supported **<format>**s**),(**list of supported **<parity>**s**)** **OK**
Read command Syntax **AT+ICF=?**	 Response **+ICF: (1-6),(0-4)** **OK**
Write command Syntax **AT+ICF=** **<format>,** **<parity>**	 Response **OK** Paramters **<format>** 1 8 data 2 stop. <parity> parameter is ignored. 2 8 data 1 parity 1 stop. If no <parity> is provided, 4 is used as <parity> value by default. 3 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> is provided, 4 is used as <parity> value by default. 6 7 data 1 stop. <parity> parameter is ignored. **<parity>** 0 Odd 1 Even 2 Mark 3 Space 4 None
Notes	Parameters are persistent to resets.
Examples	**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**

5.36. +KADC Command: Analog to Digital Converter

HL6528RDx	
Test command Syntax **AT+KADC=?**	 Response **+KADC: (**list of supported **<Meas id>**s**), (**list of supported **<Meas time>**s**)** **OK**
Write command Syntax **AT+KADC=** **<Meas id>,** **<Meas time>**	 Response **+KADC: <Meas result>, <Meas id>, <Meas time>[, <Temperature>]** Parameters **<Meas id>** Measurement ID 0 VBATT – "VBATT" voltage 1 Reserved 2 THERM – connected to NTC200 (the thermistor on board which is located close to the 26MHz DCXO) 3 Reserved 4 ADC0 5 Reserved 6 Reserved 7 ADC1 **<Meas time>** Measurement time 3 No constraint **<Meas result>** Measurement result is in µV **<Temperature>** Temperature for THERM in degrees Celsius
Reference Sierra Wireless Proprietary	Notes • The ADC is a 10-bit converter • Available voltage input range are as follows: **<Meas id>** **Range (V)** VBATT 3.35 – 4.3 THERM 0 – 2.8 ADC0 and ADC1 0 – 2.8 • This command does not require a SIM card to function. • A space is added between each parameter for the read response.

5.37. +KBCAP Command: Retrieve Bitmap Capabilities

HL6528RDx	
Execute command Syntax **AT+KBCAP**	 Response **+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** Parameters **<status>** 0 Deactivated 1 Activated **<pinout_config>** 0 Not supported 1 GPIO pinout configured for demo board design version 1 2 GPIO pinout configured for demo board design version 2 **<FDPname>** Product definition file number **<microboot_version>** Microboot version (if AVMS status is 0, this field will be empty)
Reference	Sierra Wireless Proprietary

5.38. +KBND Command: Current Networks Band Indicator

HL6528RDx	
Test command Syntax **AT+KBND=?**	 Response **+KBND: (**list of supported **<bnd>**s**)** **OK**

HL6528RDx	
Read command Syntax **AT+KBND?**	 Response **+KBND: <bnd>** **OK** Parameter **<bnd>** In Hexadecimal 0x00 Not available 0x01 850 MHz 0x02 900 MHz 0x04 1800 MHz 0x08 1900 MHz

5.39. +KCELL Command: Cell Environment Information

HL6528RDx	
Test command Syntax **AT+KCELL=?**	 Response **+KCELL: (**list of supported **<revision>**s**)** **OK**
Read command Syntax **AT+KCELL?**	 Response **OK**
Write command Syntax **AT+KCELL= <revision>**	 Response **+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** Parameters **<revision>** Reserved for future development (only 0 for the moment) **<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

HL6528RDx	
	<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
Reference Sierra Wireless Proprietary	Notes • This command provides information related to the network environment and can be used for example for localization calculation • Values in italic are not available during certain times; i.e. CI is not available during a communication phase. By default, all values will be initialized to 0xFF; thus, when a value is returned equal to 0xFF, this means it was not possible to decode it.
Example	**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**

5.40. +KCELLSCAN Command: Cell Scan

HL6528RDx	
Test command Syntax **AT+KCELLSCAN=?**	Response **+KCELLSCAN: (**list of supported **<mode>**s**),(**list of supported **<URC>**s**),(**list of supported **<timeout>**s**),(**list of supported **<ext>**s**)** **OK**
Read command Syntax **AT+KCELLSCAN?**	Response **+KCELLSCAN: <mode>** **OK**
Write command Syntax **AT+KCELLSCAN=<mode>[,[<ARFCN>][,[<URC>][,[<timeout>][,<ext>]]]]**	Response **OK** when <mode>=2 and command is successful: **+KCELLSCAN: <ARFCN>,<BSIC>,<PLMN>,<LAC>,<CI>,<RSSI>,<RAC>** **OK** Parameters **<mode>** 0 Deactivate cell scan 1 Activate cell scan 2 Request cells information

HL6528RDx	
	<PLMN> PLMN identifiers (3 bytes), made of MCC (Mobile Country Code) and MNC (Mobile Network Code) **<URC>** 0 No Unsolicited Result Code sent at the end of the scan 1 Unsolicited Result Code is sent at the end of the scan **<timeout>** 1 – 120 Timeout in seconds for sending the unsolicited result code (default value = 60) **<ext>** 0 Reserved for future purposes **<ARFCN>** 0 – 1023 Absolute Radio Frequency Channel Number **<BSIC>** Base Station Identity Code in decimal format **<LAC>** Location Area in hexadecimal format (maximum of 4-digits) **<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 (for serving cell only)
Unsolicited Notification	Response **+KCELLSCAN: <ARFCN>,<BSIC>,<PLMN>,<LAC>,<CI>,<RSSI>,<RAC>**
Examples	Cell scan activation: **AT+KCELLSCAN=1,67** — Define the ARFCN, the sending of notification, and the timeout **OK** — Module launches a power campaign and synchronizes on the ARFCN. Wait for unsolicited message **+KCELLSCAN: 67,32,54f440,f0a, 4ccd,53,255** — Power campaign is finished and all information about the cell have been received Retrieving cell information: **AT+KCELLSCAN=2** — To check cells information at any time **+KCELLSCAN: 67,32,54f440,f0a, 4ccd,53,255** **OK** Cell scan deactivation: **AT+KCELLSCAN=0** — Return to nominal mode **OK**
Reference Sierra Wireless Proprietary	Notes • A value returned equal to 0xFF in the response or the notification means that the module was not possible to decode the information. • When <mode>=0 and <mode>=2, no other parameters are needed. • When <mode>=1, <ARFCN> is mandatory. • URC is sent when all information is available or when <timeout> expires. • Found cells description can be obtained at any moment during the scan with an AT command. • A new scan can be requested at any moment, even if the last one has not yet finished. In such cases, the last scan will be aborted. • Activation of the PLMN scan stops a previous cell scan and vice versa.

HL6528RDx	
Restrictions	• Cell scan is not allowed during a voice call. • If the SIM's PIN is enabled, sending the concatenated command **AT+CPIN="xxxx";+KCELLSCAN=1,<ARFCN>** will have no cell scan response returned.

5.41. +KGPIO Command: Hardware IO Control

HL6528RDx	
Test command Syntax **AT+KGPIO=?**	 Response **+KGPIO: (**list of supported **<IO>**s**),(**list of supported **<cde>**s**)** **OK**
Read command Syntax **AT+KGPIO?**	 Response **OK**
Write command Syntax **AT+KGPIO=<IO>, <cde>**	 Response If <cde> = 2: **+KGPIO: <IO>,<current_value>** **OK** else **OK** Parameters **<IO>** 1 – 8 Selected IO **<cde>** 0 Reset the selected IO, LOW 1 Set the selected IO, HIGH 2 Request the current value of the IO **<current_value>** 0 GPIO is LOW 1 GPIO is HIGH
Reference Sierra Wireless Proprietary	Notes • The current configuration is kept in non-volatile memory after reset. • Check the configuration of **+KGPIOCFG** when **+CME ERROR: 3** issued. • GPIO 3 is used by SIM detection and cannot be reconfigured. • GPIOs assigned to a specific purpose are not listed. • This command can be used without SIM.
Examples	// Change GPIO1's output level **AT+KGPIOCFG=1,0,2** // Configure GPIO1 as output mode; <pull mode> must be // "no pull" **OK** **AT+KGPIO=1,1** // Set GPIO1 **OK** **AT+KGPIO=1,0** // Reset GPIO1 **OK**

HL6528RDx	
	// Define input/output mode for GPIO1 **AT+KGPIOCFG=1,1,0** // Configure GPIO1 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 GPIO1 **OK** **at+kgpio=?** **+KGPIO: (1,2,4,5,6,7,8),(0-2)** **OK** **at+kgpio=9,1** // Set GPIO9; it should return ERROR **+CME ERROR: 3**

5.42. +KGPIOCFG Command: GPIO Configuration

HL6528RDx	
Test command Syntax **AT+KGPIOCFG=?**	Response **+KGPIOCFG: (**list of supported **<n>**s**),(**list of supported **<dir>**s**),(**list of supported **<pull mode>**s**)** **OK**
Read command Syntax **AT+KGPIOCFG?**	Response **+KGPIOCFG: <n>,<dir>,<pull mode>[<CR><LF>** **+KGPIOCFG: <n>,<dir>,<pull mode>** **[...]]** **OK**
Write command Syntax **AT+KGPIOCFG=<n>,<dir>,<pull mode>**	Response **OK** Parameters **<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

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • This command provides configuration for the **+KGPIO** command. • The current configuration is saved in non-volatile memory before reset. • GPIO 3 is used by SIM detection and cannot be reconfigured. • GPIOs assigned to a specific purpose are not listed. • This command can be used without SIM.
Examples	**at+kgpiocfg=1,0,0** // When setting GPIO1 as Output, with incorrect <pull // mode> **ERROR** **at+kgpiocfg=1,0,1** // When setting GPIO1 as Output, with incorrect <pull // mode> **ERROR** **at+kgpiocfg=1,0,2** // When setting GPIO1 as Output, with correct <pull mode> **OK** **at+kgpiocfg=1,1,0** // When setting GPIO1 as Input, with pull down **OK** **at+kgpiocfg=1,1,1** // When setting GPIO1 as Input, with pull up **OK** **at+kgpiocfg=1,1,2** // When setting GPIO1 as Input, with incorrect <pull mode> **ERROR** **at+kgpiocfg=?** **+KGPIOCFG: (1,2,4,5,6,7,8),(0-1),(0-2)** **OK** **at+kgpiocfg?** **//** GPIO 9 is not available to be used **+KGPIOCFG: 1,0,2** **+KGPIOCFG: 2,0,2** **+KGPIOCFG: 4,0,2** **+KGPIOCFG: 5,0,2** **+KGPIOCFG: 6,0,2** **+KGPIOCFG: 7,0,2** **+KGPIOCFG: 8,0,2** **OK** **at+kgpiocfg=9,1,0** **//** When setting GPIO9, it returns ERROR **+CME ERROR: 3** **at+kgpiocfg?** **+KGPIOCFG: 1,0,2** **+KGPIOCFG: 2,0,2** **+KGPIOCFG: 4,0,2** **+KGPIOCFG: 5,0,2** **+KGPIOCFG: 6,0,2** **+KGPIOCFG: 7,0,2** **+KGPIOCFG: 8,0,2** **OK**

5.43. +KGSMBOOT Command: GSM Stack Boot Mode

HL6528RDx	
Test command Syntax **AT+KGSMBOOT=?**	Response **+KGSMBOOT:** (list of supported **<boot_mode>**s) **OK**
Read command Syntax **AT+KGSMBOOT?**	Response **+KGSMBOOT: <boot_mode>** **OK**
Write command Syntax **AT+KGSMBOOT=<boot_mode>**	Response **OK** Parameter **<boot_mode>** 0 Boot with GSM stack OFF 1 Boot with GSM stack ON 2 Boot in the last state (default)
Notes	• To activate the GSM stack, use **AT+CFUN=1,0**. • To deactivate the GSM stack, use **AT+CFUN=4,0**. • When <boot_mode>=2 and the last **+CFUN** state is 0, it will not boot to state 0. Instead, it will boot to the state before setting the state to 0, i.e., it can only boot to state 1 or 4.

5.44. +KJAM Command: Jamming Detection

HL6528RDx	
Test command Syntax **AT+KJAM=?**	Response **+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**
Read command Syntax **AT+KJAM?**	Response **+KJAM: <mode>,<continuous_detection>,<urc_mode>,<gpio_mode>, <gpio_index>,<gpio_result_threshold>,<urc_result_threshold>** **OK**

HL6528RDx

Write command

Syntax

AT+KJAM=<mode>[,<continuous_detection>[,<urc_mode>[,<gpio_mode>[,<gpio_index>[,<gpio_result_threshold>[,<urc_result_threshold>]]]]]]

Response

OK

When <mode>=2 and the command is successful:

+KJAM: <result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>]]]]]]]]

OK

Parameters

<mode> 0 Disable jamming detection
1 Start jamming detection
2 Get latest final result (final as <result_type>, see below)

<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 the final result of jamming detection, no intermediate result

<gpio_mode> 0 Do not report result by GPIO
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. Default value = 5

<gpio_result_threshold> Defines the threshold of the status, whose result will be reported by GPIO
1 Low
2 Medium
3 High
4 Jammed

<urc_result_threshold> Defines the threshold of the status, whose result will be reported by URC; concerns both intermediate and final results
1 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

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	<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
Unsolicited Notification	**+KJAM: <result_type>,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>[,<result>,<band>]]]]]]]]** Parameters **<result_type>** Indicates if <result> is an intermediate or a final result 0 Intermediate result 1 Final result
Reference Sierra Wireless Proprietary	Notes • In case of continuous detection, URC **+KJAM** is only sent when the <result> of at least one <band> changes. • When <mode>=0 or 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 presented. • Intermediate results only concern the current band. • Notification by GPIO only concerns the final result. As soon as the <result> of at least one band is above <gpio_result_threshold>, the GPIO is set to low. • Check available GPIOs using **+KGPIOCFG** when using this command. GPIOs may already be used by **+KSIMDET**, **+KSYNC**, **+KTEMPMON**, **+KGSMAD** or **+KGNSSAD**. If the GPIO is already in use, the module answers with ERROR. • This command cannot be supported without a SIM card. • **AT+KJAM=2** returns the final result without considering <urc_result_threshold>. • Result 0 (no jamming) is sent regardless of the <urc_result_threshold>'s value. • If results are always below <urc_result_threshold>, no URC will be sent.
Examples	**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** // Detect jamming continuously; the result will be reported by // URC when result is 4;

HL6528RDx		
	AT+KJAM=1,1,1,1,5	// Detect jamming continuously; the result will be reported by // URC when result is 4 and GPIO 5 when result is 4
	AT+KJAM=1,1,1,1,5,2	// Detect jamming continuously; the result will be reported by // URC when result is 4 and GPIO 5 when result is 2, 3, or 4
	AT+KJAM=0	// Disable jamming detection

5.45. +KMCLASS Command: Change GPRS Multislot Class

HL6528RDx

Test command

Syntax
AT+KMCLASS=?

Response
+KMCLASS: (list of supported **<class>**es)
OK

or
+CME ERROR: <error>

Read command

Syntax
AT+KMCLASS?

Response
+KMCLASS: <class>
OK

or
+CME ERROR: <error>

Write command

Syntax
AT+KMCLASS= <mclass>

Response
OK

or
+CME ERROR: <error>

Parameter
<mclass>

Multislot Class	Maximum Number of Slots		
	Rx	**Tx**	**Sum**
1	1	1	2
2	2	1	3
4	3	1	4
8	4	1	5
10 (default)	4	2	5

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • This command needs a restart to be effective. • <mclass> is automatically stored in non-volatile memory.

5.46. +KNETSCAN Command: Network Scan

HL6528RDx	
Test command Syntax **AT+KNETSCAN=?**	 Response **+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**
Read command Syntax **AT+KNETSCAN?**	 Response **+KNETSCAN: <mode>** **OK**
Write command Syntax **AT+KNETSCAN=<mode>[,[<oper>][,[<max_cells>][,[<URC>][,[<timeout>][,<ext]]]]]**	 Response **OK** when <mode>=2 and command successful: **+KNETSCAN: <nbcells>[,<ARFCN>,<BSIC>,<PLMN>,<LAC>,<CI>,<RSSI>,<RAC>[,<ARFCN$_i$>,<BSIC$_i$>,<PLMN$_i$>,<LAC$_i$>,<CI$_i$>,<RSSI$_i$>][…]]** **OK** Parameters **<mode>** 0 Deactivate network scan 1 Activate network scan 2 Request cells information **<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 value = 7) **<URC>** 0 No Unsolicited Result Code sent at the end of the scan 1 Unsolicited Result Code sent at the end of the scan **<timeout>** 1 – 600 Timeout in seconds for sending Unsolicited Result Code (default value = 300) **<ext>** 0 Reserved for future purposes

HL6528RDx	
	<nbcells> Number of 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 **<BSIC>** 0 – 63 Base Station Identify Code in decimal format **<LAC>** Location Area in hexadecimal format (maximum of 4-digits) **<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 (for serving cell only)
Unsolicited Notification	Response **+KNETSCAN: <nbcells>[,<ARFCN>,<BSIC>,<PLMN>,<LAC>,<CI>,<RSSI>,<RAC>[,<ARFCN$_i$>,<BSIC$_i$>,<PLMN$_i$>,<LAC$_i$>,<CI$_i$>,<RSSI$_i$>][…]]**
Examples	Network scan activation **AT+KNETSCAN=1,"45406"** Define the PLMN to use in numeric format, the number of cells, the sending of notification, the timeout. **OK** **+KNETSCAN: 6,62,10,54f460,8c, 6771,47,0,113,15,54f460,8c,6772,31, 120,12,54f460,8c,6704,29,117,34,54f 460,8c,5975,26,115,13,54f460,8c,53 5,25,114,33,54f460,8c,1da7,19** Wait for unsolicited message: +KNETSCAN Power campaign is finished and all information about the serving and neighbor cells have been received Retrieving cells information: **AT+KNETSCAN=2** To check cells information at any time **+KNETSCAN: 6,62,10,54f460,8c, 6771,47,0,113,15,54f460,8c,6772,31,1 20,12,54f460,8c,6704,29,117,34,54f4 60,8c,5975,26,115,13,54f460,8c,535,2 5,114,33,54f460,8c,1da7,19** **OK** Maximum number of cells **AT+KNETSCAN=1,"45406",2** Maximum number of cells is 2 **OK** **+KNETSCAN: 2,62,10,54f460,8c, 6771,45,0,113,15,54f460,8c,6772,32** No unsolicited result code sent at the end of scan: **AT+KNETSCAN=1,"45406",,0** **+KNETSCAN: 7,62,10,54f460,8c, 6771,41,0,120,12,54f460,8c,6704,27,1 13,15,54f460,8c,6772,26,117,34,54f46 0,8c,5975,23,115,13,54f460,8c,535,20, 114,33,54f460,8c,1da7,20,662,33,54f4 60,8c,8324,16** **OK** OK is returned after scanning

HL6528RDx	
	Network scan deactivation: **AT+KNETSCAN=0** Return to nominal mode **OK**
Reference Sierra Wireless Proprietary	Notes • For <mode>=0 and <mode>=2, no other parameter is needed. • URC is sent when all information is available or when <timeout> expires. • Found cells description can be obtained after scan with an AT command. • When starting a scan, the scan needs to be explicitly stopped with the **AT+KNETSCAN=0** command. Sending anything else will not abort the scan. • A new scan can be requested at any moment even if the last one has not finished; in such cases, the last scan will be aborted. • This command can work without a SIM card.
Restrictions	• Network scan is not allowed during a voice call. • If the SIM's PIN is enabled, sending the concatenated command **AT+CPIN="xxxx";+KNETSCAN=1** will have no network scan response returned.

5.47. +KPLAYAMR Command: Play AMR File

HL6528RDx	
Test command Syntax **AT+ KPLAYAMR=?**	Response **+KPLAYAMR:** (list of supported **<mode>**s), **<audio_file>**),(list of supported **<volume>**s),(list of supported **<progress>**es) **OK**
Write command Syntax **AT+KPLAYAMR= <mode>, [<audio_file>], [<volume>], [progress]**	Response **OK** **+AMR playing: <percent_done>** **+AMR playing: <percent_done> [...]** Error case **+KPLAYAMR_ERROR: <play_notif>** Parameters **<mode>** 0 Start playing 1 Stop playing 2 Play pause 3 Play resume **<audio_file>** String type that indicates the path and AMR filename to be played. This is mandatory when <mode> is 0. If no path is given in <audio_file>, the root folder "/" will be searched first, then followed by "/ftp/" folder and then "/data/" folder. **<volume>** 1 – 10 Sound level (the smaller the number, the lower the volume). Default value = 5 **<progress>** 0 Disable progress display 1 Enable progress display

HL6528RDx	
	<play_notif> Cause of 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 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 that indicates the percent of the AMR file already played
Reference Sierra Wireless Proprietary	Notes • The AMR file can be uploaded using **AT+KFSFILE**, and it should be stored in "/ftp". • Only narrow-band AMR file format is supported. • The maximum AMR file size depends on the available space of the module's non-volatile memory. • The AMR playing will be stopped when making or receiving a call. • If this command is started during a voice call (MO or MT), the AMR audio is heard on both sides. Once the AMR audio play ends, sound will work as before. • If an AMR or SND file (using **+KPLAYSOUND**) is already playing, this command will stop the current play and play the new one. • Volume cannot be changed when an AMR file is playing; the **+CLVL** command has no effect on the AMR file playing.

5.48. +KPLAYSOUND Command: Play Audio File

HL6528RDx	
Test command Syntax **AT+ KPLAYSOUND=?**	Response **+KPLAYSOUND:** (list of supported **<mode>**s),**<audio_file>**),(list of supported **<volume>**s),(list of supported **<duration>**s) **OK**

HL6528RDx	
Write command Syntax **AT+ KPLAYSOUND= <mode> [,<audio_file>] [,<volume>] [,<duration>]**	Response **OK** Error case **+CME ERROR: <err>** **+KPLAY_ERROR: <play_notif>** Parameters **<mode>** 0 Start playing 1 Stop playing **<audio_file>** String type that indicates the path and midi filename to be played. This is mandatory when <mode> is 0. If no path is given in <audio_file>, the root folder "/" will be searched first, then followed by "/ftp/" folder and then "/data/" folder. **<volume>** 1 – 3 Sound level (the smaller the number, the lower the volume). Default value = 2 **<duration>** 1 – 32767 Playing time (in seconds) 0 Play the file repetitively Default is to play the file once. **<play_notif>** Cause of the play failure 1 Cannot play during a call
Reference Sierra Wireless Proprietary	Notes • Audio file should be stored in "/ftp". • Only supports Sierra Wireless proprietary file formats. The max file size is 2048 bytes. • If the module receives an SMS or call, the play will stop. • If a melody is already playing, this command will stop the current melody and play the new melody. • Volume cannot be changed when a melody is playing; the **+CLVL** command has no effect on the melody playing. • Refer to section 12 Audio Commands for information on how to build an audio file.
Examples	To add a file: **AT+KFSFILE=0,"/ftp/abc.snd",1024** **CONNECT** **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 with volume 3 for 20 secs **OK**

HL6528RDx	
	To play a file repetitively: **AT+KPLAYSOUND=0, "abc.snd", 3, 0** // play abc.snd file with volume 3 repetitively **OK** To play a file once: **AT+KPLAYSOUND=0, "abc.snd", 3** **//** play abc.snd file with volume 3 once **OK** To stop playing immediately: **AT+KPLAYSOUND=1** // stop playing **OK**

5.49. +KRIC Command: Ring Indicator Control

HL6528RDx	
Test command Syntax **AT+KRIC=?**	Response **+KRIC:** (list of supported **<mask>**s),(list of supported **<shape>**s),(list of supported **<pulse_duration>**s in seconds) **OK**
Read command Syntax **AT+KRIC?**	Response **+KRIC: <mask>,<shape>,<pulse duration>** **OK**
Write command Syntax **AT+KRIC= <mask> [,<shape> [,<pulse duration]]**	Response **OK** Parameters **<mask>** Use of RI signal 0x00 RI not used 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; only available 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>** 1 – 5 RI pulse duration in seconds

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • 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 by default. For repeated pulse on incoming calls, pulse width is 1s by default, and then rest for 4 second, and then repeated. • Do not use this command during an incoming call, SMS, SMSCB, USSD, etc. • This command can be used without SIM • If <shape> or <pulse duration> is omitted, the previously saved value will be used.

Examples	**AT+KRIC=?**
	+KRIC: (0-31),(0-1),(1-5)
	OK
	
	AT+KRIC?
	+KRIC: 15,0,1 // pulse duration is set to 1 by default
	OK
	
	AT+KRIC=1,1 // RI is activated on incoming calls only; always active.
	// Setting of pulse duration will not be effective
	OK
	
	AT+KRIC?
	+KRIC: 1,1,1 // RI is always active for incoming calls only
	OK
	
	AT+KRIC=2 // RI is activated on SMS only
	OK
	
	AT+KRIC?
	+KRIC: 2,1,1 // RI is active for 1 second when SMS is received
	OK
	
	AT+KRIC=2,0,1
	OK
	
	AT+KRIC?
	+KRIC: 2,0,1 // RI is active for 1 second when SMS is received
	OK
	
	AT+KRIC=2,0,5
	OK
	
	AT+KRIC? // RI is active for 5 seconds when SMS is received
	+KRIC: 2,0,5
	OK
	
	AT+KRIC=1,0,5 // RI is activated for incoming calls only with repeat pulses
	OK
	
	AT+KRIC?
	+KRIC: 1,0,5 // RI is active for 5 seconds with a rest of 4 seconds
	// between pulses for incoming calls only
	OK

5.50. +KRST Command: Module Reset Period

HL6528RDx	
Test command Syntax **AT+KRST=?**	 Response **+KRST=<0,1,2>[,<time information>,<reset notification>]** **OK**
Read command Syntax **AT+KRST?**	 Response 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 Syntax **AT+KRST =<type> [,<time information> [,<reset notification>]]**	 Response **OK** Parameters **<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
Reference Sierra Wireless Proprietary	Notes • When the programmable time has come: ▪ For voice call and data call, reset will be delayed until the communication is over. ▪ For an ongoing AT command, reset will be delayed until the process is finished • The module is notified by URC **`+KRST: RESET`** if reset time is coming, then the module will reset in 3 seconds. • Programming a new time will take effect immediately: e.g. **`AT+KRST=0`** will immediately cancel any pending programmable resets. • Parameters are stored in non-volatile memory and kept even after start-up. • This reset refers to a software reset, not a hardware reset.

HL6528RDx	
	• Scheduling at specific times require the user to setup the device clock correctly using **AT+CCLK**. **AT+KRST** won't prevent the user from scheduleing a reset with an incorrect date and time setup. It's up to the user to setup the system correctly.

5.51. +KSIMDET Command: SIM Detection

HL6528RDx	
Test command Syntax **AT+KSIMDET=?**	Response **+KSIMDET:** (list of supported **<mod>**s), (list of supported **<selected_sim>**s) **OK**
Read command Syntax **AT+KSIMDET?**	Response **+KSIMDET: <mod>,<gpio>,<sim slot>** **OK**
Write command Syntax **AT+KSIMDET= <mod>, <selected_sim>**	Response **OK** Parameters **<mod>** 0 Disable SIM detection 1 Enable SIM detection **<gpio>** 3 GPIO 3 **<sim slot>, <selected_sim>** 1 First external SIM
Notes	• If the module detects a change in 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. • UIM1_DET (GPIO 3) is used for SIM1 detection. When SIM detection is disabled, GPIO 3 will be free for customer use via the **+KGPIO** command (configured to output, no pull). • GPIOs may already be used by other commands such as **+KSIMSEL** and **+KSYNC**. • This command can be supported even without a SIM card. • The setting of <mod> will be kept after the module reboots.
Examples	<A SIM card is inserted on slot 1> **AT+KSIMDET?** // read current setting **+KSIMDET: 0,3,1** **OK**

HL6528RDx	
	AT+KSIMDET=? // check supported setting **+KSIMDET: (0-1),(1)** **OK** **AT+KSIMDET=1,1** // enable SIM detection on slot 1 **OK** **+SIM: 0,1** // SIM card is removed **+SIM: 1,1** // SIM card is inserted **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** **OK** <Reboot module> **AT+KSIMDET?** // read current setting **+KSIMDET: 0,3,1** **OK**

5.52. +KSIMSEL Command: SIM Selection

HL6528RDx	
Test command Syntax **AT+KSIMSEL=?**	 Response **+KSIMSEL:** (list of supported **<mode>**),(list of supported **<GPIO_polarity>**s) **OK**
Read command Syntax **AT+KSIMSEL?**	 Response **+KSIMSEL: <mode>[,<GPIO_polarity>]** **OK**
Write command Syntax **AT+KSIMSEL= <mode>[,<GPIO_ polarity>]**	 Response **OK** Parameters **<mode>** 0 Disable SIM selection 1 First external SIM is currently used 2 Second external SIM is currently used **<GPIO_polarity>** 0 SIM switching by toggling GPIO6 from 0 to 1 1 SIM switching by toggling GPIO6 from 1 to 0

HL6528RDx	
Notes	• <mode> = 0 is used to activate or deactivate DSSS (feature support can be determined using **+KBCAP**). • When SIM select feature is disabled, only the first external SIM interface is available and the dedicated GPIO is availale for other use (using **+KGPIO**). • The GPIO used for SIM switching is GPIO6. • Only one SIM is active at a time (DSSS: Dual SIM Single Standby)

5.53. +KSLEEP Command: Power Management Control

HL6528RDx	
Test command Syntax **AT+KSLEEP=?**	 Response **+KSLEEP: (**list of supported **<mngt>**s**)** **OK**
Read command Syntax **AT+KSLEEP?**	 Response **+KSLEEP: <mngt>** **OK**
Write command Syntax **AT+KSLEEP= <mngt>**	 Response **OK** Parameter **<mngt>** 0 The UART doesn't go in sleep mode as long as the DTR is active (low level). The DTR has to be active to send AT commands. 1 The module decides by itself (via internal timing) when it goes in sleep mode and will be woken up by a character. 2 The module never goes in sleep mode regardless of the DTR state.
Reference Sierra Wireless Proprietary	Notes • The current configuration is kept in non-volatile memory after reset. • This command can be used without SIM.
Examples	**AT+KSLEEP=?** **+KSLEEP: (0-2)** **OK** **AT+KSLEEP?** **+KSLEEP: 2** **OK** **AT+KSLEEP=1** // Change settings to mode 1 **OK** **AT+KSLEEP?** **+KSLEEP: 1** **OK**

HL6528RDx	
	AT+KSLEEP=2 // Change settings to mode 2 **OK** **AT+KSLEEP?** **+KSLEEP: 2** **OK**

5.54. +KSREP Command: Mobile Start-Up Reporting

HL6528RDx	
Test command Syntax **AT+KSREP=?**	Response **+KSREP:** (list of supported **<act>**s) **OK**
Read command Syntax **AT+KSREP?**	Response **+KSREP: <act>,<stat>** **OK**
Write command Syntax **AT+KSREP= <act>**	Response **OK** Parameters **<act>** Indicates if the module must send an unsolicited code during startup 0 The module will not 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 the access code) 2 The SIM card is not present 3 The module is in “SIMlock” state 5 Unknown state
Reference Sierra Wireless Proprietary	Notes The module uses unsolicited code **+KSUP: <stat>** once after the boot process.
Examples	**AT+KSREP=?** // insert SIM (PIN disabled) **+KSREP: (0-1)** **OK** **AT+KSREP=1** **OK**

HL6528RDx	

	AT+KSREP?
	+KSREP: 1,0
	OK
	
	// reboot the module
	
	+KSUP: 0 // indicates that the module is ready to receive commands
	// and that no access code is required
	
	AT+KSREP?
	+KSREP: 1,0
	OK

5.55. +KSYNC Command: Application Synchronization Signal

HL6528RDx	
Test command Syntax **AT+KSYNC=?**	Response **+KSYNC: (**list of supported **<mod>**s**),(**list of supported **<IO>**s**),(**range of **<Duty Cycle>**s**),(**range of **<Pulse Duration>**s**)** **OK**
Read command Syntax **AT+KSYNC?**	Response **+KSYNC: <mod>,<IO>,<Duty Cycle>,<Pulse Duration>** **OK**
Write command Syntax **AT+KSYNC=<mod>[,<IO>[,<Duty Cycle>[,<Pulse Duration>]]]**	Response **OK** Parameters **<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 register/Initialization/Register denied/no SIM card **600 ms ON / 600ms OFF** Not registered but searching **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 **<Duty Cycle>** 1 – 100 Duty cycle; only used when <mod> = 1 50 Default value

HL6528RDx			
	<Pulse Duration>	1 – 65535	Pulse duration in milliseconds; only used when <mod> = 1
		1000	Default value
Notes	• Parameter values are automatically saved in the module. • Check with **+KGPIOCFG** when using **+KSYNC** command to configuration settings per GPIO. • This command will return ERROR if the selected GPIO is already used by another feature. Check GPIO availability using other related commands. • 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 a time.		

