



AirPrime HL78xx

AT Commands Interface Guide



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5.1	October 30, 2018	Updated 6.5 +COPS Command: Operator Selection



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>> 1. Introduction

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

Variants covered in this manual are:

- HL7800 DV2 or later

1.1. Reference Configuration

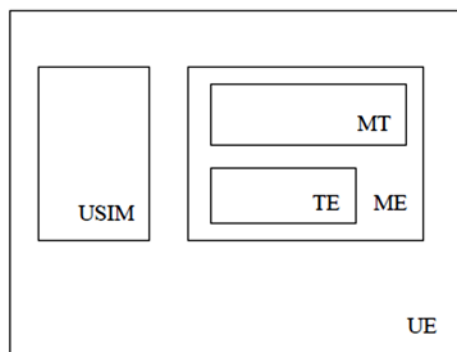


Figure 1. Reference Configuration

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

HL7800	
Execute command	
<u>Syntax</u> +++	<u>Response</u> OK
<u>Reference</u> V.25Ter	<u>Notes</u> <ul style="list-style-type: none"> • 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

HL7800							
<i>Test command</i>							
<u>Syntax</u> ATO[<n>]	<u>Response</u> TA returns to data mode from command mode: CONNECT <text> If connection is not successfully resumed: NO CARRIER <u>Parameter</u> <table><tr><td><n></td><td>0</td><td>Switch from command mode to data mode</td></tr><tr><td></td><td>1 – 200</td><td>Session ID</td></tr></table>	<n>	0	Switch from command mode to data mode		1 – 200	Session ID
<n>	0	Switch from command mode to data mode					
	1 – 200	Session ID					
<u>Reference</u> V.25Ter	<u>Notes</u> 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

HL7800							
<i>Execute command</i>							
<u>Syntax</u> ATE[<value>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <table><tr><td><value></td><td>0</td><td>Echo OFF</td></tr><tr><td></td><td><u>1</u></td><td>Echo ON</td></tr></table>	<value>	0	Echo OFF		<u>1</u>	Echo ON
<value>	0	Echo OFF					
	<u>1</u>	Echo ON					
<u>Notes</u>	<ul style="list-style-type: none">• 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

HL7800							
<i>Execute command</i>							
<u>Syntax</u> AT&K[<mode>]	<u>Response</u> OK <u>Parameter</u> <table><tr><td><mode></td><td>0</td><td>Disable all flow control</td></tr><tr><td></td><td>3</td><td>Enable RTS/CTS flow control</td></tr></table>	<mode>	0	Disable all flow control		3	Enable RTS/CTS flow control
<mode>	0	Disable all flow control					
	3	Enable RTS/CTS flow control					
<u>Reference</u> Rockwell Rev4	<u>Notes</u> Sierra Wireless recommends the use of hardware flow control.						

2.5. &F Command: Restore Factory Settings

HL7800		
<i>Execute command</i>		
<u>Syntax</u> AT&F[<value>]	<u>Response</u> OK	
	<u>Parameter</u> <value>	0 or Omitted Restore parameters to factory settings

HL7800	
<u>Reference</u> V.25Ter	<u>Notes</u> <ul style="list-style-type: none"> 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
<u>Examples</u>	AT&F OK AT&F0 OK AT&F1 ERROR

2.6. &V Command: Display Current Configuration

HL7800	
<u>Execute command</u> <u>Syntax</u> AT&V[<value>]	<u>Response</u> ACTIVE PROFILE: <current configuration> STORED PROFILE 0: <user0 default configuration> STORED PROFILE 1: <user1 default configuration> OK <u>Parameter</u> <value> <u>0</u> or <u>Omitted</u> All Profiles
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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.
<u>Example</u>	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: <div style="text-align: center;"> <pre> graph TD AP[Active Profile] -- ATZ --> SP[Stored profile] SP -- AT&W --> AP DS[Default Settings] -- AT&F --> AP </pre> </div>

2.7. &W Command: Write Current Configuration

HL7800																																							
<p><i>Execute command</i></p> <p><u>Syntax</u> AT&W[<value>]</p>	<p><u>Response</u> OK</p> <p><u>Parameter</u> <value></p> <table> <tr> <td>0 or Omitted</td><td>Save in STORED PROFILE 0</td></tr> <tr> <td>1</td><td>Save in STORED PROFILE 1</td></tr> </table>	0 or Omitted	Save in STORED PROFILE 0	1	Save in STORED PROFILE 1																																		
0 or Omitted	Save in STORED PROFILE 0																																						
1	Save in STORED PROFILE 1																																						
<p><u>Reference</u> V.25Ter</p>	<p><u>Notes</u></p> <ul style="list-style-type: none"> This command saves the current configuration in a non-erasable place. See also AT&V. <p>Configuration saved:</p> <table> <tr><td>E</td><td>Echo</td></tr> <tr><td>Q</td><td>Set result code presentation mode</td></tr> <tr><td>V</td><td>Verbose</td></tr> <tr><td>X</td><td>Extended result code</td></tr> <tr><td>&C</td><td>DCD control</td></tr> <tr><td>&D</td><td>DTR behavior</td></tr> <tr><td>&R</td><td>RTS control</td></tr> <tr><td>&S</td><td>DSR control</td></tr> <tr><td>+IFC</td><td>Reflect Flow Control set by AT&K</td></tr> <tr><td>&K</td><td>Flow control</td></tr> <tr><td>+IPR</td><td>Set Fixed Local/DTE Rate</td></tr> <tr><td>FCLASS</td><td>FCLASS</td></tr> <tr><td>S0</td><td>Set number of rings before automatically answering the call</td></tr> <tr><td>S3</td><td>Write command line termination character</td></tr> <tr><td>S4</td><td>Set response formatting character</td></tr> <tr><td>S5</td><td>Write command line editing character</td></tr> <tr><td>S7</td><td>Set number of seconds to wait for connection completion</td></tr> <tr><td>S8</td><td>Comma dial modifier time</td></tr> <tr><td>S10</td><td>Automatic disconnect delay</td></tr> </table>	E	Echo	Q	Set result code presentation mode	V	Verbose	X	Extended result code	&C	DCD control	&D	DTR behavior	&R	RTS control	&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
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																																						
<p><u>Example</u></p>	<p>AT&W // Save current configuration to Profile 0 OK</p> <p>AT&W0 // Save current configuration to Profile 0 OK</p> <p>AT&W1 // Save current configuration to Profile 1 OK</p>																																						

2.8. Z Command: Reset and Restore User Configuration

HL7800		
<i>Execute command</i>		
<u>Syntax</u> ATZ[<value>]	<u>Response</u> OK	
	<u>Parameter</u> <value>	
	0	Reset and restore user configuration with profile 0
	1	Reset and restore user configuration with profile 1
<u>Reference</u> V.25ter	<u>Notes</u> See also AT&V	

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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+IPR=?	<u>Response</u> +IPR: (list of supported auto-detectable <rate>s)[,(list of fixed-only <rate>s)] OK
<i>Read command</i>	
<u>Syntax</u> AT+IPR?	<u>Response</u> +IPR: <rate> OK
<i>Write command</i>	
<u>Syntax</u> AT+IPR=<rate>	<u>Response</u> OK or ERROR <u>Parameters</u> <rate> Rate in bits per second 4800, 9600, 19200, 38400, 57600, <u>115200</u> (default value), 230400, 460800
<u>Reference</u> ITU-T V.250	<u>Notes</u> <ul style="list-style-type: none"> Configuration is saved in non-volatile memory using AT&W. Once the OK response is received, the new <rate> is effective after about 1s.

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

HL7800		
<i>Execute command</i>		
<u>Syntax</u> AT&C<value>	<u>Response</u> OK	
	<u>Parameter</u> <value>	0 DCD line is always active
	<u>1</u>	DCD line is active in the presence of data carrier only
<u>Reference</u> V.25Ter	<u>Notes</u> See data stored by &w for default value.	

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

HL7800		
<i>Execute command</i>		
<u>Syntax</u> AT&D<value>	<u>Response</u> OK	
	<u>Parameters</u>	
	<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. Auto-answer is off when DTR is inactive.
<u>Reference</u> V.25Ter	<u>Notes</u> This command only applies to data calls.	

2.12. &S Command: DSR Option

HL7800			
<i>Execute command</i>			
<u>Syntax</u> AT&S [<override>]	<u>Response</u> OK		
	<u>Parameter</u> <override>	<u>0</u> or Omitted 1	DSR signal is always ON DSR signal is always OFF
<u>Reference</u> V.25ter	<u>Notes</u> This is a dummy command and has no effect on the DSR signal.		

2.13. &R Command: RTS/CTS Option

HL7800	
<i>Execute command</i>	
<u>Syntax</u> AT&R<option>	<u>Response</u> OK <u>Parameter</u> <option> <u>1</u> In sync mode, CTS is always ON (RTS transitions are ignored). In async mode, CTS will only drop if required by the flow control.
<u>Notes</u>	This selects how the modem controls CTS. CTS operation is modified if hardware flow control is selected (see AT&K). The parameter value, if valid, is written to S21 bit2.

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

HL7800	
<i>Read command</i>	
<u>Syntax</u> ATS2?	<u>Response</u> <n> OK
<i>Write command</i>	
<u>Syntax</u> ATS2=<n>	<u>Response</u> OK <u>Parameter</u> <n> Only 43 ("+") is supported
<u>Reference</u> V.25Ter	<u>Notes</u> <ul style="list-style-type: none"> This command has no effect and was only implemented for compliance with V.25ter. Parameters are ignored and are not saved in non-volatile memory.

2.15. S4 Command: Set Response Formatting Character

HL7800	
Read command	
<u>Syntax</u> ATS4?	<u>Response</u> <n> OK
Write command	
<u>Syntax</u> ATS4=<n>	<u>Response</u> OK <u>Parameter</u> <n> 10 Response formatting character <LF>: line feed.
<u>Reference</u> V.25Ter	<u>Notes</u> <ul style="list-style-type: none"> <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	
<u>Syntax</u> AT+IFC=?	<u>Response</u> +IFC: (list of supported <DCE_by_DTE>s),(list of supported <DTE_by_DCE>s) OK
Read command	
<u>Syntax</u> AT+IFC?	<u>Response</u> +IFC: <DCE_by_DTE>,<DTE_by_DCE> OK
Write command	
<u>Syntax</u> AT+IFC= <DCE_by_DTE>, <DTE_by_DCE>	<u>Response</u> OK <u>Parameters</u> <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	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none">• 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.
<u>Examples</u>	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

HL7800	
Execute command	
<u>Syntax</u> ATI[<n>]	<u>Response</u> // depends on <n> OK <u>Parameters</u> <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: <Long revision identification> <Build Date and Time> IMEI-SV: <IMEI-SV version> Legato RTOS: <Legato RTOS version and binary date> <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) <Component> Embedded software component type; ASCII string "atSwi" "UBOOT" "Apps" "Modem Apps" "MAC" "PHY" "PMP" <Component version> Version of the software component; ASCII string
<u>Reference</u> V.25ter	<u>Notes</u> <ul style="list-style-type: none">• ATI3 is identical to AT+GMR and AT+CGMR.• ATI is identical to AT+GMM and AT+CGMM.

HL7800	
<u>Examples</u>	<p>ATI HL7800 // When using an HL7800 module; model identification can be // customer dependent</p> <p>OK</p> <p>ATI0 HL7800 OK</p> <p>ATI3 AHL7800.1.2.0.20171116 OK</p> <p>ATI8 HL7800.1.2.3 OK</p> <p>ATI9 HL7800.1.2.3 AHL78xx.1.2.3.1.RK_01_00_00_00_14.20171211 2017/12/11 11:44:30 IMEI: 3533470800001402 Legato RTOS: 17.06.0.rc5 2017/12/31 12:10 atSwi: 01.02 UBOOT: 01.02 Apps: RKAPP_01_00_00_00_15__e41c9ccf65c771ccf41885ea1fbb762b320f3886 Modem Apps: ALT1250_01_00_00_00_04_MA MAC: ALT1250_01_00_00_00_11_FW PHY: 12.10.158472 PMP: 165845 OK</p>

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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CGMI=? AT+GMI=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CGMI AT+GMI	<u>Response</u> Sierra Wireless OK

HL7800	
<u>Examples</u>	AT+CGMI Sierra Wireless OK AT+GMI Sierra Wireless OK

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

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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CGMR=? AT+GMR=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CGMR AT+GMR	<u>Response</u> <SW release> OK <u>Parameter</u> <SW release> Software release
<u>Notes</u>	This command is identical to ATI3 .
<u>Examples</u>	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)

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CGSN=?	<u>Response</u> +CGSN: (list of supported <snt>s) OK
<i>Execute command</i>	
<u>Syntax</u> AT+CGSN [=<snt>]	<u>Response</u> 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

HL7800	
	<p>When <snt>=3 and command is successful: +CGSN: <svn> OK</p> <p>or +CME ERROR: <err></p> <p><u>Parameters</u> <snt> 0 Returns the IMEI 1 Returns the IMEI 2 Returns the IMEISV 3 Returns the SVN</p> <p><sn>, <imei> International Mobile Station Equipment Identity</p> <p><imeisv> International Mobile Station Equipment Identity and Software Version Number</p> <p><svn> Software Version Number</p>
<u>Reference</u> 27.007 Rev13	<u>Notes</u> <ul style="list-style-type: none"> This command can work with or without a SIM. See also AT+KGSN.

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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KGSN=?	<u>Response</u> +KGSN: (list of supported <number type>s) OK
<i>Execute command</i>	
<u>Syntax</u> AT+KGSN=<number type>	<u>Response</u> If <number type> = 0: +KGSN: <IMEI> OK If <number type> = 1: +KGSN: <IMEISV> OK If <number type> = 2: +KGSN: <IMEISV_STR> OK If <number type> = 3: +KGSN: <FSN> OK

HL7800	
	<p>If <number type> = 4 +KGSN: <CSN> OK</p> <p><u>Parameters</u></p> <p><IMEI> 15-digit IMEI (8 digits for TAC + 6 digits for SNR + 1 check digit)</p> <p><IMEISV> 16-digit IMEISV (8 digits for TAC + 6 digits for SNR + 2 SVN digits)</p> <p><IMEISV_STR> Formatted string: <14 digits>-<Check digit> SV: <Software version></p> <p><FSN> 14-digit Serial Number</p> <p><CSN> Customer Serial Number (limited to 2048 characters)</p>
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command is used to get the IMEI (International Mobile Equipment Identity) and the software revision.
<u>Examples</u>	<p>AT+KGSN=0 +KGSN: 351578000023006 OK</p> <p>AT+KGSN=1 +KGSN: 3515780000230001 OK</p> <p>AT+KGSN=2 +KGSN: 35157800002300-6 SV:01 OK</p> <p>AT+KGSN=3 +KGSN: T5640400011101 OK</p> <p>AT+KGSN=4 +KGSN: 000000000000000 OK</p>

3.7. +CSCS Command: Set TE Character Set

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CSCS=?	<u>Response</u> +CSCS: (list of supported <chset>s) OK

HL7800	
Read command	
<u>Syntax</u> AT+CSCS?	<u>Response</u> +CSCS: <chset> OK or +CME ERROR: <err>
Write command	
<u>Syntax</u> AT+CSCS= [<chset>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <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 conversions to the original MT character set shall be done "PCCP437" PC character set code page 437
<u>Reference</u> 27.007 Rev8	<u>Notes</u> This command only affects SMS AT commands.

3.8. +CIMI Command: Request International Mobile Subscriber Identity

HL7800	
Test command	
<u>Syntax</u> AT+CIMI=?	<u>Response</u> OK
Execute command	
<u>Syntax</u> AT+CIMI	<u>Response</u> <IMSI> OK or +CME ERROR: <err> <u>Parameter</u> <IMSI> International Mobile Subscriber Identity
<u>Reference</u>	27.007 Rev12

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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+GSN=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+GSN	<u>Response</u> <IMEI> (identification text for determination of the individual ME) OK
<u>Reference</u> 27.007 Rev13	<u>Notes</u> <ul style="list-style-type: none"> This command can work with or without a SIM. See also AT+KGSN.

3.10. +GCAP Command: Request Complete TA Capability List

HL7800	
<i>Execute command</i>	
<u>Syntax</u> AT+GCAP	<u>Response</u> +GCAP: +CLTE-M1 OK
<u>Reference</u>	ITU-T V.250

3.11. +CMUX Command: Multiplexer

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CMUX=?	<u>Response</u> +CMUX: (list of supported <mode>s),(list of supported <subset>s),(list of supported <port_speed>s),(list of supported <N1>s),(list of supported <T1>s),(list of supported <N2>s),(list of supported <T2>s),(list of supported <T3>s),(list of supported <k>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CMUX?	<u>Response</u> +CMUX: <mode>,<subset>,<port speed>,<N1>,<T1>,<N2>,<T2>,<T3>[,<k>] OK

HL7800	
<p><i>Write command</i></p> <p><u>Syntax</u> AT+CMUX= <mode> [,<subset>] [,<port_speed>] [,<N1>][,<T1>] [,<N2>][,<T2>] [,<T3>][,<k>]]]]]]]]]</p>	<p><u>Response</u> OK</p> <p>or +CME ERROR: <error> OK</p> <p><u>Parameters</u></p> <p><mode> Multiplexer Transparency Mechanism <u>0</u> Basic option 1 Advanced option (not supported)</p> <p><subset> <u>0</u> UIH frames used only 1 UI frames used only; currently not supported 2 I frames used only; currently not supported</p> <p><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 <u>7</u> 460 800 bit/s 8 1 Mbit/s</p> <p><N1> 1 – 1509 Maximum frame size; default value = <u>31</u> (64 if advanced option is used)</p> <p><T1> 1 – 255 Acknowledgement timer in units of ten milliseconds; default value = <u>10</u> (100 ms)</p> <p><N2> 0 – 100 Maximum number of re-transmissions; default value = <u>3</u>. Note that currently, only range 0 – 5 is supported</p> <p><T2> 2 – 255 Response timer for the multiplexer control channel in units of ten milliseconds; default value = <u>30</u> (300 ms). Note that <T2> must be longer than <T1>.</p> <p><T3> 1 – 255 Wake up response timer in seconds; default value = <u>10</u>. This parameter is currently not supported. In case of read command, 0 is returned.</p> <p><k> 1 – 7 Window size for Advanced operation with Error Recovery options; default value = <u>2</u>. This parameter is currently not supported. In case of read command, 0 is returned.</p>
<p><u>Reference</u> [27.007] § 5.7</p>	<p><u>Notes</u></p> <ul style="list-style-type: none"> 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.

HL7800	
	<ul style="list-style-type: none"> 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

HL7800	
<i>Test command</i> <u>Syntax</u> AT+WPPP=?	<u>Response</u> +WPPP: (list of supported <Auth>s),(list of supported <cid>s) OK
<i>Read command</i> <u>Syntax</u> AT+WPPP?	<u>Response</u> +WPPP: <Auth>,<cid>,<username>,<password> OK
<i>Write command</i> <u>Syntax</u> AT+WPPP= <Auth>,<cid>,<username>,<password>	<u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <Auth> Type of authentication supported 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 and the setting is saved to non-volatile memory. To change the <Auth> setting to all PDP contexts, there must be at least one PDP context defined in AT+CGDCONT. Else, if this parameter is present, the <Auth> setting applies to a particular PDP context and the setting is not saved to non-volatile memory. <username> Login for the APN. String type, up to 64 characters <password> Password for the APN. String type, up to 64 characters

HL7800	
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> 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.
<u>Examples</u>	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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+HWREV=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+HWREV	<u>Response</u> +HWREV: <hardware revision> OK <u>Parameter</u> <hardware revision> Module hardware revision represented by 2 digits, separated by a decimal point
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Note</u> <ul style="list-style-type: none"> This command gives the module's hardware revision. This command is available even if SIM is not inserted.
<u>Examples</u>	AT+HWREV=? OK AT+HWREV +HWREV: 1.0 OK

4. Call Control Commands

4.1. D Command: Dial Number

[illegible]

HL7800	
	ATD=? 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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CEER=?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+CEER	<u>Response</u> +CEER: <category>[,<cause>,<descriptions>] OK <u>Parameter</u> <category> "No report available" "CC setup error" "CC modification error" "CC release" "SM attach error" "SM detach" "SM activation error" "SM deactivation" "SS network error cause" "SS network reject cause" "SS network GSM cause" <cause> Digit representing the error cause sent internally or by the network. Refer to 12.3.2 CEER Error Codes for more information. <description> Verbose string containing the textual representation of <cause>. Refer to 12.3.2 CEER Error Codes for more information.
<u>Reference</u>	27.007 Rev12

4.3. +CMEE Command: Report Mobile Termination Error

HL7800								
<i>Test command</i>								
<u>Syntax</u> AT+CMEE=?	<u>Response</u> +CMEE: (list of supported <n>s) OK							
<i>Read command</i>								
<u>Syntax</u> AT+CMEE?	<u>Response</u> +CMEE: <n> OK							
<i>Execute command</i>								
<u>Syntax</u> AT+CMEE=[<n>]	<u>Response</u> OK							
	<u>Parameter</u> <table><tr><td><n></td><td>0</td><td>Disable +CME ERROR: <err> result code and use ERROR instead</td></tr><tr><td></td><td>1</td><td>+CME ERROR: <err> result code and use numeric <err> values</td></tr></table>	<n>	0	Disable +CME ERROR: <err> result code and use ERROR instead		1	+CME ERROR: <err> result code and use numeric <err> values	
<n>	0	Disable +CME ERROR: <err> result code and use ERROR instead						
	1	+CME ERROR: <err> result code and use numeric <err> values						
<u>Reference</u>	27.007 Rev12							

5. Mobile Equipment Control and Status Commands

5.1. +CCLK Command: Real Time Clock

HL7800	
Test command	
<u>Syntax</u> AT+CCLK=?	<u>Response</u> OK
Read command	
<u>Syntax</u> AT+CCLK?	<u>Response</u> +CCLK: <time> or +CME ERROR: <err>
Write command	
<u>Syntax</u> AT+CCLK=<time>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <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"
<u>Reference</u> 27.007 Rev12	<u>Notes</u> <ul style="list-style-type: none"> Currently, when AT+CTZU=0 is set, then time is set with AT+CCLK=<time> <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

HL7800	
Test command	
<u>Syntax</u> AT+CCID=?	<u>Response</u> OK

HL7800	
<i>Read command</i>	
<u>Syntax</u> AT+CCID?	<u>Response</u> +CCID: <ICCID> OK or +CME ERROR: <error>
<i>Execute command</i>	
<u>Syntax</u> AT+CCID	<u>Response</u> +CCID: <ICCID> OK or +CME ERROR: <error> <u>Parameter</u> <ICCID> Integrated Circuit Card ID of the SIM card

5.3. +CLAC Command: List Available AT Commands

HL7800	
<i>Execute command</i>	
<u>Syntax</u> AT+CLAC	<u>Response</u> <AT command 1> [<CR><LF><AT command 2>[.]] OK or +CME ERROR: <err> <u>Parameter</u> <AT command> AT command (including the prefix "AT")
<u>Notes</u>	This command provides the AT command list available for the user.

