AirPrime HL78xx

AT Commands Interface Guide

SIERRA WIRELESS®

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Document History

Version	Date	Updates
1.0	May 21, 2018	Creation
2.0	July 13, 2018	Added: • 2.5 &F Command: Restore Factory Settings • 2.6 &V Command: Display Current Configuration • 2.7 &W Command: Write Current Configuration • 2.8 Z Command: Reset and Restore User Configuration • 2.9 +IPR Command: Set Fixed Local/DTE Rate • 3.6 +KGSN Command: Request Product Serial Number and Software Version • 5.8 +KSREP Command: Mobile Start-up Reporting • 5.16 +CEDRXS Command: eDRX Setting • 5.21 +KGPIO Command: Hardware IO Control • 5.22 +KGPIOCFG Command: GPIO Configuration • 5.23 +KCELL Command: Cell Environment Information • 5.30 +KCARRIERCFG Command: Set Operator • 8.2 +CGACT Command: PDP Context Activate or Deactivate • 9.12 UDP Specific Commands • 14.1 Command Timeout and Other Information • 14.6 How to Use UDP Specific Commands
		Updated: • 2.4 &K Command: Flow Control Option • 3.5 +CGSN Command: Request Product Serial Number Identification (IMEI) • 3.7 +CSCS Command: Set TE Character Set • 4.3 +CMEE Command: Report Mobile Termination Error • 5.1 +CCLK Command: Real Time Clock • 5.4 +CFUN Command: Set Phone Functionality • 5.5 +CPIN Command: Enter Pin • 5.10 +CCHO Command: Open Logical Channel • 5.11 +CCHC Command: Close Logical Channel • 5.12 +CRSM Command: Restricted SIM Access • 5.14 +CTZR Command: Time Zone Reporting • 6.1 +CLCK Command: Facility Lock • 6.2 +CPWD Command: Change Password • 6.4 +COPS Command: Operator Selection • 6.5 +CPOL Command: Preferred PLMN List • 6.6 +CREG Command: Network Registration • 6.7 +CPLS Command: Select Preferred PLMN List • 6.8 +CEREG Command: EPS Network Registration Status • 7.9 +CNMI Command: New Message Indication • 7.11 +CSMP Command: Set Text Mode Parameters • 8.9 +CGEREP Command: Packet Domain Event Reporting • 9.11.5 +KTCPCLOSE Command: Close Current TCP Operation • 14.2 Result Codes and Unsolicited Messages • 10 AVMS Commands

Version	Date	Updates
2.0	July 13, 2018	Deleted: • 1.2.3 Multiple AT Commands on the Same Command Line • 5.4 CMER Command: Mobile Equipment Event Reporting • 5.6 +CCID Command: Request SIM Card Identification
3.0	July 31, 2018	Added: • 2.10 &C Command: Set Data Carrier Detect (DCD) Function Mode • 2.11 &D Command: Set Data Terminal Ready (DTR) Function Mode • 2.12 &S Command: DSR Option • 2.13 &R Command: RTS/CTS Option • 2.15 S4 Command: Set Response Formatting Character • 3.11 +CMUX Command: Multiplexer • 3.12 +WPPP Command: PDP Context Authentication Configuration • 5.17 +CEDRXRDP Command: eDRX Read Dynamic Parameters • 5.24 +KSLEEP Command: Power Management Control • 5.25 +KRIC Command: Ring Indicator Control • 5.26 +CPOF Command: Power Off • 5.27 +CPWROFF Command: Power Off • 5.28 +WIMEI Command: IMEI Write and Read • 5.29 +KSYNC Command: Application Synchronization Signal • 8.7 +CGCONTRDP Command: PDP Context Read Dynamic Parameter • 8.8 +CGSCONTRDP Command: Secondary PDP Context Read Dynamic Parameter • 9.9 SSL Configuration • 9.10 SSL Certificate Manager • 9.11.9 +KTCP_IND Notification: TCP Status • 9.11.10 +KTCPSTART Command: Start a TCP Connection in Direct Data Flow • 10.1 +WDSC Command: Device Services Configuration
		Updated: • <cnx cfg> in 9 Protocol Specific Commands • 10.5 +WDSI Command: Device Services Indications
4.0	October 02, 2018	Added: • 1.4 SIM Application Toolkit • 4.1 D Command: Dial Number • 5.2 +CCID Command: Request SIM Card Identification
		Updated: • 2.5 &F Command: Restore Factory Settings • 2.6 &V Command: Display Current Configuration • 2.7 &W Command: Write Current Configuration • 3.6 +KGSN Command: Request Product Serial Number and Software Version • 5.14 +CTZR Command: Time Zone Reporting • 5.19 +KBNDCFG Command: Set Configured LTE Band(s) • 5.20 +KBND Command: Get Active LTE Band(s) • 5.21+KGPIO Command: Hardware IO Control • 5.22 +KGPIOCFG Command: GPIO Configuration • 5.23 +KCELL Command: Cell Environment Information

Version	Date	Updates
4.0	October 02, 2018	Updated: • 5.24 +KSLEEP Command: Power Management Control • 5.25 +KRIC Command: Ring Indicator Control • 5.29 +KSYNC Command: Application Synchronization Signal • 5.30 +KCARRIERCFG Command: Set Operator • 9.3 Session ID • 9.8.3 +KIPOPT Command: General Options Configuration • 9.9 SSL Configuration • 9.10.1 +KCERTSTORE Command: Store Root CA and Local Certificates to Internal Storage • 9.10.2 +KPRIVKSTORE Command: Store Private Key Associated to a Local Certificate • 10 AVMS Commands • Table 4 Command Timeout
4.1	October 03, 2018	Updated: • 1.4 SIM Application Toolkit • 10.1 +WDSC Command: Device Services Configuration
4.2	October 04, 2018	Updated 5.19 +KBNDCFG Command: Set Configured LTE Band(s)
5.0	October 29, 2018	Added: • 2.16 +IFC Command: DTE-DCE Local Flow Control • 3.13 +HWREV Command: Request Hardware Revision • 5.31 +KMON Command: Enable/Disable Monitor Mode
		Updated: • 2.9 +IPR Command: Set Fixed Local/DTE Rate • 3.1 I Command: Request Identification Information • 3.12 +WPPP Command: PDP Context Authentication Configuration • 5.1 +CCLK Command: Real Time Clock • 5.7 +CSQ Command: Signal Quality • 5.8 +KSREP Command: Mobile Start-up Reporting • 5.15 +CPSMS Command: Power Saving Mode Setting • 5.16 +CEDRXS Command: eDRX Setting • 5.17 +CEDRXRDP Command: eDRX Read Dynamic Parameters • 5.23 +KCELL Command: Cell Environment Information • 5.24 +KSLEEP Command: Power Management Control • 6.4 +COPS Command: Operator Selection • 6.8 +CEREG Command: EPS Network Registration Status • 8.11 +CGSMS Command: Select Service for MO SMS Messages • 9.11.1 +KTCPCFG Command: TCP Connection Configuration • 9.12.1 +KUDPCFG Command: UDP Connection Configuration • 10.6 +WDSR Command: Device Services Reply • 10.7 +WDSS Command: Device Services Session • Table 4 Command Timeout
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6.0	November 27, 2018	Added: • 5.32 +KSRAT Command: Set Radio Access Technology • 11 Test Commands

Version	Date	Updates
6.0	November 27, 2018	Updated: • 2.9 +IPR Command: Set Fixed Local/DTE Rate • 2.10 &C Command: Set Data Carrier Detect (DCD) Function Mode • 2.11 &D Command: Set Data Terminal Ready (DTR) Function Mode • 2.12 &S Command: DSR Option • 3.7 +CSCS Command: Set TE Character Set • 3.12 +WPPP Command: PDP Context Authentication Configuration • 4.2 +CEER Command: Extended Error Report • 5.4 +CFUN Command: Set Phone Functionality • 5.6 +CPAS Command: Phone Activity Status • 5.16 +CEDRXS Command: eDRX Setting • 5.18 +CESQ Command: Extended Signal Quality • 5.19 +KBNDCFG Command: Set Configured LTE Band(s) • 5.20 +KBND Command: Get Active LTE Band(s) • 5.24 +KSLEEP Command: Power Management Control • 5.30 +KCARRIERCFG Command: Set Operator • 6.4 +COPS Command: Operator Selection • 6.5 +CPOL Command: Preferred PLMN List • 6.6 +CREG Command: Network Registration • 6.8 +CEREG Command: EPS Network Registration Status • 9.4 Connection of PDP Contexts • 9.8.3 +KIPOPT Command: General Options Configuration • 9.9 SSL Configuration • 9.12.2 +KUDPRCV Command: Receive Data through a UDP Connection • Table 4 Command Timeout • 14.3.2 CEER Error Codes
		Deleted: • 6.3 CNUM Command: Subscriber Number • 7 Phone Book Management
6.1	December 04, 2018	Updated: • 5.16 +CEDRXS Command: eDRX Setting • 2.13 &R Command: RTS/CTS Option
7.0	February 28, 2019	Added: • 3.14 +KALTCFG: Set and Get Custom Configuration • 3.15 +KHWIOCFG: Enable and Disable IO Features • 5.33 +KNWSCANCFG Command: Configure Network Scan Policy • 5.34 +CRCES Command: Read Coverage Enhancement Status • 5.35 +KADC Command: Analog Digital Converter • 5.36 +WESHDOWN Command: Emergency Shutdown • 5.37 +KCELLMEAS Command: Request Network Coverage Information • 8.12 +CSODCP Command: Send Originating Data via the Control Plane • 8.13 +CRTDCP Command: Report Terminating Data via the Control Plane • 9.11.10 +KTCPSTAT Command: Get TCP Socket Status

Version	Date	Updates
7.0	February 28, 2019	Added: • 10.8 +WDSTPF Command: Device Services Third Party FOTA • 12 GNSS Commands • 13 NV Commands
		Updated: • 2.9 +IPR Command: Set Fixed Local/DTE Rate • 2.14 S2 Command: Set Character for the Escape Sequence (Data to Command Mode) • 3.1 I Command: Request Identification Information • 5.4 +CFUN Command: Set Phone Functionality • 5.16 +CEDRXS Command: eDRX Setting • 5.20 +KBND Command: Get Active LTE Band(s) • 5.21 +KGPIO Command: Hardware IO Control • 5.25 +KRIC Command: Ring Indicator Control • 5.26 +CPOF Command: Power Off • 5.27 +CPWROFF Command: Power Off • 5.30 +KCARRIERCFG Command: Set Operator • 5.31 +KMON Command: Enable/Disable Monitor Mode • 6.5 +CPOL Command: Preferred PLMN List • 7.2 +CMGD Command: Delete Message • 7.9 +CNMI Command: New Message Indication • 8.5 +CGDCONT Command: Define PDP Context • 9.7.6 +KCNXUP Command: Bring the PDP Connection Up • 9.8.2 +KURCCFG Command: Enable or Disable the URC from Protocol Commands • 9.8.3 +KIPOPT Command: General Options Configuration • 9.10.1 +KCERTSTORE Command: Store Root CA and Local Certificates to Internal Storage • 9.10.2 +KPRIVKSTORE Command: Store Private Key Associated to a Local Certificate • 9.11.2 +KTCPCNX Command: Start TCP Connection • 9.11.8 +KTCP_DATA Notification: Incoming Data through a TCP Connection • 9.12.1 +KUDPCFG Command: UDP Connection Configuration • 9.12.2 +KUDPRCV Command: Receive Data through a UDP Connection • 10.1 +WDSC Command: Device Services Configuration • 10.5 +WDSI Command: Device Services Indications • Table 4 Command Timeout • 14.6.1 Client Mode
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Version	Date	Updates
8.0	April 18, 2019	Added: • 5.38 +KSIMSEL Command: SIM Selection • 5.39 +KSIMDET Command: SIM Detection • 5.40 +KUSBCOMP Command: Enable/Disable USB Mode • 6.10 +CNUM Command: Subscriber Number • 9.13 HTTP Client Specific Commands • 9.14 FTP Client Specific Commands • 14.4 FTP Reply Codes • 14.7 Switch Data/Command Mode DTR +++ ATO Behavior Table
		Updated: • 3.12 +WPPP Command: PDP Context Authentication Configuration • 3.14 +KALTCFG: Set and Get Custom Configuration • 5.20 +KBND Command: Get Active LTE Band(s) • 5.23 +KCELL Command: Cell Environment Information • 5.29 +KSYNC Command: Application Synchronization Signal • 5.33 +KNWSCANCFG Command: Configure Network Scan Policy • 5.35 +KADC Command: Analog Digital Converter • 5.36 +WESHDOWN Command: Emergency Shutdown • 5.37 +KCELLMEAS Command: Request Network Coverage Information • 6.9 +CEMODE Command: UE Modes of Operation for EPS • 8.10 +CGPADDR Command: Show PDP Address • 9.3 Session ID • 9.8.1 +KPATTERN Command: Custom End of Data Pattern • 9.11.1 +KTCPCFG Command: TCP Connection Configuration • 10.8 +WDSTPF Command: Device Services Third Party FOTA • 12.3 +GNSSNMEA Command: Configure NMEA Frames Flow • 14.1 Command Timeout and Other Information
8.1	April 23, 2019	Updated 9.14.3 +KFTPRCV Command: Receive FTP Files
9.0	July 22, 2019	Updated: • 5.4 +CFUN Command: Set Phone Functionality • 5.30 +KCARRIERCFG Command: Set Operator • 10.8 +WDSTPF Command: Device Services Third Party FOTA • 14.1 Command Timeout and Other Information • 14.3.1 CME Error Codes
9.1	August 27, 2019	Added 5.41 +KTEMPMON Command: Temperature Monitor
		Updated Table 4 Command Timeout
9.2	September 11, 2019	Updated: • 5.41 +KTEMPMON Command: Temperature Monitor • 12.4 +GNSSCONF Command: Configure the Location Service and GNSS Receiver

Version	Date	Updates
9.3	September 18, 2019	Updated: • 3.14 +KALTCFG: Set and Get Custom Configuration • 3.15 +KHWIOCFG: Enable and Disable IO Features • 5.16 +CEDRXS Command: eDRX Setting • 5.25 +KRIC Command: Ring Indicator Control • 5.37 +KCELLMEAS Command: Request Network Coverage Information • 8.5 +CGDCONT Command: Define PDP Context • 9.7.1 +KCNXCFG Command: GPRS Connection Configuration
10	February 2020	Added: • 5.42 +KCIOTOPT Command: UE Network Capability Information Configuration
		Updated: • 3.14 +KALTCFG: Set and Get Custom Configuration • 3.15 +KHWIOCFG: Enable and Disable IO Features • 3.16 +WDSD Command: Device Services Local Download • 5.16 +CEDRXS Command: eDRX Setting • 5.23 +KCELL Command: Cell Environment Information • 5.25 +KRIC Command: Ring Indicator Control5.27 +CPWROFF Command: Power Off • 5.31 +KMON Command: Enable/Disable Monitor Mode • 5.32 +KSRAT Command: Set Radio Access Technology • 5.40 +KUSBCOMP Command: Enable/Disable USB Mode • 5.41 +KTEMPMON Command: Temperature Monitor • 6.6 +CREG Command: Network Registration • 8.2 +CGACT Command: PDP Context Activate or Deactivate • 9.11.1 +KTCPCFG Command: TCP Connection Configuration • 9.12.7 +KUDP_DATA Notification: Incoming Data through a UDP Connection • 9.14.1 +KFTPCFG Command: FTP Connection Configuration • 9.14.2 +KFTPCNX Command: Start FTP Connection • 9.14.5 +KFTPDEL Command: Delete FTP Files • 9.14.9 +KFTPLS Command: List File Size of a Specific File • 14.1 Command Timeout and Other Information Table 4 Command Timeout

Version	Date	Updates
11	April 17, 2020	Added: • 5.43 +KEDRXCFG Command: Configure eDRX • 8.14 +KNMPSD Command: No More PS Data Updated: • 5.1 +CCLK Command: Real Time Clock • 5.19 +KBNDCFG Command: Set Configured LTE Band(s) • 5.23 +KCELL Command: Cell Environment Information • 5.41 +KTEMPMON Command: Temperature Monitor • 7.9 +CNMI Command: New Message Indication • 9.9.1 +KSSLCRYPTO Command: Cipher Suite Configuration • 9.10.1 +KCERTSTORE Command: Store Root CA and Local Certificates to Internal Storage • 9.10.2 +KPRIVKSTORE Command: Store Private Key Associated to a Local Certificate • 9.10.3 +KCERTDELETE Command: Delete Local Certificate from the Index • 13.3 +NVBU Command: NV Backup Status and Control

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1. Introduction

This document presents the AT command set for the AirPrime HL78xx series of embedded modules.

1.1. Reference Configuration

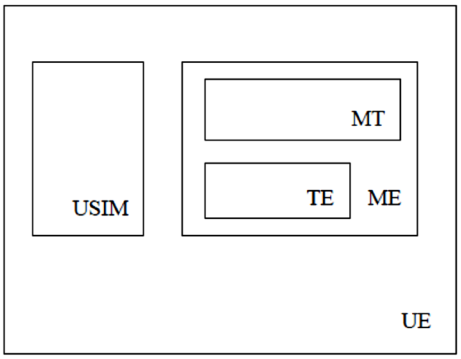


Figure 1. Reference Configuration

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.

1.2. 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 as listed in the table below.

Table 1. Types of Extended AT Commands

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

1.2.1. Parameters

In this document, 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.

1.2.2. Answers and Responses

There is always an answer sent by the TA to an AT command line (except the special case of a TA setup for no answer).

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

Classical messages	**OK** or **ERROR**
Extended Error message (see AT+CMEE)	**+CME ERROR: <n>**
	(See Appendix for the different values for **<n>**)
Numeric Mode	**<n>** with: <**n**> = 0 ⇔ OK or **<n>** is an error code

1.2.3. 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 Error message) appears. This avoids sending too many AT commands at a time without waiting for a response for each.

1.3. Unsolicited Result Codes (URCs)

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

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

1.4. SIM Application Toolkit

SIM Toolkit modes cannot be managed by AT commands. By default, SIM Toolkit is active and in silent mode.

1.5. Document Modification

The commands described in this document are only to be used for usual AT command 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 Error 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
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
DCS	Digital Cellular System
DCE	Data Circuit Equipment
DCD	Data Carrier Detect
DLC	Data Link Connection
DLCI	Data Link Connection Identifier
DM	Device Management
DNS	Domain Name System
DSR	Data Set Ready

Abbreviation	Definition
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
IN/OUT/IN_OUT	In, out or in/out
I/O	Input/Output
IP	Internet Protocol
LAC	Local Area Code
LED	Light Emitting Diode
LND	Last Number Dialed
LP	Language Preferred
LPI	Lines Per Inch
M	Mandatory
MCC	Mobile Country Code
ME	Mobile Equipment
MMI	Man Machine Interface
MNC	Mobile Network Code
MNP	Microcom Networking Protocol

Abbreviation	Definition
MO	Mobile Originated
MOC	Mobile Originated Call (outgoing call)
MS	Mobile Station
MSB	Most Significant Bit
MSISDN	Mobile Station International ISDN Number
MT	Mobile Terminal
MTC	Mobile Terminated Call (incoming call)
N.A.	Not applicable
NCK	Network Control Key
NITZ	Network Information and Time Zone
NSCK	Network Subset Control Key
NTC	Negative Temperature Coefficient
N.U.	Not used
O	Optional
OA	Outgoing Access
OPL	Operator PLMN List
OS	Operating System
OTA	Over the Air
PAD	Portable Application Description
PAP	Password Authentication Protocol
PC	Personal Computer
PCCP	PC character set Code Page
PCK	Personalization Control Key
PCL	Power Control Level
PCM	Protection Circuit Module
PCN	Personal Communication Network
PCS 1900	Personal Communication Service
PDP	Packet Data Protocol
PDU	Protocol Description Unit
PIN	Personal Identification Number
PLMN	Public Land Mobile Networks
PNN	PLMN Network Name
PPP	Point-to-Point Protocol/Peer to Peer
PSTN	Public Switched Telephone Network
PTS	Product Technical Specification
PUCT	Price per Unit and Currency Table
PUK	PIN Unlock Key
PWM	Pulse Width Modulation
QoS	Quality of Service
RAM	Random Access Memory
RDMS	Remote Device Management Services
RI	Ring Indicator
RIL	Radio Interface Layer
RLP	Radio Link Protocol

Abbreviation	Definition
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 AT Commands

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

HL78xx	
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 **ATO[n]**. • Line needs one second silence before and one second after (do not end with terminating character). • The "+" character may be changed with **ATS2**. • The +++ characters are not transmitted in the data flow.

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

HL78xx	
Test 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 – 200 Session ID
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.

2.3. E Command: Enable Echo Command

HL78xx	
Execute command Syntax **ATE[<value>]**	 Response **OK** or **+CME ERROR: <err>** Parameter **<value>** 0 Echo OFF 1 Echo ON
Notes	• This setting determines whether the TA echoes characters received from the TE in the command state. • <value> is set for all AT ports.

2.4. &K Command: Flow Control Option

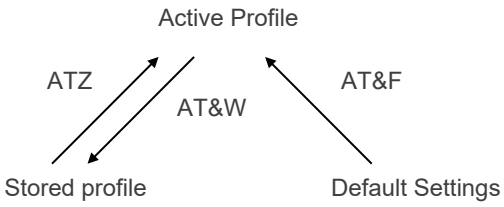
HL78xx	
Execute command Syntax **AT&K[<mode>]**	 Response **OK** Parameter **<mode>** 0 Disable all flow control 3 Enable RTS/CTS flow control
Reference Rockwell Rev4	Notes Sierra Wireless recommends the use of hardware flow control.

2.5. &F Command: Restore Factory Settings

HL78xx	
Execute command Syntax **AT&F[<value>]**	 Response **OK** Parameter **<value>** 0 or Omitted Restore parameters to factory settings

HL78xx	
Reference V.25Ter	Notes • See also **AT&V**. • Restore factory settings to active profile. • Default factory settings for HL78xx are: **E1 Q0 V1 X4 &C1 &D1 &R1 &S0 +IFC=2,2 &K3 +IPR=115200 +FCLASS0 S00:0 S01:0 S03:13 S04:10 S05:8 S07:255 S08:0 S10:1**
Examples	**AT&F** **OK** **AT&F0** **OK** **AT&F1** **ERROR**

2.6. &V Command: Display Current Configuration

HL78xx	
Execute command Syntax **AT&V[<value>]**	Response **ACTIVE PROFILE:** **<current configuration>** **STORED PROFILE 0:** **<user0 default configuration>** **STORED PROFILE 1:** **<user1 default configuration>** **OK** Parameter **<value>** 0 or Omitted All Profiles
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 manufactory, the product and the user setup. • **AT&V** lists **+IFC** and **S01** parameters which are directly editable. **+IFC** answer reflects the flow control parameters set by **AT&K**.
Example	**E1 Q0 V1 X4 &C1 &D1 &R1 &S0 +IFC=2,2 &K3 +IPR=115200 +FCLASS0 S00:0 S01:0 S03:13 S04:10 S05:8 S07:255 S08:0 S10:1** This command indicates the result of certain actions as shown below: 

2.7. &W Command: Write Current Configuration

HL78xx	
Execute command Syntax **AT&W[<value>]**	Response **OK** Parameter **<value>** 0 or Omitted — Save in STORED PROFILE 0 1 — Save in STORED PROFILE 1
Reference V.25Ter	Notes • This command saves the current configuration in a non-erasable place. • See also **AT&V**. Configuration saved: E — Echo Q — Set result code presentation mode V — Verbose X — Extended result code &C — DCD control &D — DTR behavior &R — RTS control &S — DSR control +IFC — Reflect Flow Control set by **AT&K** &K — Flow control +IPR — Set Fixed Local/DTE Rate FCLASS — FCLASS S0 — Set number of rings before automatically answering the call S3 — Write command line termination character S4 — Set response formatting character S5 — Write command line editing character S7 — Set number of seconds to wait for connection completion S8 — Comma dial modifier time S10 — Automatic disconnect delay
Example	**AT&W** // Save current configuration to Profile 0 **OK** **AT&W0** // Save current configuration to Profile 0 **OK** **AT&W1** // Save current configuration to Profile 1 **OK**

2.8. Z Command: Reset and Restore User Configuration

HL78xx	
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 See also AT&V

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

HL78xx	
Test command Syntax **AT+IPR=?**	 Response **+IPR: (**list of supported auto-detectable **<rate>**s**)[,(**list of fixed-only **<rate>**s**)]** **OK**
Read command Syntax **AT+IPR?**	 Response **+IPR: <rate>** **OK**
Write command Syntax **AT+IPR=<rate>**	 Response **OK** or **ERROR** Parameter **<rate>** Rate in bits per second 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 (default value), 230400, 460800, 921600
Reference ITU-T V.250	Notes • Configuration is saved in non-volatile memory using **AT&W**. • Once the **OK** response is received, the new <rate> is effective after about 2s.

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

HL78xx	
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 (data call ongoing)
Reference V.25ter	Notes See data stored by **&W** for default value.

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

HL78xx	
Execute command Syntax **AT&D<value>**	 Response **OK** Parameters **<value>** 0 TA ignores status on DTR 1 DTR drops 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.
Reference V.25ter	Notes See data stored by **&W** for default value.

2.12. &S Command: DSR Option

HL78xx	
Execute command Syntax **AT&S [<override>]**	 Response **OK** Parameter **<override>** 0 or Omitted DSR signal is always active 1 DSR signal is always inactive

HL78xx	
Reference V.25ter	Notes See data stored by **&W** for default value.

2.13. &R Command: RTS/CTS Option

HL78xx	
Execute command Syntax **AT&R<option>**	Response **OK** Parameter **<option>** 1 Only for compatibility. See **AT&K** for hardware handshaking.
Reference V.25ter	Notes See data stored by **&W** for default value.

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

HL78xx	
Read command Syntax **ATS2?**	Response **<n>** **OK**
Write command Syntax **ATS2=<n>**	Response **OK** Parameter **<n>** 0-255
Reference V.25ter	Notes • It is mandatory to keep the "+" default character (n=43) for protocol specific commands (TCP, UDP, FTP, HTTP, etc.) • Parameters are not saved in non-volatile memory.

2.15. S4 Command: Set Response Formatting Character

HL78xx	
Read command Syntax **ATS4?**	 Response **<n>** **OK**
Write command Syntax **ATS4=<n>**	 Response **OK** Parameter **<n>** 10 Response formatting character <LF>: line feed.
Reference V.25ter	Notes • <n> determines the character recognized by TA to terminate answer line. The value is set to 10 and cannot be changed. • See data stored by **&W** for default value.

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

HL78xx	
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>** Local flow control parameter 0 None 2 RTS (default value) **<DTE_by_DCE>** Local flow control parameter 0 None 2 CTS (default value)

HL78xx	
Reference Sierra Wireless Proprietary	Notes • Hardware flow control is only effective for AT UART. • Configuration is saved in non-volatile memory using **AT&W**. • The valid pairs of values for **AT+IFC** are '0,0' and '2,2' as only 'Auto RTS CTS - Hardware' flow control or no flow control are supported. • **+IFC** response reflects the flow control parameters set by the **AT&K** command.
Examples	**AT+IFC=?** **+IFC: (0,2),(0,2)** **OK** // Possible settings: **AT+IFC=0,0** **OK** **AT+IFC?** **+IFC: 0,0** **OK** **AT+IFC=2,2** **OK** **AT+IFC?** **+IFC: 2,2** **OK**

3. General AT Commands

3.1. I Command: Request Identification Information

HL78xx	
Execute command Syntax **ATI[<n>]**	Response // depends on <n> **OK** Parameters **<n>** 0 or Omitted Display model information (equivalent to +CGMM/+GMM) 3 Display revision identification (equivalent to +CGMR/+GMR) 8 Display modem software version 9 Display component details: <modem SW version> <Long revision identification> <Build Date and Time> IMEI-SV: <IMEI-SV version> Legato RTOS: <Legato RTOS version and binary date> SBUB: <SBUB> SBFW: <SBFW> RPuK: <RPuK> FPuK: <FPuK> RBUB: <RB> RBFW: <RB> <Component>: <Component version> <Component>: <Component version> <Component>: <Component version> … **<Long revision identification>** ASCII string **<Build Date and Time>** YYYY/MM/DD HH:MM:SS **<Legato RTOS version and binary date>** ASCII string **<IMEI-SV version>** 16 digits IMEISV (8 digits for TAC + 6 digits for SNR + 2 SVN digits) **<SBUB>** Secure boot activation status for the bootloader 0 Secure boot not activated 1 Secure boot activated **<SBFW>** Secure boot activation status for the firmware package 0 Secure boot not activated 1 Secure boot activated

HL78xx	
	<RPuK> CRC32 checksum of the root public key in OTP (empty if secure boot is not active for the bootloader), displayed in hexadecimal. **<FPuK>** CRC32 checksum of the firmware package public key (empty if secure boot is not active for the firmware package), displayed in hexadecimal. **<RBUB>** anti-rollback counter for the bootloader image, displayed in decimal **<RBFW>** anti-rollback counter for the modem package, displayed in decimal **<Component>** Embedded software component type; ASCII string "atSwi" "UBOOT" "Apps" "Modem Apps" "MAC" "PHY" "PMP" **<Component version>** Version of the software component; ASCII string
Reference V.25ter	Notes • **ATI3** is identical to **AT+GMR** and **AT+CGMR**. • **ATI** is identical to **AT+GMM** and **AT+CGMM**.

Examples	**ATI**
	HL7800 // When using an HL7800 module; model identification can be
	// customer dependent
	OK
	
	ATI0
	HL7800
	OK
	
	ATI3
	AHL7800.1.2.0.20171116
	OK
	
	ATI8
	HL7800.1.2.3
	OK
	
	// If secure boot is not activated on the device:
	ATI9
	HL7800.2.3.0
	AHL78xx.2.3.0.0.RK_02_01_01_00_18.20190207
	2019/02/07 09:54:54
	IMEI-SV: 0123456789012301
	Legato RTOS: 18.09.0.ALT1250-10-g919c693 2019/01/30 16:39:25
	atSwi: 08.00
	UBOOT: 01.03
	Apps: RKAPP_02_01_01_00_17__52a2801313924544b18fb0cd20d894d22b8a3140
	Modem Apps: ALT1250_02_01_01_00_17_MA
	MAC: ALT1250_02_01_01_00_17_FW

HL78xx	
	PHY: 12.50.202571 **PMP: 202576** **SBUB: 0** **SBFW: 0** **RPuK:** **FPuK:** **RBUB: 0** **RBFW: 0** **OK** // If secure boot is active on the device: **ATI9** **HL7800.2.3.0** **AHL78xx.2.3.0.0.RK_02_01_01_00_18.20190207** **2019/02/07 09:27:33** **IMEI-SV: 0123456789012301** **Legato RTOS: 18.09.0.ALT1250-10-g919c693 2019/01/30 16:39:25** **atSwi: 08.00** **UBOOT: 01.03** **Apps: RKAPP_02_01_01_00_17__52a2801313924544b18fb0cd20d894d22b8a3140** **Modem Apps: ALT1250_02_01_01_00_17_MA** **MAC: ALT1250_02_01_01_00_17_FW** **PHY: 12.50.202571** **PMP: 202576** **SBUB: 1** **SBFW: 1** **RPuK: 42BA7F7D** **FPuK: 4A14BD70** **RBUB: 8** **RBFW: 6** **OK**

3.2. +CGMI/+GMI Command: Request Manufacturer Identification

HL78xx	
Test command Syntax **AT+CGMI=?** **AT+GMI=?**	 Response **OK**
Execute command Syntax **AT+CGMI** **AT+GMI**	 Response **Sierra Wireless** **OK**

HL78xx	
Examples	**AT+CGMI** **Sierra Wireless** **OK** **AT+GMI** **Sierra Wireless** **OK**

3.3. +CGMM/+GMM Command: Request Model Identification

HL78xx	
Test command Syntax **AT+CGMM=?** **AT+GMM=?**	 Response **OK**
Execute command Syntax **AT+CGMM** **AT+GMM**	 Response **<model>** **OK** Parameter **<model>** Model indentification text; maximum of 2048 characters (including line terminators)
Notes	This command is identical to **ATI** and **ATI0**.
Examples	**AT+CGMM** **HL7800** //When using an HL7800 module **OK** **AT+GMM** **HL7800** //When using an HL7800 module **OK**

3.4. +CGMR/+GMR Command: Request Revision Identification

HL78xx	
Test command Syntax **AT+CGMR=?** **AT+GMR=?**	 Response **OK**

HL78xx	
Execute command Syntax **AT+CGMR** **AT+GMR**	 Response **<SW release>** **OK** Parameter **<SW release>** Software release
Notes	This command is identical to **ATI3**.
Examples	**AT+CGMR** **AHL7800.1.2.3.1.20171211** **OK** **AT+GMR** **AHL7800.1.2.3.1.20171211** **OK**

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

HL78xx	
Test command Syntax **AT+CGSN=?**	 Response **+CGSN: (**list of supported **<snt>**s**)** **OK**
Execute command Syntax **AT+CGSN** **[=<snt>]**	 Response When <snt>=0 (or omitted) and command is successful: **<sn>** **OK** When <snt>=1 and command is successful: **+CGSN: <imei>** **OK** When <snt>=2 and command is successful: **+CGSN: <imeisv>** **OK** When <snt>=3 and command is successful: **+CGSN: <svn>** **OK** or **+CME ERROR: <err>** Parameters **<snt>** 0 Returns the IMEI 1 Returns the IMEI 2 Returns the IMEISV 3 Returns the SVN

HL78xx	
	<sn>, <imei> International Mobile Station Equipment Identity **<imeisv>** International Mobile Station Equipment Identity and Software Version Number **<svn>** Software Version Number
Reference 27.007 Rev13	Notes • This command can work with or without a SIM. • See also **AT+KGSN**.

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

HL78xx	
Test command Syntax **AT+KGSN=?**	Response **+KGSN:** (list of supported **<number type>**s) **OK**
Execute 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: <FSN>** **OK** If **<number type>** = 4 **+KGSN: <CSN>** **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: <14 digits>-<Check digit> SV: <Software version>

HL78xx	
	<FSN> 14-digit Serial Number **<CSN>** Customer Serial Number (limited to 2048 characters)
Reference Sierra Wireless Proprietary	Notes This command is used to get the IMEI (International Mobile Equipment Identity) and the software revision.
Examples	**AT+KGSN=0** **+KGSN: 351578000023006** **OK** **AT+KGSN=1** **+KGSN: 3515780000230001** **OK** **AT+KGSN=2** **+KGSN: 35157800002300-6 SV:01** **OK** **AT+KGSN=3** **+KGSN: T5640400011101** **OK** **AT+KGSN=4** **+KGSN: 00000000000000** **OK**

3.7. +CSCS Command: Set TE Character Set

HL78xx	
Test command Syntax **AT+CSCS=?**	 Response **+CSCS:** (list of supported **<chset>**s) **OK**
Read command Syntax **AT+CSCS?**	 Response **+CSCS: <chset>** **OK** or **+CME ERROR: <err>**

HL78xx	
Write command Syntax **AT+CSCS=** **[<chset>]**	Response **OK** or **+CME ERROR: <err>** Parameter **<chset>** "UCS2" 16-bit universal multiple-octet coded character set (ISO/IEC 10646) "8859-1" ISO 8859 Latin 1-character set "IRA" International reference alphabet "HEX" Character strings only consist of hexadecimal numbers from 00 to FF. For example, “032FE6” equals three 8-bit characters with decimal values 3, 47 and 230. No converstions to the original MT character set shall be done "PCCP437" PC character set code page 437
Reference 27.007 Rev8	Notes • This command only affects SMS AT commands. • The value of <chset> is saved in non-volatile memory.

3.8. +CIMI Command: Request International Mobile Subscriber Identity

HL78xx	
Test command Syntax **AT+CIMI=?**	Response **OK**
Execute command Syntax **AT+CIMI**	Response **<IMSI>** **OK** or **+CME ERROR: <err>** Parameter **<IMSI>** International Mobile Subscriber Identity
Reference	27.007 Rev12

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

HL78xx	
Test command Syntax **AT+GSN=?**	 Response **OK**
Execute command Syntax **AT+GSN**	 Response **<IMEI>** (identification text for determination of the individual ME) **OK**
Reference 27.007 Rev13	Notes • This command can work with or without a SIM. • See also **AT+KGSN**.

3.10. +GCAP Command: Request Complete TA Capability List

HL78xx	
Execute command Syntax **AT+GCAP**	 Response **+GCAP: +CLTE-M1** **OK**
Reference	ITU-T V.250

3.11. +CMUX Command: Multiplexer

HL78xx	
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**
Read command Syntax **AT+CMUX?**	 Response **+CMUX: <mode>,<subset>,<port speed>,<N1>,<T1>,<N2>,<T2>,<T3>[,<k>]** **OK**

HL78xx

Write command

Syntax
AT+CMUX=
<mode>
[,[<subset>]
[,[<port_speed>]
[,[<N1>][,[<T1>]
[,[<N2>][,[<T2>]
[,[<T3>][,[<k>]
]]]]]]]]

Response
OK

or
+CME ERROR: <error>
OK

Parameters
<mode> Multiplexer Transparency Mechanism
0 Basic option
1 Advanced option (not supported)

<subset> 0 UIH frames used only
1 UI frames used only; currently not supported
2 I frames used only; currently not supported

<port_speed> Transmission rate
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
7 460 800 bit/s
8 1 Mbit/s

<N1> 1 – 1509 Maximum frame size; default value = 31 (64 if advanced option is used)

<T1> 1 – 255 Acknowledgement timer in units of ten milliseconds; default value = 10 (100 ms)

<N2> 0 – 100 Maximum number of re-transmissions; default value = 3. Note that currently, only range 0 – 5 is supported

<T2> 2 – 255 Response timer for the multiplexer control channel in units of ten milliseconds; default value = 30 (300 ms). Note that <T2> must be longer than <T1>.