Examples	**AT+KSYNC=1,1,50,2000**
	OK
	
	AT+KSYNC=1,2,50,2000
	OK
	// Note that the previous signal on GPIO1 will be stopped.
	
	AT+KSYNC=0,2
	OK
	
	AT+KSYNC=2,1
	OK
			// Generate the signal, 50% duty cycle, and 2000 ms // pulse duration on GPIO1
			
			// Generate the signal, 50% duty cycle, and 2000 ms // pulse duration on GPIO2
			
			// Disable signal generation
			
			// Generate signal on GPIO1, according to the // network status

5.56. +KTEMPMON Command: Temperature Monitor

HL6528RDx	
Test command Syntax **AT+KTEMPMON=?**	 Response **+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**
Read command Syntax **AT+KTEMPMON?**	 Response **+KTEMPMON: <mod>,<temperature>,<urcMode>,<action>,<hystTime>,<repGPIO>** **OK**

HL6528RDx	
Write command Syntax **AT+KTEMPMON=<mod>,[<temperature>[,<urcMode>[,<action>[,<hystTime>[,<repGPIO>]]]]]**	Response **+KTEMPMON: <level>,<value>** **OK** Parameters **<mod>** 0 Disable the module's internal temperature monitor 1 Enable the module's internal temperature monitor **<temperature>** Temperature limit before the module acts as defined by <action>. Range = 0 – 150; default value = 0 **<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 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. **<level>** Threshold level -2 Extreme temperature lower bound -1 Operating temperature lower bound 0 Normal temperature 1 Operating temperature upper bound 2 Extreme temperature upper bound **<value >** Actual temperature expressed in degrees Celsius
Notes	• The module internal temperature reaches either operating or extreme levels; the unsolicited message is in the format: **+KTEMPMEAS: <level>,<value>**. • Typical temperature bounds are represented as following; Extreme Temperature Lower Bound -40°C Operating Temperature Lower Bound -30°C Operating Temperature Upper Bound +80°C Extreme Temperature Upper Bound +100°C • Due to temperature measurement uncertainty, there is a tolerance of ±2°C. • Check available GPIO with **+KGPIOCFG** when using this command; GPIOs may be already used by **+KSIMDET**, **+KGSMAD**, **+KGNSSAD** or **+KSYNC**.

5.57. +WESHDOWN Command: Emergency Shutdown

HL6528RDx	
Test command Syntax **AT+WESHDOWN=?**	 Response **+WESHDOWN:** (list of supported **<mode>**s)**,**(list of supported **<gpio_index>**s)**)** **OK**
Read command Syntax **AT+WESHDOWN?**	 Response **+WESHDOWN: <mode>,<gpio_index>** **OK**
Write command Syntax **AT+WESHDOWN=<mode>[,<gpio_index>]**	 Response **OK** Parameter **<mode>** 0 Disable emergency shutdown feature by GPIO 1 Enable emergency shutdown feature by GPIO 2 Trigger emergency shutdown **<gpio_index>** 2, 4 Defines which GPIO will be used as input to trigger the emergency shutdown on LOW signal.
Notes	• Currently, only GPIO2 and GPIO4 can be used for emergency shutdown. • Configuration is saved in non-volatile memory and is therefore still effective after a power cycle. • The GPIO may already be used by another AT command, e.g. **+KSIMDET**, **+KJAMDET**, **+KSYNC**, etc. and therefore may no longer be used. • It is possible for the application to not receive the **OK** response on the serial link after **AT+WESHDOWN=2** is sent due to the quick shut down. • Shutdown time is arbitrary; typically, it takes less than 80ms.
Examples	**AT+WESHDOWN=?** **+WESHDOWN: (0-2),(2,4)** **OK** **AT+WESHDOWN?** **+WESHDOWN: 0,4** **//** Emergency shutdown by GPIO is not active **OK** **AT+WESHDOWN=1,2** **//** Activate emergency shutdown on GPIO2 **OK** **AT+WESHDOWN?** **+WESHDOWN: 1,2** **//** A falling edge (low signal) on GPIO2 shuts the module // down **OK** **AT+WESHDOWN=2** // Module shuts down **OK**

HL6528RDx	
	AT+WESHDOWN=1,4 // Activate emergency shutdown on GPIO4 **OK** **AT+WESHDOWN?** **+WESHDOWN: 1,4** // A falling edge (low signal) on GPIO4 shuts the module // down **OK**

5.58. +WEXTCLK Command: External Clocks Setting

HL6528RDx	
Test command Syntax **AT+WEXTCLK=?**	Response **+WEXTCLK: (**list of supported **<output>**s**), (**list of supported **<status>**es**)** **OK**
Read command Syntax **AT+WEXTCLK?**	Response **+WEXTCLK: <output>,<status>** **+WEXTCLK: <output>,<status>** **OK**
Write command Syntax **AT+WEXTCLK= <output>, <status>**	Response **+WEXTCLK: <output>,<status>** **OK** Parameters **<output>** 0 32kHz output (32K_CLKOUT) on GPIO18 1 26MHz output (26M_CLKOUT) **<status>** 0 Disabled 1 Enabled
Reference Sierra Wireless Proprietary	Notes • This command allows the generation of 32 kHz and 26 MHz on the output clock pins of the embedded module. • The 32kHz output is enabled if GPS is initialized for the HL6528RD-G; disabled after GPS release. • Parameters are saved in non-volatile memory. • This command is available when the module has finished its initialization. • This command works without a SIM card.

6. Network Service Related Commands

6.1. *PSGAAT Command: GPRS Automatic Attach

HL6528RDx	
Test command Syntax **AT*PSGAAT=?**	 Response ***PSGAAT:** (list of supported **<attach mode>**s) or **+CME ERROR: <err>**
Read command Syntax **AT*PSGAAT?**	Get current mode Response ***PSGAAT: <attach mode>** **OK** or **+CME ERROR: <err>** Parameter **<attach mode>** 0 No GPRS automatic attach at switch on 1 GPRS automatic attach at switch on
Write command Syntax **AT*PSGAAT= <attach mode>**	Set attach mode Response **OK** or **+CME ERROR: <err>**
Reference Sierra Wireless Proprietary	Notes The write command is used to select GPRS attach mode when ME is switched on.

6.2. *PSHPLMN Command: Home PLMN

HL6528RDx	
Read command Syntax **AT*PSHPLMN?**	Get HPLMN information Response ***PSHPLMN: <mcc>, <mnc>, <PLMN name>** **OK** or **+CME ERROR: <err>** Parameters **<mcc>** Mobile country code in numeric format (e.g. “208”) **<mnc>** Mobile network code in numeric format (e.g. “10”) **<PLMN name>** PLMN name in alphanumeric format
Execute command Syntax **AT*PSHPLMN**	 Response **OK**
Reference Sierra Wireless Proprietary	Notes • This command is used to get the Home PLMN identification (MCC and MNC are decoded from IMSI). • The execute command has no effect (returns OK).

6.3. *PSNTRG Command: Network Registration

HL6528RDx	
Test command Syntax **AT*PSNTRG=?**	Select notification mode Response ***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**)** or **+CME ERROR <err>**
Read command Syntax **AT*PSNTRG?**	Get current network status Response ***PSNTRG: <Registration state>,<GPRS state>,<MCC>,<MNC>,<LAC>,<CI>, <PLMN Name>,[<Band indication>],[<Rat>],[<EGPRS state>]** or **+CME ERROR <err>**

HL6528RDx	
	Parameters **<Registration state>** 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) **<GPRS state>** 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 (not supported) **<MCC>** Mobile country code in numeric format (e.g. “208”) **<MNC>** Mobile network code in numeric format (e.g. “10”) **<LAC>** 2-byte location area code in hexadecimal format (e.g. “3FA2”) **<CI>** 2-byte cell ID in hexadecimal format (e.g. “6CA5”) **<PLMN Name>** Current PLMN Name in long alphanumeric format **<Band indication>** 0 GSM 900 1 E-GSM 900 2 DCS 1800 3 PCS 1900 4 GSM 850 **<Rat>** 0 GSM 1 UMTS (not supported) **<EGPRS state>** 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
Write command Syntax **AT*PSNTRG= <mode>**	Select notification mode Response **OK** or **+CME ERROR <err>** Parameter **<mode>** 0 Disable presentation of the notification 1 Enable presentation of the notification
Unsolicited Notification	Response ***PSNTRG: <Registration state>,<GPRS state>,<MCC>,<MNC>,<LAC>,<CI>,<PLMN Name>,[<Band indication>],[<Rat>],[<EGPRS state>]**

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • This command allows access to network registration information and provides information for both CS and PS domain and is more flexible than the **+CREG** or **+CGREG** commands. • When <mode>=1, the write command enables the presentation of network registration URC (***PSNTRG**) every time one of the parameters is updated by the network or MS.
Example	**AT*PSNTRG?** ***PSNTRG: 1,1,"454","06","008C","6771","SmarTone HK",1,0,0** **OK**

6.4. *PSNWID Command: Network Identity

HL6528RDx	
Test command Syntax **AT*PSNWID=?**	 Response ***PSNWID:** (list of supported **<mode>**s) or **+CME ERROR <err>**
Read command Syntax **AT*PSNWID?**	Get current mode Response ***PSNWID: <mode>** or **+CME ERROR <err>** Parameter **<mode>** 0 Disable network identity indication 1 Enable network identity indication
Write command Syntax **AT*PSNWID= <mode>**	Set notification mode Response **OK** or **+CME ERROR <err>**
Unsolicited Notification	Response ***PSNWID: <MCC>,<MNC>,<long name id>,<long name CI>,<short name id>, <short name CI>** Parameters **<MCC>** Mobile country code in numeric format (e.g. “208”) **<MNC>** Mobile network code in numeric format (e.g. “10”)

HL6528RDx	
	<long name id> 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>** 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
Reference Sierra Wireless Proprietary	Notes The write command is used to enable or disable the presentation of network identity notification (***PSNWID**).

6.5. *PSOPNM Command: Operator Name

HL6528RDx	
Read command Syntax **AT*PSOPNM?**	Response ***PSOPNM: <Operator Name string>** **OK** or **+CME ERROR: <err>** Parameter **<Operator Name string>** Operator name string. Character set as specified by command **+CSCS**
Execute command Syntax **AT*PSOPNM**	Response **OK**
Reference Sierra Wireless Proprietary	Notes • The read command returns the operator name string which can be: ▪ The operator name in long format if EFONS SIM file (6F14) is present and readable in SIM ▪ The operator name short format if EFONS SIM file (6F14) not present or not readable in SIM ▪ An empty string if neither EFONS nor EFONSF SIM files (6F18) are present or readable. • The ONSF file (Operator Name Short Format) is used for applications that cannot accommodate the long name format. • The execute command has no effect (returns OK).

6.6. *PSUTTZ Command: Universal Time and Time Zone

HL6528RDx	
Test command Syntax **AT*PSUTTZ=?**	 Response ***PSUTTZ:** (list of supported **<mode>**s)
Read command Syntax **AT*PSUTTZ?**	Get current mode Response ***PSUTTZ: <mode>** Parameter **<mode>** 0 Disable time zone indication 1 Enable time zone indication
Write command Syntax **AT*PSUTTZ= <mode>**	Set time zone notification mode Response **OK** or **+CME ERROR <err>**
Unsolicited Notification	Response ***PSUTTZ: <year>, <month>, <day>, <hour>, <minute>, <second>, <timezone>, <daylight saving>** Parameters **<year>** UT year; integer type **<month>** 1 – 12 UT month **<day>** 1 – 31 UT day **<hour>** 0 – 23 UT hour **<minute>** 0 – 59 UT minute **<second>** 0 – 59 UT second **<timezone>** “-96” to “+96” String representing the time zone **<daylight saving>** 0 – 2 Daylight saving
Reference Sierra Wireless Proprietary	Notes The write command is used to enable or disable the presentation of universal time and time zone change (**`*PSUTTZ`**).

6.7. +CAOC Command: Advice of Charge Information

HL6528RDx	
Test command Syntax **AT+CAOC=?**	 Response **+CAOC: (**list of supported **<mode>**s**)** **OK**
Read command Syntax **AT+CAOC?**	 Response **+CAOC: <mode>** **OK**
Unsolicited Notification	Response **+CCCM: <ccm>**
Write command Syntax **AT+CAOC= [<mode>]**	 Response If <mode> = 0 **+CAOC: <ccm>** **OK** else **OK** Parameters **<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
Execute command Syntax **AT+CAOC**	 Response **+CAOC: <ccm>** **OK**
Reference [27.007] §7.16	Notes • 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.

6.8. +CCFC Command: Call Forwarding Conditions

HL6528RDx	
Test command Syntax **AT+CCFC=?**	 Response **+CCFC: (**list of supported **<reas>**es**)** **OK**
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>** Sum of integers, each representing a class of information (default = 7) 1 Voice 2 Data **<subaddr>** String type sub address of format specified by <satype> **<satype>** Type of sub-address 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 20) **<status>** 0 Not active 1 Active

HL6528RDx	
Reference [27.007] § 7.11	Notes This command allows control of the call forwarding supplementary service according to GSM 02.84.

6.9. +CCWA Command: Call Waiting

HL6528RDx	
Test command Syntax **AT+CCWA=?**	 Response **+CCWA:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CCWA?**	 Response **+CCWA: <n>** **OK**
Write command Syntax **AT+CCWA=[<n>[,<mode>[,<class>]]]**	 Response when <mode>=2 and command successful **+CCWA: <status>,<class1>** **[+CCWA: <status>,<class2>[...]]** **OK** Parameters **<n>** Sets/shows the result code presentation status in the TA 0 Disable 1 Enable **<mode>** 0 Disable 1 Enable 2 Query status When this parameter is not given, the network is not interrogated. **<class>** Sum of integers, each representing a class of information (default = 9) 1 Voice (telephony) 8 Shotr message service **<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)
Reference [27.007] § 7.12	Notes When enabled (<n>=1), the following unsolicited code is sent to the TE: **+CCWA: <number>,<type>,<class>**.

6.10. +CHLD Command: Call Hold and Multiparty

HL6528RDx	
Test command Syntax **AT+CHLD=?**	 Response **+CHLD: (**list of supported **<n>s)** **OK**
Write command Syntax **AT+CHLD=[<n>]**	 Response **OK** Parameter **<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 3 Add the held call to the active calls 4 Explicit call transfer 5 Activate the Completion of Calls to Busy Subscriber Request. (CCBS)
Reference	[27.007] §7.13

6.11. +CLCC Command: List Current Calls

HL6528RDx	
Test command Syntax **AT+CLCC=?**	 Response **OK**
Execute command Syntax **AT+CLCC**	 Response **[+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>]]** **[+CLCC: <id2>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>]]** **[…]** **OK** Parameters **<id>** Integer type; call identification number as described in GSM 22.030 [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

HL6528RDx	
	<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 3 Voice followed by data, voice mode 4 Alternating voice/data, voice mode 6 Voice followed by data, data mode 7 Alternating voice/data, data mode 9 Unknown **<mpty>** 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 24.008 [8] sub clause 10.5.4.7)
Reference [27.007] §7.18	Notes This command returns the current list of ME calls.

6.12. +CLCK Command: Facility Lock

HL6528RDx	
Test command Syntax **AT+CLCK=?**	 Response **+CLCK:** (list of supported **<fac>**s) **OK**
Write command Syntax **AT+CLCK=<fac>, <mode> [,<passwd> [,<class>]]**	 Response If <mode> <> 2 and command is successful: **OK** If <mode> = 2 and command is successful: **+CLCK:<status>[,<class1>[<CR>,<LF>+CLCK:<status>,class2…]]** **OK** or **+CME ERROR: <err>**

HL6528RDx

Parameters

<fac>

"AO" BAOC (Barr All Outgoing Calls) (refer 3GPP TS 22.088 clause 1)
"OI" BOIC (Barr Outgoing International Calls) (refer 3GPP TS 22.088 clause 1)
"OX" BOIC-exHC (Barr Outgoing International Calls except to Home Country) (refer 3GPP TS 22.088clause 1)
"AI" BAIC (Barr All Incoming Calls) (refer 3GPP TS 22.088 clause 2)
"IR" BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (refer 3GPP TS 22.088 clause 2)
"AB" All Barring services (refer 3GPP TS 22.030) (applicable only for mode>=0)
"AG" All outgoing barring services (refer 3GPP TS 22.030) (applicable only for <mode>=0)
"AC" All incoming barring services (refer 3GPP TS 22.030) (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)
"PU" Network subset Personalization (refer 3GPP TS 22.022)
"PP" Service Provider Personalization (refer 3GPP TS 22.022)
"PC" Corporate Personalization (refer 3GPP TS 22.022)
“PF” Lock Phone to the very First inserted SIM/UICC card (also referred as PH-FSIM) (MT asks password when other than the first SIM/UICC card is inserted)

<mode> 0 Unlock
1 Lock
2 Query status

<status> 0 Not active
1 Active

<passwd> String type; same as the password specified for the facility from the ME user interface or with command +CPWD.

<class> Sum of integers each representing a class of information (default value: 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

Notes

- This command may be used by the TE to lock or unlock the ME or network facilities (with password protection).
- In case of unlock ME then re-lock again, a reset of the module is mandatory to have the ME locked.

Example

```
AT+CLCK="PN",2   // Query the status of the Network Personalization (commonly
                 // named "SIMLock", "SIM Lock")
+CLCK: 0         // Unlock state
OK
```

6.13. +CLIP Command: Calling Line Identification Presentation

HL6528RDx	
Test command Syntax **AT+CLIP=?**	 Response **+CLIP: (**list of supported **<n>**s**)** **OK**
Read command Syntax **AT+CLIP?**	 Response **+CLIP: <n>,<m>** **OK**
Write command Syntax **AT+CLIP=<n>**	 Response **OK** Parameters **<n>** Result code presentation status in the TA 0 Disable 1 Enable **<m>** 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>** 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
Reference [27.007] § 7.6	Notes 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>]]]**

6.14. +CLIR Command: Calling Line Identification Restriction

HL6528RDx	
Test command Syntax **AT+CLIR=?**	 Response **+CLIR: (**list of supported **<n>s)** **OK**
Read command Syntax **AT+CLIR?**	 Response **+CLIR: <n>,<m>** **OK**
Write command Syntax **AT+CLIR=<n>**	 Response **OK** Parameters **<n>** Adjustment for outgoing calls 0 Presentation indicator is used according to the subscription of the CLIR service 1 CLIR invocation 2 CLIR suppression **<m>** 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
Reference	[27.007] § 7.7

6.15. +CNUM Command: Subscriber Number

HL6528RDx	
Test command Syntax **AT+CNUM=?**	 Response **OK**
Execute command Syntax **AT+CNUM**	 Response **+CNUM: [<alpha1>],<number1>,<type1>>[,<speed>,<service>][<CR><LF>** **+CNUM: [<alpha2>],<number2>,<type2>>[,<speed>,<service>][...]]** **OK**

HL6528RDx	
	Parameters **<alpha>** Optional alphanumeric string associated with <number>; used character set should be the one selected using command **+CSCS** **<number>** String type phone number of format specified by <type> **<type>** Type of address octet in integer format (refer to GSM 04.08 [8] sub clause 10.5.4.7) **<speed>** As defined in 27.007 sub clause 6.7 **<service>** Service related to the phone number 4 Voice All other values below 128 are reserved.
Example	**AT+CNUM** **+CNUM: "TEL","0612345678",129** **+CNUM: "","",255** **+CNUM: "","",255** **+CNUM: "","",255** **OK**
Reference [27.007] § 7.21	Notes • The 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. • The response depends on the network provider’s policy.

6.16. +COLP Command: Connected Line Identification Presentation

HL6528RDx	
Test command Syntax **AT+COLP=?**	 Response **+COLP: (**list of supported **<n>**s**)** **OK**
Read command Syntax **AT+COLP?**	 Response **+COLP: <n>,<m>** **OK**
Write command Syntax **AT+COLP=[<n>]**	 Response **OK**

HL6528RDx	
	Parameters **<n>** Result code presentation status in the TA 0 Disable 1 Enable **<m>** Subscriber COLP service status in the network 0 COLP not provisioned 1 COLP 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.
Reference [27.007] § 7.8	Notes • 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).

6.17. +COPN Command: Read Operator Name

HL6528RDx	
Test command Syntax **AT+COPN=?**	 Response **OK**
Execute command Syntax **AT+COPN**	 Response **+COPN: <numeric1>,<alpha1>[<CR><LF>** **+COPN: <numeric2>,<alpha2>** **[...]]** **OK**

HL6528RDx	
	Parameters **<numeric>** String type; operator in numeric format (see **+COPS**) **<alpha>** String type; operator in long alphanumeric format (see **+COPS**)
Reference	[27.007] § 7.21

6.18. +COPS Command: Operator Selection

HL6528RDx	
Test command Syntax **AT+COPS=?**	Response **+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>**
Read command Syntax **AT+COPS?**	Response **+COPS: <mode>[,<format>,<oper>]** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+COPS=** **[<mode>** **[,<format>** **[,<oper>** **[,<Act>]]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<mode>** 0 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 the network 3 Only set <format>; do not attempt to register or deregister. In this case <format> becomes a mandatory input 4 Manual/automatic (<oper> field shall be present); if manual selection fails, automatic mode (<mode>=0) is entered **<format>** 0 Long alphanumeric format for <oper> 1 Short alphanumeric format for <oper> 2 Numeric format for <oper>

HL6528RDx			
	<oper>	String type; <format> indicates if the format is alphanumeric or numeric	
	<stat>	0	Unknown
		1	Available
		2	Current
		3	Forbidden
	<Act>	0	GSM
		2	UTRAN
Reference	[27.007] §7.3		

6.19. +CPLS Command: Select Preferred PLMN List

HL6528RDx	
Test command Syntax **AT+CPLS=?**	 Response **+CPLS:** (list of supported **<list>**s) **OK** or **+CME ERROR: <err>**
Read command Syntax **AT+CPLS?**	 Response **+CPLS: <list>** **OK**
Write command Syntax **AT+CPLS=<list>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<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) 1 Operator controlled PLMN selector with Access Technology EFOPLMNwAcT 2 HPLMN selector with Access Technology EFHPLMNwAcT
Reference [27.007] §7.5	Notes This command appears in 27.007 Release 5, but SIM files EFPLMNwAcT, EFOPLMNwAcT exists in Release 99.

6.20. +CPOL Command: Preferred PLMN List

HL6528RDx	
Test command Syntax **AT+CPOL=?**	Response **+CPOL: (**list of supported **<index>**es**),(**list of supported **<format>**s**)** **OK**
Read command Syntax **AT+CPOL?**	Response **+CPOL: <index1>,<format>,<oper1>[,<GSM_AcT1>,<GSM_Comp_AcT1>,<UTRAN_AcT1>]** **[+CPOL: <index2>,<format>,<oper2>[,<GSM_AcT2>,<GSM_Comp_AcT2>,<UTRAN_AcT2>]** **[...]]** **OK**
Write command Syntax **AT+CPOL=** **[<index>]** **[,<format>** **[,<oper>[,<GSM_AcT>,<GSM_Compact_AcT>,** **<UTRAN_AcT>]]]**	Response **OK** Parameters **<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 **<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
Reference [27.007] §7.19	Notes 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.

6.21. +CPWD Command: Change Password

HL6528RDx	
Test command Syntax **AT+CPWD=?**	Response **+CPWD:** list of supported (**<fac>,<pwdlength>**)s **OK**
Write command Syntax **AT+CPWD= <fac>, <oldpwd>, <newpwd>**	Response **OK** or **+CME ERROR: <err>** Parameters **<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) "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) “AG" All outgoing barring services (refer GSM02.30 [19]) (applicable only for <mode>=0) “AC” All inComing barring services (refer GSM02.30 [19]) (applicable only for <mode>=0) **<oldpwd>, <newpwd>** String type; <oldpwd> shall be the same as password specified for the facility from the ME user interface or using command this command, 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
Reference [27.007] §7.5	Notes • The test command returns a list of pairs which present the available facilities and the maximum length of their password. • The write command sets a new password for the facility lock function.

6.22. +CREG Command: Network Registration

HL6528RDx	
Test command Syntax **AT+CREG=?**	 Response **+CREG: (**list of supported **<n>**s**)** **OK**
Read command Syntax **AT+CREG?**	 Response **+CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]]** **OK**
Write command Syntax **AT+CREG=<n>**	 Response **OK** Parameters **<n>** 0 Disable network registration unsolicited result code 1 Enable network registration unsolicited result code **+CREG: <stat>** 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 1 Registered, home network 2 Not registered, but ME is currently searching a new operator to register to 3 Registration denied 4 Unknown 5 Registered, roaming **<lac>** String type; 2-byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal) **<ci>** String type; 2-byte cell ID in hexadecimal format **<AcT>** 0 GSM 2 UTRAN
Reference [27.007] § 7.2	Notes • This command controls the presentation of an unsolicited result code **+CREG** and provides the network registration status. • The write command is used to control the unsolicited result code **+CREG**. The syntax of unsolicited result **+CREG** is as follows: **+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. • The read command returns the status of the 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. • The test command returns the range of supported modes (i.e. <n>s).

6.23. +CSSN Command: Supplementary Service Notification

HL6528RDx	
Test command Syntax **AT+CSSN=?**	 Response **+CSSN: (**list of supported **<n>**s**), (**list of supported **<m>**s**)** **OK**
Read command Syntax **AT+CSSN?**	 Response **+CSSN: <n>,<m>** **OK**
Write command Syntax **AT+CSSN=<n>** **[,<m>]**	 Response **OK** Parameters **<n>** 0 Suppresses +CSSI messages 1 Activates +CSSI messages **<m>** 0 Suppresses +CSSU messages 1 Activates +CSSU messages
Reference [27.007] § 7.17	Notes Currently, the following values are supported: • CSSI: 0 to 6 • CSSU: 0 to 5

6.24. +CTFR Command: Call Deflection

HL6528RDx	
Test command Syntax **AT+CTFR=?**	 Response **OK**
Write command Syntax **AT+CTFR=** **<number>** **[, <type>** **[, <subaddr>** **[, <satype>]]]**	 Response **OK** or **+CME ERROR: <err>** Parameter **<number>** String type phone number of format specified by <type>

HL6528RDx	
	<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
Reference	[27.007] § 7.14

6.25. +CUSD Command: Unstructured Supplementary Service Data

HL6528RDx	
Test command Syntax **AT+CUSD=?**	Response **+CUSD:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CUSD?**	Response **+CUSD: <n>** **OK**
Unsolicited Notification	Response **+CUSD: <m>[,<str>,<dcs>]**
Write command Syntax **AT+CUSD=[<n>[,<str>[,<dcs>]]]**	Response **OK** Parameters **<n>** 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 this parameter is not given, the network is not interrogated) • If <dcs> indicates that 3GPP TS 23.038 [25] 7-bit default alphabet is used • If TE character set other than "HEX" (refer to command +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 <dcs> 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))

HL6528RDx	
	<dcs> 3GPP TS 23.038 [25] Cell Broadcast Data Coding Scheme in integer format (default = 0) **<m>** 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
Reference [27.007] §7.15	Notes • When TE sends a USSD to the network, the OK result code is sent before the response of the network. When the network answers, the response will be sent as a URC (as if it were a network-initiated operation; in case of error, **+CUSD: 4** will be sent). • This allows the link to not 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**.

6.26. +PHYR Command: Physical Randomization

HL6528RDx	
Test command Syntax **AT+PHYR=?**	Response **+PHYR: (**list of supported **<rand_start_wind>**s**), (**list of supported **<mltp_factor>**s**), (**list of supported **<num_of_retries>**s**)** **OK**
Read command Syntax **AT+PHYR?**	Response **+PHYR: <rand_start_wind>,<mltp_factor>,<num_of_retries>** **OK**
Write command Syntax **AT+PHYR=<rand_start_wind>, [<mltp_factor>], [<num_of_ retries>]**	Response **OK** **+CME ERROR <err>** Parameters **<rand_start_wind>** 0 to 65535 Randomization start window length 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. **<mltp_factor>** 1 to 10 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. Default value = 2

HL6528RDx	
	<num_of_retries> 1 to 31 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. Default value = 5
Notes	• Configuration is saved in non-volatile memory and therefore is still effective after power cycle. • If <rand_start_window> is not 0: ▪ AT+KGSMBOOT is not allowed ▪ AT+CFUN=4 puts the module in flight mode 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 when sending 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.

Examples	**AT+PHYR=?**
	+PHYR: (0-65535),(1-10),(1-31)
	OK
	
	AT+PHYR?
	+PHYR: 0,2,5 // smart connect not active
	OK
	
	AT+PHYR=5000,2,6
	OK
	
	AT+PHYR?
	+PHYR: 5000,2,6
	OK
	// Randomization window length I 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.

7. Phone Book Management Commands

7.1. +CPBF Command: Find Phonebook Entries

HL6528RDx	
Test command Syntax **AT+CPBF=?**	 Response **+CPBF: [<nlength>],[<tlength>]** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+CPBF= <findtext>**	 Response **[[+CPBF: <index1>,<number>,<type>,<text>]** **[+CBPF: <index2>,<number>,<type>,<text>]]** **OK** or **+CME ERROR: <err>** Parameters **<index1>, <index2>** 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 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 **+CSCS** **<nlength>** Integer type value indicating the maximum length of field <number> **<tlength>** Integer type value indicating the maximum length of field <text>
Reference [27.007] §8.13	Notes The write command returns phonebook entries (from the current phonebook memory storage selected with **+CPBS**).

7.2. +CPBR Command: Read Current Phonebook Entries

HL6528RDx	
Test command Syntax **AT+CPBR=?**	 Response **+CPBR: (**list of supported **<index>**s)**,[<nlength>],[<tlength>]** **OK** or **+CME ERROR: <error>**
Write command Syntax **AT+CPBR=<index1>[,<index2>]**	 Response **[+CPBR: <index1>,<number>,<type>,<text>[,<hidden>]]** **[+CPBR: <index2>,<number>,<type>,<text>[,<hidden>]]** **OK** or **+CME ERROR: <error>** 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 **+CSCS** **<nlength>** Integer type value indicating the maximum length of field <number> **<tlength>** Integer type value indicating the maximum length of field <text>
Reference [27.007] §8.12	Notes The write 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

HL6528RDx	
Test command Syntax **AT+CPBS=?**	 Response **+CPBS: (list of supported <storage>s)** **OK**
Read command Syntax **AT+CPBS?**	 Response **+CPBS: <storage>[,<used>,<total>]** **OK**
Write command Syntax **AT+CPBS= <storage>**	 Response **OK** or **+CME ERROR: <err>** Parameters **<storage>** "DC" MT dialed calls list (**+CPBW** may not be applicable for this storage) "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) "RC" MT received calls list (**+CPBW** may not be applicable for this storage) "SM" SIM phonebook "LD" Last-dialing-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
Reference [27.007] §8.11	Notes The write command selects the phonebook memory storage <storage> which is used by other phonebook commands.

7.4. +CPBW Command: Write Phonebook Entries

HL6528RDx	
Test command Syntax **AT+CPBW=?**	Response **+CPBW**: **(**list of supported **<index>**s**),[<nlength>],(**list of supported **<type>**s**), [<tlength>]** **OK**
Execute command Syntax **AT+CPBW= [<index>] [,<number> [,<type>[,<text>]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<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 is 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 **+CSCS** **<nlength>** Integer type value indicating the maximum length of field <number> **<tlength>** Integer type value indicating the maximum length of field <text>
Reference [27.007] §8.14	Notes The execute command writes phonebook entries in location number <index> in the current phonebook memory storage selected with **+CPBS**.

8. SMS 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 3GPP 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 +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 to command +cscs in3G TS 27.007 [9]); type of address given by <toda>

<data> In the case of SMS: 3G TS 23.040 [3] TP-User-Data in text mode responses; format:

- if <dcs> 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 to 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 GSM 7-bit default alphabet into two IRA character long hexadecimal number (e.g. character Π (GSM 7 bit default alphabet 23) is presented as 17 (IRA 49 and 55))
- if <dcs> 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 <dcs> indicates that 3G TS 23.038 [2] GSM 7-bit default alphabet is used:
  - if TE character set other than "HEX" (refer to 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 <dcs> 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

<dcs> 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-Discharge-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 to 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 to 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 to 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

HL6528RDx	
Test command Syntax **AT+CMGD=?**	 Response **+CMGD:** (list of supported **<index>**s)[,(list of supported **<delflag>**s)] **OK**
Write command Syntax **AT+CMGD= <index> [,<delflag>]**	 Response **OK** or **CMS ERROR: <error>** Parameter **<delflag>** Integer indicating multiple message deletion requests 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
Reference [27.005] §3.5.4	Notes The write command deletes messages from the 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 the <delflag> shown.