5.4. +CFUN Command: Set Phone Functionality

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CFUN=?	<u>Response</u> +CFUN: (list of supported <fun>s), (list of supported <rst>s) OK or +CME ERROR: <err>
<i>Read command</i> <u>Syntax</u> AT+CFUN?	<u>Response</u> +CFUN: <fun> or +CME ERROR: <err>
<i>Write command</i> <u>Syntax</u> AT+CFUN=<fun> [,<rst>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <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. Do not reset the MT before setting it to <fun> power level.
<u>Reference</u>	27.007 Rev11

5.5. +CPIN Command: Enter Pin

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CPIN=?	<u>Response</u> OK

HL7800																						
<i>Read command</i>																						
<u>Syntax</u> AT+CPIN?	<u>Response</u> +CPIN: <code> OK or +CME ERROR: <err>																					
<i>Write command</i>																						
<u>Syntax</u> AT+CPIN=<pin> [,<newpin>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <table><tr><td><code></td><td>READY</td><td>MT is not pending for any password</td></tr><tr><td></td><td>SIM PIN</td><td>MT is waiting for SIM PIN to be given</td></tr><tr><td></td><td>SIM PUK</td><td>MT is waiting for SIM PUK to be given</td></tr><tr><td></td><td>SIM PIN2</td><td>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)</td></tr><tr><td></td><td>SIM PUK2</td><td>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).</td></tr><tr><td></td><td>PH-SIM PIN</td><td>MT is waiting for the phone-to-SIM card password to be given</td></tr><tr><td></td><td>PH-NET PIN</td><td>MT is waiting for the network personalization password to be given</td></tr></table> <pin>, <newpin> String type values	<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
<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																				
<u>Reference</u>	27.007 Rev12																					

5.6. +CPAS Command: Phone Activity Status

HL7800	
Test command	
<u>Syntax</u> AT+CPAS=?	<u>Response</u> +CPAS: (list of supported <pas>es) OK or +CME ERROR: <err>

HL7800														
<i>Execute command</i>														
<u>Syntax</u> AT+CPAS	<u>Response</u> +CPAS: <pas> OK or +CME ERROR: <err>													
	<u>Parameter</u> <pas>	<table><tr><td>0</td><td>Ready (ME allows commands from TA/TE)</td></tr><tr><td>1</td><td>Unavailable (ME does not allow commands from TA/TE)</td></tr><tr><td>2</td><td>Unknown (ME is not guaranteed to respond to instructions)</td></tr><tr><td>3</td><td>Ringing (ME is ready for commands from TA/TE, but the ringer is active)</td></tr><tr><td>4</td><td>Call in progress (ME is ready for commands from TA/TE, but a call is in progress)</td></tr><tr><td>5</td><td>Asleep (ME is unable to process commands from TA/TE because it is in a low function-ality state)</td></tr></table>	0	Ready (ME allows commands from TA/TE)	1	Unavailable (ME does not allow commands from TA/TE)	2	Unknown (ME is not guaranteed to respond to instructions)	3	Ringing (ME is ready for commands from TA/TE, but the ringer is active)	4	Call in progress (ME is ready for commands from TA/TE, but a call is in progress)	5	Asleep (ME is unable to process commands from TA/TE because it is in a low function-ality state)
0	Ready (ME allows commands from TA/TE)													
1	Unavailable (ME does not allow commands from TA/TE)													
2	Unknown (ME is not guaranteed to respond to instructions)													
3	Ringing (ME is ready for commands from TA/TE, but the ringer is active)													
4	Call in progress (ME is ready for commands from TA/TE, but a call is in progress)													
5	Asleep (ME is unable to process commands from TA/TE because it is in a low function-ality state)													
<u>Reference</u> 27.007 Rev12	<u>Notes</u> This command reflects the data connection status.													

5.7. +CSQ Command: Signal Quality

HL7800																	
<i>Test command</i>																	
<u>Syntax</u> AT+CSQ=?	<u>Response</u> +CSQ: (list of supported <rssi>s),(list of supported <ber>s) OK																
<i>Execute command</i>																	
<u>Syntax</u> AT+CSQ	<u>Response</u> +CSQ: <rssi>,<ber> OK or +CME ERROR: <err> <u>Parameters</u> <table> <tr> <td><rssi></td><td>Received signal strength indication</td></tr> <tr> <td>0</td><td>-113 dBm or less</td></tr> <tr> <td>1 – 30</td><td>-111 to -53 dBm</td></tr> <tr> <td>31</td><td>-51 dBm or greater</td></tr> <tr> <td>99</td><td>Not known or not detectable</td></tr> <tr> <td><ber></td><td>Integer type; channel bit error rate (in percent)</td></tr> <tr> <td>0 – 7</td><td>As RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4</td></tr> <tr> <td>99</td><td>Not known or not detectable</td></tr> </table>	<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
<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																
<u>Reference</u>	27.007 Rev12																

5.8. +KSREP Command: Mobile Start-up Reporting

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KSREP=?	<u>Response</u> +KSREP: (list of supported <act>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+KSREP?	<u>Response</u> +KSREP: <act>,<stat> OK
<i>Write command</i>	
<u>Syntax</u> AT+KSREP= <act>	<u>Response</u> OK <u>Parameters</u> <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
<i>Unsolicited Notification</i>	<u>Response</u> +KSUP: <stat>
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CSIM=?	<u>Response</u> OK

HL7800	
<p><i>Write command</i></p> <p><u>Syntax</u> AT+CSIM= <length>, <command></p>	<p><u>Response</u> +CSIM: <length>,<response> OK</p> <p>or</p> <p>+CME ERROR: <err></p> <p><u>Parameters</u> <length> Integer type; length of the characters that are sent to TE in <command> or <response> <command> Command passed on by MT to the SIM in hexadecimal format <response> Response to the command passed on by the SIM to the MT in hexadecimal format</p>
<p><u>Reference</u> 27.007 Rev12</p>	<p><u>Notes</u> 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.</p>

5.10. +CCHO Command: Open Logical Channel

HL7800	
<p><i>Test command</i></p> <p><u>Syntax</u> AT+CCHO=?</p>	<p><u>Response</u> OK</p>
<p><i>Write command</i></p> <p><u>Syntax</u> AT+CCHO= <dfname></p>	<p><u>Response</u> <session_id> OK</p> <p>or</p> <p>+CME ERROR: <err></p> <p><u>Parameters</u> <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.</p>
<p><u>Reference</u></p>	<p>27.007 Rev12</p>

5.11. +CCHC Command: Close Logical Channel

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CCHC=?	<u>Response</u> OK
<i>Write command</i> <u>Syntax</u> AT+CCHC= <session_id>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <sessionid> Session ID to target a specific application on the USIM using logical channels mechanisms.
<u>Reference</u>	27.007 Rev12

5.12. +CRSM Command: Restricted SIM Access

HL7800																									
Test command																									
<u>Syntax</u> AT+CRSM=?	<u>Response</u> OK																								
Write command																									
<u>Syntax</u> AT+CRSM= <command> [,<fileid>[,<P1>,<P2>,<P3> [,<data> [,<pathid>]]]]	<u>Response</u> +CRSM: <sw1>,<sw2>[,<response>] OK or +CME ERROR: <err> <u>Parameters</u> <table><tr><td><command></td><td>176</td><td>READ BINARY</td></tr><tr><td></td><td>178</td><td>READ RECORD</td></tr><tr><td></td><td>192</td><td>GET RESPONSE</td></tr><tr><td></td><td>214</td><td>UPDATE BINARY</td></tr><tr><td></td><td>220</td><td>UPDATE RECORD</td></tr><tr><td></td><td>242</td><td>STATUS</td></tr><tr><td></td><td>203</td><td>RETRIEVE DATA</td></tr><tr><td></td><td>219</td><td>SET DATA</td></tr></table> <fileid> Integer type; this is the identifier of an elementary data file on the SIM. Mandatory for every command except STATUS.	<command>	176	READ BINARY		178	READ RECORD		192	GET RESPONSE		214	UPDATE BINARY		220	UPDATE RECORD		242	STATUS		203	RETRIEVE DATA		219	SET DATA
<command>	176	READ BINARY																							
	178	READ RECORD																							
	192	GET RESPONSE																							
	214	UPDATE BINARY																							
	220	UPDATE RECORD																							
	242	STATUS																							
	203	RETRIEVE DATA																							
	219	SET DATA																							

HL7800	
	<p><P1>, <P2>, <P3> Integer type defining the request. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in 3GPP TS 51.011 [28]</p> <p><data> Information to be written to the SIM</p> <p><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].</p> <p><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.</p> <p><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.</p>
Reference 27.007 Rev12	<p>Notes</p> <p>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.</p>

5.13. +CTZU Command: Automatic Time Zone Update

HL7800							
<i>Test command</i>							
<u>Syntax</u> AT+CTZU=?	<u>Response</u> +CTZU: (list of supported <onoff>s) OK						
<i>Read command</i>							
<u>Syntax</u> AT+CTZU?	<u>Response</u> +CTZU: <onoff> OK						
<i>Write command</i>							
<u>Syntax</u> AT+CTZU =<onoff>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <table><tr><td><onoff></td><td>0</td><td>Disable automatic time zone update via NITZ</td></tr><tr><td></td><td><u>1</u></td><td>Enable automatic time zone update via NITZ</td></tr></table>	<onoff>	0	Disable automatic time zone update via NITZ		<u>1</u>	Enable automatic time zone update via NITZ
<onoff>	0	Disable automatic time zone update via NITZ					
	<u>1</u>	Enable automatic time zone update via NITZ					
Reference	27.007 Rev12						

5.14. +CTZR Command: Time Zone Reporting

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CTZR=?	<u>Response</u> +CTZR: (list of supported <reporting>s) OK
<i>Read command</i> <u>Syntax</u> AT+CTZR?	<u>Response</u> +CTZR: <reporting> OK
<i>Write command</i> <u>Syntax</u> AT+CTZR= <reporting>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <reporting> <u>0</u> 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> <u>0</u> <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.
<u>Reference</u> 27.007 Rev12	<u>Notes</u> <ul style="list-style-type: none"> • <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

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CPSMS=?	<u>Response</u> +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)
<i>Read command</i> <u>Syntax</u> AT+CPSMS?	<u>Response</u> +CPSMS: <mode>, [<Requested_Periodic-RAU>], [<Requested_GPRS-READY-timer>], [<Requested_Periodic-TAU>], [<Requested_Active-Time>]
<i>Write command</i> <u>Syntax</u> AT+CPSMS= [<mode> [,<Requested_Periodic-RAU> [,<Requested_GPRS-READY-timer> [,<Requested_Periodic-TAU> [,<Requested_Active-Time>]]]]]	<u>Response</u> OK <u>Parameters</u> <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.
<u>Reference</u>	27.007 Rev12

5.16. +CEDRXS Command: eDRX Setting

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CEDRXS=?	<u>Response</u> +CEDRXS: (list of supported <mode>s), (list of supported <AcT-type>s), (list of supported <Requested_eDRX_value>s)
<i>Read command</i>	
<u>Syntax</u> AT+CEDRXS?	<u>Response</u> +CEDRXS: <AcT-type>, <Requested_eDRX_value> +CEDRXS: <AcT-type>, <Requested_eDRX_value> ... OK
<i>Write command</i>	
<u>Syntax</u> +CEDRXS= [<mode> [,<AcT-type> [,<Requested_eDRX_value>]]]	<u>Response</u> OK <u>Parameters</u> <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 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 UTRAN (WB-S1 mode) 5 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
<u>Reference</u>	27.007 Rev13

5.17. +CEDRXRDP Command: eDRX Read Dynamic Parameters

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CEDRXRDP=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+CEDRXRDP	<u>Response</u> +CEDRXRDP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]] OK
	<u>Parameters</u> <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
<u>Reference</u> TS 27.007 Rev13	<u>Notes</u> 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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CESQ=?	<u>Response</u> +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
<i>Execute command</i>	
<u>Syntax</u> AT+CESQ	<u>Response</u> +CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp> OK

HL7800Parameters

<rxlev> Integer type; received signal strength level (see 3GPP TS 45.008 [20] subclause 8.1.4)

0	$\text{rssi} < -110 \text{ dBm}$
1	$-110 \text{ dBm} \leq \text{rssi} < -109 \text{ dBm}$
2	$-109 \text{ dBm} \leq \text{rssi} < -108 \text{ dBm}$
...	
61	$-50 \text{ dBm} \leq \text{rssi} < -49 \text{ dBm}$
62	$-49 \text{ dBm} \leq \text{rssi} < -48 \text{ dBm}$
63	$-48 \text{ dBm} \leq \text{rssi}$
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)

0	$\text{rscp} < -120 \text{ dBm}$
1	$-120 \text{ dBm} \leq \text{rscp} < -119 \text{ dBm}$
2	$-119 \text{ dBm} \leq \text{rscp} < -118 \text{ dBm}$
...	
94	$-27 \text{ dBm} \leq \text{rscp} < -26 \text{ dBm}$
95	$-26 \text{ dBm} \leq \text{rscp} < -25 \text{ dBm}$
96	$-25 \text{ dBm} \leq \text{rscp}$
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)

0	$\text{Ec/lo} < -24 \text{ dB}$
1	$-24 \text{ dB} \leq \text{Ec/lo} < -23.5 \text{ dB}$
2	$-23.5 \text{ dB} \leq \text{Ec/lo} < -23 \text{ dB}$
...	
47	$-1 \text{ dB} \leq \text{Ec/lo} < -0.5 \text{ dB}$
48	$-0.5 \text{ dB} \leq \text{Ec/lo} < 0 \text{ dB}$
49	$0 \text{ dB} \leq \text{Ec/lo}$
255	Not known or not detectable

<rsrq> Integer type; reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7)

0	$\text{rsrq} < -19.5 \text{ dB}$
1	$-19.5 \text{ dB} \leq \text{rsrq} < -19 \text{ dB}$
2	$-19 \text{ dB} \leq \text{rsrq} < -18.5 \text{ dB}$
...	
32	$-4 \text{ dB} \leq \text{rsrq} < -3.5 \text{ dB}$
33	$-3.5 \text{ dB} \leq \text{rsrq} < -3 \text{ dB}$
34	$-3 \text{ dB} \leq \text{rsrq}$
255	Not known or not detectable

<rsrp> Integer type; reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4)

0	$\text{rsrp} < -140 \text{ dBm}$
1	$-140 \text{ dBm} \leq \text{rsrp} < -139 \text{ dBm}$

HL7800		
	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	<u>Notes</u> <ul style="list-style-type: none"> 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, <rsrp> 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. 	

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 HL7800-M MNO and RF Band Customization at Customer Production Site Application Note (reference number: 2174213) for details.

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KBNDCFG=?	<u>Response</u> +KBNDCFG: <RAT>,(list of supported <bnd bitmap>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+KBNDCFG?	<u>Response</u> +KBNDCFG: <RAT>,(list of configured <bnd bitmap>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+KBNDCFG =<RAT>,<bnd bitmap>	<u>Response</u> +KBNDCFG: <RAT>,<bnd bitmap>s to configure) OK <u>Parameters</u> <RAT> Radio Access Technology 0 CAT-M1 1 NB1 (will be available in a future release) 2 GSM (for HL7802 only; will be available in a future release)

HL7800																															
	<p><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)</p> <table> <tr><td>0000 00000000 00000000</td><td>Not Available</td></tr> <tr><td>0000 00000000 00000001</td><td>LTE Band 1 (2000 MHz)</td></tr> <tr><td>0000 00000000 00000002</td><td>LTE Band 2 (1900 MHz)</td></tr> <tr><td>0000 00000000 00000004</td><td>LTE Band 3 (1800 MHz)</td></tr> <tr><td>0000 00000000 00000008</td><td>LTE Band 4 (1700 MHz)</td></tr> <tr><td>0000 00000000 00000010</td><td>LTE Band 5 (850 MHz)</td></tr> <tr><td>0000 00000000 00000080</td><td>LTE Band 8 (900MHz)</td></tr> <tr><td>0000 00000000 00000800</td><td>LTE Band 12 (700 MHz)</td></tr> <tr><td>0000 00000000 00001000</td><td>LTE Band 13 (700 MHz)</td></tr> <tr><td>0000 00000000 00020000</td><td>LTE Band 18 (800MHz)</td></tr> <tr><td>0000 00000000 00040000</td><td>LTE Band 19 (800MHz)</td></tr> <tr><td>0000 00000000 00080000</td><td>LTE Band 20 (800MHz)</td></tr> <tr><td>0000 00000000 02000000</td><td>LTE Band 26 (800 MHz)</td></tr> <tr><td>0000 00000000 08000000</td><td>LTE Band 28 (700MHz)</td></tr> <tr><td>0002 00000000 00000000</td><td>LTE Band 66 (1800MHz)</td></tr> </table>	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)	0000 00000000 00000080	LTE Band 8 (900MHz)	0000 00000000 00000800	LTE Band 12 (700 MHz)	0000 00000000 00001000	LTE Band 13 (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 02000000	LTE Band 26 (800 MHz)	0000 00000000 08000000	LTE Band 28 (700MHz)	0002 00000000 00000000	LTE Band 66 (1800MHz)
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)																														
0000 00000000 00000080	LTE Band 8 (900MHz)																														
0000 00000000 00000800	LTE Band 12 (700 MHz)																														
0000 00000000 00001000	LTE Band 13 (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 02000000	LTE Band 26 (800 MHz)																														
0000 00000000 08000000	LTE Band 28 (700MHz)																														
0002 00000000 00000000	LTE Band 66 (1800MHz)																														
<p><u>Reference</u> Sierra Wireless Proprietary</p>	<p><u>Notes</u></p> <ul style="list-style-type: none"> • This command sets the configured LTE band(s) on which the module can operate. • When using the write command, 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+CUN=1,1). • 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. 																														
<p><u>Examples</u></p>	<p>AT+KBNDCFG=0,7 // Set LTE Bands 1, 2, 3 selected; no 0x prefix for CAT-M1 +KBNDCFG: 0,7 OK</p> <p>AT+CFUN=1,1 // Force initialization of radio to consider new configured bands</p> <p>AT+KBNDCFG? // Get configured network bands: LTE bands 1, 2, 3 for CAT-M1 +KBNDCFG: 0,00000000000000000007 +KBNDCFG: 1,0 +KBNDCFG: 2,0 OK</p> <p>AT+KBNDCFG=? // Get supported network bands: bands 1, 2, 3, 4, 5, 8, 12, 13, 18, // and bands 19, 20, 26, 28, 66 for CAT-M1 +KBNDCFG: 0,000200000000A0E189F +KBNDCFG: 1,0 +KBNDCFG: 2,0 OK</p>																														

HL7800	
	AT+KBNDCFG=0,0 // Not defined +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

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

HL78xx	
<u>Read command</u> <u>Syntax</u> AT+KBND?	<u>Response</u> +KBND: <RAT>,(the active <bnd bitmap>) OK <u>Parameter</u> <RAT> Radio Access Technology 0 CAT-M1 1 NB1 (will be available in a future release) 2 GSM (for HL7802 only; will be available in a future release) <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) 0000 00000000 00000000 No current active band 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) 0000 00000000 00000080 LTE Band 8 (900MHz) 0000 00000000 00000800 LTE Band 12 (700 MHz) 0000 00000000 00001000 LTE Band 13 (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 02000000 LTE Band 26 (800 MHz) 0000 00000000 08000000 LTE Band 28 (700MHz) 0002 00000000 00000000 LTE Band 66 (1800MHz)
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> This command returns the LTE band that the module is currently using and the corresponding RAT. If the module is not registered to a network or if there is no current active band, the returned bitmap is 0. +CME_ERROR: 3 is returned in 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+CUN=1,1).