<T3> 1 – 255 Wake up response timer in seconds; default value = 10. This parameter is currently not supported. In case of read command, 0 is returned.

<k> 1 – 7 Window size for Advanced operation with Error Recovery options; default value = 2. This parameter is currently not supported. In case of read command, 0 is returned.

Reference
[27.007] § 5.7

Notes
- This command enables the multiplexing protocol control channel as defined in 3GPP GSM27.010. It sets parameters for the Control Channel (DLC0). If optional parameters are left out, the default values are used except for <port speed>; the current baudrate for the communication channel will remain (the read command provides current baudrate). The final response code **OK** or **CME ERROR: <err>** is returned using the old interface speed; the parameters become active only after sending **OK**.

HL78xx	
	• The module handles the frame data step by step in CMUX mode. If there are any wrong data in the frame, e.g., wrong CRC, nothing will be returned to the terminal, and the module will wait for a valid frame data. • If **AT+CFUN** is entered with <rst>=1, all open CMUX channels will be closed and the module will reset. • There is no activity timeout to return to AT mode after entering MUX mode. • MUX DLC ports are not persistent over power cycles. After a power cycle, DLC ports need to be re-established. • When an established MT call is hanged up from the caller side, NO CARRIER will only be sent to the port on which the call was established (i.e. the port on which **ATD**/**ATA** was sent).

3.12. +WPPP Command: PDP Context Authentication Configuration

HL78xx	
Test command Syntax **AT+WPPP=?**	Response **+WPPP:** (list of supported **<Auth>**s),(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** or **+CME ERROR <err>** Parameters **<Auth>** Type of authentication supported 0 None 1 PAP 2 CHAP **<cid>** PDP context identifier used in **+CGDCONT**. If this parameter is omitted, the <Auth> setting applies to all PDP contexts. In this case, there must be at least one PDP context defined in **AT+CGDCONT**. If this parameter is present, the <Auth> setting applies to this PDP context. In both cases, the parameters are saved into non-volatile memory. **<username>** Login for the APN. String type, up to 64 characters **<password>** Password for the APN. String type, up to 64 characters

HL78xx	
Reference Sierra Wireless Proprietary Command	Notes • The write command can be used only if the module has no PDP context activated. To set the parameters, it is required to deactivate the context or switch the radio off before sending the write command and reactivate or switch the radio on after. • If credentials <username> and/or <password> are modified while the radio is off (**CFUN=0** or **CFUN=4**), the device must be reset to take them into account.
Examples	**AT+WPPP=?** **+WPPP: (0-2),(1-5)** **OK** **AT+WPPP=1,1,"myusername","mypassword"** **OK** **AT+WPPP?** **+WPPP: 1,1,"myusername","mypassword"** **OK**

3.13. +HWREV Command: Request Hardware Revision

HL78xx	
Test command Syntax **AT+HWREV=?**	 Response **OK**
Execute command Syntax **AT+HWREV**	 Response **+HWREV: <hardware revision>** **OK** Parameter **<hardware revision>** Module hardware revision represented by 2 digits, separated by a decimal point
Reference Sierra Wireless Proprietary Command	Note • This command gives the module's hardware revision. • This command is available even if SIM is not inserted.
Examples	**AT+HWREV=?** **OK** **AT+HWREV** **+HWREV: 1.0** **OK**

3.14. +KALTCFG: Set and Get Custom Configuration

HL78xx	
Test command Syntax **AT+KALTCFG=?**	 Response **+KALTCFG:** (list of supported **<mode>**s),(list of supported **<param>**s) **OK**
Write command Syntax **AT+KALTCFG=<mode>,<param>[,<value>]**	 Response **OK** or **+CME ERROR: <err>** Parameters **<mode>** 0 Set configuration 1 Get configuration **<param>** "RRC_INACTIVITY_TIMER" Inactivity timer for RRC state mismatch recovery "PS_DEV_MOB_TYPE" Configure optimizations for mobility purpose **<value>** Value when <param> = "RRC_INACTIVITY_TIMER": 0 – 10800 (timer in seconds). Default – 35. Value when <param> = "PS_DEV_MOB_TYPE": 1 Mobile (default) 2 Static
Reference Sierra Wireless Proprietary	Notes • <value> is not relevant when <mode>=1. • **Important:** When <param> = "RRC_INACTIVITY_TIMER", the value on the device side must be longer than the inactivity timer running on the network side. • "RRC_INACTIVITY_TIMER" value is persistent after reset and Firmware upgrade. • "PS_DEV_MOB_TYPE" value is persistent after reset and Firmware upgrade.

Examples	// Set parameter RRC_INACTIVITY_TIMER to default value (35 seconds)
	AT+KALTCFG=0,"RRC_INACTIVITY_TIMER"
	OK
	
	// Set parameter RRC_INACTIVITY_TIMER to 15 seconds
	AT+KALTCFG=0,"RRC_INACTIVITY_TIMER",15
	OK
	
	// Get value of RRC_INACTIVITY_TIMER
	AT+KALTCFG=1,"RRC_INACTIVITY_TIMER"
	+KALTCFG: 15
	OK
	
	// Set parameter PS_DEV_MOB_TYPE to default value (mobile)
	AT+KALTCFG=0,"PS_DEV_MOB_TYPE"
	OK

HL78xx	

	// Get value of PS_DEV_MOB_TYPE
	AT+KALTCFG=1,"PS_DEV_MOB_TYPE"
	+KALTCFG: 1
	OK
	
	// Set parameter PS_DEV_MOB_TYPE to static value
	AT+KALTCFG=0,"PS_DEV_MOB_TYPE",2
	OK

3.15. +KHWIOCFG: Enable and Disable IO Features

HL78xx	
Test command Syntax **AT+KHWIOCFG=?**	Response **+KHWIOCFG:** (list of supported **<featureID>**s),(list of supported **<mode>**s) **+KHWIOCFG:** (list of supported **<featureID>**s),(list of supported **<mode>**s),(list of supported **<IO>**s) **OK**
Read command Syntax **AT+KHWIOCFG?**	Response **+ KHWIOCFG: <featureID>,<mode>** **[…]** **+ KHWIOCFG: 3,<mode>,<IO>** **OK**
Write command Syntax **AT+KHWIOCFG=<featureID>, <mode> [,<IO>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<featureID>** 0 Power On button 1 32kHz clock output 2 26MHz clock output 3 Low power mode monitoring 4 External RF voltage control 5 TX_ON indicator **<mode>** 0 Disabled (default) 1 Enabled **<IO>** 6 GPIO6 reserved for low power monitoring (cannot be changed) 8 GPIO8 reserved for external RF voltage control (cannot be changed) Other IOs are reserved.

HL78xx	
Reference Sierra Wireless Proprietary	Notes • This command can be issued without a SIM card inserted. • <IO> is only relevant for low power mode monitoring (<featureID>=3) and external RF voltage control (<featureId>=4). • When 32kHz and/or 26MHz feature is enabled: ▪ The 32kHz and 26MHz features allow generating 32 kHz and/or 26 MHz signals on the module's output clock pins. ▪ Parameters are saved in non-volatile memory and reloaded at startup. • When the Power On feature is enabled: ▪ If the power button is in the Off position at startup, the module will be in Off mode. As soon as the power button is switched to the On position, the module boots normally. ▪ If **AT+CPOF** is executed and the power button is in the On position, the module returns **OK** and will only go in Off mode when the power button is switched to the Off position. • When Low Power Mode Monitoring feature is enabled: ▪ GPIO6 is the only I/O pin that is used for this feature. ▪ GPIO6 cannot be used by **AT+KGPIOCFG** or **AT+KGPIO** commands. ▪ GPIO6 is pulled low if the module is: ▪ Configured in hibernate or lite hibernate mode, and ▪ eDRX mode has been configured and successfully negotiated, and ▪ The application processor is ready to enter Low Power Mode. GPIO6 will be set high when the module wakes up. (Note that tracking area updates (TAUs) will not wake the module from sleep mode.) ▪ If **AT+CEDRXS** is used to update the eDRX parameters, the module must be rebooted for the low power mode monitoring feature to behave as expected. • When the External RF Voltage Control feature is enabled: ▪ GPIO8 is the only I/O pin that is used for this feature. ▪ GPIO8 is dedicated to output an active high signal during the period from ~400 µs before the Rx or Tx window to ~400 µs after the Rx or Tx window to enable control to an external DCDC for VBATT RF. Otherwise, when this feature is disabled, GPIO8 can be used as a regular GPIO. ▪ The module must be reset for changes to take effect after the mode of this feature is changed. • When the TX_ON indicator feature is enabled: ▪ TX_ON is dedicated to output an active high signal during the period from ~30 µs before the Tx window to the end of the Tx window. ▪ The module must be reset for changes to take effect after the mode of this feature is changed. • Configuration is saved in non-volatile memory and is therefore still effective after a power cycle.
Examples	**at+khwiocfg?** **+KHWIOCFG: 0,1** **+KHWIOCFG: 1,1** **+KHWIOCFG: 2,0** **+KHWIOCFG: 3,0,6** **+KHWIOCFG: 4,1,8** **+KHWIOCFG: 5,0** **OK**

3.16. +WDSD Command: Device Services Local Download

HL78xx	
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>** 1 – <maximum size> Package size in bytes
Reference Sierra Wireless Proprietary	Notes • This command is available when the module has finished its initialization. • The response to **AT+WDSD=<Size>** is the <NACK> character when the device is ready to receive data using the 1K-Xmodem or 128-Xmodem protocol. • No reset is made during the package download. • A timeout will happen (and a **+CME ERROR: 3** is returned) if no data is sent to the device in 5 minutes. • When +WDSD completes (all data is received by the module), a **+WDSI: 3** notification will be received requesting a user agreement to install the package. The only supported +WDSR reply is **AT+WDSR=4** (accept the install) – installs cannot be delayed. • The **+WDSR** option 5 (Delay the Install) does not apply to this command.
Examples	**AT+WDSD=?** **+WDSD: (1-24643584)** **OK** **AT+WDSD=1024** //download a 1kBytes package **<NACK>** //the device is ready to receive data //send data **OK** //All data are well received by the module **+WDSI: 3** //A package is ready to install (see **+WDSI** and **+WDSR**) **AT+WDSR=4** //Install the package

4. Call Control Commands

4.1. D Command: Dial Number

HL78xx	
Test command Syntax **ATD=?**	 Response **1 2 3 4 5 6 7 8 9 0 * # + A B C D P T W , @ !** **OK**
Read command Syntax **ATD?**	 Response **1 2 3 4 5 6 7 8 9 0 * # + A B C D P T W , @ !** **OK**
Execute command Syntax **ATD[<n>]**	 Response **OK** If successfully connected **CONNECT** Connection has been established **RING** The DCE has detected an incoming call signal from the network **NO CARRIER** The connection cannot be established **BUSY** Engaged (busy) signal detected **NO ANSWER** If no hang up is detected after a fixed network timeout **CONNECT <data rate>** Same as CONNECT but includes the data rate **RING CTM** The MS has detected an incoming CTM call signal from the network; this code is proprietary **CONNECT FAX** Same as CONNECT but includes the indication related to a fax call Parameter **<n>** String of dialing digits and optionally V.25ter modifiers (dialing digits): 0-9, * , #, +, A, B, C, D, P, T, W, ,, @, ! (maximum length: 20 digits)
Reference V.25Ter	Notes • This command may generally be aborted when receiving an **ATH** command during execution. • Response **OK** may arrive just after the **ATD** command or after the call is active (see **AT+COLP**). • <n> is ignored when it is set to ",", "T", "!", "W" or "@" • When an established MT call is hanged up from the caller side, NO CARRIER will only be sent to the port on which the call was established (i.e. the port on which **ATD** was sent).
Examples	**ATD*99***3#** **CONNECT** **~ÿ}#À!}!}!} }4}"}&} } } } }%}&R}8}0D}'}"}(}"ná~~ÿ}#À!}!}!} }4}"}&} } } } }%}&R}8}0D}'}"}(}"ná~~ÿ}#À!}!}!} }4}"}&} } } } }%}&R}8}0D}'}"}(}"ná~~ÿ}#À!}!}!} }4}"}&} } } } }%}&R}8}0D}'}"}(}"ná~~ÿ}#À!}!}!} }4}"}&} } } } }%}&R}8}0D}'}"}(}"ná~~ÿ}#À!}!}!} }4}"}&} } } } }%}&R}8}0D}'}"}(}"ná~~ÿ}#À!}!}!} }4}"}&} } } } }%}&R}8}0D}'}"}(}"ná~~ÿ}#À!}!}!} }4}"}&} } } } }%}&R}8}0D}'}"}(}"ná~~ÿ}#À!}!}!} }4}"}&} } } } }%}&R}8}0D}'}"}(}"ná~** **NO CARRIER** **ATD=?**

HL78xx	
	1 2 3 4 5 6 7 8 9 0 * # + A B C D P T W , @ ! **OK**

4.2. +CEER Command: Extended Error Report

HL78xx	
Test command Syntax **AT+CEER=?**	 Response **OK**
Write command Syntax **AT+CEER**	 Response **+CEER: <report>** **OK** Parameter **<report>** Error information given by the network in text format. Empty if no report is available. Possible <report> values are listed in 14.3.2 CEER Error Codes.
Reference	27.007 Rev12

4.3. +CMEE Command: Report Mobile Termination Error

HL78xx	
Test command Syntax **AT+CMEE=?**	 Response **+CMEE:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CMEE?**	 Response **+CMEE: <n>** **OK**
Execute 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
Reference	27.007 Rev12

5. Mobile Equipment Control and Status Commands

5.1. +CCLK Command: Real Time Clock

HL78xx	
Test command Syntax **AT+CCLK=?**	 Response **OK**
Read command Syntax **AT+CCLK?**	 Response **+CCLK: <time>** or **+CME ERROR: <err>**
Write command Syntax **AT+CCLK=<time>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<time>** String type value with format "yy/MM/dd,hh:mm:ss±zz", 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 Rev12	Notes • <time> is not retained after a power cycle or software reset and it cannot be updated by NITZ or SIB16.

5.2. +CCID Command: Request SIM Card Identification

HL78xx	
Test command Syntax **AT+CCID=?**	 Response **OK**

HL78xx	
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

5.3. +CLAC Command: List Available AT Commands

HL78xx	
Execute command Syntax **AT+CLAC**	 Response **<AT command 1>** **[<CR><LF><AT command 2>[..]]** **OK** or **+CME ERROR: <err>** Parameter **<AT command>** AT command (including the prefix “AT”)
Notes	This command provides the AT command list available for the user.

5.4. +CFUN Command: Set Phone Functionality

HL78xx	
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** or **+CME ERROR: <err>**
Write command Syntax **AT+CFUN=<fun>[,<rst>]**	 Response **OK** or **+CME ERROR: <err>** Parameters **<fun>** 0 Minimum functionality 1 Full functionality 4 Disable phone both transmit and receive RF circuits 5 – 127 Not supported **<rst>** 0 Do not reset the MT before setting it to <fun> power level 1 Reset the MT before setting it to <fun> power level.
Reference 27.007 Rev11	Notes • **AT+CFUN=4,1** is not supported • After a reset, the module always starts in **CFUN=1**, even after **AT+CFUN=0,1**. • If <fun>=0 and the SIM is waiting for the PIN to be entered, **AT+CFUN=1** will return ERROR. • If the **AT+CFUN=1** command returns ERROR, the command should be retried for successful execution.

5.5. +CPIN Command: Enter Pin

HL78xx	
Test command Syntax **AT+CPIN=?**	 Response **OK**

HL78xx	
Read command Syntax **AT+CPIN?**	 Response **+CPIN: <code>** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+CPIN=<pin> [,<newpin>]**	 Response **OK** or **+CME ERROR: <err>** Parameters **<code>** READY — MT is not pending for any password SIM PIN — MT is waiting for SIM PIN to be given SIM PUK — MT is waiting for SIM PUK to be given SIM PIN2 — MT is waiting for SIM PIN2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. **+CME ERROR: 17**); if PIN2 is not entered right after the failure, it is recommended that MT does not block its operation) SIM PUK2 — MT is waiting for SIM PUK2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. **+CME ERROR: 18**); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that ME does not block its operation). PH-SIM PIN — MT is waiting for the phone-to-SIM card password to be given PH-NET PIN — MT is waiting for the network personalization password to be given **<pin>, <newpin>** String type values
Reference	27.007 Rev12

5.6. +CPAS Command: Phone Activity Status

HL78xx	
Test command Syntax **AT+CPAS=?**	 Response **+CPAS:** (list of supported **<pas>**es) **OK** or **+CME ERROR: <err>**

HL78xx	
Execute command Syntax **AT+CPAS**	 Response **+CPAS: <pas>** **OK** or **+CME ERROR: <err>** Parameter **<pas>** 0 Ready (ME allows commands from TA/TE)
Reference 27.007 Rev12	Notes This command reflects the data connection status.

5.7. +CSQ Command: Signal Quality

HL78xx	
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** or **+CME ERROR: <err>** Parameters **<rssi>** Received signal strength indication 0 -113 dBm or less 1 – 30 -111 to -53 dBm 31 -51 dBm or greater 99 Not known or not detectable **<ber>** Integer type; channel bit error rate (in percent) 0 – 7 As RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99 Not known or not detectable
Reference	27.007 Rev12

5.8. +KSREP Command: Mobile Start-up Reporting

HL78xx	
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 the startup 0 The module doesn't send an unsolicited code 1 The module will send an unsolicited code **<stat>** This code indicates the status of the module 0 The module is ready to receive commands for the TE. No access code is required 1 The module is waiting for an access code. (The **AT+CPIN?** command can be used to determine it) 2 The SIM card is not present 3 The module is in "SIMlock" state 4 Unrecoverable error 5 Unknown state 6 Inactive SIM
Unsolicited Notification	Response **+KSUP: <stat>**
Reference Sierra Wireless Proprietary	Notes • Current configuration is kept in non-volatile memory after reset. • The unsolicited notification is sent once after the boot process, and after waking up from LITE HIBERNATE or HIBERNATE.

5.9. +CSIM Command: Generic SIM Access

HL78xx	
Test command Syntax **AT+CSIM=?**	 Response **OK**

HL78xx	
Write command Syntax **AT+CSIM= <length>, <command>**	Response **+CSIM: <length>,<response>** **OK** or **+CME ERROR: <err>** Parameters **<length>** Integer type; length of the characters that are sent to TE in <command> or <response> **<command>** Command passed on by MT to the SIM in hexadecimal format **<response>** Response to the command passed on by the SIM to the MT in hexadecimal format
Reference 27.007 Rev12	Notes Compared to **+CRSM**, the definition of **+CSIM** allows the TE to take more control over the SIM-ME interface. The locking and unlocking of the interface may be done by a special <command> value or automatically by TA/ME (by interpreting 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.

5.10. +CCHO Command: Open Logical Channel

HL78xx	
Test command Syntax **AT+CCHO=?**	Response **OK**
Write command Syntax **AT+CCHO= <dfname>**	Response **<session_id>** **OK** or **+CME ERROR: <err>** Parameters **<dfname>** All selectable applications in the UICC are referenced by a DF name coded on 1 – 16 bytes **<sessionid>** Session ID to target a specific application on the USIM using logical channels mechanisms.
Reference	27.007 Rev12

5.11. +CCHC Command: Close Logical Channel

HL78xx	
Test command Syntax **AT+CCHC=?**	 Response **OK**
Write command Syntax **AT+CCHC= <session_id>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<sessionid>** Session ID to target a specific application on the USIM using logical channels mechanisms.
Reference	27.007 Rev12

5.12. +CRSM Command: Restricted SIM Access

HL78xx	
Test command Syntax **AT+CRSM=?**	 Response **OK**
Write command Syntax **AT+CRSM= <command> [,<fileid>[,<P1>, <P2>,<P3> [,<data> [,<pathid>]]]]**	 Response **+CRSM: <sw1>,<sw2>[,<response>]** **OK** or **+CME ERROR: <err>** Parameters **<command>** 176 READ BINARY 178 READ RECORD 192 GET RESPONSE 214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS 203 RETRIEVE DATA 219 SET DATA **<fileid>** Integer type; this is the identifier of an elementary data file on the SIM. Mandatory for every command except STATUS.

HL78xx	
	<P1>, <P2>, <P3> Integer type defining the request. These parameters are mandatory for every command, except GET RESPONE and STATUS. The values are described in 3GPP TS 51.011 [28] **<data>** Information to be written to the SIM **<pathid>** String type that contains the path of an elementary file on the SIM/USIM in hexadecimal format as defined in ETSI TS 102 221 (e.g. "7F205F70" in SIM and USIM case). This parameter will only be used in the mode "select by path from MF" as defined in ETSI TS 102 221 [60]. **<sw1>, <sw2>** Integer type containing from information the SIM about the execution of the actual command. These parameters are delivered to the TE in either successful or failed executions of the command. **<response>** Response of successful completion of the command previously issued. STATUS and GET RESPONSE returns data, which gives information about the current elementary data field. This information includes the type of file and its size (refer to 3GPP TS 51.011 [28]). After READ BINARY, READ RECORD or RETRIEVE DATA commands, the requested data will be returned. <response> is not returned after a successful UPDATE BINARY, UPDATE RECORD or SET DATA command.
Reference 27.007 Rev12	Notes By using this command instead of the generic SIM access command, **+CSIM**, the DTE application has an easier but more limited access to the SIM database.

5.13. +CTZU Command: Automatic Time Zone Update

HL78xx	
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** or **+CME ERROR: <err>** Parameter **<onoff>** 0 Disable automatic time zone update via NITZ 1 Enable automatic time zone update via NITZ
Reference	27.007 Rev12

5.14. +CTZR Command: Time Zone Reporting

HL78xx	
Test command Syntax **AT+CTZR=?**	 Response **+CTZR:** (list of supported **<reporting>**s) **OK**
Read command Syntax **AT+CTZR?**	 Response **+CTZR: <reporting>** **OK**
Write command Syntax **AT+CTZR= <reporting>**	 Response **OK** or **+CME ERROR: <err>** Parameters **<reporting>** 0 Disable time zone change event reporting 1 Enable time zone change event reporting with URC **+CTZV: <tz>** 2 Enable time zone change event reporting with URC **+CTZE: <tz>,<dst>,[<time>]** **<tz>** Sum of the local time zone (difference between the local time and GMT expressed in quarters of an hour) plus daylight saving time. The format is "±zz", expressed as a fixed width, 2-digit integer with range -48 to +56. To maintain a fixed width, numbers in the range -9 to +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09". **<dst>** 0 <tz> includes no adjustment for Daylight Saving Time 1 <tz> includes +1 hour (equals 4 quarters in <tz>) adjustment for Daylight Saving Time 2 <tz> includes +2 hours (equals 8 quarters in <tz>) adjustment for Daylight Saving Time **<time>** Local time in format "YYYY/MM/DD,hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date (DD), hour (hh), minute (mm) and second (ss). Local time can be derived by the MT from information provided by the network at the time of delivering time zone information and will be present in the unsolicited result code for extended time zone and local time reporting if the universal time is provided by the network.
Reference 27.007 Rev12	Notes • <reporting> is saved into non-volatile memory when the write command is sent. • URCs are enabled on all AT ports, including CMUX DLC.

5.15. +CPSMS Command: Power Saving Mode Setting

HL78xx	
Test command Syntax **AT+CPSMS=?**	Response **+CPSMS: (**list of supported **<mode>**s**),** **(**list of supported **<Requested_Periodic-RAU>**s**),** **(**list of supported **<Requested_GPRS-READY-timer>**s**),** **(**list of supported **<Requested_Periodic-TAU>**s**),** **(**list of supported **<Requested_Active-Time>**s**)**
Read command Syntax **AT+CPSMS?**	Response **+CPSMS: <mode>,** **[<Requested_Periodic-RAU>],** **[<Requested_GPRS-READY-timer>],** **[<Requested_Periodic-TAU>],** **[<Requested_Active-Time>]**
Write command Syntax **AT+CPSMS=** **[<mode>** **[,<Requested_** **Periodic-RAU>** **[,<Requested_** **GPRS-READY-** **timer>** **[,<Requested_** **Periodic-TAU>** **[,<Requested_** **Active-Time>]]]]]**	Response **OK** Parameters **<mode>** Indication to disable or enable the use of PSM in the UE; integer type 0 Disable the use of PSM 1 Enable the use of PSM **<Requested_Periodic-RAU>** Requested extended periodic RAU. String type; one byte in an 8 bit-format **<Requested_GPRS-READY-timer>** Requested GPRS READY timer value (T3314) to be allocated to the UE in GERAN/UTRAN. String type; one byte in an 8-bit format **<Requested_Periodic-TAU>** Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN. String type; one byte in an 8-bit format. **<Requested_Active-Time>** Requested Active Time value (T3324) to be allocated to the UE. String type; one byte in an 8-bit format.
Reference	27.007 Rev12

5.16. +CEDRXS Command: eDRX Setting

HL78xx	
Test command Syntax **AT+CEDRXS=?**	Response **+CEDRXS: (**range of supported **<mode>**s**),(**range of supported **<AcT-type>**s**),(**range of supported **<Requested_eDRX_value>**s**)** Note: The range of supported <Requested_eDRX_value>s depends on the current RAT — Cat-M1 ("0000"-"1101") / NB1 ("0000"-"1111").
Read command Syntax **AT+CEDRXS?**	Response **[+CEDRXS: <AcT-type>, <Requested_eDRX_value>** **[<CR><LF>+CEDRXS: <AcT-type>, <Requested_eDRX_value>** **[…]]]** **OK**
Write command Syntax **+CEDRXS=** **[<mode>** **[,<AcT-type>** **[,<Requested_** **eDRX_value>]]]**	Response **OK** Parameters **<mode>** Integer type, indicates to disable or enable the use of eDRX in the UE 0 Disable the use of eDRX 1 Enable the use of eDRX 2 Enable the use of eDRX and enable the unsolicited result code **+CEDRXP: <AcT-type>[,<Requested_eDRX_value>** **[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]** 3 Disable the use of eDRX and discard all parameters for eDRX **<AcT-type>** Integer type, indicates the type of access technology 0 Access technology is not using eDRX 4 E-UTRAN (WB-S1 mode) 5 E-UTRAN (NB-S1 mode) **<Requested_eDRX_value>** Integer type in Write command, or string type (half a byte in a 4-bit format) in Read/Write/Test commands. The eDRX value refers to bits 4 to 1 of octet 3 of the Extended DRX parameters information element. For example: Test command shows string value range as ("0000"-"1111") Read command shows a string value from that range (e.g. "0110") Write command accepts 0–15 or "0000"–"1111") Note: The actual supported range varies by RAT — CAT-M1 (0-13); NB1 (0-15). **<NW-provided_eDRX_value>** String type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element **<Paging_time_window>** String type; half a byte in a 4-bit format. The paging time window referes to bit 8 to 5 of octet 3 of the Extended DRX parameters information element
Reference 27.007 Rev13	Notes Configuration is saved in non-volatile memory and is therefore still effective after a power cycle.

5.17. +CEDRXRDP Command: eDRX Read Dynamic Parameters

HL78xx	
Test command Syntax **AT+ CEDRXRDP=?**	 Response **OK**
Read command Syntax **AT+CEDRXRDP**	 Response **+CEDRXRDP: <AcT-type>[,<Requested_eDRX_value[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]** **OK** Parameters **<AcT-type>** Indicates the type of access technology 0 Access technology does not use eDRX 4 E-UTRAN (WB-S1 mode) 5 E-UTRAN (NB-S1 mode) **<Requested_eDRX_value>** String type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element. **<NW-provided_eDRX_value>** String type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element **<Paging_time_window>** String type; half a byte in a 4-bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element
Reference TS 27.007 Rev13	Notes This command is used to specify the relationship between the type of access technology and the requested eDRX value.

5.18. +CESQ Command: Extended Signal Quality

HL78xx	
Test command Syntax **AT+CESQ=?**	 Response **+CESQ: (**list of supported **<rxlev>**s**),(**list of supported **<ber>**s**),(**list of supported **<rscp>**s**),(**list of supported **<ecno>**s**),(**list of supported **<rsrq>**s**),(**list of supported **<rsrp>**s**)** **OK**
Execute command Syntax **AT+CESQ**	 Response **+CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>** **OK**

HL78xx	
	Parameters **<rxlev>** Integer type; received signal strength level (see 3GPP TS 45.008 [20] subclause 8.1.4) 0 rssi < -110 dBm 1 -110 dBm ≤ rssi < -109 dBm 2 -109 dBm ≤ rssi < -108 dBm … 61 -50 dBm ≤ rssi < -49 dBm 62 -49 dBm ≤ rssi < -48 dBm 63 -48 dBm ≤ rssi 99 not known or not detectable **<ber>** Integer type; channel bit error rate (in percent) 0 – 7 As RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99 Not known or not detectable **<rscp>** Integer type; received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3) 255 Not known or not detectable **<ecno>** Integer type; ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [95] subclause) 255 Not known or not detectable **<rsrq>** Integer type; reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7) 0 rsrq < -19.5 dB 1 -19.5 dB ≤ rsrq < -19 dB 2 -19 dB ≤ rsrq < -18.5 dB … 32 -4 dB ≤ rsrq < -3.5 dB 33 -3.5 dB ≤ rsrq < -3 dB 34 -3 dB ≤ rsrq 255 Not known or not detectable **<rsrp>** Integer type; reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4) 0 rsrp < -140 dBm 1 -140 dBm ≤ rsrp < -139 dBm 2 -139 dBm ≤ rsrp < -138 dBm … 95 -46 dBm ≤ rsrp < -45 dBm 96 -45 dBm ≤ rsrp < -44 dBm 97 -44 dBm ≤ rsrp 255 Not known or not detectable
Reference 27.007 Rev12	Notes • If the current serving cell is not a GERAN cell, <rxlev> and <ber> are set to value 99. • If the current serving cell is not a UTRA FDD or UTRA TDD cell, <rscp> is set to 255. • If the current serving cell is not a UTRA FDD cell, <ecno> is set to 255. • If the current serving cell is not an E-UTRA cell, <rsrq> and <rsrp> are set to 255.

HL78xx	
	• Consequently, the HL78xx will return: ▪ 99 for <rxlev> and <ber> ▪ 255 for <rscp> and <ecno>

5.19. +KBNDCFG Command: Set Configured LTE Band(s)

Warning: *RF bands must be set prior to using the module. It is highly recommended to limit the number of enabled RF bands to lessen power consumption. Additionally, the number of enabled RF bands should be limited to avoid prolonged scanning operations. Scanning operations take place regardless of number of RF bands enabled but will take longer if too many bands are enabled. Refer to section 5 of AirPrime HL78XX Customization Guide Application Note (reference number: 2174213) for details.*

HL78xx	
Test command Syntax **AT+KBNDCFG=?**	Response **+KBNDCFG: <RAT>,**(list of supported **<bnd bitmap>**s) **OK**
Read command Syntax **AT+KBNDCFG?**	Response **+KBNDCFG: <RAT>,**(list of configured **<bnd bitmap>**s) **OK**
Write command Syntax **AT+KBNDCFG =<RAT>,<bnd bitmap>**	Response **+KBNDCFG: <RAT>,(<bnd bitmap>**s to configure) **OK** Parameters **<RAT>** Radio Access Technology 0 CAT-M1 (this is the only RAT available on the HL7800-M) 1 NB1 2 GSM (for HL7802 only) **<bnd bitmap>** Band bitmap in hexadecimal format without the 0x prefix. This is the logical representation of 1<<(BandNumber -1). (Currently only used for RAT CAT-M1 and NB-1.) 0000 00000000 **00000000** Not available 0000 00000000 **00000001** LTE Band 1 (2000 MHz) 0000 00000000 **00000002** LTE Band 2 (1900 MHz) 0000 00000000 **00000004** LTE Band 3 (1800 MHz) 0000 00000000 **00000008** LTE Band 4 (1700 MHz) 0000 00000000 00000010 LTE Band 5 (850 MHz)

HL78xx	
	0000 00000000 00000080 LTE Band 8 (900MHz) 0000 00000000 00000100 LTE Band 9 (1900MHz) 0000 00000000 00000200 LTE Band 10 (2100MHz) 0000 00000000 00000800 LTE Band 12 (700 MHz) 0000 00000000 00001000 LTE Band 13 (700 MHz) 0000 00000000 00010000 LTE Band 17 (700 MHz) 0000 00000000 00020000 LTE Band 18 (800MHz) 0000 00000000 00040000 LTE Band 19 (800MHz) 0000 00000000 00080000 LTE Band 20 (800MHz) 0000 00000000 01000000 LTE Band 25 (1900MHz) 0000 00000000 02000000 LTE Band 26 (800 MHz) 0000 00000000 04000000 LTE Band 27 (800 MHz) 0000 00000000 08000000 LTE Band 28 (700MHz) 0002 00000000 00000000 LTE Band 66 (1800MHz)
Reference Sierra Wireless Proprietary	Notes • This command sets the configured LTE band(s) on which the module can operate. • The module must be reset (power cycle, reset input, or **AT+CUN=1,1**) for any changes to the band configuration to take effect. • When using the write command, the answer will return the entered <bnd bitmap>. • To get the list of configured band(s), use **AT+KBNDCFG?**. • To get the list of supported band(s), use **AT+KBNDCFG=?**. • Only bands returned by **+KBNDCFG=?** for available RAT can be configured. • To avoid a long scanning duration, it is necessary to limit the number of bands to the targeted network. • Switching RAT is possible with the **+KSRAT** command.
Examples	**AT+KSRAT?** **+KSRAT: 0** // Get active RAT: CAT-M1 **OK** **AT+KBNDCFG=0,7** // Set LTE Bands 1, 2, 3 selected; no 0x prefix for CAT-M1 **+KBNDCFG: 0,7** **OK** **AT+CFUN=1,1** // Force initialization of radio to consider new configured bands **AT+KBNDCFG?** // Get configured network bands **+KBNDCFG: 0,00000000000000000007** // LTE bands 1, 2, 3 for CAT-M1 **+KBNDCFG: 1,0** **+KBNDCFG: 2,0** **OK** **AT+KBNDCFG=?** // Get supported network bands **+KBNDCFG: 0,0002000000000F0F1B9F** // bands 1, 2, 3, 4, 5, 8, 9, 10, 12, 13, // 17, 18, 19, 20, 25, 26, 27, 28, 66 // for CAT-M1 **+KBNDCFG: 1,0002000000000B0F189F** // bands 1, 2, 3, 4, 5, 8, 12, 13, 17, // 18, 19, 20, 25, 26, 28, 66 for NB1 **+KBNDCFG: 2,0** **OK** **AT+KBNDCFG=0,0** **//** Not defined

HL78xx	

	+CME ERROR: 3
	
	AT+KBNDCFG=0,189F // Set LTE Bands 1, 2, 3, 4, 5, 8, 12, 13 for CAT-M1
	+KBNDCFG: 0,189F
	OK
	
	AT+KSRAT=1
	OK
	
	// Automatic reboot of module to force initialization of radio to consider new configured
	// bands
	
	AT+KSRAT? // Get active RAT
	+KSRAT: 1 // Active RAT is NB-1
	OK
	
	AT+KBNDCFG? // Get configured network bands
	+KBNDCFG:0,0
	+KBNDCFG:1,000000000000000000E **//** LTE bands 1,2,3 for NB1
	+KBNDCFG:2,0
	OK

5.20. +KBND Command: Get Active LTE Band(s)

HL78xx	
Read command Syntax **AT+KBND?**	Response **+KBND: <RAT>,**(the active **<bnd bitmap>**) **OK** Parameters **<RAT>** Radio Access Technology 0 CAT-M1 (this is the only RAT available on the HL7800-M) 1 NB1 2 GSM (for HL7802 only) **<bnd bitmap>** Band bitmap in hexadecimal format without the 0x prefix. This is the logical representation of 1<<(BandNumber -1). (Currently only used for RAT CAT-M1 or NB-1) 0000 00000000 **00000000** Not available 0000 00000000 **00000001** LTE Band 1 (2000 MHz) 0000 00000000 **00000002** LTE Band 2 (1900 MHz) 0000 00000000 **00000004** LTE Band 3 (1800 MHz) 0000 00000000 **00000008** LTE Band 4 (1700 MHz) 0000 00000000 00000010 LTE Band 5 (850 MHz)

HL78xx	
	0000 00000000 00000080 LTE Band 8 (900MHz) 0000 00000000 00000100 LTE Band 9 (1900MHz) 0000 00000000 00000200 LTE Band 10 (2100MHz) 0000 00000000 00000800 LTE Band 12 (700 MHz) 0000 00000000 00001000 LTE Band 13 (700 MHz) 0000 00000000 00010000 LTE Band 17 (700 MHz) 0000 00000000 00020000 LTE Band 18 (800MHz) 0000 00000000 00040000 LTE Band 19 (800MHz) 0000 00000000 00080000 LTE Band 20 (800MHz) 0000 00000000 01000000 LTE Band 25 (1900MHz) 0000 00000000 02000000 LTE Band 26 (800 MHz) 0000 00000000 04000000 LTE Band 27 (800 MHz) 0000 00000000 08000000 LTE Band 28 (700MHz) 0002 00000000 00000000 LTE Band 66 (1800MHz)
Reference Sierra Wireless Proprietary	Notes • This command returns the LTE band that the module is currently using and the corresponding RAT. • If there is no current active band, the returned bitmap is 0. • **+CME_ERROR: 3** is returned is case of bad syntax. • When using **AT+KBNDCFG=<RAT>,<bnd bitmap>**, radio re-initialization is necessary to consider new configured band(s). Otherwise, **AT+KBND?** won't be functional. This can be done by resetting the module (**AT+CFUN=1,1**). • Switching RAT is possible with the **+KSRAT** command.
Examples	**AT+KBND?** // Get the activated network band: LTE band 66 for CAT-M1 **+KBND**: **0,00020000000000000000** **OK** **AT+KBND?** // Get the activated network band: no active band **+KBND**: **0,00000000000000000000** **OK**