8.4. +CMGF Command: Select SMS Message Format

HL6528RDx	
Test command Syntax **AT+CMGF=?**	 Response **+CMGF: (**list of supported **<mode>**s**)** **OK**

HL6528RDx	
Read command Syntax **AT+CMGF?**	 Response **+CMGF: <mode>** **OK**
Execute command Syntax **AT+CMGF= [<mode>]**	 Response **OK** Parameter **<mode>** 0 PDU mode 1 Text mode
Reference [27.005] §3.2.3	Notes The execute 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 either be 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 **+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

HL6528RDx	
Test command Syntax **AT+CMGL=?**	 Response **+CMGL: (**list of supported **<stat>**s**)** **OK**
Execute command Syntax **AT+CMGL [=<stat>]**	 Response 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** Parameters See chapter section 8.2 Parameters Definition
Reference [27.005] § 3.4.2 and 4.1	Notes • 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 in the HL6528RDx.

8.6. +CMGR Command: Read SMS Message

HL6528RDx	
Test command Syntax **AT+CMGR=?**	 Response **OK**
Write command Syntax **AT+CMGR= <index>**	 Response if PDU mode (+CMGF=0) and command successful: **+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu>** **OK** Parameters See chapter section 8.2 Parameters Definition
Reference [27.005] §3.4.3 and 4.2	Notes • 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. • If status of the message is “received unread”, status in the storage changes to “received read”. • <alpha> is optional; it is NOT used in the HL6528RDx.

8.7. +CMGS Command: Send SMS Message

HL6528RDx	
Test command Syntax **AT+CMGS=?**	 Response **OK**
Write command Syntax if PDU mode (+CMGF=0): **AT+CMGS= <length><CR>** **PDU is given <ctrl-Z/ESC>**	 Response if PDU mode (+CMGF=0) and sending successful: **+CMGS: <mr>[,<ackpdu>]** **OK** Parameters See chapter section 8.2 Parameters Definition

HL6528RDx	
Reference [27.005] § 3.5.1 and 4.3	Notes • <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 4-character sequence <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after the command line is terminated with <CR>; after that, the PDU can be given from TE to ME/TA and the DCD signal shall be in ACTIVE state while PDU is given. • The PDU shall be in 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 **+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 the <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

HL6528RDx	
Test command Syntax **AT+CMGW=?**	 Response **OK**
Write command Syntax if PDU mode (+CMGF=0): **AT+CMGW=<length>[,<stat>]<CR>PDU is given<ctrl-Z/ESC>**	 Response **+CMGW: <index>** **OK** Parameters See chapter section 8.2 Parameters Definition
Reference [27.005] § 3.5.3 and 4.4	Notes The execution command stores the 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 a different default <stat> for different message types.) The entering of PDU is done similarly as specified in command **+CMGS**.

8.9. +CMSS Command: Send SMS Message from Storage

HL6528RDx	
Test command Syntax **AT+CMSS=?**	 Response **OK**
Write command Syntax **AT+CMSS= <index>[,<da> [,<toda>]]**	 Response if PDU mode (+CMGF=0) and sending successful: **+CMSS: <mr>[,<ackpdu>]** **OK** Parameters See chapter section 8.2 Parameters Definition
Reference [27.005] § 3.5.2 and 4.7	Notes • The execution command sends a 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. • Note that none of the messages stored in the module may be forwarded (for instance, carrier messages as SMS replace, etc.)

8.10. +CMT Notification: Received SMSPP Content

HL6528RDx	
Unsolicited Notification	Response **+CMT: [<alpha>], <length><CR><LF><pdu>** **+CMT: <oa> ,[<alpha>], <scts> [, <tooa> , <fo>, <pid> , <dcs> , <sca> , <tosca> , <length>] <CR > <LF> <data>**
Reference [27.005]	Notes • All parameters are extracted from the received message. • Detailed header information is shown in text mode result codes according to command **+CSDH**.

8.11. +CNMI Command: New SMS Message Indication

HL6528RDx	
Test command Syntax **AT+CNMI=?**	 Response **+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 Syntax **AT+CNMI?**	 Response **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>** **OK**
Write command Syntax **+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]**	 Response **OK** or **CMS ERROR: <error>** Parameters **<mode>** Processing of unsolicited result codes 0 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. 1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved. Otherwise forward them directly to the TE. 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 Forward unsolicited result codes directly to the TE. TA-TE link specific inband technique used to embed result codes and data when TA is in online data mode. **<mt>** Result code indication routing for SMS-DELIVER indications 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>** 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) or **+CMT: <oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<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. **<bm>** Rules for storing the received CBMs (cell Broadcast Message) types 0 No CBM indications are routed to the TE 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>,<dcs>,<page>,<pages><CR><LF><data>** (text mode enabled).

HL6528RDx	
	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. **<ds>** SMS-STATUS-REPORTs routing 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) **<bfr>** TA buffer of unsolicited result code modes 0 TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode>=1 – 3 is entered (**OK** response shall be given before flushing the codes) 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

8.12. +CPMS Command: Preferred Message Storage

HL6528RDx	
Test command Syntax **AT+CPMS=?**	Response **+CPMS: (**list of supported **<mem1>**s**), (**list of supported **<mem2>**s**), (**list of supported **<mem3>**s**)** **OK**
Read command Syntax **AT+CPMS?**	Response **+CPMS:** **<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>** **OK**
Write command Syntax **AT+CPMS=** **<mem1>** **[,<mem2>** **[,<mem3>]]**	Response **+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>** **OK** Parameters See chapter section 8.2 Parameters Definition

HL6528RDx	
Examples	**AT+CPMS=?** **+CPMS: ("SM","ME"),("SM","ME"),("SM","ME")** **OK** **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**
Reference [27.005] §3.2.2	Notes • The write 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 versus 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), it is only seen with +CMTI notification. 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	Refused	ME	Refused
SMS Class 2 (SIM specific)	SIM	Refused	SIM	Refused
SMS Class 3 (TE specific)	SIM	Refused	ME	Refused
SMS No Class	SIM	Refused	ME	Refused

8.13. +CSCA Command: SMS Service Center Address

HL6528RDx	
Test command Syntax **AT+CSCA=?**	 Response **OK**
Read command Syntax **AT+CSCA?**	 Response **+CSCA: <sca>,<tosca>** **OK**

HL6528RDx	
Write command Syntax **AT+CSCA=<sca> [,<tosca>]**	 Response **OK** Parameters See chapter section 8.2 Parameters Definition
Reference [27.005] § 3.3.1	Notes The write 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.

8.14. +CSCB Command: Select Cell Broadcast Message Types

HL6528RDx	
Test command Syntax **AT+CSCB=?**	 Response **+CSCB: (list of supported <mode>s)** **OK**
Read command Syntax **AT+CSCB?**	 Response **+CSCB: <mode>,<mids>,<dcss>** **OK**
Write command Syntax **AT+CSCB= [<mode> [,<mids>]]**	 Response **OK** Parameters **<mode>** 0 Message types specified in <mids> are accepted 1 Message types specified in <mids> are not accepted **<mids>** String type; combinations of CBM message IDs (e.g. "0,1,5,320-478,922"). The number of ranges in the <mids> parameter string is limited to 10. Note that intervals are not allowed. **<dcss>** String type; all different possible combinations of CBM data coding schemes (refer <dcs>) (default is empty string); e.g. "0-3,5"
Reference [27.005] § 3.3.4	Notes • The write command selects which types of CBMs are to be received by the ME. • The module does not manage the SMSCB language, nor the data coding scheme parameter (<dcss> parameter).

8.15. +CSDH Command: Show Text Mode Parameters

HL6528RDx	
Test command Syntax **AT+CSDH=?**	Response **+CSDH:** (list of supported **<show>**s) **OK**
Read command Syntax **AT+CSDH?**	Response **+CSDH: <show>** **OK**
Write command Syntax **AT+CSDH=[<show>]**	Response **OK** Parameter **<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
Reference [27.005] §3.3.3	Notes The write command controls whether detailed header information is shown in text mode result codes.

8.16. +CSMP Command: Set SMS Text Mode Parameters

HL6528RDx	
Test command Syntax **AT+CSMP=?**	Response **OK**
Read command Syntax **AT+CSMP?**	Response **+CSMP: <fo>,<vp>,<pid>,<dcs>** **OK**

HL6528RDx	
Write command Syntax **AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]**	Response **OK** Parameters See chapter section 8.2 Parameters Definition (refer to the notes below for applicable parameter limitations).
Examples	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**
Reference [27.005] § 3.3.2	Notes • The write 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 to 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 an SMS-DELIVER from the TE to the preferred memory storage in text mode (refer to command **+CMGW**), <vp> field can be used for <scts>. • Only Relative Validity Period (bit3 = 0, bit4 = 1) is supported for <fo>. • Only Relative format (one octet, 0 – 255) is supported for <vp>. • Only uncompressed text (bit5 = 0) is supported for <dcs>.

8.17. +CSMS Command: Select Message Service

HL6528RDx	
Test command Syntax **AT+CSMS=?**	Response **+CSMS:** (list of supported **<service>**s) **OK**
Read command Syntax **AT+CSMS?**	Response **+CSMS: <service>,<mt>,<mo>,<bm>** **OK**
Write command Syntax **AT+CSMS=<service>**	Response **+CSMS: <mt>,<mo>,<bm>** **OK**

HL6528RDx	
	Parameters **<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 **<bm>** Broadcast Type Messages 0 Type not supported 1 Type supported
Reference [27.005] §3.2.1	Notes The write 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.

9. Data Commands

9.1. +CR Command: Service Reporting Control

HL6528RDx	
Test command Syntax **AT+CR=?**	 Response **+CR:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+CR?**	 Response **+CR: <mode>** **OK**
Write command Syntax **AT+CR=** **[<mode>]**	 Response **OK** Parameters **<mode>** 0 Disables reporting 1 Enables reporting **<serv>** ASYNC Asynchronous transparent SYNC Synchronous transparent REL ASYNC Asynchronous non-transparent REL SYNC Synchronous non-transparent
Reference [27.007] §6.9	Notes • The write command controls whether 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 command **+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 **+ER** and **+DR**.

10. GPRS Commands

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

10.1. *PSGCNT Command: GPRS Counters

HL6528RDx	
Test command Syntax **AT*PSGCNT=?**	 Response ***PSGCNT:** (list of supported **<CiD>**s)
Read command Syntax **AT*PSGCNT?**	Get counter values Response ***PSGCNT: <CiD>, <Rx bytes>, <Tx bytes> [...]** **<CR><LF>** ***PSGCNT: <CiD> <Rx bytes>, <Tx bytes>** Parameters **<Rxbytes>** Number of received bytes **<Txbytes>** Number of transmitted bytes
Write command Syntax **AT*PSGCNT= <CiD>**	Reset counter Response **OK** Parameter **<CiD>** Numeric parameter which specifies a particular PDP context definition (see **+CGDCONT**)
Reference Sierra Wireless Proprietary	Notes • The write command resets the counter of <cid> given as a parameter (all counters are reset at switch ON). • The read command returns the current received and transmitted bytes (Rx and Tx) for all possible CiDs.

10.2. +CGACT Command: Activate or Deactivate PDP Context

HL6528RDx	
Test command Syntax **AT+CGACT=?**	 Response **+CGACT: (**list of supported **<state>**s**)** **OK**

HL6528RDx	
Read command Syntax **AT+CGACT?**	 Response **+CGACT: <cid>, <state>** **OK**
Write command Syntax **AT+CGACT= <state>[, <cid>]**	 Response **OK** Parameters **<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 **<cid>** PDP Context Identifier is a numeric parameter which specifies a particular PDP context definition
Reference [27.007] §10.1.10	Notes • It is impossible to use ATD*99… or *98… commands after using this command. • Up to two (2) PDP contexts can be active at once.

10.3. +CGATT Command: Attach or Detach PS

HL6528RDx	
Test command Syntax **AT+CGATT=?**	 Response **+CGATT:** (list of supported **<state>**s) **OK**
Read command Syntax **AT+CGATT?**	 Response **+CGATT: <state>** **OK**
Write command Syntax **AT+CGATT= <state>**	 Response **OK** Parameter **<state>** Indicates the state of PS attachment 0 Detached 1 Attached
Reference	[27.007] §10.1.9

10.4. +CGCLASS Command: GPRS Mobile Station Class

HL6528RDx	
Test command Syntax **AT+CGCLASS=?**	 Response **+CGCLASS:** (list of supported **<class>**es) **OK**
Read command Syntax **AT+CGCLASS?**	 Response **+CGCLASS: <class>** **OK**
Write command Syntax **AT+CGCLASS= <class>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<class>** A string parameter which indicates the GPRS mobile class (in descending order of functionality) "B" Class B "CG" Class C in GPRS only mode "CC" Class C in circuit switched only mode (lowest)
Reference [27.007] §10.1.17	Notes Class A is not supported.

10.5. +CGDCONT Command: Define PDP Context

HL6528RDx	
Test command Syntax **AT+CGDCONT=?**	 Response **+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**
Read command Syntax **AT+CGDCONT?**	 Response **+CGDCONT: <cid>, <PDP_type>, <APN>,<PDP_addr>, <data_comp>, <head_comp>[,<pd1>[,…[,pdN]]** **OK**

HL6528RDx	
Write command Syntax **AT+CGDCONT=** **[<cid>** **[,<PDP_type>** **[,<APN>** **[,<PDP_addr>** **[,<d_comp>** **[,<h_comp>]]]]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<cid>** 1 – 2 PDP Context Identifier; a numeric parameter which specifies a particular PDP context definition. **<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>** 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>** Numeric parameter that controls PDP data compression. 0 Off (default and only value supported) **<h_comp>** Numeric parameter that controls PDP header compression 0 Off (default and only value supported) **<pd1>, … <pdN>** Zero to N string parameters whose meanings are specific to <PDP_type>
Reference [27.007] §10.1.1	Notes • The write 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 write command, **+CGDCONT=<cid>** causes the values for context number <cid> to become undefined.

10.6. +CGEREP Command: GPRS Event Reporting

HL6528RDx	
Test command Syntax **AT+CGEREP=?**	Response **+CGEREP:** (list of supported **<mode>**s),(list of supported **<bfr>**s) **OK**

HL6528RDx	
Read command Syntax **AT+CGEREP?**	Response **+CGEREP: <mode>, <bfr>** **OK**
Write command Syntax **AT+CGEREP=** **[<mode>[,<bfr>]]**	Response **OK** Parameters **<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 **<bfr>** 0 MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered
Unsolicited Notification	For network attachment: **+CGEV: NW DETACH** **+CGEV: ME DETACH** For PDP context deactivation: **+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]** **+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]** For PDP context activation: **+CGEV: ME PDN ACT <cid>** For other PDP context handling: **+CGEV: REJECT <PDP_type>, <PDP_addr>** **+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]**
Reference	[27.007] §10.1.18

10.7. +CGPADDR Command: Show PDP Address

HL6528RDx	
Test command Syntax **AT+CGPADDR=?**	Response **+CGPADDR:** (list of supported **<cid>**s) **OK**

HL6528RDx	
Write command Syntax **AT+CGPADDR=[,<cid>[,<cid>[,...]]]**	Response **+CGPADDR: <cid>, <PDP_addr>** **[+CGPADDR: <cid>, <PDP_addr>** **[…]]** **OK**
Execute command Syntax **AT+CGPADDR**	Response **[+CGPADDR: <cid>,<PDP_addr>** **[+CGPADDR: <cid>,<PDP_addr>]]** **OK** or **+CME ERROR: <err>** Parameters **<PDP_addr>** 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>** Numeric parameter which specifies a particular PDP context definition
Reference [27.007] §10.1.14	Notes The execution command returns a list of PDP addresses for the specified context identifiers.
Example	Ask for IP address according to cid=1 (identify the PDP context): **AT+CGPADDR=1** **+CGPADDR: 1, "10.20.30.40"**

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

HL6528RDx	
Test command Syntax **AT+CGQMIN=?**	Response **+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**

HL6528RDx	
Read command Syntax **AT+CGQMIN?**	Response **+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>** **[+CGQMIN: ...]** **OK**
Write command Syntax **AT+CGQMIN=** **[<cid>** **[,<precedence>** **[,<delay>** **[,<reliability>** **[,<peak>** **[,<mean>]]]]]]**	Response **OK** Parameters **<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 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)

HL6528RDx	
	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) 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

10.9. +CGQREQ Command: Request Quality of Service Profile

HL6528RDx	
Test command Syntax **AT+CGQREQ=?**	Response **+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**
Read command Syntax **AT+CGQREQ?**	Response **+CGQREQ: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>** **[+CGQREQ: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>** **[…]]** **OK**
Write command Syntax **+CGQREQ=** **[<cid>** **[,<precedence >** **[,<delay>** **[,<reliability.>** **[,<peak>** **[,<mean>]]]]]]**	Response **OK** Parameters **<cid>** Numeric parameter which specifies a particular PDP context definition (see the **+CGDCONT** command). **<precedence>** Numeric parameter which specifies the precedence class **<delay>** Numeric parameter which specifies the delay class

HL6528RDx	
	<reliability> Numeric parameter which specifies the reliability class **<peak>** Numeric parameter which specifies the peak throughput class **<mean>** Numeric parameter which specifies the mean throughput class
Reference [27.007] §10.1.4	Notes • 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.

10.10. +CGREG Command: GPRS Network Registration Status

HL6528RDx	
Test command Syntax **AT+CGREG=?**	Response **+CGREG:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CGREG?**	Response **+CGREG: <n>,<stat>[,<lac,<ci>[,<Act>]]** **OK**
Write command Syntax **AT+CGREG=[<n>]**	Response **OK** Parameters **<n>** 0 Disable network registration unsolicited result code 1 Enable network registration unsolicited result code **+CGREG: <stat>** 2 Enable network registration and location information unsolicited result code **+CGREG: <stat>[,<lac>,<ci>[,<Act>]]** **<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 can 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.

HL6528RDx	
	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; 2-byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal) **<ci>** String type; 2-byte cell ID in hexadecimal format **<Act>** 0 GSM 2 UTRAN
Reference [27.007] §10.1.19	Notes The write command controls the presentation of 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>[,<Act>]]** when <n>=2 and there is a change of the network cell.

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

HL6528RDx	
Test command Syntax **AT+CGSMS=?**	Response **+CGSMS: (**list of currently available **<service>**s**)** **OK**
Read command Syntax **AT+CGSMS?**	Response **+CGSMS: <service>** **OK**
Execute command Syntax **AT+CGSMS= [<service>]**	Response **OK** Parameter **<service>** Indicates the service or service preference to be used. 0 Packet Domain 1 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)

HL6528RDx	
Reference [27.007] § 10.1.20	Notes • When <service> value is 2, the SMS is sent on the GPRS network if already attached. Otherwise it is sent on a circuit switched network. If an error occurs on the GPRS network, no further attempts are made. • Parameter is saved in non-volatile memory.

10.12. +WPPP Command: Configure PDP Context Authentication

HL6528RDx	
Test command Syntax **AT+WPPP=?**	 Response **+WPPP:** (list of supported **<Auth>**),[<list of supported **<cid>**s] **OK**
Read command Syntax **AT+WPPP?**	 Response **+WPPP: <Auth>,<cid>,[<username>],[<password>]** **OK**
Write command Syntax **AT+WPPP= <Auth>,[<cid>], [<username>], [<password>]**	 Response **OK** **+CME ERROR <err>** Parameters **<Auth>** Authentication type 0 None 1 PAP 2 CHAP **<cid>** 1 – 2 PDP context identifier used in **+CGDCONT**. If omitted, the configuration is set for all PDP contexts. **<username>** Login for the APN. String type, up to 30 characters **<password>** Password for the APN. String type, up to 30 characters
Reference Sierra Wireless Proprietary Command	Notes • Parameters are stored in non-volatile memory. • This command is available after the SIM has been inserted and the pin code has been entered.

HL6528RDx	
Examples	**AT+WPPP=?** **+WPPP: (0-2),(1-2)** **OK** **AT+WPPP=1,1,“myusername”,“mypassword”** **OK** **AT+WPPP?** **+WPPP: 1,1,“myusername”,“mypassword”** **+WPPP: 1,2**

11. Board Support Commands

11.1. +KGNSSAD Command: GNSS Antenna Detection

HL6528RDx	
Test command Syntax **AT+KGNSSAD=?**	Response **+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**
Read command Syntax **AT+KGNSSAD?**	Response **+KGNSSAD: <mod>,<urcmode>,<interval>,<detGPIO>,<repGPIO>** **OK**
Write command Syntax **AT+KGNSSAD=<mod>,[<urcmode>[,<interval>[,<detGPIO>[,<repGPIO>]]]]**	Response **OK** Parameters **<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 – 3600s Interval between two detections. This parameter only means something if <mod>=1. Default value = 120 **<detGPIO>** 1 – 8 Defines which GPIO is to be used as input by the antenna detection algorithm **<repGPIO>** 1 – 8 Defines which GPIO is to be used as output by the antenna detection algorithm to report antenna condition. This parameter only means something if <mod>=1

HL6528RDx	
Notes	• **<repGPIO>** is set to LOW when the antenna is connected. Otherwise, this 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> means: 0 Antenna connected 1 Antenna connector short circuited to ground 2 Antenna connector short circuited to power 3 Antenna not detected (open) • Check with **+KGPIOCFG** when using **+KGNSSAD** command. GPIOs may already be used by **+KSIMDET**, **+KGSMAD**, **+KSYNC**, **+KTEMPMON**, **+GPSNMEA** or **+GPSPVT**. • Instantaneous activation doesn't affect a periodic activation that has already been started.

11.2. +KGSMAD Command: GSM Antenna Detection

HL6528RDx	
Test command Syntax **AT+KGSMAD=?**	Response **+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**
Read command Syntax **AT+KGSMAD?**	Response **+KGSMAD: <mod>,<urcmode>,<interval>,<detGPIO>,<repGPIO>** **OK**
Write command Syntax **AT+KGSMAD=<mod>,[<urcmode>[,<interval>[,<detGPIO>[,<repGPIO>]]]]**	Response **OK** Parameters **<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 – 3600s Interval between two detections. This parameter only means something if <mod>=1. Default value = 120 **<detGPIO>** 1 – 8 Defines which GPIO is to be used as input by the antenna detection algorithm. Default value = 5

HL6528RDx	
	<repGPIO> 1 – 8 Defines which GPIO is to be used as output by the antenna detection algorithm to report antenna condition. This parameter only means something if <mod>=1
Notes	• <repGPIO> is set to LOW when the antenna is connected. Otherwise, this 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> means: 0 Antenna connected 1 Antenna connector short circuited to ground 2 Antenna connector short circuited to power 3 Antenna not detected (open) • Check with **+KGPIOCFG** when using **+KGSMAD** command. GPIOs may already be used by **+KSIMDET**, **+KGNSSAD**, **+KSYNC**, **+KTEMPMON**, **+GPSNMEA** or **+GPSPVT**. • Instantaneous activation doesn't affect a periodic activation that has already been started.

11.3. +KSIOCFG Command: Serial IO Configuration

HL6528RDx	
Test command Syntax **AT+KSIOCFG=?**	Response **+KSIOCFG: (**list of supported **<mode>**s**)** **OK**
Read command Syntax **AT+KSIOCFG?**	Response **+KSIOCFG: <mode>** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+KSIOCFG= <mode>**	Response **+KSIOCFG: <mode>** **OK** Parameters **<mode>** 0 UART1 for AT/data, UART0 (Debug_UART) for trace 1 USB for AT/data, USB for trace 2 UART1 for AT/data, USB for trace
Notes	• Parameters are saved in non-volatile memory. • Setting is effective after reboot. • This command works without SIM card.

11.4. +WCARRIER Command: Show Carrier Name

HL6528RDx	
Test command Syntax **AT+WCARRIER=?**	 Response **OK**
Execute command Syntax **AT+WCARRIER**	 Response **+WCARRIER: <Carrier Name>** **OK** Parameter **<Carrier Name>** Carrier name; maximum of 8 characters string
Notes	The carrier name is written in non-volatile memory during the factory customization process.
Example	**at+wcarrier** **+WCARRIER: Telstra** **OK**

12. Audio Commands

12.1. +CLVL Command: Loudspeaker Volume Level

HL6528RDx	
Test command Syntax **AT+CLVL=?**	 Response **+CLVL:** (list of supported **<level>**s) **OK**
Read command Syntax **AT+CLVL?**	 Response **+CLVL: <level>** **OK**
Write command Syntax **AT+CLVL= <level>**	 Response **OK** Parameter **<level>** 0 – 10 Loudspeaker level (smaller value represents lower sound level; 0 = mute)
Reference [27.007] § 8.23	Examples **AT+CLVL=?** **+CLVL: (0-10)** **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**

12.2. +CODECINFO Command: Display Audio Codec Information

HL6528RDx	
Test command Syntax **AT+CODECINFO =?**	 Response **+CODECINFO: (**list of supported **<MODE>**s**)** **OK**
Read command Syntax **AT+CODECINFO ?**	 Response **+CODECINFO: <MODE>** **OK**
Write command Syntax **AT+CODECINFO =<MODE>**	 Response **OK** Parameter **<MODE>** 0 Disable codec info unsolicited message 1 Enable codec info unsolicited message
Reference Sierra Wireless Proprietary	Notes • <MODE> is immediately stored in non-volatile memory 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
Examples	**AT+CODECINFO=?** // Read the available options **+CODECINFO: (0-1)** **OK** **AT+CODECINFO=1** **OK** **AT+CODECINFO?** // Read the current setting **+CODECINFO: 1** **OK** **AT+WVR?** **+WVR: 7** // Check audio codec selection **OK** **RING** An incoming call **+CODECINFO: 4** HR_AMR is chosen

12.3. +CRSL Command: Ringer Sound Level

HL6528RDx	
Test command Syntax **AT+CRSL=?**	 Response **+CRSL:** (list of supported **<level>**s) **OK**
Read command Syntax **AT+CRSL?**	 Response **+CRSL: <level>** **OK**
Write command Syntax **AT+CRSL= <level>**	 Response **OK** Parameter **<level>** 0 – 10 Integer type value with manufacturer-specific range (smallest value represents the lowest sound level; 0 means silent)
Reference Sierra Wireless Proprietary	Notes • This command is used to select the incoming call ringer sound level. • The parameter is kept in non-volatile memory.
Examples	**at+CRSL?** **+CRSL: 3** **OK** **at+CRSL=0** // <level> = 0 means silent, no ringtone **OK** **at+CRSL?** **+CRSL: 0** **OK** **AT+CFUN=1,1** // <level> is stored into the flash **OK** **at+CRSL?** **+CRSL: 0** **OK** **at+CRSL=10** // <level> = 10 is maximum **OK** **at+CRSL=?** **+CRSL: (0-10)** **OK**

12.4. +KECHO Command: Echo Cancellation

HL6528RDx	
Test command Syntax **AT+KECHO=?**	 Response **+KECHO: (**list of supported **<status>**s**)** **OK**
Read command Syntax **AT+KECHO?**	 Response **+KECHO: <status>** **OK**
Write command Syntax **AT+KECHO= <status>**	 Response **OK** Parameter **<status>** 0 Deactivate echo cancellation 1 Activate echo cancellation
Reference Sierra Wireless Proprietary	Notes • Settings will take effect in the next call. • Parameter values will be reset after the module is powered ON. • Settings must be sent before a call is set up; this command should not be used during a call.

12.5. +KMAP Command: Microphone Analog Parameters

HL6528RDx	
Test command Syntax **AT+KMAP=?**	 Response **+KMAP:** (list of supported **<mute>**s**) [,<coarse_gain >] [,<fine_gain>]** **OK**
Read command Syntax **AT+KMAP?**	 Response **+KMAP: <mute>, <coarse_gain>, <fine_gain>** **OK**
Write command Syntax **AT+KMAP= <mute>, [,<coarse_gain>] [,<fine_gain>]**	 Response **OK** Parameter **<mute>** 0 Unmute 1 Mute

HL6528RDx	
	<coarse_gain> 1 0 dB 2 20 dB 3 30 dB **<fine_gain>** 0 0 dB 1 2 dB 2 4 dB 3 6 dB 4 8 dB 5 10 dB 6 12 dB 7 14 dB 8 16 dB 9 18 dB 10 20 dB
Reference Sierra Wireless Proprietary	Notes • Total gain = coarse_gain + fine_gain. • The total gain must be less than or equal to 31 dB due to hardware limitations. • Both <coarse_gain> and <fine_gain> are stored in volatile memory. • If either <coarse_gain> or <fine_gain> is omitted, no change will be applied to the omitted parameter.
Examples	**at+kmap?** **+KMAP: 0, 1, 6** **OK** **at+kmap=0,,5** // <coarse_gain> was omitted so keep the old value is used **OK** **at+kmap?** **+KMAP: 0, 1, 5** **OK** **at+kmap=0,2** // <fine_gain> was omitted so the old value is used **OK** **at+kmap?** **+KMAP: 0, 2, 5** **OK** **at+kmap=0,3,2** // Total gain is more than 31 so error is returned **+CME ERROR: 3** **at+kmap=0,1,6** **OK**

12.6. +KNOISE Command: Noise Cancellation

HL6528RDx	
Test command Syntax **AT+KNOISE=?**	 Response **+KNOISE: (**list of supported **<Receive>**s**),(**list of supported **<Transmit>**s**)** **OK**
Read command Syntax **AT+KNOISE?**	 Response **+KNOISE: <Receive>,<Transmit>** **OK**
Write command Syntax **AT+KNOISE= <Receive>, <Transmit>**	 Response **OK** Parameters **<Receive>** 0 OFF 1 ON **<Transmit>** 0 OFF 1 ON
Reference Sierra Wireless Proprietary	Notes • Parameter values will be reset after the module is powered ON. • Settings must be sent before a call is set up; this command should not be used during a call.

12.7. +KPCMCFG Command: Configure PCM/Digital Audio

HL6528RDx	
Test command Syntax **AT+KPCMCFG=?**	 Response **+KPCMCFG: (**list of supported **<sync_type>**s**),(**list of supported **<bit_clk>**s**)** **OK**
Read command Syntax **AT+KPCMCFG?**	 Response **+KPCMCFG: <sync_type>,<bit_clk>** **OK**

HL6528RDx	
Write command Syntax **AT+KPCMCFG=<sync_type>,<bit_clk>**	Response **OK** Parameters **<sync_type>** 0 Short sync 1 Long sync **<bit_clk>** 0 256 kHz 1 512 kHz 2 1024 kHz 3 2048 kHz
Notes	Parameter values are automatically saved and kept after reset.

12.8. +KSRAP Command: Save or Restore Audio Parameters

HL6528RDx	
Test command Syntax **AT+KSRAP=?**	Response **+KSRAP:** (list of supported **<level>**s) **OK**
Write command Syntax **AT+KSRAP=<level>**	Response **OK** Parameter **<level>** 2 Restore initial audio parameters in RAM and save in non-volatile memory
Reference Sierra Wireless Proprietary	Notes Initial audio parameters are those that have not yet been modified using **+KECHO**, **+KNOISE**, **+KVGR**, **+KVGT**, **+VGR**, **+VGT** and **+KST** commands.

12.9. +KST Command: Side Tone

HL6528RDx	
Test command Syntax **AT+KST=?**	Response **+KST:** (list of supported **<level>**s) **OK**

HL6528RDx	
Read command Syntax **AT+KST?**	 Response **+KST: <level>** **OK**
Write command Syntax **AT+KST=<level>**	 Response **OK** Parameter **<level>** 0 – 16 Side tone value (side tone gain from -26dB o 6dB by steps of 2) 20 Disable side tone
Reference Sierra Wireless Proprietary	Notes • Volume must be set to 5 (**AT+CLVL = 5**). • Values take effect immediately and are not persistent after reset. • When modifying the side tone, double check to have set the right VIP value prior to redial.