HL78xx	
<u>Examples</u>	<p>AT+KBND? // Get the activated network band: LTE band 66 for CAT-M1 +KBND: 0,00020000000000000000 OK</p> <p>AT+KBND? // Get the activated network band: no active band +KBND: 0,00000000000000000000 OK</p>

5.21. +KGPIO Command: Hardware IO Control

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KGPIO=?	<u>Response</u> +KGPIO: (list of supported <IO>s),(list of supported <cde>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+KGPIO?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+KGPIO=<IO>,<cde>	<u>Response</u> If <cde> = 2: +KGPIO: <IO>,<current_value> OK Else OK <u>Parameters</u> <IO> 1 - 3, 5 - 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
<u>Notes</u>	<ul style="list-style-type: none"> • 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.

HL7800	
<u>Examples</u>	AT+KGPIO=? +KGPIO: (1,2,3,5,6,7,8,10,11,14,15),(0-2) OK AT+KGPIO? OK AT+KGPIOCFG=1,0,2 AT+KGPIO=1,1 OK AT+KGPIO=1,0 OK

5.22. +KGPIOCFG Command: GPIO Configuration

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KGPIOCFG=?	<u>Response</u> +KGPIOCFG: (list of supported <n>s),(list of supported <dir>s), (list of supported <pull mode>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+KGPIOCFG?	<u>Response</u> +KGPIOCFG: <n>,<dir>,<pull mode>[<CR><LF> +KGPIOCFG: <n>,<dir>,<pull mode> [...]] OK
<i>Write command</i>	
<u>Syntax</u> AT+KGPIOCFG=<n>,<dir>,<pull mode>	<u>Response</u> OK <u>Parameters</u> <n> 1 – 3, 5 – 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.

HL7800	
<u>Notes</u>	<ul style="list-style-type: none"> 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.
<u>Examples</u>	<p>AT+KGPIOCFG=? +KGPIOCFG: (1,2,3,5,6,7,8,10,11,14,15),(0-1),(0-2) OK</p> <p>AT+KGPIOCFG? +KGPIOCFG: 1,0,2 +KGPIOCFG: 2,0,2 +KGPIOCFG: 3,0,2 +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</p> <p>AT+KGPIOCFG=1,0,2 OK</p> <p>AT+KGPIOCFG=1,1,1 OK</p>

5.23. +KCELL Command: Cell Environment Information

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KCELL=?	<u>Response</u> +KCELL: (list of supported <revision>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+KCELL?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+KCELL= <revision>	<u>Response</u> +KCELL: 0 +KCELL: 0 +KCELL: <nbLTEcells>,<cell_type>,<PLMN>,<LTE_CI>,<PhyCellInd>,<trackingAreaCode>,<RSRPResult>,<RSRQResult>,<LTE_TA>][<cell_type>,<Earfcn>,<PhyCellID>,<RSRPResult>,<RSRQResult>]]][...]] OK

HL7800	
	<p><u>Parameters</u></p> <p><revision> 0 Reserved for future development</p> <p><cell_type> 0 GSM serving cell (Not supported) 1 GSM neighbor cell (Not supported) 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</p> <p><PLMN> PLMN identifiers (3 bytes) in hexadecimal format, made of MCC (Mobile Country Code), and MNC (Mobile Network Code)</p> <p><nbLTEcells> $0 \leq k \leq 33$ Number of LTE base stations available</p> <p><LTE_CI> Cell Identity in 8 hexadecimal digits with length = 28 bits. (Ref: 3GPP TS 36.331, 6.3.4, CellIdentity IE)</p> <p><PhyCellInd> 0 – 503 Physical Cell ID (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE)</p> <p><TrackingAreacode> Tracking Area Code (Ref: 3GPP TS 36.331, 6.3.4, Tracking AreaCode IE) Integer type with length = 16 bits</p> <p><RSRPResult> 0 – 97 Reference Signal Received Power (Ref: 3GPP TS 36.331, 6.3.5, RSRP-Range IE)</p> <p><RSRQResult> 0 – 34 Reference Signal Received Quality (Ref: 3GPP TS 36.331, 6.3.5, RSRQ-Range IE)</p> <p><LTE_TA> 0 – 1282 Timing advance (as per [3GPP 36.321])</p> <p><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)</p>
<u>Notes</u>	<ul style="list-style-type: none"> This command provides information related to the network environment and can be used, for example, for localization calculation. The first two lines are 2G and 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.
<u>Examples</u>	<p>AT+KCELL=? +KCELL: 0 OK</p> <p>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</p>

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

Refer to the following table for power saving mode conditions and states.

Table 2. Power Saving Mode Matrix

AT+KSLEEP	Condition	Wake-Up Source	IO State	Application Context
Forbidden	-	-	Retained	-
Sleep	<ul style="list-style-type: none"> • DTR if <mgt> = 0 • Modem in idle mode 	<ul style="list-style-type: none"> • DTR • SMS/IP data reception • Wakeup 	Retained	Retained
Lite Hibernate	<ul style="list-style-type: none"> • DTR if <Mgt>=0 • Modem in eDRX mode or PSM mode/OFF or no coverage. 	<ul style="list-style-type: none"> • Wake-up PIN • SMS reception • IP data reception • PSM timer • Network search timer 	Retained	Not retained
Hibernate	<ul style="list-style-type: none"> • DTR if <mgt> = 0 • Modem in PSM mode/OFF or no coverage 	<ul style="list-style-type: none"> • Wake-up PIN • PSM timer when PSM • Network search timer when no coverage 	Not Retained	Not retained
	<ul style="list-style-type: none"> • DTR if <Mgt>=0 • Modem in eDRX mode • UICC SIM card allows USIM deactivation 	<ul style="list-style-type: none"> • Wake-up PIN • SMS reception • IP data reception 	Not Retained	Not retained
	<ul style="list-style-type: none"> • DTR if <Mgt>=0 • Modem in eDRX mode • UICC SIM card doesn't allow USIM deactivation 	<ul style="list-style-type: none"> • Wake-up PIN • SMS reception • IP data reception 	Retained	Not retained

Table 3. AT+KSLEEP Command Description

HL7800	
Test command	
<u>Syntax</u> AT+KSLEEP=?	<u>Response</u> +KSLEEP: (list of supported <mngt>s), (list of supported <level>s), (list of supported <delay>s) OK
Read command	
<u>Syntax</u> AT+KSLEEP?	<u>Response</u> +KSLEEP: <mngt>[,<level>[,<delay>]] OK
Write command	
<u>Syntax</u> AT+KSLEEP= <mngt>[,<level> [,<delay>]]	<u>Response</u> OK <u>Parameters</u> <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 <delay> 0 – 99 Duration of delay before the module enters power saving mode after reboot in seconds
Reference Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> Current configuration is kept in non-volatile memory after reset. Only hardware signals impact power saving management (modem signals over MUX will not).
<u>Examples</u>	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

HL7800	
	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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KRIC=?	Response +KRIC: (list of supported <mask>s),(list of supported <shape>s),(list of supported <pulse duration>s),(list of supported <Ri inverse gpio>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+KRIC?	Response +KRIC: <mask>,<shape>,<pulse duration>,<RI inverse gpio> OK
<i>Write command</i>	
<u>Syntax</u> AT+KRIC= <mask> [,<shape> [,<pulse duration>[,<RI inverse gpio]]]	Response OK <p><u>Parameters</u></p> <p><mask> Use of RI signal</p> <p>0x00 RI not used</p> <p>0x10 RI activated on network state (+CIEV)</p> <p>0x20 RI activated on TCP connection request (+KTCP_SRVREQ)</p> <p>0x40 RI activated on TCP Data reception (+KTCP_DATA)</p> <p>0x80 RI activated on UDP Data reception (+KUDP_DATA)</p> <p><shape> Signal shape – only available for incoming calls</p> <p>0 Repeat pulses. The total length of the pulse is equivalent to the transfer of the RING or CRING notification</p> <p><pulse duration> 1 – 5 RI pulse durations in seconds</p> <p><RI inverse gpio> GPIO number to notify event instead of RI</p> <p>0 Event notified on RI pin</p> <p>2 Event notified on GPIO2</p>

HL7800	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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. If <shape> is omitted, the previously saved value will be used. When a specified event occurs, the RI is asserted for the defined length of time then it is de-asserted. If multiple events happen during an assertion, the time for assert will be extended. For example, if a second RI event occurs before the RI signal is de-asserted, the RI signal will be kept asserted for <pulse_duration> time after this second RI event. In this scenario, the RI pulse could exceed the time that +KRIC was set for a single event. When the event is notified on GPIO2 instead of the RI pin, the GPIO is active low 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.

5.26. +CPOF Command: Power Off

HL7800	
<i>Execute command</i>	
<u>Syntax</u> AT+CPOF	<u>Response</u> OK
<u>Notes</u>	<ul style="list-style-type: none"> 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.

5.27. +CPWROFF Command: Power Off

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CPWROFF=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CPWROFF [=<mode>]	<u>Response</u> OK or ERROR <u>Parameter</u> <mode> Power down mode 1 Fast power down mode

HL7800	
<u>Notes</u>	<ul style="list-style-type: none"> 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.

5.28. +WIMEI Command: IMEI Write and Read

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+WIMEI=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+WIMEI?	<u>Response</u> +WIMEI: <IMEI> OK
<i>Write command</i>	
<u>Syntax</u> AT+WIMEI= <IMEI>	<u>Response</u> +WIMEI: <IMEI> OK <u>Parameter</u> <IMEI> 14 or 15-digit IMEI as defined in GSM 23.003
<u>Notes</u>	<ul style="list-style-type: none"> 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.
<u>Examples</u>	<pre>// 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</pre>

HL7800	
	at+wimei? +WIMEI: 354610060035829 OK

5.29. +KSYNC Command: Application Synchronization Signal

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KSYNC=?	<u>Response</u> +KSYNC: (list of supported <mod>),(list of supported <IO>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+KSYNC?	<u>Response</u> +KSYNC: <mode>,<IO> OK
<i>Write command</i>	
<u>Syntax</u> AT+KSYNC= <mod>,<IO>	<u>Response</u> +KSYNC: <IO>, <current_value> OK <u>Parameters</u> <mod> 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 - 3, 5 - 8, 10, 11, 14, 15, 20 Defines which GPIO is used as output to indicate the network status
<u>Notes</u>	<ul style="list-style-type: none"> • <mod> 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. • This command can be used without a SIM.

HL7800	
<u>Examples</u>	<p>AT+KSYNC=? +KSYNC: (0,2),(1,2,3,5,6,7,8,10,11,14,15,20) OK</p> <p>AT+KSYNC=2,1 OK</p> <p>AT+KSYNC? +KSYNC: 2,1 OK</p> <p>AT+KSYNC=2,1 OK</p>

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.

HL7800																																													
<i>Test command</i>																																													
<u>Syntax</u> AT+KCARRIERCFG=?	<u>Response</u> +KCARRIERCFG: (list of supported <operator_idx>es) OK																																												
<i>Read command</i>																																													
<u>Syntax</u> AT+KCARRIERCFG?	<u>Response</u> +KCARRIERCFG: <operator_idx> OK																																												
<i>Write command</i>																																													
<u>Syntax</u> AT+KCARRIERCFG=<operator_idx>	<u>Response</u> OK <u>Parameter</u> <table><tr><td><operator_idx></td><td>0</td><td>Default</td></tr><tr><td></td><td>1</td><td>Verizon</td></tr><tr><td></td><td>2</td><td>CMCC</td></tr><tr><td></td><td>3</td><td>RJIL</td></tr><tr><td></td><td>4</td><td>KDDI</td></tr><tr><td></td><td>5</td><td>AT&T</td></tr><tr><td></td><td>6</td><td>USCC</td></tr><tr><td></td><td>7</td><td>Docomo</td></tr><tr><td></td><td>8</td><td>Softbank</td></tr><tr><td></td><td>9</td><td>LGU+</td></tr><tr><td></td><td>10</td><td>KT</td></tr><tr><td></td><td>11</td><td>T-Mobile</td></tr><tr><td></td><td>12</td><td>SKT</td></tr><tr><td></td><td>13</td><td>TELSTRA</td></tr></table>			<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
<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																																											

HL7800	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> Configuration is saved immediately in non-volatile memory.
<u>Examples</u>	AT+KCARRIERCFG=? +KCARRIERCFG: (0-13) OK AT+KCARRIERCFG? +KCARRIERCFG: 0 // Default configuration selected OK AT+KCARRIERCFG=1 // Set Verizon configuration OK

5.31. +KMON Command: Enable/Disable Monitor Mode

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KMON=?	<u>Response</u> +KMON: (0-2) OK
<i>Read command</i>	
<u>Syntax</u> AT+KMON?	<u>Response</u> +KMON: <n> OK
<i>Write command</i>	
<u>Syntax</u> AT+KMON=<n>	<u>Response</u> OK or +CME ERROR: 3 <u>Parameter</u> <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)
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> This command provides the ability to deactivate monitor mode for customer configurations. Monitor mode is a special state in which 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. Monitor mode must be deactivated when customer configuration is applied.

HL7800	
	<ul style="list-style-type: none">• New configuration is written into flash. There is no need to re-enter it at each module reboot.• Configuration is not applied dynamically. Module must be rebooted after the configuration has been changed.• If the asked configuration is the same as the current one, nothing is changed into the flash filesystem.• The global configuration command (+SWITRACEMODE) automatically activates/deactivates monitor mode depending on the configuration. For customer/log configurations, monitor mode is deactivated; and activated for all other configurations.
<u>Examples</u>	<p>AT+KMON=? +KMON: (0-2) OK</p> <p>AT+KMON? +KMON: 0 OK</p> <p>AT+KMON=0 // disable monitor mode OK</p> <p>AT+KMON=1 // enable monitor mode OK</p>



6. Network Service Related Commands

6.1. +CLCK Command: Facility Lock

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CLCK=?	<u>Response</u> +CLCK: (list of supported <fac>s) OK or +CME ERROR: <err>
<i>Write command</i>	
<u>Syntax</u> AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	<u>Response</u> If <mode> = 2 and command is successful OK +CLCK: <status>[,<class1>[<CR>,<LF>+CLCK: <status>,class2...]] or +CME ERROR: <err> <u>Parameters</u> <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 Change Password +CPWD <class> 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)

HL7800	
	8 Short message service 16 Data circuit sync 32 Data circuit async 64 Dedicated packet access 128 Dedicated PAD access
<u>Reference</u>	27.007 Rev12

6.2. +CPWD Command: Change Password

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CPWD=?	<u>Response</u> +CPWD: list of supported (<fac>,<pwdlength>)s OK
<i>Write command</i>	
<u>Syntax</u> AT+CPWD= <fac>,<oldpwd>,<newpwd>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <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
<u>Reference</u>	27.007 Rev12

6.3. +CNUM Command: Subscriber Number

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CNUM=?	<u>Response</u> OK
<i>Execute command</i>	
<u>Syntax</u> AT+CNUM	<u>Response</u> +CNUM: [<alpha1>,<number1>,<type1>,<speed>,<service>,<itc>]] [<CR><LF> +CNUM: [<alpha2>,<number2>,<type2>,<speed>,<service>,<itc>]] [...]] OK or +CME ERROR: <err> <u>Parameters</u> <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
<u>Reference</u>	27.007 Rev12

6.4. +COPN Command: Read Operator Name

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+COPN=?	<u>Response</u> OK

HL7800	
<i>Execute command</i>	
<u>Syntax</u> AT+COPN	<u>Response</u> +COPN: <numeric1>,<alpha1>[<CR><LF> +COPN: <numeric2>,<alpha2> [...]] OK or +CME ERROR: <err> <u>Parameters</u> <numeric> String type; operator in numeric format (see +COPS) <alpha> String type; operator in long alphanumeric format (see +COPS)
<u>Reference</u>	27.007 Rev12

6.5. +COPS Command: Operator Selection

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+COPS=?	<u>Response</u> +COPS: [list of supported (<stat>, long alphanumeric <oper>, short alphanumeric <oper>, numeric <oper>[,< AcT>])s][,[(list of supported <mode>s),(list of supported <format>s)] OK or +CME ERROR: <err>
<i>Read command</i>	
<u>Syntax</u> AT+COPS?	<u>Response</u> +COPS: <mode>[,<format>,<oper>[,<AcT>]] OK or +CME ERROR: <err>
<i>Write command</i>	
<u>Syntax</u> AT+COPS= [<mode> [,<format> [,<oper> [,< AcT>]]]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <mode> <u>0</u> Automatic; in this case other fields are ignored, and registration is done automatically by ME

HL7800	
	<p>1 Manual (other parameters like format and operator need to be passed)</p> <p>2 Deregister from network</p> <p>3 Sets <format> value. In this case <format> becomes a mandatory input</p> <p><format> 0 Long alphanumeric; if network name is not available it displays a combination of MCC and MNC in string format</p> <p>1 Short alphanumeric</p> <p>2 Numeric</p> <p><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)</p> <p><stat> 0 Unknown networks</p> <p>1 Network available</p> <p>2 Current (registered)</p> <p>3 Forbidden network</p> <p><AcT> 7 E-UTRAN</p>
<u>Reference</u> 27.007 Rev12	<u>Notes</u> AT+COFS=? is only available when the device is not in RRC Connected state (when it still has data to transmit or receive). AT+COFS=? 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.