5.21. +KGPIO Command: Hardware IO Control

HL78xx	
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**

HL78xx	
Write command Syntax **AT+KGPIO=<IO>, <cde>**	Response If <cde> = 2: **+KGPIO: <IO>, <current_value>** **OK** Else **OK** Parameters **<IO>** 1-8, 10, 11, 14, 15 Selected IO **<cde>** 0 Reset the selected IO 1 Set the selected IO 2 Request the current value of the IO **<current_value>** 0 GPIO is Low 1 GPIO is High
Notes	• The current configuration is saved in non-volatile memory after a reset. • Check the configuration of **+KGPIOCFG** when **+CME ERROR: 3** issued. • **AT+KGPIO=?** returns a dynamic list of supported GPIO. GPIOs assigned to a specific purpose are not listed. • This command can be used without SIM.
Examples	**AT+KGPIO=?** **+KGPIO: (1,2,3,4,5,6,7,8,10,11,14,15),(0-2)** **OK** **AT+KGPIO?** **OK** **AT+KGPIOCFG=1,0,2** **OK** **AT+KGPIO=1,1** **OK** **AT+KGPIO=1,0** **OK**

5.22. +KGPIOCFG Command: GPIO Configuration

HL78xx	
Test command Syntax **AT+KGPIOCFG=?**	Response **+KGPIOCFG**: (list of supported **<n>**s),(list of supported **<dir>**s), (list of supported **<pull mode>**s) **OK**

HL78xx	
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, 10, 11, 14, 15 GPIO number **<dir>** Direction 0 Output 1 Input **<pull mode>** 0 Pull down. Internal pull down resistor available. Only used in input mode. 1 Pull up. Internal pull up resistor available. Only used in input mode. 2 No pull. Internal pull up/down resistor NOT available. Only used in output mode.
Notes	• The current configuration is saved in non-volatile memory before a reset. • Pull down/up mode provides a stable input level. • **AT+KGPIOCFG=?** and **AT+KGPIOCFG?** return a dynamic list of supported GPIOs. GPIOs assigned to a specific purpose are not listed. • This command can be used without SIM.
Examples	**AT+KGPIOCFG=?** **+KGPIOCFG: (1,2,3,4,5,6,7,8,10,11,14,15),(0-1),(0-2)** **OK** **AT+KGPIOCFG?** **+KGPIOCFG: 1,0,2** **+KGPIOCFG: 2,0,2** **+KGPIOCFG: 3,0,2** **+KGPIOCFG: 4,0,2** **+KGPIOCFG: 5,0,2** **+KGPIOCFG: 6,0,2** **+KGPIOCFG: 7,0,2** **+KGPIOCFG: 8,0,2** **+KGPIOCFG: 10,0,2** **+KGPIOCFG: 11,0,2** **+KGPIOCFG: 14,0,2** **+KGPIOCFG: 15,0,2** **OK** **AT+KGPIOCFG=1,0,2** **OK** **AT+KGPIOCFG=1,1,1** **OK**

5.23. +KCELL Command: Cell Environment Information

HL78xx	
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 (LTE mode) **+KCELL: 0** **+KCELL: 0** **+KCELL: <nbLTEcells>[,<cell_type>,<PLMN>,<LTE_CI>,<PhyCellInd>, <trackingAreaCode>,<RSRPResult>,<RSRQResult>,<LTE_TA>][<cell_type>, [[Earfcn>,[<PhyCellID>,[<RSRPResult>,[<RSRQResult>]]]]][…]]** **OK** Response (GSM mode) **+KCELL: <nbGSMcells>[,<cell_type>,<ARFCN>,<BSIC>,<PLMN>,<LAC>, <GSM_CI>,<RSSI>,<GSM_TA>][,<cell_type>,<ARFCN>,<BSIC>,<PLMN>, <LAC>,<CI>,<RSSI>][…]]** **+KCELL: 0** **+KCELL: 0** **OK** Parameters **<revision>** 0 Reserved for future development **<nbGSMcells>** 0 ≤ i ≤ 10 Number of base stations available **<cell_type>** 0 GSM serving cell 1 GSM neighbor cell 2 UMTS serving cell (Not supported) 3 UMTS neighbor cell (Not supported) 4 UMTS detected cell (Not supported) 5 LTE serving cell 6 LTE neighbor cell **<ARFCN>** 0 – 1023 Absolute Radio Frequency Channel Number **<BSIC>** 0 – 63 Base Station Identity Code **<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

HL78xx	
	<GSM_CI> Cell ID, 4 hexadecimal digits, e.g. ABCD **<RSSI>** (Serving Cell) 0 – 63 Received signal level of the BCCH carrier. Add -110 to convert value to dBm. (Neighbor Cell) 0 – 63 Add -110 to convert value to dBm. **<GSM_TA>** 0 – 63 Timing advance; only available for serving cell **<nbLTEcells>** 0 ≤ k ≤ 20 Number of LTE base stations available **<LTE_CI>** Cell Identity in 8 hexadecimal digits with length = 28 bits. (Ref: 3GPP TS 36.331, 6.3.4, CellIdentity IE) **<PhyCellInd>** 0 – 503 Physical Cell ID (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE) **<TrackingAreacode>** 0 – 65535 Tracking Area Code (Ref: 3GPP TS 36.331, 6.3.4, Tracking AreaCode IE) **<RSRPResult>** 0 – 97 Reference Signal Received Power (Ref: 3GPP TS 36.331, 6.3.5, RSRP-Range IE) **<RSRQResult>** 0 – 34 Reference Signal Received Quality (Ref: 3GPP TS 36.331, 6.3.5, RSRQ-Range IE) **<LTE_TA>** 0 – 63 Timing advance. Available only when the module is in connected state. **<Earfcn>** 0 – 0xFFFF Carrier frequency of the neighbor cell designated by the EUTRA Absolute Radio Frequency Channel Number (EARFCN) (Ref: 3GPP TS 36.101, 5.7.3)
Notes	• This command provides information related to the network environment and can be used, for example, for localization calculation. • The second query response line is for UMTS cells, which are not supported so `+KCELL: 0`. • This command can only be used with a SIM. The cell information can only be retrieved when the UE stays in attached mode.
Examples	**AT+KCELL=?** **+KCELL: 0** **OK** ***// LTE Mode*** **AT+KCELL=0** **+KCELL: 0** **+KCELL: 0** **+KCELL: 3,5, 54f460, c437406,322,54140,34,14,0,6,1424,266,32,9,6,1424,28,30,5** **OK** ***// GSM Mode*** **AT+KCELL=0** **+KCELL: 2,0,178,22,030227,2008,2a87,60,1,1,233,17,030227,2008,bdb3,13** **+KCELL: 0** **+KCELL: 0** **OK**

5.24. +KSLEEP Command: Power Management Control

AirPrime HL78xx modules offer 3 types of power saving management:

- Hardware controlled (DTR signal) – sleep mode permission is driven by a HW signal (DTR). If the signal is active (low level), the module doesn't enter sleep mode.
- Standalone – standalone sleep mode. The module decides by itself when it enters sleep mode.
- Forbidden – sleep mode always disabled.

And 3 levels of power saving mode (from lightest to deepest):

- Sleep
- Lite Hibernate
- Hibernate

For more details, refer to AirPrime HL7800 Low Power Modes Application Note (reference number: 2174229).

Table 2. AT+KSLEEP Command Description

HL78xx	
Test command Syntax **AT+KSLEEP=?**	 Response **+KSLEEP: (**list of supported **<mngt>**s**)[,(**list of supported **<level>**s**)[,(**list of supported **<delay>**s**)]** **OK**
Read command Syntax **AT+KSLEEP?**	 Response **+KSLEEP: <mngt>[,<level>[,<delay>]]** **OK**
Write command Syntax **AT+KSLEEP= <mngt>[,<level> [,<delay>]]**	 Response **OK** Parameters **<mngt>** Defines how the module enter and leave power saving mode 0 Sleep mode permission is driven by a HW signal (DTR). If the signal is active (low level), the module doesn't enter sleep mode. 1 Standalone sleep mode. The module decides by itself when it enters sleep mode. 2 Sleep mode is always disabled **<level>** Defines the lowest power saving mode that the module can enter. This parameter is mandatory when <mngt>=0 or 1; not allowed for <mngt>=2. 0 Sleep 1 Lite Hibernate 2 Hibernate

HL78xx	
	<delay> 0 – 99 Duration of delay before the module enters power saving mode after reboot in seconds
Reference Sierra Wireless Proprietary	Notes • Current configuration is kept in non-volatile memory after reset. • Only hardware signals impact power saving management (modem signals over MUX will not).
Examples	**AT+KSLEEP=?** **+KSLEEP: (0-2)[,(0-2)[,(0-99)]]]** **OK** **AT+KSLEEP?** **+KSLEEP: 0,0,0** **OK** **AT+KSLEEP=1,2** **OK** **AT+KSLEEP?** **+KSLEEP: 1,2,0** **OK** **AT+KSLEEP=2** **OK** **AT+KSLEEP?** **+KSLEEP: 2** **OK** **AT+KSLEEP=0,1,10** **OK** **AT+KSLEEP?** **+KSLEEP: 0,1,10** **OK**

5.25. +KRIC Command: Ring Indicator Control

HL78xx	
Test command Syntax **AT+KRIC=?**	Response **+KRIC:** (list of supported **<masks>**s),(list of supported **<shape>**s),(list of supported **<pulse duration>**s),(list of supported **<Ri inverse gpio>**s),(list of supported <pull>s) **OK**
Read command Syntax **AT+KRIC?**	Response **+KRIC: <mask>,<shape>,<pulse duration>,<RI inverse gpio>,<pull>** **OK**

HL78xx	
Write command Syntax **AT+KRIC=<mask>[,<shape>[,<pulse duration>[,<RI inverse gpio>[,<pull>]]]]**	Response **OK** Parameters **<mask>** Use of RI signal; bit field type. To set several activation triggers, sum up the values 0 RI not used (Default) 2 RI activated on SMS (**+CMT**, **+CMTI**) 16 RI activated on network state (**+CIEV**) 32 RI activated on TCP connection request (**+KTCP_SRVREQ**) 64 RI activated on TCP Data reception (**+KTCP_DATA**) 128 RI activated on UDP Data reception (**+KUDP_DATA**) **<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 **<pulse duration>** 1 – 5 RI pulse durations in seconds (Default is 1) **<RI inverse gpio>** GPIO number to notify event instead of RI 0 Event notified on RI pin (Default) 2 Event notified on GPIO2 **<pull>** Internal pull resistor state 0 Disabled (Default) 1 Pull-down enabled
Reference Sierra Wireless Proprietary	Notes • The current configuration is kept in non-volatile memory after a reset. • Write command is only sent once to define the RI behavior. • Do not use the command during an incoming call, etc. • This command can be used without a SIM. • When the event is notified on GPIO2 instead of the RI pin, the GPIO is active high so the pulse goes from low voltage level to high voltage level then low voltage level. Whereas when the RI pin is active low, the pulse on RI goes from high voltage level to low voltage level then high voltage level. • Recommendation – Use the internal pull-down to prevent voltage spikes when entering hibernate mode. Note that enabling the pull-down may increase current consumption while the GPIO is asserted, depending on external hardware connections. • Configuration is saved in non-volatile memory and is therefore still effective after a power cycle.

HL78xx	
Examples	**AT+KRIC=?** **+KRIC: (0-240),(0),(1-5),(0,2),(0,1)** **OK** **AT+KRIC?** **+KRIC: 0,0,1,0** // RI deactivated **OK** **AT+KRIC=192** // activation of RI for TCP and UDP data reception (64+128) **OK** **AT+KRIC?** **+KRIC: 192,0,1,0** **OK**

5.26. +CPOF Command: Power Off

HL78xx	
Execute command Syntax **AT+CPOF**	 Response **OK**
Notes	• This command powers the module off. • **OK** is immediately returned before the power off sequence. • The only way to wake the module up is to set the WAKEUP pin high. • When the Power On feature (**+KHWIOCFG**) is enabled and the power button is ON, **+CPOF** will return OK and the module will power off as soon as the power button is switched OFF.

5.27. +CPWROFF Command: Power Off

HL78xx	
Test command Syntax **AT+CPWROFF=?**	 Response **OK**

HL78xx	
Execute command Syntax **AT+CPWROFF [=<mode>]**	Response **OK** or **ERROR** Parameter **<mode>** Power down mode 1 Fast power down mode
Notes	• Not specifying a parameter value for the execute command will perform normal IMSI detach before powering down. • <mode>=1 will perform fast power down without an IMSI detach request being sent to the network. • The only way to wake the module up is to set the WAKEUP pin high. The WAKEUP pin must be de-asserted within 1 second of executing AT+CPWROFF to power off properly. • When the Power On feature (**+KHWIOCFG**) is enabled and the power button is ON, **+CPWROFF** will return OK and the module will power off as soon as the power button is switched OFF.

5.28. +WIMEI Command: IMEI Write and Read

HL78xx	
Test command Syntax **AT+WIMEI=?**	Response **OK**
Read command Syntax **AT+WIMEI?**	Response **+WIMEI: <IMEI>** **OK**
Write command Syntax **AT+WIMEI= <IMEI>**	Response **+WIMEI: <IMEI>** **OK** Parameter **<IMEI>** 14 or 15-digit IMEI as defined in GSM 23.003

HL78xx	
Notes	• The default IMEI is 012345678901237. • The write command can only be used once for IMEI programming. • The IMEI to be written must be different from the default IMEI. • If a 14-digit IMEI is entered, the 15th checksum digit is automatically calculated. • Customers take on the responsibility of adhering to 3GPP TS 22.016, Section 2 – General requirements when using this command. This includes ensuring that each IMEI is within the allocated range and is unique to the ME in which it resides, as well as ensuring that detailed records of produced and delivered MEs are kept.

Examples	// Default IMEI
	at+wimei?
	+WIMEI: 012345478901237
	OK
	
	// Enter 15-digit IMEI
	at+wimei=354610060035829
	OK
	
	at+wimei?
	+WIMEI: 354610060035829
	OK
	
	// Enter 14-digit IMEI
	at+wimei=35461006003582
	OK
	
	at+wimei?
	+WIMEI: 354610060035829
	OK

5.29. +KSYNC Command: Application Synchronization Signal

HL78xx	
Test command Syntax **AT+KSYNC=?**	 Response **+KSYNC:** (list of supported **<mode>**),(list of supported **<IO>s**) **OK**
Read command Syntax **AT+KSYNC?**	 Response **+KSYNC: <mode>,<IO>** **OK**
Write command Syntax **AT+KSYNC= <mode>,<IO>**	 Response **+KSYNC: <IO>, <current_value>** **OK**

HL78xx	
	Parameters **<mode>** Synchronization signal mode 0 Disable the generation of synchronization signal 2 Manage the generation of signal according to network status: **Permanently ON** – The module is powered on, but not registered in the network **Slow flash (LED is ON for 200ms, OFF for 2s)** – The module is powered on and registered in the network **OFF** – The module is either switched off or the flash LED has been disabled by the user **<IO>** 1-8, 10, 11, 14, 15, 20 Defines which GPIO is used as output to indicate the network status
Notes	• <mode> and <IO> settings are automatically saved. • This command will force the GPIO pins as output, regardless of the **AT+KGPIOCFG** configuration. • Only one GPIO signal can be generated at any time. • **AT+KSYNC=?** returns a dynamic list of supported GPIOs. GPIOs assigned to a specific purpose are not listed. • This command can be used without a SIM.
Examples	**AT+KSYNC=?** **+KSYNC: (0,2),(1,2,3,4,5,6,7,8,10,11,14,15,20)** **OK** **AT+KSYNC=2,1** **OK** **AT+KSYNC?** **+KSYNC: 2,1** **OK** **AT+KSYNC=2,1** **OK**

5.30. +KCARRIERCFG Command: Set Operator

Warning: *Operator must be set prior to using the module. Refer to section 6 of AirPrime HL7800-M MNO and RF Band Customization at Customer Production Site Application Note (reference number: 2174213) for details.*

HL78xx	
Test command Syntax **AT+ KCARRIERCFG= ?**	Response **+KCARRIERCFG: (**list of supported **<operator_idx>**es**)** **OK**
Read command Syntax **AT+ KCARRIERCFG?**	Response **+KCARRIERCFG: <operator_idx>** **OK**
Write command	

HL78xx	
Syntax **AT+ KCARRIERCFG =<operator_idx>**	Response **OK** Parameter **<operator_idx>** 0 Default 1 Verizon 2 CMCC 3 RJIL 4 KDDI 5 AT&T 6 USCC 7 Docomo 8 Softbank 9 LGU+ 10 KT 11 T-Mobile 12 SKT 13 TELSTRA 14 China Telecom 15 Sierra Wireless
Reference Sierra Wireless Proprietary	Notes Configuration is saved immediately in non-volatile memory. The answer to the write command is therefore displayed a few seconds after it is sent. However, the new configuration is only taken into account on the next reboot.
Examples	**AT+KCARRIERCFG=?** **+KCARRIERCFG: (0-15)** **OK** **AT+KCARRIERCFG?** **+KCARRIERCFG: 0** // Default configuration selected **OK** **AT+KCARRIERCFG=1** // Set Verizon configuration **OK**

5.31. +KMON Command: Enable/Disable Monitor Mode

HL78xx	
Test command Syntax **AT+KMON=?**	 Response **+KMON: (0-2)** **OK**

HL78xx	
Read command Syntax **AT+KMON?**	 Response **+KMON: <n>** **OK**
Write command Syntax **AT+KMON=<n>**	 Response **OK** or **+CME ERROR: 3** Parameter **<n>** Monitor mode configuration 0 Monitor mode disabled (automatic reboot when a crash occurs) 1 Monitor mode enabled (no automatic reboot, backtrace provided for analysis) 2 Mixed monitor mode (backtrace is provided before automatic reboot)
Reference Sierra Wireless Proprietary	Notes • This command provides the ability to deactivate monitor mode for customer configurations. • Monitor mode (<n>=1): o This is a special state that the module enters when a software exception happens. The module displays the backtrace and all low-level information needed for debug. Monitor mode prevents the module from rebooting since it must be manually reset. o When deploying devices, <n>=0 or 2 are recommended. If <n>=1 is selected, the device will not automatically reboot in the event of a crash, and will require the user to manually reboot. o Is not persistent over power cycle (cold boot). When the module boots, if <n>=1, the mode changes automatically to 2 (the default value). • If the Write command is used and the requested configuration is the same as the current configuration, nothing changes. • If the Write command is used and the requested configuration is different than the current configuration: o The requested configuration is written into flash o The configuration change is persistent (does not have to be re-entered after each module reboot), except for <n>=1 as noted above.
Examples	**AT+KMON=?** **+KMON: (0-2)** **OK** **AT+KMON?** **+KMON: 0** **OK** **AT+KMON=0** // disable monitor mode **OK** **AT+KMON=1** // enable monitor mode **OK**

5.32. +KSRAT Command: Set Radio Access Technology

HL78xx	
Test command Syntax **AT+KSRAT=?**	 Response **+KSRAT:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+KSRAT?**	 Response **+KSRAT: <mode>** **OK**
Write command Syntax **AT+KSRAT= <mode>**	 Response **OK** Parameter **<mode>** 0 CAT-M1 only (this is the only RAT available on the HL7800-M) 1 NB1 only 2 GSM only (for HL7802 only)

Examples	// HL7800/7800-M
	AT+KSRAT=? **//** Available modes
	+KSRAT: (0-1) // CAT-M1, NB1 RAT
	OK
	
	// HL7802
	AT+KSRAT=? **//** Available modes
	+KSRAT: (0-2) // CAT-M1, NB1 RAT, GSM
	OK
	
	AT+KSRAT? // Display current mode
	+KSRAT: 0 // CAT-M1 current RAT
	OK
	
	AT+KSRAT=1 // Set NB1 RAT and reboot of the module to force initialization of // radio to consider new RAT.
	OK
	
	AT+KSRAT? // Display current mode
	+KSRAT: 1 // NB1 current RAT
	OK

Reference Sierra Wireless Proprietary	Notes • <mode> is persistent after reset. • The write command automatically reboots the module to force a re-initialization of the radio with the selected RAT.

5.33. +KNWSCANCFG Command: Configure Network Scan Policy

HL78xx	
Test command Syntax **AT+ KNWSCANCFG= ?**	 Response **+KNWSCANCFG:** (list of supported **<mode>s**),(list of supported **<scheme>s**),(list of supported **<min>s**),(list of supported **<max>s**),(list of supported **<step>s**) **OK**
Read command Syntax **AT+ KNWSCANCFG?**	 Response **+KNWSCANCFG: <mode$_0$>,<scheme$_0$>,<min$_0$>,<max$_0$>[,<step$_0$>]** **+KNWSCANCFG: <mode$_1$>,<scheme$_1$>,<min$_1$>,<max$_1$>[,<step$_1$>]** **OK**
Write command Syntax **AT+ KNWSCANCFG =<mode> [,<scheme>, <min>,<max> [,<step>]]**	 Response **OK** or **+CME ERROR <err>** Parameters **<mode>** 0 Out of coverage network scan 1 Initial scan Other values Reserved for future use **<scheme>** 0 Linear scheme 1 Exponential scheme (default configuration for both modes) **<min>** 2 – 65535 Minimum interval in seconds between scans **<max>** 2 – 65535 Maximum interval in seconds between scans. Default value = 30 **<step>** 2 – 32767 Interval incrementation in seconds between scans for linear mode. Mandatory for <scheme>=0, not allowed for <scheme>=1.
Reference Sierra Wireless Proprietary	Notes • By default, configuration is exponential scheme with min=2s, max=30s. Interval starts with the current value = min seconds, and step is increased by power of 2. When the max interval value is achieved, it is then always used. This default configuration applies to all scenarios. • Initial scan defines the scenario when the module has not attached to any network. It applies when the module resets or wakes up from sleep. **+CFUN=0** or **+CFUN=1** also applies to this scenario. Scan initiated by **+COPS=?** is not applied to this scenario. • Out of Coverage scenario applies when the module is attached to the network and loses network connectivity or cell coverage. This is usually marked by change of registration state to unknown (**+CEREG: 4**). • The parameter ranges are same for all scenarios. • **AT+KNWSCANCFG=<mode>** resets <min>, <max> and <scheme> to default values (2s, 30s and exponential, respectively). <mode> can be 0 or 1.

HL78xx	
	• When <scheme>=0 (linear scheme), interval starts with min seconds and is incremented by step seconds until the maximum is reached. • Exponential scheme works by adding $T_{min}+2^{exponent}$ where exponent is equal to scan times. • The configuration is saved in non-volatile Memory (NVM) and persists across reboots.

Examples	**AT+KNWSCANCFG=? //** Available values
	+KNWSCANCFG: (0-1),(0-1),(2-65535),(2-65535),(2-32767)
	OK
	
	AT+KNWSCANCFG?
	+KNWSCANCFG: 0,1,2,30 // OOC scan: Default configuration
	+KNWSCANCFG: 1,0,10,100,10 // Initial scan: linear scheme, min=10s, max=100s, //step=10s
	OK
	
	AT+KNWSCANCFG=0,0,3,90,2 // Set for OOC scan scenario a linear scheme with // min=3s, max=90s, step=2s.
	OK
	
	AT+KNWSCANCFG?
	+KNWSCANCFG: 0,0,3,90,2 // OOC scan: linear scheme, min=3s, max=90s, // step=2s
	+KNWSCANCFG: 1,0,10,100,10 // Initial scan: linear scheme, min=10s, // max=100s, step=10s
	OK
	
	AT+KNWSCANCFG=1,0,15,150 // Set for initial scan scenario an expo scheme with // min=15s, max=150s
	OK
	
	AT+KNWSCANCFG?
	+KNWSCANCFG: 0,0,3,90,2 // linear scheme, min=3s, max=90s, step=2s
	+KNWSCANCFG: 1,0,15,150 // Initial scan: expo scheme, min=15s, max=150s
	OK
	
	//Setting default configuration:
	//Mode 0:
	AT+KNWSCANCFG=0
	OK
	
	AT+KNWSCANCFG?
	+KNWSCANCFG: 0,1,2,30 // OOC scan: expo scheme, min=2s, max=30s
	+KNWSCANCFG: 1,0,15,150 // Initial scan: expo scheme, min=15s, max=150s
	OK
	
	//Mode 1:
	AT+KNWSCANCFG=1
	OK
	
	AT+KNWSCANCFG?
	+KNWSCANCFG: 0,1,2,30 // OOC scan: expo scheme, min=2s, max=30s
	+KNWSCANCFG: 1,1,2,30 // initial scan: expo scheme, min=2s, max=30s
	OK

5.34. +CRCES Command: Read Coverage Enhancement Status

HL78xx	
Test command Syntax **AT+CRCES=?**	 Response **OK**
Execute command Syntax **AT+CRCES**	 Response **+CRCES:<AcT>,<CE_level>,<CC>** **OK** Parameters **<AcT>** Integer type; access technology of the serving cell 0 Serving cell has no coverage enhancement 1 E-UTRAN 2 EC-GSM-IoT (A/Gb mode) 3 E-UTRAN (NB-S1 mode) **<CE_level>** Integer type; Coverage Enhancement (CE) level of the MT in the serving cell. Applicable only if <Act>=1 (E-UTRAN) or <Act>=3 (E-UTRAN (NB-S1 mode)). 0 No Coverage Enhancement in the serving cell 1 Coverage Enhancement level 0 2 Coverage Enhancement level 1 3 Coverage Enhancement level 2 4 Coverage Enhancement level 3 **<CC>** Integer type; Coverage Class (CC) of the MT in the serving cell. Applicable only if <Act>=2 (EC-GSM-IoT). 0 No Coverage Class in the serving cell 1 Coverage Class 1 2 Coverage Class 2 3 Coverage Class 3 4 Coverage Class 4 5 Coverage Class 5
Reference	27.007 Rel 14

5.35. +KADC Command: Analog Digital Converter

HL78xx	
Test command Syntax **AT+KADC=?**	 Response **+KADC:** (list of supported **<Meas id>**s),(list of supported **<Meas time>**s) **OK**

HL78xx	
Write command Syntax **AT+KADC=<Meas id>,<Meas time>**	Response For <Meas id>= 2: **+KADC: <Meas result>,<Meas id>,<Meas time>[,<Temperature>]** For other values of <Meas id>: **+KADC: <Meas result>,<Meas id>,<Meas time>** **OK** or **+CME ERROR: <err>** Parameters **<Meas id>** Measurement ID 2 THERM (internal CTN) 4 ADC0 7 ADC1 **<Meas time>** Measurement time 3 No constraint **<Meas result>** Measurement result in µV **<Temperature>** Temperature in °C
Reference Sierra Wireless Proprietary	Notes • Only ADC0 (<Meas id>=4) and ADC1 (<Meas id=7) are available as external input. • Available range for input ADC0 and ADC1 is [0; 1.8] V. • If <Meas result> is not available, the answer will display this field as empty. • This AT command does not require a SIM card.
Examples	**AT+KADC=2,3** **+KADC: ,2,3,25** // no µV measurement available; temperature on internal CTN is 25°C **OK**

5.36. +WESHDOWN Command: Emergency Shutdown

HL78xx	
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**

HL78xx	
Write command Syntax **AT+WESHDOWN =<mode> [,<gpio_index>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<mode>** 0 Disable emergency shutdown feature by GPIO 1 Enable emergency shutdown feature by GPIO 2 Trigger emergency shutdown **<gpio_index>** 1-8, 10, 11, 14, 15 Defines which GPIO will be used as input to trigger the emergency shutdown on the falling edge. Default value = 4.
Reference Sierra Wireless Proprietary	Notes • <gpio_index> is not needed when <mode>=0 or 2. • Configuration is saved in non-volatile memory and is therefore still effective after a power cycle. • GPIOs may already be assigned to other commands such as **+KRIC** or **+KSYNC**. <gpio_index> must be an unassigned GPIO. • **AT+WESHDOWN=?** returns a dynamic list of supported GPIOs. GPIOs assigned to a specific purpose are not listed. • It might occasionally happen that the **OK** response to **AT+WESHDOWN=2** is not received on the serial link by the application due to quick shutdown. • This command can be used without SIM. • This command performs fast power down without an IMSI detach request being sent to the network. • Only one GPIO at a time can be configured for emergency shutdown. The only way to wake the module up is to set the WAKEUP pin high.
Examples	**AT+WESHDOWN=?** **+WESHDOWN: (0-2),(1,2,3,4,5,6,7,8,10,11,14,15)** **OK** **AT+WESHDOWN?** **+WESHDOWN: 0** *// Emergency shutdown by GPIO is not active* **OK** **AT+WESHDOWN=1,4** *// Activate emergency shutdown on GPIO4* **OK** **AT+WESHDOWN?** **+WESHDOWN: 1,4** *// A falling edge on GPIO4 will shut down the module* **OK** **AT+WESHDOWN=0** *// Deactivate emergency shutdown by GPIO* **OK** **AT+WESHDOWN=2** *// Module shutdown* **OK**

5.37. +KCELLMEAS Command: Request LTE Network Coverage Information

HL78xx	
Test command Syntax **AT+KCELLMEAS=?**	Response **+KCELLMEAS:** (list of supported **<revision>**s) **OK**
Read command Syntax **AT+KCELLMEAS?**	Response **OK**
Write command Syntax **AT+KCELLMEAS=<revision>**	Response For <revision>=0: **+KCELLMEAS: <RSRP>,<Downlink Path Loss>,<PUSCH Tx Power>,<PUCCH Tx Power>,<SiNR>** **OK** or when out of service: **+KCELLMEAS: ,,,,,** // empty or invalid response Parameters **<revision>** Revision of network information. Only 0 is currently supported. **<RSRP>** Reference Signals Received Power (dBm) Range = -140 dBm to 0 dBm **<Downlink Path Loss>** Downlink Path Loss (dBm) Range = -60 to 190 dBm **<PUSCH Tx Power>** Last Tx Power used on PUSCH channel (dBm) Range = -50 dBm to 100 dBm **<PUCCH Tx Power>** Last Tx Power used on PUCCH channel (dBm) Range = -26 dBm to 40 dBm **<SINR>** Signal to Interference plus Noise Ratio (dBm) Range = -128 dBm to 40dBm
Notes	• This command applies to LTE only. • This command only returns valid radio measurements if the device has a SIM and is in RRC connected state. • The integer part of the parameter values can have up to 3 digits. • Parameter values will always have one decimal place. Whole numbers will be given with 0 as the fractional part. For example, 22 will be returned as 22.0.

HL78xx	
Examples	**AT+KCELLMEAS=?** **+KCELLMEAS: 0** **OK** **AT+KCELLMEAS=0** **+KCELLMEAS: -85.,68.0,-6.3,9.0,23.0** **OK** // In case of N/A reported: **AT+KCELLMEAS=0** **+KCELLMEAS: ,,,,,** **OK**

5.38. +KSIMSEL Command: SIM Selection

HL78xx	
Test command Syntax **AT+KSIMSEL=?**	 Response **+KSIMSEL:** (list of supported **<mode>**s**)** **OK**
Read command Syntax **AT+KSIMSEL?**	 Response **+KSIMSEL: <mode>[, <GPIO>[, <sim_used>]]** **OK**

HL78xx	
Write command Syntax **AT+KSIMSEL=<mode>[,<GPIO>]**	Response **[+KSIMSEL: 4, <sim1_pres>, <sim2_pres>, <sim3_pres>]** Parameters **<mode>** SIM selection mode 0 Force to select external SIM (default value if there is no embedded SIM) 4 Read SIM presence status 9 Select internal SIM if present. The presence of an external SIM will be ignored 20 Select external SIM if present, else select internal SIM (default value if embedded SIM is present) **<GPIO>** Not supported currently. Parameter has no effect. **<sim1_pres>** 0 External SIM1 is not present 1 External SIM1 is present **<sim2_pres>** 0 External SIM2 is not present (currently not supported) 1 External SIM2 is present (currently not supported) **<sim3_pres>** 0 Internal SIM is not present (only possible value without embedded SIM) 1 Internal SIM is present (only possible value with embedded SIM) **<sim_used>** 1 External SIM1 is used 2 External SIM2 is used (currently not supported) 3 Embedded SIM is used
Reference Sierra Wireless Proprietary	Notes • Only one SIM is active at a time (DSSS: Dual SIM Single Standby). • This command can be supported even without a SIM card. • Currently, GPIO based external SIM switching is not supported; <GPIO> has no effect. • Fallback mode and embedded SIM can only be selected if embedded SIM is detected at bootup. • <mode>=4 and <mode>=20 are not available when SIM detection is disabled (**AT+KSIMDET=0**). • The default policy is to select External SIM slot on bootup. • Settings are kept after module reboot.

Examples	**//** Mode 0
	// Select external SIM1 when both internal and external SIMs are present
	AT+KSIMSEL=0
	OK
	
	// Query current SIM slot selection
	AT+KSIMSEL?
	+KSIMSEL: 0,,1 // External SIM1 is currently active
	OK
	
	// Select external SIM when only internal SIM is present
	AT+KSIMSEL=0
	OK
	
	// Query current SIM slot selection
	AT+KSIMSEL?

HL78xx	

	+KSIMSEL: 0,,1 // External SIM1 is currently active
	OK
	
	// Mode 9
	// Select internal SIM when both external and internal SIMs are present
	AT+KSIMSEL=9
	OK
	
	// Query current SIM slot selection
	AT+KSIMSEL?
	+KSIMSEL: 9,,3 // Internal SIM is currently active
	OK
	
	// Mode 20
	// Select external SIM if present, else fallback to internal SIM
	AT+KSIMSEL=20 //Requires reboot for setting to take effect
	OK
	
	// Reboot for setting to take affect
	// Query current SIM slot selection
	AT+KSIMSEL?
	+KSIMSEL: 20,,1 // Device switches to external SIM1
	OK
	
	// Remove external SIM
	// Query current SIM slot selection
	AT+KSIMSEL?
	+KSIMSEL: 20,,3 // Device falls back to internal SIM
	OK
	
	// Read SIM presence status Mode 4
	// Read SIM card presence status when first external SIM is not present
	AT+KSIMSEL=4
	+KSIMSEL: 4,1,,0 // First external SIM1 is present, but internal SIM is not present
	OK
	
	// Test command
	AT+KSIMSEL=?
	+KSIMSEL: (0,4,9,20)
	OK

5.39. +KSIMDET Command: SIM Detection

HL78xx	
Test command Syntax **AT+KSIMDET=?**	 Response **+KSIMDET: (**list of supported **<mode>**s**)** **OK**

HL78xx	
Read command Syntax **AT+KSIMDET?**	 Response **+KSIMDET: <mode>** **OK**
Write command Syntax **AT+KSIMDET=<mode>**	 Response **+KSIMDET: <mode>** **OK** Parameter **<mode>** Status of unsolicited SIM notification events 0 Disable SIM detection 1 Enable SIM detection
Unsolicited Notification	Response **+SIM: <status>** Parameter **<status>** Event status 0 Removed 1 Inserted
Reference Sierra Wireless Proprietary	Notes • This command can be supported even without a SIM card. • This command is only applicable to external SIM card detection. • Disabling SIM detection is not allowed when **+KSIMSEL <mode>=20**. • 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. • Settings are kept after module reboot.

Examples	// Enable SIM detection URC indications
	AT+KSIMDET=1
	OK
	
	// SIM card is removed
	+SIM: 0
	
	// SIM card is inserted
	+SIM: 1
	
	// No URC indication when SIM card is removed or inserted
	AT+KSIMDET=0
	OK
	
	// Read current setting
	AT+KSIMDET?
	+KSIMDET: 0
	OK
	
	// Test command
	AT+KSIMDET=?
	+KSIMDET: (0-1)
	OK

5.40. +KUSBCOMP Command: Enable/Disable USB Mode

HL78xx	
Test command Syntax **AT+KUSBCOMP =?**	Response **+KUSBCOMP: (**supported **<mode>**s**), (**supported **<acm0>**s**), (**supported **<acm1>**s**), (**supported **<acm2>**s**)** **OK**
Read command Syntax **AT+KUSBCOMP ?**	Response **+KUSBCOMP: <mode>,<acm0>,<acm1>,<acm2>** **OK**

HL78xx	
Write command Syntax **AT+KUSBCOMP=<mode>[,<acm0>[,<acm1>[,<acm2>]]]**	Response **OK** or **+CME ERROR: 3** Parameter **<mode>** USB mode config 0 USB disabled (default) 1 CDC-ACM mode (PID: 0xC001) — Three interfaces supported. If no optional <acm#> parameters are specified, the default interface assignments are: USB-ACM0 — AT port USB-ACM1 — AT/PPP data port USB-ACM2 — NMEA data port If any optional <acm#> parameters are specified, then any <acm> that is not specified will be assigned 0 (none). **<acm0>** Port type to enable on USB ACM0 0 None 1 AT 2 AT_PPP 3 NMEA 4 SFP_LOGGER 5 MAC_VIA_MAP **<acm1>** Port type to enable on USB ACM1 0 None 1 AT 2 AT_PPP 3 NMEA 4 SFP_LOGGER 5 MAC_VIA_MAP **<acm2>** Port type to enable on USB ACM2 0 None 1 AT 2 AT_PPP 3 NMEA 4 SFP_LOGGER 5 MAC_VIA_MAP
Reference Sierra Wireless Proprietary	Notes • The current configuration is kept in flash. • New configuration will only be activated after module reboots. • The factory preset value of <mode> is 0. • This command can be used without SIM. • If USB is enabled with all three ACM parameters set to 0 or NULL, the default interface assignments for each ACM will be used. • If FW Log is enabled over the UART port, enabling MAC_VIA_MAP over USB will disable the FW log over UART port (i.e. the UART port will no longer be set). • Any service (port type) can be enabled on only one ACM port at a time.