12.10. +KVGR Command: Receive Gain Selection

HL6528RDx	
Test command Syntax **AT+KVGR=?**	 Response **+KVGR: (**list of supported **<n>**s**)** **OK**
Read command Syntax **AT+KVGR?**	 Response **+KVGR: <n>** **OK**
Write command Syntax **AT+KVGR=<n>**	 Response **OK** Parameter **"<n>"** Digital gain of the downlink path. Range = -20 to 18 dB
Reference Sierra Wireless Proprietary	Notes The parameter is a string in order to accept negative values. The value MUST be written between quotes ("xx").
Examples	**AT+KVGR?** **+KVGR: 0** **OK** **AT+KVGR=?** **+KVGR: (-20-18)** **OK**

HL6528RDx	
	AT+KVGR="100" **+CME ERROR: 3** **AT+KVGR=-20** **+CME ERROR: 3** **AT+KVGR=0** **+CME ERROR: 3** **AT+KVGR=18** **+CME ERROR: 3** **AT+KVGR=** **+CME ERROR: 3** **AT+KVGR=""** **+CME ERROR: 3** **AT+KVGR="-20"** **OK** **AT+KVGR="18"** **OK** **AT+KVGR="0"** **OK**

12.11. +KVGT Command: Transmit Gain Selection

HL6528RDx	
Test command Syntax **AT+KVGT=?**	 Response **+KVGT: (**list of supported **<n>**s**)** **OK**
Read command Syntax **AT+KVGT?**	 Response **+KVGT: <n>** **OK**
Write command Syntax **AT+KVGT=<n>**	 Response **OK** Parameter **"<n>"** Digital gain of the uplink path. Range = -20 to 18 dB

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes The parameter is a string to accept negative values. The value MUST be written between quotes (“xx”).
Examples	**AT+KVGT?** **+KVGT: 0** **OK** **AT+KVGT=?** **+KVGT: (-20-18)** **OK** **AT+KVGT="100"** **+CME ERROR: 3** **AT+KVGT=-20** **+CME ERROR: 3** **AT+KVGT=0** **+CME ERROR: 3** **AT+KVGT=18** **+CME ERROR: 3** **AT+KVGT=** **+CME ERROR: 3** **AT+KVGT=""** **+CME ERROR: 3** **AT+KVGT="-20"** **OK** **AT+KVGT="18"** **OK** **AT+KVGT="0"** **OK**

12.12. +VGR Command: Receive Gain Selection

HL6528RDx	
Test command Syntax **AT+VGR=?**	 Response **+VGR: (**list of supported **<n>**s**)** **OK**

HL6528RDx	
Read command Syntax **AT+VGR?**	 Response **+VGR: <n>** **OK**
Write command Syntax **AT+VGR=<n>**	 Response **OK** Parameter **<n>** 108 ≤ n ≤ 146 <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)
Notes	If the current or the requested value goes out of the gain range (-20 to 18 dB), the command returns an error.
Examples	**AT+VGR?** **+VGR: 128** **OK** **AT+VGR=?** **+VGR: (108-146)** **OK** **AT+VGR=100** **+CME ERROR: 3** **AT+VGR=200** **+CME ERROR: 3** **AT+VGR=108** **OK** **AT+VGR=128** **OK**

12.13. +VGT Command: Transmit Gain Selection

HL6528RDx	
Test command Syntax **AT+VGT=?**	 Response **+VGT: (**list of supported **<n>**s**)** **OK**

HL6528RDx	
Read command Syntax **AT+VGT?**	 Response **+VGT: <n>** **OK**
Write command Syntax **AT+VGT=<n>**	 Response **OK** Parameter **<n>** 108 ≤ n ≤ 146 <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)
Notes	If the current or the requested value goes out of the gain range (-20 to 18 dB), the command returns an error.
Examples	**AT+VGT?** **+VGT: 128** **OK** **AT+VGT=?** **+VGT: (108-146)** **OK** **AT+VGT=100** **+CME ERROR: 3** **AT+VGT=200** **+CME ERROR: 3** **AT+VGT=108** **OK** **AT+VGT=128** **OK**

12.14. +VIP Command: Initialize Voice Parameters

HL6528RDx	
Test command Syntax **AT+VIP=?**	 Response **+VIP:** (list of supported **<n>**s) **OK**

HL6528RDx	
Read command Syntax **AT+VIP?**	 Response **+VIP: <n>** **OK**
Write command Syntax **AT+VIP=<n>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<n>** Mode 0 Handset 1 Hands free 2 Handset raw 23 PCM interface 24 PCM basic interface
Reference [27.007] § C.2.6	Notes <n> is set to 0 whenever the module is powered on.

12.15. +VTD Command: Tone Duration

HL6528RDx	
Test command Syntax **AT+VTD=?**	 Response **+VTD:** (list of supported **<n>**s**)** **OK**
Read command Syntax **AT+VTD?**	 Response **+VTD: <n>** **OK**
Write command Syntax **AT+VTD=<n>**	 Response **OK** Parameter **<n>** 0 Default setting (default duration of the tone is 7/10 second) 1 – 100 Duration of tone in 1/10 second

HL6528RDx	
Reference [27.007] § C.2.12	Notes • The network ensures 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 network 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. • <n> is kept in non-volatile memory.
Examples	**at+VTD?** **+VTD: 5** **OK** **at+VTD=0** **OK** **at+VTD?** **+VTD: 0** **OK** **AT+CFUN=1,1** **OK** **at+VTD?** **+VTD: 0** **OK** **at+VTD=5** **OK** **at+VTD=?** **+VTD: (0-100)** **OK**

12.16. +VTS Command: DTMF and Tone Generation

HL6528RDx	
Test command Syntax **AT+VTS=?**	Response **+VTS:** (list of supported **<DTMF>**s) **OK**
Write command Syntax **AT+VTS= "<DTMF>"**	Response **OK** or **CME ERROR: <error>**

HL6528RDx	
	Parameter **<DTMF>** A single ASCII character in the set 0 – 9, #, *, A – D. DTMF tones can only be issued during a voice call.
Reference [27.007] § C.2.11	Notes 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, and 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.

12.17. +WDDM Command: DTMF Decoder Mode

HL6528RDx	
Test command Syntax **AT+WDDM=?**	 Response **+WDDM: (**list of supported **<mode>**s**)** **OK**
Read command Syntax **AT+WDDM?**	 Response **+WDDM: <mode>** **OK**
Write command Syntax **AT+WDDM= <mode>**	 Response **OK** Parameter **<mode>** DTMF detection activation 0 Stop DTMF detection 1 Start DTMF detection
Unsolicited Notification	Response **+WDDI: <char>, <duration>** **<CR><LF>** Parameters **<char>** Detected DTMF character. Possible detected DTMF characters are: 0-9, A, B, C, D, *, # **<duration>** Duration of the incoming character in milliseconds (the value limited by the network capabilities)
Reference Sierra Wireless Proprietary	Notes Parameter values are automatically saved and kept after reset.

12.18. +WVR Command: Voice Codec Selection

HL6528RDx	
Test command Syntax **AT+WVR=?**	 Response **+WVR: (**list of supported **<aud_coding_type>**s**)** **OK**
Read command Syntax **AT+WVR?**	 Response **+WVR: <aud_coding_type>** **OK**
Write command Syntax **AT+WVR= <aud_coding_ type>**	 Response **OK** Parameters **<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 10 AMR-HR, AMR-FR, EFR, FR, HR
Reference Sierra Wireless Proprietary	Notes • This command allows the configuration of the supported 2G voice codec of the device; however, the final codec decision is 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 with the network decision. • <aud_coding_type> is immediately stored in non-volatile memory when a valid write command is entered. • This command is available with or without a SIM card.
Examples	**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**

13. Test Commands

13.1. +WMAUDIOLOOP Command: Audio Test

HL6528RDx	
Test command Syntax **AT+ WMAUDIOLOOP =?**	Response **+WMAUDIOLOOP: (**list of supported **<ENABLE>**s**),(**list of supported **<TXORGAN>**s**),** **(**list of supported **<RXORGAN>**s**)** **OK**
Read command Syntax **AT+ WMAUDIOLOOP ?**	Response **+WMAUDIOLOOP: <ENABLE>[,<TXORGAN>,<RXORGAN>]** **[+WMAUDIOLOOP: <ENABLE>,<TXORGAN>,<RXORGAN>]** **OK**
Write command Syntax **AT+ WMAUDIOLOOP =<ENABLE> [,<TXORGAN>] [,<RXORGAN>]**	Response **OK** or **+CME ERROR: 4** If the AT command tries to control a <TXORGAN> or <RXORGAN> that isn't supported. Parameters **<ENABLE>** Enable or disable audio loop 0 Disable audio loop 1 Enable audio loop **<TXORGAN>** Audio input used as reference for Audio Loop. 0 Main microphone 1 PCM in **<RXORGAN>** Audio output used to loop Audio Input. 0 Main speaker 1 PCM out
Reference Sierra Wireless Proprietary	Notes If <TXORGAN> = 0, <RXORGAN> should also be set to 0; likewise, if <TXORGAN> = 1, <RXORGAN> should also be set to 1.

13.2. +WMGNSSTEST Command: GNSS Test

HL6528RDx	
Test command Syntax **AT+ WMGNSSTEST=?**	 Response **+WMGNSSTEST: (**list of supported **<mode>**s)**,(list of supported <SvID>s)** **OK**
Read command Syntax **AT+ WMGNSSTEST?**	 Response **+WMGNSSTEST: <mode>[,<SvID>]** **OK**
Write command Syntax **AT+ WMGNSSTEST= <mode>[,<SvID>]**	 Response **OK** Parameters **<mode>** GNSS test mode 0 Deactivate GNSS test mode 1 Start test mode 4 4 Start test mode 7 **<SvID>** 0 – 32 Satellite ID (if mode = 1)
Unsolicited Notification	Response If <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>** If <mode>=4: **+WMGNSSTEST: <max_spur_frequency>,<max_spur_sig_to_noise>**
Reference Sierra Wireless Proprietary	Notes • This command works with or without a SIM card. • The test mode setting is not persistent. • Test mode 7 works by feeding a CW (e.g. 1575.32 MHz at -116dBm) into the GPS RF connector, and then detecting the maximum spur frequency. Its S/N will be output periodically over time. A spur frequency with the highest S/N should be chosen.

13.3. +WMRXPOWER Command: Test RF Rx

HL6528RDx	
Test command Syntax **AT+ WMRXPOWER=?**	Response **+WMRXPOWER=(**list of supported **<BAND>**s**), (**list of supported **<CHANNEL>** ranges**)** **OK**
Read command Syntax **AT+ WMRXPOWER?**	Response **+WMRXPOWER:<ENABLE>[,<BAND>,<CHANNEL>,<EXP_POWER>]** **OK**
Write command Syntax **AT+ WMRXPOWER= <ENABLE> [,<BAND>, <CHANNEL>, <EXP_POWER>]**	Response **+WMRXPOWER=<POWER>** **OK** Parameters **<ENABLE>** 0 Stop the Rx measurement 1 Start the Rx measurement **<BAND>** Rx band to read 850 GSM850 band 900 GSM900 band 1800 DCS band 1900 PCS band This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. **<CHANNEL>** Rx channel to read If <BAND>=850 128 – 251 If <BAND>=900 0 – 124 975 – 1023 If <BAND>=1800 512 – 885 If <BAND>=1900 512 – 810 This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. **<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
Reference Sierra Wireless Proprietary	Notes • The module must be set to flight mode before using this command (refer to **+CFUN**). • This AT command is not available if **AT+WMTXPOWER** is enabled. • This AT command is available even if **AT+WMAUDIOLOOP** is enabled

HL6528RDx	
Examples	**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** **at+wmrxpower?** **+WMRXPOWER: 1,850,192,-30** **OK** **at+wmrxpower=1,1800,711,"-27"** // read GSM1800, urafcn=711 **+WMRXPOWER: -27.0** // Rx power -27 dBm **OK** **at+wmrxpower=1,1900,661,"-40"** // read GSM1900, urafcn=661 **+WMRXPOWER: -41.0** // Rx power -41 dBm **OK**

13.4. +WMTXPOWER Command: Test RF Tx

HL6528RDx	
Test command Syntax **AT+ WMTXPOWER=?**	Response **+WMTXPOWER=(**list of supported **<BAND>**s**), (**list of supported **<CHANNEL>** ranges**),(**supported **<MULTISLOT>** values**)** **OK**
Read command Syntax **AT+ WMTXPOWER?**	Response **+WMTXPOWER=<ENABLE>[,<BAND>,<CHANNEL>,<POWER_LEVEL>, <MULTISLOT>]** **OK**
Write command Syntax **AT+ WMTXPOWER= <ENABLE> [,<BAND>, <CHANNEL>, <POWER_ LEVEL> [,<MULTISLOT>]]**	Response **OK** Parameters **<ENABLE>** 0 Stop the burst emission 1 Start the burst emission

HL6528RDx	
	<BAND> Tx burst band emission 850 GSM850 band 900 GSM900 band 1800 DCS band 1900 PCS band This is a mandatory parameter if <ENABLE>=1 but is not allowed if <ENABLE>=0. **<CHANNEL>** Tx burst channel emission If <BAND>=850 128 – 251 If <BAND>=900 0 – 124 975 – 1023 If <BAND>=1800 512 – 885 If <BAND>=1900 512 – 810 This is a mandatory parameter if <ENABLE>=1 but is not allowed if <ENABLE>=0. **<POWER_LEVEL>** Tx burst power 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) This is a mandatory parameter if <ENABLE>=1 but is not allowed if <ENABLE>=0. **<MULTISLOT>** Defines which slot is used in Tx burst emissions 0 Emit on one-time slot (GSM) 1 Emit on two-time slots (GPRS compliant) This parameter is not allowed if <ENABLE>=0.
Reference Sierra Wireless Proprietary	Notes • Before using this command, the module must be set to flight mode. • 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; but with a noticeable short interrupt. Only one burst can be emitted at a time. • This AT command is not available if **AT+WMRXPOWER** is enabled. • This AT command is available even if **AT+WMAUDIOLOOP** is enabled.
Examples	**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 **OK** **at+wmtxpower?** **+WMTXPOWER: 1,850,192,6,1** **OK**

14. SIM Application Toolkit Commands

14.1. STK Command Usage

*Note: The information listed in the "Involvement" column in the table below only applies to *PSSTKI in manual mode.*

Table 1. STK Command Usage

STK Procedure	Command	Involvement	AT Command to Use	Class
Proactive SIM	DISPLAY TEXT	TE	<+STKPCI,0> +STKTR	Class 2
	GET INKEY	TE	<+STKPCI,0> +STKTR	Class 2
	GET INPUT	TE	<+STKPCI,0> +STKTR	Class 2
	MORE TIME	ME	Do Nothing	Class 2
	PLAY TONE	ME	<+STKPCI,1> +STKTR	Class 2
	POLL INTERVAL	ME	Do Nothing	Class 2
	REFRESH	TE / ME	<+STKPCI,1>	Class 2
	SETUP MENU	TE	<+STKPCI,0> +STKTR	Class 2
	SELECT ITEM	TE	<+STKPCI,0> +STKTR	Class 2
	SEND SMS	TE / ME	<+STKPCI,1> +STKSMS	Class 2
	SEND SS	TE / ME	<+STKPCI,1> +STKSS	Class 2
	SEND USSD	TE / ME	<+STKPCI,1> +STKUSSD	Class 2
	SET UP CALL	TE / ME	<+STKPCI,1> +STKCALL	Class 2
	POLLING OFF	ME	Do Nothing	Class 2
	PROVIDE LOCAL INFORMATION	ME	<+STKPCI,1>	Class 2
	SET UP EVENT LIST	ME	<+STKPCI,1>	Class 3
	TIMER MANAGEMENT	ME	Do Nothing	Class 3
	SET UP IDLE MODE TEXT	TE	<+STKPCI,0> +STKTR	Class 3
	RUN AT COMMAND	ME	<+STKPCI,1>	Class B
	SEND DTMF	TE / ME	<+STKPCI,1> +STKDTMF	Class 3
	LANGUAGE NOTIFICATION	TE / ME	<+STKPCI,1>	Class 3
	LAUNCH BROWSER	TE	<+STKPCI,0> +STKTR	Class C
	OPEN CHANNEL	TE	<+STKPCI,0> +STKTR	Class E
	CLOSE CHANNEL	TE	<+STKPCI,0> +STKTR	Class E
	RECEIVE DATA	TE	<+STKPCI,0> +STKTR	Class E
	SEND DATA	TE	<+STKPCI,0> +STKTR	Class E
	GET CHANNEL STATUS	TE	<+STKPCI,0> +STKTR	Class E
Data Download	SMS-PP data download	ME	Do Nothing	Class 2
	CB data download	ME	Do Nothing	Class 2
Menu Selection		TE	+STKENV	Class 2
Call Control by SIM		ME	Do Nothing	Class 2

STK Procedure	Command	Involvement	AT Command to Use	Class
MO SMS Control by SIM		ME	Do Nothing	Class 2
Event Download	MT call event	ME	Do Nothing	Class 3
	Call connected event	ME	Do Nothing	Class 3
	Call disconnected event	ME	Do Nothing	Class 3
	Location status event	ME	Do Nothing	Class 3
	User activity event	TE	**+STKENV**	Class 3
	Idle screen available event	TE	**+STKENV**	Class 3
	Language selection event	TE	**+STKENV**	Class 3
	Browser termination event	TE	**+STKENV**	Class C
	Data available event	TE	**+STKENV**	Class E
	Channel Status	TE	**+STKENV**	Class E

14.2. *PSSTKI Command: SIM Toolkit Interface Configuration

HL6528RDx	
Test command Syntax **AT*PSSTKI=?**	Response ***PSSTKI: (**list of supported **<mode>**s**)** **OK**
Read command Syntax **AT*PSSTKI?**	Response ***PSSTKI: <mode>** **OK**
Write command Syntax **AT*PSSTKI= <mode>**	Response **OK** Parameter **<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 must acknowledge with an **+STKPRO** notification. 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.

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • This AT command configures 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 the module reboots. • <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 ▪ SETUP_MENU ▪ SETUP_EVENT_LIST ▪ Where MMI action is needed and Yes/No responses are expected when done (for the display part): ▪ SET UP IDLE MODE TEXT ▪ DISPLAY TEXT ▪ REFRESH ▪ For BIP feature: ▪ OPEN CHANNEL ▪ CLOSE CHANNEL ▪ RECEIVE DATA ▪ SEND DATA ▪ GET CHANNEL STATUS

Examples	<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
	
	at*psstki =0 // disable unsolicited result code
	OK
	
	at*psstki=2 // set auto acknowledge mode
	OK
	
	// proactive command SETUP CALL received
	+STKPCI: 1,"D030810301100182028183050B43616C6C696E67202121210606912143658 7F9051043616C6C20696E2070726F6772657373"
	
	// TR is sent automatically here
	+STKPCI: 2
	at+clcc // check connection status
	+CLCC: 1,0,0,0,0,"123456789",145 // active call established (with CMU200)
	OK

HL6528RDx	

	at*psstki=3 // set Auto acknowledge mode without sending unsolicited
	// result code to TE
	
	// proactive command SETUP CALL received
	// TR sent automatically
	
	at+clcc // check connection status
	+CLCC: 1,0,0,0,0,"123456789",145 // active call established (with CMU200)
	OK

14.3. +STKCALL Command: STK Call Setup

HL6528RDx	
Test command Syntax **AT+STKCALL=?**	 Response **OK**
Write command Syntax **AT+STKCALL=<TR>[,<add_info>]**	 Response **OK** Parameters **<TR>** Possible terminal response to be responded to by the application 0 Trigger modem to send STK CALLSETUP 4 Trigger modem to send STK CALLSETUP but icon cannot be displayed 16 Proactive session terminated by user 32 ME is currently unable to process this command 33 Network is currently unable to process this command 34 User rejects setup call 50 Command data is not understood by the ME **<add_info>** Additional information 0 No specific cause can be given 1 Screen is busy 2 ME is currently busy on a call 3 ME is currently busy on an SS transaction 4 No service 5 Access control class bar 6 Radio resource not granted 7 Not in speech call 8 ME is currently busy on a USSD transaction 9 ME is currently busy on a SEND DTMF command 10 No active USIM
Reference Sierra Wireless Proprietary	Notes Refer to Table 1 STK Command Usage.

HL6528RDx	
Example	// SET UP CALL received **+STKPCI: 1,"D030810301100182028183050B43616C6C696E67202121210606912143658 7F9051043616C6C20696E2070726F6772657373"** **at+stkcall=0** // setup STK call **OK** **+STKPCI: 0,"D01A81030121008202810 28D0F0443616C6C20636F6E6E6563746564"** **at+clcc** // check call connection **+CLCC: 1,0,0,0,0,"123456789",145** // active call established (with CMU200) **OK** **ATH** // hang up call **OK** **at+clcc** **OK**

14.4. +STKDTMF Command: STK Sends DTMF

HL6528RDx	
Test command Syntax **AT+STKDTMF=?**	 Response **OK**
Write command Syntax **AT+STKDTMF= <TR> [,<add_info>]**	 Response **OK** Parameters **<TR>** Possible terminal response to be responded to by the application 0 Trigger modem to send STK DTMF 4 Trigger modem to send STK DTMF but icon cannot be displayed 32 ME is currently unable to process this command **<add_info>** Additional information 0 No specific cause can be given 1 Screen is busy 2 ME is currently busy on a call 3 ME is currently busy on an SS transaction 4 No service 5 Access control class bar 6 Radio resource not granted 7 Not in speech call 8 ME is currently busy on a USSD transaction 9 ME is currently busy on a SEND DTMF command 10 No active USIM

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes Refer to Table 1 STK Command Usage.
Examples	// SEND DTMF received **+STKPCI: 1,"D00D810301140082028183 2C02C1F2"** **at+stkdtmf=0** **OK** **+STKPCI: 2**

14.5. +STKENV Command: Send STK Envelope

HL6528RDx	
Test command Syntax **AT+STKENV=?**	 Response **OK**
Write command Syntax **AT+STKENV= <stk_command>**	 Response **OK** Parameter **<stk_command>** HEX string of envelope command
Reference Sierra Wireless Proprietary	Notes Refer to Table 1 STK Command Usage.

Examples	// Set STK to auto mode with URC
	AT*PSSTKI=2
	OK
	
	// proactive command SET UP MENU is received
	+STKPCI: 0,"D0818781030125008202818285 0E47656D58706C6F726520434153458F11015573 657220696E746572616374696F6E8F13024D6F62696C6520696E746572616374696F 6E8F14034E6574776F726B20696E746572616374696F6E8F1104436172642069 6E746572616374696F6E8F1480436F6D6D6F6E2053544B20666561747572657318052121 212121"
	
	// Terminal response (command perform successfully) is automatically sent by the ME
	// in STK auto mode (2 or 3)
	
	// select menu item #1
	at+stkenv="d30782028281900101"
	OK
	
	// proactive command SELECT ITEM is received
	+STKPCI: 0,"D0668103012400820281820510436 86F6F736520616E206974656D203A8F0D0144 6973706C617920746578748F0C0253656C656374206974656D8F0A0347657420696E 7075748F0A0447657420696E6B65798F1405536574757020496 46C652053637220546 57874"

14.6. +STKPCI Notification: STK Proactive Command Indication

HL6528RDx	
Unsolicited Notification	Response **+STKPCI: <pci_type>[,<proactive_cmd>]** Parameters **<pci_type>** 0 The STK command is handled by TE 1 The STK command is handled by the ME but some commands may need TE involvement, e.g. +STKCALL, +STKSS, etc. 2 No other command (end of session) **<proactive_cmd>** HEX string of STK proactive command sent when <pci_type> = 0 or 1
Reference Sierra Wireless Proprietary	Notes Refer to Table 1 STK Command Usage.

14.7. +STKSMS Command: STK Sends SMS

HL6528RDx	
Test command Syntax **AT+STKSMS=?**	 Response **OK**
Write command Syntax **AT+STKSMS= <TR>**	 Response **OK** Parameters **<TR>** Possible terminal response to be responded to by the application 0 Trigger modem to send STK SMS 4 Trigger modem to send STK SMS but icon cannot be displayed
Reference Sierra Wireless Proprietary	Notes Refer to Table 1 STK Command Usage.
Examples	// SEND SHORT MESSAGE received **+STKPCI: 1,"D022810301130182028183050006059121436587 0B0E01000491341241F205C8329BFD06"** **at+stksms=0** // send STK SMS **OK** **+STKPCI: 2**

14.8. +STKSS Command: STK SS Setup

HL6528RDx	
Test command Syntax **AT+STKSS=?**	 Response **OK**
Write command Syntax **AT+STKSS= <TR> [,<add_info>]**	 Response **OK** Parameters **<TR>** Possible terminal response to be responded to by the application 0 Trigger modem to send STK SS 4 Trigger modem to send STK SS but icon cannot be displayed 50 Command data is not understood by the ME **<add_info>** Additional information 0 No specific cause can be given
Reference Sierra Wireless Proprietary	Notes Refer to Table 1 STK Command Usage.

Examples	// SEND SS received
	// call forward: "**21*01234567890123456789#"
	+STKPCI: 1,"D01D81030111008202818309 0E91AA120A21436587092143658 7B91E020101"
	
	at+stkss=0
	OK
	+STKPCI: 2

14.9. +STKTR Command: STK Terminal Response

HL6528RDx	
Test command Syntax **AT+STKTR=?**	 Response **OK**
Write command Syntax **AT+STKTR= <terminal_ response>**	 Response **OK** Parameter **<terminal_response>** HEX string of STK response
Reference Sierra Wireless Proprietary	Notes • This command is needed when +STKPCI <pci_type>=0. User uses this command to respond to the proactive command received. • Refer to Table 1 STK Command Usage.

HL6528RDx	

Examples	// Set STK to manual mode
	AT*PSSTKI=1
	OK
	
	// proactive command SET UP MENU is received
	+STKPCI: 0,"D0818781030125008202818285 0E47656D58706C6F726520434153458F11015573657220696E746572616374696F6E8F13024D6F62696C6520696E746572616374696F6E8F14034E6574776F726B20696E746572616374696F6E8F11044361726420696E746572616374696F6E8F1480436F6D6D6F6E2053544B20666561747572657318052121212121"
	
	// send terminal response (command perform successfully)
	at+stktr="810301250082028281830100"
	OK
	
	// select menu item #1
	at+stkenv="d30782028281900101"
	OK
	
	// proactive command SELECT ITEM is received
	+STKPCI: 0,"D06681030124008202818205104 3686F6F736520616E206974656D203A8F0D01446973706C61792074657874 8F0C0253656C656374206974656D8F0A0347657420696E7075748F0A0447657420696E6B65798F1405536574757020496 46C652053637220546 57874"

14.10. +STKUSSD Command: STK USSD Setup

HL6528RDx	
Test command Syntax **AT+STKUSSD=?**	 Response **OK**
Write command Syntax **AT+STKUSSD= <TR> [,<add_info>]**	 Response **OK** Parameters **<TR>** Possible terminal response to be responded to by the application 0 Trigger modem to send STK USSD 4 Trigger modem to send STK USSD but icon cannot be displayed 50 Command data is not understood by the ME **<add_info>** Additional information 0 No specific cause can be given
Reference Sierra Wireless Proprietary	Notes Refer to Table 1 STK Command Usage.

HL6528RDx	

Examples	// SEND USSD received
	// specified USSD string ("ABCDEFGHIJKLMNOPQRSTUVWXYZ-
	// abcdefghijklmnopqrstuvwxyz-1234567890")
	+STKPCI:
	1,"D04C810301120082028183 0A41444142434445464748494A4B4C4D4E4F5051525 35455565758595A2D6162636465666768696A6B6C6D6E6F707172737475767778797 A2D31323334353637383930"
	
	at+stkussd=0
	OK
	+CUSD: 4 // in this case, USSD is not supported
	+STKPCI: 2

15. NV Related Commands

15.1. NV Backup Coverage

NV backup encompasses the following:

- All factory NV, including important and calibrated data.
- All Sierra Wireless NV except NV logs.
- Some user NV for configuration.

15.2. Auto Generation of NV Backup Files

The firmware automatically generates NV backup files from existing NV data after boot if:

- an NV backup of a partition does not exist,
- An NV backup file exists, but the firmware version is different from the records in the NV.

An automatic backup file generation is notified with **+NVBU_IND** with <status>=0 on all AT ports.

15.3. Auto Recovery from Backup NV Files

NV recovery is automatically done if an NV corruption is detected during NV initialization.

The firmware automatically recovers NV data from available NV backups when one or more NV items are corrupted during NV read. This is notified with **+NVBU_IND** with <status>=1 on all AT ports.

Manual NV data restores all data from the backup file to the currently used NV.

If all NV has been erased because of FAT formatting, all data in the NV backup file will be used for NV restore. For NV data not in the backup file, default firmware values will be written.

15.4. +NVBU_IND: NV Backup Status Notification

HL6528RDx	
Unsolicited Notification	Response **+NVBU_IND: <status>[,<nb_restored_nv>]** If <status> = 1 **+NVBU_IND: <status>, <nb_restored_nv>** Parameters **<status>** Status of the NV backup 0 Indicates completion of NV backup generation 1 Indicates that backup data was restored after an NV corruption was detected **<nb_restored_nv>** Number of restored NV

HL6528RDx	
Reference	Sierra Wireless Proprietary

15.5. +NVBU: NV Backup Status and Control

HL6528RDx	
Test command Syntax **AT+NVBU=?**	 Response **+NVBU: (0-2)** **OK**
Read command Syntax **AT+NVBU?**	 Response **ERROR**
Write command Syntax For <mode> = 0 or 1: **AT+NVBU=<mode>** For <mode>=2: **AT+NVBU=<mode>[,<clear>]**	 Response For <mode>=0 or 1: **+NVBU_IND: <status>** **OK** For <mode>=2 and <clear>=0: **<log data 0>** **[<log data 1>]** **…** **[<log data n>]** **OK** For <mode>=2 and <clear>=1: **OK** Parameters **<status>** 0 Indicates completion of NV backup generation 1 Indicates that backup data has been restored **<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 and restore operations **<log data>** Log data of NV backup or restore operation (maximum of 500 lines) **<clear>** 0 Read log 1 Clear log

HL6528RDx	
Reference Sierra Wireless Proprietary	Examples **at+nvbu=2** **[2004/01/01 01:42:52] LOG: SYS@AHL6528RD.1.9.0.11CV10F23.20151204TEST.m6261a_1** **[2004/01/01 01:42:52] GEN: Software version changed. Automatic generating NVRAM backup..** **[2004/01/01 01:42:56] GEN: Number of NVRAM backup=48** **[2004/01/01 01:42:56] GEN: MT1F MT0Z MT48 SU00 SU01 SU02 SU03 SU04 SU05 SU06** **[2004/01/01 01:42:56] GEN: SU07 SU08 SU09 SU0C SUA0 SUA1 SUA2 SUA3 SUA4 SUA5** **[2004/01/01 01:42:56] GEN: SUA6 SUA7 MT05 MT06 MT07 MT08 MT09 MT0I MT0J MT0K** **[2004/01/01 01:42:56] GEN: MT0L MT0M MT0N MT0O MT0P MT0Q MT0R MT1V MP09 MPA2** **[2004/01/01 01:42:56] GEN: MPA8 MP0B ST33 SF00 SF01 SF02 MT00 CA00** **[2004/01/01 01:42:56] GEN: NVRAM backup generated successfully** **[2004/01/01 01:43:33] RES: User triggered NVRAM restore..** **[2004/01/01 01:43:34] RES: Number of NVRAM restored=48** **[2004/01/01 01:43:34] RES: MT1F MT0Z MT48 SU00 SU01 SU02 SU03 SU04 SU05 SU06** **[2004/01/01 01:43:34] RES: SU07 SU08 SU09 SU0C SUA0 SUA1 SUA2 SUA3 SUA4 SUA5** **[2004/01/01 01:43:34] RES: SUA6 SUA7 MT05 MT06 MT07 MT08 MT09 MT0I MT0J MT0K** **[2004/01/01 01:43:34] RES: MT0L MT0M MT0N MT0O MT0P MT0Q MT0R MT1V MP09 MPA2** **[2004/01/01 01:43:34] RES: MPA8 MP0B ST33 SF00 SF01 SF02 MT00 CA00** **[2004/01/01 01:43:34] RES: All NVRAM restored successfully** **OK**

16. AVMS Commands

16.1. +WDSA Command: Change Account for DM Connection

HL6528RDx	
Test command Syntax **AT+WDSA=?**	 Response **+WDSA:** (list of supported **<ServerId>**s) **OK**
Read command Syntax **AT+WDSA?**	 Response **+WDSA: <ServerId>** **OK**
Write command Syntax **AT+WDSA= <serverId>**	 Response **OK** **+CME ERROR <err>** Parameters **<ServerId>** ServerId associated with the account
Reference Sierra Wireless Proprietary Command	Notes This command is available when the embedded module has finished Device Services initialization (see **+WDSI** command description) and when AVMS services are activated (see **+WDSG** command).
Examples	**AT+WDSA=?** **+WDSA: (“Cingular”, “Cingularlab”,“WAVECOM-RDMS-SERVER”)** **OK** **AT+WDSA=“WAVECOM-RDMS-SERVER”** **OK** **AT+WDSA?** **+WDSA: “WAVECOM-RDMS-SERVER”** **OK**

16.2. +WDSC Command: Device Services Configuration

HL6528RDx	
Test command Syntax **AT+WDSC=?**	Response **+WDSC: (0-2),** (list of supported **<State>**s) **+WDSC: 3,** (list of supported **<State>**s) **+WDSC: 4,** (list of supported **<Timer_n>**s) **OK**
Read command Syntax **AT+WDSC?**	Response **+WDSC: 0,<State>** **+WDSC: 1,<State>** **+WDSC: 2,<State>** **+WDSC: 3,<State>** **+WDSC: 4,<Timer_1>[[,<Timer_2>]…[,<Timer_n]]** **OK**
Write command Syntax For <Mode> = 0, 1, 2 or 3 **AT+WDSC= <Mode>,<State>** For <Mode> = 4 **AT+WDSC= <Mode>, <Timer_1> [[,<Timer_2>]… [,<Timer_n>]]**	Response **OK** **+CME ERROR <err>** Parameters **<Mode>** 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 AirVantage 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. **<State>** Mode status For <Mode> = 0, 1 or 2: 0 Disabled 1 Enabled

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	For <Mode> = 3, value in the range of 0 – 525600 minutes: 0 Polling mode is deactivated **<Timer_1>** Timer between the first failed connection and the next attempt. Value in range of 0 to 20160 minutes. Default value = 15. 0 Retry mode is deactivated **<Timer_n>** Timer between the n^{th} failed attempt connection and the $(n+1)^{th}$ connection (n ≤ 8). Value in the range of 1 to 20160 minutes. Default values: <Timer_2> = 60 <Timer_3> = 240 <Timer_4> = 960 <Timer_5> = 2880 <Timer_6> = 10080 <Timer_7> = 10080
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished the Device Services initialization (see **+WDSI** command description) and when the AVMS services are in prohibited state (see **+WDSG** command). • Parameters <State> and <Timer_1> to <Timer_n> are stored in non-volatile memory without sending **&W** command. **&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.
Examples	**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),(1-20160)** **OK** **AT+WDSC?** // All modes are deactivated except retry mode which is used with default timers **+WDSC: 0,0** **+WDSC: 1,0** **+WDSC: 2,0** **+WDSC: 3,0** **+WDSC: 4,15,60,240,960,2880,10080,10080** **OK** **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**

16.3. +WDSD Command: Device Services Local Download

HL6528RDx	
Test command Syntax **AT+WDSD=?**	 Response **+WDSD:** (list of supported **<Size>**s) **OK**
Write command Syntax **AT+WDSD=<Size>**	 Response **<NACK>** *// User sends data* **OK** or **+CME ERROR <err>** Parameter **<Size>** Package size in bytes. The maximum allowed value depends on the available free size in the file system.
Examples	**AT+WDSD=?** **+WDSD: (1-1572864)** **OK** **AT+WDSD=1024** //Download a 1kByte package **<NACK>** //The device is ready to receive data //Send Data **OK** //All data are received by the module **+WDSI: 3** //A package is ready to install (see **+WDSI** and **+WDSR** commands)
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the module has finished initialization. • The response to **AT+WDSD=<Size>** command is the <NACK> character when the device is ready to receive data using 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**). • 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 within 5 minutes.