6.6. +CPOL Command: Preferred PLMN List

HL7800	
<u>Test command</u> <u>Syntax</u> AT+CPOL=?	<u>Response</u> +CPOL: (list of supported <index>es),(list of supported <format>s) OK or +CME ERROR: <err>
<u>Read command</u> <u>Syntax</u> AT+CPOL?	<u>Response</u> +CPOL: <index1>,<format>,<oper1>[,<EUTRAN_AcT>][<CR><LF> +CPOL: <index2>,<format>,<oper2>[,<EUTRAN_AcT>][...] OK or +CME ERROR: <err>

HL7800	
Write command	
<u>Syntax</u> AT+CPOL= [<index>] [,<format> [,<oper>]]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <index> Integer type; order number of operator in the SIM/USIM preferred operator list <format> <u>0</u> Long format alphanumeric <oper> 1 Short format alphanumeric <oper> 2 Numeric <oper> <opern> String type; <format> indicates if the format is alphanumeric or numeric <EUTRA_AcT> 0 EUTRA access technology not selected 1 EUTRA access technology selected
<u>Reference</u>	27.007 Rev12

6.7. +CREG Command: Network Registration

HL7800	
Test command	
<u>Syntax</u> AT+CREG=?	<u>Response</u> +CREG: (list of supported <n>s) OK
Read command	
<u>Syntax</u> AT+CREG?	<u>Response</u> +CREG: <n>,<stat>[,<lac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]] OK OK
Write command	
<u>Syntax</u> AT+CREG=[<n>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <n> <u>0</u> 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>]]

HL7800	
	<p><stat> Circuit mode registration status</p> <p>0 Not registered, ME is not currently searching a new operator to register to</p> <p>1 Registered, home network</p> <p>2 Not registered, but ME is currently searching a new operator to register to</p> <p>3 Registration denied</p> <p>4 Unknown</p> <p>5 Registered, roaming</p> <p><lac> String-type; 2-byte location area code in hexadecimal format (e.g. "00C3")</p> <p><ci> String-type; 4-byte cell ID in hexadecimal format</p> <p><AcT> 7 E-UTRAN</p> <p><cause_type> Type of <reject_cause></p> <p>0 <reject_cause> contains an MM cause value (see 3GPP TS 24.008 [8] Annex G)</p> <p>1 <reject_cause> contains a manufacturer specific cause</p> <p><reject_cause> Cause of the failed registration</p>
<u>Reference</u>	27.007 Rev12

6.8. +CPLS Command: Select Preferred PLMN List

HL7800							
<i>Test command</i>							
<u>Syntax</u> AT+CPLS=?	<u>Response</u> +CPLS: (list of supported < list>s) OK						
<i>Read command</i>							
<u>Syntax</u> AT+CPLS?	<u>Response</u> +CPLS: < list> OK						
<i>Write command</i>							
<u>Syntax</u> AT+CPLS= [<cpls_list>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <list> <table border="0"> <tr> <td>0</td><td>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)</td></tr> <tr> <td>1</td><td>Operator controlled PLMN selector with Access Technology EF_{OPLMNwAcT}</td></tr> <tr> <td>2</td><td>HPLMN selector with Access Technology EF_{HPLMNwAcT}</td></tr> </table>	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}
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}						
<u>Reference</u>	27.007 Rev12						

6.9. +CEREG Command: EPS Network Registration Status

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CEREG=?	<u>Response</u> +CEREG: (list of supported <n>s) OK
<i>Read command</i> <u>Syntax</u> AT+CEREG?	<u>Response</u> 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
<i>Execute command</i> <u>Syntax</u> AT+CEREG= [<n>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <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)

HL7800	
	<p>5 Registered, roaming</p> <p>6 Registered for "SMS only", home network (not applicable)</p> <p>7 Registered for "SMS only", roaming (not applicable)</p> <p>8 Attached for emergency bearer services only</p> <p>9 Registered for "CSFB not preferred", home network (not applicable)</p> <p>10 Registered for "CSFB not preferred", roaming (not applicable)</p> <p><tac> 2-byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)</p> <p><ci> String-type; 4-byte E-UTRAN cell ID in hexadecimal format</p> <p><AcT> Access technology of the serving cell</p> <p>0 GSM (not applicable)</p> <p>1 GSM Compact (not applicable)</p> <p>2 UTRAN (not applicable)</p> <p>3 GSM with EGPRS (not applicable)</p> <p>4 UTRAN with HSDPA (not applicable)</p> <p>5 UTRAN with HSUPA (not applicable)</p> <p>6 UTRAN with HSDPA and HSUPA (not applicable)</p> <p>7 E-UTRAN</p> <p><cause_type> Indicates the type of <reject_cause></p> <p>0 <reject_cause> contains an EMM cause value (see 3GPP TS 24.301 [83] Annex A)</p> <p>1 <reject_cause> contains a manufacturer-specific cause</p> <p><reject_cause> Cause of the failed registration</p> <p><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].</p> <p><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].</p>
Reference	27.007 Rev12

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

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CEMODE=?	<u>Response</u> +CEMODE: (list of supported <mode>s) OK
<i>Read command</i> <u>Syntax</u> AT+CEMODE?	<u>Response</u> +CEMODE: <mode> OK
<i>Write command</i> <u>Syntax</u> AT+CEMODE= [<mode>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <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
<u>Reference</u>	27.007 Rev12



7. Phone Book Management

7.1. +CPBF Command: Find Phonebook Entries

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CPBF=?	<u>Response</u> +CPBF: [<nlength>],[<tlength>],[<glength>],[<slength>],[<elength>] OK or +CME ERROR: <err>
<i>Write command</i>	
<u>Syntax</u> AT+CPBF= <findtext>	<u>Response</u> [+CPBF:<index1>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>] [,<adtype>][,<secondtext>][,<email>]] OK or +CME ERROR: <err> <u>Parameters</u> <index1>, <index2>, <index> Integer type values in the range of location numbers of phonebook memory <number> String type phone number of format <type> <type> Type of address octet in integer format <text> String type field of maximum length <tlength>; character set as specified by +CSCS <group> String type field of maximum length <glength>; character set as specified by +CSCS <adnumber> String type phone number of format <adtype> <adtype> Type of address octet in integer format <secondtext> String type field of maximum length <slength>; character set as specified by +CSCS <email> String type field of maximum length <elength>; character set as specified by +CSCS <nlength> Integer type value indicating the maximum length of field <number> <tlength> Integer type value indicating the maximum length of field <text>

HL7800	
	<p><glength> Integer type value indicating the maximum length of field <group></p> <p><slength> Integer type value indicating the maximum length of field <secondtext></p> <p><elength> Integer type value indicating the maximum length of field <email></p> <p><hidden> Indicates if the entry is hidden or not 0 Phonebook entry not hidden 1 Phonebook entry hidden</p>
Reference	27.007 Rev12

7.2. +CPBR Command: Read Current Phonebook Entries

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CPBR=?	<u>Response</u> +CPBR: (list of supported <index>es),[<nlength>],[<tlength>],[<glength>],[<alength>],[<slength>],[<elength>] OK
<i>Write command</i> <u>Syntax</u> AT+CPBR= <index1> [,<index2>]	<u>Response</u> [+CPBR: <index1>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>]]][...] OK or +CME ERROR: <err> <u>Parameters</u> <index1>,<index2>,<index> Integer type values in the range of location numbers of phonebook memory <number> String type phone number of format <type> <type> Type of address octet in integer format <text> String type field of maximum length <tlength> <hidden> Indicates if the entry is hidden or not – only available if a UICC with an active USIM application is present 0 Phonebook entry not hidden 1 Phonebook entry hidden <group> String type field of maximum length <glength> <adnumber> String type phone number of format <adtype>

HL7800	
	<p><adtype> Type of address octet in integer format</p> <p><secondtext> String type field of maximum length <slength></p> <p><email> String type field of maximum length <elength></p> <p><nlength> Integer type value indicating the maximum length of field <number></p> <p><tlength> Integer type value indicating the maximum length of field <text></p> <p><glength> Integer type value indicating the maximum length of field <group></p> <p><alength> Integer type value indicating the maximum length of field <adnumber></p> <p><slength> Integer type value indicating the maximum length of field <secondtext></p> <p><elength> Integer type value indicating the maximum length of field <email></p>
Reference	27.007 Rev12

7.3. +CPBS Command: Select Phonebook Memory Storage

HL7800	
Test command	
<u>Syntax</u> AT+CPBS=?	<u>Response</u> +CPBS: (list of supported <storage>s) OK
Read command	
<u>Syntax</u> AT+CPBS?	<u>Response</u> +CPBS: <storage>[,<used>,<total>] OK or +CME ERROR:<err>
Write command	
<u>Syntax</u> AT+CPBS= <storage> [,<password>]	<u>Response</u> OK or +CME ERROR:<err> <u>Parameters</u> <storage> "FD" SIM/USIM fixdialing phonebook "LD" SIM/UICC last dialing phonebook (LD phonebook can't be deleted)

HL7800	
	<p>"ON" SIM (or MT) own numbers (MSISDNs) list (reading of this storage may be available through +CNUM also)</p> <p>"SM" SIM/UICC phonebook (default)</p> <p>"BL" Blacklist phonebook (delete only)</p> <p>"EN" SIM emergency-call-codes phonebook (read only)</p> <p>"AP" Selected application phonebook</p> <p>"BN" SIM barred-dialing-number (EF_BDN) phonebook (only valid with PIN2)</p> <p>"SN" SIM service-dialing-number (EF_SDN) phonebook (read only)</p> <p><password> String type value representing the PIN2-code required when selecting PIN2 code locked <storage>s above</p> <p><used> Integer type value indicating the number of used locations in the selected memory</p> <p><total> Integer type value indicating the total number of locations in the selected memory</p>
Reference	27.007 Rev12

7.4. +CPBW Command: Write Phonebook Entry

HL7800	
Test command	
<u>Syntax</u> AT+CPBW=?	<u>Response</u> +CPBW: (list of supported <index>es),[<nlength>],(list of supported <type>s),[<tlength>],[<glength>],[<alength>],[<slength>],[<elength> OK
Read command	
<u>Syntax</u> AT+CPBW?	<u>Response</u> +CPBW: <written_index> OK or +CPBW:-1 OK
Write command	
<u>Syntax</u> AT+CPBW= [<index>] [,<number> [,<type>,<text> [,<group> [,<adnumber> [,<adtype> [,<secondtext> [,<email> [,<hidden>]]]]]]]]	<u>Response</u> +CPBW: <written_index> OK or +CME ERROR: <err> <u>Parameters</u> <index> Integer type values in the range of location numbers of phonebook memory

HL7800	
	<p><number> String type phone number of format <type></p> <p><type> Type of address octet in integer format; default value is <u>145</u> when dialing string includes international access code character "+"; otherwise, default value is 129</p> <p><text> String type field of maximum length <tlength></p> <p><hidden> Indicates if the entry is hidden or not – only available if a UICC with an active USIM application is present 0 Phonebook entry not hidden 1 Phonebook entry hidden</p> <p><group> String type field of maximum length <glength></p> <p><adnumber> String type phone number of format <adtype></p> <p><adtype> Type of address octet in integer format</p> <p><secondtext> String type field of maximum length <slength></p> <p><email> String type field of maximum length <elength></p> <p><nlength> Integer type value indicating the maximum length of field <number></p> <p><tlength> Integer type value indicating the maximum length of field <text></p> <p><glength> Integer type value indicating the maximum length of field <group></p> <p><alength> Integer type value indicating the maximum length of field <adnumber></p> <p><slength> Integer type value indicating the maximum length of field <secondtext></p> <p><elength> Integer type value indicating the maximum length of field <email></p>
<u>Reference</u>	27.007 Rev12

>> 8. SMS Commands

8.1. 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.

8.1.1. 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>	

8.1.2. 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>	<p>In the case of user data in text mode responses; format:</p> <ul style="list-style-type: none"> if <dcscs> indicates that GSM 7-bit default alphabet is used and <fo> indicates that user data header indication is not set <ul style="list-style-type: none"> 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 <dcscs> 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)) <p>In the case of CBS: CBM Content of Message in text mode responses; format:</p> <ul style="list-style-type: none"> if <dcscs> indicates that GSM 7-bit default alphabet is used <ul style="list-style-type: none"> 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 <dcscs> 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>	<p>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.</p> <p>In text mode, the maximum length of an SMS depends on the used coding scheme (160 characters if 7-bit).</p>
<mid>	CBM Message Identifier in integer format
<mn>	TP-Message-Number in integer format
<mr>	Message reference in integer format
<oa>	Origination 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
<toa>	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
<dc>	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

8.2. +CMGD Command: Delete Message

HL7800	
Test command	
<u>Syntax</u> AT+CMGD=?	<u>Response</u> +CMGD: (list of supported <index>es)[,(list of supported <delflag>s)] OK
Write command	
<u>Syntax</u> AT+CMGD= <index> [,<delflag>]	<u>Response</u> OK

HL7800	
	<p>or</p> <p>+CMS ERROR: <err></p> <p><u>Parameters</u></p> <p><delflag> Integer indicating multiple message deletion request</p> <p>0 (or omitted) Delete the message specified in <index></p> <p>1 Delete all read messages from preferred message storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched</p> <p>2 Delete all read messages from preferred message storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched</p> <p>3 Delete all read messages from preferred message storage, sent and unsent mobile originated messages leaving unread messages untouched</p> <p>4 Delete all messages from preferred message storage including unread messages</p>
<u>Notes</u>	Execution command deletes message from preferred message storage <mem1>, location <index>. If <delflag> is present and not set to 0 then the ME shall ignore <index> and follow the rules for <delflag> shown above.

8.3. +CMGF Command: Set Message Format

HL7800							
<i>Test command</i>							
<u>Syntax</u> AT+CMGF=?	<u>Response</u> +CMGF: (list of supported <mode> s) OK						
<i>Read command</i>							
<u>Syntax</u> AT+CMGF?	<u>Response</u> +CMGF: <mode> OK						
<i>Execute command</i>							
<u>Syntax</u> AT+CMGF= [<mode>]	<u>Response</u> OK or +CMS ERROR: err> <u>Parameter</u> <table><tr><td><mode></td><td><u>0</u></td><td>PDU mode (default when implemented)</td></tr><tr><td></td><td><u>1</u></td><td>Text mode</td></tr></table>	<mode>	<u>0</u>	PDU mode (default when implemented)		<u>1</u>	Text mode
<mode>	<u>0</u>	PDU mode (default when implemented)					
	<u>1</u>	Text mode					
<u>Notes</u>	<mode> is saved in non-volatile memory per AT port over module reboot.						

8.4. +CMGL Command: List Messages

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CMGL=?	<u>Response</u> +CMGL: (list of supported <stat>s) OK
<i>Execute command</i>	
<u>Syntax</u> AT+CMGL [=<stat>]	<u>Response</u> <p>If in text mode, command is successful and SMS-SUBMITs and/or SMS-DELIVERs:</p> <p>+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> [...]]</p> <p>If in text mode, command is successful and SMS-STATUS-REPORTs:</p> <p>+CMGL: <index>, <stat>,<fo>, <mr>, [<ra>], [<tora>], <scts>, <d_t>,<st>[<CR><LF> +CMGL: <index>, <stat>, <fo>, <mr>,<ra>], [<tora>],<scts>,<d_t>,<st>[...]]</p> <p>If in text mode, command is successful and SMS-COMMANDs:</p> <p>+CMGL: <index>,<stat>,<fo>,<ct> [<CR><LF> +CMGL: <index>,<stat>, <fo>,<ct>[...]]</p> <p>If in text mode, command is successful and CBM storage:</p> <p>+CMGL: <index>,<stat>,<sn>, <mid>, <page>,<pages> <CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<sn>, <mid>,<page>,<pages><CR><LF><data>[...]]</p> <p>If in PDU mode and command is successful:</p> <p>+CMGR: <stat>,<alpha>,<length><CR><LF><pdu></p> <p>or</p> <p>+CMS ERROR: <err></p> <p><u>Parameters</u> For parameter information and values, refer to section 8.1 Parameters Definition.</p>

8.5. +CMGR Command: Read Message

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CMGR=?	<u>Response</u> OK

HL7800	
Write command	
<u>Syntax</u> AT+CMGR= <index>	<u>Response</u> If text mode (+CMGF=1), command is successful, and SMS-DELIVER: +CMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>]<CR><LF><data> if text mode (+CMGF=1), command is successful, and SMS-SUBMIT: +CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dc>,[<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>,<dc>,<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> <u>Parameters</u> For parameter information and values, refer to section 8.1 Parameters Definition.

8.6. +CMGS Command: Send Message

HL7800	
Test command	
<u>Syntax</u> AT+CMGS=?	<u>Response</u> OK
Write command	
<u>Syntax</u> If text mode (+CMGF=1): AT+CMGS=<da> [,<toda>]<CR> text is entered <ctrl-Z/ESC>	<u>Response</u> 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>

HL7800	
If PDU mode (+CMGF=0): AT+CMGS= <length><CR> PDU is given <ctrl-Z/ESC>	<u>Parameters</u> For parameter information and values, refer to section 8.1 Parameters Definition.
<u>Notes</u>	<ul style="list-style-type: none"> 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.

8.7. +CMGW Command: Write Message to Memory

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CMGW=?	<u>Response</u> OK
<i>Write command</i> <u>Syntax</u> 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>	<u>Response</u> +CMGW: <index> OK or +CMS ERROR: <err> <u>Parameters</u> For parameter information and values, refer to section 8.1 Parameters Definition.
<u>Notes</u>	<ul style="list-style-type: none"> 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.

8.8. +CMSS Command: Send Message from Storage

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CMSS=?	<u>Response</u> OK
<i>Write command</i> <u>Syntax</u> AT+CMSS= <index>[,<da> [,<toda>]]	<u>Response</u> If text mode (+CMGF=1) and sending is unsuccessful: +CMSS: <mr>[,<scts>] If PDU mode (+CMGF=0) and sending is successful: +CMSS: <mr> OK or +CMS ERROR: <err> <u>Parameters</u> For parameter information and values, refer to section 8.1 Parameters Definition.
<u>Notes</u>	<ul style="list-style-type: none"> 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.

8.9. +CNMI Command: New Message Indication

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CNMI=?	<u>Response</u> +CNMI: (list of supported <mode>s), (list of supported <mt>s), (list of supported <bm>s), (list of supported <ds>es), (list of supported <bfr>s) OK
<i>Read command</i> <u>Syntax</u> AT+CNMI?	<u>Response</u> +CNMI: <mode>,<mt>,<bm>,<ds>,<bfr> OK

HL7800	
Write command	
<u>Syntax</u> +CNMI=[<mode> [,<mt>[,<bm> [,<ds>[,<bfr>]]]]]	<u>Response</u> OK or +CMS ERROR: <err> <u>Parameters</u> <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
<u>Notes</u>	<mode>, <mt>, <bm> and <ds> are saved in non-volatile memory over module reboot; URC is available on the port that executes the command.
<u>Examples</u>	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

8.10. +CSCA Command: Service Center Address

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CSCA=?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+CSCA?	<u>Response</u> +CSCA: <sca>,<tosca> OK
<i>Write command</i>	
<u>Syntax</u> AT+CSCA=<sca> [,<tosca>]	<u>Response</u> OK or +CMS ERROR: <err> <u>Parameters</u> For parameter information and values, refer to section 8.1 Parameters Definition.

8.11. +CSMP Command: Set Text Mode Parameters

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CSMP=?	<u>Response</u> +CSMP: (list of supported <fo>s), (list of supported <vp>s), (list of supported <pid>s, (list of supported <dc>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CSMP?	<u>Response</u> +CSMP: <fo>,<vp>,<pid>,<dc> OK
<i>Write command</i>	
<u>Syntax</u> AT+CSMP=[<fo> [,<vp>[,<pid> [,<dc>]]]	<u>Response</u> OK <u>Parameters</u> For parameter information and values, refer to section 8.1 Parameters Definition.

8.12. +CSMS Command: Select Message Service

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CSMS=?	<u>Response</u> +CSMS: (list of supported <service>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CSMS?	<u>Response</u> +CSMS: <service>,<mt>,<mo>,<bm> OK
<i>Write command</i>	
<u>Syntax</u> AT+CSMS= <service>	<u>Response</u> +CSMS: <mt>,<mo>,<bm> OK or +CMS ERROR: <err> <u>Parameters</u> <service> <u>0</u> 3GPP TS 23.040 and 3GPP TS 23.041 <u>1</u> 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 <u>0</u> Type not supported <u>1</u> Type supported <mo> Message originated messages <u>0</u> Type not supported <u>1</u> Type supported <bm> Broadcast type messages <u>0</u> Type not supported <u>1</u> Type supported

8.13. +CPMS Command: Preferred Message Storage

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CPMS=?	<u>Response</u> +CPMS: (list of supported <mem1>s), (list of supported <mem2>s), (list of supported <mem3>s) OK

HL7800	
<i>Read command</i> <u>Syntax</u> AT+CPMS?	<u>Response</u> +CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> OK or +CMS ERROR: <err>
<i>Write command</i> <u>Syntax</u> AT+CPMS= <mem1> [,<mem2> [,<mem3>]]	<u>Response</u> +CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK or +CMS ERROR: <err> <u>Parameters</u> For parameter information and values, refer to section 8.1 Parameters Definition.
<u>Notes</u>	<mem1>, <mem2> and <mem3> are saved in non-volatile memory over module reboot.

8.14. +CSDH Command: Show Text Mode Parameters

HL7800	
<i>Test command</i> <u>Syntax</u> AT+CSDH=?	<u>Response</u> +CSDH: (list of supported <show>s) OK
<i>Read command</i> <u>Syntax</u> AT+CSDH?	<u>Response</u> +CSDH: <show> OK
<i>Write command</i> <u>Syntax</u> AT+CSDH= [<show>]	<u>Response</u> OK or +CME ERROR: <err>

HL7800	
	<p><u>Parameter</u></p> <p><show> <u>0</u> Do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcsc>) 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></p> <p> 1 Show values in result codes</p>

8.15. +CMT Notification: Received SMSPP Content

HL7800	
<i>Unsolicited Notification</i>	<p><u>Response</u></p> <p>+CMT: [<alpha>], <length><CR><LF><pdu></p> <p>+CMT: <oa>,<alpha>,<scts>,<tooa>,<fo>,<pid>,<dcsc>,<sca>,<tosca>,<length>]</p> <p><CR> <LF> <data></p>
Reference [27.005]	<p><u>Notes</u></p> <ul style="list-style-type: none"> • All parameters are extracted from received message. • Detailed header information is shown in text mode result codes according to +CSDH.