HL78xx	
Examples	***// Show command format*** **AT+KUSBCOMP=?** **+KUSBCOMP: (0-1),(0-5),(0-5),(0-5)** **OK** ***// Disable USB*** **AT+KUSBCOMP=0** **OK** **AT+KUSBCOMP?** **+KUSBCOMP: 0,0,0,0** ***// All ACMs = 0 because USB is disabled*** **OK** ***// Enable USB, all ACMs to use default assignments*** **AT+KUSBCOMP=1,,,** **OK** **AT+KUSBCOMP?** ***// ACMs set to default assignments (1,2,3 respectively)*** **+KUSBCOMP:1,1,2,3** **OK** ***// Enable USB, ACM0 uses 0 (none), and ACM1/ACM2 use specified assignments*** **AT+KUSBCOMP=1,,1,2** **OK** **AT+KUSBCOMP?** **+KUSBCOMP:1,0,1,2** ***// ACM0 uses port 0, ACM1/ACM2 use specified ports*** **OK**

5.41. +KTEMPMON Command: Temperature Monitor

HL78xx	
Test command Syntax **AT+KTEMPMON=?**	 Response **+KTEMPMON: (**list of supported **<mode>**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: <mode>,<temperature>,<urcMode>,<action>,<hystTime>,<repGPIO>** **OK**
Write command Syntax **AT+KTEMPMON=<mode>,[<temperature>[,<urcMode>**	 Response **+KTEMPMON: <level>,<value>** **OK**

HL78xx	
[,<action> [,<hystTime> [,<repGPIO>]]]]	Parameters **<mode>** 0 Disable the module's internal temperature monitor 1 Enable the module's internal temperature monitor **<temperature>** Set a single user-defined temperature threshold at which the specified <action> occurs. (Note – Additional non-configurable threshold <level>s are monitored and can be reported by enabling event reporting with <urcMode>.) **<urcMode>** 0 Disable temperature monitor event reporting 1 Enable temperature monitor event reporting via URCs: **+KTEMPMEAS: <level>,<value>** A URC will be received each time the temperature crosses a threshold (i.e. when the <level> changes). **<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. **<hystTime>** 0 – 255 Hysteresis time in seconds. All <action> will only happen if <temperature> is maintained for at least this period. If value is set to 0, it means <action> will be taken immediately. Default value = 30. **<repGPIO>** 1 – 15 (platform dependent), 255 (no GPIO used) Reporting GPIO — Defines which GPIO is allocated as an output pin to report the event. This parameter is mandatory if <action>=2 is specified. Default value = 255 (since default <action> is 0). When <action> changes from 2, the previously allocated reporting GPIO (for <action>=2) is deallocated. **<level>** Threshold level -2 Extreme temperature lower bound (-40°C) -1 Operating temperature lower bound (-20°C). Reserved; to be implemented in a future revision. 0 Normal temperature 1 Operating temperature upper bound (+55°C) 2 Extreme temperature upper bound (temperature limit set in **AT+KTEMPMON**, default = +85°C) **<value>** Current temperature expressed in degrees Celsius.
Notes	• Due to temperature measurement uncertainty there is a tolerance of ± 2°C. • Check available GPIOs with **+KGPIOCFG** when using this command. • This command will return **ERROR** if the selected GPIO is already being used by another feature. Check GPIO availability with other related commands **+KSIMDET**, **+KSIMSEL**, **+KSYNC**, **+KJAM**, **+GSMAD**, **+GNSSAD**, and **+KTEMPMON** when using this command.

Examples	//test command
	AT+KTEMPMON=?
	+KTEMPMON: (0-1),(0-120),(0),(0-2),(0-255),(1,2,4,5,6,7,8,10,11,14,15,255)
	OK
	
	//default setting
	AT+KTEMPMON?

HL78xx	

	+KTEMPMON: 0,90,0,0,30,255
	OK
	
	//enable temperature monitor, set threshold to 70 degrees
	AT+KTEMPMON=1,70
	+KTEMPMON: 0,30
	OK
	
	AT+KTEMPMON?
	+KTEMPMON: 1,70,0,0,30,255
	OK
	
	//set hysteresis time to 20 seconds
	AT+KTEMPMON=1,70,0,0,20
	+KTEMPMON: 0,29
	OK
	
	AT+KTEMPMON?
	+KTEMPMON: 1,70,0,0,20,255
	OK
	
	//set action to output HIGH on GPIO 1
	AT+KTEMPMON=1,70,0,2,20,1
	+KTEMPMON: 0,30
	OK
	
	AT+KTEMPMON?
	+KTEMPMON: 1,70,0,2,20,1
	OK

5.42. +KCIOTOPT Command: UE Network Capability Information Configuration

HL78xx	
Test command Syntax **AT+KCIOTOPT=?**	 Response **+KCIOTOPT: (**list of supported **<opt_item>**s**),(**list of supported **<val>**s**)[,(**list of supported **<act>**s**)]** **OK**
Read command Syntax **AT+KCIOTOPT?**	 Response **+KCIOTOPT:** **<opt_item=0>,<val_act_0>,<val_act_1>** **<opt_item=1>,<val_act_0>,<val_act_1>** **<opt_item=2>,<val_act_0>,<val_act_1>** **<opt_item=3>,<val_act_0>,<val_act_1>** **OK**

HL78xx	
Write command Syntax **AT+KCIOTOPT=<opt_item>,<val>[,<act>]**	Response **OK** Parameters **<opt_item>** CIOT optimization/support item (Specific elements of Network Attach Request Octet 8 (3GPP TS 24.301)) 0 Extended PCO IE (Octet 8, bit 8) 1–3 Not implemented, reserved for future use **<val>** Value **<val_act_0>, <val_act_1>** Values for M1 and NB1, respectively 0 Disabled 1 Enabled **<act>** Access Control technology 0 M1 1 NB1 (default)
Notes	• Functionality depends on network/carrier-level support for this feature. • If <opt_item>=0 (Extended PCO IE) is enabled, sending of regular PCO information in the NAS Attach Request is automatically disabled.

Examples	//test command
	AT+KCIOTOPT=?
	+KCIOTOPT: (0-3),(0,1)[,(0-1)]
	OK
	
	//default setting
	AT+KCIOTOPT?
	+KCIOTOPT: 0,0,0
	+KCIOTOPT: 1,0,0
	+KCIOTOPT: 2,0,0
	+KCIOTOPT: 3,0,0
	OK
	
	//enable ePCO for Cat-M1
	AT+KCIOTOPT=0,1,0
	OK
	
	AT+KCIOTOPT?
	+KCIOTOPT: 0,0,0
	+KCIOTOPT: 1,0,0
	+KCIOTOPT: 2,0,0
	+KCIOTOPT: 3,0,0
	OK
	
	OK

5.43. +KEDRXCFG Command: Configure eDRX

HL78xx	
Test command Syntax **AT+KEDRXCFG=?**	Response **+KEDRXCFG: (**range of supported **<mode>**s**),(**active **<AcT-type>),(**range of supported **<Requested_eDRX_value>**s**) ,(**range of supported **<Requested_PTW_value>**s**)**
Read command Syntax **AT+KEDRXCFG?**	Response **+KEDRXCFG: <AcT-type>, <Requested_eDRX_value>, <NW-provided_eDRX_value>, <Requested_PTW_value>, <NW-provided_PTW_value>** **OK**
Write command Syntax **+KEDRXCFG=[<mode>][,[<AcT-type>][,[<Requested_eDRX_value>][,[<Requested_PTW_value>]]]]**	Response **OK** Parameters **<mode>** Integer type, indicates to disable or enable the use of eDRX in the UE 0 Disable the use of eDRX 1 Enable the use of eDRX 2 Enable the use of eDRX and enable the unsolicited result code `+CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<NW-provided_PTW_value>]]]` 3 Disable the use of eDRX and discard all parameters for eDRX to the factory default values. **<AcT-type>** Integer type, indicates the type of access technology 0 (Read response only) Access technology is not using eDRX 4 E-UTRAN (WB-S1 mode) 5 E-UTRAN (NB-S1 mode) **<Requested_eDRX_value>** eDRX value requested by the module. Integer type (and string type (half a byte in a 4-bit format) is also allowed in the Write command format). The eDRX value refers to bits 4 to 1 of octet 3 of the Extended DRX parameters information element. For example: Test command shows integer value range (i.e. 0–15) Read command shows integer value Write command accepts 0–15 or "0000"–"1111" Note: The actual supported range varies by RAT — CAT-M1 (0-13); NB1 (0-15). **<NW-provided_eDRX_value>** eDRX value assigned by the network. Integer type (in Read response) or string type (in +CEDRXP URC; half a byte in a 4-bit format). The eDRX value refers to bitS 4 to 1 of octet 3 of the Extended DRX parameters information element **<Requested_PTW_value>** PTW value requested by the module (Valid range: 0-15) corresponding to: • CAT-M1 – actual PTW length = 1.28 sec × (1 + PTW) • NB1 – actual PTW length = 2.56 sec × (1 + PTW) Integer type (and string type (half a byte in a 4-bit format) is also allowed in the Write command format). The PTW value refers to bits 8 to 5 of octet 3 of the Extended DRX

HL78xx	
	parameters information element. For example: Test command shows integer value range (i.e. 0–15) Read command shows integer value Write command accepts 0–15 or "0000"–"1111" **<NW-provided_PTW_value>** Integer type (in Read response) or string type (in +CEDRXP URC; half a byte in a 4-bit format). The paging time window refers to bits 8 to 5 of octet 3 of the Extended DRX parameters information element
Notes	• This command expands upon AT+CEDRXS by including configuration of the eDRX Paging Time Window (PTW). All other parameters are common and can be read/written by either command. **IMPORTANT:** To set the PTW, eDRX must be disabled and then re-enabled for the PTW configuration to be updated (see the last example in the "Examples" section, below). • Most configurations are persistent across power cycles. The PTW configuration does not currently persist. This will be addressed in a future firmware upgrade. • The Read command response shows details for the currently running RAT.
Reference	27.007 Rev13

Examples	//Enable eDRX with previously configured parameters
	AT+KEDRXCFG=1
	OK
	
	//Enable eDRX for Cat-M1 with T(eDRX)=81.92s and T(PTW)=1.28s
	AT+KEDRXCFG=1,4,5,0
	OK
	
	//Enable eDRX for Cat-M1 with previously configured T(eDRX), and T(PTW)=2.56s
	AT+KEDRXCFG=1,4,,1
	OK
	
	//Disable eDRX for Cat-M1 and change T(PTW) to 3.84s
	AT+KEDRXCFG=0,4,,2
	OK
	
	//Configure T(PTW) for the currently active RAT (Cat-M1 or NB-IOT)
	//Note – At this time, eDRX must be disabled and re-enabled to set the PTW. This
	// is a temporary requirement that will be addressed in a future firmware upgrade.
	AT+KEDRXCFG=0
	AT+KEDRXCFG=1,,,2
	OK

6. Network Service Related Commands

6.1. +CLCK Command: Facility Lock

HL78xx	
Test command Syntax **AT+CLCK=?**	 Response **+CLCK:** (list of supported **<fac>**s) **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+CLCK=<fac>, <mode> [,<passwd> [,<class>]]**	 Response If **<mode>** = 2 and command is successful **OK** **+CLCK: <status>[,<class1>[<CR>,<LF>** **+CLCK: <status>,class2…]]** or **+CME ERROR: <err>** Parameters **<fac>** Values reserved by the present document: "PS" PH-SIM (lock Phone to SIM/UICC card installed in the currently selected card slot) (MT asks for the password when other than current SIM/UICC card is inserted; MT may remember certain previously used cards thus not requiring password when they are inserted) "SC" SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command issued) "PN" Network Personalization "PU" Network subset Personalization **<mode>** 0 Unlock 1 Lock 2 Query status **<status>** 0 Not active 1 Active **<passwd>** String type; shall be the same as password specified for the facility from the ME user interface or with command **+CPWD** **<classx>** Sum of integers each representing a class of information (default value = 7) 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) 4 Fax (facsimile services)

HL78xx	
	8 Short message service 16 Data circuit sync 32 Data circuit async 64 Dedicated packet access 128 Dedicated PAD access
Reference	27.007 Rev12

6.2. +CPWD Command: Change Password

HL78xx	
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>** "PS" PH-SIM (lock Phone to SIM/UICC card installed in the currently selected card slot) (MT asks for the password when other than current SIM/UICC card is inserted; MT may remember certain previously used cards thus not requiring password when they are inserted) "P2" SIM PIN2 password specified for the facility from the user interface or with a command. "SC" SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command issued) "PN" Network Personalization "PU" Network subset Personalization **<oldpwd>** String type containing the old password **<newpwd>** String type containing the new password **<pwdlength>** Length of password
Reference	27.007 Rev12

6.3. +COPN Command: Read Operator Name

HL78xx	
Test command Syntax **AT+COPN=?**	 Response **OK**
Execute command Syntax **AT+COPN**	 Response **+COPN: <numeric1>,<alpha1>[<CR><LF>** **+COPN: <numeric2>,<alpha2>** **[...]]** **OK** or **+CME ERROR: <err>** Parameters **<numeric>** String type; operator in numeric format (see **+COPS**) **<alpha>** String type; operator in long alphanumeric format (see **+COPS**)
Reference	27.007 Rev12

6.4. +COPS Command: Operator Selection

HL78xx	
Test command Syntax **AT+COPS=?**	 Response **+COPS: [**list of supported **(<stat>**, long alphanumeric **<oper>**, short alphanumeric **<oper>**, numeric **<oper>[,< AcT>])**s**][,,(**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>[,<AcT>]]** **OK** or **+CME ERROR: <err>**

HL78xx	
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 network 3 Sets <format> value. In this case <format> becomes a mandatory input **<format>** 0 Long alphanumeric; if network name is not available it displays a combination of MCC and MNC in string format 1 Short alphanumeric 2 Numeric **<oper>** String type given in format <format>; this field may be up to 16 character long for long alphanumeric format, up to 8 characters for short alphanumeric format and 5 characters long for numeric format (MCC/MNC codes) **<stat>** 0 Unknown networks 1 Network available 2 Current (registered) 3 Forbidden network **<AcT>** 7 E-UTRAN 9 E-UTRAN (NB-S1 mode)
Reference 27.007 Rev12	Notes **AT+COPS=?** is only available when the device is not in RRC Connected state (when it still has data to transmit or receive). **AT+COPS=?** will return ERROR if the device is in RRC Connected state. To ensure that the device is not in RRC Connected state, the device can be explicitly detached from the network using **AT+CGATT=0**, for example.

6.5. +CPOL Command: Preferred PLMN List

HL78xx	
Test command Syntax **AT+CPOL=?**	Response **+CPOL:** (list of supported **<index>**es),(list of supported **<format>**s) **OK** or **+CME ERROR: <err>**

HL78xx	
Read command Syntax **AT+CPOL?**	Response **+CPOL: <index1>,<format>,<oper1>[,<GSM_AcT1>,<GSM_Compact_AcT1>, <UTRAN_AcT1>,<E-UTRAN_AcT1>][<CR><LF>** **+CPOL: <index2>,<format>,<oper2>[,<GSM_AcT2>,<GSM_Compact_AcT2>, <UTRAN_AcT2>,<EUTRAN_AcT2>][...]]** **OK** or **+CME ERROR: <err>**
Write command Syntax **+CPOL=[<index>] [,<format> [,<oper> [,<GSM_AcT>, <GSM_Compact_ AcT>, <UTRAN_AcT>, <EUTRAN_AcT>]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<indexn>** Integer type; 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 **<GSM_AcTn>** Integer type; GSM access technology 0 Access technology not selected 1 Access technology selected **<GSM_Compact_AcTn>** Integer type; GSM compact access technology 0 Access technology not selected 1 Access technology selected **<UTRAN_AcTn>** Integer type; UTRAN access technology 0 Access technology not selected 1 Access technology selected **<E-UTRAN_AcTn>** Integer type; E-UTRAN access technology 0 Access technology not selected 1 Access technology selected
Reference	27.007 Rev12

6.6. +CREG Command: Network Registration

HL78xx	
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>][,<cause_type>,<reject_cause>]]** **OK**
Write command Syntax **AT+CREG=[<n>]**	 Response **OK** or **+CME ERROR: <err>** 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>]]** 3 Enable network registration, location information and cause value information unsolicited result code **+CREG:<stat>[,[<lac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]]** **<stat>** Circuit mode registration status 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") **<ci>** String-type; 4-byte cell ID in hexadecimal format **<AcT>** 0 GSM 7 E-UTRAN 9 E-UTRAN (NB-S1 mode) **<cause_type>** Type of <reject_cause> 0 <reject_cause> contains an MM cause value (see 3GPP TS 24.008 [8] Annex G) 1 <reject_cause> contains a manufacturer specific cause **<reject_cause>** Cause of the failed registration
Reference	27.007 Rev12

6.7. +CPLS Command: Select Preferred PLMN List

HL78xx	
Test command Syntax **AT+CPLS=?**	 Response **+CPLS:** (list of supported **< list>**s) **OK**
Read command Syntax **AT+CPLS?**	 Response **+CPLS: < list>** **OK**
Write command Syntax **AT+CPLS= [<cpls_list>]**	 Response **OK** or **+CME ERROR: <err>** Parameter **<list>** 0 User controlled PLMN selector with Access Technology $EF_{PLMNwAcT}$. If not found in the SIM/UICC, then the PLMN preferred list is $EF_{PLMNsel}$ (this file is only available in SIM card or GSM application selected in UICC) 1 Operator controlled PLMN selector with Access Technology $EF_{OPLMNwAcT}$ 2 HPLMN selector with Access Technology $EF_{HPLMNwAcT}$
Reference	27.007 Rev12

6.8. +CEREG Command: EPS Network Registration Status

HL78xx	
Test command Syntax **AT+CEREG=?**	 Response **+CEREG:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CEREG?**	 Response when <n>=0, 1, 2 or 3 and command is successful: **+CEREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>,<reject_cause>]]]** **OK** when <n>=4 or 5 and command is successful: **+CEREG: <n>,<stat>[,[<lac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>] [,[<Active-Time>],[<Periodic-TAU>]]]]** **OK**

HL78xx

Execute command

Syntax
AT+CEREG=[<n>]

Response
OK

or
+CME ERROR: <err>

Parameters

<n>
0 Disable network registration unsolicited result code
1 Enable network registration unsolicited result code **+CEREG: <stat>**
2 Enable network registration and location information unsolicited result code **+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]**
3 Enable network registration, location information and EMM cause value information unsolicited result code **+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]]**
4 For a UE that wants to apply PSM, enable network registration and location information unsolicited result code **+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>],[<Periodic-TAU>]]]]**
5 For a UE that wants to apply PSM, enable network registration, location information and EMM cause value information unsolicited result code **+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]**

<stat> Indicates the EPS registration status
0 Not registered; MT is currently not searching for an operator to register to
1 Registered, home network
2 Not registered but MT is currently trying to attach or searching for an operator to register to
3 Registration denied
4 Unknown (e.g. out of E-UTRAN coverage)
5 Registered, roaming
6 Registered for "SMS only", home network (not applicable)
7 Registered for "SMS only", roaming (not applicable)
8 Attached for emergency bearer services only
9 Registered for "CSFB not preferred", home network (not applicable)
10 Registered for "CSFB not preferred", roaming (not applicable)

<tac> 2-byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

<ci> String-type; 4-byte E-UTRAN cell ID in hexadecimal format

<AcT> Access technology of the serving cell
0 GSM (not applicable)
1 GSM Compact (not applicable)
2 UTRAN (not applicable)
3 GSM with EGPRS (not applicable)
4 UTRAN with HSDPA (not applicable)
5 UTRAN with HSUPA (not applicable)
6 UTRAN with HSDPA and HSUPA (not applicable)
7 E-UTRAN
9 E-UTRAN (NB-S1 mode)

HL78xx	
	<cause_type> Indicates the type of <reject_cause> 0 <reject_cause> contains an EMM cause value (see 3GPP TS 24.301 [83] Annex A) 1 <reject_cause> contains a manufacturer-specific cause **<reject_cause>** Cause of the failed registration **<Active-Time>** 1-byte in an 8-bit format. Indicates the Active Time value (T3324) allocated to the UE in E-UTRAN. The Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008 [8] Table 10.5.163/3GPP TS 24.008. Also see 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82]. **<Periodic-TAU>** 1-byte in an 8-bit format. Indicates the extended periodic TAU value (T3412) allocated to the UE in E-UTRAN. The extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer 3 IE in 3GPP TS 24.008 [8] Table 10.5.163a/3GPP TS 24.008. Also see 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82].
Reference	27.007 Rev12

6.9. +CEMODE Command: UE Modes of Operation for EPS

HL78xx	
Test command Syntax **AT+CEMODE=?**	Response **+CEMODE:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+CEMODE?**	Response **+CEMODE: <mode>** **OK**
Write command Syntax **AT+CEMODE=[<mode>]**	Response **OK** or **+CME ERROR: <err>** Parameter **<mode>** Indicates mode of operation 0 PS mode 2 of operation 1 CS/PS mode 1 of operation 2 CS/PS mode 2 of operation 3 PS mode 1 of operation

HL78xx	
Reference 27.007 Rev12	Notes In NB1, only <mode>=0 is supported.

6.10. +CNUM Command: Subscriber Number

HL78xx	
Test command Syntax **AT+CNUM=?**	 Response **OK**
Execute command Syntax **AT+CNUM**	 Response **+CNUM: [<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]][<CR><LF>** **+CNUM: [<alpha2>],<number2>,<type2>[,<speed>,<service>[,<itc>]][...]]** **OK** or **+CME ERROR: <err>** Parameters **<alphax>** Optional alphanumeric string associated with <numberx>; used character set should be the one selected with command +CSCS **<numberx>** String type phone number of format specified by <typex> **<typex>** Type of address octet in integer format **<speed>** As defined in 27.007 sub clause 6.7, corresponding to +CBST setting **<service>** Service related to the phone number 0 Asynchronous modem 1 Synchronous modem 2 PAD Access (asynchronous) 3 Packet Access (synchronous) 5 Fax **<itc>** Information transfer capability 0 3.1kHz 1 UDI
Reference	27.007 Rev12

7. SMS Commands

7.1. 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.

7.1.1. 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/or deleted (by commands **+CMGL**, **+CMGR** and **+CMGD**); defined values are as follows:

"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 **+CMSS** and **+CMGW**); refer to <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 to **+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> Status of message in memory. Integer type in PDU mode, or string type in text mode. Available values are as follows:

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>

7.1.2. Message Data Parameters

<ackpdu> RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without 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 +cscs.

<cdata> 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> Command type in integer format (default value = 0).

<da> Address value 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 +cscs). Type of address is given by <toda>.

<data> In the case of user data in text mode responses; format:

- if <dcs> indicates that GSM 7-bit default alphabet is used and <fo> indicates that user data header indication is not set
  - if TE character set other than "HEX" (refer to +cscs): ME/TA converts GSM alphabet into current TE character set
  - 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 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: CBM Content of Message in text mode responses; format:

- if <dcs> indicates that GSM 7-bit default alphabet is used
  - if TE character set other than "HEX" (refer to +cscs); ME/TA converts GSM alphabet into current TE character set
  - 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

<length> Integer type vlayue indicating the length of the actual TP data unit in octets in PDU mode. This is 140 characters long according to 8-bit GSM coding scheme.

In text mode, the maximum length of an SMS depends on the used coding scheme (160 characters if 7-bit).

<mid> CBM Message Identifier in integer format

<mn> TP-Message-Number in integer format

<mr> Message reference in integer format

<oa> Origiantion 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 +cscs); type of address given by <tooa>

<page> CBM Page Parameter bits 4-7 in integer format

<pages>	CBM Page Parameter bits 0-3 in integer format
<pdu>	GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format In the case of CBS, TPDU in hexadecimal format
<pid>	Protocol identifier in integer format. Default value is 0
<ra>	Recipient address address value 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 +cscs); type of address is given by <tora>
<sca>	String value enclosed in quotes indicating the service center address. Note that BCD numbers are converted to characters; type of address is given by <tosca>
<scts>	Service centre time stamp in time-string format (refer to <dt>)
<sn>	CBM Serial Number in integer format
<st>	Status in integer format
<toda>	Type of address octet in integer format. Default value is 145 if the first character of <da> is “+”; otherwise, default value is 129
<tooa>	Originating address type of address octet in integer format (refer to <toda> for the default value)
<tora>	Recipient address type of address octet in integer format (refer to <toda> for the default value)
<tosca>	SC address type of address octet in integer format (refer to <toda> for the default value)
<vp>	Depending on SMS-SUBMIT <fo> setting: TP-Validity-Period either in integer format (default value = 167) or in time-string format (refer to <dt>)
<vp>	Validity period in either integer format (default value = 167) or in time-string format depending on <fo> settings
<dcs>	SMS Data Coding Scheme (default value = 0), or Cell Broadcast Data Coding Scheme in integer format
<dt>	Discharge time in time-string format “yy/MM/dd,hh:mm:ss+zz” where the characters indicate year, month, day, hour, minutes, seconds and time zone. For example, May 6, 1994, 10:10 pm GMT+2 hours is equals to “94/05/06,22:10:00+08”
<fo>	First octet of SMS-DELIVER, SMS-SUBMIT (default value = 17), SMS-STATUS-REPORT, or SMS-COMMAND (default value = 2) in integer format depending on command or result code

7.2. +CMGD Command: Delete Message

HL78xx	
Test command Syntax **AT+CMGD=?**	Response **+CMGD:** (list of supported **<index>**es)[,(list of supported **<delflag>**s)] **OK**
Write command Syntax **AT+CMGD=<index>[,<delflag>]**	Response **OK**

HL78xx	
	or **+CMS ERROR: <err>** or **+CME ERROR: <err>** Parameter **<delflag>** Integer indicating multiple message deletion request 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
Notes	Execution command deletes message from preferred message storage <mem1>, location <index>. If <delflag> is present and not set to 0 then the ME shall ignore <index> and follow the rules for <delflag> shown above.

7.3. +CMGF Command: Set Message Format

HL78xx	
Test command Syntax **AT+CMGF=?**	Response **+CMGF:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+CMGF?**	Response **+CMGF: <mode>** **OK**
Execute command Syntax **AT+CMGF=** **[<mode>]**	Response **OK** or **+CMS ERROR: err>** Parameter **<mode>** 0 PDU mode (default when implemented) 1 Text mode
Notes	<mode> is saved in non-volatile memory per AT port over module reboot.

7.4. +CMGL Command: List Messages

HL78xx	
Test command Syntax **AT+CMGL=?**	Response **+CMGL:** (list of supported **<stat>**s) **OK**
Execute command Syntax **AT+CMGL [=<stat>]**	Response If in text mode, command is successful and SMS-SUBMITs and/or SMS-DELIVERs: **+CMGL: <index>,<stat>, <oa/da>,[<alpha>], [<scts>][,<tooa/toda>,<length>] <CR><LF><data>[<CR><LF>** **+CMGL: <index>,<stat>, <da/oa>,[<alpha>], [<scts>][,<tooa/toda>, <length>] <CR><LF><data>** **[...]]** If in text mode, command is successful and SMS-STATUS-REPORTs: **+CMGL: <index>, <stat>,<fo>, <mr>, [<ra>], [<tora>], <scts>, <d-t>,<st>[<CR><LF>** **+CMGL: <index>, <stat>, <fo>, <mr>,[<ra>], [<tora>],<scts>,<d_t>,<st>[...]]** If in text mode, command is successful and SMS-COMMANDs: **+CMGL: <index>,<stat>,<fo>,<ct> [<CR><LF>** **+CMGL: <index>,<stat>, <fo>,<ct>[...]]** If in text mode, command is successful and CBM storage: **+CMGL: <index>,<stat>,<sn>, <mid>, <page>,<pages> <CR><LF><data>[<CR><LF>** **+CMGL: <index>,<stat>,<sn>, <mid>,<page>,<pages><CR><LF><data>[...]]** If in PDU mode and command is successful: **+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu>** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 7.1 Parameters Definition.

7.5. +CMGR Command: Read Message

HL78xx	
Test command Syntax **AT+CMGR=?**	Response **OK**

HL78xx	

Write command
 	
Syntax
AT+CMGR=<index>
	Response
	If text mode (+CMGF=1), command is successful, and SMS-DELIVER:
	+CMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>
	
	if text mode (+CMGF=1), command is successful, and SMS-SUBMIT:
	+CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>
	
	if text mode (+CMGF=1), command is successful, and SMS-STATUS-REPORT:
	+CMGR: <stat>,<fo>,<mr>,[<ra>], [<tora>],<scts>,<d_t>,<st>
	
	if text mode (+CMGF=1), command is successful, and SMS-COMMAND:
	+CMGR: <stat>, <fo>,<ct>[, <pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]
	
	if text mode (+CMGF=1), command is successful, and CBM storage:
	+CMGR: <stat>,<sn>, <mid>,<dcs>,<page>,<pages><CR><LF><data>
	
	if PDU mode (+CMGF=0) and command is successful:
	+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu>
	
	or
	+CMS ERROR: <err>
	
	Parameters
	For parameter information and values, refer to section 7.1 Parameters Definition.

7.6. +CMGS Command: Send Message

HL78xx	
Test command Syntax **AT+CMGS=?**	Response **OK**
Write command Syntax If text mode (+CMGF=1): **AT+CMGS=<da>[,<toda>]<CR>** **text is entered** **<ctrl-Z/ESC>**	Response If text mode (+CMGF=1) and sending is successful: **[+CMGS: <mr>[,<scts>]]** **OK** if PDU mode (+CMGF=0) and sending is successful: **[+CMGS: <mr>]** **OK** or **+CMS ERROR: <err>**

HL78xx	
If PDU mode (+CMGF=0): **AT+CMGS= <length><CR>** **PDU is given <ctrl-Z/ESC>**	Parameters For parameter information and values, refer to section 7.1 Parameters Definition.
Notes	• The TA shall send a four-character sequence <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>; after that PDU can be given from TE to ME/TA. • The PDU shall be hexadecimal format (similarly as specified for <pdu>) and given in one line; ME/TA converts this coding into the actual octets of PDU. • When the length octet of the SMSC address (given in the PDU) equals zero, the SMSC address set with **+CSCA** is used; in this case the SMSC Type-of-Address octet shall not be present in the PDU, i.e. TPDU starts right after SMSC length octet. • Sending can be cancelled by giving <ESC> character. • <ctrl-Z> must be used to indicate the ending of PDU. • **+CMGS: <mr>[,<scts>]** is not available in **+CMGS** intermediate response as SMS is sent over IMS using 3GPP2 SMS PDU format and protocol.

7.7. +CMGW Command: Write Message to Memory

HL78xx	
Test command Syntax **AT+CMGW=?**	Response **OK**
Write command Syntax If text mode (+CMGF=1): **AT+CMGW[= <oa/da> [,<tooa/toda> [,<stat>]]]<CR>** **text is entered <ctrl-Z/ESC>** If PDU mode (+CMGF=0): **AT+CMGW= <length>[,<stat>] <CR>** **PDU is given <ctrl-Z/ESC>**	Response **+CMGW: <index>** **OK** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 7.1 Parameters Definition.
Notes	• Execution command stores a message to memory storage <mem2>, and memory location <index> of the stored message is returned. • By default, message status will be set to 'stored unsent', but parameter <stat> also allows other status values to be given. (ME/TA manufacturer may choose to use different default <stat> values for different message types.) • Entering of PDU is done similarly as specified in **+CMGS**.

7.8. +CMSS Command: Send Message from Storage

HL78xx	
Test command Syntax **AT+CMSS=?**	 Response **OK**
Write command Syntax **AT+CMSS=<index>[,<da>[,<toda>]]**	 Response If text mode (+CMGF=1) and sending is successful: **+CMSS: <mr>[,<scts>]** If PDU mode (+CMGF=0) and sending is successful: **+CMSS: <mr>** **OK** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 7.1 Parameters Definition.
Notes	• Execution command sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address <da> is given for SMS-SUBMIT, it shall be used instead of the one stored with the message. • Reference value <mr> is returned to the TE on successful message delivery. Optionally (when **+CSMS** <service> value is 1 and network supports the feature), <scts> is returned in text mode.

7.9. +CNMI Command: New Message Indication

HL78xx	
Test command Syntax **AT+CNMI=?**	 Response **+CNMI:** (list of supported **<mode>**s), (range of supported **<mt>**s), (list of supported **<bm>**s), (range of supported **<ds>**es), (range of supported **<bfr>**s) **OK**
Read command Syntax **AT+CNMI?**	 Response **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>** **OK**

HL78xx

Write command

Syntax
+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]

Response
OK

or
+CMS ERROR: <err>

or
ERROR

Parameters

<mode>
- 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.

<mt>
- 0 No indications are routed to the TE.
- 1 Result code is sent when ME does not have any other display device other than the AT interface
- 2 Acknowledgement command must be sent when +CSMS <service> = 1 and ME does not have any other display device other than the AT interface

<bm>
- 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)

<ds>
- 0 No SMS-STATUS-REPORTs are routed to the TE.
- 1 SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: **+CDS: <length><CR><LF><pdu>** (PDU mode enabled) or **+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>** (text mode enabled)
- 2 If SMS-STATUS-REPORT is stored in ME/TA, indication of the memory location is routed to the TE using unsolicited result code: **+CDSI: <mem>,<index>**

<bfr>
- 0 TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> = 1 – 3 is entered
- 1 TA buffer of unsolicited result codes defined within this command is cleared when <mode> = 1 – 3 is entered

Notes
<mode>, <mt>, <bm> and <ds> are saved in non-volatile memory over module reboot; URC is available on the port that executes the command.

Examples

```
AT+CNMI=1                                   // Write command
OK

AT+CNMI=?                                   // Test command
+CNMI: (1,2),(0-2),(0,2),(0-2),(0-1)
OK

AT+CNMI?                                    // Read command
+CNMI: 1,0,0,0,0
OK
```

7.10. +CSCA Command: Service Center Address

HL78xx	
Test command Syntax **AT+CSCA=?**	 Response **OK**
Read command Syntax **AT+CSCA?**	 Response **+CSCA: <sca>,<tosca>** **OK**
Write command Syntax **AT+CSCA=<sca>[,<tosca>]**	 Response **OK** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 7.1 Parameters Definition.

7.11. +CSMP Command: Set Text Mode Parameters

HL78xx	
Test command Syntax **AT+CSMP=?**	 Response **+CSMP:** (list of supported **<fo>**s), (list of supported **<vp>**s), (list of supported **<pid>**s, (list of supported **<dcs>**s) **OK**
Read command Syntax **AT+CSMP?**	 Response **+CSMP: <fo>,<vp>,<pid>,<dcs>** **OK**
Write command Syntax **AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]**	 Response **OK** Parameters For parameter information and values, refer to section 7.1 Parameters Definition.

7.12. +CSMS Command: Select Message Service

HL78xx	
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** or **+CMS ERROR: <err>** Parameters **<service>** 0 3GPP TS 23.040 and 3GPP TS 23.041 1 3GPP TS 23.040 and 3GPP TS 23.041 (the requirement of setting <service> =1 is mentioned in the corresponding command description) **<mt>** Message terminated messages 0 Type not supported 1 Type supported **<mo>** Message originated messages 0 Type not supported 1 Type supported **<bm>** Broadcast type messages 0 Type not supported 1 Type supported

7.13. +CPMS Command: Preferred Message Storage

HL78xx	
Test command Syntax **AT+CPMS=?**	Response **+CPMS:** (list of supported **<mem1>**s), (list of supported **<mem2>**s), (list of supported **<mem3>**s) **OK**

HL78xx	
Read command Syntax **AT+CPMS?**	Response **+CPMS:** **<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>** **OK** or **+CMS ERROR: <err>**
Write command Syntax **AT+CPMS=** **<mem1>** **[,<mem2>** **[,<mem3>]]**	Response **+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>** **OK** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 7.1 Parameters Definition.
Notes	<mem1>, <mem2> and <mem3> are saved in non-volatile memory over module reboot.

7.14. +CSDH Command: Show Text Mode Parameters

HL78xx	
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** or **+CME ERROR: <err>**

HL78xx			
	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 **+CMGL**, **+CMGR** result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in **+CMGR** resultcode, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata>
		1	Show values in result codes

7.15. +CMT Notification: Received SMSPP Content

HL78xx	
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 received message. • Detailed header information is shown in text mode result codes according to **+CSDH**.

8. Packet Domain Commands

8.1. +CGATT Command: PS Attach or Detach

HL78xx	
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** or **ERROR** Parameter **<state>** State of PS attachment 0 Detached 1 Attached
Reference	27.007 Rev12

8.2. +CGACT Command: PDP Context Activate or Deactivate

HL78xx	
Test command Syntax **AT+CGACT=?**	 Response **+CGACT:** (list of supported **<state>**s) **OK**
Read command Syntax **AT+CGACT?**	 Response **[+CGACT: <cid>,<state>]** **[<CR><LF>+CGACT: <cid>,<state>** **[...]]** **OK**

HL78xx	
Write command Syntax **AT+CGACT=[<state>[,<cid>[,<cid>[,...]]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<state>** Indicates the state of PDP context activation 0 Deactivated 1 Activated **<cid>** Numeric parameter which specifies a particular PDP context definition
Reference 27.007 Rev12	Notes • Be aware that the module includes an internal stack that may automatically activate or deactivate PDP context. • Important: Deactivating all PDP contexts (e.g. by using AT+CGACT=0 with no <cid> parameters) also causes the device to detach from the network (equivalent to AT+CGATT=0). • Important: The command will not allow you to deactivate the last active PDP context without another PDP context active (it will return ERROR). To deactivate your last PDP context (or all of them), you must detach with AT+CGATT=0 or AT+CGACT=0. • You must reattach with AT+CGATT=1 before reactivating any PDP contexts.