16.4. +WDSE Command: Device Services Error

HL6528RDx	
Execute command Syntax **AT+WDSE**	Response **[+WDSE:<HTTP_Status>]** **OK** **+CME ERROR <err>** Parameters **<HTTP_Status>** 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 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** returns only OK, without **+WDSE: <HTTP_Status>** intermediary response.

HL6528RDx	
Reference Sierra Wireless Proprietary Command	Notes This command is available when the embedded module has finished Device Services initialization (see **+WDSI** command description) and when AVMS services are activated (see **+WDSG** command).
Examples	**AT+WDSS=1,1** // A session was made with the server **OK** **AT+WDSE** **+WDSE: 200** // The last HTTP response received is “OK” **OK**

16.5. +WDSF Command: Device Services Fallback

HL6528RDx	
Test command Syntax **AT+WDSF=?**	 Response **+WDSF:** (list of supported **<Mode>**s) **OK**
Read command Syntax **AT+WDSF?**	 Response **+WDSF: 1,<FallbackInfo>** **+WDSF: 2,<EraseInfo>** **OK**
Write command Syntax **AT+WDSF=<Mode>**	 Response **OK** **+CME ERROR <err>** Parameters **<Mode>** 1 Downgrade to a previous installation 2 Delete the downloaded package which contains the reverse patch **<FallbackInfo>** Indicate the presence of a previous package 0 Previous package is not present 1 Previous package is present **<EraseInfo>** Indicates if a package can be deleted. Note that erasing the package will disable the possibility of making any recovery or manual fallback. 0 The package cannot be deleted 1 The package can be deleted
Reference Sierra Wireless Proprietary Command	Notes This command is available when the embedded module has finished Device Services initialization (see **+WDSI** command description).

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Examples	**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
	// Package downgrade is successfully done, displayed only if +WDSI indication is
	// activated.

16.6. +WDSG Command: Device Services General Status

HL6528RDx	
Test command Syntax **AT+WDSG=?**	 Response **OK**
Execute command Syntax **AT+WDSG**	 Response **+WDSG: <Indication>,<State>** **[+WDSG: <Indication>,<State>[…]]** **OK** **+CME ERROR <err>** Parameters **<Indication>** 0 Device services activation state 1 Session and package indication **<State>** Indication status 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 must be provisioned. 2 Device services must be provisioned. NAP parameters must 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, and 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 is installed or a recovery was made, <State> is set to 0.

HL6528RDx	
Reference Sierra Wireless Proprietary Command	Notes This command is available when the embedded module has finished Device Services initialization (see **+WDSI** command description).
Examples	**AT+WDSG=?** **OK** **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**

16.7. +WDSI Command: Device Services Indications

HL6528RDx	
Read command Syntax **AT+WDSI=?**	 Response **+WDSI:** (list of supported **<Level>**s) **OK**
Read command Syntax **AT+WDSI?**	 Response **[+WDSI: <Level>]** **OK**
Write command Syntax **AT+WDSI= <Level>**	 Response **OK** **+CME ERROR <err>** Parameters **<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 and 3) 4 Activate the authentication indications (<Event>=4 and 5) 8 Activate the session start indication (<Event>=6, 7 and 8) 16 Activate the package download indications (<Event>=9, 10 and 11) 32 Activate the certified downloaded package indication (<Event>=12 and 13) 64 Activate the update indications (<Event>=14, 15 and 16) 128 Activate the fallback indication (<Event>=17) 256 Activate download progress indication (<Event>=18) 512 Reversed 1024 Reversed 2048 Activate provisioning indication (<Event>=21) 4096 Reserved

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<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 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 Byte
	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 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 AirVantage Management Services server
	13	Downloaded package is not certified to be sent by the AirVantage 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 AirVantage 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.		

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	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) 1 Fallback asked by the user (see **+WDSF** command for more information) For<Event>=18, <Data> indicates the download progress in percentage. For<Event>=21, <Data> indicates the provisioned parameters: 9 Device Service Polling mode (see **+WDSC** command for more information)
Unsolicited Notification	Response **+WDSI: <Event>[,<Data>]**
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished its initialization. • To receive **+WDSI** indications, Device Services should be activated (see **+WDSG** command for more information). • <Level> is stored in non-volatile memory without using **AT&W**. The default value can be restored using **AT&F**.
Examples	**AT+WDSI=?** **+WDSI: (0-4096)** **OK** **AT+WDSI?** **+WDSI: 0** // All indications are deactivated **OK** **AT+WDSI=4096** **OK** **+WDSI: 1** // The devices services server requests a connection to the // embedded module **AT+WDSR=1** // Accept the connection **OK** **+WDSI: 4** // The embedded module will send the first data to the AirVantage // Management Services server **+WDSI: 6** // The authentication succeeded **+WDSI: 8** // The session with the server is over **+WDSI: 9,1000** // A package will be downloaded, the size is 1kbytes **+WDSI: 18,“1%”** // 1% was downloaded **+WDSI: 18,“100%”** // The whole package was downloaded **+WDSI: 10** // The whole package was stored in flash

16.8. +WDSM Command: Manage Device Services

HL6528RDx	
Test command Syntax **AT+WDSM=?**	Response **+WDSM:** (list of supported **<Mode>**s),(list of supported **<State>**s) **OK**

HL6528RDx	
Read command Syntax **AT+WDSM?**	 Response **+WDSM: 0,<State>** **+WDSM: 1,<State>** **OK**
Write command Syntax **AT+WDSM=<Mode>,<State>**	 Response **OK** **+CME ERROR <err>** Parameters **<Mode>** APN backup 0 If the AVMS APN (filled using **+WDSS** command) is incorrect, the module will use the APN defined by **+CGDCONT**. 1 If the AVMS APN has not been filled using **+WDSS**, the module will use the APN defined by **+CGDCONT**. 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>** <Mode> status 0 Disable 1 Enable
Reference Sierra Wireless Proprietary Command	Notes <State> is stored in non-volatile memory without sending **AT&W**. **AT&F** has no impact on this value.
Examples	**AT+WDSM=?** **+WDSM: (0-1),(0-1)** **OK** **AT+WDSM?** **+WDSM: 0,1** **+WDSM: 1,1** **OK** // All modes are activated **AT+WDSM=0,0** **OK** **AT+WDSM?** **+WDSM: 0,0** **+WDSM: 1,1** **OK**

16.9. +WDSR Command: Device Services Reply

HL6528RDx	
Test command Syntax **AT+WDSR=?**	 Response **+WDSR:** (list of supported **<Reply>**s),(list of supported **<Timer>**s) **OK**
Write command Syntax **AT+WDSR= <Reply> [,<Timer>]**	 Response **OK** **+CME ERROR <err>** Parameters **<Reply>** Reply to user agreement request (see +WDSI command description) 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 in minutes until a new user agreement request is returned by the module. This parameter is only available when <Reply>=0, 2 or 5. Range = 0 to 1440; default value = 30. Value 0 indicates that the application refuses the user agreement (impossible when <reply>=5).
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished Device Services initialization (see **+WDSI** command description) and when AVMS services are activated (see **+WDSG** command). • It is not possible to refuse an install request (**AT+WDSR=5,0**). Doing so will return **+CME ERROR: 3**. • If the embedded module is powered down and not powered on until after an install delay, the new user agreement request is returned at the new start up.

Examples	**AT+WDSR=?**
	+WDSR: (0-5),(0-1440)
	OK
	+WDSI: 1 // The device Services server requests the device to make a
	// connection to the server. The user is requested to allow the
	// connection.
	
	AT+WDSR=1
	OK
	+WDSI: 3 // a user agreement is requested to install a package
	
	AT+WDSR=5,10 // A delay of 10 minutes is requested
	OK
	+WDSI: 3 // 10 minutes later, a new user agreement is requested to install a
	// package
	
	AT+WDSR=4 // The install is requested
	OK

16.10. +WDSS Command: Device Services Session

HL6528RDx	
Test command Syntax **AT+WDSS=?**	 Response **+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**
Read command Syntax **AT+WDSS?**	 Response **[+WDSS: 0,<Apn>[,<User>]]** **[+WDSS: 1,<Action>]** **OK**
Write command Syntax For <Mode>=0 **AT+WDSS=<Mode>[,<Apn>[,<User>[,<Pwd>]]]** For <Mode>=1 **AT+WDSS=<Mode>,<Action>**	 Response **OK** **+CME ERROR <err>** Parameters **<Mode>** 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>** Used when <Mode>=1 only 0 Release the current connection to the Device Services server (default value) 1 Establish a connection to the Device Services server
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished Device Services initialization (see **+WDSI** command description). • <Apn>, <User> and <Pwd> are stored in non-volatile memory without using **AT&W**. **AT&F** has no effect on these parameters. • **AT+WDSS?** 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 and a session is asked (by an AT command or notified by SMS), the embedded module will use a NAP defined by **+CGDCONT** 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 AirVantage 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).

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	• 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 AirVantage Management Services server is possible when a registration is not completed.
Examples	**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 Sierra Wireless **OK** **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** **AT+WDSS=1,0** // Release connection to the Device Services server **OK**

17. Location Service Commands

17.1. +CMTLR Command: Mobile Terminated Location Request Notification

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+CMTLR=?**	 Response **+CMTLR: (0,2)** **OK**
Read command Syntax **AT+CMTLR?**	 Response **+CMTLR: <subscribe>** **OK**
Write command Syntax **AT+CMTLR= <subscribe>**	 Response **OK** or **CME ERROR: <error>** Parameters **<subscribe>** Enable or Disable subscription for MT-LR notification. 0 Disables reporting and positioning 2 Notifications of MT-LR over SUPL
Unsolicited Notification	Response **+CMTLR: <handle_id>,<notification_type>,<location_type>,<client_external_id>, <requestor_id>,<client_name>,<plane>** Parameters **<handle_id>** 0 – 255 ID associated with each MT-LR request **<notification_type>** Information about the user's privacy. 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>** Indicates what type of the location is requested 0 Current location 1 Current or last known location 2 Initial location **<client_external_id>** String type that indicates the external client where the location information is sent to.

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	<requestor_id>		String type that indicates the requestor id requesting the user's location.
	<client_name>		String type that indicates the external client requesting the user's location.
	<plane>	1	Secure user plane (SUPL)

17.2. +CMTLRA Command: Mobile Terminated Location Request Disclosure Allowance

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+CMTLRA=?**	 Response **+CMTLRA: (0,1)** **OK**
Read command Syntax **AT+CMTLRA?**	 Response **+CMTLRA: <allow>,<handle_id>** **OK**
Write command Syntax **AT+CMTLRA=<allow>,<handle_id>**	 Response **OK** or **CME ERROR: <error>** Parameters **<allow>** 0 Location disclosure allowed 1 Location disclosure not allowed **<handle_id>** 0 – 255 ID associated with each MT-LR request.

17.3. +GPSAUTOINIT Command: Select GPS State at Power Up

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+ GPSAUTOINIT=?**	 Response **+GPSAUTOINIT:** (list of supported **<state>**s) **OK**

HL6528RD-G and HL6528RD-G2.8V	
Read command Syntax **AT+ GPSAUTOINIT?**	 Response **+GPSAUTOINIT: <state>** **OK**
Write command Syntax **AT+ GPSAUTOINIT= <state>**	 Response **OK** Parameter **<state>** 0 GPS will not be initialized at power up 1 GPS will be initialized at power up
Examples	**AT+GPSAUTOINIT=?** **+GPSAUTOINIT: (0-1)** **OK** **AT+GPSAUTOINIT?** **+GPSAUTOINIT: 1** **OK** **AT+GPSAUTOINIT=0** **OK** // or **+CME ERROR: <error>**

17.4. +GPSCONF Command: Configure the Location Service and GPS Receiver

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+GPSCONF=?**	 Response **+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**
Read command Syntax **AT+GPSCONF?**	 Response **+GPSCONF: <config_type>, <config_value_1>** **[+GPSCONF: <config_type>,<config_value_1>,<config_value_2>]** **OK**

HL6528RD-G and HL6528RD-G2.8V	
Write command Syntax **AT+GPSCONF=<config_type>,<config_value_1>[,<config_value_2>]**	Response **OK** Parameters **<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 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 For <config_type>=10 (enable/disable GPS, GPS/GLONASS or GPS/GLONASS/SBAS features): 0 GPS 1 GPS/GLONASS 2 GPS/GLONASS/SBAS For <config_type>=11 (set horizontal and vertical accuracy parameters – location information NMEA senrence $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
Notes	Parameters are immediately stored into non-volatile memory and are effective at the next power on.

HL6528RD-G and HL6528RD-G2.8V	
Examples	**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** **AT+GPSCONF?** **+GPSCONF: 0,0** **+GPSCONF: 1,2** **+GPSCONF: 10,1** **+GPSCONF: 11,200,200** **OK**

17.5. +GPSCORE Command: Report GNSS Receiver Core Information

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+ GPSCORE=?**	 Response **+GPSCORE:** (list of supported **<output>**s) ,(list of supported **<rate>**s),(list of supported **<core_info>**s) **OK**
Read command Syntax **AT+ GPSCORE?**	 Response **+GPSCORE: <output>,<rate>,<core_info>** **OK**
Write command Syntax **AT+GPSCORE= <output> [[,<rate>] [,<core_info>]]**	 Response **OK** Parameters **<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 are not output 1 Core information output on UART1 3 Core information output on USB (only applicable if **+KSIOCFG=1**) 4 Core information output on port where the **+GPSCORE** command was received **<rate>** 1 Core frames update rate in seconds. Fixed value.

HL6528RD-G and HL6528RD-G2.8V	
	<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. 0 Core information data output disabled 1 GPS jamming detection report 2 GLONASS jamming detection report 3 GPS and GLONASS jamming detection report
Unsolicited Notification	Response 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>** Parameters **<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
Notes	• Core frames update rate is fixed at 1 per second. • This command can be run without any SIM card
Examples	**AT+GPSCORE=1,1,1** **OK** // or **+CME ERROR: <error>** **AT+GPSCORE=0** **OK** // or **+CME ERROR: <error>** **AT+GPSCORE?** **+GPSCORE: 0,1,1** **OK**

17.6. +GPSINIT Command: Initialization of the Location Service

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+GPSINIT=?**	 Response **+GPSINIT:** (list of supported **<hw>**s) **OK**
Read command Syntax **AT+GPSINIT?**	 Response **+GPSINIT: <hw>** **OK**

HL6528RD-G and HL6528RD-G2.8V	
Write command Syntax **AT+GPSINIT =<hw>**	 Response **OK** Parameter **<hw>** Hardware type or configuration for initialization. This parameter gets the last known value within the current session if omitted. 41 HL6528RD-G or HL6528RD-G2.8V integrating SiRFVe GNSS receiver (factory default value)
Unsolicited Notification	Response **+GPSEVINIT: <status>** Parameter **<status>** Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed
Examples	**AT+GPSINIT=41** //Initialize GNSS device **OK** **+GPSEVINIT: 1** // or **+CME ERROR: <error>** **AT+GPSINIT?** //The current settings are saved. **+GPSINIT: 41** **OK**

17.7. +GPSNMEA Command: Configure the NMEA Frames Flow

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+GPSNMEA=?**	 Response **+GPSNMEA:** (list of supported **<output>**s),(list of supported **<rate>**s), (list of supported **<nmea_mask>**s), (list of supported **<nmea_profile>**s) **OK**
Read command Syntax **AT+GPSNMEA?**	 Response **+GPSNMEA: <output>,<rate>,<nmea_mask>,<nmea_profile>** **OK**

HL6528RD-G and HL6528RD-G2.8V

Write command

Syntax
AT+GPSNMEA=<output>[,[<rate>][,<nmea_mask>],[<nmea_profile>]]

Response
OK

Parameters

<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
0x03 NMEA frames output on USB (only applicable if **+KSIOCFG=1**)
0x04 NMEA frames output on port where the **+GPSNMEA** command was received
0x101 NMEA frames output on I^2C

<rate> Defines the NMEA frames update rate in seconds.
1 Factory default value (this value is fixed and cannot be changed)

<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)	*GPS_NMEA_NONE_EN*	All NMEA frames output are disabled
(1 << 0)	*GPS_NMEA_GGA_EN*	(NMEA $GPGGA) GPS Fix Data
(1 << 1)	*GPS_NMEA_GGSA_EN*	(NMEA $--GSA GNSS) DOPS and Active Satellites
(1 << 2)	*GPS_NMEA_RMC_EN*	(NMEA $--RMC) Recommended Minimum GNSS Sentence
(1 << 3)	*GPS_NMEA_VTG_EN*	(NMEA $--VTG) Course Over Ground and Ground Speed
(1 << 4)	*GPS_NMEA_GLL_EN*	(NMEA $--GLL) Geographic Position - Latitude, Longitude
(1 << 5)	*GPS_NMEA_GST_EN*	(NMEA $--GST) GNSS Pseudorange Error Statistics
(1 << 6)	*GPS_NMEA_GSV_EN*	(NMEA $--GSV) GNSS Satellites in View
(1 << 7)	*GPS_NMEA_ZDA_EN*	(NMEA $--ZDA) Time & Date
(1 << 8)	*GPS_NMEA_GNS_EN*	(NMEA $--GNS) GNSS Fix Data. The GPS Proprietary diagnostics data output are enabled
(0xFFFF)	*GPS_NMEA_ALL_EN*	All NMEA frames output supported by 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.

0xFF	Factory default value	
(0x0)	*GPS_NMEA_PROFILE_NONE*	No NMEA profile
(1 << 0)	*GPS_NMEA _PROFILE_GPS*	"<nmea_mask> is applied to "$GP" NMEA frames"
(1 << 1)	*GPS_NMEA_PROFILE_GLONASS*	"<nmea_mask> is applied to "$GL" NMEA frames"
(1 << 7)	*GPS_NMEA_PROFILE_GNSS*	"<nmea_mask> is applied to "$GN" NMEA frames"
(0xFF)	*GPS_NMEA_PROFILE_ALL*	All NMEA profiles

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Notes	• NMEA frames update rate is fixed at 1 per second. • All NMEA frames may not be supported depending on the GPS receiver type. Refer to supported NMEA sentences for more information. • Parameters are immediately stored in non-volatile memory, and I^2C settings are effective at the next power on. • Check available GPIOs using **+KGPIOCFG** when selecting NMEA frames output on I^2C; GPIOs may already be used by **+KTEMPMON**, **+KGSMAD**, **+KGNSSAD**, **+KSIMDET** or **+KSYNC**.
Examples	**AT+GPSNMEA=1** **OK** // or **+CME ERROR: <error>** **AT+GPSNMEA?** **+GPSNMEA: 1,1,FFFF,FF** **OK** **AT+GPSNMEA=,,,** **OK** **AT+GPSNMEA?** **+GPSNMEA: 1,1,FFFF,FF** **OK**

17.8. +GPSPVT Command: Configure PVT Frames Flow

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+GPSPVT=?**	 Response **+GPSPVT:** (list of supported **<output>**s), (list of supported **<rate>**s),(list of supported **<pvt_mask>**s) **OK**
Read command Syntax **AT+GPSPVT?**	 Response **+GPSPVT: <output>,<rate>,<pvt_mask>** **OK**
Write command Syntax **AT+ GPSPVT= <output> [,[<rate>] [,<pvt_mask>]]**	 Response **OK**

HL6528RD-G and HL6528RD-G2.8V

Parameters

<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

0x03 PVT frames output on USB (only applicable if **+KSIOCFG=1**)

0x04 PVT frames output on port where the **+GPSPVT** command was received

0x101 PVT frames output on I^2C

<rate> Defines the PVT sentence update rate in seconds. Range: 0-65535. This parameter gets the last known value within the current session if omitted. Refer to Diagram for Settings Management for more information.

1 Factory default value

<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.

0xFFFF Factory default value

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

Example:

+GPSPVT: 0,08:17:32,27/04/2010,3D FIX,N 48 34'52.90'',E 002 21'58.65",+0010m

0x0002	PVT sentence including course and speed over ground. Fields included in the sentence are described below.	
	Header	**+GPSPVT: 1**
	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

Example:

+GPSPVT: 1,087.5deg,021m/s

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0x0004	PVT sentence including main satellites information. Fields included in the sentence are described below.	
	Header	**+GPSPVT: 2**
	1	Satellites in View used for Navigation followed by “SV”
	2	HDOP (Horizontal Dilution of Precision) followed by “HDOP”
	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]

Example:
+GPSPVT: 2,05SV,1.7HDOP,23,12.0

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**
	1	Total number of messages of this type in this cycle
	2	Message number in this cycle
	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
	4	Satellite status: “U” for Used for Navigation or “N” for Not used for Navigation
	5	Satellites in View Signal To Noise Ratio [dBHz, integer value]
	6-8	Information about second SV, same format as fields 3–5
	9-11	Information about third SV, same format as fields 3–5
	12-14	Information about fourth SV, same format as fields 3–5
	15-17	Information about fifth SV, same format as fields 3–5
	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]

Notes

- If <rate>=0, PVT sentences will only be sent once with the last PVT information.
- Parameters are immediately stored in non-volatile memory, and I^2C settings are effective at the next power on.
- Check available GPIOs using **+KGPIOCFG** when selecting PVT frames output on I^2C; GPIOs may already be used by **+KTEMPMON**, **+KGSMAD**, **+KGNSSAD**, **+KSIMDET** or **+KSYNC**.

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Examples	**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,FFFF
	OK

17.9. +GPSRELEASE Command: Power the GPS Chipset Off

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+ GPSRELEASE=?**	 Response **OK**
Read command Syntax **AT+ GPSRELEASE?**	 Response **+GPSRELEASE: <status>** **OK**
Execute command Syntax **AT+ GPSRELEASE**	 Response **OK**
Unsolicited Notification	Response **+GPSEVRELEASE: <status>** Parameter **<status>** Event status 0 The action has failed. Application state is unchanged 1 The action has been successfully completed

HL6528RD-G and HL6528RD-G2.8V	
Notes	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 must 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.
Examples	**AT+GPSRELEASE?** **OK** **+GPSEVRELEASE: 1** // or **+CME ERROR: <error>** **AT+GPSRELEASE=?** **OK** **AT+GPSRELEASE** **OK** **+GPSEVRELEASE: 1**

17.10. +GPSSLEEP Command: Put GPS Receiver to the Specified GPS Sleep Mode

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+GPSSLEEP=?**	 Response **+GPSSLEEP: (**list of supported **<sleep_mode>**s**)** **OK**
Read command Syntax **AT+GPSSLEEP?**	 Response **+GPSSLEEP: <sleep_mode>** **OK**
Write command Syntax **AT+GPSSLEEP= <sleep_mode>**	 Response OK Parameter **<sleep_mode>** GPS sleep mode 1 GPS hibernate
Unsolicited Notification	Response **+GPSEVSLEEP: <status>** Parameter **<status>** Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed

HL6528RD-G and HL6528RD-G2.8V	
Examples	**AT+GPSSLEEP=1** **OK** **+GPSEVSLEEP: 1** // or **+CME ERROR: <error>** **AT+GPSSLEEP =?** **+GPSSLEEP: (1)** **OK** **AT+GPSSLEEP?** **+GPSSLEEP: 1** **OK**

17.11. +GPSSTART Command: Start or Restart the Location Service

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+GPSSTART=?**	Response **+GPSSTART:** (list of supported **<starting_mode>**s) **OK**
Read command Syntax **AT+GPSSTART?**	Response **+GPSSTART: <starting_mode>** **OK**
Write command Syntax **AT+GPSSTART=<starting_mode>**	Response **OK** Parameter **<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. 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.

HL6528RD-G and HL6528RD-G2.8V	
Unsolicited Notification	Response **+GPSEVSTART: <status>** Parameter **<status>** Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed
Examples	**AT+GPSSTART=1** **OK** **+GPSEVSTART: 1** // or **+CME ERROR: <error>** **AT+GPSSTART=?** **+GPSSTART: (0-3)** **OK** **AT+GPSSTART?** **+GPSSTART: 1** //The current starting mode is “HOT” start **OK**

17.12. +GPSSTOP Command: Stop the Location Service

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+GPSSTOP=?**	 Response **OK**
Read command Syntax **AT+GPSSTOP?**	 Response **+GPSSTOP: <status>** **OK**
Write command Syntax **AT+GPSSTOP**	 Response **OK**
Unsolicited Notification	Response **+GPSEVSTOP: <status>** Parameter **<status>** Event status 0 The action has failed; the application state is unchanged 1 The action has been successfully completed

HL6528RD-G and HL6528RD-G2.8V	
Examples	**AT+GPSSTOP** **OK** **+GPSEVSTOP: 1** // or **+CME ERROR: <error>** **AT+GPSSTOP=?** **OK**

17.13. +GPSSUPLCFG Command: GPS SUPL Configuration

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+ GPSSUPLCFG=?**	 Response **+GPSSUPLCFG:** (list of supported **<mode>**s) **OK**
Read command Syntax **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>** **+GPSSUPLCFG: 2,<SUPL-PDP-APN>,<SUPL-PDP-login>, <SUPL-PDP-password>,<SUPL-PDP-ip>,<SUPL-PDP-dns1>,<SUPL-PDP-dns2>** **OK**
Write command Syntax 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** Parameters 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>** 0 – 65535TCP SUPL server port; factory default = 7276 **<SUPL-ver>** SUPL version 0 SUPL disable 1 Support SUPL1.0 (factory default) 2 Support SUPL1.0 & SUPL2.0 **<NI-SUPL-sm>** NI SUPL start mode. If the parameter is omitted, the last known value is preserved. 0 Auto start (factory default) 1 Hot start 2 Warm start 3 Cold start

HL6528RD-G and HL6528RD-G2.8V	
For <mode>=2: **AT+GPSSUPLCFG=2,[<SUPL-PDP-APN>][,<SUPL-PDP-login>][,<SUPL-PDP-password>][,<SUPL-PDP-ip>][,<SUPL-PDP-dns1>][,<SUPL-PDP-dns2>]**	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 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 (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 (only supported when using TLSv1.2) **<SUPL-TLS-auth>** TLS authentication options. If the parameter is omitted, the last known value is preserved. 1 No authentication (factory default) 2 Manage server authentication 3 Manage server and client authentication if requested by remote server **<SUPL-TLS-ver>** TLS version options 0 TLSv 1.0 1 TLSv1.1 (factory default) 2 TLSv1.2 For <mode=2>; configure SUPL-PDP context **<SUPL-PDP-APN>** Access Point Name for SUPL; string parameter with maximum size = 100 bytes. Logical name used to select the GGSN or the external packet data network. **<SUPL-PDP-login>** PDP username for login. String type with maximum size = 32 bytes **<SUPL-PDP-password>** PDP password. String type with maximum size = 32 bytes **<SUPL-PDP-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 **<SUPL-PDP-dns1>, <SUPL-PDP-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. If the parameter is omitted, then an empty string is assumed.
Reference Sierra Wireless Proprietary	Notes • This command can work with or without a SIM card. • The SUPL configurations are loaded when GPS is started the first time after boot (by **AT+GPSINIT**, **AT+GPSAUTOINIT**, **SUPL NI**). It is recommended to reboot the module after changing the configurations. • For SSL certificates and private keys, refer to section 18.16 SSL Certificate Manager for available AT commands (**AT+KCERTSTORE**, **AT+KCERTDELETE**, **AT+KPRIVKSTORE** and **AT+KPRIVKDELETE**). • <SUPL-TLS-auth> is only effective if <SUPL-TLS-cipher> is enabled (>=0).

HL6528RD-G and HL6528RD-G2.8V	
Examples	# read current configurations **AT+GPSSUPLCFG?** **+GPSSUPLCFG: 0,"supl.google.com",7276,1,0** **+GPSSUPLCFG: 1,-1,1,1** **+GPSSUPLCFG: 2,"","","","0.0.0.0","0.0.0.0","0.0.0.0"** **OK** # Input APN for the PDP connection **AT+GPSSUPLCFG=2,“APN”** **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** # reboot once to ensure configurations are loaded by AT+GPSINIT **AT+CFUN=1,1** **OK** # 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**

17.14. +GPSTTFF Command: Report Calculated TTFF of the Last Run

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+GPSTTFF=?**	 Response **OK**

HL6528RD-G and HL6528RD-G2.8V	
Read command Syntax **AT+GPSTTFF?**	 Response **+GPSTTFF: <2D_time>,<3D_time>** **OK** Parameters **<2D_time>** 2-dimensional position time to first fix, defined in ms **<3D_time>** 3-dimensional position time to first fix, defined in ms
Examples	**AT+GPSTTFF?** **+GPSTTFF: 32051,32051** **OK** // or **+CME ERROR: <error>** **AT+GPSTTFF?** **+GPSTTFF: -30,-30** //The current run is not fixed **OK** **AT+GPSTTFF=?** **OK**

17.15. +GPSVERS Command: Report Software Version of Location Patch Version

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+GPSVERS=?**	 Response **OK**
Read command Syntax **AT+GPSVERS?**	 Response **+GPSVERS: <version>** **OK** Parameter **<version>** Patch version of location library
Examples	**AT+GPSVERS?** **+GPSVERS: "GNSS patch version"** **OK** **AT+GPSVERS=?** **OK**

17.16. +KIICADDR Command: Configure the I²C Device

HL6528RD-G and HL6528RD-G2.8V	
Test command Syntax **AT+KIICADDR=?**	 Response **+KIICADDR**: (range of supported **<device address>**es) **OK**
Read command Syntax **AT+KIICADDR?**	 Response **+KIICADDR: <device address>**) **OK** Parameter **<device address>** 0 – 127 Address of the I²C device (in decimal value). Factory default value = 34.
Write command Syntax **AT+KIICADDR= <device address>**	 Response **OK** Parameter **<device address>** Address of the I²C device (in decimal value)
Examples	**AT+KIICADDR?** **+KIICADDR: 34** **OK**

18. Protocol Specific Commands

18.1. Preliminary Comments

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

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

18.2. IP Address Format in AT Commands

Unless specified elsewhere, the format used for IP address fields in AT commands described in this chapter consists of dot-separated decimal (0-255) parameters of the form a1.a2.a3.a4.