9. Packet Domain Commands

9.1. +CGATT Command: PS Attach or Detach

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CGATT=?	<u>Response</u> +CGATT: (list of supported <state>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CGATT?	<u>Response</u> +CGATT: <state> OK
<i>Write command</i>	
<u>Syntax</u> AT+CGATT= [<state>]	<u>Response</u> OK or ERROR <u>Parameter</u> <state> State of PS attachment 0 Detached 1 Attached
<u>Reference</u>	27.007 Rev12

9.2. +CGACT Command: PDP Context Activate or Deactivate

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CGACT=?	<u>Response</u> +CGACT: (list of supported <state>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CGACT?	<u>Response</u> [+CGACT: <cid>,<state>] [<CR><LF>+CGACT: <cid>,<state> [...]] OK

HL7800	
<p><i>Write command</i></p> <p><u>Syntax</u> AT+CGACT= [<state>[,<cid> [,<cid>[,...]]]</p>	<p><u>Response</u> OK</p> <p>or</p> <p>+CME ERROR: <err></p> <p><u>Parameters</u> <state> Indicates the state of PDP context activation 0 Deactivated 1 Activated</p> <p><cid> Numeric parameter which specifies a particular PDP context definition</p>
<p><u>Reference</u> 27.007 Rev12</p>	<p><u>Notes</u> The modules include an internal stack that may automatically activate or deactivate PDP context. Use this command with caution.</p>

9.3. +CGCMOD Command: Modify PDP Context

HL7800	
<p><i>Test command</i></p> <p><u>Syntax</u> AT+CGCMOD=?</p>	<p><u>Response</u> +CGCMOD: (list of <cid>s addociated with active contexts) OK</p>
<p><i>Write command</i></p> <p><u>Syntax</u> AT+CGCMOD= [<cid>[,<cid> [,...]]]</p>	<p><u>Response</u> OK</p> <p>or</p> <p>+CME ERROR: <err></p> <p><u>Parameter</u> <cid> Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT)</p>
<p><u>Reference</u></p>	<p>27.007 Rev10</p>

9.4. +CGTFT Command: Traffic Flow Template

HL7800	
<p><i>Test command</i></p> <p><u>Syntax</u> AT+CGTFT=?</p>	<p><u>Response</u> +CGTFT: <PDP_type>, (list of supported <packet filter identifier>s) , (list of supported <evaluation precedence index>s), (list of supported <source address and subnet mask>s), (list of supported <protocol number (ipv4) / next header (ipv6)>s), (list of supported <destination port range>s), (list of supported <source port range>s), (list of supported <ipsec security parameter index (spi)>s), (list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s), (list of supported <flow label (ipv6)>s), (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)[...]]</p>
<p><i>Read command</i></p> <p><u>Syntax</u> AT+CGTFT?</p>	<p><u>Response</u> +CGTFT: <cid>, <packet filter identifier>,<evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)>, <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> [...]]</p>
<p><i>Execute command</i></p> <p><u>Syntax</u> AT+CGTFT= [<cid>,<packet filter identifier>, <evaluation precedence index> [<source address and subnet mask> [,<protocol number (ipv4) / next header (ipv6)> [,<destination port range> [,<source port range> [,<ipsec security parameter index (spi)> [<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask></p>	<p><u>Response</u> OK</p> <p>or ERROR</p> <p><u>Parameter</u> <cid> Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT)</p> <p><packet filter identifier> Numeric parameter with value range from 1 to 16</p> <p><evaluation precedence index> Numeric parameter with value range from 0 to 255</p> <p><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</p>

HL7800	
[,<flow label (ipv6)>,<direction>]]]]]]]]]]	<p><protocol number (ipv4) / next header (ipv6)> Numeric parameter with value range from 0 to 255</p> <p><destination port range> String type given as a dot-separated numeric (0 – 65535) parameter on the form 'f.t.'</p> <p><source port range> String type given as a dot-separated numeric (0 – 65535) parameter on the form 'f.t.'</p> <p><ipsec security parameter index (spi)> Numeric value in hexadecimal format with value range from 00000000 to FFFFFFFF</p> <p><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.'</p> <p><flow label (ipv6)> Numeric value in hexadecimal format with value range from 00000 to FFFFF. Valid for IPv6 only</p> <p><direction> Specifies the transmission direction in which the packet filter shall be applied</p> <p>1 Uplink</p> <p>2 Downlink</p> <p>3 Bidirectional (up and downlink; default if omitted)</p>
<p><u>Reference</u></p> <p>27.007 Rev12</p>	<p><u>Notes</u></p> <ul style="list-style-type: none"> 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.

9.5. +CGDCONT Command: Define PDP Context

HL7800	
<p><i>Test command</i></p> <p><u>Syntax</u></p> <p>AT+CGDCONT=?</p>	<p><u>Response</u></p> <p>+CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s), (list of supported <IPv4Addr Alloc>s), (list of supported <emergency_indication>s), (list of supported <PCSCF_discovery>s), (list of supported <IM_CN_Signalling_Flag_Ind>s)</p> <p>[<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 <IPv4Addr Alloc>s), (list of supported <emergency_indication>s), (list of supported <PCSCF_discovery>s), (list of supported <IM_CN_Signalling_Flag_Ind>s)</p> <p>[...]</p> <p>OK</p>

HL7800	
Read command	
<u>Syntax</u> AT+CGDCONT?	<u>Response</u> [+CGDCONT: <cid>, <PDP_type>, <APN>,<PDP_addr>, <d_comp>, <h_comp> [,<IPv4AddrAlloc>[,<emergency_indication>[,<PCSCF_discovery> [,<IM_CN_Signalling_Flag_Ind>]]]]] [<CR><LF>+CGDCONT: <cid>, <PDP_type>, <APN>,<PDP_addr>, <d_comp>, <h_comp>[,<IPv4AddrAlloc>[,<emergency_indication>[,<PCSCF_discovery> [,<IM_CN_Signalling_Flag_Ind>]]]]] [...] OK
Execute command	
<u>Syntax</u> AT+CGDCONT= [<cid> [,<PDP_type> [,<APN> [,<PDP_addr> [,<d_comp> [,<h_comp> [,<IPv4AddrAlloc >[,<emergency_ indication> [,<PCSCF_ discovery> [,<IM_CN_ Signalling_Flag_ Ind>]]]]]]]]]	<u>Response</u> OK or ERROR <u>Parameters</u> <p><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.</p> <p><PDP_type> Packet Data Protocol type</p> <p>"IP" Internet Protocol</p> <p>"IPv6" Internet Protocol, version 6</p> <p>"IPv4V6" Virtual <PDP_type>introduced to handle dual IP stack UE capability</p> <p><APN> Access Point Name</p> <p>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.</p> <p><PDP_address> String parameter that identifies the MT in the address space applicable to the PDP. If the value is null or omitted then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The read command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using +CGPADDR.</p> <p>Note that IPv6 address obtained on LTE will be prefixed with a constant 8-byte address "FE.80.00.00.00.00.00" if the network has not provided any.</p> <p><d_comp> PDP data compression (applicable for SNDCP only)</p> <p>0 Off (default if value if omitted)</p> <p>1 On (manufacturer preferred compression)</p> <p>2 V.42 bis</p> <p><h_comp> PDP header compression</p> <p>0 Off (default if value if omitted)</p> <p>1 On (manufacturer preferred compression)</p> <p>2 RFC1144 (applicable for SNDCP only)</p> <p>3 RFC2507</p> <p>4 RFC3095 (applicable for PDCCP only)</p>

HL7800	
	<p><IPv4AddrAlloc> Numeric parameter that controls how MT/TA requests to get IPv4 address information</p> <p>0 IPv4 address allocated through NAS signalling</p> <p>1 IPv4 address allocated through DHCP</p> <p><emergency_indication> Indicates whether the PDP context is for emergency bearer services or not</p> <p>0 PDP context is not for emergency bearer services</p> <p>1 PDP context is for emergency bearer services</p> <p><P-CSCF_discovery> Numeric parameter that influences how the MT/TA requests get the P-CSCF address</p> <p>0 Preference of P-CSCF address discovery not influences by +CGDSCONT</p> <p>1 Preference of P-CSCF address discovery through NAS signalling</p> <p><IM_CN_Signalling_Flag_Ind> Numeric parameter used to indicate whether the PDP context is for IM CN subsystem related signaling only or not</p> <p>0 UE indicates that the PDP context is not for IM CN subsystem-related signaling only</p> <p>1 UE indicates that the PDP context is for IM CN subsystem-related signaling only</p>
<p><u>Reference</u></p> <p>27.007 Rev12</p>	<p><u>Notes</u></p> <ul style="list-style-type: none"> If the command is used only with the 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 ACL of EF-ACL of the USIM will be read out and compared with the requested APN. <ul style="list-style-type: none"> 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.

9.6. +CGDSCONT Command: Define Secondary PDP Context

HL7800	
<p><i>Test command</i></p> <p><u>Syntax</u></p> <p>AT+CGDSCONT=?</p>	<p><u>Response</u></p> <p>+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)</p> <p>[<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)</p> <p>[...]</p> <p>OK</p>

HL7800	
Read command	
<u>Syntax</u> AT+CGDSCONT?	<u>Response</u> [+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
Execute command	
<u>Syntax</u> AT+CGDSCONT= [<cid>,<p_cid> [,<d_comp> [,<h_comp> [,<IM_CN_Signalling_Flag_Ind>]]]	<u>Response</u> OK or ERROR <u>Parameter</u> <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 +CGDSCONT. 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 SNDSCP 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 SNDSCP 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
<u>Reference</u>	27.007 Rev12

9.7. +CGCONTRDP Command: PDP Context Read Dynamic Parameter

HL7800	
<i>Test command</i> <u>Syntax</u> +CGCONTRDP=?	<u>Response</u> +CGCONTRDP: (list of <cid>s associated with active contexts) OK
<i>Execute command</i> <u>Syntax</u> +CGCONTRDP [=<cid>]	<u>Response</u> +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>]]]]]]]]] +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>]]]]]]]]] [...] or ERROR <u>Parameters</u> <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 1 PDP context is for IM CN subsystem-related signalling only

HL7800	
	<p><LIPA_indication> Indicates that the PDP context provides connectivity using a LIPA PDN connection. This parameter cannot be set by the TE.</p> <p>0 Indication not received that the PDP context provides connectivity using a LIPA PDN connection</p> <p>1 Indication received that the PDP context provides connectivity using a LIPA PDN connection</p>
Reference	27.007 Rev11

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

HL7800	
Test command	
<u>Syntax</u> +CGSCONTRDP= ?	<u>Response</u> +CGCONTRDP: (list of <cid> s associated with active contexts) OK
Execute command	
<u>Syntax</u> +CGSCONTRDP [=<cid>]	<u>Response</u> +CGSCONTRDP: <cid>,<p_cid>,<bearer_id>[,<IM_CN_Signalling_Flag>]] +CGSCONTRDP: <cid>,<p_cid>,<bearer_id>[,<IM_CN_Signalling_Flag>] [...]] or ERROR <u>Parameters</u> <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

9.9. +CGEREP Command: Packet Domain Event Reporting

HL7800																
<i>Test command</i>																
<u>Syntax</u> AT+CGEREP=?	<u>Response</u> +CGEREP: (list of supported <mode>s),(list of supported <bfr>s) OK															
<i>Read command</i>																
<u>Syntax</u> AT+CGEREP?	<u>Response</u> +CGEREP: <mode> , <bfr> OK or ERROR															
<i>Write command</i>																
<u>Syntax</u> AT+CGEREP= [<mode>[,<bfr>]]	<u>Response</u> OK or ERROR <u>Parameters</u> <table><tr><td><mode></td><td>0</td><td>Buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.</td></tr><tr><td></td><td>1</td><td>Discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE</td></tr><tr><td></td><td><u>2</u></td><td>Buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE (2 is the default value)</td></tr></table> <table><tr><td><bfr></td><td><u>0</u></td><td>MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered</td></tr><tr><td></td><td>1</td><td>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)</td></tr></table>	<mode>	0	Buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.		1	Discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE		<u>2</u>	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)	<bfr>	<u>0</u>	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)
<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														
	<u>2</u>	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)														
<bfr>	<u>0</u>	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)														
<i>Unsolicited Notification</i>	<u>Response</u> +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															

HL7800	
	<p>+CGEV: ME DEACT <p_cid>, <cid>, <event_type> The network has responded to an ME initiated context deactivation request</p> <p>+CGEV: NW MODIFY <cid>, <change_reason>, <event_type> The network has modified a context</p> <p>+CGEV: ME MODIFY <cid>, <change_reason>, <event_type> The mobile termination has modified a context</p> <p><u>Parameters</u></p> <p><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</p> <p><event_type> 0 Informational event 1 Information request, acknowledgement required</p> <p><change_reason> 0 TFT only changed 1 QoS only changed 2 Both TFT and QoS changed</p>
<u>Reference</u>	27.007 Rev12

9.10. +CGPADDR Command: Show PDP Address

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CGPADDR=?	<u>Response</u> +CGPADDR: (list of supported <cid>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+CGPADDR= [<cid>,<cid> [,...]]	<u>Response</u> +CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]] [<CR><LF> +CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]][...] OK <p><u>Parameters</u></p> <p><cid> Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT). If no <cid> is specified, the addresses for all defined contexts are returned.</p> <p><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>.</p> <p>Both <PDP_addr_1> and <PDP_addr_2> are omitted if none are available.</p>

HL7800	
	<p>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.</p> <p>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.</p>
Reference	27.007 Rev12

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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+CGSMS=?	<u>Response</u> +CGSMS: (list of currently available <service>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+CGSMS?	<u>Response</u> +CGSMS: <service> OK
<i>Write command</i>	
<u>Syntax</u> AT+CGSMS= [<service>]	<u>Response</u> OK or ERROR <u>Parameter</u> <service> Indicates the service or service preference to be used 0 Packet Domain 1 Circuit Switched
Reference 27.007 Rev12	<u>Notes</u> In 4G RAT, Packet Domain service means IMS messaging on EPS bearers and Circuit Switched service means transmission on Signalling Gateways.



10. Protocol Specific Commands

10.1. Preliminary Comments

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

- TCP
- UDP

10.2. 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

10.3. 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 10. Currently, the maximum number of simultaneous connected sessions is 6.

10.4. 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).

10.5. 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.

10.6. 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.

10.7. Connection Configuration

10.7.1. +KCNXCFG Command: GPRS Connection Configuration

HL7800	
<i>Test command</i> <u>Syntax</u> AT+KCNXCFG=?	<u>Response</u> +KCNXCFG: (list of possible <cnx conf>s), "GPRS", (range of possible length of <apn>), (range of possible length of <login>), (range of possible length of <password>), <af>, <ip>, <dns1>, <dns2>, <ip_v6>, <dns1_v6>, <dns2_v6> OK
<i>Read command</i> <u>Syntax</u> AT+KCNXCFG?	<u>Response</u> +KCNXCFG: <cnx cnf>, "GPRS", <apn>, <login>, <password>, <af>, <ip>, <dns1>, <dns2>[, <ip_v6>, <dns1_v6>, <dns2_v6>], <state> [...] OK
<i>Write command</i> <u>Syntax</u> AT+KCNXCFG= <cnx cnf>, "GPRS", <apn> [, <login>] [, <password>] [, <af> [, <ip>] [, <dns1>] [, <dns2>]]] [, <ip_v6>] [, <dns1_v6>] [, <dns2_v6>]]]]] 	<u>Response</u> OK <u>Parameters</u> <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 user name of the cnx <password> string type (max size 24 bytes), indicates the password of the cnx

HL7800	
	<p><af> Address family used for the connection (up to 3GPP Release 7 compliant)</p> <p>IPV4 IPv4 only IPV6 IPv6 only IPV4V6 IPv4 and IPv6</p> <p><ip> String type. Static IP not supported only dynamic address supported, the value should be "0.0.0.0" or an empty string.</p> <p><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.</p> <p><ip_v6> IPv6 String type. If the mobile is supposed to work with a dynamic address, the value should be "::" or an empty string.</p> <p><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.</p> <p><state> Connection state</p> <p>0 Disconnected 1 Connecting 2 Connected 3 Idle, down counting for disconnection 4 Disconnecting</p>
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> • <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.

10.7.2. +KCNXTIMER Command: Connection Timer Configuration

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KCNXTIMER =?	<u>Response</u> +KCNXTIMER: (list of supported <cnx cnf>s),(list of supported <tim1>s),(list of supported <nbtrial>s),(list of supported <tim2>s) ,(list of supported <idletime>s) OK

HL7800	
<i>Read command</i> <u>Syntax</u> AT+KCNXTIMER ?	<u>Response</u> +KCNXTIMER: <cnx cnf>,<tim1>,<nbtrial>,<tim2>,<idletime> [...] OK
<i>Write command</i> <u>Syntax</u> AT+KCNXTIMER =<cnx cnf>[[<tim1>][[<nbtrial>] [,<tim2>] [,<idletime>]]]	<u>Response</u> OK <u>Parameters</u> <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 from 1 – 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.
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command will only have impact on TCP and UDP.

10.7.3. +KCNXPROFILE Command: Current Profile Connection Configuration

HL7800	
<i>Test command</i> <u>Syntax</u> AT+ KCNXPROFILE =?	<u>Response</u> +KCNXPROFILE: (list of possible <cnx cnf>s) OK
<i>Read command</i> <u>Syntax</u> AT+ KCNXPROFILE?	<u>Response</u> +KCNXPROFILE: <cnx cnf> OK

HL7800	
<i>Write command</i> <u>Syntax</u> AT+KCNXPROFILE= <cnx cnf>	<u>Response</u> OK <u>Parameter</u> <cnx cnf> PDP context configuration. Numeric parameter which specifies a particular PDP context configuration
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command sets the default PDP context configuration ID for +KTCPCFG and +KUDPCFG , if <cnx cnf> parameter is not given in these commands.

10.7.4. +KCGPADDR Command: Display PDP Address

HL7800	
<i>Test command</i> <u>Syntax</u> AT+KCGPADDR =?	<u>Response</u> +KCGPADDR: (list of possible <cnx_cnf> s) OK
<i>Write command</i> <u>Syntax</u> For all <cnx_cnf> s: AT+KCGPADDR For specific <cnx_cnf> s: AT+KCGPADDR= <cnx_cnf>	<u>Response</u> +KCGPADDR: <cnx_cnf> , <PDP_addr_1> [[+KCGPADDR: <cnx_cnf> , <PDP_addr_2>] ...] OK <u>Parameters</u> <cnx_cnf> PDP context configuration. 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
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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.

10.7.5. +KCNX_IND Notification: Connection Status Notification

HL7800	
<i>Unsolicited Notification</i>	<p><u>Response</u></p> <p>+KCNX_IND: <cnx cnf>,<status>,<af> (for <status> = 0, 1)</p> <p>+KCNX_IND: <cnx cnf>,<status>,<attempt>,<nbtrial>,<tim1> (for <status> = 2)</p> <p>+KCNX_IND: <cnx cnf>,<status> (for <status> = 3,6)</p> <p>+KCNX_IND: <cnx cnf>,<status>,<attempt> (for <status> = 4)</p> <p>+KCNX_IND: <cnx cnf>,<status>,<idletime> (for <status> = 5)</p> <p><u>Parameters</u></p> <p><cnx cnf> PDP context configuration. Numeric parameter which specifies a particular PDP context configuration</p> <p><status> PDP connection status</p> <p>0 Disconnected due to network</p> <p>1 Connected</p> <p>2 Failed to connect, <tim1> timer is started if <attempt> is less than <nbtrial></p> <p>3 Closed</p> <p>4 Connecting</p> <p>5 Idle time down counting started for disconnection</p> <p>6 Idle time down counting canceled</p> <p><af> 0 IPV4 1 IPV6</p> <p><tim1> Refer to +KCNXTIMER</p> <p><attempt> Current attempt of bringing up of PDP connection</p> <p><nbtrial> Refer to +KCNXTIMER</p> <p><idletime> Refer to +KCNXTIMER</p>
<u>Reference</u>	Sierra Wireless Proprietary

10.7.6. +KCNXUP Command: Bring the PDP Connection Up

HL7800	
<i>Test command</i>	
<p><u>Syntax</u></p> <p>AT+KCNXUP=?</p>	<p><u>Response</u></p> <p>+KCNXUP: (list of possible <cnx_cnf>s)</p> <p>OK</p>

HL7800	
<i>Write command</i> <u>Syntax</u> AT+KCNXUP= <cnx_cnf>	<u>Response</u> OK <u>Parameter</u> <cnx_cnf> PDP context configuration. Numeric parameter which specifies a particular PDP context configuration
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> • 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.

10.7.7. +KCNXDOWN Command: Bring the PDP Connection Down

HL7800							
<i>Test command</i>							
<u>Syntax</u> AT+KCNXDOWN =?	<u>Response</u> +KCNXDOWN: (list of possible <cnx_cnf> s),(list of possible <mode> s) OK						
<i>Write command</i>							
<u>Syntax</u> AT+KCNXDOWN =<cnx_cnf> [,<mode>]	<u>Response</u> OK <u>Parameters</u> <cnx_cnf> PDP context configuration. Numeric parameter which specifies a particular PDP context configuration <table><tr><td><mode></td><td>0</td><td>Cancels the reservation of the activated PDP connection previously configured by +KCNXUP</td></tr><tr><td></td><td>1</td><td>Similar to 0, but deactivates the PDP connection even if the active session exists</td></tr></table>	<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
<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					
<u>Reference</u>	Sierra Wireless Proprietary						

10.8. Common Configuration

10.8.1. +KPATTERN Command: Custom End of Data Pattern

HL7800	
<i>Test command</i> <u>Syntax</u> AT+KPATTERN =?	<u>Response</u> OK
<i>Read command</i> <u>Syntax</u> AT+KPATTERN?	<u>Response</u> +KPATTERN: <EOF pattern> OK
<i>Write command</i> <u>Syntax</u> AT+KPATTERN =<EOF pattern>	<u>Response</u> OK or +CME ERROR <err> <u>Parameter</u> <EOF pattern> String type (max size 128 bytes). This is a pattern used to notify the end of data (or file) during data or file transfer. This string doesn't have to be human-readable (not printable characters are allowed).
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> • 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 and without following data. The timeout value is equal to <wait_time> of +KILOPT. • 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>.