8.3. +CGCMOD Command: Modify PDP Context

HL78xx	
Test command Syntax **AT+CGCMOD=?**	Response **+CGCMOD:** (list of **<cid>**s addociated with active contexts) **OK**
Write command Syntax **AT+CGCMOD=[<cid>[,<cid>[,...]]]**	Response **OK** or **+CME ERROR: <err>** Parameter **<cid>** Numeric parameter which specifies a particular PDP context definition (see **+CGDCONT** and **+CGDSCONT**)
Reference	27.007 Rev10

8.4. +CGTFT Command: Traffic Flow Template

HL78xx	
Test command Syntax **AT+CGTFT=?**	Response **+CGTFT: <PDP_type>,** (list of supported **<packet filter identifier>**s) , (list of supported **<evaluation precedence index>**s), (list of supported **<source address and subnet mask>**s), (list of supported **<protocol number (ipv4) / next header (ipv6)>**s), (list of supported **<destination port range>**s), (list of supported **<source port range>**s), (list of supported **<ipsec security parameter index (spi)>**s), (list of supported **<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>**s), (list of supported **<flow label (ipv6)**>s), (list of supported **<direction>**s) **[<CR><LF>+CGTFT: <PDP_type>,** (list of supported **<packet filter identifier>**s), (list of supported **<evaluation precedence index>**s), (list of supported **<source address and subnet mask>**s), (list of supported **<protocol number (ipv4) / next header (ipv6)>**s), (list of supported **<destination port range>**s),(list of supported **<source port range>**s), (list of supported **<ipsec security parameter index (spi)>**s), (list of supported **<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>**s), (list of supported **<flow label (ipv6)**>s), (list of supported **<direction>**s)**[...]]**
Read command Syntax **AT+CGTFT?**	Response **+CGTFT: <cid>, <packet filter identifier>,<evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)>, <direction>** **[<CR><LF>+CGTFT: <cid>, <packet filter identifier>, <evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)>, <direction>** **[...]]**
Execute command Syntax **AT+CGTFT= [<cid>,[<packet filter identifier>, <evaluation precedence index> [,<source address and subnet mask> [,<protocol number (ipv4) / next header (ipv6)> [,<destination port range> [,<source port range> [,<ipsec security parameter index (spi)> [,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>**	Response **OK** or **ERROR** Parameter **<cid>** Numeric parameter which specifies a particular PDP context definition (see **+CGDCONT** and **+CGDSCONT**) **<packet filter identifier>** Numeric parameter with value range from 1 to 16 **<evaluation precedence index>** Numeric parameter with value range from 0 to 255 **<source address and subnet mask>** String tpe given as a dot-separated numeric (0 – 255) parameter of the form "a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13. a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8. m9.m10.m11.m12.m13.m14.m15.m16" for IPv6

HL78xx	
[,<flow label (ipv6)>, <direction>]]]]]]]]]	**<protocol number (ipv4) / next header (ipv6)>** Numeric parameter with value range from 0 to 255 **<destination port range>** String type given as a dot-separated numeric (0 – 65535) parameter on the form 'f.t.' **<source port range>** String type given as a dot-separated numeric (0 – 65535) parameter on the form 'f.t.' **<ipsec security parameter index (spi)>** Numeric value in hecadecimal format with value range from 00000000 to FFFFFFFF **<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>** String type given as a dot-separated numeric (0 – 255) parameter on the form 't.m.' **<flow label (ipv6)>** Numeric value in hecadecimal format with value range from 00000 to FFFFF. Valid for IPv6 only **<direction>** Specifies the transmission direction in which the packet filter shall be applied 1 Uplink 2 Downlink 3 Birectional (up and downlink; default if omitted)
Reference 27.007 Rev12	Notes • Some of the listed attributes above may coexist in a Packet Filter while others mutually exclude each other. For the list of possible combinations, refer to 3GPP TS 23.060. • **+CGTFT=<cid>** causes all packet filters in the TFT for context number <cid> to become undefined.

8.5. +CGDCONT Command: Define PDP Context

HL78xx	
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 **<IPv4AddrAlloc>**s),(list of supported **<request_type>**s),(list of supported **<P-CSCF_discovery>**s),(list of supported **<IM_CN_Signalling_Flag_Ind>**s),(list of supported **<NSLPI>**s),(list of supported **<securePCO>**s),(list of supported **<IPv4_MTU_discovery>**s),(list of supported **<Local_Addr_Ind>**s),(list of supported **<Non-IP_MTU_discovery>**s),(list of supported **<Reliable_Data_Service>**s) **[<CR><LF>+CGDCONT:** (range of supported **<cid>**s),**<PDP_type>**,,,(list of supported **<d_comp>**s),(list of supported **<h_comp>**s),(list of supported **<IPv4AddrAlloc>**s),(list of supported **<request_type>**s),(list of supported **<P-CSCF_discovery>**s),(list of supported **<IM_CN_Signalling_Flag_Ind>**s),(list of supported **<NSLPI>**s),(list of supported **<securePCO>**s),(list of supported **<IPv4_MTU_discovery>**s),(list of supported **<Local_Addr_Ind>**s),(list of supported **<Non-IP_MTU_discovery>**s),(list of supported **<Reliable_Data_Service>**s) **[...]]** **OK**

HL78xx	
Read command Syntax **AT+CGDCONT?**	Response **[+CGDCONT:** **<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>** **[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>** **[,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind>** **[,<Non-IP_MTU_discovery>[,<Reliable_Data_Service>]]]]]]]]]]** **[<CR><LF>+CGDCONT:<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,** **<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>** **[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>** **[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>[,<Reliable_Data_Service>]]]]]]]]]]** **OK**
Execute command Syntax **AT+CGDCONT=** **[<cid>[,<PDP_type>[,<APN>** **[,<PDP_addr>** **[,<d_comp>** **[,<h_comp>** **[,<IPv4AddrAlloc>** **[,<request_type>** **[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>** **[,<NSLPI>** **[,<securePCO>** **[,<IPv4_MTU_discovery>]** **[,<Local_Addr_Ind>][,<Non-IP_MTU_discovery>]** **[,<Reliable_Data_Service>]** **]]]]]]]]]]]]**	Response **OK** or **ERROR** Parameters **<cid>** PDP Context Identifier. A numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of the permitted values (minimum value = 1) is returned by the test command. **<PDP_type>** Packet Data Protocol type "IP" Internet Protocol "IPV6" Internet Protocol version 6 "IPV4V6" Virtual <PDP_type>introduced to handle dual IP stack UE capability “Non-IP” Transfer of non-IP data to external packet data network **<APN>** Access Point Name String parameter which is a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested. **<PDP_addr>** String parameter that identifies the MT in the address space applicable to the PDP. If the value is null or omitted then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The read command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using **+CGPADDR**. Note that IPv6 address obtained on LTE will be prefixed with a constant 8-byte address "FE.80.00.00.00.00.00.00" if the network has not provided any. Currently, this parameter is omitted. **<d_comp>** PDP data compression (applicable for SNDCP only) 0 Off (default if value is omitted) **<h_comp>** PDP header compression 0 Off (default if value is omitted)

HL78xx	
	<IPv4AddrAlloc> Numeric parameter that controls how MT/TA requests to get IPv4 address information 0 IPv4 address allocated through NAS signalling 1 IPv4 address allocated through DHCP **<request_type>** Integer type; indicates the type of PDP context activation request for the PDP context 0 PDP context is for new PDP context establishment or for handover from a non-3GPP access network 1 PDP context is for emergency bearer services 2 PDP context is for new PDP context establishment 3 PDP context is for handover from a non-3GPP access network 4 PDP context is for handover of emergency bearer services from a non-3GPP access network **<P-CSCF_discovery>** Numeric parameter that influences how the MT/TA requests get the P-CSCF address 0 Preference of P-CSCF address discovery not influenced by **+CGDCONT** 1 Preference of P-CSCF address discovery through NAS signalling 2 Preference of P-CSCF address discovery through DHCP **<IM_CN_Signalling_Flag_Ind>** Numeric parameter used to indicate whether the PDP context is for IM CN subsystem related signaling only or not 0 UE indicates that the PDP context is not for IM CN subsystem-related signaling only 1 UE indicates that the PDP context is for IM CN subsystem-related signaling only **<NSLPI>** Integer type; indicates the NAS signalling priority requested for this PDP context 0 Indicates that this PDP context is to be activated with the value for the low priority indicator configured in the MT 1 Indicates that this PDP context is is to be activated with the value for the low priority indicator set to "MS is not configured for NAS signalling low priority". **<securePCO>** Integer type. Specifies if security protected transmission of PCO is requested or not (applicable for EPS only) 0 Security protected transmission of PCO is not requested 1 Security protected transmission of PCO is requested **<IPv4_MTU_discovery>** Integer type; influences how the MT/TA requests get the IPv4 MTU size 0 Preference of IPv4 MTU size discovery not influenced by **+CGDCONT** 1 Preference of IPv4 MTU size discovery through NAS signalling **<Local_Addr_Ind>** Integer type; indicates to the network whether the MS supports local IP address in TFTs 0 Indicates that the MS does not support local IP address in TFTs 1 Indicates that the MS supports local IP address in TFTs **<Non-IP_MTU_discovery>** Integer type; influences how the MT/TA requests get the non-IP MTU size. 0 Preference of non-IP MTU size discovery not influenced by **+CGDCONT** 1 Preference of non-IP MTU size discovery through NAS signalling

HL78xx	
	<Reliable_Data_Service> Integer type; indicates whether the UE is using Reliable Data Service for a PDN connection or not. 0 Reliable Data Service is not being used for the PDN connection 1 Reliable Data Service is being used for the PDN connection
Reference 27.007 Rev14	Notes • If the command is only used with one parameter, <cid>, it means that the corresponding PDP context becomes undefined. • The APN Control List (ACL) will only be checked if a USIM is inserted. Before performing context definition, it will check if the ACL-service is enabled and activated. If yes, all APNs from the ACL of EF-ACL of the USIM will be read out and compared with the requested APN. ▪ If the requested APN is listed in the ACL, the context definition will be performed. ▪ If the requested APN is empty ("") and ACL contains "network provided APN", the context definition will also be requested. ▪ If the APN is not listed in the ACL, the command returns error. ▪ If the ACL-service is not enabled or not activated in the USIM or a GSM-SIM is inserted, the context definition will be performed without any checks. • Parameters are saved in non-volatile memory over module reboot. • Parameters like available CIDs might vary depending on operator configuration set by **+KCARRIERCFG** . Refer to Table 2 Device Configuration of AirPrime HL7800-M MNO and RF Band Customization at Customer Application Site Application Note (reference number 2174213) for configuration description. • Configuration is saved in non-volatile memory and is therefore still effective after a power cycle.

8.6. +CGDSCONT Command: Define Secondary PDP Context

HL78xx	
Test command Syntax **AT+CGDSCONT=?**	Response **+CGDSCONT:** (range of **<cid>**s),(list of **<cid>**s for defined primary contexts), **<PDP_type>**,,,(list of supported **<d_comp>**s),(list of supported **<h_comp>**s),(list of supported **<IM_CN_Signalling_Flag_Ind>**s) **[<CR><LF>+CGDSCONT:** (range of **<cid>**s),(list of **<cid>**s for defined primary contexts), **<PDP_type>**,,,(list of supported **<d_comp>**s),(list of supported **<h_comp>**s),(list of supported **<IM_CN_Signalling_Flag_Ind>**s) **[...]]** **OK**
Read command Syntax **AT+CGDSCONT?**	Response **[+CGDSCONT: <cid>, <p_cid>, <d_comp>, <h_comp>** **[,<IM_CN_Signalling_Flag_Ind>]]** **[<CR><LF>+CGDSCONT: <cid>, <p_cid>, <d_comp>,<h_comp>** **[,<IM_CN_Signalling_Flag_Ind>]]** **[...]]]** **OK**

HL78xx	
Execute command Syntax **AT+CGDSCONT=[<cid>,<p_cid>[,<d_comp>[,<h_comp>[,<IM_CN_Signalling_Flag_Ind>]]]]**	Response **OK** or **ERROR** Parameter **<cid>** PDP Context Identifier. A numeric parameter that specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of the permitted values (minimum value = 1) is returned by the test command. **<p_cid>** Primary PDP Context Identifier. Numeric parameter that specifies a particular PDP context definition which has been specified by +CGDCONT. The parameter is local to the TE-MT interface. The list of permitted values is returned by the test command. **<d_comp>** PDP data compression (applicable for SNDCP only) 0 Off (default value if omitted) 1 On (manufacturer preferred compression) 2 V.42 bis **<h_comp>** PDP header compression 0 Off (default value if omitted) 1 On (manufacturer preferred compression) 2 RFC1144 (applicable for SNDCP only) 3 RFC2507 4 RFC3095 (applicable for PDCP only) **<IM_CN_Signalling_Flag_Ind>** Numeric parameter used to indicate whether the PDP context is for IM CN subsystem related signaling only or not 0 UE indicates that the PDP context is not for IM CN subsystem-related signaling only 1 UE indicates that the PDP context is for IM CN subsystem-related signaling only
Reference	27.007 Rev12

8.7. +CGCONTRDP Command: PDP Context Read Dynamic Parameter

HL78xx	
Test command Syntax **+CGCONTRDP=?**	Response **+CGCONTRDP:** (list of **<cid>**s associated with active contexts) **OK**

HL78xx	
Execute command Syntax **+CGCONTRDP [=<cid>]**	Response **[+CGCONTRDP: <cid>,<bearer_id>,<apn>[,<local_addr and subnet_mask> [,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-CSCF_prim_addr> [,<P-CSCF_sec_addr>[,<IM_CN_Signalling_Flag>[,<LIPA_indication>[,<IPv4_MTU> [,<WLAN_Offload>[,<Local_Addr_Ind>[,<Non-IP_MTU> [,<Serving_PLMN_rate_control_value>[,<Reliable_Data_Service]]]]]]]]]]]]]]]** **[<CR><LF>+CGCONTRDP: <cid>,<bearer_id>,<apn>[,<local_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<P-CSCF_sec_addr>[,<IM_CN_Signalling_Flag> [,<LIPA_indication>[,<IPv4_MTU>[,<WLAN_Offload>[,<Local_Addr_Ind> [,<Non-IP_MTU>[,<Serving_PLMN_rate_control_value> [,<Reliable_Data_Service]]]]]]]]]]]]]]** **[...]]** **OK** or **ERROR** Parameters **<cid>** Integer type; specifies a particular non-secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands (see **+CGDCONT** and **+CGDSCONT**). **<bearer_id>** Numeric parameter which identifies the bearer; EPS Bearer in EPS **<apn>** Access Point Name; string parameter which is a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested. **<local_addr and subnet_mask>** String type; shows the IP address and subnet mask of the MT. The string is given as dot-separated numeric (0-255) parameters. **<gw_addr>** String type; shows the Gateway Address of the MT. The string is given as dot-separated numeric (0-255) parameters. **<DNS_prim_addr>** String parameter which shows the IP Address of the primary DNS Server **<DNS_sec_addr>** String parameter which shows the IP address of the secondary DNS Server **<P_CSCF_prim_addr>** String parameter which shows the IP Address of the primary P-CSCF Server **<P_CSCF_sec_addr>** String parameter which shows the IP Address of the secondary P-CSCF Server **<IM_CN_Signalling_Flag>** Shows whether the PDP context is for IM CN subsystem-related signalling only or not. 0 PDP context is not for IM CN subsystem-related signalling only **<LIPA_indication>** Indicates that the PDP context provides connectivity using a LIPA PDN connection. This parameter cannot be set by the TE. 0 Indication not received that the PDP context provides connectivity using a LIPA PDN connection 1 Indication received that the PDP context provides connectivity using a LIPA PDN connection

HL78xx	
	<IPv4_MTU> Integer type; shows the IPv4 MTU size in octets. **<WLAN_Offload>** Integer type; indicates whether traffic can be offloaded using the specified PDN connection via a WLAN or not. 0 Offloading the traffic of the PDN connection via a WLAN when in S1 mode or when in Iu mode is not acceptable. 1 Offloading the traffic of the PDN connection via a WLAN when in S1 mode is acceptable, but not acceptable in Iu mode. 2 Offloading the traffic of the PDN connection via a WLAN when in Iu mode is acceptable, but not acceptable in S1 mode. 3 Offloading the traffic of the PDN connection via a WLAN when in S1 mode or when in Iu mode is acceptable. **<Local_Addr_Ind>** Integer type; indicates whether the MS and the network support local IP address in TFTs 0 Indicates that the MS or the network or both do not support local IP address in TFTs 1 Indicates that the MS and the network support local IP address in TFTs **<Non-IP_MTU>** Integer type; shows the non-IP MTU size in octets. **<Serving_PLMN_rate_control_value>** Integer type; indicates the maximum number of uplink messages the UE can send in a 6-minute interval **<Reliable_Data_Service>** Integer type; indicates whether the UE is using Reliable Data Service for a PDN connection 0 Reliable Data Service is not being used for the PDN connection 1 Reliable Data Service is being used for the PDN connection
Reference	27.007 Rev14

8.8. +CGSCONTRDP Command: Secondary PDP Context Read Dynamic Parameter

HL78xx	
Test command Syntax **+CGSCONTRDP=?**	Response **+CGCONTRDP**: (list of **<cid>**s associated with active contexts) **OK**
Execute command Syntax **+CGSCONTRDP [=<cid>]**	Response **+CGSCONTRDP: <cid>,<p_cid>,<bearer_id>[,<IM_CN_Signalling_Flag>]]** **+CGSCONTRDP: <cid>,<p_cid>,<bearer_id>[,<IM_CN_Signalling_Flag>] [...]]** or **ERROR**

HL78xx	
	Parameters **<cid>** Integer type; specifies a particular active secondary PDP context or Traffic Flows definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands (see **+CGDCONT** and **+CGDSCONT**). **<p_cid>** Integer type; specifies a particular PDP context definition or default EPS context Identifier which has been specified by **+CGDCONT**. The parameter is local to the TE-MT interface (see **+CGDSCONT**) **<bearer_id>** Numeric parameter which identifies the bearer; EPS Bearer in EPS **<IM_CN_Signalling_Flag>** Shows whether the PDP context is for IM CN subsystem-related signalling only or not. 0 PDP context is not for IM CN subsystem-related signalling only 1 PDP context is for IM CN subsystem-related signalling only
Reference	27.007 Rev11

8.9. +CGEREP Command: Packet Domain Event Reporting

HL78xx	
Test command Syntax **AT+CGEREP=?**	Response **+CGEREP:** (list of supported **<mode>**s),(list of supported **<bfr>**s) **OK**
Read command Syntax **AT+CGEREP?**	Response **+CGEREP: <mode>, <bfr>** **OK** or **ERROR**
Write command Syntax **AT+CGEREP=** **[<mode>[,<bfr>]]**	Response **OK** or **ERROR** 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 2 Buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE (2 is the default value)

HL78xx	
	<bfr> 0 MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered 1 MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes)
Unsolicited Notification	Response **+CGEV: NW DETACH** The network has forces a PS detach **+CGEV: NW CLASS <class>** The network has forced a change of MT class **+CGEV: ME CLASS <class>** The mobile termination has forced a change of MT class **+CGEV: ME PDN ACT <cid>[,<reason>]** The mobile termination has activated a context **+CGEV: NW ACT <p_cid>, <cid>, <event_type>** The network has activated a context **+CGEV: ME ACT <p_cid>, <cid>, <event_type>** The network has responded to an ME initiated context activation **+CGEV: NW PDN DEACT <cid>** The network has deactivated a context **+CGEV: ME PDN DEACT <cid>** The mobile termination has deactivated a context **+CGEV: NW DEACT <p_cid>, <cid>, <event_type>** The network has deactivated a context **+CGEV: ME DEACT <p_cid>, <cid>, <event_type>** The network has responded to an ME initiated context deactivation request **+CGEV: NW MODIFY <cid>, <change_reason>, <event_type>** The network has modified a context **+CGEV: ME MODIFY <cid>, <change_reason>, <event_type>** The mobile termination has modified a context Parameters **<reason>** 0 IPv4 only allowed 1 IPv6 only allowed 2 Single address bearers only allowed 3 Single address bearers only allowed and MT initiated context activation for a second address type bearer was not successful **<event_type>** 0 Informational event 1 Information request, acknowledgement required **<change_reason>** 0 TFT only changed 1 QoS only changed 2 Both TFT and QoS changed
Reference	27.007 Rev12

8.10. +CGPADDR Command: Show PDP Address

HL78xx	
Test command Syntax **AT+CGPADDR=?**	Response **+CGPADDR:** (list of supported **<cid>**s) **OK**

HL78xx	
Write command Syntax **AT+CGPADDR=[<cid>,<cid>[,...]]]**	Response **+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]** **[<CR><LF>** **+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]][...]]** **OK** Parameters **<cid>** Numeric parameter which specifies a particular PDP context definition (see **+CGDCONT** and **+CGDSCONT**). If no <cid> is specified, the addresses for all activated contexts are returned. **<PDP_addr_1>, <PDP_addr_2>** 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 **+CGDCONT** and **+CGDSCONT** when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. Both <PDP_addr_1> and <PDP_addr_2> are omitted if none are available. Both <PDP_addr_1> and <PDP_addr_2> are included when both Ipv4 and Ipv6 addresses are assigned, with <PDP_addr_1> containing the IPv4 address and <PDP_addr_2> containing the IPv6 address. The string is given as dot-separated numeric (0 – 255) parameter of the form: a1.a2.a3.a4 for IPv4 and a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6.
Reference	27.007 Rev12

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

HL78xx	
Test command Syntax **AT+CGSMS=?**	Response **+CGSMS:** (list of currently available **<service>**s) **OK**
Read command Syntax **AT+CGSMS?**	Response **+CGSMS: <service>** **OK**
Write command Syntax **AT+CGSMS=[<service>]**	Response **OK** or **ERROR**

HL78xx	
	Parameter **<service>** Indicates the service or service preference to be used 0 Packet Domain 1 Circuit Switched
Reference 27.007 Rev12	Notes In 4G RAT, Packet Domain service means IMS messaging on EPS bearers and Circuit Switched service means transmission on Signalling Gateways.

8.12. +CSODCP Command: Send Originating Data via the Control Plane

HL78xx	
Test command Syntax **AT+CSODCP=?**	Response **+CSODCP:** (range of supported **<cid>**s),(maximum number of octets of user data indicated by **<cpdata_length>**),(list of supported **<RAI>**s),(list of supported **<type_of_user_data>**s) **OK**
Write command Syntax **AT+CSODCP=<cid>,<cpdata_length>,<cpdata>[,<RAI>[,<type_of_user_data>]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<cid>** Integer type. A numeric parameter which specifies a particular PDP context or EPS bearer context definition. This parameter is local to the TE-MT interface and identifies the PDP or EPS bearer contexts which have been setup via AT command (see the **+CGDCONT** and **+CGDSCONT** commands). **<cpdata_length>** Integer type. Indicates the number of octets of the <cpdata> information element. When there is no data to transmit, the value is zero. **<cpdata>** String of octets. Contains the user data container contents (refer to 3GPP TS 24.301 [83] subclause 9.9.4.24). When there is no data to transmit, <cpdata> should be an empty string (""). This parameter is not subject to conventional character conversion as per **+CSCS**. **<RAI>** Integer type. Indicates the value of the release assistance indication; refer to 3GPP TS 24.301 [83] subclause 9.9.4.25. 0 No information available 1 The MT expects that exchange of data will be completed with the transmission of the ESM DATA TRANSPORT message. 2 The MT expects that exchange of data will be completed with the receipt of an ESM DATA TRANSPORT message.

HL78xx	
	<type_of_user_data> Integer type. Indicates whether the user data that is transmitted is regular or exceptional 0 Regular data 1 Exception data
Reference 27.007 Rev14	Notes The set command is used by the TE to transmit data over the control plane to the network via MT. Context identifier <cid> is used to link the data to a particular context.

8.13. +CRTDCP Command: Report Terminating Data via the Control Plane

HL78xx	
Test command Syntax **AT+CRTDCP=?**	Response **+CRTDCP:** (list of supported **<reporting>**s),(range of supported **<cid>**s),(maximum number of octets of user data indicated by **<cpdata_length>**) **OK**
Read command Syntax **AT+CRTDCP?**	Response **+CRTDCP: <reporting>** **OK**
Write command Syntax **AT+CRTDCP=[<reporting>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<reporting>** Integer type; controls reporting of mobile terminated control plane data events 0 Disable reporting of MT control plane data. 1 Enable reporting of MT control plane data by the unsolicited result code **+CRTDCP** **<cid>** Integer type. A numeric parameter which specifies a particular PDP context or EPS bearer context definition. This parameter is local to the TE-MT interface and identifies the PDP or EPS bearer contexts which have been setup via AT command (see the **+CGDCONT** and **+CGDSCONT** commands). **<cpdata_length>** Integer type. Indicates the number of octets of the <cpdata> information element. When there is no data to transmit, the value is zero. **<cpdata>** String of octets. Contains the user data container contents (refer to 3GPP TS 24.301 [83] subclause 9.9.4.24). When there is no data to transmit, the <cpdata> should be an empty string (""). This parameter is not subject to conventional character conversion as per **+CSCS**.

HL78xx	
Reference 27.007 Rev14	Notes The write command is used to enable and disable reporting of data from the network to the MT that is transmitted via the control plane in downlink direction. If reporting is enabled, the MT returns the following unsolicited result code when data is received from the network: **+CRTDCP: <cid>,<cpdata_length>,<cpdata>**.

8.14. +KNMPSD Command: No More PS Data

HL78xx	
Write command Syntax **AT+KNMPSD**	Response **OK** Parameters None
	Notes • Command indicates to the module that there is no more data to transmit or receive. • Important: This command should be used only when there is no more data expected to transmit or receive. Otherwise, additional signaling will be required to reestablish the radio connection and additional power will be consumed. • This command brings the LTE RRC layer to the Idle state immediately, rather than waiting for a network-controlled timeout (typically 10 – 20 seconds).

9. Protocol Specific Commands

9.1. Preliminary Comments

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

- TCP
- UDP
- HTTP
- FTP

9.2. IP Address Format in AT Commands

Unless specified elsewhere, the following format is used for IP address field in AT commands described in this chapter when using the HL78xx embedded module:

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

9.3. Session ID

Protocol specific AT commands share the same range of session IDs. A session ID, <session_id>, is a unique number and ranges from 1 to 6.

9.4. Connection of PDP Contexts

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

When a PDP context is active, the configuration of **+KCNXCFG** must be consistent with the configuration of **+CGDCONT**; otherwise, an error will be returned when creating a connection with **+KCNXUP**, **+KCTPCNX** or **+KUDPCFG**. Therefore, with an active PDP context, in **+KCNXCFG**:

- <af> must be consistent with **+CGDCONT <PDP_type>**, and
- <APN> must be identical to **+CGDCONT <APN>** or must be set to the empty string “”.

9.5. Buffer Length of AT Commands

In AT command mode, the maximum length of an AT command is 1023 characters; any AT command 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 still bound 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.

9.6. 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.

9.7. Connection Configuration

9.7.1. +KCNXCFG Command: GPRS Connection Configuration

HL78xx	
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>**),**<af>,<ip>,<dns1>,<dns2>,<ip_v6>,<dns1_v6>,<dns2_v6>** **OK**
Read command Syntax **AT+KCNXCFG?**	 Response **+KCNXCFG: <cnx cnf>, "GPRS", <apn>,<login>,<password>,<af>,<ip>,<dns1>, <dns2>[,<ip_v6>,<dns1_v6>,<dns2_v6>],<state>** **[...]>** **OK**

HL78xx	
Write command Syntax **AT+KCNXCFG=<cnx cnf>,"GPRS",<apn>[,[<login>][,[<password>][,<af> [,[<ip>][,[<dns1>][,<dns2>]]]][,[<ip_v6>][,[<dns1_v6>][,<dns2_v6>]]]]]**	Response **OK** Parameters **<cnx cnf>** PDP context configuration. Numeric parameter which specifies a particular PDP context configuration **<apn>** (Access Point Name) a string parameter (max size 63 bytes), logical name used to select the GGSN or the external packet data network. **<login>** string type (max size 24 bytes), indicates the username of the cnx **<password>** string type (max size 24 bytes), indicates the password of the cnx **<af>** Address family used for the connection (up to 3GPP Release 7 compliant) IPV4 IPv4 only IPV6 IPv6 only IPV4V6 IPv4 and IPv6 **<ip>** String type. Static IP not supported only dynamic address supported, the value should be “0.0.0.0” or an empty string. **<dns1>, <dns2>** String type. If the mobile is supposed to work with dynamic DNS addresses, the value should be “0.0.0.0” or an empty string. **<ip_v6>** IPV6 String type. If the mobile is supposed to work with a dynamic address, the value should be “::” or an empty string. **<dns1_v6>, <dns2_v6>** IPV6 String type. If the mobile is supposed to work with dynamic DNS addresses, the value should be “::” or an empty string. **<state>** Connection state 0 Disconnected 1 Connecting 2 Connected 3 Idle, down counting for disconnection 4 Disconnecting

HL78xx	
Reference Sierra Wireless Proprietary	Notes • <ip> IP static not supported • This AT command is used to configure the bearer to be used for the future IP services. • By default, the IP and DNS address are dynamic (those values would be affected by the network during the PDP connection). • This connection will be used by the module to access to the IP services described in subsequent chapters. **AT+KCNXCFG** is only defined to set the current parameters. The defined connection will be automatically opened when needed by the IP services (e.g. UDP service). • The use of IPV4 and/or IPV6 addresses is configured by PDP context configuration. • <cnx cfg> values correspond to PDP context ID. • When the connection is up, the read command returns the actual values used by the connection interface. • If reuse of existing activated PDP context is required, <apn> can be set as an empty string or as the existing APN string returned by **+CGDCONT** read command. • Settings are only restored if the TCP server or UDP server is restored.

9.7.2. +KCNXTIMER Command: Connection Timer Configuration

HL78xx	
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**

HL78xx	
Write command Syntax **AT+KCNXTIMER =<cnx cnf>[, [<tim1>][, [<nbrtrial>] [,<tim2>] [,<idletime>]]]]**	Response **OK** Parameters **<cnx cnf>** PDP context configuration. Numeric parameter which specifies a particular PDP context configuration **<tim1>** 1 – 120 s (30 s by default) If the 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>** Attempt times from1 – 4 (2 by default). The module will try to activate the PDP context for a maximum of <nbtrial> times. **<tim2>** 0 – 300s (60 s by default) 0 Deactivated (connection will not close by itself) For client sockets, module will try to connect to the server within <tim2>s; if <tim2> expires, it will give up the connection. **<idletime>** 0 – 1800 s (30 s by default) When all sessions are closed, the idle timer starts with the idle time. When this timer expires, it will try to deactivate the PDP context. Before the timer expires, connecting any session will stop this timer and the PDP context is reused.
Reference Sierra Wireless Proprietary	Notes This command will only have impact on TCP and UDP.

9.7.3. +KCNXPROFILE Command: Current Profile Connection Configuration

HL78xx	
Test command Syntax **AT+ KCNXPROFILE =?**	Response **+KCNXPROFILE:** (list of possible **<cnx cnf>**s) **OK**
Read command Syntax **AT+ KCNXPROFILE?**	Response **+KCNXPROFILE: <cnx cnf>** **OK**

HL78xx	
Write command Syntax **AT+KCNXPROFILE=<cnx cnf>**	Response **OK** Parameter **<cnx cnf>** PDP context configuration. 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** and **+KUDPCFG**, if <cnx cnf> parameter is not given in these commands.

9.7.4. +KCGPADDR Command: Display PDP Address

HL78xx	
Test command Syntax **AT+KCGPADDR=?**	Response **+KCGPADDR:** (list of possible **<cnx_cnf>**s) **OK**
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>** PDP context configuration. 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 **+KTCPCNX**, **+KUDPCFG**, etc. to display the local IP address of the module • For IPv6, more than one PDP addresses corresponding to the interface may be displayed.

9.7.5. +KCNX_IND Notification: Connection Status Notification

HL78xx	
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>** PDP context configuration. Numeric parameter which specifies a particular PDP context configuration **<status>** PDP connection status 0 Disconnected due to network 1 Connected 2 Failed to connect, <tim1> timer is started if <attempt> is less than <nbtrail> 3 Closed 4 Connecting 5 Idle time down counting started for disconnection 6 Idle time down counting canceled **<af>** 0 IPV4 1 IPV6 **<tim1>** Refer to **+KCNXTIMER** **<attempt>** Current attempt of bringing up of PDP connection **<nbtrial>** Refer to **+KCNXTIMER** **<idletime>** Refer to **+KCNXTIMER**
Reference	Sierra Wireless Proprietary

9.7.6. +KCNXUP Command: Bring the PDP Connection Up

HL78xx	
Test command Syntax **AT+KCNXUP=?**	 Response **+KCNXUP:** (list of possible **<cnx_cnf>**s) **OK**

HL78xx	
Write command Syntax **AT+KCNXUP=<cnx_cnf>**	Response **OK** Parameter **<cnx cnf>** PDP context configuration. 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. • The connection will not be requested when the concerned PDP is active and the configuration of **+KCNXCFG** is not the same as **+CGDCONT**.

9.7.7. +KCNXDOWN Command: Bring the PDP Connection Down

HL78xx	
Test command Syntax **AT+KCNXDOWN=?**	Response **+KCNXDOWN:** (list of possible **<cnx_cnf>**s),(list of possible **<mode>**s) **OK**
Write command Syntax **AT+KCNXDOWN=<cnx_cnf>[,<mode>]**	Response **OK** Parameters **<cnx cnf>** PDP context configuration. 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 the active session exists
Reference	Sierra Wireless Proprietary

9.8. Common Configuration

9.8.1. +KPATTERN Command: Custom End of Data Pattern

HL78xx	
Test command Syntax **AT+KPATTERN =?**	 Response **OK**
Read command Syntax **AT+KPATTERN?**	 Response **+KPATTERN: <EOF pattern>** **OK**
Write command Syntax **AT+KPATTERN =<EOF pattern>**	 Response **OK** or **+CME ERROR <err>** Parameter **<EOF pattern>** String type (max size 128 bytes). This is a pattern used to notify the end of data (or file) during data or file transfer. This string doesn't have to be human-readable (not printable characters are allowed).
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 within 100ms or higher timeout. The timeout value is equal to <wait_time> of +KIPOPT. • The received data is stored with buffer size <send size v4> or <send size v6> so that the <EOF pattern> with size larger than it is not detected. The user application should ensure that the value of <send size v4> or <send size v6> is larger than the size of <EOF pattern>.

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

HL78xx	
Test command Syntax **AT+KURCCFG=?**	 Response **+KURCCFG:** (list of supported **<protoopt>**s),(list of supported **<noti_act>**s),(list of supported **<indi_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>]**	 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 “HTTP” HTTP client session “HTTPS” HTTPS client session "TCP" Both TCP client and TCP server sessions "UDP" Both UDP client and UDP server sessions **<noti_act>** 1 Enable URC (like **+KTCP_NOTIF**) 0 Disable URC **<indi_act>** 1 Enable URC (like **+KTCP_SRVREQ**, **+KTCP_IND**, **+KTCP_DATA**, **+KUDP_DATA**, **+KUDP_RCV**, **+KFTP_IND**) 0 Disable URC
Reference Sierra Wireless Proprietary	Notes • Enabling or disabling **+KTCP_NOTIF** unsolicited messages is only useful when in polling mode with **+KTCPSTAT**. • If set to "disable", URCs are discarded and not stored. • Can be used in 07.10 multiplexer.
Examples	To disable URC: **AT+KURCCFG=“TCP”,0** **OK** Test and read command: **AT+KURCCFG=?** **+KURCCFG: ("TCPC","TCPS","UDPC","UDPS","FTP","HTTP","HTTPS","TCP","UDP"),(0,-1),(0-1)** **OK**

HL78xx	
	AT+KURCCFG? **+KURCCFG: "TCPC",1,1** **+KURCCFG: "TCPS",1,1** **+KURCCFG: "UDPC",1,1** **+KURCCFG: "UDPS",1,1** **+KURCCFG: "FTP",1,1** **+KURCCFG: "HTTP",1,1** **+KURCCFG: "HTTPS",1,1** **OK**

9.8.3. +KIPOPT Command: General Options Configuration

HL78xx	
Test command Syntax **AT+KIPOPT=?**	 Response **+KIPOPT: 0,<UDP>,(1-100),(8-1472),(8-1452)** **+KIPOPT: 0,<TCP-based>,(0-100),(0,8-1460),(0,8-1440)** **+KIPOPT: 3,(0-1),(0-1)** **OK**
Read command Syntax **AT+KIPOPT?**	 Response **+KIPOPT: 0,<proto>,<wait time>,<send size v4>,<send size v6>]** **[...]** **+KIPOPT: 3,<stop_on_error>, <stop_on_peer>** **OK**
Write command Syntax If <option_id>=0 **AT+KIPOPT= <option_id>, <proto>,<wait time> [,<send size v4> [,<send size v6>]]** If <option_id>=1 **AT+KIPOPT= <option_id>** If <option_id>=2 **AT+KIPOPT= <option_id>**	 Response **OK** or **+CME ERROR<err>** Parameters **<option_id>** Option ID 0 Wait time, send size threshold configuration 1 Internal use or compatibility purposes 2 Internal use or compatibility purposes 3 PDP connection deactivated behavior 4 Internal use or compatibility purposes **<proto>** Protocol, string type “TCPC” TCP client session “TCPS” TCP server session “UDPC” UDP client session

HL78xx	
If <option_id>=3 **AT+KIPOPT=<option_id>, <stop_on_error>, <stop_on_peer>** If<option_id>=4 **AT+KIPOPT=<option_id>, <ssl_ver>**	"UDPS" UDP server session "FTP" FTP client session "HTTP" HTTP client session "HTTPS" HTTPS client session "TCP" Both client and server TCP sessions "UDP" Both client and server UDP sessions **<wait time>** Timeout for configuring the packet segmentation on the IP network side; it specifies the timeout after which the buffered data 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 packet size for IPv4 sessions. This parameter specifies the minimum data packet size that needs to be sent to the peer. Range: For UDP: 8 – 1472, default value = 1020 For TCP: 0, 8 – 1460, default value = 0 (disabled) **<send size v6>** Data packet size for IPv6 sessions. This parameter specifies the minimum data packet size that needs to be sent to the peer. Range: For UDP: 8 – 1452, default value = 1020 For TCP: 0, 8 – 1440, default value = 0 (disabled). Note that value = 0 uses a wait time of 100 ms. **<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
Reference Sierra Wireless Proprietary	Notes • The default setting of <option_id>=3 is (<stop_on_error>=0, <stop_on_peer>=0) after module boot-up; this means that a PDP connection is requested to stop only when a session is closed by an Internet AT command (e.g. **+KTCPCLOSE**). • Thresholds <send size v4> and <send size v6> control the minimum size of data received from the AT terminal to be buffered within timeout <wait time>. When the threshold is reached or after timeout, the buffered data are sent to the socket layer for transmission. For UDP: data is sent as a UDP packet For TCP based protocol: data is copied to socket first-in-first-out buffer for transmission, but packet segmentation is not guaranteed to be <send size> • The range for <send_size_v4> and <send_size_v6> are given for a maximum transmission unit (MTU) of 1500 bytes, but the network operator can set a lower value. In this case the upper limit of the minimum data packet size will be the one set by the operator. For instance, on the Telstra network, MTU is 1358 so max <send_size_v4> for TCP is 1318. • <send size v4> and <send size v6> impacts the detection of <EOF pattern>. Refer to the notes of **+KPATTERN** for more information.