18.3. Session ID

Protocol specific AT commands share the same range of session IDs. Session ID <session_id> is a unique number and ranges from 1 to 25.

18.4. Connection of PDP Contexts

A PDP connection will be started when a session becomes active, 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. **+KUDPCLOSE**).

18.5. Buffer Length of AT Command

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.

18.6. Parameter Format of AT Commands

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.

18.7. Connection Configuration

18.7.1. +KCGPADDR Command: Display PDP Address

HL6528RDx	
Write command Syntax For all <cnx_cnf>s: **AT+KCGPADDR** For specific <cnx_cnf>s: **AT+KCGPADDR=<cnx_cnf>**	Response **+KCGPADDR: <cnx cnf>, <PDP_addr_1>** **[[+KCGPADDR: <cnx cnf>, <PDP_addr_2>]** **…]** **OK** Parameters **<cnx cnf>** 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration. **<PDP_addr>** A string that identifies the MT in the address space applicable to the PDP
Reference Sierra Wireless Proprietary	Notes This AT command can be used after **+KUDPCFG** to display the local IP address of the module.

18.7.2. +KCNX_IND Notification: Connection Status Notification

HL6528RDx	
Unsolicited Notification	Response **+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) **+KCNX_IND: <cnx cnf>,<status>,<attempt>** (for <status> = 4) **+KCNX_IND: <cnx cnf>,<status>,<idletime>** (for <status> = 5) Parameters **<cnx cnf>** 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration

HL6528RDx	
	<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 **<tim1>** Refer to **+KCNXTIMER** **<attempt>** Current attempt of bringing up of PDP connection **<nbtrial>** Refer to **+KCNXTIMER** **<idletime>** Refer to **+KCNXTIMER**
Reference	Sierra Wireless Proprietary

18.7.3. +KCNXCFG Command: GPRS Connection Configuration

HL6528RDx	
Test command Syntax **AT+KCNXCFG=?**	 Response **+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>**),**<ip>**,**<dns1>**,**<dns2>** **OK**
Read command Syntax **AT+KCNXCFG?**	 Response **+KCNXCFG: <cnx cnf>, "GPRS", <apn>,<login>,<password>,<ip>,<dns1>,<dns2>, <state>** **[...]** **OK**

HL6528RDx	
Write command Syntax **AT+KCNXCFG=<cnx cnf>,"GPRS",<apn>[,[<login>][,[<password>][,[<ip>][,[<dns1>][,<dns2>]]]]]**	Response **OK** Parameters **<cnx cnf>** 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration **<apn>** Access Point Name; string parameter with maximum size = 63 bytes. Logical name used to select the GGSN or the external packet data network. **<login>** Cnx username. String type with maximum size = 24 bytes **<password>** Cnx password. String type with maximum size = 24 bytes **<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. **<state>** Connection state 0 Disconnected 1 Connecting 2 Connected 3 Idle, down counting for disconnection 4 Disconnecting
Reference Sierra Wireless Proprietary	Notes • 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 the IP services described in 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). • When the connection is up, the read command returns the actual values used by the connection interface.

18.7.4. +KCNXDOWN Command: Bring the PDP Connection Down

HL6528RDx	
Test command Syntax **AT+KCNXDOWN=?**	Response **+KCNXDOWN:** (list of possible **<cnx_cnf>**s),(list of possible **<mode>**s) **OK**

HL6528RDx	
Write command Syntax **AT+KCNXDOWN =<cnx_cnf> [,<mode>]**	Response **OK** Parameters, **<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
Reference	Sierra Wireless Proprietary

18.7.5. +KCNXPROFILE Command: Current Profile Connection Configuration

HL6528RDx	
Test command Syntax **AT+ KCNXPROFILE =?**	Response **+KCNXPROFILE: (**list of possible **<cnx cnf>**s**)** **OK**
Read command Syntax **AT+ KCNXPROFILE?**	Response **+KCNXPROFILE: <cnx cnf>** **OK**
Write command Syntax **AT+ KCNXPROFILE= <cnx cnf>**	Response **OK** Parameter **<cnx cnf>** 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration
Reference Sierra Wireless Proprietary	Notes This command sets the default PDP context configuration ID for **+KTCPCFG**, **+KFTPCFG**, **+KUDPCFG** and **+KHTTPCFG**, if the <cnx cnf> parameter is not given in these commands.

18.7.6. +KCNXTIMER Command: Connection Timer Configuration

HL6528RDx	
Test command Syntax **AT+KCNXTIMER =?**	 Response **+KCNXTIMER:** (list of supported **<cnx cnf>**s),(list of supported **<tim1>**s),(list of supported **<nbtrial>**s),(list of supported **<tim2>**s) ,(list of supported **<idletime>**s) **OK**
Read command Syntax **AT+KCNXTIMER ?**	 Response **+KCNXTIMER: <cnx cnf>,<tim1>,<nbtrial>,<tim2>,<idletime>** **[…]** **OK**
Write command Syntax **AT+KCNXTIMER =<cnx cnf>[,[<tim1>][,[<nbrtrial>][,<tim2>][,<idletime>]]]]**	 Response **OK** Parameters **<cnx cnf>** 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration **<tim1>** 1 – 120s (default value = 30s) 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. **<nbtrial>** 1 – 4 (default value = 2) Number of attempt times the module will try to activate the PDP context with max <nbtrial> **<tim2>** 0 – 300s (default value = 60s) 0 Deactivated (connection will not close by itself) For client sockets, the module will try to connect to the server within <tim2>s; if <tim2> expires, it will give up the connection **<idletime>** 0 – 1800s (default value = 30s) 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.
Reference Sierra Wireless Proprietary	Notes This command has an impact on TCP, FTP, UDP and HTTP-specific commands.

18.7.7. +KCNXUP Command: Bring the PDP Connection Up

HL6528RDx	
Test command Syntax **AT+KCNXUP=?**	 Response **+KCNXUP:** (list of possible **<cnx_cnf>**s) **OK**
Write command Syntax **AT+KCNXUP=<cnx_cnf>**	 Response **OK** Parameter **<cnx cnf>** 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration
Reference Sierra Wireless Proprietary	Notes • 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.

18.8. Common Configuration

18.8.1. +KIPOPT Command: General Options Configuration

HL6528RDx	
Test command Syntax **AT+KIPOPT=?**	 Response **+KIPOPT: 0,<UDP>,(1-100),(8-1472)** **+KIPOPT: 0,<TCP-based>,(0-100),(0,8-1460)** **+KIPOPT: 1,(0-1)** **+KIPOPT: 2,(0-255)** **+KIPOPT: 3,(0-1),(0-1)** **+KIPOPT: 4,(0-1)** **OK**

HL6528RDx	
Read command Syntax **AT+KIPOPT?**	Response **+KIPOPT: 0,<proto>,<wait time>,<send size v4>** **[...]** **+KIPOPT: 1,<http_chunked>** **+KIPOPT: 2,<http_max_redirect>** **+KIPOPT: 3,<stop_on_error>, <stop_on_peer>** **+KIPOPT: 4,<ssl_ver>** **OK**
Write command Syntax If <option_id>=0 **AT+KIPOPT=<option_id>,<proto>,<wait time>[,<send size v4>]** If <option_id>=1 **AT+KIPOPT=<option_id>,<http_chunked>** If <option_id>=2 **AT+KIPOPT=<option_id>,<http_max_redirect>** If <option_id>=3 **AT+KIPOPT=<option_id>,<stop_on_error>,<stop_on_peer>** If <option_id>=4 **AT+KIPOPT=<option_id>,<ssl_ver>**	Response **OK** **+CME ERROR<err>** Parameters **<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 **<proto>** Protocol, string type “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 **<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. For UDP: 8 – 1472, default value = 1020 For TCP: 0, 8 – 1460, default value = 0 (disabled) **<http_chunked>** “Chunked” transfer encoding for HTTP POST 0 Data sent with HTTP POST are not encoded 1 Data sent with HTTP POST are automatically encoded using “chunked” transfer encoding

HL6528RDx	
	<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 HTTPS 0 TLS version 1.1 1 TLS version 1.0 2 TLS version 1.2
Reference Sierra Wireless Proprietary	Notes • "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. **+KUDPCLOSE**) • <send size v4> controls 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. Data is sent as a UDP packet. • For TCP based protocol, when <send size v4> is 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> impacts the detection of <EOF pattern>; refer to the notes of **+KPATTERN** for more information.

18.8.2. +KPATTERN Command: Custom End of Data Pattern

HL6528RDx	
Read command Syntax **AT+KPATTERN?**	 Response **+KPATTERN: <EOF pattern>** **OK**

HL6528RDx	
Write command Syntax **AT+KPATTERN = <EOF pattern>**	Response **OK** **+CME ERROR <err>** Parameter **<EOF pattern>** String type with maximum 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).
Reference Sierra Wireless Proprietary	Notes • 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). • 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> 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> is larger than the size of the <EOF pattern>.

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

HL6528RDx	
Test command Syntax **AT+KURCCFG=?**	Response **+KURCCFG:** (list of supported **<protoopt>**s),(list of supported **<noti_act>**s),(list of supported **<indi_act>**s) **+KURCCFG:** "CNX",(list of supported **<noti_act>**s) **OK**
Read command Syntax **AT+KURCCFG?**	Response **+KURCCFG: list of supported (<protoopt>,<noti_act>,<indi_act>)** **OK**
Write command Syntax **AT+KURCCFG= <protoopt>, <noti_act> [,<indi_act>]** When <protoopt> = "CNX": **AT+KURCCFG= <protoopt>, <noti_act>**	Response **OK** Parameters **<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

HL6528RDx	
	"HTTP" HTTP client session "HTTPS" HTTPS client session “POP3” POP3 client session “SMTP” SMTP client session "TCP" Both TCP client and TCP server sessions "UDP" Both UDP client and UDP server sessions "CNX" Connection status notification **<noti_act>** 1 Enable URC (like **+KUDP_NOTIF**) (default value for TCPC, TCPS and TCP) 0 Disable URC (default value for UDPC, UDPS, FTP, HTTP, HTTPS, UDP and CNX) **<indi_act>** 1 Enable URC (like **+KUDP_IND**, **+KUDP_DATA**, **+KUDP_RCV**) 0 Disable URC
Examples	To disable URC: **AT+KURCCFG=“UDP”,0** **OK** Test and read command: **AT+KURCCFG=?** **+KURCCFG: ("TCPC","TCPS","UDPC","UDPS","FTP","HTTP","HTTPS","POP3", "SMTP","TCP","UDP"),(0-1),(0-1)** **+KURCCFG: "CNX",(0-1)** **OK** **AT+KURCCFG?** **+KURCCFG: "TCPC",1,0** **+KURCCFG: "TCPS",1,0** **+KURCCFG: "UDPC",0,0** **+KURCCFG: "UDPS",0,0** **+KURCCFG: "FTP",0,0** **+KURCCFG: "HTTP",0,0** **+KURCCFG: "HTTPS",0,0** **+KURCCFG: "POP3",0,0** **+KURCCFG: "SMTP",0,0** **+KURCCFG: "CNX",0** **OK**
Reference Sierra Wireless Proprietary	Notes • If disabled, URCs are discarded and not stored. • Can be used in 07.10 multiplexer.

18.9. TCP Specific Commands

18.9.1. +KTCP_ACK Notification: Status Report for Latest TCP Data

HL6528RDx	
Unsolicited Notification	Response **+KTCP_ACK: <session_id>,<result> <CR><LF>** Parameters **<session_id>** TCP session index **<result>** 0 Data sent failure: not all data has been received by the remote side 1 Data sent success: all the data has already been received by the remote side
Reference Sierra Wireless Proprietary	Notes • This URC is enabled or disabled by parameter <URC-ENDTCP-enable> of command **+KTCPCFG**. The URC is disabled by default. • See section 20.2.6 Use Cases for AT+KTCPACKINFO and <URC-ENDTCP-enable> Option for more information.

18.9.2. +KTCP_DATA Notification: Incoming Data through a TCP Connection

HL6528RDx	
Unsolicited Notification	Response **+KTCP_DATA: <session_id>,<ndata available>[,<data>]** Parameters **<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>

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • **+KTCP_DATA** is sent every time a TCP packet is received, and the number indicates the number of bytes received in the current TCP packet. To determine the accumulated number of bytes to be read by the next **AT+KTCPRCV**, 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.

18.9.3. +KTCP_IND Notification: TCP Status

HL6528RDx	
Unsolicited Notification	Response **+KTCP_IND: <session_id>,<status>** Parameters **<session_id>** TCP session index **<status>** TCP session status 1 Session is set up and ready for operation
Reference	Sierra Wireless Proprietary

18.9.4. +KTCP_SRVREQ Notification: Incoming Client Connection Request

HL6528RDx	
Unsolicited Notification	Response **+KTCP_SRVREQ: <session_id>,<subsession_id>,<client_ip>,<client_port>** Parameters **<session_id>** TCP session index **<subsession_id>** Newly created TCP session index **<client_ip>** IP address string of the incoming socket **<client_port>** 0 – 65535 Incoming client port
Examples	Configure the module to TCP servers **AT+KCNXCFG=0,"GPRS","szsjmc.gd";** **+KTCPCFG=0,1,,179** **+KTCPCFG: 1** **OK**

HL6528RDx	

	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
	
	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

Reference Sierra Wireless Proprietary	Notes • 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**, **KTCPRCV**, **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 using **AT+KTCPCFG?** after the client is connected to the TCP server.

18.9.5. +KTCPACKINFO Command: Poll ACK Status for the Latest Data

HL6528RDx	
Test command Syntax **AT+ KTCPACKINFO =?**	 Response **OK**
Read command Syntax **AT+ KTCPACKINFO?**	 Response **OK**
Execute command Syntax For all TCP session IDs with <URC-ENDTCP-enable>=1: **AT+ KTCPACKINFO** or **AT+ KTCPACKINFO= <session_id>**	 Response **+KTCPACKINFO: <session_id>,<result>** **[…]** **OK** or **+KTCPACKINFO: <session_id>,<result>** **OK** **+CME ERROR: <err>** Parameters **<session_id>** TCP session index **<result>** 0 Data sent failure: not all data has been received by the 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
Reference Sierra Wireless Proprietary	Notes • 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.

18.9.6. +KTCPCFG Command: TCP Connection Configuration

HL6528RDx	
Test command Syntax **AT+KTCPCFG=?**	Response **+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**),<cipher_index>** **OK**
Read command Syntax **AT+KTCPCFG?**	Response **+KTCPCFG: <session_id>,<status>,<cnx cnf>,<mode>[,<serverID>],<tcp remote address>,<tcp_port>,[source_port>],<data_mode>,<URC-ENDTCP-enable>, <cipher_index>** **[…]]**
Write command Syntax **AT+KTCPCFG= [<cnx cnf>], <mode>, [<tcp remote address>], <tcp_port>[, [<source_port>] [<data_mode>], [<URC-ENDTCP-enable>]], [<SSL profile]**	Response **+KTCPCFG: <session_id>** **OK** Parameters **<cnx cnf>** Index of a set of parameters for configuring one TCP session (see **+KCNXCFG**) **<session_id>** TCP session index **<mode>** 0 Client 1 Server 2 Child (generated by server sockets) 3 Secure client **<tcp remote address>** IP address string or explicit name of the remote server. For a server configuration, this parameter is left blank **<tcp_port>** 1 – 65535 TCP peer port; numeric parameter. For a server configuration, this parameter is the listening port. **<status>** Connection state of the selected socket 0 Disconnected 1 Connected **<serverID>** Server session ID index; only for socket in Child mode **<source_port>** 0 – 65535 Numeric parameter that specifies the local TCP port number. For a server configuration, this parameter is left blank. **<data_mode>** 0 Do not display <data> in URC 1 Display <data> in URC **<URC-ENDTCP-enable>** 0 Do not display URC "**+KTCP_ACK**" 1 Display URC "**+KTCP_ACK**"

HL6528RDx	
	<cipher_index> Cipher suite profile index to use for a secured socket defined by **+KSSLCRYPTO**
Reference Sierra Wireless Proprietary	Notes • 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 to connect to. • Maximum <session_id> is 25. • For child session, the property <data_mode> will be kept the same as the server socket's setting. • See section 20.2.6 Use Cases for AT+KTCPACKINFO and <URC-ENDTCP-enable> Option for more information. • This command can be used before setting up **+KCNXCFG**. 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 of 3 seconds delay.

18.9.7. +KTCPCLOSE Command: Close Current TCP Operation

HL6528RDx	
Test command Syntax **AT+KTCPCLOSE =?**	Response **+KTCPCLOSE: (**list of possible **<session_id>**s**), (**list of possible **<closing_type>**s**)** **OK**
Write command Syntax **AT+KTCPCLOSE =<session_id> [,<closing_type>]**	Response **OK** **+CME ERROR: <err>** **NO CARRIER** **+KTCP_NOTIF: <session_id>, <tcp_notif>** Parameters **<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 using **AT+KTCPSND** will be sent to the TCP server and acknowledged before the socket is closed. **<tcp_notif>** See command **AT+KTCPCNX**
Reference Sierra Wireless Proprietary	Notes • This command 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 the connection has been closed.

18.9.8. +KTCPCNX Command: Start TCP Connection

HL6528RDx	
Test command Syntax **AT+KTCPCNX=?**	 Response **+KTCPCNX: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KTCPCNX=** **<session_id>**	 Response **OK** **+CME ERROR: <err>** **+KTCP_NOTIF: <session_id>, <tcp_notif>** Parameters **<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
Reference Sierra Wireless Proprietary	Notes • 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.

18.9.9. +KTCPDEL Command: Delete a Configured TCP Session

HL6528RDx	
Test command Syntax **AT+KTCPDEL=?**	 Response **+KTCPDEL:** (list of possible **<session_id>**s**)** **OK**

HL6528RDx	
Write command Syntax **AT+KTCPDEL= <session_id>**	 Response **OK** **+CME ERROR: <err>** Parameter **<session_id>** TCP session index
Reference Sierra Wireless Proprietary	Notes The session must be closed (using **+KTCPCLOSE**) before using this command.

18.9.10. +KTCPRCV Command: Receive Data through a TCP Connection

HL6528RDx	
Test command Syntax **AT+KTCPRCV=?**	 Response **+KTCPRCV: (**list of possible **<session_id>**s**),(**list of possible **<ndata>**s**)** **OK**
Write command Syntax **AT+KTCPRCV= <session_id>, <ndata>**	 Response **CONNECT** **…<EOF pattern>** **OK** **+KTCP_NOTIF: <session_id>,<tcp_notif>** Parameters **<session_id>** TCP session index **<ndata>** Number of bytes the device wants to receive (max value 4294967295) **<tcp_notif>** See command **AT+KTCPCNX**
Reference Sierra Wireless Proprietary	Notes • 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**. • Refer to **AT&D** for the behavior of DTR drop.

18.9.11. +KTCPSND Command: Send Data through a TCP Connection

HL6528RDx	
Test command Syntax **AT+KTCPSND=?**	Response **+KTCPSND: (**list of possible **<session_id>**s**),(**list of possible **<ndata>**s**)** **OK**
Write command Syntax **AT+KTCPSND= <session_id>, <ndata>**	Response **CONNECT** **OK** Error case **NO CARRIER** **+CME ERROR: <err>** **+KTCP_NOTIF: <session_id>,<tcp_notif>** Parameters **<session_id>** TCP session index **<ndata>** Number of bytes (max value 4294967295) **<tcp_notif>** See command **AT+KTCPCNX**
Reference Sierra Wireless Proprietary	Notes • User must use <EOF pattern> to finish sending, then the module will return to command mode. • All data will be sent out ignoring <ndata>. If data sent is not equal to <ndata>, then **KTCP_NOTIF** will be displayed. • <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**. • Refer to **AT&D** for the behavior of DTR drop. • Using **+++** can abort sending data and using **ATO[n]** can return to data mode. • If sending is suspended or aborted using **+++** or by toggling the DTR, **+KTCP_NOTIF: <session_id>,8** is displayed

18.9.12. +KTCPSTART Command: Start a TCP Connection in Direct Data Flow

HL6528RDx	
Test command Syntax **AT+KTCPSTART =?**	Response **OK**

HL6528RDx	
Read command Syntax **AT+KTCPSTART ?**	 Response **OK**
Execute command Syntax **AT+KTCPSTART =<session_id>**	 Response **CONNECT** **OK** Error case **+CME ERROR: an error occurs, syntax error** **+KTCP_NOTIF: <session_id>,<tcp_notif>: an error occurs** Parameters **<session_id>** TCP session index **<tcp_notif>** See command **AT+KTCPCNX**
Reference Sierra Wireless Proprietary	Notes • 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**. • Refer to **AT&D** for the behavior of DTR drop. • **+++** can be used to switch to command mode. • **ATO<session_id>** can be used to switch back to data mode. • Only 1 KTCPSTART session can be used. • This command 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.

18.9.13. +KTCPSTAT Command: Get TCP Socket Status

HL6528RDx	
Test command Syntax **AT+KTCPSTAT= ?**	 Response **OK**
Read command Syntax **AT+KTCPSTAT?**	 Response **OK**
Execute command Syntax For all TCP session IDs: **AT+KTCPSTAT**	 Response **+KTCPSTAT: <session_id>,<status>,<tcp_notif>,<rem_data>,<rcv_data>** **[…]** **OK**

HL6528RDx	
or **AT+KTCPSTAT=<session_id>**	or **+KTCPSTAT: <status>,<tcp_notif>,<rem_data>,<rcv_data>** **OK** Parameters **<session_id>** TCP session index **<status>** 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 and 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 occured **<rem_data>** Remaining bytes waiting to be sent in the socket buffer **<rcv_data>** Received bytes; can be read with **+KTCPRCV**
Reference Sierra Wireless Proprietary	Notes • Socket buffer size for sending is 17520 bytes. • This command returns **+CME ERROR: 910** (Bad Session ID) for undefined <session_id>s.

18.10. FTP Client Specific Commands

18.10.1. +KFTP_IND Notification: FTP Status

HL6528RDx	
Unsolicited Notification	Response **+KFTP_IND: <session_id>,<status>[,<data_len>]** Parameters **<session_id>** FTP session index **<status>** FTP session status 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 (using **+KFTPRCV**/**+KFTPSND**)
Reference	Sierra Wireless Proprietary

18.10.2. +KFTPCFG Command: FTP Configuration

HL6528RDx	
Test command Syntax **AT+KFTPCFG=?**	 Response **+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**)** **OK**
Read command Syntax **AT+KFTPCFG?**	 Response **+KFTPCFG: <session_id>,<cnx cnf>,<server_name>,<login>,<password>, <port_number>,<mode>,<started>**
Write command Syntax **AT+KFTPCFG= [<cnx cnf>], <server_name> [,<login> [,<password> [,<port_number> [,<mode>] [,<start>]]]]**	 Response **+KFTPCFG:<session_id>** **OK** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<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 username to be used during the FTP connection **<password>** String type, indicates the password to be used during the FTP connection **<port_number>** 1 – 65535 Numeric parameter that indicates the remote command port (default value = 21) **<mode>** Numeric number that indicates the initiator of the FTP connection 0 Active. The server is the initiator of the FTP data connection 1 Passive. The client is the 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 Note that only passive mode is currently supported; active mode is internally switched to passive. **<start>** Specifies whether to start the FTP connection immediately or not 0 Start the FTP connection later using **+KFTPCNX** 1 Start the FTP connection immediately **<started>** Specifies whether the FTP connection has been started 0 FTP connection has not been started yet 1 FTP connection has been started

HL6528RDx	
	<ftp_cause> Integer type that indicates the cause of the FTP connection failure 0 Sending or retrieving was impossible due to request timeout 1 Impossible to connect to the server due to DNS resolution failure 2 Impossible to download a file due to connection troubles 3 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 representing reply codes from the FTP server. Refer to section 20.1.4 FTP Reply Codes.
Example	**AT+KFTPCFG=1,"ftp.connect.com","username", "password",21,0**
Reference Sierra Wireless Proprietary	Notes • The write command sets the server name, login, password, port number and mode for FTP operations. • This command (when <start> = 0) can be used before setting up **+KCNXCFG**. Note however that the latter is required to start the connection properly. • The connection timeout for FTP socket is about 9 seconds with 3 retransmissions with a 3-second delay. • The result of the FTP connection is indicated by URC.

18.10.3. +KFTPCFGDEL Command: Delete a Configured FTP Session

HL6528RDx	
Test command Syntax **AT+ KFTPCFGDEL=?**	 Response **+KFTPCFGDEL: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+ KFTPCFGDEL= <session_id>**	 Response **OK** **+CME ERROR: <err>** Parameter **<session_id>** FTP session index
Reference Sierra Wireless Proprietary	Notes The session must be closed (using **+KFTPCLOSE**) before using this command.

18.10.4. +KFTPCLOSE Command: Close Current FTP Connection

HL6528RDx	
Test command Syntax **AT+KFTPCLOSE =?**	Response **+KFTPCLOSE: (**list of possible **<session_id>**s**),(**list of possible **<keep_cfg>**s**)** **OK**
Write command Syntax **AT+KFTPCLOSE = <session_id> [,<keep_cfg>]**	Response **OK** Parameters **<session_id>** FTP session index **<keep_cfg>** Specifies whether to delete the session configuration after closing it or not 0 Delete the session configuration 1 Keep the session configuration
Reference Sierra Wireless Proprietary	Notes This command will close the connection to the FTP server.

18.10.5. +KFTPCNX Command: Start FTP Connection

HL6528RDx	
Test command Syntax **AT+KFTPCNX=?**	Response **+KFTPCNX: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KFTPCNX= <session_id>**	Response **OK** **NO CARRIER** **+CME ERROR: <err>** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<session_id>** FTP session index **<ftp_cause>** Integer type that indicates the cause of the FTP connection failure 0 Sending or retrieving was impossible due to request timeout 1 Impossible to connect to the server due to DNS resolution failure 2 Impossible to download a file due to connection troubles 3 Download was impossible due to connection timeout 4 No network available 5 Flash access trouble

HL6528RDx	
	6 Flash memory full 7 Network error XXX Three digits representing reply codes from the FTP server. Refer to section 20.1.4 FTP Reply Codes.
Reference Sierra Wireless Proprietary	Notes • This command is used to start the FTP connection created by **+KFTPCFG** when <start>=0. • **+KFTPRCV**, **+KFTPSND**, and **+KFTPDEL** automatically starts the connection if it has not been started using **AT+KFTPCNX**. • The result of the FTP connection is indicated by URC.

18.10.6. +KFTPDEL Command: Delete FTP Files

HL6528RDx	
Test command Syntax **AT+KFTPDEL=?**	 Response **+KFTPDEL:** (list of possible **<session_id>**s)**,<server_path>,<file_name>,(**list of possible **<type>**s**)** **OK**
Write command Syntax **AT+KFTPDEL= <session_id>, [<server_path>], <file_name> [,<type>]**	 Response **OK** **+CME ERROR <err>** **NO CARRIER** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<session_id>** FTP session index **<server_path>** String type that 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 that indicates the name of the file to delete **<type>** Numeric type that indicates the type of file to transfer 0 Binary 1 ASCII **<ftp_cause>** Integer type that indicates the cause of the FTP connection failure 0 Sending or retrieving was impossible due to request timeout 1 Impossible to connect to the server due to DNS resolution failure 2 Impossible to download a file due to connection troubles 3 Download was impossible due to connection timeout 4 No network available XXX Three digits representing reply codes from the FTP server. Refer to section 20.1.4 FTP Reply Codes.

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • An FTP connection must have been achieved using **AT+KFTPCFG** before using this command. • The result of the delete operation is indicated by URC.

18.10.7. +KFTPRCV Command: Start FTP Connection

HL6528RDx	
Test command Syntax **AT+KFTPRCV=?**	 Response **+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**
Write command Syntax **AT+KFTPRCV=<session_id>,[<local_uri>],[<server_path>],<file_name>[,<type_of_file>[,<offset>]]**	 Response **CONNECT** **<EOF_pattern>** **OK** **+CME ERROR<err>** **NO CARRIER** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<session_id>** FTP session index **<local_uri>** String type that indicates the URI of the destination file and starts 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. Once the download is finished the module notifies the user with **+KFTP_RCV_DONE**. **<local_uri>** This argument must be empty. Reserved for compatibility of command syntax. **<server_path>** String type that indicates the path of the file to be downloaded. An empty string or no string indicates that downloading is done from the path given by the FTP server. **<file_name>** String type that indicates the name of the file to download **<type_of_file>** Numeric type that indicates the type of file to transfer 0 Binary 1 ASCII **<offset>** 0 – 4294967295 Integer type that indicates the offset to "resume transfer". Refer to section 20.3.2 "FTP Resume" Use Case. When downloading a file and transmitting to the serial link, the module will use the <offset> value and "resume transfer" from this position. When downloading a file to non-volatile memory, the <offset> should be set to a non-zero value. The module will then automatically detect the real size of the file in the file system. The real size will be used as the real <offset> for resuming transfer.

HL6528RDx	
	<EOF_pattern> End of file notification. See **+KPATTERN** for possible values **<ftp_cause>** Integer type that indicates the cause of the FTP connection failure 0 Sending or retrieving was impossible due to request timeout 1 Impossible to connect to the server due to DNS resolution failure 2 Impossible to download a file due to connection troubles 3 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 representing reply codes from the FTP server. Refer to section 20.1.4 FTP Reply Codes.
Reference Sierra Wireless Proprietary	Notes • An FTP connection must have been achieved using **+KFTPCFG** before using this command. • The user will receive the entire data stream after sending this command. • The user can abort 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. • If **AT&C1** is set, DCD will be ON after CONNECT, and DCD will be OFF after the download is done. • “Resume transfer” feature should be supported by the FTP server to be used. Refer to section 20.3.2 "FTP Resume" Use Case. • If the FTP server does not support the resume feature, the module will output +KFTP_ERROR. The <ftp_cause> will be in the sets {500, 501, 502, 421, 530}. Refer to section 20.1.4 FTP Reply Codes.

18.10.8. +KFTPSND Command: Send FTP Files

HL6528RDx	
Test command Syntax **AT+KFTPSND=?**	Response **+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**
Write command Syntax **AT+KFTPSND=<session_id>,[<local_uri>],[<server_path>],<file_name>[,<type of file>][,<append>]**	Response **CONNECT** **data …** **| OK** **<EOF pattern>** **OK** **| +KFTP_SND_DONE: <session_id>** **+CME ERROR <err>** **NO CARRIER** **+KFTP_ERROR: <session_id>,<ftp cause>**

HL6528RDx	
	Parameters **<session_id>** FTP session index **<local_uri>** This argument must be empty. Reserved for compatibility of command syntax. **<server_path>** String type that indicates the path of the file to be uploaded. An empty string or no string indicates that uploading is done from the path given by the FTP server. **<file_name>** String type that indicates the name of the file to upload **<type of file>** Numeric type that indicates the type of file to transfer 0 Binary 1 ASCII **<append>** Numeric type that indicates whether to use "append" or not when uploading 0 Do not use "append". 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 possible values **<ftp_cause>** Integer type that indicates the cause of the FTP connection failure 0 Sending or retrieving was impossible due to request timeout 1 Impossible to connect to the server due to DNS resolution failure 2 Impossible to download a file due to connection troubles 3 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 representing reply codes from the FTP server. Refer to section 20.1.4 FTP Reply Codes.
Reference Sierra Wireless Proprietary	Notes • An FTP connection must have been achieved using **+KFTPCFG** before using this command. • The host must send the entire data stream of the file after sending this command. • Upload can also be ended (disconnected) by **+++** or DTR. • **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.