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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KURCCFG=?	<u>Response</u> +KURCCFG: (list of supported <protoopt>s),(list of supported <noti_act>s),(list of supported <indi_act>s) OK
<i>Read command</i>	
<u>Syntax</u> AT+KURCCFG?	<u>Response</u> +KURCCFG: list of supported (<protoopt>,<noti_act>,<indi_act>) OK
<i>Write command</i>	
<u>Syntax</u> AT+KURCCFG= <protoopt>, <noti_act> [,<indi_act>]	<u>Response</u> OK <u>Parameters</u> <protoopt> Protocol option to enable/disable URC "TCPC" TCP client session "TCPS" TCP server session "UDPC" UDP client session "UDPS" UDP server session "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, +KUDDP_DATA, +KUDDP_RCV, etc.) 0 Disable URC
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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.
<u>Examples</u>	To disable URC: AT+KURCCFG="TCP",0 OK Test and read command: AT+KURCCFG=? +KURCCFG: ("TCPC","TCPS","UDPC","UDPS","TCP","UDP"),(0,-1),(0-1) OK

HL7800	
	AT+KURCCFG? +KURCCFG: "TCPC",1,1 +KURCCFG: "TCPS",1,1 +KURCCFG: "UDPC",1,1 +KURCCFG: "UDPS",1,1 OK

10.8.3. +KIOPT Command: General Options Configuration

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KIOPT=?	<u>Response</u> +KIOPT: 0,<UDP>,(1-100),(8-1472),(8-1452) +KIOPT: 0,<TCP-based>,(0-100),(0,8-1460),(0,8-1440) +KIOPT: 3,(0-1),(0-1) OK
<i>Read command</i>	
<u>Syntax</u> AT+KIOPT?	<u>Response</u> +KIOPT: 0,<proto>,<wait time>,<send size v4>,<send size v6>] [...] +KIOPT: 3,<stop_on_error>,<stop_on_peer> OK
<i>Write command</i>	
<u>Syntax</u> If <option_id>=0 AT+KIOPT= <option_id>,<proto>,<wait time> [,<send size v4> [,<send size v6>]] If <option_id>=1 AT+KIOPT= <option_id> If <option_id>=2 AT+KIOPT= <option_id> If <option_id>=3 AT+KIOPT= <option_id>,<stop_on_error>,<stop_on_peer>	<u>Response</u> OK or +CME ERROR<err> <u>Parameters</u> <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 "UDPS" UDP server session "TCP" Both client and server TCP sessions "UDP" Both client and server UDP sessions

HL7800					
If<option_id>=4 AT+KIOPT= <option_id>, <ssl_ver>	<p><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</p> <p><send size v4> Data packet size for IPv4 sessions. This parameter specifies the 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)</p> <p><send size v6> Data packet size for IPv6 sessions. This parameter specifies the 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.</p> <p><stop_on_error> PDP connection deactivation behavior when a session is closed due to any error <u>0</u> Do not request to stop the connection 1 Request to stop the connection</p> <p><stop_on_peer> PDP connection deactivation behavior when a session is closed by a peer/server <u>0</u> Do not request to stop the connection 1 Request to stop the connection</p>				
Reference Sierra Wireless Proprietary	<p>Notes</p> <ul style="list-style-type: none"> 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 maximum size of data received from the AT terminal to be buffered within timeout <wait time>. When the threshold is reached or after timeout, the buffered data are sent to the socket layer for transmission. <table border="0"> <tr> <td>For UDP:</td> <td>data is sent as a UDP packet</td> </tr> <tr> <td>For TCP based protocol:</td> <td>data is copied to socket first-in-first-out buffer for transmission, but packet segmentation is not guaranteed to be <send size></td> </tr> </table> The maximum transmission unit (MTU) is 1500 bytes. <send size v4> and <send size v6> impacts the detection of <EOF pattern>. Refer to the notes of +KPATTERN for more information. 	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>
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>				

10.9. SSL Configuration

10.9.1. +KSSLCRYPTO Command: Cipher Suite Configuration

HL7800	
<i>Test command</i> <u>Syntax</u> AT+KSSLCRYPTO=?	<u>Response</u> +KSSLCRYPTO: <profile_id>,<mkey_Algo>,<auth_algo>,<enc_algo>,<mac_algo>,<tls_ver>,<auth> OK
<i>Read command</i> <u>Syntax</u> AT+KSSLCRYPTO?	<u>Response</u> +KSSLCRYPTO: <profile_id>,<mkey_algo>,<auth_algo>,<enc_algo>,<mac_algo>,<tls_ver>,<auth> [...] OK
<i>Write command</i> <u>Syntax</u> AT+KSSLCRYPTO= <profile_id>,<mkey_Algo>,<auth_algo>,<enc_algo>,<mac_algo>,<tls_ver>,<auth>	<u>Response</u> OK <u>Parameters</u> <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. 1 TLS 1.0 2 TLS 1.1 4 TLS 1.2

HL7800	
	<auth> Authentication 0 No authentication 1 Authenticate server 2 Provide client certificate to server 3 Authenticate server and provide client certificate to server
<u>Reference</u>	Sierra Wireless Proprietary

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

Table 4. 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

10.9.2. +KSSLCFG Command: SSL Configuration

HL7800																												
<i>Test command</i>																												
<u>Syntax</u> AT+KSSLCFG=?	<u>Response</u> +KSSLCFG: <option id>,<option> OK																											
<i>Read command</i>																												
<u>Syntax</u> AT+KSSLCFG?	<u>Response</u> +KSSLCFG: 0,<TLS Version> +KSSLCFG: 2,<Session Mode> OK																											
<i>Write command</i>																												
<u>Syntax</u> AT+KSSLCFG =<option id>,<option>	<u>Response</u> If <option_id> = 0: AT+KSSLCFG=<option_id>,<TLS Version> OK If <option_id> = 1: AT+KSSLCFG=<option_id>,<Random Seed> OK If <option_id> = 2: AT+KSSLCFG=<option_id>,<Session Mode> OK <u>Parameters</u> <table><tr><td><option id></td><td>0</td><td>Specify a TLS version to be used for hand shake</td></tr><tr><td></td><td>1</td><td>Setup random seed</td></tr><tr><td></td><td>2</td><td>Specify session mode</td></tr></table> <table><tr><td><TLS Version></td><td>0</td><td>Highest possible</td></tr><tr><td></td><td>1</td><td>TLS 1.0</td></tr><tr><td></td><td>3</td><td>TLS 1.2</td></tr></table> <table><tr><td><Random Seed></td><td colspan="2">String to be added into the entropy of the random number generator</td></tr></table> <table><tr><td><Session Mode></td><td>0</td><td>Automatic</td></tr><tr><td></td><td>1</td><td>Always start a new session (not supported)</td></tr></table>	<option id>	0	Specify a TLS version to be used for hand shake		1	Setup random seed		2	Specify session mode	<TLS Version>	0	Highest possible		1	TLS 1.0		3	TLS 1.2	<Random Seed>	String to be added into the entropy of the random number generator		<Session Mode>	0	Automatic		1	Always start a new session (not supported)
<option id>	0	Specify a TLS version to be used for hand shake																										
	1	Setup random seed																										
	2	Specify session mode																										
<TLS Version>	0	Highest possible																										
	1	TLS 1.0																										
	3	TLS 1.2																										
<Random Seed>	String to be added into the entropy of the random number generator																											
<Session Mode>	0	Automatic																										
	1	Always start a new session (not supported)																										

10.10. SSL Certificate Manager

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

HL7800	
<i>Test command</i> <u>Syntax</u> AT+KCERTSTORE=?	<u>Response</u> +KCERTSTORE: (list of possible <data_type>s),(range of possible lengths of <NbData>),(list of possible <index>es) OK
<i>Read command</i> <u>Syntax</u> AT+KCERTSTORE?	<u>Response</u> +KCERTSTORE: [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>
<i>Write command</i> <u>Syntax</u> AT+KCERTSTORE= <data_type> [,<NbData> [,<index>]]	<u>Response</u> CONNECT OK or +CME ERROR: <err> <u>Parameters</u> <data_type> 0 Root certificate 1 Local certificate <NbData> 1 – 3000 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

HL7800	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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.

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

HL7800	
<i>Test command</i> <u>Syntax</u> AT+KPRIVKSTORE=?	<u>Response</u> +KPRIVKSTORE: (list of possible <index>s),(range of possible lengths of <NbData>) OK
<i>Read command</i> <u>Syntax</u> AT+KPRIVKSTORE?	<u>Response</u> +KPRIVKSTORE: private_key,<index>,<NbData><CR><LF> <File_data> <CR><LF> OK or +CME ERROR: <err>
<i>Write command</i> <u>Syntax</u> AT+KPRIVKSTORE= <index> [,<NbData>]	<u>Response</u> CONNECT OK or +CME ERROR: <err> <u>Parameters</u> <index> 0 – 2 Index of the stored local certificate associated to this private key <NbData> 1 – 3000 Number of bytes to read/write (mandatory for both reading and writing) <File_data> File data in bytes

HL7800	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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.

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

HL7800	
<i>Test command</i> <u>Syntax</u> AT+KCERTDELETE=?	<u>Response</u> +KCERTDELETE: (list of possible <data_type>s),(list of possible <index>s) OK
<i>Read command</i> <u>Syntax</u> AT+KCERTDELETE?	<u>Response</u> +KCERTDELETE: OK or +CME ERROR: <err>
<i>Write command</i> <u>Syntax</u> AT+KCERTDELETE=<data_type>[,<index>]	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <data_type> 0 Root certificate 1 Local certificate <index> Stored local certificate index Value range: 0 If <data_type> = 0 0 – 2 If <data_type> = 1
<u>Reference</u>	Sierra Wireless Proprietary

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

HL7800	
<i>Test command</i> <u>Syntax</u> AT+KPRIVKDELETE=?	<u>Response</u> +KPRIVKDELETE: (list of possible <index>es) OK
<i>Write command</i> <u>Syntax</u> AT+KPRIVKDELETE=<index>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameter</u> <index> 0 – 2 Stored private key index
<u>Reference</u>	Sierra Wireless Proprietary

10.11. TCP Specific Commands

10.11.1. +KTCPCFG Command: TCP Connection Configuration

HL78xx	
<i>Test command</i> <u>Syntax</u> AT+KTCPCFG=?	<u>Response</u> +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
<i>Read command</i> <u>Syntax</u> AT+KTCPCFG?	<u>Response</u> +KTCPCFG: <session_id>,<status>,<cnx_cnf>,<mode>[,<serverID>],<tcp remote address>,<tcp_port>[,<source_port>],<data_mode>,<URC-ENDTCP-enable>,<af>,<cipher_index>[,<restore_on_boot>] [...]]

HL78xx*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

<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"
1	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

HL78xx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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 10. 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.

10.11.2. +KTCPCNX Command: Start TCP Connection

HL78xx																															
<i>Test command</i>																															
<u>Syntax</u> AT+KTCPCNX=?	<u>Response</u> +KTCPCNX: (list of possible <session_id>s) OK																														
<i>Write command</i>																															
<u>Syntax</u> AT+KTCPCNX= <session_id>	<u>Response</u> OK or +CME ERROR: <err> +KTCP_NOTIF: <session_id>, <tcp_notif> <u>Parameters</u> <session_id> TCP session index <tcp_notif> Integer type. Indicates the cause of the TCP connection failure <table> <tr><td>0</td><td>Network error</td></tr> <tr><td>1</td><td>No more sockets available; max. number already reached</td></tr> <tr><td>2</td><td>Memory problem</td></tr> <tr><td>3</td><td>DNS error</td></tr> <tr><td>4</td><td>TCP disconnection by the server or remote client</td></tr> <tr><td>5</td><td>TCP connection error</td></tr> <tr><td>6</td><td>Generic error</td></tr> <tr><td>7</td><td>Fail to accept client request's</td></tr> <tr><td>8</td><td>Data sending is OK but +KTCPSND was waiting for more or less characters</td></tr> <tr><td>9</td><td>Bad session ID</td></tr> <tr><td>10</td><td>Session is already running</td></tr> <tr><td>11</td><td>All sessions are used</td></tr> <tr><td>12</td><td>Socket connection timeout error</td></tr> <tr><td>13</td><td>SSL connection error</td></tr> <tr><td>14</td><td>SSL initialization error</td></tr> </table>	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
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																														

HL78xx	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> This command is used for connecting to a remote server or listening to a bound port, depending on the selected mode of <session_id>.

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

HL78xx	
<i>Test command</i>	
<u>Syntax</u> AT+KTCPRCV=?	<u>Response</u> +KTCPRCV: (list of possible <session_id>s),(list of possible <ndata>s) OK
<i>Write command</i> <u>Syntax</u> AT+KTCPRCV= <session_id>, <ndata>	<u>Response</u> CONNECT ...<EOF pattern> OK or +KTCP_NOTIF: <session_id>,<tcp_notif> <u>Parameters</u> <session_id> TCP session index <ndata> Number of bytes the device wants to receive (max value 4294967295) <tcp_notif> See command AT+KTCPCNX
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> • 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.

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

HL78xx	
Test command	
<u>Syntax</u> AT+KTCPSND=?	<u>Response</u> +KTCPSND: (list of possible <session_id>s),(list of possible <ndata>s) OK
Write command <u>Syntax</u> AT+KTCPSND= <session_id>, <ndata>	<u>Response</u> CONNECT OK or NO CARRIER +CME ERROR: <err> +KTCP_NOTIF: <session_id>,<tcp_notif> <u>Parameters</u> <session_id> TCP session index <ndata> Number of bytes (max value = 4294967295) <tcp_notif> See command AT+KTCPCNX
Reference Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> • 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.

10.11.5. +KTCPCLOSE Command: Close Current TCP Operation

HL78xx	
Test command	
<u>Syntax</u> AT+KTCPCLOSE =?	<u>Response</u> +KTCPCLOSE: (list of possible <session_id>s), (list of possible <closing_type>s) OK

HL78xx	
<p><i>Write command</i></p> <p><u>Syntax</u> AT+KTCPCLOSE =<session_id> [,<closing_type>]</p>	<p><u>Response</u> OK</p> <p>or</p> <p>+CME ERROR: <err> NO CARRIER +KTCP_NOTIF: <session_id>, <tcp_notif></p> <p><u>Parameters</u> <session_id> TCP session index</p> <p><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.</p> <p><tcp_notif> See AT+KTCPCNX</p>
<p><u>Reference</u> Sierra Wireless Proprietary</p>	<p><u>Notes</u></p> <ul style="list-style-type: none"> 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.

10.11.6. +KTCPDEL Command: Delete a Configured TCP Session

HL78xx	
<p><i>Test command</i></p> <p><u>Syntax</u> AT+KTCPDEL=?</p>	<p><u>Response</u> +KTCPDEL: (list of possible <session_id>s) OK</p>
<p><i>Write command</i></p> <p><u>Syntax</u> AT+KTCPDEL= <session_id></p>	<p><u>Response</u> OK</p> <p>or</p> <p>+CME ERROR: <err></p> <p><u>Parameter</u> <session_id> TCP session index</p>
<p><u>Reference</u> Sierra Wireless Proprietary</p>	<p><u>Notes</u> The session must be closed (using +KTCPCLOSE) before using this command.</p>

10.11.7. +KTCP_SRVREQ Notification: Incoming Client Connection Request

HL78xx	
<i>Unsolicited Notification</i>	<p><u>Response</u> +KTCP_SRVREQ: <session_id>,<subsession_id>,<client_ip>,<client_port></p> <p><u>Parameters</u></p> <p><session_id> TCP session index</p> <p><subsession_id> Newly created TCP session index</p> <p><client_ip> IP address string of the incoming socket</p> <p><client_port> Numeric parameter (0-65535); port of the incoming client</p>
<u>Examples</u>	<p>Configure the module to TCP servers AT+KCNXCFG=0,"GPRS","szsjmc.gd"; +KTCPCFG=0,1,,179 +KTCPCFG: 1 OK</p> <p>AT+KCNXCFG=0,"GPRS","szsjmc.gd"; +KTCPCFG=0,1,,180 +KTCPCFG: 2 OK</p> <p>Start the TCP servers AT+KTCPCNX=1 //listen on port 179 OK</p> <p>AT+KTCPCNX=2 //listen on port 180 OK</p> <p>Show the TCP servers' IP address AT+KCGPADDR +KCGPADDR: 0,"192.168.1.49" OK</p> <p>//Incoming connection request from remote client, shows ip address and port of remote //client</p> <p>+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</p> <p>+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</p> <p>+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</p> <p>+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</p>

HL78xx	
	<p>+KTCP_NOTIF: 4,4 //the connection of sub session id 4 (on listening port 180) is closed.</p> <p>+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</p>
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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 +KTCPSEND, +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.

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

HL78xx	
<i>Unsolicited Notification</i>	<p><u>Response</u> +KTCP_DATA: <session_id>,<ndata available>[,<data>]</p> <p><u>Parameters</u> <session_id> TCP session index</p> <p><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></p> <p><data> Data in octet. The length of data is specified by <ndata_available></p>
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> As soon as the connection is established, the module can receive data through the TCP socket. This notification is sent when data are available in the receive buffer. This notification is sent for each TCP packet received. When <data_mode> is set to 1, <ndata_available> will range from 1 to 1500 in the URC. If the user application sends over 1500 bytes of data to the module, the module will display those data with several URCs.

10.11.9. +KTCP_IND Notification: TCP Status

HL78xx	
<i>Unsolicited Notification</i>	<p><u>Response</u> +KTCP_IND: <session_id>,<status></p>

HL78xx	
	<u>Parameters</u> <session_id> TCP session index <status> TCP session status. 1 session is set up and ready for operation
<u>Reference</u>	Sierra Wireless Proprietary

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

HL78xx	
<i>Test command</i>	
<u>Syntax</u> AT+KTCPSTART =?	<u>Response</u> OK
<i>Read command</i>	
<u>Syntax</u> AT+KTCPSTART ?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+KTCPSTART =<session_id>	<u>Response</u> CONNECT OK or +CME ERROR: an error occurs, syntax error +KTCP_NOTIF: <session_id>,<tcp_notif> : an error occurs <u>Parameters</u> <session_id> TCP session index <tcp_notif> See AT+KTCPCNX
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> • 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.

10.12. UDP Specific Commands

10.12.1. +KUDPCFG Command: UDP Connection Configuration

HL7800	
<i>Test command</i> <u>Syntax</u> AT+KUDPCFG=?	<u>Response</u> +KUDPCFG: (list of possible <cnx cnf>s),(list of possible <mode>s),(list of possible <port>s),(list of possible <data_mode>s),<remote-name/ip>,(list of possible <udp_port>s),(list of possible <af>s),(list of possible <restore_on_boot>s) OK
<i>Read command</i> <u>Syntax</u> AT+KUDPCFG?	<u>Response</u> +KUDPCFG: <session_id>,<cnx cnf>,<mode>,<port>,<data_mode>,<udp remote address>,<udp_port>,<af>,<restore_on_boot> [...] OK
<i>Write command</i> <u>Syntax</u> AT+KUDPCFG= [<cnx cnf>], <mode>[,<port>] [, [<data_mode>] [, [<udp remote address>][,<udp_port>][,<af>][,<restore_on_boot>]]]]]]]]	<u>Response</u> +KUDPCFG: <session_id> OK or +CME ERROR: <err> +KUDP_NOTIF: <session_id>, <udp_notif> <u>Parameters</u> <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)

HL7800	
	<p><udp remote address> IP address string or explicit name of the remote host, Default is empty (given by +KUDPSND).</p> <p><udp_port> <u>0</u> – 65535 UDP peer port; given by +KUDPSND</p> <p><af> Address family used for the connection. <u>0</u> IPv4 <u>1</u> IPv6</p> <p><restore_on_boot> Restore session on boot (only for server socket) <u>0</u> Session is not restored on boot <u>1</u> Session is restored on boot</p>
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> For UDP socket in server mode, it is bound to a defined port number, incoming connection are notified by +KUDP_DATA. If remote address and port are given, they are saved for use in +KUDPSND. Maximum <session_id> is 32. +KCNXCFG configuration should be set up to start the connection properly.

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

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KUDPRCV=?	<u>Response</u> +KUDPRCV: (list of possible <session_id>s),(list of possible <ndata>s) OK
<i>Write command</i> <u>Syntax</u> AT+KUDPRCV= <session_id>,<ndata>	<u>Response</u> CONNECT ...<EOF pattern> OK +KUDP_RCV: <udp remote address>,<udp remote port>,<ndata available> or NO CARRIER +CME ERROR: <err> +KUDP_NOTIF: <session_id>,<udp_notif> +KUDP_DATA_MISSED: <session_id>,<ndata missed> <u>Parameters</u> <session_id> UDP session index <ndata> Number of bytes the device wants to receive (max value 4294967295) <udp remote address> IP address string of the remote host

HL7800	
	<p><udp remote port> 0 – 65535 Remote UDP port</p> <p><ndata available> Number of bytes to be read in first received packet</p> <p><udp_notif> See AT+KUDPCFG</p> <p><ndata missed> Number of bytes left in the UDP socket</p>
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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.