9.9. SSL Configuration

9.9.1. +KSSLCRYPTO Command: Cipher Suite Configuration

HL78xx	
Test command Syntax **AT+ KSSLCRYPTO=?**	Response **+KSSLCRYPTO: <profile_id>,<mkey_Algo>,<auth_algo>,<enc_algo>,<mac_algo>, <tls_ver>,<auth>** **OK**
Read command Syntax **AT+ KSSLCRYPTO?**	Response **+KSSLCRYPTO: <profile_id>,<mkey_algo>,<auth_algo>,<enc_algo>,<mac_algo>, <tls_ver>,<auth>** **[…]]** **OK**
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 8 ECDHE **<auth_algo>** Authentication algorithm selection 1 RSA 2 ECDSA **<enc_algo>** Encryption algorithm selection 16 AES-128-CCM 32 AES-256-CCM 64 AES-128-CBC 256 AES-128-CCM-8 512 AES-256-CCM-8 8192 AES-128-GCM 16384 AES-256-GCM **<mac_algo>** Message authentication code algorithm selection 0 NULL 4 SHA256 8 SHA384 **<tls_ver>** Cipher suite version selection. 4 TLS 1.2

HL78xx	
	<auth> Authentication 0 No authentication 1 Authenticate server (Default) 2 Provide client certificate to server 3 Authenticate server and provide client certificate to server
Reference	Sierra Wireless Proprietary

Refer to the following table for the list of cipher suites supported by the AirPrime HL78xx.

Table 3. Supported Cipher Suites

NIST Name	<mkey_algo>	<auth_algo>	<enc_algo>	<mac_algo>
TLS-RSA-WITH-AES-128-GCM-SHA256	RSA	RSA	AES-128-GCM	SHA256
TLS-RSA-WITH-AES-256-GCM-SHA384	RSA	RSA	AES-256-GCM	SHA384
TLS-RSA-WITH-AES-128-CCM	RSA	RSA	AES-128-CCM	NULL
TLS-RSA-WITH-AES-256-CCM	RSA	RSA	AES-256-CCM	NULL
TLS-RSA-WITH-AES-128-CCM-8	RSA	RSA	AES-128-CCM-8	NULL
TLS-RSA-WITH-AES-256-CCM-8	RSA	RSA	AES-256-CCM-8	NULL
TLS-ECDHE-RSA-WITH-AES-128-CBC-SHA256	ECDHE	RSA	AES-128-CBC	SHA256
TLS-ECDHE-RSA-WITH-AES-128-GCM-SHA256	ECDHE	RSA	AES-128-GCM	SHA256
TLS-ECDHE-ECDSA-WITH-AES-128-CBC-SHA256	ECDHE	ECDSA	AES-128-CBC	SHA256
TLS-ECDHE-ECDSA-WITH-AES-128-GCM-SHA256	ECDHE	ECDSA	AES-128-GCM	SHA256
TLS-ECDHE-ECDSA-WITH-AES-256-GCM-SHA384	ECDHE	ECDSA	AES-256-GCM	SHA384
TLS-ECDHE-ECDSA-WITH-AES-128-CCM	ECDHE	ECDSA	AES-128-CCM	NULL
TLS-ECDHE-ECDSA-WITH-AES-256-CCM	ECDHE	ECDSA	AES-256-CCM	NULL
TLS-ECDHE-ECDSA-WITH-AES-128-CCM-8	ECDHE	ECDSA	AES-128-CCM-8	NULL
TLS-ECDHE-ECDSA-WITH-AES-256-CCM-8	ECDHE	ECDSA	AES-256-CCM-8	NULL

9.9.2. +KSSLCFG Command: SSL Configuration

HL78xx	
Test command Syntax **AT+KSSLCFG=?**	 Response **+KSSLCFG: <option id>,<option>** **OK**

HL78xx	
Read command Syntax **AT+KSSLCFG?**	 Response **+KSSLCFG: 0,<TLS Version>** **+KSSLCFG: 2,<Session Mode>** **OK**
Write command Syntax **AT+KSSLCFG =<option id>, <option>**	 Response If <option_id> = 0: **AT+KSSLCFG=<option_id>,<TLS Version>** **OK** If <option_id> = 1: **AT+KSSLCFG=<option_id>,<Random Seed>** **OK** If <option_id> = 2: **AT+KSSLCFG=<option_id>,<Session Mode>** **OK** Parameters **<option id>** 0 Specify a TLS version to be used for hand shake 1 Setup random seed 2 Specify session mode **<TLS Version>** 0 Highest possible 3 TLS 1.2 **<Random Seed>** String to be added into the entropy of the random number generator **<Session Mode>** 0 Automatic 1 Always start a new session (not supported)

9.10. SSL Certificate Manager

9.10.1. +KCERTSTORE Command: Store Root CA and Local Certificates to Internal Storage

HL78xx	
Test command Syntax **AT+ KCERTSTORE=?**	 Response **+KCERTSTORE: (**list of possible **<data_type>**s**),(**range of possible lengths of **<NbData>),(**list of possible **<index>**es**)** **OK**

HL78xx	
Read command Syntax **AT+ KCERTSTORE?**	Response **CONNECT** **[root_cert,<index>,<NbData><CR><LF>** **<File_data><CR><LF>]** **[local_cert,<index>,<NbData><CR><LF>** **<File_data> <CR><LF>]** **[...]** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+ KCERTSTORE= <data_type> [,<NbData> [,<index>]]**	Response **CONNECT** **OK** or **+CME ERROR: <err>** Parameters **<data_type>** 0 Root certificate 1 Local certificate **<NbData>** 1 – 4096 Number of bytes to read/write **<index>** Stored root/local certificate index. If a root/local certificate is already stored at the index, it will be overloaded Value range: 0 If <data_type> = 0 0 – 2 If <data_type> = 1 **<File_data>** File data in bytes
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). • The data session is automatically ended when <ndata> data bytes are sent/received, and the module returns to command state and returns **OK**. • The data session can also be ended by <EOF pattern>, +++ or DTR. • **ATO** is not available for this command. • It is highly recommended to configure the module for hardware flow control before using this command.

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

HL78xx	
Test command Syntax **AT+ KPRIVKSTORE =?**	Response **+KPRIVKSTORE: (**list of possible **<index>**s**),(** range of possible lengths of **<NbData>)** **OK**
Read command Syntax **AT+ KPRIVKSTORE?**	Response **CONNECT** **private_key,<index>,<NbData><CR><LF>** **<File_data> <CR><LF>** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+ KPRIVKSTORE= <index> [,<NbData>]**	Response **CONNECT** **OK** or **+CME ERROR: <err>** Parameters **<index>** 0 – 2 Index of the stored local certificate associated to this private key **<NbData>** 1 – 4096 Number of bytes to read/write (mandatory for both reading and writing) **<File_data>** File data in bytes
Reference Sierra Wireless Proprietary	Notes • The data session is automatically ended when <ndata> data bytes are sent/received, and the module returns to command state and returns **OK**. • The data session can also be ended by <EOF pattern>, +++ or DTR. • **ATO** is not available for this command. • It is highly recommended to configure the module for hardware flow control before using this command.

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

HL78xx	
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** or **+CME ERROR: <err>**
Write command Syntax **AT+ KCERTDELETE= <data_type> [,<index>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<data_type>** 0 Root certificate 1 Local certificate **<index>** Stored root/local certificate index Value range: 0 If <data_type> = 0 0 – 2 If <data_type> = 1
Reference	Sierra Wireless Proprietary

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

HL78xx	
Test command Syntax **AT+ KPRIVKDELETE =?**	Response **+KPRIVKDELETE: (**list of possible **<index>**es**)** **OK**

HL78xx	
Write command Syntax **AT+ KPRIVKDELETE= <index>**	Response **OK** or **+CME ERROR: <err>** Parameter **<index>** 0 – 2 Stored private key index
Reference	Sierra Wireless Proprietary

9.11. TCP Specific Commands

9.11.1. +KTCPCFG Command: TCP Connection Configuration

HL78xx	
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**),(**list of possible **<af>s),<cipher_index>,(**list of possible **<restore_on_boot>**s**)** **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>,<af>,<cipher_index>[,<restore_on_boot>]** **[…]]**
Write command Syntax **AT+KTCPCFG= [<cnx cnf>], <mode>, [<tcp remote address>],<tcp_ port>[,[<source_ port>][,[<data_ mode>][,[<URC-ENDTCP-enable>][,[<af>][, [<cipher_suite>] [,[<restore_on_ boot>]]]]]]]**	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

HL78xx	
	<tcp remote address> IP address string or explicit name of the remote server. For server configuration, this parameter is left blank **<tcp_port>** TCP port number; numeric parameter with range 1 – 65535. This parameter is the listening port for a server configuration. **<status>** Connection state of the selected socket 0 Disconnected 1 Connected **<serverID>** Server session ID index. Only for sockets in Child mode **<source_port>** Numeric parameter (0-65535). Specifies the local TCP port number. This parameter is left blank for a server configuration. **<data_mode>** 0 Do not display <data> in URC (default setting) 1 Display <data> in URC (not supported) **<URC-ENDTCP-enable>** 0 Do not display URC **+KTCP_ACK** **<af>** Address family used for the connection. 0 IPV4 1 IPV6 **<cipher_index>** Cipher suite profile index to use for a secured socket; defined by **+KSSLCRYPTO** **<restore_on_boot>** Restore session on boot (only for server socket) 0 Session is not restored on boot 1 Session is restored on boot
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 we want to connect. • Maximum <session_id> is 6. • For child session, the property <data_mode> will be kept the same as the server socket's setting. • 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 with 3 seconds delay. • For <restore_on_boot> parameter, only the first server session is restored.

9.11.2. +KTCPCNX Command: Start TCP Connection

HL78xx	
Test command Syntax **AT+KTCPCNX=?**	 Response **+KTCPCNX: (**list of possible **<session_id>**s**)** **OK**

HL78xx	
Write command Syntax **AT+KTCPCNX= <session_id>**	Response **OK** or **+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 for more or less characters 9 Bad session ID 10 Session is already running 11 All sessions are used 12 Socket connection timeout error 13 SSL connection error 14 SSL initialization error
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>. • The socket connection will not be requested when the concerned PDP is active and the configuration of **+KCNXCFG** is not the same as **+CGDCONT**.

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

HL78xx	
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**

HL78xx	
	or **+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. • It is highly recommended to configure the module for hardware flow control using **AT&K3** before using this command. • Refer to **AT&D** for the behavior of DTR drop.

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

HL78xx	
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** or **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**

HL78xx	
Reference Sierra Wireless Proprietary	Notes • All the 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>. • It is highly recommended to configure the module for hardware flow control using **AT&K3** before using this command. • Refer to **AT&D** for the behavior of DTR drop. • The data session can also be ended by <EOF pattern>, +++ or DTR.

9.11.5. +KTCPCLOSE Command: Close Current TCP Operation

HL78xx	
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** or **+CME ERROR: <err>** **NO CARRIER** **+KTCP_NOTIF: <session_id>, <tcp_notif>** Parameters **<session_id>** TCP session index **<closing_type>** 1 The TCP connection is properly closed, which means that data sent to the module by **AT+KTCPSND** will be sent to the TCP server and acknowledged before the socket is closed. **<tcp_notif>** See **AT+KTCPCNX**
Reference Sierra Wireless Proprietary	Notes • This function first closes the TCP socket and if there is no other session running then the PDP context is released. • **AT+KTCPDEL=<session_id>** can be used to delete the socket configuration after it's been closed.

9.11.6. +KTCPDEL Command: Delete a Configured TCP Session

HL78xx	
Test command Syntax **AT+KTCPDEL=?**	 Response **+KTCPDEL:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+KTCPDEL=<session_id>**	 Response **OK** or **+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.

9.11.7. +KTCP_SRVREQ Notification: Incoming Client Connection Request

HL78xx	
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>** Numeric parameter (0-65535); port of the incoming client
Examples	Configure the module to TCP servers **AT+KCNXCFG=0,"GPRS","szsjmc.gd";** **+KTCPCFG=0,1,,179** **+KTCPCFG: 1** **OK** **AT+KCNXCFG=0,"GPRS","szsjmc.gd";** **+KTCPCFG=0,1,,180** **+KTCPCFG: 2** **OK**

HL78xx	

	Start the TCP servers
	AT+KTCPCNX=1 //listen on port 179
	OK
	
	AT+KTCPCNX=2 //listen on 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.

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

HL78xx	
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>
Reference Sierra Wireless Proprietary	Notes • As soon as the connection is established, the module can receive data through the TCP socket. This notification is sent when data are available in the receive buffer. • This notification is sent for each TCP packet received sequentially; notification of the following received packet is sent only when the current **+KTCP_DATA** has been read with a **+KTCP_RCV** command. • 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.

9.11.9. +KTCP_IND Notification: TCP Status

HL78xx	
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

9.11.10. +KTCPSTAT Command: Get TCP Socket Status

HL78xx	
Test command Syntax **AT+KTCPSTAT=?**	Response **OK**

HL78xx	
Read command Syntax **AT+KTCPSTAT?**	 Response **OK**
Write command Syntax For all TCP session IDs: **AT+KTCPSTAT** or **AT+KTCPSTAT=<session_id>**	 Response **+KTCPSTAT: <session_id>,<status>,<tcp_notif>,<rem_data>,<rcv_data>** **[…]** **OK** 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, it cannot be used, wait for status 5 5 Socket is closed **<tcp_notif>** -1 if socket/connection is OK, <tcp_notif> if an error has happened (see **AT+KTCPCNX**) **<rem_data>** Remaining bytes in the socket buffer, waiting to be sent **<rcv_data>** Received bytes, can be read with **+KTCPRCV** command
Reference Sierra Wireless Proprietary	Notes This command returns **+CME ERROR: 910** (Bad Session ID) for undefined <session_id>s.

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

HL78xx	
Test command Syntax **AT+KTCPSTART=?**	 Response **OK**
Read command Syntax **AT+KTCPSTART?**	 Response **OK**

HL78xx	
Write command Syntax **AT+KTCPSTART =<session_id>**	Response **CONNECT** **OK** or **+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 **AT+KTCPCNX**
Reference Sierra Wireless Proprietary	Notes • This function is used to send and receive data bytes through a TCP socket. • It is highly recommended to configure the module for hardware flow control using **AT&K3** before using this command. • Refer to **AT&D** for the behavior of DTR drop. • Only one **+KTCPSTART** session can be used. • Can be used in 07.10 multiplexer. • If the session is successfully connected by **+KTCPCNX**, this command does not restart the connection and the module directly enters direct data flow. • The data session can also be ended by <EOF pattern>, +++ or DTR.

9.12. UDP Specific Commands

9.12.1. +KUDPCFG Command: UDP Connection Configuration

HL78xx	
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**),(**list of possible **<af>**s**),(**list of possible **<restore_on_boot>**s**)** **OK**
Read command Syntax **AT+KUDPCFG?**	Response **+KUDPCFG: <session_id>,<cnx cnf>,<mode>,<port>,<data_mode>,<udp remote address>,<udp_port>,<af>,<restore_on_boot>** **[…]** **OK**

HL78xx

Write command

Syntax
AT+KUDPCFG=[<cnx cnf>],<mode>[,[<port>][,[<data_mode>][,[<udp remote address>][,[<udp_port>][,[<af>][,[<restore_on_boot>]]]]]]]

Response
+KUDPCFG: <session_id>
OK

or
+CME ERROR: <err>
+KUDP_NOTIF: <session_id>, <udp_notif>

Parameters
<session_id> UDP session index

<mode> 0 Client
1 Server

<port> 0 – 65535 Port (0 = random)

<cnx cnf> PDP context configuration. Numeric parameter which specifies a particular PDP context configuration.

<udp_notif> Integer type. Indicates the cause of the UDP connection failure.
0 Network error
1 No more sockets available; max number already reached
2 Memory problem
3 DNS error
5 UDP connection error (host unreachable)
6 Generic error
8 Data sending is OK but **+KUDPSND** was waiting more or less characters
9 Bad session ID
10 Session is already running
11 All sessions are used

<data_mode> 0 Do not display <data> in URC (Default setting)
1 Display <data> in URC (not supported)

<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; given by **+KUDPSND**

<af> Address family used for the connection.
0 IPV4
1 IPV6

<restore_on_boot> Restore session on boot (only for server socket)
0 Session is not restored on boot
1 Session is restored on boot

HL78xx	
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 6. • **+KCNXCFG** configuration should be set up to start the connection properly. • The socket connection will not be requested when the concerned PDP is active and the configuration of **+KCNXCFG** is not the same as **+CGDCONT**.

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

HL78xx	
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>** or **NO CARRIER** **+CME ERROR: <err>** **+KUDP_NOTIF: <session_id>, <udp_notif>** Parameters **<session_id>** UDP session index **<ndata>** Number of bytes the device wants to receive (max value 4294967295) **<udp remote address>** IP address string of the remote host **<udp remote port>** 0 – 65535 Remote UDP port **<udp_notif>** See **AT+KUDPCFG**

HL78xx	
Reference Sierra Wireless Proprietary	Notes • This function is used to receive <ndata> data bytes through a previously opened UDP socket. • <ndata> indicates the max data number that the terminal wishes to receive. If the UDP socket contains more data than <ndata> bytes, then only <ndata> bytes will be received, and more data can be read by running this command again. • <EOF pattern> would be added at the end of data automatically. • When <ndata> (max value) bytes or only available data in the UDP socket have been received, the module returns to command mode. • It is highly recommended to configure the module for hardware flow control using **AT&K3** before using this command. • Refer to **AT&D** for the behavior of DTR drop.

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

HL78xx	
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** or **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 **<udp_port>** 1 – 65535 UDP peer port **<ndata>** Number of bytes (max value 4294967295) **<udp_notif>** See **AT+KUDPCFG**

HL78xx	
Reference Sierra Wireless Proprietary	Notes • 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>. • It is highly recommended to configure the module for hardware flow control using **AT&K3** before using this command. • Refer to **AT&D** for the behavior of DTR drop. • The maximum transmission unit (MTU) is 1500 Bytes. • The <udp remote address> and <udp_port> are saved internally such that they can be omitted in subsequent calls of **+KUDPSND**. • The packet segmentation is controlled by **+KIPOPT** with <option_id>=0, and the maximum UDP packet size is limited by <send size v4> (1472 bytes) or <send size v6> (1452 bytes). Default value for both parameters is 1020 bytes. • The data session can also be ended by <EOF pattern>, +++ or DTR.

9.12.4. +KUDPCLOSE Command: Close Current UDP Operation

HL78xx	
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** or **+KUDP_NOTIF: <session_id>, <udp_notif>** Parameters **<session_id>** UDP session index **<udp_notif>** See **AT+KUDPCFG** **<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 function closes the UDP session. If there is no other session running, the PDP context will be released. • This function will delete the session configuration if <keep_cfg> = 0.

9.12.5. +KUDPDEL Command: Delete a Configured UDP Session

HL78xx	
Test command Syntax **AT+KUDPDEL=?**	 Response **+KUDPDEL: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KUDPDEL= <session_id>**	 Response **OK** or **+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.

9.12.6. +KUDP_IND Notification: UDP Status

HL78xx	
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

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

HL78xx	
Unsolicited Notification	Response **+KUDP_DATA: <session_id>,<ndata available>[,<udp remote address>,<udp remote port>,<data>]**

HL78xx	
	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 Remote UDP port **<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> was 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, the maximum <data> length the module can receive is 1500 bytes. If the user application sends >1500 bytes of data, the first 1500 bytes are included in the URC and the remainder is truncated (lost). • 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**.

9.13. HTTP Client Specific Commands

9.13.1. +KHTTPCFG Command: HTTP Connection Configuration

HL78xx	
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**),(**list of possible **<af>**s,**(**list of **<cipher_index>**es**))** **OK**
Read command Syntax **AT+KHTTPCFG?**	Response **+KHTTPCFG: <session_id>,<cnx cnf>,<http_server>,<http_port>,<http_version>, <login>,<password>,<started>,<af>,<cipher_index>** **OK**

HL78xx

Write command

Syntax
AT+KHTTPCFG=<cnx cnf>,<http_server>[,<http_port>[,<http_version>[,<login>[,<password>[,<start>[,<af>[,<cipher_index>]]]]]]]

Response
+KHTTPCFG: <session_id>
OK

or
+CME ERROR: <err>

Parameters
<cnx cnf> PDP context configuration; numeric parameter which specifies a particular PDP context configuration (see **+KCNXCFG**)
Note that the maximum number of simultaneous connections is limited to 2.

<session_id> HTTP session index

<http_server> IP address string or explicit name of the remote server

<http_port> 1 – 65535 Numeric parameter; default value = 80

<http_version>
0 HTTP 1.1
2 HTTP 1.1 over TLS (HTTPS)

<login> String type, indicates the user name to be used during the HTTP connection

<password> String type, indicates the password to be used during the HTTP connection

<start> Specifies whether to start the HTTP connection immediately or not
0 Start the HTTP connection later using **+KHTTPCNX**
1 Start the HTTP connection immediately

<started> Specifies whether the HTTP connection has been started
0 The HTTP connection has not been started yet
1 The HTTP connection has already been started

<af> Address family used for the connection. Default is IPV4.
0 IPV4
1 IPV6

<cipher_suite> Cipher suite profile index to use for a secured socket; defined by **+KSSLCRYPTO**

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.
- For <af> = 1 (IPV6), server address <http_server> in the IP address string format can be optionally quoted with square brackets "[]".
  e.g. [FEDC:BA98:7654:3210:FEDC:BA98:7654:3210]

9.13.2. +KHTTPCNX Command: Start HTTP Connection

HL78xx	
Test command Syntax **AT+KHTTPCNX=?**	 Response **+KHTTPCNX: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KHTTPCNX=<session_id>**	 Response **OK** or **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<http_notif>** Integer type. Indicates the cause of the HTTP connection failure 4 DNS error 5 HTTP connection error due to internal trouble 6 HTTP connection timeout 7 Flash access trouble 8 Flash memory full 9 Triple plus (+++) error (switch to command mode) 10 HTTP has no data 11 HTTP has partial data
Reference Sierra Wireless Proprietary	Notes • This command is used to start the HTTP connection created by **+KHTTPCFG** with <start>=0. • **+KHTTPGET**, **+KHTTPHEAD** and **+KHTTPPOST** automatically starts the connection if it has not been started before using **AT+KHTTPCNX**.

9.13.3. +KHTTPHEADER Command: Set HTTP Request Header

HL78xx	
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>** **[…]**

HL78xx	
Write command Syntax **AT+ KHTTPHEADER= <session_id> [,<local_uri>]**	Response **CONNECT** **…<EOF pattern>** **OK** or **+CME ERROR: <err>** Parameters **<session_id>** HTTP session index **<local_uri>** This argument must be empty. It is reserved for compatibility of command syntax. **<count>** HTTP headers count
Reference Sierra Wireless Proprietary	Notes User must use <EOF pattern> to finish sending; the module will then return to command mode.

9.13.4. +KHTTPGET Command: Get HTTP Server Information

HL78xx	
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** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<request_uri>** String type, indicates the information url to get during the HTTP connection

HL78xx	
	<http_notif> Integer type. Indicates the cause of the HTTP connection failure 4 DNS error 5 HTTP connection error due to internal trouble 6 HTTP connection timeout 7 Flash access trouble 8 Flash memory full 9 Triple plus (+++) error (switch to command mode) 10 HTTP got no data 11 HTTP got partial data **<show_resp>** Whether to show HTTP response and HTTP headers 0 Do not show response and headers 1 Show response and headers (default)
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. • Download can also be aborted (disconnected) by **+++** or DTR as specified in section 14.7 Switch Data/Command Mode DTR +++ ATO Behavior Table.

9.13.5. +KHTTPHEAD Command: Get HTTP Headers

HL78xx	
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** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<request_uri>** String type, indicates the information URL to get during HTTP connection **<http_notif>** Refer to **+KHTTPGET**

HL78xx	
Reference Sierra Wireless Proprietary	Notes • This method is identical to **+KHTTPGET** 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. • HTTP does not support **ATO**.

9.13.6. +KHTTPPOST Command: Send Data to HTTP Server

HL78xx	
Test command Syntax **AT+KHTTPPOST=?**	Response **+KHTTPPOST: (**list of possible **<session_id>**s**),<local_uri>,<request_uri>,(**list of possible **<show_resp>**s**)** **OK**
Write command Syntax **AT+KHTTPPOST=<session_id>,<local_uri>,<request_uri>[,<show_resp>]**	Response **CONNECT** **…<EOF pattern>** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<local_uri>** This argument must be empty. It is reserved for compatibility of command syntax. **<request_uri>** String type, the request data of the HTTP connection **<http_notif>** Refer to **+KHTTPGET** **<show_resp>** Whether to show HTTP headers 0 Do not show HTTP headers – show HTTP body only 1 Show HTTP headers and body
Reference Sierra Wireless Proprietary	Notes • Before using this command, it is highly recommended to configure the module for hardware flow control using command **AT&K3**. • Upload can be ended (disconnected) by **+++** or DTR as specified in section 14.7 Switch Data/Command Mode DTR +++ ATO Behavior Table. • **ATO** is not available for this command.

9.13.7. +KHTTP_IND Notification: HTTP Status

HL78xx	
Unsolicited Notification	Response **+KHTTP_IND: <session_id>,<status>[,<data_len>,<st_code>,<st_reason>]** Parameters **<session_id>** HTTP session index **<status>** Status of the HTTP session 0 Session is diconnected 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

9.13.8. +KHTTPCLOSE Command: Close HTTP Connection

HL78xx	
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** or **+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

9.13.9. +KHTTPDEL Command: Delete a Configured HTTP Connection

HL78xx	
Test command Syntax **AT+KHTTPDEL=?**	 Response **+KHTTPDEL: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KHTTPDEL=<session_id>**	 Response **OK** or **+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.

9.13.10. +KHTTPPUT Command: Perform HTTP PUT

HL78xx	
Test command Syntax **AT+KHTTPPUT=?**	 Response **+KHTTPPUT: (**list of possible **<session_id>**s**),<local_uri>,<request_uri>,(**list of possible **<show_resp>**s**)** **OK**
Write command Syntax **AT+KHTTPPUT=<session_id>,<local_uri>,<request_uri>[,<show_resp>]**	 Response **CONNECT** **…<EOF pattern>** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<local_uri>** This parameter must be empty; it is reserved for compatibility of command syntax

HL78xx	
	<request_uri> String type, request data of the HTTP connection **<http_notif>** Refer to **+KHTTPGET** **<show_resp>** Indicated whether to show HTTP header 0 Do not show header – show HTTP body only 1 Show HTTP header and body
Reference Sierra Wireless Proprietary	Notes • Before using this command, it is highly recommended to configure the module for hardware flow control using command **AT&K3**. • Uploading can be ended (disconnected) using **+++** or DTR as specified in section 14.7 Switch Data/Command Mode DTR +++ ATO Behavior Table. • **ATO** is not available for this command.

9.13.11. +KHTTPDELETE Command: Perform HTTP Delete

HL78xx	
Test command Syntax **AT+ KHTTPDELETE= ?**	Response **+KHTTPDELETE: (**list of possible **<session_id>**s**),<request_uri>,(**list of possible **<show_resp>**s**)** **OK**
Write command Syntax **AT+ KHTTPDELETE= <session_id>, <request_uri> [,<show_resp>]**	Response **CONNECT** **…<EOF pattern>** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>,<http_notif>** Parameters **<session_id>** HTTP session index **<request_uri>** String type, indicates the information URL to get during the HTTP connection **<http_notif>** Refer to **+KHTTPGET** **<show_resp>** Indicates whether to show HTTP response and HTTP headers 0 Do not show 1 Show

HL78xx	
Reference Sierra Wireless Proprietary	Notes • The user can abort downloading by sending “End of Data pattern” from the host. In this case, the module will end the transfer by transmitting the EOF followed by NO CARRIER. • Downloading can also be aborted (disconnected) using +++ or DTR as specified in section 14.7 Switch Data/Command Mode DTR +++ ATO Behavior Table.

9.14. FTP Client Specific Commands

9.14.1. +KFTPCFG Command: FTP Connection Configuration

HL78xx	
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**),(**list of possible **<af>**s**)** **OK**
Read command Syntax **AT+KFTPCFG?**	 Response **+KFTPCFG: <session_id>,<cnx cnf>,<server_name>,<login>,<password>, <port_number>,<mode>,<started>,<af>** **OK**
Write command Syntax **AT+KFTPCFG=** **[<cnx cnf>],** **<server_name>** **[,<login>** **[,<password>** **[,<port_number>** **[,<mode>]** **[,<start>]** **[,<af>]]]]**	 Response **+KFTPCFG:<session_id>** **OK** or **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<cnx cnf>** Index of a set of parameters for configuring one FTP session (see **+KCNXCFG**) **<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

HL78xx	
	<password> String type, indicates the password to be used during the FTP connection. (Note: The password does not appear in the Read response. The field displays as "".) **<port_number>** 1 – 65535 Indicates the remote command port (default value = 21) **<mode>** Numeric number. 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 0 Start the FTP connection later using **+KFTPCNX** 1 Start the FTP connection immediately **<started>** Specifies whether to the FTP connection has been started 0 FTP connection has not been started yet 1 FTP connection has been started **<af>** Address family used for the connection 0 IPV4 1 IPV6 **<ftp_cause>** Integer type. Indicates the cause of the FTP connection failure 0 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 3-digit reply code from the FTP server. See section 14.4 FTP Reply Codes
Reference Sierra Wireless Proprietary	Notes • Write command sets the server name, login, password, port number and mode for ftp operations. • This command (with <start> = 0) can be used before setting up **+KCNXCFG** configuration. Note however that the latter is required to start the connection properly. • The connection timeout for TCP socket is about 9 seconds with 3 retransmissions with a 3-second delay. • The result of the FTP connection is indicated by URC. • The default timeout for FTP is 180 seconds. • The password does not appear in the Read response. The field displays as "".
Examples	**AT+KFTPCFG=1,"ftp.connect.com","username","password",21,1** **+KFTPCFG: 1** **OK** **AT+KFTPCFG =?** **+KFTPCFG: (1),<remote-name/ip>,(0-65),(0-65),(1-65535),(0-1),(0-1),(0-1)** **OK**

HL78xx	
	AT+KFTPCFG? **+KFTPCFG: 1,1,"ftp.connect.com","username","",21,1,0,0** **OK**

9.14.2. +KFTPCNX Command: Start FTP Connection

HL78xx	
Test command Syntax **AT+KFTPCNX=?**	 Response **+KFTPCNX: (**list of possible **<session_id>**s**)** **OK**
Read command Syntax **AT+KFTPCNX?**	 Response **ERROR**
Write command Syntax **AT+KFTPCNX= <session_id>**	 Response **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<session_id>** FTP session index **<ftp_cause>** Integer type. 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 3-digit reply code from the FTP server. See section 14.4 FTP Reply Codes
Reference Sierra Wireless Proprietary	Notes • This command is used to start the FTP connection created by **+KFTPCFG** with <start>=0.
Examples	**AT+KFTPCNX=?** **+KFTPCNX: (1-6)** **OK** **AT+KFTPCNX=1** **ERROR** **+KFTP_ERROR: 1,2**

HL78xx	
	AT+KFTPCNX=? **+KFTPCNX: (1-6)** **OK** **AT+KFTPCNX=1** **OK** **+KCNX_IND: 1,1,0** **+KFTP_IND: 1,1**

9.14.3. +KFTPRCV Command: Receive FTP Files

HL78xx	
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),(list of possible **<size>**s) **OK**
Read command Syntax **AT+KFTPRCV?**	Response **ERROR**
Write command Syntax **AT+KFTPRCV=** **<session_id>,** **[<local_uri>],** **[<server_path>],** **<file_name>** **[,<type_of_file>** **[,<offset>]** **[,<size>]]**	Response **CONNECT** **<EOF_pattern>** **OK** or **+CME ERROR<err>** **NO CARRIER** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<session_id>** FTP session index **<local_uri>** This argument must be empty. It is reserved for compatibility of command syntax. **<server_path>** String type. Indicates the path of the file to be downloaded. An empty string or no string indicates the downloading is done from the path given by the FTP server **<file_name>** String type. Indicates the name of the file to download **<type_of_file>** Numeric type. Indicates the type of file (ASCII or binary) to transfer 0 Binary (default value) 1 ASCII (not supported)

HL78xx	
	<offset> 0 – 4294967295 Indicates the offset to “resume transfer”. When downloading file and transmitting to serial link, module will use the <offset> value and “resume transfer” from this position. **<size>** 0 – 4294967295 Indicates the size to “resume transfer”. When downloading file and transmitting to serial link, module will use the <size> value to indicate how many bytes to receive. **<EOF_pattern>** End of file notification. See **+KPATTERN** for values **<ftp_cause>** Integer type. 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 3-digit reply code from the FTP server. See section 14.4 FTP Reply Codes
Reference Sierra Wireless Proprietary	Notes • An FTP connection must have been achieved using **AT+KFTPCFG** before using this command. • The user will receive the entire data stream after sending **+KFTPRCV**. • 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. • If **AT&C1** is set, DCD will be ON after CONNECT, and DCD will be OFF after the download is done. • 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}. See section section 14.4 FTP Reply Codes for details.
Examples	**AT+KFTPRCV?** **ERROR** **AT+KFTPRCV=?** **+KFTPRCV: (1-6),<local_uri>,<server_path>,<file_name>,(0),(0-4294967295) ,(0-4294967295)** **OK** **AT+KFTPRCV=1,,,"filename.txt"** **CONNECT** **…data…** **OK** **+KFTP_IND: 1,2,10**

9.14.4. +KFTPSND Command: Send FTP Files

HL78xx	
Test command Syntax **AT+KFTPSND=?**	 Response **+KFTPSND: (**list of possible **<session_id>**s)**,(**list of possible **<local_uri>**,**<server_path>**,**<file_name>**,(**list of possible **<type of file>**s)**,(**list of possible **<append>**s)**,(**list of possible **<offset>**s)**,(**list of possible **<size>**s)** **OK**
Read command Syntax **AT+KFTPSND?**	 Response **ERROR**
Write command Syntax **AT+KFTPSND=<session_id>,[<local_uri>],[<server_path>],<file_name>[,<type of file>][,<append>][,<offset>][,<size>]**	 Response **CONNECT** **data …** **| OK** **<EOF pattern>** **OK** or **+CME ERROR <err>** **NO CARRIER** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<session_id>** FTP session index **<local_uri>** This argument must be empty. It is reserved for compatibility of command syntax. **<server_path>** String type. Indicates the path of the file to be uploaded. An empty string or no string indicates the uploading is done from the path given by the FTP server **<file_name>** String type. Indicates the name of the file to upload **<type of file>** Numeric type. Indicates the type of file (ASCII or binary) to transfer 0 Binary 1 ASCII (not supported) **<append>** Numeric type. Indicates using "append" or not when uploading. 0 Do not use "append". (default value) If the file already exists then the file will be overridden 1 Use "append". If the file already exists, then the data will be appended at the end of the file; otherwise the file will be created **<offset>** 0 – 4294967295 Indicates the offset to “resume transfer”. When transmitting to serial link and sending file, module will use the <offset> value and “resume transfer” from this position. **<size>** 0 – 4294967295 Indicates the size to “resume transfer”. When transmitting to serial link and sending file, module will use the <size> value to indicate how many bytes to send.