18.11. UDP Specific Commands

18.11.1. +KUDP_DATA Notification: Incoming Data through a UDP Connection

HL6528RDx	
Unsolicited Notification	Response **+KUDP_DATA: <session_id>,<ndata available>[,<udp remote address>,<udp remote port>,<data>]** Parameters **<session_id>** UDP session index **<ndata available>** Number of bytes to be read **<udp remote address>** IP address string of the remote host **<udp remote port>** 0 – 65535 Numeric parameter **<data>** Data in octet. The length of data is specified by <ndata_available>.
Reference Sierra Wireless Proprietary	Notes • 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** 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**.

18.11.2. +KUDP_IND Notification: UDP Status

HL6528RDx	
Unsolicited Notification	Response **+KUDP_IND: <session_id>,<status>** Parameters **<session_id>** UDP session index **<status>** UDP session status. 1 session is set up and ready for operation
Reference	Sierra Wireless Proprietary

18.11.3. +KUDPCFG Command: UDP Connection Configuration

HL6528RDx	
Test command Syntax **AT+KUDPCFG=?**	Response **+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**)** **OK**
Read command Syntax **AT+KUDPCFG?**	Response **+KUDPCFG: <session_id>,<cnx cnf>,<mode>,<port>,<data_mode>, <udp remote address>,<udp_port>** **[…]** **OK**
Write command Syntax **AT+KUDPCFG= <cnx cnf>, <mode>[,[<port>] [,<data_mode>], [<udp remote address>] , <udp_port>]**	Response **+KUDPCFG: <session_id>** **OK** Error case **NO CARRIER** **+CME ERROR: <err>** **+KUDP_NOTIF: <session_id>, <udp_notif>** Parameters **<session_id>** UDP session index **<mode>** 0 Client 1 Server **<port>** 0 – 65535 Numeric parameter; default value = 0 (random) **<cnx cnf>** 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration (see section 18.7.3 +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 1 Display <data> in URC

HL6528RDx	
	<udp remote address> IP address string or explicit name of the remote host, Default is empty (given by **+KUDPSND**). **<udp_port>** 0 – 65535 UDP peer port; default value = 0 (given by **+KUDPSND**).
Reference Sierra Wireless Proprietary	Notes • 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 25. • When more than two different APNs are used in **+KCNXCFG**, only one of them can be used in TCP or UDP services. • **+KCNXCFG** configuration should be set up to start the connection properly. • When using **+++** to abort sending UDP data, URC **+KUDP_NOTIF: <session_id>,8** could be displayed.

18.11.4. +KUDPCLOSE Command: Close Current UDP Operation

HL6528RDx	
Test command Syntax **AT+KUDPCLOSE =?**	Response **+KUDPCLOSE: (**list of possible **<session_id>**s**),(**list of possible **<keep_cfg>**s**)** **OK**
Write command Syntax **AT+KUDPCLOSE =<session_id> [,<keep_cfg>]**	Response **OK** **+KUDP_NOTIF: <session_id>, <udp_notif>** Parameters **<session_id>** UDP session index **<udp_notif>** See command **AT+KUDPCFG** **<keep_cfg>** Specifies whether to delete the session configuration after closing it 0 Delete the session configuration 1 Keep the session configuration
Reference Sierra Wireless Proprietary	Notes • 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.

18.11.5. +KUDPDEL Command: Delete a Configured UDP Session

HL6528RDx	
Test command Syntax **AT+KUDPDEL=?**	 Response **+KUDPDEL: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KUDPDEL= <session_id>**	 Response **OK** **+CME ERROR: <err>** Parameters **<session_id>** UDP session index
Reference Sierra Wireless Proprietary	Notes The session must be closed (using **+KUDPCLOSE**) before using this command.

18.11.6. +KUDPRCV Command: Receive Data through a UDP Connection

HL6528RDx	
Test command Syntax **AT+KUDPRCV=?**	 Response **+KUDPRCV:** (list of possible **<session_id>**s),(list of possible **<ndata>**s) **OK**
Write command Syntax **AT+KUDPRCV= <session_id>, <ndata>**	 Response **CONNECT** **…<EOF pattern>** **OK** **+KUDP_RCV: <udp remote address>,<udp remote port>,<ndata available>** Error case **NO CARRIER** **+CME ERROR: <err>** **+KUDP_NOTIF: <session_id>, <udp_notif>** **+KUDP_DATA_MISSED: <session_id>, <ndata missed>** Parameters **<session_id>** UDP session index **<ndata>** Number of bytes the device wants to receive; (max value = 4294967295)

HL6528RDx	
	<udp remote address> 0 – 255 Dot-separated numeric parameters of the form a1.a2.a3.a4 **<udp remote port>** 0 – 65535 Numeric parameter **<ndata available>** Number of bytes to be read in the first received packet **<udp_notif>** See command **AT+KUDPCFG** **<ndata missed>** Number of bytes left (and lost) in the UDP socket
Reference Sierra Wireless Proprietary	Notes • This function is used to receive <ndata> data bytes through a previously opened UDP socket. • <ndata> indicates the maximum bytes of data 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> is 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**. • Refer to **AT&D** for the behavior of DTR drop.

18.11.7. +KUDPSND Command: Send Data through a UDP Connection

HL6528RDx	
Test command Syntax **AT+KUDPSND=?**	Response **+KUDPSND: (**list of possible **<session_id>**s**),<remote-name/ip>,(**list of possible **<udp_port>**s**),(**list of possible **<ndata>**s**)** **OK**
Write command Syntax **AT+KUDPSND= <session id>, <udp remote address>, <udp_port>, <ndata>**	Response **CONNECT** **OK** Error case **NO CARRIER** **+CME ERROR: <err>** **+KUDP_NOTIF: <session_id>,< udp_notif>** Parameters **<session_id>** UDP session index **<udp remote address>** IP address string or explicit name of the remote host

HL6528RDx	
	<udp_port> 1 – 65535 UDP peer port **<ndata>** Number of bytes (maximum value = 4294967295) **<udp_notif>** See command **AT+KUDPCFG**
Reference Sierra Wireless Proprietary	Notes • User must use <EOF pattern> to finish sending; the module will then return to command mode. • All data will be sent out ignoring <ndata>. If data sent is not equal to <ndata> then **+KUDP_NOTIF** will be displayed. • <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**. • Refer to **AT&D** for the behavior of DTR drop. • Using **+++** can abort sending data and using **ATO[n]** to return to data mode. • The maximum transmission unit (MTU) is 1500 bytes. • The <udp remote address> and <udp_port> are saved internally; 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); default value for both parameters 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.

18.12. POP3 Client Specific Commands

18.12.1. +KPOPCFG Command: POP3 Connection Configuration

HL6528RDx	
Test command Syntax **AT+KPOPCFG=?**	Response **+KPOPCFG:<cnx_cnf>,<server>,<port>,<login>,<password>,<secure>, <crypto_profile>,<startcon>** **OK** Error case **+CME ERROR: <err>**

HL6528RDx	
Read command Syntax **AT+KPOPCFG?**	Response **+KPOPCFG:<session_id>,<cnx_cnf>,<server>,<port>,<login>,<password>, <secure>,<cryptor_profile>,<started>** Error case **+CME ERROR: <err>**
Write command Syntax **AT+KPOPCFG= <cnx_cnf>, <server>,<port>, <login>, <password> [,<secure> [,<crypto_profile>]][,<startcon>]**	Response **+KPOPCFG: <session_id>** **OK** Error case **+CME ERROR: <err>** Parameters **<cnx cnf>** 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration (see **+KCNXCFG**) **<server>** IP address string or explicit name of the remote server **<port>** Numeric parameter (1 – 65535). Default is 110 if <secure>=0, or 465 if <secure>=1 **<login>** String type that indicates the username to be used during the POP3 connection **<password>** String type that indicates the password to be used during the POP3 connection **<secure>** Secured connection to the server 0 Use plain TCP connection 1 Use TLS connection **<crypto_profile>** TLS encryption settings 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 (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 **<startcon>** Specifies whether to start the POP3 connection immediately or not 0 Start the POP3 connection later using **+KPOPCNX** 1 Start the POP3 connection immediately **<session_id>** POP3 session index

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • <port> and <server> define the port and the IP address of the remote server one wants to connect to. • 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.

18.12.2. +KPOPCFGDEL Command: Delete a POP3 Connection Configuration

HL6528RDx	
Test command Syntax **AT+ KPOPCFGDEL=?**	Response **+KPOPCFGDEL: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+ KPOPCFGDEL= <session_id>**	Response **OK** Error case **+CME ERROR: <err>** Parameter **<session_id>** POP3 session index
Reference Sierra Wireless Proprietary	Notes The POP3 session must be closed (using **+KPOPQUIT**) before using this command.

18.12.3. +KPOPCNX Command: Start a POP3 Connection

HL6528RDx	
Test command Syntax **AT+KPOPCNX=?**	Response **+KPOPCNX: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KPOPCNX= <session_id>**	Response **OK** Error case **+CME ERROR: <err>**

HL6528RDx	
	Parameter **<session_id>** POP3 session index
Reference Sierra Wireless Proprietary	Notes The connection may get disconnected from the server due to inactivity. Consult the server administrator for timeout values.

18.12.4. +KPOPDEL Command: Delete an E-Mail from the Server

HL6528RDx	
Test command Syntax **AT+KPOPDEL=?**	Response **+KPOPDEL: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KPOPDEL= <session_id>, <index>**	Response **OK** Parameters **<session_id>** POP3 session index **<index>** Numeric type that indicates the index of the mail to delete
Reference Sierra Wireless Proprietary	Notes • If the asked mail ID is wrong, the command returns the associated error code and maintains connection with the server. • The mail is deleted by the server after the **+KPOPQUIT** command.

18.12.5. +KPOPLIST Command: Get E-mail Listing from the Server

HL6528RDx	
Test command Syntax **AT+KPOPLIST=?**	Response **+KPOPLIST: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KPOPLIST= <session_id>**	Response **+KPOPLIST:<N> messages (<size> octets)** **+KPOPLIST:<n1>,<size1>[<CR><LF>** **+KPOPLIST:<n2>,<size2><CR><LF>[…]]** **OK**

HL6528RDx	
	Error case **+CME ERROR: <err>** Parameter **<session_id>** POP3 session index **<N>** Numeric type that indicates the number of available messages **<size>** Numeric type that indicates the total size of the messages **<n#>** Numeric type that indicates the message index **<size#>** Numeric type that indicates the size in octet of the message #
Reference Sierra Wireless Proprietary	Notes This command lists available mail in the POP3 server.

18.12.6. +KPOPQUIT Command: Disconnect from E-mail Server

HL6528RDx	
Test command Syntax **AT+KPOPQUIT=?**	Response **+KPOPQUIT: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KPOPQUIT= <session_id>**	Response **OK** Parameter **<session_id>** POP3 session index
Reference Sierra Wireless Proprietary	Notes This command closes the connection.

18.12.7. +KPOPREAD Command: Retrieve an E-mail from the Server

HL6528RDx	
Test command Syntax **AT+KPOPREAD=?**	 Response **+KPOPREAD: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KPOPREAD=<session_id>, <index>**	 Response **CONNECT** **Dataflow with <EOF pattern> at the end** **OK** Error case **+CME ERROR: <err>** **NO CARRIER** Parameters **<session_id>** POP3 session index **<index>** Numeric type that indicates the index of the mail to read
Reference Sierra Wireless Proprietary	Notes • If the asked mail ID is wrong, the command returns the associated error code and maintains connection with the server. • If an error is detected during mail transfer, the connection with the server is closed. • Hardware flow control (**AT&K3**) is required for the serial link. • Refer to **AT&D** for the behavior of DTR drop. • Using **+++** can abort sending data, and **ATO[n]** can be used to return.

18.13. SMTP Client Specific Commands

18.13.1. +KSMTPCLEAR Command: Clear E-Mail Parameters

HL6528RDx	
Test command Syntax **AT+KSMTPCLEAR=?**	 Response **+KSMTPCLEAR: (**list of possible **<session_id>**s**)** **OK**

HL6528RDx	
Write command Syntax **AT+KSMTPDEL= <session_id>**	 Response **OK** Parameter **<session_id>** SMTP session index
Reference Sierra Wireless Proprietary	Notes This command clears the email addresses and subject line defined by **+KSMTPTO** and **+KSMTPSUBJECT**.

18.13.2. +KSMTPCNX Command: Start an SMTP Connection

HL6528RDx	
Test command Syntax **AT+KSMTPCNX=?**	 Response **+KSMTPCNX: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KSMTPCNX= <session_id>**	 Response **OK** **+CME ERROR: <err>** Parameter **<session_id>** SMTP session index
Reference Sierra Wireless Proprietary	Notes The connection may get disconnected from the server due to inactivity. Consult the server administrator for timeout values.

18.13.3. +KSMTPDEL Command: Delete an SMTP Connection Configuration

HL6528RDx	
Test command Syntax **AT+KSMTPDEL=?**	 Response **+KSMTPDEL: (**list of possible **<session_id>**s**)** **OK**

HL6528RDx	
Write command Syntax **AT+KSMTPDEL= <session_id>**	Response **OK** Parameter **<session_id>** SMTP session index
Reference Sierra Wireless Proprietary	Notes This command deletes an SMTP connection configuration.

18.13.4. +KSMTPPARAM Command: SMTP Connection Configuration

HL6528RDx	
Test command Syntax **AT+ KSMTPPARAM=?**	Response **+KSMTPPARAM:<cnx_cnf>,<server>,<port>,<secure>,<sender>,<login>, <password>,<startcon>** **OK** Error case **+CME ERROR: <err>**
Read command Syntax **AT+ KSMTPPARAM?**	Response **+KSMTPPARAM:<session_id>,<cnx_cnf>,<server>,<port>,<secure>,<sender>, <login>,<password>,<secure>,<crypto_profile>,<started>** Error case **+CME ERROR: <err>**
Write command Syntax **AT+ KSMTPPARAM =<cnx_cnf>, <server>,<port>, <secure>, <sender>,<login>, <password>, <startcon>**	Response **+KSMTPPARAM: <session_id>** **OK** Error case **+CME ERROR: <err>** Parameters **<cnx cnf>** 1 – 5 PDP context configuration; a numeric parameter which specifies a particular PDP context configuration (see **+KCNXCFG**) **<server>** IP address string or explicit name of the remote server **<port>** 1 – 65535 Port

HL6528RDx	
	<secure> Secured connection to the server 0 Use plain TCP connection 1 Use TLS connection **<sender>** String type that indicates the sender's email address **<login>** String type that indicates the username to be used in the SMTP connection **<password>** String type that indicates the password to be used in the the SMTP connection **<startcon>** Specifies whether to start the SMTP connection immediately or not 0 Start the SMTP connection later using **+KSMTPCNX** 1 Start the SMTP connection immediately **<session_id>** SMTP session index
Reference	Sierra Wireless Proprietary

18.13.5. +KSMTPSUBJECT Command: Specify E-Mail Subject

HL6528RDx	
Test command Syntax **AT+ KSMTPSUBJECT =?**	Response **+KSMTPSUBJECT:<session_id>,<subject>** **OK**
Read command Syntax **AT+ KSMTPSUBJECT?**	Response **+KSMTPSUBJECT:<session_id>,<subject>[<CR><LF>** **…]** **OK**
Write command Syntax **AT+ KSMTPSUBJECT= <session_id>, <subject>**	Response **OK** Error case **+CME ERROR: <err>** Parameters **<session_id>** SMTP session index **<subject>** String type that specifies the outgoing email's subject. Maximum string length is 255.
Reference	Sierra Wireless Proprietary

18.13.6. +KSMTPTO Command: Specify E-Mail Recipient

HL6528RDx	
Test command Syntax **AT+KSMTPTO=?**	 Response **+KSMTPTO:<session_id>,<to1>[,<to2>[,<cc1>[,<cc2>]]]** **OK**
Read command Syntax **AT+KSMTPTO?**	 Response **+KSMTPTO:<session_id>,<to1>[,<to2>[,<cc1>[,<cc2>]]][<CR><LF>** **…]** **OK**
Write command Syntax **AT+KSMTPCNX=<session_id>,<to1>[,<to2>[,<cc1>[,<cc2>]]]**	 Response **OK** Error case **+CME ERROR: <err>** Parameters **<session_id>** SMTP session index **<to1>** String type that indicates the first receiver's email address. Maximum string length is 255 **<to2>** String type that indicates the second receiver's email address. Maximum string length is 255 **<cc1>** String type that indicates the first copy receiver's email address. Maximum string length is 255 **<cc2>** String type that indicates the second copy receiver's email address. Maximum string length is 255
Reference	Sierra Wireless Proprietary

18.13.7. +KSMTPUL Command: SMTP Connection Configuration

HL6528RDx	
Test command Syntax **AT+KSMTPUL=?**	 Response **+KSMTPUL:<session_id>,<mode>,<size>** **OK**

HL6528RDx	
Write command Syntax **AT+KSMTPUL=<session_id>[,<mode>[,<size>]]**	Response **CONNECT** (The ME waits for the data to be sent) **OK** Error case **+CME ERROR: <err>** **NO CARRIER** Parameters **<session_id>** SMTP session index **<mode>** Numeric type. Reserved for future use **<size>** Numeric type. Reserved for future use
Reference Sierra Wireless Proprietary	Notes • Hardware flow control (**AT&K3**) is required for the serial link. • The user can use <EOF pattern> to stop transfers. See **AT+KPATTERN**. • Refer to **AT&D** for the behavior of DTR drop. • Using **+++** can abort sending data, and **ATO[n]** can be used to return.

18.14. HTTP Client Specific Commands

18.14.1. +KHTTP_IND Notification: HTTP Status

HL6528RDx	
Unsolicited Notification	Response **+KHTTP_IND: <session_id>,<status>[,<data_len>,<st_code>,<st_reason>]** Parameters **<session_id>** HTTP session index **<status>** HTTP session status 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**) **<st_code>** HTTP response status code **<st_reason>** HTTP response status reason string
Reference	Sierra Wireless Proprietary

18.14.2. +KHTTPCFG Command: HTTP Connection Configuration

HL6528RDx	
Test command Syntax **AT+KHTTPCFG =?**	Response **+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**),<cipher_index>** **OK** Error case **+CME ERROR: <err>**
Read command Syntax **AT+KHTTPCFG?**	Response **+KHTTPCFG: <session_id>,<cnx cnf>,<http_server>,<http_port>,<http_version>, <login>,<password>,<started>,<cipher_index>** Error case **+CME ERROR: <err>**
Write command Syntax **AT+KHTTPCFG= [<cnx cnf>], <http_server> [,<http_port> [,<http_version> [,<login> [,<password>] [,<start>]]] [,<cipher_index>]]**	Response **+KHTTPCFG: <session_id>** **OK** Error case **+CME ERROR: <err>** Parameters **<cnx cnf>** 1 – 5 PDP context configuration. A numeric parameter which specifies a particular PDP context configuration (see **+KCNXCFG**) **<session_id>** HTTP session index **<http_server>** IP address string or explicit name of the remote server **<http_port>** 1 – 65535 HTTP port; 80 by default **<http_version>** 0 HTTP 1.1 1 HTTP 1.0 2 HTTP 1.1 over TLS (HTTPS) 3 HTTP 1.0 over TLS (HTTPS) **<login>** String type, indicates the username 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 0 Start the HTTP connection later using **+KHTTPCNX** 1 Start the HTTP connection immediately

HL6528RDx	
	<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 **<cipher_index>** Cipher suite profile index to use for a secured socket defined by **+KSSLCRYPTO**
Reference Sierra Wireless Proprietary	Notes • <http_port> and <http_server> define the port and the IP address of the remote server to connect to. • This command can be used before setting up **+KCNXCFG**. Note however that the latter is required to start the connection properly. • <cipher_index> is only shown in the read command when <http_version> is set to 2 or 3 (TLS enabled).

18.14.3. +KHTTPCLOSE Command: Close an HTTP Connection

HL6528RDx	
Test command Syntax **AT+ KHTTPCLOSE=?**	Response **+KHTTPCLOSE: (**list of possible **<session_id>**s**), (**list of possible **<keep_cfg>**s**)** **OK**
Write command Syntax **AT+ KHTTPCLOSE= <session_id> [,<keep_cfg>]**	Response **OK** Error case **+CME ERROR: <err>** Parameters **<session_id>** HTTP session index **<keep_cfg>** 0 Delete the session configuration 1 Keep the session configuration
Reference	Sierra Wireless Proprietary

18.14.4. +KHTTPCNX Command: Start the HTTP Connection

HL6528RDx	
Test command Syntax **AT+KTTPCNX=?**	 Response **+KHTTPCNX: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KHTTPCNX= <session_id>**	 Response **OK** Error case **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<http_notif>** HTTP connection failure cause 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
Reference Sierra Wireless Proprietary	Notes • 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**.

18.14.5. +KHTTPDEL Command: Delete a Configured HTTP Session

HL6528RDx	
Test command Syntax **AT+KHTTPDEL =?**	 Response **+KHTTPDEL: (**list of possible **<session_id>**s**)** **OK**

HL6528RDx	
Write command Syntax **AT+KHTTPDEL=<session_id>**	 Response **OK** **+CME ERROR: <err>** Parameter **<session_id>** HTTP session index
Reference Sierra Wireless Proprietary	Notes The HTTP session must be closed (using **+KHTTPCLOSE**) before using this command.

18.14.6. +KHTTPGET Command: Get HTTP Server Information

HL6528RDx	
Test command Syntax **AT+KHTTPGET=?**	 Response **+KHTTPGET: (**list of possible **<session_id>**s**),<request_uri>, (**list of possible **<show_resp>**s**)** **OK**
Write command Syntax **AT+KHTTPGET=<session_id>, <request_uri> [,<show_resp>]**	 Response **CONNECT** **…<EOF pattern>** **OK** Error case **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<request_uri>** Information URL to get during the HTTP connection **<http_notif>** HTTP connection failure cause 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

HL6528RDx	
	<show_resp> Indicates whether to show HTTP response and HTTP headers 0 Do not show response and headers 1 Show response and headers
Reference Sierra Wireless Proprietary	Notes • 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.

18.14.7. +KHTTPHEAD Command: Get HTTP Headers

HL6528RDx	
Test command Syntax **AT+KHTTPHEAD =?**	 Response **+KHTTPHEAD: (**list of possible **<session_id>**s**),<request_uri>** **OK**
Write command Syntax **AT+KHTTPHEAD =<session_id>, <request_uri>**	 Response **CONNECT** **…<EOF pattern>** **OK** Error case **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<request_uri>** Information URL to get during HTTP connection **<http_notif>** Refer to **+KHTTPGET**
Reference Sierra Wireless Proprietary	Notes • 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. • HTTP does not support DTR1.

18.14.8. +KHTTPHEADER Command: Set the HTTP Request Header

HL6528RDx	
Test command Syntax **AT+ KHTTPHEADER =?**	 Response **+KHTTPHEADER: (**list of possible **<session_id>**s**),<local_uri>** **OK**
Read command Syntax **AT+ KHTTPHEADER?**	 Response **+KHTTPHEADER: <session_id>,<count>** **[…]**
Write command Syntax **AT+ KHTTPHEADER= <session_id> [,<local_uri>]**	 Response **OK** Error case **+CME ERROR: <err>** Parameters **<session_id>** HTTP session index **<local_uri>** “<file name>”; this argument must be empty. It is reserved for compatibility of command syntax. Data will be input from serial link. **<count>** HTTP headers count
Reference Sierra Wireless Proprietary	Notes User must use <EOF pattern> to finish sending; then the module will return to command mode.

18.14.9. +KHTTPPOST Command: Send Data to HTTP Server

HL6528RDx	
Test command Syntax **AT+KHTTPPOST =?**	 Response **+KHTTPPOST: (**list of possible **<session_id>**s**),<local_uri>,<request_uri>,(**list of possible **<show_resp>**s**)** **OK**

HL6528RDx	
Write command Syntax **AT+KHTTPPOST = <session_id>, <local_uri>, <request_uri> [,<show_resp>]**	Response **CONNECT** **…<EOF pattern>** **OK** Error case **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<local_uri>** "<file name>"; this argument must be empty. It is reserved for compatibility of command syntax. Data will be input from serial link. **<request_uri>** Request data of the HTTP connection; string type **<http_notif>** Refer to **+KHTTPGET** **<show_resp>** Indicates whether to show HTTP response and HTTP headers 0 Do not show HTTP response and headers 1 Show HTTP response and headers
Reference Sierra Wireless Proprietary	Notes • It is highly recommended to configure the module for hardware flow control using the command **AT&K3** before using this command. • Upload can be ended (disconnected) by **+++** or DTR. • **ATO** is not available for this command.

18.15. HTTPS Client Specific Commands

18.15.1. +KHTTPS_IND Notification: HTTPS Status

HL6528RDx	
Unsolicited Notification	Response **+KHTTPS_IND: <session_id>,<status>[,<data_len>]** Parameters **<session_id>** HTTPS session index **<status>** HTTPS session status 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 **+KHTTPSPOST**)
Reference	Sierra Wireless Proprietary

18.15.2. +KHTTPSCFG Command: HTTPS Connection Configuration

HL6528RDx	
Test command Syntax **AT+KHTTPSCFG=?**	Response **+KHTTPSCFG: (**list of possible **<cnx_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**)** **OK**
Read command Syntax **AT+KHTTPSCFG?**	Response **+KHTTPSCFG: <session_id>,<cnx cnf>,<http_server>,<https_port>, <http_version>,<cipher suite>,<sec_level>,<login>,<password>,<started>** **OK**
Write command Syntax **AT+KHTTPSCFG=[<cnx cnf>,] <http_server> [,<https_port> [,<http_version> [,<cipher_suite> [,<sec_level> [,<login> [,<password>] [,<start>]]]]]]**	Response **+KHTTPCFG: <session_id>** **OK** Error case **+CME ERROR: <err>** Parameters **<cnx cnf>** 1 – 5 PDP context configuration. A numeric parameter which specifies a particular PDP context configuration (see **+KCNXCFG**) **<session_id>** HTTPS session index **<http_server>** IP address string or explicit name of the remote server **<https_port>** Numeric parameter (1-65535), 443 by default. **<http_version>** 0 HTTP 1.1 1 HTTP 1.0 **<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 (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>** 1 No authentication 2 Manage server authentication 3 Manage server and client authentication if requested by remote server

HL6528RDx	
	<login> String type that indicates the username to be used during the HTTPS connection **<password>** String type that 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** 1 Start the HTTPS connection immediately **<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
Reference Sierra Wireless Proprietary	Notes • <https_port> and <http_server> define the port and the IP address of the remote server to connect to. • The connection timeout for the HTTPS socket is about 9 seconds with 3 retransmissions with a 3-second delay. • For <sec_level>=2 or 3, certificates or private keys must be loaded from internal storage. See section 18.16 SSL Certificate Manager for more information. • Any certificates referenced in the HTTPS feature should be DER encoded. • Any private key referenced in the HTTPS feature should be DER- PKCS#8 encoded. • This command can be used before setting up **+KCNXCFG**. Note however that the latter is required to start the connection properly. • SSL version is TLS 1.2 by default; refer to the <ssl_ver> parameter of **+KIPOPT** for configuration. • +KSSLCRYPTO setting will affect the <cipher_suite> setting. To use the desired +KSSLCRYPTO setting, +KHTTPCFG with <http_version> set to 2 (HTTP 1.1 over TLS (HTTPS)) or 3 (HTTP 1.0 over TLS (HTTPS)) should be used instead.

18.15.3. +KHTTPSCLOSE Command: Close an HTTPS Connection

HL6528RDx	
Test command Syntax **AT+KHTTPSCLOSE=?**	Response **+KHTTPSCLOSE: (**list of possible **<session_id>**s**), (**list of possible **<keep_cfg>**s**)** **OK**

HL6528RDx	
Write command Syntax **AT+ KHTTPSCLOSE= <session_id> [,<keep_cfg>]**	Response **OK** Error case **+CME ERROR: <err>** Parameters **<session_id>** HTTPS session index **<keep_cfg>** Specifies whether to delete the session configuration after closing it or not 0 Delete the session configuration 1 Keep the session configuration

18.15.4. +KHTTPSCNX Command: Start HTTPS Connection

HL6528RDx	
Test command Syntax **AT+KHTTPSCNX =?**	Response **+KHTTPSCNX: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KHTTPSCNX =<session_id>**	Response **OK** **+CME ERROR: <err>** **+KHTTPS_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTPS session index **<http_notif>** 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
Reference Sierra Wireless Proprietary	Notes • This command is used to start the HTTPS connection created by **+KHTTPSCFG** with <start>=0. • **+KHTTPSGET**, **+KHTTPSHEAD** and **+KHTTPSPOST** automatically starts the connection if it has not been started using **+KHTTPSCNX**.

18.15.5. +KHTTPSDEL Command: Delete a Configured HTTPS Session

HL6528RDx	
Test command Syntax **AT+KHTTPSDEL=?**	 Response **+KHTTPSDEL: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KHTTPSDEL=<session_id>**	 Response **OK** **+CME ERROR: <err>** Parameter **<session_id>** HTTPS session index
Reference Sierra Wireless Proprietary	Notes The session must be closed (using **+KHTTPSCLOSE**) before using this command.

18.15.6. +KHTTPSGET Command: Perform HTTPS Get

HL6528RDx	
Test command Syntax **AT+KHTTPSGET=?**	 Response **+KHTTPSGET: (**list of possible **<session_id>**s**),<request_uri>,(**list of possible **<show_resp>**s**)** **OK**
Write command Syntax **AT+KHTTPSGET=<session_id>, <request_uri> [,<show_resp>]**	 Response **CONNECT** **…<EOF pattern>** **OK** Error case **NO CARRIER** **+CME ERROR: <err>** **+KHTTPS_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTPS session index **<request_uri>** String type that indicates the information URL to get during the HTTPS connection

HL6528RDx	
	<http_notif> Integer type that 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
Reference Sierra Wireless Proprietary	Notes 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.

18.15.7. +KHTTPSHEAD Command: Retrieve HTTPS Headers

HL6528RDx	
Test command Syntax **AT+ KHTTPSHEAD=?**	 Response **+KHTTPSHEAD: (**list of possible **<session_id>**s**),<request_uri>** **OK**
Write command Syntax **AT+ KHTTPSHEAD= <session_id>, <request_uri>**	 Response **CONNECT** **…<EOF pattern>** **OK** Error case **NO CARRIER** **+CME ERROR: <err>** **+KHTTPS_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTPS session index **<request_uri>** String type that indicates the information URL to get during the HTTPS connection

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • 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. • <session_id> is always 0. • HTTPS does not support ATO.

18.15.8. +KHTTPSHEADER Command: Set the HTTPS Request Header

HL6528RDx	
Test command Syntax **AT+ KHTTPSHEADER =?**	Response **+KHTTPSHEADER: (**list of possible **<session_id>**s**), <local_uri>** **OK**
Read command Syntax **AT+ KHTTPSHEADER ?**	Response **+KHTTPSHEADER: <session_id>,<count>** **[…]**
Write command Syntax **AT+ KHTTPSHEADER =<session_id> [,<local_uri>]**	Response **OK** Error case **+CME ERROR: <err>** Parameters **<session_id>** HTTPS session index **<local_uri>** This parameter must be empty. It is reserved for compatibility of command syntax. **<count>** HTTPS header count
Reference Sierra Wireless Proprietary	Notes The user must use <EOF pattern> to finish sending. The module then returns to command mode.

18.15.9. +KHTTPSPOST Command: Perform HTTPS Post

HL6528RDx	
Test command Syntax **AT+ KHTTPSPOST=?**	Response **+KHTTPSPOST: (**list of possible **<session_id>**s**),<local_uri>,<request_uri>,(**list of possible **<show_resp>**s**)** **OK**
Write command Syntax **AT+ KHTTPSPOST= <session_id>, <local_uri>, <request_uri> [,<show_resp>]**	Response **CONNECT** **…<EOF pattern>** **OK** Error case **NO CARRIER** **+CME ERROR: <err>** **+KHTTPS_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTPS session index **<local_uri>** This parameter must be empty. It is reserved for compatibility of command syntax. **<request_uri>** String type that indicates the request data of the HTTPS connection **<http_notif>** Refer to **+KHTTPSGET** **<show_resp>** Defines whether HTTPS response and HTTP headers are shown 0 Do not show HTTPS response and headers 1 Show HTTPS response and headers
Reference Sierra Wireless Proprietary	Notes • It is highly recommended to configure the module for hardware flow control using command **AT&K3** before using this command. • ATO is not available for this command.