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

HL7800	
<u>Test command</u> <u>Syntax</u> AT+KUDPSND=?	<u>Response</u> +KUDPSND: (list of possible <session_id>s),<remote-name/ip>,(list of possible <udp_port>s),(list of possible <ndata>s) OK
<u>Write command</u> <u>Syntax</u> AT+KUDPSND= <session_id>, <udp remote address>, <udp_port>, <ndata>	<u>Response</u> CONNECT OK or NO CARRIER +CME ERROR: <err> +KUDP_NOTIF: <session_id>,<udp_notif> <u>Parameters</u> <session_id> UDP session index <udp remote address> IP address string or explicit name of the remote host <udp_port> 1 – 65535 UDP peer port <ndata> Number of bytes (max value 4294967295) <udp_notif> See AT+KUDPCFG

HL7800	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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.

10.12.4. +KUDPCLOSE Command: Close Current UDP Operation

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KUDPCLOSE =?	<u>Response</u> +KUDPCLOSE: (list of possible <session_id>s),(list of possible <keep_cfg>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+KUDPCLOSE =<session_id> [,<keep_cfg>]	<u>Response</u> OK or +KUDP_NOTIF: <session_id>, <udp_notif> <u>Parameters</u> <session_id> UDP session index <udp_notif> See 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
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> 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.

10.12.5. +KUDPDEL Command: Delete a Configured UDP Session

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+KUDPDEL=?	<u>Response</u> +KUDPDEL: (list of possible <session_id>s) OK
<i>Write command</i> <u>Syntax</u> AT+KUDPDEL= <session_id>	<u>Response</u> OK or +CME ERROR: <err> <u>Parameters</u> <session_id> UDP session index
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> The session must be closed (using +KUDPCLOSE) before using this command.

10.12.6. +KUDP_IND Notification: UDP Status

HL7800	
<i>Unsolicited Notification</i>	<u>Response</u> +KUDP_IND: <session_id>,<status> <u>Parameters</u> <session_id> UDP session index <status> UDP session status. 1 Session is set up and ready for operation
<u>Reference</u>	Sierra Wireless Proprietary

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

HL7800	
<i>Unsolicited Notification</i>	<u>Response</u> +KUDP_DATA: <session_id>,<ndata available>[,<udp remote address>,<udp remote port>,<data>]

HL7800	
	<p><u>Parameters</u></p> <p><session_id> UDP session index</p> <p><ndata available> Number of bytes to be read</p> <p><udp remote address> IP address string of the remote host</p> <p><udp remote port> 0 – 65535 Remote UDP port</p> <p><data> Data in octet. The length of data is specified by <ndata_available>.</p>
<p><u>Reference</u></p> <p>Sierra Wireless Proprietary</p>	<p><u>Notes</u></p> <ul style="list-style-type: none"> • 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> was set to 1, <ndata_available> will range from 1 – 1500 in the URC. If the user application sends over 1500 bytes of data to the module, the module will display those data with several URCs. It is possible for other applications (e.g. from Windows) to send more than 1472 bytes UDP packets to the module but the packet will be segmented and reassembled by the network stack. • When <data_mode> is set to 1, URC +KUDP_RCV will not be displayed after +KUDP_DATA. • When <data_mode> was set to 1, the fields <udp remote address> and <udp remote port> will be displayed in URC +KUDP_DATA. When <data_mode> was set to 0, they will be displayed in URC +KUDP_RCV.

>> 11. AVMS Commands

Note: Two IP sessions are required during an AVMS FOTA session (connection to AirVantage and FOTA upgrade). Refer to section 10.3 Session ID for session ID details.

11.1. +WDSC Command: Device Services Configuration

HL7800										
<i>Test command</i>										
<u>Syntax</u> AT+WDSC=?	<u>Response</u> +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									
<i>Read command</i>										
<u>Syntax</u> AT+WDSC?	<u>Response</u> +WDSC: 0,<State> +WDSC: 1,<State> +WDSC: 2,<State> +WDSC: 3,<State> +WDSC: 4,<Timer_1>[[,<Timer_2>]...[,<Timer_n>]] +WDSC: 5,<State> +WDSC: 6,<State> OK									
<i>Write command</i>										
<u>Syntax</u> For <Mode>= 0, 1, 2, 3, 5, 6: AT+WDSC=<Mode>,<State> For <Mode>=4: AT+WDSC=<Mode>,<Timer_1>[[,<Timer_2>]...[,<Timer_n>]]	<u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <table><tr><td><Mode></td><td>0</td><td>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</td></tr><tr><td></td><td>1</td><td>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</td></tr><tr><td></td><td>2</td><td>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</td></tr></table>	<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
<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								

HL7800	
	<p>3 Polling mode The embedded module will initiate a connection to the Device Services server according to the defined timer</p> <p>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.</p> <p>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</p> <p>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.</p> <p><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</p> <p><Timer_1> Timer between the first failed connection and the next attempt. Range = 0 – 20160 (units: min). 0 The retry mode is deactivated <u>15</u> Default value</p> <p><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>=<u>60</u> <Timer_3>=<u>240</u> <Timer_4>=<u>960</u> <Timer_5>=<u>2880</u> <Timer_6>=<u>10080</u> <Timer_7>=<u>10080</u></p>
<p><u>Reference</u> Sierra Wireless Proprietary Command</p>	<p><u>Notes</u></p> <ul style="list-style-type: none"> 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 +WDS.

HL7800	
<u>Examples</u>	<p>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) OK</p> <p>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</p> <p>AT+WDSC=0,1 OK</p> <p>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</p>

11.2. +WDS Command: Device Services Local Download

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+WDS=?	<u>Response</u> +WDS: (list of supported <Size>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+WDS=<Size>	<u>Response</u> <NACK> // User sends data OK or +CME ERROR <err>
	<u>Parameters</u> <Size> 1 – <maximum size> Package size in bytes

HL7800	
<u>Reference</u> Sierra Wireless Proprietary	<u>Notes</u> <ul style="list-style-type: none"> This command is available when the module has finished its initialization. The response to AT+WDS=<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.
<u>Examples</u>	AT+WDS=? +WDS: (1-24643584) OK AT+WDS=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)

11.3. +WDSE Command: Device Services Error

HL7800	
<i>Execute command</i> <u>Syntax</u> AT+WDSE	<u>Response</u> [+WDSE:<HTTP_Status>] OK +CME ERROR <err> <u>Parameters</u> <HTTP_Status> Integer type – Last HTTP response received by the module 100 Continue 101 Switching Protocols 200 OK 201 Created 202 Accepted 203 Non-Authoritative Information 204 No Content 205 Reset Content 206 Partial content 300 Multiple Choices 301 Moved Permanently 302 Found 303 See Other 304 Not Modified 305 Use Proxy 307 Temporary Redirect 400 Bad Request 401 Unauthorized 402 Payment Required 403 Forbidden 404 Not Found

HL7800	
	405 Method Not Allowed 406 Not Acceptable 407 Proxy Authentication Required 408 Request time-out 409 Conflict 410 Gone 411 Length Required 412 Precondition Failed 413 Request Entity too large 414 Request URI too large 415 Unsupported Media type 416 Request range unsatisfiable 417 Expectation failed 500 Internal server error 501 Not implemented 502 Bad Gateway 503 Service unavailable 504 Gateway time-out 505 HTTP version not supported If no session was made with the server, AT+WDSE only returns OK, without +WDSE: <HTTP_Status> intermediary response.
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> This command is available when the embedded module has finished the Device Services initialization (see +WDSI) and when the AVMS services are in activated state (see +WD SG).
<u>Examples</u>	AT+WDSS=1,1 //A session was made with the server OK AT+WDSE +WDSE: 200 //The last HTTP response received is "OK" OK

11.4. +WD SG Command: Device Services General Status

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+WD SG=?	<u>Response</u> OK
<i>Write command</i>	
<u>Syntax</u> AT+WD SG	<u>Response</u> +WD SG: <Indication>,<State> [+WD SG: <Indication>,<State>[...]] OK or +CME ERROR <err>

HL7800	
	<p><u>Parameters</u></p> <p><Indication> Integer type</p> <p>0 Device services activation state</p> <p>1 Session and package indication</p> <p><State> Status of indication</p> <p>For <Indication>=0</p> <p>0 Device services are prohibited. Devices services will never be activated.</p> <p>1 Device services are deactivated. Connection parameters to a device services must be provisioned.</p> <p>2 Device services have to be provisioned. NAP parameters must be provisioned.</p> <p>3 Device services are activated.</p> <p>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.</p> <p>For <Indication>=1</p> <p>0 No session or package</p> <p>1 A session is under treatment</p> <p>2 A package is available on the server.</p> <p>3 A package was downloaded and ready to install</p> <p>When a package was installed or a recovery was made, <State> is set to 0.</p>
<p><u>Reference</u></p> <p>Sierra Wireless Proprietary Command</p>	<p><u>Notes</u></p> <p>This command is available when the embedded module has finished the Device Services initialization (see +WDSI).</p>
<p><u>Examples</u></p>	<p>AT+WDSG=? OK</p> <p>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</p>

11.5. +WDSI Command: Device Services Indications

HL7800	
<p><i>Test command</i></p> <p><u>Syntax</u> AT+WDSI=?</p>	<p><u>Response</u> +WDSI: (list of supported <Level>s) OK</p>
<p><i>Read command</i></p> <p><u>Syntax</u> AT+WDSI?</p>	<p><u>Response</u> [+WDSI: <Level>] OK</p>

HL7800*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 and 23)

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)

512 Activate memory pre-emption indication (<Event> = 19)

1024 Activate User Pin request indication for bootstrap (<Event> = 20)

2048 Reserved

4096 Activate Bootstrap event indications (<Event> = 23)

<Event>	0	Device services are initialized and can be used. Device services are initialized when the SIM is registered on network and a dedicated NAP is configured.
	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 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

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- 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 module 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>=17, <Data> indicates if the fallback was asked by the user or applied because a recovery was necessary

0 Automatic recovery (a recovery mechanism was made)

1 Fallback asked by the user (see +**WDSF** for more information)

For<Event>=18, <Data> indicates the download progress in percentage

For<Event>=21, <Data> indicates the provisioned parameters

0 Reserved

1 Alarm (see +**CALA**)

2 Reserved

3 Greeting (see +**CGMI**)

4 Preferred PLMN (see +**CPOL**)

5 PDP context (see +**CGDCONT** and +**WDSS**)

6 SIM PIN code activation state (see +**CLCK**)

7 Reserved

8 GPRS class (see +**CGCLASS**)

9 Device Service Polling mode (see +**WDSC** for more information)

10 Network selection (see +**COPS** for more information)

11 Reserved

12 Retry mode (see +**WDSC** for more information (mode 4))

13 MSISDN (see +**CPBS** for more information)

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<i>Unsolicited Notification</i>	<u>Response</u> +WDSI: <Event>[,<Data>]
Reference Sierra Wireless Proprietary Command	<u>Notes</u> <ul style="list-style-type: none"> 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).
<u>Examples</u>	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

11.6. +WDSR Command: Device Services Reply

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+WDSR=?	<u>Response</u> +WDSR: (list of supported <Reply>s),(list of supported <Timer>s) OK
<i>Write command</i>	
<u>Syntax</u> AT+WDSR= <Reply> [,<Timer>]	<u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <Reply> Reply to user agreement request (see +WDSI) 0 Delay the connection to the server

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	<ol style="list-style-type: none"> 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 <p><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 = <u>30</u>.</p>
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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.
<u>Examples</u>	<p>AT+WDSR=? +WDSR: (0-9),(0-1440) OK +WDSI: 1 //The device Services server requests the device to make a connection to //the server. The user is requested to allow the connection.</p> <p>AT+WDSR=1 OK +WDSI: 3 //A user agreement is requested to install a package</p> <p>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</p> <p>AT+WDSR=4 //The install is requested OK</p>

11.7. +WDSS Command: Device Services Session

HL7800	
<i>Test command</i>	
<u>Syntax</u> AT+WDSS=?	<u>Response</u> +WDSS: 1,(list of supported <Action>s for this <Mode>) +WDSS: 2,(range of supported PDP context identifiers) OK

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<i>Read command</i>										
<u>Syntax</u> AT+WDSS?	<u>Response</u> [+WDSS: 1,<Action>] [+WDSS: 2,<Cid>] OK									
<i>Write command</i>										
<u>Syntax</u> For <mode>=1 AT+WDSS= <Mode>,<Action> For <mode>=2 AT+WDSS= <Mode>,<Cid>	<u>Response</u> OK or +CME ERROR <err> <u>Parameters</u> <table><tr><td><Mode></td><td>0</td><td>Deprecated and cannot be used anymore. Instead, use <Mode>=2 to set the profile to be used, and configure it using AT+CGDCONT.</td></tr><tr><td></td><td>1</td><td>User initiated connection to the Device Services server</td></tr><tr><td></td><td>2</td><td>PDP context identifier configurations for Device Services</td></tr></table> <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	<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
<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								
<u>Reference</u> Sierra Wireless Proprietary Command	<u>Notes</u> <ul style="list-style-type: none">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).									
<u>Examples</u>	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									

>> 12. Appendix

12.1. 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 SIM cards and networks.

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 5. Command Timeout

Chapter	Command Description	HL7800
V25TER AT Commands		
2.1	+++ Command: Switch from Data Mode to Command Mode	
2.2	O Command: Switch from Command Mode to Data Mode	
2.3	E Command: Enable Command Echo	
2.4	&K Command: Flow Control Option	
2.5	&F Command: Restore Manufactory Configuration	
2.6	&V Command: Display Current Configuration	
2.7	&W Command: Save Stored Profile	↓
2.8	Z Command: Reset and Restore User Configuration	
2.9	+IPR Command: Set Fixed Local 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	
2.13	&R Command: RTS/CTS Option	
2.14	S2 Command: Set Character for the Escape Sequence (Data to Command Mode)	
2.15	S4 Command: Set Response Formatting Character	
2.16	+IFC Command: DTE-DCE Local Flow Control	
General AT Commands		
3.1	I Command: Request Identification Information	
3.2	+CGMI/+GMI Command: Request Manufacturer Identification	
3.3	+CGMM/+GMM Command: Request Model Identification	
3.4	+CGMR/+GMR Command: Request Revision Identification	
3.5	+CGSN Command: Request Product Serial Number Identification (IMEI)	

Chapter	Command Description	HL7800
3.6	+KGSN Command: Request Product Serial Number Identification and Software Version	
3.7	+CSCS Command: Set TE Character Set	↓
3.8	+CIMI Command: Request International Subscriber Identity	
3.9	+GSN Command: Request Product Serial Number Identification (IMEI)	
3.10	+GCAP Command: Request Complete TA Capability List	
3.11	+CMUX Command: Multiplexer	
3.12	+WPPP Command: PDP Context Authentication Configuration	
3.13	+HWREV Command: Request Hardware Revision	
Call Control Commands		
4.2	+CEER Command: Extended Error Report	
4.3	+CMEE Command: Report Mobile Termination Error	↓
Mobile Equipment Control and Status Commands		
5.1	+CCLK Command: Real Time Clock	
5.2	+CCID Command: Request SIM Card Identification	
5.3	+CLAC Command: List All Available AT Commands	
5.4	+CFUN Command: Set Phone Functionality	
5.5	+CPIN Command: Enter PIN	
5.6	+CPAS Command: Phone Activity Status	
5.7	+CSQ Command: Signal Quality	
5.8	+KSREP Command: Mobile Start-Up Reporting	↓
5.9	+CSIM Command: Generic SIM Access	
5.10	+CCHO Command: Open Logical Channel	
5.11	+CCHC Command: Close Logical Channel	
5.12	+CRSM Command: SIM Restricted Access	
5.13	+CTZU Command: Automatic Time Zone Update	↓
5.14	+CTZR Command: Time Zone Reporting	↓
5.15	+CPSMS Command: Power Saving Mode setting	
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)	↓
5.21	+KGPIO Command: Hardware IO Control	↓
5.22	+KGPIOCFG Command: User GPIO Configuration	↓
5.23	+KCELL Command: Cell Environment Information	
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	
5.27	+CPWROFF Command: Power Off (when +CPWROFF=1)	
5.28	+WIMEI Command: IMEI Write and Read	↓
5.29	+KSYNC Command: Application Synchronization Signal	↓
5.30	+KCARRIERCFG Command: Set operator	↓
5.31	+KMON Command: Enable/Disable Monitor Mode	↓

Chapter	Command Description	HL7800
Network Service Related Commands		
6.2	+CPWD Command: Change Password	
6.3	+CNUM Command: Subscriber Number	
6.4	+COPN Command: Read Operator Name	
6.5	+COPS Command: Operator Selection	
6.6	+CPOL Command: Preferred PLMN List	↓
6.7	+CREG Command: Network Registration	↓
6.8	+CPLS Command: Selection of Preferred PLMN List	
6.9	+CEREG Command: EPS Network Registration Status	↓
6.10	+CEMODE Command: UE Modes of Operation for EPS	
Phone Book Management		
7.1	+CPBF Command: Find Phonebook Entries	
7.2	+CPBR Command: Read Current Phonebook Entries	
7.3	+CPBS Command: Select Phonebook Memory Storage	
7.4	+CPBW Command: Write Phonebook Entries	
SMS AT Commands		
8.2	+CMGD Command: Delete SMS Message	
8.3	+CMGF Command: Select SMS Message Format	↓
8.4	+CMGL Command: List SMS Messages from Preferred Storage	
8.5	+CMGR Command: Read SMS Message	
8.6	+CMGS Command: Send SMS Message	
8.7	+CMGW Command: Write SMS Message to Memory	
8.8	+CMSS Command: Send SMS Message from Storage	
8.9	+CNMI Command: New SMS Message Indication	↓
8.10	+CSCA Command: SMS Service Center Address	↓
8.11	+CSMP Command: Set SMS Text Mode Parameters	
8.12	+CSMS Command: Select Message Service	
8.13	+CPMS Command: Preferred Message Storage	
8.14	+CSDH Command: Show Text Mode Parameters	
8.15	+CMT Notification: Received SMSPP Content	
Packet Domain Commands		
9.1	+CGATT Command: PS Attach or Detach	
9.2	+CGACT Command: PDP Context Activate or Deactivate	
9.3	+CGCMOD Command: Modify PDP Context	
9.4	+CGTFT Command: Traffic Flow Template	
9.5	+CGDCONT Command: Define PDP Context	
9.6	+CDGSCONT Command: Define Secondary PDP Context	
9.7	+CGEREP Command: GPRS Event Reporting	↓
9.10	+CGPADDR Command: Show PDP Address	
9.11	+CGSMS Command: Select Service for MO SMS Messages	

Chapter	Command Description	HL7800
Protocol Specific Commands – Connection Configuration		
10.7.1	+KCNXCFG Command: GPRS Connection Configuration	
10.7.2	+KCNXTIMER Command: Connection Timer Configuration	
10.7.3	+KCNXPROFILE Command: Connection Current Profile Configuration	
10.7.4	+KCGPADDR Command: Show PDP Address	
10.7.5	+KCNX_IND Notification: Connection Status Notification	
10.7.6	+KCNXUP Command: Bring the PDP Connection Up	
10.7.7	+KCNXDOWN Command: Bring the PDP Connection Down	
Protocol Specific Commands – Common Configuration		
10.8.1	+KPATTERN Command: Custom End Of Data Pattern	
10.8.2	+KURCCFG Command: Enable or Disable the URC from TCP Commands	
10.8.3	+KIOPT Command: General Options Configuration	
TCP Specific Commands		
10.11.1	+KTCPCFG Command: TCP Connection Configuration	
10.11.2	+KTCPCNX Command: TCP Connection	
10.11.3	+KTCPRCV Command: Receiving Data through a TCP Connection	
10.11.4	+KTCPSEND Command: Sending Data through a TCP Connection	
10.11.5	+KTCPCLOSE Command: Closing Current TCP Operation	
10.11.6	+KTCPDEL Command: Delete a Configured TCP Session	
10.11.7	+KTCP_SRVREQ Notification: Incoming client's connection request	
10.11.8	+KTCP_DATA Notification: Incoming Data through a TCP Connection	
UDP Specific Commands		
10.12.1	+KUDPCFG Command: UDP Connection Configuration	
10.12.2	+KUDPRCV Command: Receive data through an UDP Connection	
10.12.3	+KUDPSND Command: Send data through an UDP Connection	
10.12.4	+KUDPCLOSE Command: Close current UDP operation	
10.12.5	+KUDPDEL Command: Delete a Configured UDP Session	
10.12.6	+KUDP_IND Notification: UDP Status	
10.12.7	+KUDP_DATA Notification: Incoming data through a UDP Connection	
AVMS Commands		
11.1	+WDSC Command: Device Services Configuration	
11.2	+WDS Command: Device Services Local Download	
11.3	+WDSE Command: Device Services Error	
11.4	+WDSG Command: Device Services General Status	
11.5	+WDSI Command: Device Services Indications	
11.6	+WDSR Command: Device Services Reply	
11.7	+WDSS Command: Device Services Session	