HL78xx	
	<EOF pattern> End of file notification. See **+KPATTERN** for values **<ftp_cause>** Integer type. 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 3-digit reply code from the FTP server. See section 14.4 FTP Reply Codes
Reference Sierra Wireless Proprietary	Notes • An FTP connection must have been achieved using **AT+KFTPCFG** before using this command. • After sending the command, the host must send the entire data stream of the file after sending **+KFTPSND**. • Upload can also be ended (disconnected) by **+++** or DTR as specified in section 14.7 Switch Data/Command Mode DTR +++ ATO Behavior Table. • **ATO** is not available for this command • If **AT&C1** is set, DCD will be ON after CONNECT, and it will be OFF after the upload is done.
Examples	**AT+KFTPSND=?** **+KFTPSND: (1-6),<local_uri>,<server_path>,<file_name>,(0),(0-1),(0-4294967295),(0-4294967295)** **OK**

9.14.5. +KFTPDEL Command: Delete FTP Files

HL78xx	
Test command Syntax **AT+KFTPDEL=?**	 Response **+KFTPDEL:** (list of possible **<session_id>**s)**,<server_path>,<file_name>,(**list of possible **<type>**s**)** **OK**
Read command Syntax **AT+KFTPDEL?**	 Response **ERROR**
Write command Syntax **AT+KFTPDEL=<session_id>,[<server_path>],<file_name>[,<type>]**	 Response **OK** or **+CME ERROR <err>** **NO CARRIER** **+KFTP_ERROR: <session_id>,<ftp cause>**

HL78xx	
	Parameters **<session_id>** FTP session index **<server_path>** String type. Indicates the path of the file to be deleted. An empty string or no string indicates the deleting is done from the path given by the FTP server **<file_name>** String type. Indicates the name of the file to delete **<type>** Numeric type. Indicates the type of file (ASCII or binary) to transfer 0 Binary 1 ASCII (Not supported) **<ftp_cause>** Integer type. 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 delete a file due to connection troubles 3 Deleting was impossible due to connection timeout 4 No network available XXX 3-digit reply code from the FTP server. See section 14.4 FTP Reply Codes
Reference Sierra Wireless Proprietary	Notes • An FTP connection must have been achieved using **AT+KFTPCFG** before using this command.
Examples	**AT+KFTPDEL=?** **+KFTPDEL: (1-6),<server_path>,<file_name>,(0)** **OK**

9.14.6. +KFTP_IND Notification: FTP Status

HL78xx	
Unsolicited Notification	Response **+KFTP_IND: <session_id>,<status>[,<data_len>]** Parameters **<session_id>** FTP session index **<status>** Status of the FTP session 1 Session is set up and ready for operation 2 The last FTP command is executed successfully **<data_len>** Byte length of data downloaded/uploaded to/from the terminal (using **+KFTPRCV**/**+KFTPSND**)
Reference	Sierra Wireless Proprietary

9.14.7. +KFTPCLOSE Command: Close Current FTP Connection

HL78xx	
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 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.
Examples	**AT+KFTPCLOSE=?** **+KFTPCLOSE: (1-6),(0-1)** **OK** **AT+KFTPCLOSE=1,1** **OK**

9.14.8. +KFTPCFGDEL Command: Delete a Configured FTP Session

HL78xx	
Test command Syntax **AT+KFTPCFGDEL=?**	 Response **+KFTPCFGDEL: (**list of possible **<session_id>**s**)** **OK**
Write command Syntax **AT+KFTPCFGDEL=<session_id>**	 Response **OK** or **+CME ERROR: <err>** Parameters **<session_id>** FTP session index

HL78xx	
Reference Sierra Wireless Proprietary	Notes The session must be closed (using **+KFTPCLOSE**) before using this command.
Examples	**AT+KFTPCFGDEL=?** **+KFTPCFGDEL: (1-6)** **OK** **AT+KFTPCFGDEL=1** **OK**

9.14.9. +KFTPLS Command: List File Size of a Specific File

HL78xx	
Test command Syntax **AT+KFTPLS=?**	 Response **+KFTPLS:** (list of possible **<session_id>**s)**,<server_path>,<file_name>,(**list of possible **<type>**s**)** **OK**
Write command Syntax **AT+KFTPLS=<session_id>,[<server_path>],<file_name>[,<type>]**	 Response **OK** or **+CME ERROR <err>** **NO CARRIER** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<session_id>** FTP session index **<server_path>** String type. Indicates the path of the file to be deleted. An empty string or no string indicates the deleting is done from the path given by the FTP server **<file_name>** String type. Indicates the name of the file to list size **<type>** Numeric type. Indicates the type of file (ASCII or binary) to transfer 0 Binary 1 ASCII (not supported) **<ftp_cause>** Integer type. 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 delete a file due to connection troubles 3 Deleting was impossible due to connection timeout 4 No network available XXX 3-digit reply codes from the FTP server. See section 14.4 FTP Reply Codes

HL78xx	
Reference Sierra Wireless Proprietary	Notes • An FTP connection must have been achieved using **AT+KFTPCFG** before using this command.
Examples	**AT+KFTPLS=?** **+KFTPLS: (1-6),<server_path>,<file_name>,(0)** **OK** **AT+KFTPLS=1,,"filename.txt"** **+KFTPLS: filename.txt 24** **OK**

10. AVMS Commands

Note: Two IP sessions are required during an AVMS FOTA session (connection to AirVantage and FOTA upgrade). Refer to section 9.3 Session ID for session ID details.

10.1. +WDSC Command: Device Services Configuration

HL78xx	
Test command Syntax **AT+WDSC=?**	Response **+WDSC: (0-2,5,6),(**list of supported **<State>**s) **+WDSC: 3,(**list of supported **<State>**s) **+WDSC: 4,(**list of supported **<Timer_1>**s)**,(**list of supported **<Timer_2>**s)**,(**list of supported **<Timer_3>**s)**,(**list of supported **<Timer_4>**s)**,(**list of supported **<Timer_5>**s)**,(**list of supported **<Timer_6>**s)**,(**list of supported **<Timer_7>**s)**,(**list of supported **<Timer_8>**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>]]** **+WDSC: 5,<State>** **+WDSC: 6,<State>** **OK**
Write command Syntax For <Mode>= 0, 1, 2, 3, 5, 6: **AT+WDSC= <Mode>,<State>** For <Mode>=4: **AT+WDSC= <Mode>, <Timer_1> [[,<Timer_2>]... [,<Timer_n>]]**	Response **OK** or **+CME ERROR <err>** Parameters **<Mode>** 0 User agreement for AVMS connection When this mode is activated, an indication (see **+WDSI** for more information) is returned by the embedded module to request for an agreement before connecting to the server 1 User agreement for package download When this mode is activated, an indication (see **+WDSI** for more information) is returned by the embedded module to request for an agreement before downloading any package 2 User agreements for package install When this mode is activated, an indication (see **+WDSI** for more information) is returned by the embedded module to request for an agreement before installing any package

HL78xx	
	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 (WWAN DATA 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. 5 User agreements for device reboot When this mode is activated, an indication (see **+WDSI** for more information) is returned by the embedded module to request for an agreement before rebooting the device 6 User agreements for application uninstall (SW update) When this mode is activated, an indication (see **+WDSI** for more information) is returned by the embedded module to request for an agreement before uninstalling an application. **<State>** Status of the mode For <Mode> = 0, 1, 2, 5 or 6: 0 Disabled (default value) 1 Enabled For <Mode> = 3: Range = 0 – 525600 (units:min) 0 The polling mode is deactivated **<Timer_1>** Timer between the first failed connection and the next attempt. Range = 0 – 20160 (units: min). 0 The retry mode is deactivated 15 Default value **<Timer_n>** Timer between the nth failed attempt connection and the (n+1)th connection (n ≤ 7). Range = 1 – 20160 (units: min) Default values: <Timer_2>=60 <Timer_3>=240 <Timer_4>=960 <Timer_5>=2880 <Timer_6>=10080 <Timer_7>=10080 <Timer_8>=not used
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished the Device Services initialization (see **+WDSI**) and when the AVMS services are in prohibited state (see **+WDSG**). • Parameters <State> and <Timer_1> to <Timer_n> are stored in non-volatile memory without sending the **&W** command. The **&F** command has no impact on these values. • The network registration is considered as “failed” when all connections configured by the retry mode have failed. This registration is forbidden while the APN is not set by **+WDSS**.

HL78xx	
Examples	**AT+WDSC=?** **+WDSC:(0-2,5,6),(0-1)** **+WDSC:3,(0-525600)** **+WDSC:4,(0-20160),(1-20160),(1-20160),(1-20160),(1-20160),(1-20160),(1-20160)** **OK** **AT+WDSC?** // 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** **+WDSC: 5,0** **+WDSC: 6,0** **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** **+WDSC: 5,0** **+WDSC: 6,0** **OK**

10.2. +WDSE Command: Device Services Error

HL78xx	
Execute command Syntax **AT+WDSE**	Response **[+WDSE:<HTTP_Status>]** **OK** **+CME ERROR <err>** Parameter **<HTTP_Status>** Integer type – Last HTTP response received by the module 100 Continue 101 Switching Protocols 200 OK 201 Created 202 Accepted 203 Non-Authoritative Information 204 No Content 205 Reset Content 206 Partial content

HL78xx	
	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 only returns OK, without +WDSE: <HTTP_Status> intermediary response.
Reference Sierra Wireless Proprietary Command	Notes This command is available when the embedded module has finished the Device Services initialization (see +WDSI) and when the AVMS services are in activated state (see +WDSG).
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**

10.3. +WDSG Command: Device Services General Status

HL78xx	
Test command Syntax **AT+WDSG=?**	 Response **OK**
Write command Syntax **AT+WDSG**	 Response **+WDSG: <Indication>,<State>** **[+WDSG: <Indication>,<State>[…]]** **OK** or **+CME ERROR <err>** Parameters **<Indication>** Integer type 0 Device services activation state 1 Session and package indication **<State>** Status of indication For <Indication>=0 0 Device services are prohibited. Devices services will never be activated. 1 Device services are deactivated. Connection parameters to a device services 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, no action is needed from the user. For <Indication>=1 0 No session or package 1 A session is under treatment 2 A package is available on the server. 3 A package was downloaded and ready to install When a package was installed or a recovery was made, <State> is set to 0.
Reference Sierra Wireless Proprietary Command	Notes This command is available when the embedded module has finished the Device Services initialization (see **+WDSI**).
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**

10.4. +WDSI Command: Device Services Indications

HL78xx	
Test 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** or **+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, 3, 24 and 25) 4 Activate the authentication indications (<Event> = 4 and 5) 8 Activate the session indication (<Event> = 6, 7, 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) 256 Activate download progress indication (<Event> = 18) 2048 Reserved 4096 Activate Bootstrap event indications (<Event> = 23) **<Event>** 0 Device services are initialized and can be used. The device is configured to be able to authenticate with the AV server. 1 The Device Services server requests the device to make a connection. The device requests a user agreement to allow the module to make the connection. The response can be sent using **+WDSR** and this indication can be returned by the device if the user has activated the user agreement for connection. 2 The Device Services server requests the device to make a package download. The device requests a user agreement to allow the module to make the download. The response can be sent using **+WDSR** and this indication can be returned by the device if the user has activated the user agreement for download. 3 The device has downloaded a package. The device requests a user agreement to install the downloaded package. The response

HL78xx

can be sent using **+WDSR** and this indication can be returned by the device if the user has activated the user agreement for install.

4 The embedded module starts authentication with the server

5 Authentication with the server failed. This event is sent when the server rejects the device authentication request. Example of rejection cause: authentication keys mismatch.

6 Authentication has succeeded, and session with the server started.

7 Session with the server failed. This event is sent when the server rejects the device connection request. Example of rejection cause: device not registered on server side.

8 Session with the server is finished. Example of session termination cause: connection loss, user initiated using **+WDSS=1,0** or reboot.

9 A package is available on the server and can be downloaded by the module. A <Data> parameter is returned indicating the package size in kB

10 A package was successfully downloaded and stored in flash

11 An issue happens during the package download. If the download has not started (**+WDSI: 9** 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** was returned), a flash problem implies that the package has not been saved in the device

12 Downloaded package is certified to be sent by the AirPrime Management Services server

13 Downloaded package is not certified to be sent by the AirPrime Management Services server

14 Update will be launched

15 OTA update client has finished unsuccessfully

16 OTA update client has finished successfully

17 Reserved

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 Reserved

22 Reserved

23 Session type (only in LWM2M protocol)

24 The Device Services server requests the device to make a reboot. The device requests a user agreement to allow the embedded module to reboot. The response can be sent using **+WDSR** and this indication can be returned by the device if the user has activated the user agreement for connection.

25 The Device Services server requests the device to uninstall a SW application. The device requests a user agreement to allow the embedded modeule to uninstall an application. The response can be sent using **+WDSR** and this indication can be returned by the device if the user has activated the user agreement for uninstall.

<Data> Specific data for some <Event>

For <Event>=9, <Data> indicates the package size in bytes, which will be downloaded

For <Event>=11, <Data> indicates the reason of the download failure

0 The download fails due insufficient memory in the device to save the firmware update package. The package was not downloaded

1 An HTTP/HTTPS error occurs. Please refer to +WDSE

HL78xx	
	2 Corrupted firmware update package; did not store correctly. Detected, for example, by mismatched CRCs between actual and expected or signature check error. 3 RAM issue (resume is possible but suggests rebooting the platform before the resume) 4 Download issue but the package download could be resumed 5 Flash issue during package download For <Event>=18, <Data> indicates the download progress in percentage (without %) For <Event>=23, <Data> indicates the session event 0 Bootstrap session 1 Device management session
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, the Device Services should be in activated state (see **+WDSG** for more information). • In case when user agreement for connection is enabled, the connection will not be disconnected (with notification **+WDSI: 8**) without the user's explicit action (**AT+WDSS=1,0**).
Examples	**AT+WDSI=?** **+WDSI: (0-127,256-383,4096-4223,4352-4479)** **OK** **AT+WDSI?** **+WDSI: 0** *// All indications are deactivated* **OK** **AT+WDSI=207** **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 // AirPrime 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* After the firmware was successfully installed, a connection to AirVantage server needs to be established to update the AirVantage server about the installation status. If the user agreement for connection is enabled, we will see the following: **+WDSI: 1** *// connection needs to be enabled* **AT+WDSR=1** *// user issues the command to enable the connection* **OK**

HL78xx		
	+WDSI: 4 **+WDSI: 6** **+WDSI: 23,1**	*// displays the current state of authentication notification* *// displays that the session has succeeded and has started* *// displays that the target has successfully connected to the // AirVantage Service*

10.5. +WDSR Command: Device Services Reply

HL78xx	
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** or **+CME ERROR <err>** Parameters **<Reply>** Reply to user agreement request (see **+WDSI**) 0 Delay the connection to the server 1 Accept the connection to the server 2 Delay the download 3 Accept the download 4 Accept the install 5 Delay the install 6 Accept the device reboot 7 Delay the device reboot 8 Accept the application uninstall 9 Delay the application uninstall **<timer>** Timer until a new User agreement request is returned by the module. This parameter is only available for <Reply>=0, 2, 5, 7 or 9. Units: minutes. Range is from 0 to 1440. Default value = 30.
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished the Device Services initialization (see **+WDSI**) and when the AVMS services are in activated state (see **+WDSG**) • It is not possible to refuse: ▪ an install request (**AT+WDSR=5,0**) and will return **+CME ERROR: 3**. ▪ a device reboot request (**AT+WDSR=7,0**) and will return **+CME ERROR: 3**. ▪ an uninstall request (**AT+WDSR=9,0**) and will return **+CME ERROR: 3**. • After an install delay if the embedded module is powered down until after the delay, it is not powered on and the new user agreement request should be returned at the newt start up.
Examples	**AT+WDSR=?** **+WDSR: (0-9),(0-1440)**

HL78xx	
	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**

10.6. +WDSS Command: Device Services Session

HL78xx	
Test command Syntax **AT+WDSS=?**	Response **+WDSS: 1,(**list of supported **<Action>**s for this **<Mode>)** **+WDSS: 2,(**range of supported PDP context identifiers**)** **OK**
Read command Syntax **AT+WDSS?**	Response **[+WDSS: 1,<Action>]** **[+WDSS: 2,<Cid>]** **OK**
Write command Syntax For <mode>=1 **AT+WDSS= <Mode>, <Action>** For <mode>=2 **AT+WDSS= <Mode>, <Cid>**	Response **OK** or **+CME ERROR <err>** Parameters **<Mode>** 0 Deprecated and cannot be used anymore. Instead, use <Mode>=2 to set the profile to be used, and configure it using **AT+CGDCONT**. 1 User initiated connection to the Device Services server 2 PDP context identifier configurations for Device Services **<Action>** For <Mode>=1 only 0 Release the current connection to the Device Services server 1 Establish a connection to the Device Services server **<Cid>** For <Mode>=2 only, PDP context identifier

HL78xx	
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished the Device Services initialization (see **+WDSI**) • **AT+WDSS?** command only returns **OK** if no APN is defined. • When a request is sent to the embedded module to resume an inexistent or unsuspended session, **+CME ERROR: 3** is returned. • When a request is sent to the embedded module to release an inexistent session, **+CME ERROR: 3** is returned. • When the PDP context cannot be activated because of bad AirPrime Management Services NAP configuration, the embedded module will use a NAP defined by **+CGDCONT** to activate the dedicated PDP context (but the initial NAP configuration is not erased). • The activation is done if the embedded module is registered on the network. If the embedded module is not registered when the command is performed, the activation will be done at the next network registration (even if the embedded module resets).
Examples	**AT+WDSS?** **OK** **AT+WDSS=?** **+WDSS: 1,(0-1)** **+WDSS: 2,(1-1)** **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**

10.7. +WDSTPF Command: Device Services Third Party FOTA

HL78xx	
Test command Syntax **AT+WDSTPF=?**	 Response **+WDSTPF: 0,(<addr>** length range**)** **+WDSTPF: 1** **OK**
Read command Syntax **AT+WDSTPF?**	 Response **+WDSTPF: 0,<addr>** **+WDSTPF: 1,<state>** **OK**

HL78xx	
Write command Syntax When <mode>=0: **AT+WDSTPF=<mode>,<addr>** When <mode>=1: **AT+WDSTPF=<mode>**	Response **OK** Parameters **<mode>** Mode of operation 0 Set the package URL. This address is stored in memory and is persistent to reset 1 Start FOTA operation. When this mode is activated, download starts depending on user agreement configuration (see **+WDSC**) **<addr>** String parameter containing the package address with format "<url>[:port>]" maximum length = 255 **<url>** String parameter containing the package URL **<port>** String parameter with maximum length = 5. Optional parameter. Default value = 80 <state> FOTA operation status 0 Not started 1 Started
Notes	• The user agreements for download and install are applicable for the third-party FOTA service. These user agreements are controlled by **+WDSC** and **+WDSR**. • User agreement for reboot is not supported for +WDSTPF. • Refuse a download is not supported for +WDSTPF. • **+WDSI** is available under third-party FOTA service. The sent indications notify the different states of FOTA. • FOTA from the Sierra Wireless server must not be used simultaneously with this third-party FOTA update. Cross effects are not guaranteed.
Examples	**AT+WDSTPF=?** **+WDSTPF: 0,(1-255)** **+WDSTPF: 1** **OK** **AT+WDSTPF?** **+WDSTPF: 0,"http://abcd.net:80/1234"** **+WDSTPF: 1,0** **OK** **AT+WDSC?** **+WDSC: 0,1** **+WDSC: 1,0** **+WDSC: 2,1** **+WDSC: 3,0** **+WDSC: 4,15,60,240,480,1440,2880,0,0** **+WDSC: 5,0** **+WDSC: 6,0** **AT+WDSTPF=1** // Set start download **OK** **+WDSI: 9,<package Size>** **+WDSI: 18,1**

HL78xx	
	+WDSI: 18,5 **+WDSI: 18,70** **+WDSI: 18,100** **+WDSI: 12** **+WDSI: 10** **+WDSI: 14** **+WDSI: 16**

11. Test Commands

Note: +WMTXPOWER and +WMRXPOWER are available for CAT-M1 but not for NB1.

11.1. +WMTXPOWER Command: Test RF Tx

HL78xx	
Test command Syntax **AT+ WMTXPOWER=?**	Response **+WMTXPOWER:** (list of supported **<ENABLE>**s),(list of supported**<BAND>**s),(list of supported**<CHANNEL>**s),(list of supported**<POWER_LEVEL>**s),(list of supported **<TX_TYPE>**s),(list of supported **<BANDWIDTH>**s) **OK**
Read command Syntax **AT+ WMTXPOWER?**	Response **+WMTXPOWER: <ENABLE>[,<BAND>,<CHANNEL>,<POWER_LEVEL>, <TX_TYPE>[,<BANDWIDTH>]]** **OK** Note that parameters <BAND>, <CHANNEL>, <POWER_LEVEL> and <TX_TYPE> are only available if <ENABLE>=1. <BANDWIDTH> is only available if <ENABLE>=1 and if <TX_TYPE>=0
Write command Syntax **AT+ WMTXPOWER= <ENABLE> [,<BAND>, <CHANNEL>, <POWER_ LEVEL>, <TX_TYPE> [,<BANDWIDTH>]]**	Response **OK** Parameters **<ENABLE>** 0 Stop the burst emission 1 Start the burst emission **<BAND>** Tx burst band emission. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. 1 Band 1 2 Band 2 3 Band 3 4 Band 4 5 Band 5 8 Band 8 9 Band 9 10 Band 10 12 Band 12 13 Band 13 17 Band 17 18 Band 18 19 Band 19 20 Band 20 25 Band 25 26 Band 26 27 Band 27

HL78xx	
	28 Band 28 66 Band 66 **<CHANNEL>** Tx burst channel emission. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0 If <BAND>=1 18000 – 18599 If <BAND>=2 18600 – 19199 If <BAND>=3 19200 – 19949 If <BAND>=4 19950 – 20399 If <BAND>=5 20400 – 20649 If <BAND>=8 21450 – 21799 If <BAND>=9 21800 – 22149 If <BAND>=10 22150 – 22749 If <BAND>=12 23010 – 23179 If <BAND>=13 23180 – 23279 If <BAND>=17 23730 – 23849 If <BAND>=18 23850 – 23999 If <BAND>=19 24000 – 24149 If <BAND>=20 24150 – 24449 If <BAND>=25 26040 – 26689 If <BAND>=26 26690 – 27039 If <BAND>=27 27040 – 27209 If <BAND>=28 27210 – 27659 If <BAND>=66 131972 – 132671 **<POWER_LEVEL>** Absolute output power. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. Range: 0 (0 dBm) to 2300 (23 dBm) for all bands **<TX_TYPE>** defines the type of transmitted signal. This parameter is not allowed if <ENABLE>=0. 0 SC-FDMA 1 CW (continuous waveform). For customers, which don't have CMW tester but only a spectrum analyzer. **<BANDWIDTH>** For SC-FDMA only, defines the bandwidth of Tx burst emissions. This parameter is not allowed if <ENABLE>=0 or if <TX_TYPE>=1**.** 0 1.4M
Reference Sierra Wireless Proprietary	Notes • Before using this command, it is necessary to verify that the configured LTE band(s) on which the module can operate is correctly set by using either **AT+KBNDCFG** to read the configured band(s), or **AT+KBNDCFG** to set the configured LTE band(s) . • This command is not available if **AT+WMRXPOWER** is enabled. • The module must be restarted after using this command.
Examples	**AT+WMTXPOWER=?** **+WMTXPOWER: (0-1),(1,2,3,4,5,8,9,10,12,13,17,18,19,20,25,26,27,28,66),(18000–18599,18600–19199,19200–19949,19950–20399,20400–20649,21450–21799,21800-22149,22150-22749,23010–23179,23180–23279, 23730-23849,23850–23999,24000–24149,24150–24449,26040-26689,26690–27039,27040-27209,27210–27659,131972-132671),(0-2300),(0-1),(0)** **OK**

HL78xx	
	AT+WMTXPOWER=1,2,18600,2300,0,0 // A Tx is emitted at Earfcn 18600 with a // power level of 23dbm and with a SC-FDMA // Tx type and with a bandwidth of 1.4Mhz **OK** **AT+WMTXPOWER=1,2,18600,2300,1** // A Tx is emitted at Earfcn 18600 with a // power level of 23dbm and with a continuous // waveform Tx type **OK** **AT+WMTXPOWER=0** **OK**

11.2. +WMRXPOWER Command: Test RF Rx

HL78xx	
Test command Syntax **AT+ WMRXPOWER=?**	Response **+WMRXPOWER:** (list of supported **<ENABLE>**s),(list of supported **<BAND>**s), (list of supported **<CHANNEL>**s) **OK**
Read command Syntax **AT+ WMRXPOWER?**	Response **+WMRXPOWER: <ENABLE>[,<BAND>,<CHANNEL>]** **OK** Note that parameters <BAND> and <CHANNEL> are only available if <ENABLE>=1.
Write command Syntax **AT+ WMRXPOWER= <ENABLE> [,<BAND>, <CHANNEL>]**	Response **+WMRXPOWER: <POWER1>** **OK** Parameters **<ENABLE>** 0 Stop the Rx measurement 1 Start the Rx measurement **<BAND>** Rx band to read. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. 1 Band 1 2 Band 2 3 Band 3 4 Band 4 5 Band 5 8 Band 8 9 Band 9 10 Band 10 12 Band 12

HL78xx	
	13 Band 13 17 Band 17 18 Band 18 19 Band 19 20 Band 20 25 Band 25 26 Band 26 27 Band 27 28 Band 28 66 Band 66 **<CHANNEL>** Rx channel to read. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. If <BAND>=1 0 – 599 If <BAND>=2 600 – 1199 If <BAND>=3 1200 – 1949 If <BAND>=4 1950 – 2399 If <BAND>=5 2400 – 2649 If <BAND>=8 3450 – 3799 If <BAND>=9 3800 – 4149 If <BAND>=10 4150 – 4749 If <BAND>=12 5010 – 5179 If <BAND>=13 5180 – 5279 If <BAND>=17 5730 – 5849 If <BAND>=18 5850 – 5999 If <BAND>=19 6000 – 6149 If <BAND>=20 6150 – 6449 If <BAND>=25 8040 – 8689 If <BAND>=26 8690 – 9039 If <BAND>=27 9040 – 9209 If <BAND>=28 9210 – 9659 If <BAND>=66 66436 – 67335 **<POWER1>** Received power at primary antenna in dBm
Reference Sierra Wireless Proprietary	Notes • Before using this command, it is necessary to verify that the configured LTE band(s) on which the module can operate is correctly set by using either **AT+KBNDCFG** to read the configured band(s), or **AT+KBNDCFG** to set the configured LTE band(s). • This command is not available if **AT+WMTXPOWER** is enabled. • For Rx tests, the 2 followings waveforms can be applied to the UE antenna: ▪ a continuous waveform, in which case it is recommended to use a 1Mhz offset to central frequency to avoid DC interference. ▪ an LTE signal, in which case it is recommended to use a continuous FDD radio frame, which occupies all subcarriers including the ones dedicated for PBCH/PSC/SSC.

HL78xx	
Examples	**AT+WMRXPOWER=?** **+WMRXPOWER: (0-1),(1,2,3,4,5,8,9,10,12,13,17,18,19,20,25,26,27,28,66),(0–599,600-1199,1200–1949,1950-2399, 2400–2649,3450–3799,3800-4149,4150-4749,5010-5179,5180–5279,5730-5849,5850–5999,6000–6149, 6150–6449,8040-8689,8690–9039,9040-9209,9210–9659,66436-67335)** **OK** **AT+WMRXPOWER=1,4,1950** // Read Earfcn 1950 **+WMRXPOWER: -95.0** // Rx power -95.0 dBm at antenna **OK**

12. GNSS Commands

12.1. +GNSSSTART Command: Start or Restart the GNSS Session

HL78xx	
Test command Syntax **AT+GNSSSTART =?**	 Response **+GNSSSTART:** (list of supported **<start_mode>**s) **OK**
Read command Syntax **AT+GNSSSTART ?**	 Response **+GNSSSTART: <start_mode>** **OK**
Write command Syntax **AT+GNSSSTART =<start_mode>**	 Response **OK** Parameter **<start_mode>** Start mode requested/start mode of the last successfully initiated GNSS session since power up 0 'AUTO' START – All previous stored data is used. This is used for normal operations. 1 'WARM' START – For test purposes only. All previously stored data except Ephemeris is used. 2 'COLD' START – For test purposes only. No previous stored data except Almanac and Extended Ephemeris is used. Time and last location are unknown. 3 'FACTORY' START – For test purposes only. Uses no previously stored data. Uses factory default data.
Unsolicited Notification	Response **+GNSSEV: 1,<status>** Parameter **<status>** Event status 0 The action has failed. 1 The action has been successfully completed
Reference Sierra Wireless Proprietary	Notes • This command starts or restarts a GNSS session. • If no session was previously started, the read command returns <start_mode> = 0. • If a <start_mode> other than AUTO is selected, some or all previous location information is forgotten by the module. • Start modes other than AUTO are intended for test purposes only.

HL78xx	
Examples	**AT+GNSSSTART=1** **OK** **+GNSSEV: 1,1** // or **+GNSSEV: 1,0** **AT+GNSSSTART=?** **+GNSSSTART: (0-3)** **OK** **AT+GNSSSTART?** **+GNSSSTART: 1** //The current starting mode is “WARM” start **OK**

12.2. +GNSSSTOP Command: Stop the GNSS Session

HL78xx	
Test command Syntax **AT+GNSSSTOP=?**	 Response **OK**
Read command Syntax **AT+GNSSSTOP?**	 Response **+GNSSSTOP: <status>** **OK**
Execute command Syntax **AT+GNSSSTOP**	 Response **+GNSSSTOP: <status>** **OK** Parameter **<status>** Status of the last **AT+GNSSSTOP** request 0 GNSS is still running 1 GNSS is stopped
Unsolicited Notification	Response **+GNSSEV: 2,<status>** Parameter **<status>** Event status 0 Action has failed 1 Action has been successfully completed
Reference Sierra Wireless Proprietary	Notes This command stops an ongoing GNSS session.

HL78xx	
Examples	**AT+GNSSSTOP** **OK** **+GNSSEV: 2,1** // or **+GNSSEV: 2,0** **AT+GNSSSTOP=?** **OK**

12.3. +GNSSNMEA Command: Configure NMEA Frames Flow

HL78xx	
Test command Syntax **AT+GNSSNMEA=?**	Response **+GNSSNMEA: (**list of supported **<output>**s**),(**list of supported **<rate>**s**),(**list of supported **<profile_mask>**s**),(**list of supported **<nmea_mask>**s**)** **OK**
Read command Syntax **AT+GNSSNMEA?**	Response **+GNSSNMEA: <output>,<rate>,<profile_mask>,<nmea_mask>** **OK**
Write command Syntax **AT+GNSSNMEA=[<output>],[<rate>],[[<profile_mask>],<nmea_mask>]**	Response **OK** Parameters **<output>** Specifies the port which will be used by the application to transmit NMEA frames. 0x00 NMEA frames are not output 0x01 NMEA frames are output on dedicated NMEA port over USB 0x03 NMEA frames are output on UART1 0x04 NMEA frames are output on the same port the **+GNSSNMEA** was received on. 0x05 NMEA frames are output on CMUX DLC1 0x06 NMEA frames are output on CMUX DLC2 0x07 NMEA frames are output on CMUX DLC3 0x08 NMEA frames are output on CMUX DLC4 Same output is applicable to all NMEA profiles. If omitted, the last requested output will be used. **<rate>** Specifies the rate at which the NMEA sentences are output on the requested port in milliseconds. Same rate is applicable to all NMEA profiles. If omitted, the last requested rate will be used.

HL78xx	
	<profile_mask> Specifies the NMEA profiles (Talker ID) for which the requested NMEA sentences mask shall be applied such as GP, GL, GA, GN etc. Range: 0 All supported NMEA profiles; the requested NMEA mask will be applied to all sentences **<nmea_mask>** Defines the list of NMEA sentences to be enabled as a bit mask. A sentence is enabled if its bit position is set to 1 and disable if it's set to 0. Bit 0 – GGA Bit 1 – GSA Bit 2 – GSV Bit 3 – RMC Bit 4 – VTG Bit 5 – GNS Bit 6 – GST Bit 7 – GLL Bit 8 – ZDA Bit 9 – GRS Bit 10 – DTM
Reference Sierra Wireless Proprietary	Notes • This command configures the enabled NMEA sentences, NMEA output rate and the output port. • The command can be used to configure multiple profiles using a single command with the profiles as a bitmask. A profile is enabled if its bit position is set to 1. If the profile mask is 0 or omitted, the requested NMEA mask will be applied to all sentences. If a requested NMEA sentence is supported only for some but not all profiles, the command will simply ignore these sentences for the profiles for which it's not supported, i.e. the command will not return ERROR. For example, if a single command is requested to enable GPGSA and GAGSA but the device only supports GPGSA, the command will only enable GPGSA and GAGSA will be ignored. • When this command is issued for output 4, the current port will switch to DATA mode. **+++** can be sent on the port to switch back to command mode.
Examples	**AT+GNSSNMEA=?** **+GNSSNMEA: (0,3-8),(1000),(0),(1FF)** **OK** **AT+GNSSNMEA?** **+GNSSNMEA: 4,1000,0,1FF** **OK** **AT+GNSSNMEA=1,1000,0,1FF** **OK** //or **+CME ERROR:<error>** **AT+GNSSNMEA=,,,1FF** **OK** //or **+CME ERROR:<error>**

HL78xx	
	AT+GNSSNMEA=0,1000 **OK** //or **+CME ERROR:<error>** **AT+GNSSNMEA=4** **CONNECT** **$GPGGA,235436.00,4910.3542,N,12304.2419,W,0,00,1.2,-0.4,M,-17.6,M,,*7B** **$GPGSA,A,1,,,,,,,,,,,,2.1,1.2,1.7*36** **$GPGGA,235437.00,4910.3542,N,12304.2419,W,0,00,1.2,-0.4,M,-17.6,M,,*7A** **$GPGSA,A,1,,,,,,,,,,,,2.1,1.2,1.7*36** **$GPGGA,235438.00,4910.3542,N,12304.2419,W,0,00,1.2,-0.4,M,-17.6,M,,*75** **$GPGSA,A,1,,,,,,,,,,,,2.1,1.2,1.7*36** **$GPGGA,235439.00,4910.3542,N,12304.2419,W,0,00,1.2,-0.4,M,-17.6,M,,*74** **$GPGSA,A,1,,,,,,,,,,,,2.1,1.2,1.7*36** // +++ received here **OK** **AT+GNSSNMEA=** **OK**

12.4. +GNSSCONF Command: Configure the Location Service and GNSS Receiver

HL78xx	
Test command Syntax **AT+GNSSCONF=?**	Response **+GNSSCONF: <config_type>,**(list of supported **<config_value_1>**s) **[+GNSSCONF: <config_type>,**(list of supported **<config_value_1>**s)] **OK**
Read command Syntax **AT+GNSSCONF?**	Response **+GNSSCONF: <config_type>,<config_value_1>** **[+GNSSCONF: <config_type>,<config_value_1>]** **OK**
Write command Syntax **AT+GNSSCONF=<config_type>,<config_value_1>**	Response **OK** Parameters **<config_type>** Specifies the configuration on which the configuration value is applied 1 Sets the LNA type 10 Configures enabled satellite constellations (GPS, GLONASS)

HL78xx	
	<config_value_1> Requested value 1 of the configuration type For <config_type>=1: 0 LNA_EN output signal is always OFF 1 LNA_EN output signal is automatically driven For <config_type>=10: 0 GPS only 1 GPS and GLONASS
Reference Sierra Wireless Proprietary	Notes This command configures various GNSS configurations such as satellite constellations.
Examples	**AT+GNSSCONF=?** **+GNSSCONF: 1,(0-1)** **+GNSSCONF: 10,(0-1)** **OK** **AT+GNSSCONF?** **+GNSSCONF: 1,0** **+GNSSCONF: 10,0** **OK** **AT+GNSSCONF=1,1** **OK** **AT+GNSSCONF=10,0** **OK** // or **+CME ERROR: <error>**

12.5. +GNSSTTFF Command: Report Calculated TTFF of the Last Run

HL78xx	
Test command Syntax **AT+GNSSTTFF=?**	 Response **OK**
Read command Syntax **AT+GNSSTTFF?**	 Response **+GNSSTTFF: <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

HL78xx	
Reference Sierra Wireless Proprietary	Notes • This command queries the 2D and/or 3D time to first fix. • When the TTFF of 2D vs 3D is not available, the same TTFF value is returned for both 2D and 3D.
Examples	**AT+GNSSTTFF?** **+GNSSTTFF: 32051,32051** **OK** // or **+CME ERROR: <error>** **AT+GNSSTTFF?** **+GNSSTTFF: -30,-30** //The current run is not fixed or TTFF is not available **OK** **AT+GNSSTTFF=?** **OK**

12.6. +GNSSLOC Command: Report Latest Known Position Fix

HL78xx	
Test command Syntax **AT+GNSSLOC=?**	 Response **OK**
Read command Syntax **AT+GNSSLOC?**	 Response **+GNSSLOC:** **Latitude: <latitude>** **Longitude: <longitude>** **GpsTime: <GPS Time>** **FixType: <fix_type>** **HEPE: <hepe>** **Altitude: <altitude>** **AltUnc: <Altitude uncertainty>** **Direction: <Heading direction>** **HorSpeed: <horizontal speed>** **VerSpeed: <vertical speed>** **OK** // or **+GNSSLOC:** **FIX NOT AVAILABLE** **OK** Parameters **<latitude>** Latitude at last position fix. Example: “49 Deg 10 Min 21.49 Sec N

HL78xx	
	<longitude> Latitude at last position fix. Example: “123 Deg 4 Min 14.76 Sec W **<GPS Time>** GPS time and date of the fix in “yyyy mm dd hh:mm:ss” format. Example: “2009 01 30 4 20:27:18” **<FixType>** Fix type 2D or 3D 2D 2-dimensional 3D 3-dimensional **<HEPE>** Horizontal Estimated Position Error. Example: “8.485 m” **<altitude>** Altitude in meters. Example: “-1 m” **<Altitude uncertainty>** Altitude/vertical uncertainty. Example: “3.0 m” **<heading direction>** Direction the UE is headed. Example: “0.0 deg” **<horizontal speed>** Horizontal velocity in m/s. Example: “0.0 m/s” **<vertical speed>** Vertical velocity in m/s. Example: “0.0 m/s”
Reference Sierra Wireless Proprietary	Notes • Queries the latest known position fix (even if it’s not current). • If the value for any field is not available, it will be left blank.
Examples	**AT+GNSSLOC?** **+GNSSLOC:** **Latitude: 49 Deg 10 Min 23.88 Sec N** **Longitude: 123 Deg 4 Min 8.64 Sec W** **GpsTime: 2018 12 11 1 00:02:23** **FixType: 3D** **HEPE: 129.711 m** **Altitude: -29 m** **AltUnc: 104.4 m** **Direction: 0.0 deg** **HorSpeed: 0.0 m/s** **VerSpeed: 0.0 m/s** **OK** // or **FIX NOT AVAILABLE**

12.7. +GNSSEV Notifications: Location Service Events Notification

HL78xx	
Unsolicited Notification	Response **+GNSSEV: <eventType>,<eventStatus>** Parameters **<eventType>** Event type 0 Initialization event 1 GNSS START event 2 GNSS STOP event 3 GNSS Position event **<eventStatus>** Event status. Valid range varies depending on the event type. Initialization event (<eventType>= 0): This event specifies the status of internal GNSS context initialization. 0 GNSS Initialization failed 1 GNSS is successfully initialized GNSS START event (<eventType>=1): 0 GNSS failed to start 1 GNSS started GNSS STOP event (<eventType>=2): 0 GNSS failed to stop 1 GNSS stopped GNSS Position events (<eventType>=3): 0 The GNSS fix is lost or not available yet 1 An estimated GNSS (predicted) position is available 2 A 2-dimensional GNSS position is available 3 A 3-dimensional position is available 4 GNSS fix has been changed to invalid position
Reference Sierra Wireless Proprietary	Notes • Notifies the client of any events or change in position state. • This is not a command that can be issued to the device.