18.16. SSL Certificate Manager

18.16.1. +KCERTDELETE Command: Delete Local Certificate from the Index

HL6528RDx	
Test command Syntax **AT+ KCERTDELETE =?**	Response **+KCERTDELETE: (**list of possible **<data_type>**s**),(**list of possible **<index>**s**)** **OK**
Read command Syntax **AT+ KCERTDELETE?**	Response **+KCERTDELETE:** **OK** Error case **+CME ERROR: <err>**
Write command Syntax **AT+ KCERTDELETE= <data_type> [,<index>]**	Response **OK** Error case **+CME ERROR: <err>** Parameters **<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 1 for GNSS SUPL If <data_type> = 1: 0 – 2 for HTTPS 3 – 5 for GNSS SUPL
Reference	Sierra Wireless Proprietary

18.16.2. +KCERTSTORE Command: Store Root CA and Local Certificates to File System

HL6528RDx	
Test command Syntax **AT+ KCERTSTORE=?**	Response **+KCERTSTORE:** (list of possible **<data_type>**s),(range of possible length of **<NbData>**), (list of possible **<index>**s) **OK**
Read command Syntax **AT+ KCERTSTORE?**	Response **+KCERTSTORE** **[root_cert,<index>,<NbData><CR><LF>** **<File_data><CR><LF>]** **[local_cert,<index>,<NbData><CR><LF>** **<File_data> <CR><LF>]** **[...]** **OK** Error case **+CME ERROR: <err>**
Write command Syntax **AT+ KCERTSTORE= <data_type> [,<NbData> [,<index>]]**	Response **CONNECT** **OK** Error case **+CME ERROR: <err>** Parameters **<data_type>** 0 Root certificate 1 Local certificate **<NbData>** 1 – 3000 Number of bytes to read/write **<index>** Stored root/local certificate index If a root or local certificate is already stored at the index, it will be overloaded Default value = 0 Value range: If <data_type> = 0: 0 for HTTPS 1 for GNSS SUPL If <data_type> = 1: 0 – 2 for HTTPS 3 – 5 for GNSS SUPL **<File_data>** File data in bytes

HL6528RDx	
Reference Sierra Wireless Proprietary	Notes • 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 by the DTR signal.

18.16.3. +KPRIVKDELETE Command: Delete Private Key from the Index

HL6528RDx	
Test command Syntax **AT+ KPRIVKDELETE =?**	Response **+KPRIVKDELETE: (**list of possible **<index>**es**)** **OK**
Write command Syntax **AT+ KPRIVKDELETE =<index>**	Response **OK** Error case **+CME ERROR: <err>** Parameter **<index>** Stored private key index Value range: 0 – 2 for HTTPS 3 – 5 for GNSS SUPL
Reference	Sierra Wireless Proprietary

18.16.4. +KPRIVKSTORE Command: Store Private Key Associated to a Local Certificate

HL6528RDx	
Test command Syntax **AT+ KPRIVKSTORE =?**	Response **+KPRIVKSTORE: (**list of possible **<index>**s**),(**range of possible length of **<NbData>)** **OK**

HL6528RDx	
Read command Syntax **AT+ KPRIVKSTORE?**	 Response **+KPRIVKSTORE** **private_key,<index>,<NbData><CR><LF>** **<File_data> <CR><LF>** **OK** Error case **+CME ERROR: <err>**
Write command Syntax **AT+ KPRIVKSTORE= <index> [,<NbData>]**	 Response **CONNECT** **OK** Error case **+CME ERROR: <err>** Parameters **<index>** Index of the stored local certificate associated to this private key. Value range: 0 – 2 for HTTPS 3 – 5 for GNSS SUPL **<NbData>** 1 – 3000 Number of bytes to read/write (mandatory for both reading and writing) **<File_data>** File data in bytes
Reference Sierra Wireless Proprietary	Notes If <NbData> is not given, the input should be terminated by +++ or by the DTR signal.

18.17. SSL Configuration

18.17.1. +KSSLCFG Command: SSL Configuration

HL6528RDx	
Test command Syntax **AT+KSSLCFG=?**	 Response **+KSSLCFG:<option id>,<option>** **OK**

HL6528RDx	
Read command Syntax **AT+KSSLCFG?**	 Response **+KSSLCFG:0,<TLS Version>** **+KSSLCFG:2,<Session Mode>** **OK**
Write command Syntax **AT+KSSLCFG=<option id>,<option>** If <option_id> = 0: **AT+KSSLCFG=<option_id>,<TLS Version>** If <option_id> = 1: **AT+KSSLCFG=<option_id>,<Random Seed>** If <option_id> = 2: **AT+KSSLCFG=<option_id>,<Session Mode>**	 Response **OK** Parameters **<option id>** 0 Specify a TLS version to be used for handshake 1 Setup Random Seed 2 Specify Session Mode **<TLS Version>** 0 Highest possible 1 TLS 1.0 2 TLS 1.1 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 (unsupported)
Reference Sierra Wireless Proprietary	Notes After starting a connection or running SSL Certificate write commands, <TLS Version> is fixed and cannot be changed until the module is rebooted.

18.17.2. +KSSLCRYPTO Command: Cipher Suite Configuration

HL6528RDx	
Test command Syntax **AT+ KSSLCRYPTO=?**	 Response **+KSSLCRYPTO: <profile_id>,<mkey_Algo>,<auth_algo>,<enc_algo>,<mac_algo>, <tls_ver>,<auth>,<tls_ver>,<auth>** **OK**
Read command Syntax **AT+ KSSLCRYPTO?**	 Response **+KSSLCRYPTO: <profile_id>,<mkey_algo>,<auth_algo>,<enc_algo>,<mac_algo>, <tls_ver>,<auth>** **[…]]**

HL6528RDx	
Write command Syntax **AT+ KSSLCRYPTO= <profile_id>, <mkey_Algo>, <auth_algo>, <enc_algo>, <mac_algo>, <tls_ver>,<auth>**	Response **OK** Parameters **<profile_id>** Index of a set of parameters for configuring one SSL profile **<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 2 TLS 1.1 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
Reference Sierra Wireless Proprietary	Notes Command setting is restricted to the following combinations of <mkey_algo>,<auth_algo>,<enc_algo>,<mac_algo>: • 1,1,8388,67 • 1,1,4,1 • 1,1,4,2 • 1,1,64,2 • 1,1,128,2 • 1,1,8192,64

19. Flash Commands

19.1. +KFSFILE Command: Flash File Operation Command

HL6528RDx	
Test command Syntax **AT+KFSFILE =?**	 Response **+KFSFILE: (0,1,2,3,4,5),(URI),(SIZE)** **OK**
Write command Syntax **AT+KFSFILE=<action>,<url>[,<NbData>]**	 Response **CONNECT** **OK** **+KFSFILE: <entity type> <name> <size>** **+KFSFILE: <size> bytes free** Parameters **<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) **<uri>** "/<directory name>/<file name>" (warning: the "/" is important) **<NbData>** Number of bytes to read/write (mandatory for writing) **<entity type>** F File D Directory **<name>** File name or directory name **<size>** File size or free size of the directory
Reference Sierra Wireless Proprietary	Notes • The space size shown is reserved for **+KFSFILE** only. • The user can abort the write operation using 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 • User can only use <data> and <ftp> directories. • CME error 20 will be reported if memory is full when writing.

HL6528RDx	
Examples	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** 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: 523264 bytes free** **OK** To list the information of root directory: **AT+KFSFILE=4,"/"** **+KFSFILE: <D> ftp 0** **+KFSFILE: <D> data 1024** **+KFSFILE: 523264 bytes free** **OK** 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**

20. Appendix

20.1. Error Codes

20.1.1. CME Error Codes

Table 2. CME Error Codes

<err>	Description
0	Phone failure
1	No connection to phone
2	Phone-adapter link reserved
3	Operation not allowed
4	Operation not supported
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

<err>	Description
45	Service provider personalization PUK required
46	Corporate personalization PIN required
47	Corporate personalization PUK required
50	Incorrect parameters
99	Resource limitation
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
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 25)
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

<err>	Description
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

20.1.2. CMS Error Codes

Table 3. CMS Error Codes

<err>	Description
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

<err>	Description
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
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

20.1.3. GPRS Error Codes

Table 4. GPRS Error Codes

<err>	Description
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)
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.

20.1.4. FTP Reply Codes

Table 5. FTP Reply Codes

FTP Reply Code	Description
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

FTP Reply Code	Description
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	Username 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
550	Requested action not taken. File unavailable (e.g., file not found, no access).

20.1.5. AVMS Error Codes

AVMS commands return `OK` when the command is correctly executed; and returns `+CME ERROR: 3` when:

- a parameter is out of range (except for APN, user and pwd)
- a requested action is not applicable to the session status

Other error codes used by AVMS commands are listed in the following table.

Table 6. AVMS Error Codes

<err> value	Description
3	A parameter is out of range; Device Services is not in a good state
24	<Apn>, <User> or <Pwd> is too long
650	General error
651	Communication error
652	Session in progress
654	RDMS services are in DEACTIVATED state
655	RDMS services are in PROHIBITED state (see +WDSG)
656	RDMS services are in TO BE PROVISIONED state. No NAP is available (neither in `+CGDCONT`)

20.1.6. CEER Error Codes

Table 7. CEER Error Codes

<cause>	<report>
0	No cause information available
1	Unassigned (unallocated) number
3	No route destination
6	Channel unacceptable
8	Operator determined barring
10	Call barred
11	Reserved
16	Normal call clearing
17	User busy
18	No user responding
19	User alerting, no answer
21	Call rejected
22	Number changed
25	Pre-emption
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
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 ACM max
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

<cause>	<report>
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
111	Protocol error, unspecified
112	Location area not allowed
127	Interworking, unspecified
128	Unknown

20.1.7. GNSS Error Codes

Table 8. SUPL Error Codes

Error Code	Error Name	Description
-1	GPS_SUPL_PDP_ACTIVATION_ERROR	SUPL PDP activation failed
-2	GPS_SUPL_TCP_DNS_RESOLVE_ERROR	Failed to resolve the SUPL domain name
-3	GPS_SUPL_TCP_CONNECTION_ERROR	SUPL TCP connection error

20.2. How to Use TCP Specific Commands

20.2.1. Client Mode

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+KTCPCFG=1,0,"www.google.com",80 **+KTCPCFG: 1** **OK**	Set IP address and port number Returns session ID
AT+KTCPCNX=1 **OK**	Initiate the connection

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** **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**	Send data with KPATTERN string at the end. e.g. “GET / HTTP/1.0 --EOF--Pattern--" DATA read +KTCP_DATA notification DATA read Close session 1 Delete session 1 No session is available

20.2.2. Server Mode

The following example emulates 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**	Hardware flow control activation Set GPRS parameters (APN, login, password) Set TCP listener and port number Returns session ID

AT+KTCPCNX=1 **OK**	Initiate the server
AT+KCGPADDR **+KCGPADDR: 0,"10.35.125.89"** **OK**	Get the IP address to initiate a connection request with a client
+KTCP_SRVREQ: 1,2	A client requests a connection (session ID 2)
AT+KTCPSND=2,15 **CONNECT** **…Date and time…** **OK**	DATA sent to the client read
+KTCP_SRVREQ: 1,3	Another client requests a connection (session ID 3) CHILD mode for session 3
+KTCP_NOTIF: 2, 4	Client (session 2) closes the connection
AT+KTCPSND=3,15 **CONNECT** **…Date and time…** **OK**	DATA sent to the client
AT+KTCPCLOSE=3,1 **OK**	Close client session 3 and then session 3 is deleted automatically (CHILD mode for session 3)
AT+KTCPCLOSE=1,1 **OK**	Close server: session 1
AT+KTCPDEL=1 **OK**	Delete session 1

20.2.3. Polling for the Status of a Socket

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+KTCPCFG=1,0,"www.google.com",80 **+KTCPCFG: 1** **OK**	Set TCP Server address and port number Returns the session ID
AT+KURCCFG="TCP",0 **OK**	Disable TCP unsolicited messages

AT+KTCPCNX=1 **OK**	Initiate the connection, use session 1
AT+KTCPSTAT=1 **+KTCPSTAT: 3,-1,0,0** **OK**	Poll the connection status Connection is UP
AT+KTCPSND=1,3000 **CONNECT** **…Data send…** **OK**	Send data on socket 1, we expect to send 3000 bytes but you can send less. You can send data after CONNECT To finish send the KPATTERN (EOF), you can define this with +KPATTERN command.
AT+KTCPSTAT=1 **+KTCPSTAT: 3,-1,1234,0** **OK**	Poll the connection status Connection is UP, there are 1234 bytes not yet sent
AT+KTCPSTAT=1 **+KTCPSTAT: 3,-1,100,0** **OK**	Poll the connection status Connection is UP, there are 100 bytes not yet sent
AT+KTCPSTAT=1 **+KTCPSTAT: 3,-1,0,0** **OK**	Poll the connection status Connection is UP, all bytes have been sent
AT+KTCPSTAT=1 **+KTCPSTAT: 3,-1,0,320** **OK**	Poll the connection status Connection is UP, 320 bytes are available for reading
AT+KTCPRCV=1,320 **CONNECT** **… a lot of data…** **--EOF--Pattern--** **OK**	Read 320 bytes on socket 1 Data are sent after CONNECT Receive KPATTERN
AT+KTCPCLOSE=1,1 **OK**	Close session 1
AT+KTCPDEL=1 **OK**	Delete session 1

20.2.4. End to End TCP Connection

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+KTCPCFG=1,0,"www.google.com",80 **+KTCPCFG: 1** **OK**	Set TCP Server address and port number Returns session ID
AT+KTCPSTART=1 **CONNECT** **…Data sent……Data received……Data sent…** **…Data sent……Data received……Data sent…**	Initiate the connection, use session 1 Message CONNECT: connection to server is established, you can send data
+++ **OK**	Use +++ to enter in command mode
ATO1 **CONNECT** **…Data sent……Data received……Data sent…** **…Data sent……Data received……Data sent…**	Use ATO<session_id> to switch back in data mode
OK	Toggle DTR (if AT&D1 or AT&D2 configuration) to enter in command mode
AT+KTCPCLOSE=1,1 **OK**	Use KTCPCLOSE to close the session
AT+KTCPDEL=1 **OK**	Delete the configured session

20.2.5. Error Case for End to End TCP Connection

AT+KTCPSTART=1 **NO CARRIER** **+KTCP_NOTIF: 1,<tcp_notif>**	Try to initiate the connection Connection fails, see the value of <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>**	Initiate the connection Exchange some data An error occurs during connection (network lost, server closed, etc.)

20.2.6. 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**.

20.2.6.1. <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**	<URC-ENDTCP-enable> is disabled
AT+KTCPCNX=1 **OK**	Connect to TCP server
AT+KTCPSND=1,10 **CONNECT** **OK**	Use command to send 10 bytes write to serial: 0123456789--EOF--Pattern-- The URC “+KTCP_ACK” is not displayed
AT+KTCPACKINFO=1 **+CME ERROR: operation not allowed**	Since <URC-ENDTCP-enable> is disabled, this returns error

20.2.6.2. <URC-ENDTCP-enable> is Enabled

AT+KCNXCFG=1,"GPRS","CMNET" **OK**	
AT+KTCPCFG=1,0,"202.170.131.76",2000,,,1 **+KTCPCFG: 1** **OK**	Set <URC-ENDTCP-enable> to 1, enable URC “+KTCP_ACK”
AT+KTCPCFG? **+KTCPCFG: 1,0,0,0,,"202.170.131.76",2000,,0,1** **OK**	<URC-ENDTCP-enable> is enabled

AT+KTCPCNX=1 **OK**	Connect to TCP server
AT+KTCPSND=1,10 **CONNECT** **OK**	Use command to receive those 10 bytes write to serial: 0123456789--EOF--Pattern--
….. **+KTCP_ACK: 1, 1**	Only after a short time, URC "+KTCP_ACK" tells us the latest TCP data arrived remote side
AT+KTCPACKINFO=1 **+KTCPACKINFO: 1, 1** **OK**	We can use this command to poll the status of the latest TCP data
AT+KTCPSND=1,1000 **CONNECT** **OK**	Use command to send 1000 bytes write to serial: 1000bytes and --EOF--Pattern--
…	URC "+KTCP_ACK" not got yet
AT+KTCPACKINFO=1 **+KTCPACKINFO: 1, 2** **OK**	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
… **+KTCP_ACK: 1, 0**	Since the "OK" of the latest "+KTCPSND", 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

20.3. How to Use FTP Specific Commands

20.3.1. 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** **F6E6E656374696F6E20746573742E--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**	Delete the file called "TestFile.txt" in ftp server
AT+KFTPCLOSE=0 **OK**	Then you can close the connection

20.3.2. "FTP Resume" Use Case

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	The result code indicates that the download met some problems, it may be due to control or data connection lost
Try to resume transfer as follows	
AT+KFTPRCV=0,,,"111111.txt",0,760	Already got 760 bytes totally, so set it as offset to resume transfer
bbbbbb……bbbbbbbbbend--EOF--Pattern--	Count the total data from serial link, it is 240
OK	This indicates that the download was successful
Combine the data from the two downloads to get the complete file “111111.txt”	
AT+KFTPRCV=0,,,"111111.txt",0,119111 **CONNECT** **--EOF--Pattern--**	Try to set an invalid offset
OK	Nothing can be got because server has no corresponding error code and it answers that transfer is finished

20.4. How to Use UDP Specific Commands

20.4.1. 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	Received notification that indicates the presence of 35 bytes in the socket
AT+KUDPRCV=1, 35 **CONNECT** **This is a simple UDP Protocol test** **-EOF--Pattern--** **OK**	Try to read 35 bytes from session 1
+KUDP_RCV: "82.234.17.52",32 **+KUDP_DATA: 1,35**	Received notification that indicates the presence of 35 bytes in the socket
AT+KUDPRCV=1, 16 **CONNECT** **This is a simple** **-EOF--Pattern--** **OK**	Same test but try to read 16 bytes from session 1
+KUDP_DATA_MISSED: 1,19	There are 19 unread bytes left and missed in the UDP socket
AT+KUDPCLOSE=1 **OK**	Close the UDP session definitely and at the same time session is deleted
AT+KUDPCFG? **OK**	No sessions are available now

20.4.2. Server Mode

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+KUDPCFG=1,1,3000	Set UDP listener (Port 3000). Initiate the server.
+KUDPCFG: 1 **OK**	Returns session ID
AT+KUDPCFG? **+KUDPCFG: 1,0,1,3000** **OK**	Check if the server is initiated

AT+KCGPADDR **+KCGPADDR: 0, "192.168.0.71"** **OK**	Get local IP address and let client know
+KUDP_DATA: 1,9	Data comes in from some client
AT+KUDPRCV=1,9 **CONNECT** **DATA TEST--EOF--Pattern--** **OK**	Receive data and display
+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 **CONNECT** **OK**	Send 18Bytes to a remote server(Port:3100) Some data with "-EOF--Pattern--" in the end
AT+KUDPCLOSE=1 **OK**	Close the UDP server and at the same time session is deleted
AT+KUDPCFG? **OK**	No sessions are available now

20.5. 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	Set the header of the request
CONNECT	Send HTTP data after “CONNECT”. Do not forget the PATTERN characters. For example: “Data flow --EOF--Pattern--"
Accept: text/html **lf-Modified-Since: Saturday, 15-January-2000 14:37:11 GMT** **OK**	
AT+KHTTPGET=0, "/index.html"	Get web page
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**	HTTP server response
AT+KHTTPHEAD=1, "/index.html"	Get the head of the web page
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**	HTTP server response
AT+KHTTPHEADER=1	Send the data to the HTTP server
CONNECT	
Accept: text/html **Context-Length: 64**	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.
OK	

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

20.6. Sleep Mode Management

Sleep mode allows the module to be placed in a state of low energy consumption. The module cannot receive any AT commands while in this mode.

20.6.1. Determining if the Module is in Sleep Mode

The CTS signal is inactive when the module is in sleep mode.

20.6.2. Sleep States

	+KSLEEP=0 (DTR Controls Sleep)		**+KSLEEP=1 (Auto Sleep)**	**+KSLEEP=2 (Sleep is Forbidden)**
	DTR is Active	**DTR is Inactive**		
USB is active (power on)	No sleep	No sleep	No sleep	No sleep
After module starts up	Sleep*	Sleep*	Sleep after at least 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 after at least 5s	No sleep

* DTR must be toggled from Inactive to Active to wake the module up.

Note: In all the sleep cases, the module will not sleep when there are other ongoing activities such as network searching/registering, SIM card reading etc. The module will sleep when there are no other pending activities.

20.6.3. Events that Wake the Module Up

	+KSLEEP=0 (DTR Controls Sleep)		**+KSLEEP=1 (Auto Sleep)**	**+KSLEEP=2 (Sleep is Forbidden)**
	DTR is Active	**DTR is Inactive**		
Any URC is sent (voice call ring, SMS, alarm, network, etc.)	No sleep CTS ON	Wake up, the URC is sent CTS OFF	Wake up, the URC is sent CTS ON	No sleep CTS ON

	+KSLEEP=0 (DTR Controls Sleep)		+KSLEEP=1 (Auto Sleep)	+KSLEEP=2 (Sleep is Forbidden)
Sent 0x00 character on the UART*	No sleep CTS ON	Sleep CTS OFF	Wake up CTS ON	No sleep CTS ON
Data is received on the AT channels (data call, TCP, UDP, etc.)	No sleep CTS ON	Sleep CTS OFF	Wake up CTS ON	No sleep CTS ON
Toggle RTS signal (inactive to active)	No sleep CTS ON	Sleep CTS OFF	Wake up CTS ON	No sleep CTS ON
Toggle DTR inactive to active	Wake up CTS ON	-	Wake up CTS ON	No sleep CTS ON
Toggle DTR active to inactive	-	Sleep CTS OFF	Sleep CTS OFF	No sleep CTS ON

* After 0x00, wait for 100ms before sending any AT command.

When using auto sleep mode (**AT+KSLEEP=1**) and hardware flow control (**AT&K3**), the only way to wake the module up is to toggle the RTS signal.

The module may not be woken up by sending the character “0x00” on the UART because the CTS signal is toggling ON and OFF, so it is blocked by flow control if it is OFF. Due to this limitation, **AT&K3** and **AT+KSLEEP=1** must not be used together.

20.6.4. Signal Behavior during Sleep Mode

20.6.4.1. GPIO Signals

GPIO signals configured with **+KSYNC** are still generated.

20.6.4.2. RI Signal

The RI signal state changes according to the **+KRIC** command.

20.6.4.3. DCD Signal

DCD is active when a data call (CSD call, GPRS/3G, data on MUX, TCP, FTP, UDP, etc.) is in progress even if the module is in sleep mode. After sending **+++**, the DCD becomes INACTIVE, (and become ACTIVE after **ATO** is sent if the data call is still active).

DCD is inactive if there is no data call at all.

20.6.4.4. CTS Signal

The CTS signal is always active when the module is not in sleep mode, and it is inactive when the module is in sleep mode.

20.6.4.5. DSR Signal

The DSR signal is always active when the module is powered on.

20.6.4.6. 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.

20.7. 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 17 Location Service Commands.

20.7.1. 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, I^2C, or CMUX virtual port), to configure the NMEA rate and to select the NMEA sentences
- Output the PVT sentences on a specified port (UART, I^2C, 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.

20.7.2. Start Location Service

20.7.2.1. 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 17 Location Service Commands.

20.7.2.2. 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.

20.7.3. Supported NMEA Sentences

The following table presents all supported NMEA sentences which are applicable to the HL6528RD-G and HL6528RD-G2.8V GNSS solution in both the single (GPS) and the multiple constellation (GNSS with GPS and GLONASS constellations) scenarios.

The following table uses the following indicators.

- 🟢 Fully supported
- 🟡 Partially supported or with specific behavior
- 🔴 Not supported

Table 9. Supported NMEA Sentences

Description	HL6528RD-G and HL6528RD-G2.8V
$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)	🟢

Description	HL6528RD-G and HL6528RD-G2.8V
$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)	●
$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 on the HL6528RD-G)	●

20.7.4. Capabilities and Restrictions

20.7.4.1. 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 HL6528RD-G and HL6528RD-G2.8V's GNSS receiver update takes place after the GNSS receiver is ON or after GNSS receiver is reset. ROM update will then occur after initial **AT+GPSSTART** sequence.

The startup time is < 2 seconds without GNSS receiver ROM update, and < 6 seconds with update.

20.7.4.2. 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 (warm, cold, and factory modes) are designed for test purposes.

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 and cold) 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.

The following table defines the **minimum** required data for each starting mode:

Table 10. Required Data for Each Starting Mode

Starting Mode	Broadcasted Ephemeris	Approximate Time and Position	Almanac	Calibration Data
AUTO	X	X	Updated	X
WARM TEST		X	Updated	X
COLD TEST			Updated	X

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.

Table 11. Starting Modes from Location Services Application State

Description	From GPS_OFF State	From GPS_RUNNING State
Supported start performances	AUTO COLD	AUTO WARM COLD

20.7.4.3. GNSS Data Management

GNSS data is required to improve the next GNSS start performance. GNSS data is 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.

Table 12. GNSS Data Resilience Status

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

Refer to section 20.7.5.1 State Machine for more information about state transitions.

20.7.4.4. Navigation Aiding

Navigation aiding is realized by Secure User Plan Location (SUPL) service. All SUPL configuration is done by using **+GPSSUPLCFG**.

SUPL improves the GPS TTFF by making an internet connection to a SUPL server for obtaining ephemeris. If the ephemeris is up to date, the location engine would not request for internet connection. This is usually the case for AUTO start mode.

By default, only “non-secure” SUPL is enabled and configured with the default SUPL URL = “supl.google.com”. To use non-secure SUPL, it is only required to configure the APN for activating PDP context.

To configure for secure SUPL connection, the Root CA of the SUPL certificate must be installed using **+KCERTSTORE** additionally. For some time-sensitive certificates with an expiry date, the real-time clock of the module must be correct, otherwise the certificate verification may fail due to expiry. The real-time clock can be configured using **+CCLK**. If the network supports NITZ, the automatic update of real-time clock can be enabled using **AT+CTZU=1**.

20.7.5. Location Services States

This section provides information of the Location Services states, their transitions and allowed AT commands for each state.

20.7.5.1. State Machine

The following figure details the diagram of states and state transitions in the Location Services application.

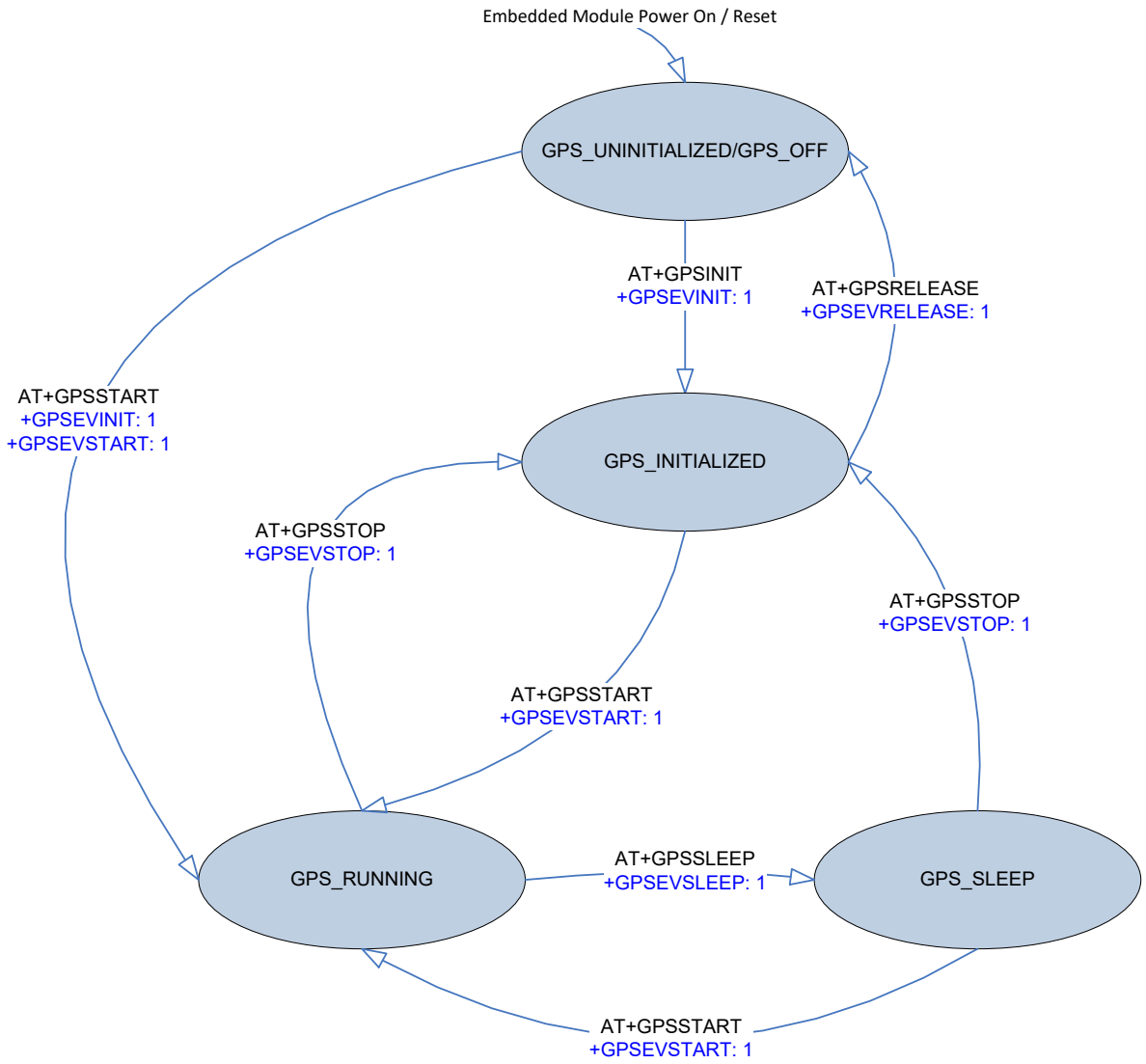

Figure 2. Location Services State Diagram

20.7.5.2. 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 13. 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+GPSAUTOINIT	X	X	X	X
AT+GPSINIT	X	-	-	-
AT+GPSCONF	-	X	X	X

Function	GPS_OFF/ GPS_UNINITIALIZED	GPS_INITIALIZED	GPS_RUNNING	GPS_SLEEP
AT+GPSVERS	X	X	X	X
AT+GPSNMEA	X	X	X	X
AT+GPSPVT	X	X	X	X
AT+GPSTTFF	-	X	X	X
AT+GPSSUPLCFG	*	*	*	*
AT+GPSRELEASE	-	X	-	-

* Refer to section 20.7.4.4 Navigation Aiding.

20.7.6. 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.

Other events are associated with +GPSSTART and +GPSSTOP AT Commands are listed below.

Table 14. Other Associated 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
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

Unsolicited Response	Description and Parameter Values
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
+GPSEVSUPL: <supl_event>	Provides information regarding the current status of the SUPL operation. **<supl_event>** SUPL event 1 SUPL connection was successful
+GPSEVSUPLERROR: <supl_error>	Provides information regarding an error that occurred while operating the SUPL service. **<supl_error>** Error number (see Table 8 SUPL Error Codes)

20.7.7. GNSS Aiding Example

Table 15. GNSS Aiding using SUPL

```
# 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
+GPSSUPLCFG: 2,"","","","0.0.0.0","0.0.0.0","0.0.0.0"
OK

# Input APN for the PDP bearer connection
AT+GPSSUPLCFG=2,”APN”
OK

# Enable TLS. Configure to use a SUPL server with TLS support
AT+GPSSUPLCFG=0,"supl.google.com",7275,2
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

# Install SUPL server certificate
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

# reboot once to ensure configurations are loaded by AT+GPSINIT
AT+CFUN=1,1
OK

AT+GPSINIT=41
OK
+GPSEVINIT: 1

AT+GPSSUPLCFG?
+GPSSUPLCFG: 0,"supl.google.com",7275,2,0
+GPSSUPLCFG: 1,0,2,1
+GPSSUPLCFG: 2,"APN","","","0.0.0.0","0.0.0.0","0.0.0.0"
OK

AT+GPSSTART=1
OK
+GPSEVSTART: 1
+GPSEVPOS: 0
+GPSEVPOS: 3
```

```
# Under open sky, 3D fix can be obtained in around 10s with aiding from SUPL
at+gpsttff?
+GPSTTFF: 10185,10185
OK

AT+GPSSTOP
OK
+GPSEVSTOP: 1
+GPSEVPOS: 0
```