12.2. 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

12.3. Error Codes

12.3.1. CME Error Codes

<err> Code	Meaning
0	Phone failure
1	No connection to phone
2	Phone-adaptor 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
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
502	CTS Unspecified Error

<err> Code	Meaning
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 10)
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

12.3.2. CEER Error Codes

<cause>	<description>
0	No cause information available
1	Unassigned (unallocated) number
3	No route destination
6	Channel unacceptable
8	Operator determined barring
16	Normal call clearing
17	User busy
18	No user responding
19	User alerting, no answer
21	Call rejected
22	Number changed
26	Non-selected user clearing
27	Destination out of order
28	Invalid number format (incomplete number)
29	Facility rejected
30	Response to STATUS ENQUIRY
31	Normal, unspecified
34	No circuit / channel available
38	Network out of order
41	Temporary failure
42	Switching equipment congestion
43	Access information discarded
44	Requested circuit / channel not available
47	Resources unavailable, unspecified
49	Quality of service unavailable
50	Requested facility not subscribed
55	Incoming calls barred with in the CUG
57	Bearer capability not authorized
58	Bearer capability not presently available
63	Service or option not available, unspecified
65	Bearer service not implemented
68	ACM equal to or greater than AC Mmax
69	Requested facility not implemented
70	Only restricted digital information bearer capability is available
79	Service or option not implemented, unspecified
81	Invalid transaction identifier value
87	User not member of CUG
88	Incompatible destination
91	Invalid transit network selection
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented

<cause>	<description>
98	Message type not compatible with protocol state
99	Information element non-existent or not implemented
100	Conditional IE error
101	Message not compatible with protocol state
102	Recovery on timer expiry
103	Illegal MS
106	Illegal ME
107	GPRS service not allowed
111	Protocol error, unspecified
112	Location area not allowed
113	Roaming not allowed in this location area
124	MBMS bearer capabilities insufficient for the service
125	LLC or SNDSCP failure
126	Insufficient resources
127	Missing or unknown APN
128	Unknown PDP address or PDP type
129	User authentication failed
130	Activation rejected by GGSN
131	Activation reject, unspecified
132	Service not supported
133	Requested service option not subscribed
134	Service option temporarily out of order
135	NSAPI already used
136	Regular PDP context deactivation
137	QoS not accepted
138	Network failure
139	Reactivation requested
140	Feature not supported
141	Semantic error in the TFT operation
142	Syntactical error in the TFT operation
143	Unknown PDP context
144	Semantic errors in packet filter(s)
145	Syntactical errors in packet filter(s)
146	PDP context without TFT already activated
148	Unspecified GPRS error
149	PDP authentication error
152	Single address bearers only allowed
153	ESM information only allowed
154	ESM information not received
155	PDN connection does not exist
156	Collision with network-initiated request
159	Unsupported QCI value
160	Bearer handling not supported
165	Maximum number of EPS bearers reached

<cause>	<description>
166	Requested APN not supported in current RAT and PLMN combination
181	Invalid PTI value
182	APN restriction value incompatible with active EPS bearer context
183	PTI already in use
184	EPS QoS not accepted
185	Invalid EPS bearer identity
186	PTI mismatch
187	Last PDN disconnection not allowed
188	PDN type IPv4 only allowed
189	PDN type IPv6 only allowed
212	APN restriction
256	Internal unspecified
257	Out of memory
258	Invalid parameters
259	Data call active
260	Speech call active
262	Missing ACM information
263	Temporary forbidden
264	Called party is blacklisted
265	Blacklist is full
266	No service
267	Limited service
268	Client conflict
269	Dual Service call active
271	Unknown SIM error
274	Active client is gone
277	SIM status failure
278	Rejected by call control
279	FDN failed
280	BDN failed
283	CCBS possible
284	Invalid alternate service line
285	LND overview
287	MM network failure unspecified
288	MM no service
289	MM access class barred
290	MM RR no resource
291	MM ME busy
292	MM unspecified
301	MMI not registered
303	Rejected by user
304	Rejected due to time out
306	Disconnected due to SIM TK call setup
307	Pending SIM TK call setup

<cause>	<description>
310	SIM reset
340	MM sapi3 release
341	MM lower layer failure
342	MM authentication failure
343	MM PS reject
344	MM service rejected
345	MM abort by network
346	MM timeout
347	MM detach
348	MM RR connection release
349	MM not registered
350	MM reestablishment failure
351	Failure due to handover
352	Link establishment failure
353	Random access failure
354	Radio link aborted
355	Lower layer failure in Layer 1
356	Immediate assignment reject
357	Failure due to paging
358	Abnormal release unspecified
359	Abnormal release channel unacceptable
360	Abnormal release timer expired
361	Abnormal release no act on radio path
362	Preemptive release
363	UTRAN configuration unknown
364	Handover impossible
365	Channel mode unacceptable
366	Frequency not implemented
367	Originator leaving call group area
368	Lower layer failure from network
369	Call already cleared
370	Semantically incorrect message
371	Invalid mandatory info
372	Message type non-existing
373	Message type incompatible in state
374	Conditional information element error
375	No cell allocation available
376	Protocol error unspecified
377	Normal event
378	Unspecified
379	Preemptive release
380	Congestion
381	RE establishment reject
382	Directed sig conn establishment

<cause>	<description>
383	User inactivity
384	Lower layer failure downlink
385	Lower layer failure uplink
386	Cell barred due to authentication failure
387	Signalling connection release
388	CS connection release triggered by MM
389	RRC connection establishment failure
390	RRC connection establishment re-ject with redirection
391	Resource conflict
392	Layer 2 sequence error
393	Layer 2 T200 exp N200 plus 1 times
394	Layer 2 unsolicited DM resp MFES
395	Layer 2 contention resolution
396	Layer 2 normal cause
397	RR connection release due to BAND change (2G)
400	MM RR connection error while release
500	User disconnected
510	Remote user / NW disconnected for call status rather than call proceeding
511	Remote user / NW disconnected for call status is call proceeding
512	Request rejected, BCM violation

12.3.2.1. SS Error Codes

12.3.2.1.1. SS Network Error Cause

According to 3GPP 24.008, section 4.5 except for internal errors 0 and 255.

<cause>	<description>
0	MN_MS_INT_SS_ERROR - This is used when the SS operation was unsuccessful due to an MS internal reason
255	MN_MS_INT_SS_TIME_OUT - This is used when the SS operation was unsuccessful due to a missing answer from the network
1	MN_UNKNOWN_SUBSCRIBER
9	MN_ILLEGAL_SUBSCRIBER
10	MN_BEARER_SERVICE_NOT_
11	MN_TELESERVICE_NOT_PROVISIONED
12	MN_ILLEGAL_EQUIPMENT
13	SYNONYM MN_CALL_BARRED
16	MN_ILLEGAL_SS_OPERATION
17	MN_SS_ERROR_STATUS
18	MN_SS_NOT_AVAILABLE
19	MN_SS_SUBSCRIPTION_VIOLATION
20	MN_SS_INCOMPATIBILITY

<cause>	<description>
21	MN_FACILITY_NOT_SUPPORTED
27	MN_ABSENT_SUBSCRIBER
29	MN_SHORT_TERM_DENIAL
30	MN_LONG_TERM_DENIAL
34	MN_SYSTEM_FAILURE
35	MN_DATA_MISSING
36	MN_UNEXPECTED_DATA_VALUE
37	MN_PW_REGISTRATION_FAILURE
38	MN_NEGATIVE_PW_CHECK
43	MN_NUMBER_OF_PW_ATTEMPTS_VIOLATION
54	MN_POS_METHOD_FAILURE
71	MN_UNKNOWN_ALPHABET
72	MN_USSD_BUSY
121	MN_REJECTED_BY_USER
122	MN_REJECTED_BY_NETWORK
123	MN_DEFLECTION_TO_SERVER_SUBSCRIBED
124	MN_SPECIAL_SERVICE_CODE
125	MN_INVALID_DEFLECTED_NUMBER
126	MN_MAX_NUMBER_OF_MPTY_PARTICIPANTS_EXCEEDED
127	MN_RESOURCES_NOT_AVAILABLE

12.3.2.1.2. SS Network GSM Cause

According to 3GPP 24.008, section 10.5.4.11 "Cause". All values greater than 255 are internal values.

<cause>	<description>
1	MN_UNASSIGNED_NUMBER
3	MN_NO_ROUTE
6	MN_CHANNEL_UNACCEPTABLE
8	MN_OPERATOR_BARRING
16	MN_NORMAL_CALL_CLEARING
17	MN_USER_BUSY
18	MN_NO_USER_RESPONDING
19	MN_USER_ALERTING_NO_ANSWER
21	MN_CALL_REJECTED
22	MN_NUMBER_CHANGED
26	MN_NON_SELECTED_USER_CLEARING
27	MN_DESTINATION_OUT_OF_ORDER
28	MN_INVALID_NUMBER_FORMAT
29	MN_FACILITY_REJECTED
30	MN_RESPONSE_TO_STATUS_ENQUIRY
31	MN_NORMAL_UNSPECIFIED
34	MN_NO_CIRCUIT_AVAILABLE

<cause>	<description>
38	MN_NETWORK_OUT_OF_ORDER
41	MN_TEMPORARY_FAILURE
42	MN_SWITCH_CONGESTION
43	MN_ACCESS_INFORMATION_DISCARDED
44	MN_REQUESTED_CIRCUIT_NOT_AVAILABLE
47	MN_RESOURCES_UNAVAILABLE
49	MN_QUALITY_UNAVAILABLE
50	MN_FACILITY_NOT_SUBSCRIBED
55	MN_INCOMING_CALLS_BARRED_IN_CUG
57	MN_BEARER_CAPABILITY_NOT_ALLOWED
58	MN_BEARER_CAPABILITY_NOT_AVAILABLE
63	MN_SERVICE_NOT_AVAILABLE
65	MN_BEARER_SERVICE_NOT_IMPLEMENTED
68	MN_ACM_GREATER_OR_EQUAL_TO_ACM_MAX
69	MN_FACILITY_NOT_IMPLEMENTED
70	MN_ONLY_RESTRICTED_DIGITAL
79	MN_SERVICE_NOT_IMPLEMENTED
81	MN_INVALID_TI
87	MN_USER_NOT_IN_CUG
88	MN_INCOMPATIBLE_DESTINATION
91	MN_INVALID_TRANSIT_NETWORK
95	MN_SEMANTICS_INCORRECT
96	MN_INVALID_MANDATORY_INFORMATION
97	MN_UNKNOWN_MESSAGE_TYPE_1
98	MN_UNEXPECTED_MESSAGE_TYPE
99	MN_UNEXPECTED_IE
100	MN_CONDITIONAL_IE_ERROR
101	MN_UNKNOWN_MESSAGE_TYPE_2
102	MN_RECOVERY_ON_TIMER_EXPIRY
111	MN_PROTOCOL_ERROR
127	MN_INTERWORKING
256	MN_VOID_CAUSE
257	MN_OUT_OF_MEMORY
258	MN_INVALID_PARAM
259	MN_DATA_CALL_ACTIVE
260	MN_SPEECH_CALL_ACTIVE
261	MN_DTMF_REJECTED_DURING_MO_CALL_SETUP
262	MN_MOC_SETUP_REJ_DUE_TO_MISSING_ACM_INFO_IND
263	MN_TEMPORARY_FORBIDDEN_CALL_ATTEMPT
264	MN_CALLED_PARTY_IS_BLACKLISTED
265	MN_BLACKLIST_IS_FULL_NO_AUTO_CALL_ATTEMPTS
266	MN_TEMPORARY_FORBIDDEN_CALL_ATTEMPT_NO_SERVICE
267	MN_TEMPORARY_FORBIDDEN_CALL_ATTEMPT_LIMITED_SERVICE
268	MN_CLIENT_TEMPORARY_BARRED

<cause>	<description>
269	MN_DUAL_SERVICE_CALL_ACTIVE
270	MN_ATC_FCLASS_NOT_SPEECH
271	MN_SI_UNKNOWN_ERROR
272	MN_DTMF_REJECTED_DUE_TO_CALL_HELD_OR_MPARTY
273	MN_CLIENT_NOT_REGISTERED
274	MN_ACTIVE_CLIENT_GONE
275	MN_DTMF_REJECTED_DUE_TO_DATA_TRANSMISSION
276	MN_NO_APPROPRIATE_DTMF_ENTRY
277	MN_SIM_STATUS_FAILURE
278	MN_REJ_BY_CALL_CONTROL
279	MN_FDN_FAILED
280	MN_BDN_FAILED
281	MN_ONLY_ERROR
282	MN_NOT_IN_SPEECH_CALL
283	MN_CCBS_POSSIBLE
283	MN_INVALID_ALS_LINE
284	MN_INVALID_ALS_LINE
285	MN_LND_OVERFLOW
286	MN_DTMF_REJECTED_NO_TCH_AVAILABLE
287	MN_NW_FAILURE_UNSPECIFIED
288	MN_MS_NO_SERVICE
289	MN_MS_ACCESS_CLASS_BARRED
290	MN_MS_NO_RESOURCE
291	MN_MS_SERVICE_BUSY
292	MN_MS_FAILURE_UNSPECIFIED
293	MN_DTMF_REJECTED_DUE_TO_SUP_TIMER_EXPIRY
300	MN_SIMTK_SETUP_MODE_NOT_SUPPORTED
301	MN_MMI_NOT_REGISTERED
302	MN_SIMTK_SETUP_REJ_DUE_TO_MISSING_ACM_INFO_IND
303	MN_SIMTK_SETUP_REJECTED_BY_THE_USER
304	MN_SIMTK_SETUP_REJECTED_TIME_OUT
305	MN_SIMTK_CALL_CONNECTED
306	MN_DISCONNECT_DUE_TO_SIMTK_SETUP
307	MN_SIMTK_SETUP_REJ_DUE_TO_PENDING_SIMTK_SETUP
308	MN_SIMTK_CALL_CONNECTED_NO_ICON_DISPLAY
309	MN_PENDING_SIMTK_SETUP
310	MN_SIMTK_SIM_RESET
311	MN_SIMTK_DTMF_TRANSMITTED
312	MN_SIMTK_DTMF_TRANSMITTED_NO_ICON_DISPLAY
313	MN_USER_DID_NOT_ACCEPT_CALL_SETUP
314	MN_PROACTIVE_SIM_APPL_TERMINATED_BY_USER
315	MN_SIMTK_ME_UNABLE_SCREEN_BUSY
316	MN_SIMTK_ME_UNABLE_NO_SPECIFIC_CAUSE
317	MN_SIMTK_UNSPECIFIED

<cause>	<description>
318	MN_SETUP_SS_ERR
319	MN_SIMTK_NET_UNABLE_NO_SPECIFIC_CAUSE
320	MN_SIMTK_USSD_TRANSACTION_TERMINATED_BY_USER
330	MN_PHONEBOOK_NOT_AVAILABLE
331	MN_ATC_NO_MATCHING_PHONEBOOK_ENTRY
332	MN_ATC_INVALID_DIALED_NUMBER
333	MN_ATC_SETUP_TEMPORARY_BLOCKED
334	MN_ATC_NO_PERMISSION
335	MN_ATC_INVALID_CALL_SETTINGS
336	MN_ATC_BLOCKING_CALL_PRESENT

12.3.2.1.3. SS Network Reject Cause

According to 3GPP 24.080, 3.6.7, table 3.13.

Table 6. Tag 128 MN_GENERAL_PROBLEM with Causes

From 3GPP 24.008, table 3.14.

<cause>	<description>
0	MN_UNRECOGNIZED_COMPONENT
1	MN_MISTYPED_COMPONENT
2	MN_BADLY_STRUCTURED_COMPONENT

Table 7. Tag 129 MN_INVOKE_PROBLEM with Causes

From 3GPP 24.008, table 3.15.

<cause>	<description>
0	MN_DUPLICATE_INVOKE_ID
1	MN_UNRECOGNIZED_OPERATION
2	MN_MISTYPED_PRO_PARAMETER
3	MN_RESOURCE_LIMITATION
4	MN_INITIATING_RELEASE
5	MN_UNRECOGNIZED_LINKED_ID
6	MN_LINKED_RESPONSE_UNEXPECTED
7	MN_UNEXPECTED_LINKED_OPERATION
130	MN_RETURN_RESULT_PROBLEM

Table 8. Tag 130 MN_RETURN_RESULT_PROBLEM with Causes

From 3GPP 24.008, table 3.16.

<cause>	<description>
0	MN_UNRECOGNIZED_INVOKE_ID
1	MN_RETURN_RESULT_UNEXPECTED

<cause>	<description>
2	MN_MISTYPED_RES_PARAMETER

Table 9. Tag 131 MN_RETURN_ERROR_PROBLEM with Causes

<cause>	<description>
0	MN_UNRECOGNIZED_ERROR_INVOKE_ID
1	MN_RETURN_ERROR_UNEXPECTED
2	MN_UNRECOGNIZED_ERROR
3	MN_UNEXPECTED_ERROR
4	MN_MISTYPED_ERROR_PARAMETER

12.3.3. 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
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

<err> Code	Meaning
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
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

12.3.4. 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.

12.4. How to Use TCP Commands

12.4.1. Client Mode

AT&K3 OK AT+KCNXCFG=1,"GPRS","APN","log","password","IPV4","0.0.0.0","0.0.0.0","0.0.0.0" OK AT+KTCPCFG=1,0,"www.google.com",80 +KTCPCFG: 1 OK AT+KTCPCNX=1 OK AT+KTCPSND=1,18 CONNECT ...Data send... OK +KTCP_DATA: 1,1380	Hardware flow control activation Set GPRS parameters (APN, login, password) Set IP address and port number Returns session ID Initiate the connection Send data with KPATTERN string at the end. e.g. "GET / HTTP/1.0" --EOF--Pattern--"
---	--

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

12.4.2. 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 AT+KTCPSND=2,15 CONNECT ...Date and time... OK	A client requests a connection (subsession 2) Data is sent to the client read (based on subsession 2)
+KTCP_SRVREQ: 1,3 +KTCP_NOTIF: 2, 4 AT+KTCPSND=3,15 CONNECT ...Date and time... OK	Another client requests a connection (subsession 3); child mode for session 3 Client (subsession 2) closes the connection
+KTCP_DATA: 3,6 AT+KTCPCRCV=3,6 CONNECT ... Data... --EOF--Pattern-- OK	Data received from client (subsession 3) 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

12.5. How to Use UDP Specific Commands

12.5.1. Client Mode

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password",,, OK	Set GPRS parameters (APN, login, password)
AT+KUDPCFG=1,0	Create a new UDP socket (returned session 1) with the parameters associated to the connection profile id number 0

+KUDPCFG: 1 OK AT+KUDPSND= 1,"82.234.17.52",32,18 CONNECT ...Data sent... --EOF--Pattern-- OK +KUDP_DATA: 1,35 AT+KUDPRCV=1, 35 CONNECT This is a simple UDP Protocol test -EOF--Pattern-- OK +KUDP_RCV: "82.234.17.52",32 +KUDP_DATA: 1,35 AT+KUDPRCV=1, 16 CONNECT This is a simple -EOF--Pattern-- OK +KUDP_DATA_MISSED: 1,19 AT+KUDPCLOSE=1 OK AT+KUDPCFG? OK	Send UDP data after "CONNECT" Received notification that indicates the presence of 35 bytes in the socket Try to read 35 bytes from session 1 Received notification that indicates the presence of 35 bytes in the socket Same test but try to read 16 bytes from session 1 There are 19 unread bytes left and missed in the UDP socket Definitely close the UDP session and at the same time session is deleted No sessions are available now
--	---

12.5.2. 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

<pre>AT+KCNXCFG=1,"GPRS","CMNET" OK AT+KTCPCFG=1,0,"202.170.131.76",2000 +KTCPCFG: 1 OK AT+KTCPCNX=1 OK +KTCP_DATA: 1,10</pre>	<p>Connect to TCP server</p> <p>URC tells us that 10 bytes arrived</p>
--	--

AT+KTCPRCV=1,10 CONNECT 0123456789--EOF--Pattern-- OK	Use KTCPRCV command to receive those 10 bytes
AT+KUDPCFG=0,0 +KUDPCFG: 2 OK +KUDP_DATA: 2,8	Open a UDP socket 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 +KTCPCFG: 1 OK	Extend a parameter for the new feature When setting to 1, data will be received by the URC "+KTCP_DATA:"
AT+KTCPCNX=1 OK	Connect to TCP server
+KTCP_DATA: 1,10,0123456789	10 bytes arrived. The URC takes them out directly
AT+KUDPCFG=0,0,3000,1 +KUDPCFG: 2 OK	Extend a parameter for the new feature When setting to 1, data will be received by the URC "+KUDP_DATA:"
+KUDP_DATA: 2,8,"202.170.131.76",2001,01234567	8 bytes arrived. The URC takes them out directly