13. NV Commands

13.1. Auto Generation of NV Backup Files

There are 3 NV partitions in flash used by the Firmware:

- Static calibrated partition
- Static config parameters partition
- Dynamic default parameters partition

The NV backup feature only backs up calibrated and static config partitions together. The dynamic partition is never backed up, although it is reset to the default configuration when a backup recovery is performed.

The firmware automatically generates NV backup files from existing NV data (calibration and static config parameters only) at ~6 seconds after boot if one of the following conditions is met:

- NV backup does not exist.
- NV backup has been corrupted unexpectedly.

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

13.2. Auto Recovery from NV Backup Files

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

The firmware automatically recovers NV data from available NV backup when:

- The calibrated partition is corrupted.
- The static config partition is corrupted.
- A file in the dynamic partition is missing.

This is notified with **+NVBU_IND with <status>=3** on all AT ports.

Manual NV data restores all data from the backup file to the original NV partition.

If the modem firmware crashes with 10 consecutive loops and a full restore has not been performed before, the firmware performs a full restore of all NV data items. Only consecutive crashes that happened within 12 seconds after the module boots are relevant for this reset loop detection.

13.3. +NVBU Command: NV Backup Status and Control

HL78xx	
Test command Syntax **AT+NVBU=?**	 Response **+NVBU: (0-4)** **OK**
Read command Syntax **AT+NVBU?**	Returns list of NV backup with the format: **+NVBU: <file id>,<backup date>,<backup firmware version>** Response **[+NVBU:0,<backup date>,<backup firmware version>]** **OK** Error case **ERROR** when no backup available Parameters **<file id>** Backup file ID corresponding to one NV partition in non-volatile memory **<backup date>** Generation date of the NV backup **<backup firmware version>** Firmware version used to generate the NV backup
Write command Syntax For <mode>=0 or 1: **AT+NVBU=<mode>[,<parti_id>]**	 Response For <mode>=0 or 1: **OK**
For <mode>=2: **AT+NVBU=<mode>[,<clear>]**	For <mode>=2 and <clear>=0: **<log data 0>** **[<log data 1>]** **…** **[<log data n>]** **OK** For <mode>=2 and <clear>=1: **OK**
For <mode>=3: **AT+NVBU=<mode>[,<auto>]**	For <mode>=3: **OK**
For <mode>=4: **AT+NVBU=<mode>**	For <mode>=4: **OK**

HL78xx			
	Parameters		
	<mode>	0	Generate backup of both static calibrated and static config NV data to NV backup partition
		1	Restore all NV data from the NVM backup partition and default dynamic parameters
		2	List logs of NV backup operations
		3	Configure NVBU mode (manual or automatic)
		4	Erase all NV backup logs
	<log data>	NV backup operations log data	
	<parti_id>	0	Static calibrated and static config NV
		1	Same as 0; for retro compatibility purposes only
		2	Same as 0; for retro compatibility purposes only
		3	Same as 0; for retro compatibility purposes only
	<clear log>	0	Read log
		1	Clear log
	<auto>	0	+NVBU operates in manual mode (Default)
		1	+NVBU operates in automatic mode

HL78xx	
Unsolicited Notification	Response **+NVBU_IND:<status>,<file id>,<errcode>** For <status>=0: **+NVBU_IND:<status>,<file id>,<errcode>,<backup date>,<backup firmware version>** For <status>=1 and 2: **+NVBU_IND:<status>,<file id>,<errcode>,<cause>,<backup date used for restoration>,<backup firmware version used for restoration>** Parameters **<status> NV backup status** 0 NV backup generation 1 NV backup restoration 2 Backup data restored (when NV corruption is detected during NV initialization) **<errcode> Error code** 0 No error 1 General error 2 Reserved 3 Flash erase error 4 Backup file corrupted 5 Flash read / write error **<cause> Root cause** 0 User request 1 Modem firmware problem 2 Whole NV partition structure corrupted 3 NV Calibrated partition corrupted 4 NV Static config partition corrupted 5 NV dynamic parameter missing **<backup date>** NV backup generation date **<backup firmware version>** Firmware version used to generate the NV backup **<backup date used for restoration>** Generation date of the NV backup that was used for the NV restore **<backup firmware version used for restoration>** Firmware version used to generate the NV backup that was used for the NV restore

HL78xx	
Examples	# automatic backup files generation, notified by +NVBU_IND **+NVBU_IND: 0,0,0,"2015/07/22-04:23:33","BHL78xx.1.7.12.0.RK_02_00_00_00_82.20181213"** # manual generation of backup files from existing NV partitions **AT+NVBU=0,3** **OK** **+NVBU_IND: 0,0,0,"2015/07/22 04:23:39","BHL78xx.1.7.12.0.RK_02_00_00_00_82.20181213"** # manual restoration of backup files to original NV partitions **AT+NVBU=1,3** **OK** **+NVBU_IND: 1,0,0,0,"2015/07/22 04:23:39","BHL78xx.1.7.12.0.RK_02_00_00_00_82.20181213"** **<module reboots automatically>** # to retrieve the list of NV related operations done by the Firmware **at+nvbu=2** **[15/07/22 04:23:39-0] Creating backup** **NVB generation success - backup id: 0 - date: 15/07/22 04:23:39-0 - version: BHL78xx.1.7.12.0.RK_02_00_00_00_82.20181213** **[15/07/22 04:25:00-0] Restoring backup id 0** **Backup entry found. Date: 15/07/22 04:23:39-0 - version: BHL78xx.1.7.12.0.RK_02_00_00_00_82.20181213** **Backup restore success.**
Reference Sierra Wireless Proprietary	Notes • Status of operations for <mode>=0 and <mode>=1 is notified by **+NVBU_IND** unsolicited notifications with <status>=0 and <status>=1 respectively on the AT port that executed the write command. • Execution of the write command with <mode>=1 is followed by a modem reboot automatically; NVs are restored to their default values during the boot sequence. • The log file is limited to 4ko. • No SIM card is required for this command. • The backup date and the backup firmware are displayed only when available (i.e. backup not corrupted). • <mode>=2 is for retrieving log for R&D analysis and not fully documented.

14. Appendix

14.1. Command Timeout and Other Information

The following table provides additional information for commands supported by the HL78xx modules.

Cells in the following table are color-coded to indicate the **recommended** timeout for AT commands; note that time is subject to change depending on several factors such as SIM cards, networks or amount of data to be written in non-volatile memory.

Legend:

	2 seconds
	5 seconds
	30 seconds
	60 seconds
	120 seconds
	No advised timeout: Data size dependent
🡻	Command can be written in non-volatile memory

Table 4. Command Timeout

Chapter	Command Description	HL78xx
V25TER AT Commands		
2.1	+++ Command: Switch from Data Mode to Command Mode	2
2.2	O Command: Switch from Command Mode to Data Mode	2
2.3	E Command: Enable Command Echo	2
2.4	&K Command: Flow Control Option	2
2.5	&F Command: Restore Manufactory Configuration	2
2.6	&V Command: Display Current Configuration	2
2.7	&W Command: Save Stored Profile	🡻 30
2.8	Z Command: Reset and Restore User Configuration	5
2.9	+IPR Command: Set Fixed Local Rate	🡻 2
2.10	&C Command: Set Data Carrier Detect (DCD) Function Mode	2
2.11	&D Command: Set Data Terminal Ready (DTR) Function Mode	2
2.12	&S Command: DSR Option	2
2.13	&R Command: RTS/CTS Option	2
2.14	S2 Command: Set Character for the Escape Sequence (Data to Command Mode)	2
2.15	S4 Command: Set Response Formatting Character	2
2.16	+IFC Command: DTE-DCE Local Flow Control	2
General AT Commands		
3.1	I Command: Request Identification Information	2
3.2	+CGMI/+GMI Command: Request Manufacturer Identification	2
3.3	+CGMM/+GMM Command: Request Model Identification	2
3.4	+CGMR/+GMR Command: Request Revision Identification	2
3.5	+CGSN Command: Request Product Serial Number Identification (IMEI)	2

Chapter	Command Description	HL78xx
3.6	+KGSN Command: Request Product Serial Number Identification and Software Version	2
3.7	+CSCS Command: Set TE Character Set	↓ 2
3.8	+CIMI Command: Request International Subscriber Identity	2
3.9	+GSN Command: Request Product Serial Number Identification (IMEI)	2
3.10	+GCAP Command: Request Complete TA Capability List	2
3.11	+CMUX Command: Multiplexer	2
3.12	+WPPP Command: PDP Context Authentication Configuration	2
3.13	+HWREV Command: Request Hardware Revision	2
3.14	+KALTCFG: Set and Get Custom Configuration	2
3.15	+KHWIOCFG: Enable and Disable IO Features	2
3.16	+WDSD Command: Device Services Local Download	2
Call Control Commands		
4.2	+CEER Command: Extended Error Report	2
4.3	+CMEE Command: Report Mobile Termination Error	↓ 2
Mobile Equipment Control and Status Commands		
5.1	+CCLK Command: Real Time Clock	30
5.2	+CCID Command: Request SIM Card Identification	2
5.3	+CLAC Command: List All Available AT Commands	2
5.4	+CFUN Command: Set Phone Functionality	30
5.5	+CPIN Command: Enter PIN	60
5.6	+CPAS Command: Phone Activity Status	2
5.7	+CSQ Command: Signal Quality	2
5.8	+KSREP Command: Mobile Start-Up Reporting	↓ 2
5.9	+CSIM Command: Generic SIM Access	5
5.10	+CCHO Command: Open Logical Channel	5
5.11	+CCHC Command: Close Logical Channel	5
5.12	+CRSM Command: SIM Restricted Access	5
5.13	+CTZU Command: Automatic Time Zone Update	↓ 2
5.14	+CTZR Command: Time Zone Reporting	↓ 2
5.15	+CPSMS Command: Power Saving Mode setting	2
5.16	+CEDRXS Command: eDRX setting	2
5.17	+CEDRXRDP Command: eDRX Read Dynamic Parameters	5
5.18	+CESQ Command: Extended Signal Quality	2
5.19	+KBNDCFG Command: Set Configured LTE Band(s)	↓ 2
5.20	+KBND Command: Get Active LTE Band(s)	↓ 2
5.21	+KGPIO Command: Hardware IO Control	↓ 2
5.22	+KGPIOCFG Command: User GPIO Configuration	↓ 2
5.23	+KCELL Command: Cell Environment Information	30
5.24	+KSLEEP Command: Power Management Control	↓ 2
5.25	+KRIC Command: Ring Indicator Control	2
5.26	+CPOF Command: Power Off	120
5.27	+CPWROFF Command: Power Off	120
5.27	+CPWROFF Command: Power Off (when +CPWROFF=1)	2

Chapter	Command Description	HL78xx
5.28	+WIMEI Command: IMEI Write and Read	↓ 2
5.29	+KSYNC Command: Application Synchronization Signal	↓ 2
5.30	+KCARRIERCFG Command: Set operator	↓ 5
5.31	+KMON Command: Enable/Disable Monitor Mode	↓ 2
5.32	+KSRAT Command: Set Radio Access Technology	↓ 2
5.33	+KNWSCANCFG Command: Configure Network Scan Policy	↓ 2
5.34	+CRCES Command: Read Coverage Enhancement Status	↓ 2
5.35	+KADC Command: Analog Digital Converter	2
5.36	+WESHDOWN Command: Emergency Shutdown	↓ 2
5.37	+KCELLMEAS Command: Request Network Coverage Information	30
5.38	+KSIMSEL Command: SIM Selection	
5.39	+KSIMDET Command: SIM Detection	
5.40	+KUSBCOMP Command: Enable/Disable USB Mode	
Network Service Related Commands		
6.2	+CPWD Command: Change Password	2
6.3	+COPN Command: Read Operator Name	30
6.4	+COPS Command: Operator Selection	120
6.5	+CPOL Command: Preferred PLMN List	↓ 2
6.6	+CREG Command: Network Registration	↓ 2
6.7	+CPLS Command: Selection of Preferred PLMN List	2
6.8	+CEREG Command: EPS Network Registration Status	↓ 2
6.9	+CEMODE Command: UE Modes of Operation for EPS	2
6.10	+CNUM Command: Subscriber Number	
SMS AT Commands		
7.2	+CMGD Command: Delete SMS Message	2
7.3	+CMGF Command: Select SMS Message Format	↓ 2
7.4	+CMGL Command: List SMS Messages from Preferred Storage	30
7.5	+CMGR Command: Read SMS Message	30
7.6	+CMGS Command: Send SMS Message	30
7.7	+CMGW Command: Write SMS Message to Memory	30
7.8	+CMSS Command: Send SMS Message from Storage	30
7.9	+CNMI Command: New SMS Message Indication	↓ 2
7.10	+CSCA Command: SMS Service Center Address	↓ 2
7.11	+CSMP Command: Set SMS Text Mode Parameters	2
7.12	+CSMS Command: Select Message Service	2
7.13	+CPMS Command: Preferred Message Storage	2
7.14	+CSDH Command: Show Text Mode Parameters	2
7.15	+CMT Notification: Received SMSPP Content	2
Packet Domain Commands		
8.1	+CGATT Command: PS Attach or Detach	60
8.2	+CGACT Command: PDP Context Activate or Deactivate	60
8.3	+CGCMOD Command: Modify PDP Context	60
8.4	+CGTFT Command: Traffic Flow Template	

Chapter	Command Description	HL78xx
8.5	+CGDCONT Command: Define PDP Context	5
8.6	+CDGSCONT Command: Define Secondary PDP Context	
8.7	+CGEREP Command: GPRS Event Reporting	↓ 2
8.10	+CGPADDR Command: Show PDP Address	2
8.11	+CGSMS Command: Select Service for MO SMS Messages	2
8.12	+CSODCP Command: Send Originating Data via the Control Plane	2
8.13	+CRTDCP Command: Report Terminating Data via the Control Plane	2
Protocol Specific Commands – Connection Configuration		
9.7.1	+KCNXCFG Command: GPRS Connection Configuration	2
9.7.2	+KCNXTIMER Command: Connection Timer Configuration	2
9.7.3	+KCNXPROFILE Command: Connection Current Profile Configuration	2
9.7.4	+KCGPADDR Command: Show PDP Address	2
9.7.5	+KCNX_IND Notification: Connection Status Notification	2
9.7.6	+KCNXUP Command: Bring the PDP Connection Up	
9.7.7	+KCNXDOWN Command: Bring the PDP Connection Down	
Protocol Specific Commands – Common Configuration		
9.8.1	+KPATTERN Command: Custom End Of Data Pattern	2
9.8.2	+KURCCFG Command: Enable or Disable the URC from TCP Commands	2
9.8.3	+KIPOPT Command: General Options Configuration	
TCP Specific Commands		
9.11.1	+KTCPCFG Command: TCP Connection Configuration	2
9.11.2	+KTCPCNX Command: TCP Connection	30
9.11.3	+KTCPRCV Command: Receiving Data through a TCP Connection	60
9.11.4	+KTCPSND Command: Sending Data through a TCP Connection	60
9.11.5	+KTCPCLOSE Command: Closing Durrent TCP Operation	60
9.11.6	+KTCPDEL Command: Delete a Configured TCP Session	2
9.11.7	+KTCP_SRVREQ Notification: Incoming client's connection request	2
9.11.8	+KTCP_DATA Notification: Incoming Data through a TCP Connection	60
9.11.9	+KTCP_IND Notification: TCP Status	2
9.11.10	+KTCPSTAT Command: Get TCP Socket Status	2
9.11.11	+KTCPSTART Command: Start a TCP Connection in Direct Data Flow	2
UDP Specific Commands		
9.12.1	+KUDPCFG Command: UDP Connection Configuration	2
9.12.2	+KUDPRCV Command: Receive data through an UDP Connection	60
9.12.3	+KUDPSND Command: Send data through an UDP Connection	60
9.12.4	+KUDPCLOSE Command: Close current UDP operation	60
9.12.5	+KUDPDEL Command: Delete a Configured UDP Session	
9.12.6	+KUDP_IND Notification: UDP Status	
9.12.7	+KUDP_DATA Notification: Incoming data through a UDP Connection	
HTTP Client Specific Commands		
9.13.1	+KHTTPCFG Command: HTTP Connection Configuration	
9.13.2	+KHTTPCNX Command: Start HTTP Connection	
9.13.3	+KHTTPHEADER Command: Set HTTP Request Header	

Chapter	Command Description	HL78xx
9.13.4	+KHTTPGET Command: Get HTTP Server Information	
9.13.5	+KHTTPHEAD Command: Get HTTP Headers	
9.13.6	+KHTTPPOST Command: Send Data to HTTP Server	
9.13.7	+KHTTP_IND Notification: HTTP Status	
9.13.8	+KHTTPCLOSE Command: Close HTTP Connection	
9.13.9	+KHTTPDEL Command: Delete a Configured HTTP Connection	
9.13.10	+KHTTPPUT Command: Perform HTTP PUT	
9.13.11	+KHTTPDELETE Command: Perform HTTP Delete	
FTP Client Specific Commands		
9.14.1	+KFTPCFG Command: FTP Connection Configuration	
9.14.2	+KFTPCNX Command: Start FTP Connection	
9.14.3	+KFTPRCV Command: Receive FTP Files	
9.14.4	+KFTPSND Command: Send FTP Files	
9.14.5	+KFTPDEL Command: Delete FTP Files	
9.14.6	+KFTP_IND Notification: FTP Status	
9.14.7	+KFTPCLOSE Command: Close Current FTP Connection	
9.14.8	+KFTPCFGDEL Command: Delete a Configured FTP Session	
9.14.9	+KFTPLS Command: List File Size of a Specific File	
AVMS Commands		
10.1	+WDSC Command: Device Services Configuration	2
10.2	+WDSE Command: Device Services Eerror	2
10.3	+WDSG Command: Device Services General Status	2
10.4	+WDSI Command: Device Services Indications	2
10.5	+WDSR Command: Device Services Reply	2
10.6	+WDSS Command: Device Services Session	2
10.7	+WDSTPF Command: Device Services Third Party FOTA	
Test Commands		
11.1	+WMTXPOWER Command: Test RF Tx	
11.2	+WMRXPOWER Command: Test RF Rx	
GNSS Commands		
12.1	+GNSSSTART Command: Start or Restart the GNSS Session	
12.2	+GNSSSTOP Command: Stop the GNSS Session	
12.3	+GNSSNMEA Command: Configure NMEA Frames Flow	
12.4	+GNSSCONF Command: Configure the Location Service and GNSS Receiver	
12.5	+GNSSTTFF Command: Report Calculated TTFF of the Last Run	
12.6	+GNSSLOC Command: Report Latest Known Position Fix	
12.7	+GNSSEV Notifications: Location Service Events Notification	
NV Commands		
13.3	+NVBU Command: NV Backup Status and Control	

14.2. Result Codes and Unsolicited Messages

Verbose Result Code	Numeric	Type	Description
+CME ERROR: <err>	Like verbose	Final	
+CMS ERROR: <err>	Like verbose	Final or unsolicited	
+CBM	Like verbose	Unsolicited	
+CDS	Like verbose	Unsolicited	
+COLP: <number>,<type> [,<subaddr>,<satype>[,<alpha>]]	Like verbose	Intermediate	
+CR: <type>	Like verbose	Intermediate	
+CREG: <stat>[,<lac>,<ci>]	Like verbose	Unsolicited	
BUSY	6	Final	
CONNECT	1	Intermediate	Connection has been established
CONNECT <text>	Manufacturer specific	Intermediate	Like CONNECT but manufacturer specific <text> gives additional information (e.g. connection data rate)
ERROR	4	Final	Command not accepted
NO ANSWER	7	Final	Connection completion timeout
NO CARRIER	3	Final	Connection terminated
OK	0	Final	Acknowledges execution of a command line
RING	2	Unsolicited	Incoming call signal from network

14.3. Error Codes

14.3.1. CME Error Codes

<err> Code	Meaning
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

<err> Code	Meaning
15	SIM wrong
16	Incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	Memory full
21	Invalid index
22	Not found
23	Memory failure
24	Text string too long
25	Invalid characters in text string
26	Dial string too long
27	Invalid characters in dial string
30	No network service
31	Network timeout
32	Network not allowed - emergency call only
40	Network personalization PIN required
41	Network personalization PUK required
42	Network subset personalization PIN required
43	Network subset personalization PUK required
44	Service provider personalization PIN required
45	Service provider personalization PUK required
46	Corporate personalization PIN required
47	Corporate personalization PUK required
48	Hidden key required
49	EAP method not supported
50	Incorrect parameters
60	Internal system failure
99	Resource limitation
100	Unknown
103	Illegal MS
106	Illega IME
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
201	Alternate SIM conflict
500	CTS Handover on Progress
501	Cellular Protocol Stack Out of service state

<err> Code	Meaning
502	CTS Unspecified Error
650	General AVMS error
651	Communication error
652	Session in progress
654	RDMS services are in “deactivated” state
655	RDMS services are in “prohibited” state
656	RDMS services are in “to be provisioned” state; no available NAP
800	SIM Security unspecified error
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 6)
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 terminate port data mode
924	Error due to session busy, retry later
925	Failed to decode HTTP header's name, missing ':'
926	Failed to decode HTTP header's value, missing 'cr/lf'
927	HTTP header's name is an empty string
928	HTTP header's value is an empty string
929	Format of input data is invalid
930	Content of input data is invalid or not supported
931	The length of a parameter is invalid
932	The format of a parameter is invalid

14.3.2. CEER Error Codes

<report>
IMSI_UNKNOWN_IN_HLR
ILLEGAL_UE
ILLEGAL_ME
EPS_SERVICES_NOT_ALLOWED
EPS_AND_NON_EPS_SERVICES_NOT_ALLOWED
UE_IDENTITY_CANNOT_BE_DERIVED_BY_THE_NETWORK
IMPLICITLY_DETACHED
PLMN_NOT_ALLOWED
TRACKING_AREA_NOT_ALLOWED
ROAMING_NOT_ALLOWED_IN_THIS_TRACKING_AREA
EPS_SERVICES_NOT_ALLOWED_IN_THIS_PLMN
NO_SUITABLE_CELLS_IN_TRACKING_AREA
MSC_TEMPORARILY_NOT_REACHABLE
NETWORK_FAILURE
CS_DOMAIN_NOT_AVAILABLE
MAC_FAILURE
SYNCH_FAILURE
CONGESTION
UE_SECURITY_CAPABILITIES_MISMATCH
SECURITY_MODE_REJECTED_UNSPECIFIED
NOT_AUTHORIZED_FOR_THIS_CSG
SEMANTICALLY_INCORRECT_MESSAGE
INVALID_MANDATORY_INFORMATION
MESSAGE_TYPE_NON_EXISTENT
MESSAGE_TYPE_NOT_COMPATIBLE_WITH_THE_PROTOCOL_STAT
INFORMATION_ELEMENT_NOT_EXISTENT
CONDITIONAL_IEI_ERROR
MESSAGE_NOT_COMPATIBLE_WITH_THE_PROTOCOL_STATE
PROTOCOL_ERROR_UNSPECIFIED
OPERATOR_DETERMINED_BARRING
INSUFFICIENT_RESOURCES
UNKNOWN_OR_MISSING_APN
UNKNOWN_PDN_TYPE
USER_AUTHENTICATION_FAILED
ACTIVATION_REJECTED_BY_SERVING_GW_OR_PDN_GW
ACTIVATION_REJECTED_UNSPECIFIED
SERVICE_OPTION_NOT_SUPPORTED
REQUESTED_SERVICE_OPTION_NOT_SUBSCRIBED
SERVICE_OPTION_TEMPORARILY_OUT_OF_ORDER
PTI_ALEARDY_IN_USE
REGULAR_DEACTIVATION
EPS_QoS_NOT_ACCEPTED

<report>
NETWORK_FAILURE
FEATURE_NOT_SUPPORTED
SEMANTIC_ERROR_IN_THE_TFT_OPERATION
SYNTACTICAL_ERROR_IN_THE_TFT_OPERATION
UNKNOWN_EPS_BEARER_CONTEXT
SEMANTIC_ERRORS_IN_PACKET_FILTERS
SYNTACTICAL_ERRORS_IN_PACKET_FILTERS
EPS_BEARER_CONTEXT_WITHOUT_TFT_ALREADY_ACTIVATED
PTI_MISMATCH
LAST_PDN_DISCONNECTION_NOT_ALLOWED
PDN_TYPE_IPV4_ONLY_ALLOWED
PDN_TYPE_IPV6_ONLY_ALLOWED
SINGLE_ADDRESS_BEARERS_ONLY_ALLOWED
ESM_INFORMATION_NOT_RECEIVED
PDN_CONNECTION_DOES_NOT_EXIST
MULTIPLE_PDN_CONNECTIONS_FOR_APN_NOT_ALLOWED
COLLISION_WITH_NETWORK_REQUEST
INVALID_PTI_VALUE
ESM_SEMANTICALLY_INCORRECT_MESSAGE
ESM_INVALID_MANDATORY_INFORMATION
MESSAGE_TYPE_NON_EXISTENT_OR_NOT_IMPLEMENTED
MESSAGE_TYPE_NOT_COMPATIBLE_WITH_THE_PROTOCOL_STATE
INFORMATION_ELEMENT_NON_EXISTENT_OR_NOT_IMPLEMENTED
CONDITIONAL_IE_ERROR
ESM_MESSAGE_NOT_COMPATIBLE_WITH_THE_PROTOCOL_STATE
ESM_PROTOCOL_ERROR_UNSPECIFIED
APN_RESTRICTION_VALUE_INCOMPATIBLE_WITH_ACTIVE_EPS_BEARER_CONTEXT

14.3.3. CMS Error Codes

<err> Code	Meaning
1	Unassigned (unallocated) number
8	Operator determined barring
10	Call barred
21	Short message transfer rejected
27	Destination out of service
28	Unidentified subscriber
29	Facility rejected
30	Unknown subscriber
38	Network out of order
41	Temporary failure
42	Congestion

<err> Code	Meaning
47	Resources unavailable, unspecified
50	Requested facility not subscribed
69	Requested facility not implemented
81	Invalid short message transfer reference value
95	Invalid message, unspecified
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message not compatible with short message protocol state
99	Information element non-existent or not implemented
111	Protocol error, unspecified
127	Interworking, unspecified
128	Telematic interworking not supported
129	Short message Type 0 not supported
130	Cannot replace short message
143	Unspecified TP-PID error
144	Data coding scheme (alphabet) not supported
145	Message class not supported
159	Unspecified TP-DCS error
160	Command cannot be executed
161	Command unsupported
175	Unspecified TP-Command error
176	TPDU not supported
192	SC busy
193	No SC subscription
194	SC system failure
195	Invalid SME address
196	Destination SME barred
197	SM Rejected-Duplicate SM
198	TP-VPF not supported
199	TP-VP not supported
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

<err> Code	Meaning
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
606	ME Busy – CM server request already pending

14.3.4. GPRS Error Codes

<err> Code	Meaning
Errors related to a failure to Perform an Attach	
103	Illegal MS
106	Illegal ME
107	GPRS services not allowed
111	PLMN not allowed
112	Location area not allowed
113	Roaming not allowed in this location area
Errors related to a failure to Activate a Context	
132	Service option not supported
133	Requested service option not subscribed
134	Service option temporarily out of order
149	PDP authentication failure
Other GPRS Errors	
148	Unspecified GPRS error
150	Invalid mobile class

Other values in the range 101 - 150 are reserved for use by GPRS.

14.4. 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
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
450	Requested file action not taken. File unavailable (e.g., file busy)
451	Requested action aborted: local error in processing
452	Requested action not taken. Insufficient storage space in system
500	Syntax error, command unrecognized. This may include errors such as command line too long
501	Syntax error in parameters or arguments
502	Command not implemented
503	Bad sequence of commands
504	Command not implemented for that parameter
530	Not logged in
532	Need account for storing files
550	Requested action not taken. File unavailable (e.g., file not found, no access)
551	Requested action aborted: page type unknown
552	Requested file action aborted. Exceeded storage allocation (for current directory or dataset)
553	Requested action not taken. File name not allowed

14.5. How to Use TCP Commands

14.5.1. Client Mode

AT&K3 **OK**	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password",“IPV4”,"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**	Send data with KPATTERN string at the end. e.g. “GET / HTTP/1.0 --EOF--Pattern--"
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**	DATA read +KTCP_DATA notification
AT+KTCPRCV=1,1380 **CONNECT** **er{padding-bottom:7px !important}#gbar,#guser{font-** **… a lot of data…** **--EOF--Pattern--** **OK** **+KTCP_DATA: 1,1380**	DATA read
AT+KTCPCLOSE=1,1 **OK**	Close session 1
AT+KTCPDEL=1 **OK**	Delete session 1
AT+KTCPCFG? **OK**	No session is available

14.5.2. Server Mode

A daytime server is emulated in the following example. The server listens to port 13, and returns the date for each connection.

AT&K3 **OK**	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password",“IPV4”,"0.0.0.0","0.0.0.0","0.0.0.0" **OK**	Set GPRS parameters (APN, login, password)
AT+KTCPCFG=1,1,,13 **+KTCPCFG: 1** **OK**	Set TCP listener and port number Returns session 1
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 (subsession 2)
AT+KTCPSND=2,15 **CONNECT** **…Date and time…** **OK**	Data is sent to the client read (based on subsession 2)
+KTCP_SRVREQ: 1,3	Another client requests a connection (subsession 3); child mode for session 3
+KTCP_NOTIF: 2, 4	Client (subsession 2) closes the connection
AT+KTCPSND=3,15 **CONNECT** **…Date and time…** **OK**	Data is sent to the client
+KTCP_DATA: 3,6	Data received from client (subsession 3)
AT+KTCPRCV=3,6 **CONNECT** **… Data… --EOF--Pattern--** **OK**	Read data received from client
AT+KTCPCLOSE=3,1 **OK**	Close client subsession 3 and then subsession 3 is deleted automatically

AT+KTCPCLOSE=1,1 **OK**	Close server session 1
AT+KTCPDEL=1 **OK**	Delete session 1

14.6. How to Use UDP Specific Commands

14.6.1. Client Mode

AT&K3 **OK**	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN" **OK**	Set the GPRS parameters
AT+KUDPCFG=1,0 **+KUDPCFG: 1** **OK** **+KCNX_IND: 1,1,0** **+KUDP_IND: 1,1**	Create a new UDP socket (returned session 1) with the parameters associated to the connection profile id number 1
AT+KUDPSND=1,"213.41.22.60",32,10 **CONNECT** **…Data Sent…** **--EOF--Pattern--** **OK**	Send UDP data after "CONNECT"
+KUDP_DATA: 1,10	Received notification that indicates the presence of 10 bytes in the socket
AT+KUDPRCV=1,5 **CONNECT** **12345--EOF—Pattern--** **OK** **+KUDP_RCV: "213.41.22.60",32** **+KUDP_DATA: 1,5**	Try to read 5 bytes from session 1 Received notification that indicates the presence of 5 bytes in the socket
AT+KUDPRCV=1,5 **CONNECT** **67890--EOF—Pattern--** **OK** **+KUDP_RCV: "213.41.22.60",32**	Try to read 5 bytes from session 1

AT+KUDPCLOSE=1 **OK**	Close the UDP session 1
AT+KUDPDEL=1 **OK**	Delete session 1

14.6.2. Use Cases for KTCP_DATA and KUDP_DATA (with/without data auto retrieval)

1) Previous features are kept (ascending compatibility of the AT commands) - Client mode

AT+KCNXCFG=1,"GPRS","CMNET" **OK**	
AT+KTCPCFG=1,0,"202.170.131.76",2000 **+KTCPCFG: 1** **OK**	
AT+KTCPCNX=1 **OK**	Connect to TCP server
+KTCP_DATA: 1,10	URC tells us that 10 bytes arrived
AT+KTCPRCV=1,10	Use KTCPRCV command to receive those 10 bytes
CONNECT **0123456789--EOF--Pattern--** **OK**	
AT+KUDPCFG=0,0 **+KUDPCFG: 2** **OK**	Open a UDP socket
+KUDP_DATA: 2,8	URC tells us that 8 bytes arrived
AT+KUDPRCV=2,8 **CONNECT** **01234567--EOF--Pattern--** **OK** **+KUDP_RCV: "202.170.131.76",2001**	Use command to receive those 8 bytes

2) New optional feature: URC takes out the data - Client mode

AT+KCNXCFG=1,"GPRS","CMNET" **OK**	
AT+KTCPCFG=0,0,"202.170.131.76",2000,,1	Extend a parameter for the new feature When setting to 1, data will be received by the URC "+KTCP_DATA:"
+KTCPCFG: 1 **OK**	
AT+KTCPCNX=1	Connect to TCP server
OK **+KTCP_DATA: 1,10,0123456789**	10 bytes arrived. The URC takes them out directly
AT+KUDPCFG=0,0,3000,1	Extend a parameter for the new feature When setting to 1, data will be received by the URC "+KUDP_DATA:"
+KUDPCFG: 2 **OK**	
+KUDP_DATA: 2,8,"202.170.131.76",2001,01234567	8 bytes arrived. The URC takes them out directly

14.7. Switch Data/Command Mode DTR +++ ATO Behavior Table

The table shows the behavior when trying to switch mode:

Case1: **+++** is used to switch from data mode to command mode, and the service is suspended.

Case2: If **AT&D1** is set, "DTR drop" is used to switch from data mode to command mode, but the service is suspended.

Case3: If **AT&D2** is set, "DTR drop" is used to switch from data mode to command mode, and the service is stopped.

Case4: If **AT&D0** is set, "DTR drop" has no impact on the mode switch.

Case5: **ATO[n]** is used to switch from command mode to data mode.

	Case1/Case5 **+++/ATO[n]**	**Case2/Case5** **DTR1/ATO[n]**	**Case3/Case5** **DTR2/ATO[n]**	**Case4/Case5** **DTR0**
TCP/UDP: **+KTCPSND**: Send data **+KTCPRCV**: Receive data **+KUDPSND**: Send data **+KUDPRCV**: Receive data **+KTCPSTART**: Direct data flow	OK/CONNECT	OK/CONNECT	NO CARRIER / NO CARRIER (disconnect)	NO IMPACT
FTP: **+KFTPRCV**: Download FTP files **+KFTPSND**: Upload FTP files	OK / NO CARRIER (disconnect)	OK / NO CARRIER (disconnect)	NO CARRIER / NO CARRIER (disconnect)	NO IMPACT

	Case1/Case5 +++/ATO[n]	**Case2/Case5 DTR1/ATO[n]**	**Case3/Case5 DTR2/ATO[n]**	**Case4/Case5 DTR0**
HTTP: **+KHTTPGET**: Get information **+KHTTPHEAD**: Get head of information **+KHTTPPOST**: Send data **+KHTTPHEADER**: Set the HTTP Request Header	OK / NO CARRIER (disconnect)	OK / NO CARRIER (disconnect)	NO CARRIER / NO CARRIER (disconnect)	NO IMPACT
Data mode ATD*99… (use **ATO** or **ATO0**)	OK/CONNECT	OK/CONNECT	NO CARRIER / NO CARRIER (disconnect)	NO IMPACT
SSL: **+KCERTSTORE**: Store root CA **+KPRIVKSTORE**: Store private key	OK / NO CARRIER (abort)	OK / NO CARRIER (abort)	NO CARRIER / NO CARRIER (abort)	NO IMPACT