AirPrime HL7528

AT Commands Interface Guide

SIERRA WIRELESS®

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Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless modem are used in a normal manner with a well-constructed network, the Sierra Wireless modem should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless modem, or for failure of the Sierra Wireless modem to transmit or receive such data.

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1.0	September 17, 2015	Creation
1.1	September 21, 2015	Updated: • 5.4 +CFUN Command: Set Phone Functionality • 5.37 +HBHV Command: Configure General System Behavior • 15.2.1 *SKT*DBG Command: Debug Message for SKT • 15.3.1 KTDBUG Command: Debug Message for KT • 15.4.10 $LGTLOCALADDR Command: Read Modem IP Address • 15.4.15 $LGTTCPOP Command: Connect TCP Session • 15.4.18 $LGTTCPCL Command: Close Current TCP Connection • 15.4.22 $LGTISNULL Command: USIM Status • 15.4.23 $LGTOTA_STATUS Command: OTA Status
2.0	October 29, 2015	Updated: • 2.13 IPR Command: Set Fixed Local/DTE Rate • 2.17 &V Command: Display Current Configuration • 5.12 +CSQ Command: Signal Quality • 5.14 +KSYNC Command: Application Synchronization Signal • 5.39 +XCSQ Command: Radio Signal Strength and Quality with URC Support • 10.7 *PSSTKI Command: SIM ToolKit Interface Configuration • 11.7.1 +KCNXCFG Command: GPRS Connection Configuration • 15.2.1 *SKT*DBG Command: Debug Message for SKT • 15.2.2 *SKT*SYSINFO Command: Current System Information for SKT • 15.3.1 KTDBUG Command: Debug Message for KT • 15.3.2 KTSYSINFO Command: Current System Information for KT • 15.4.13 $LGTLTESTATE Command: Read LTE Quality • 15.4.26 $LGTDBG Command: Debug Message for LGU+ • 15.4.27 $LGTSYSINFO Command: System Information for LG U+
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Contents

1. INTRODUCTION 17

1.1. Reference Configuration 17

1.2. AT Command Principles 17

1.2.1. Parameters 18

1.2.2. Answers and Responses 18

1.2.3. Multiple AT Commands on the Same Command Line 18

1.2.4. AT Commands on Separate Lines 18

1.3. Unsolicited Result Codes (URCs) 19

1.4. Document Modification 19

1.5. Abbreviations 19

2. V25TER AT COMMANDS 23

2.1. +++ Command: Switch from Data Mode to Command Mode 23

2.2. A/ Command: Repeat Previous Command Line 23

2.3. O Command: Switch from Command Mode to Data Mode 23

2.4. E Command: Enable Echo Command 24

2.5. Q Command: Set Result Code Presentation Mode 24

2.6. S0 Command: Set Number of Rings before Automatic Call Answering 25

2.7. S4 Command: Set Response Formatting Character 25

2.8. S7 Command: Set Delay for Connection Completion 26

2.9. V Command: TA Response Format 26

2.10. &C Command: Set Data Carrier Detect (DCD) Function Mode 27

2.11. &D Command: Set Data Terminal Ready (DTR) Function Mode 27

2.12. &F Command: Restore Factory Settings 27

2.13. IPR Command: Set Fixed Local/DTE Rate 28

2.14. L Command: Monitor Speaker Loudness 29

2.15. M Command: Monitor Speaker Mode 29

2.16. &W Command: Save Stored Profile 29

2.17. &V Command: Display Current Configuration 30

2.18. &K Command: Flow Control Option 30

2.19. &S Command: DSR Option 31

3. GENERAL AT COMMANDS 32

3.1. I Command: Request Identification Information 32

3.2. Z Command: Reset and Restore User Configuration 35

3.3. +CGMI Command: Request Manufacturer Identification 35

3.4. +CGMM Command: Request Model Identification 35

3.5. +CGMR Command: Request Revision Identification 36

3.6. +CGSN Command: Request Product Serial Number Identification (IMEI) 36

3.7. +KGSN Command: Request Product Serial Number and Software Version 37
3.8. +HWREV Command: Request Hardware Revision 38
3.9. +CSCS Command: Set TE Character Set 39
3.10. +CIMI Command: Request International Mobile Subscriber Identity 40
3.11. +GMI Command: Request Manufacturer Identification 40
3.12. +GMM Command: Request Model Identification 41
3.13. +GMR Command: Request Revision Identification 41
3.14. +GSN Command: Request Product Serial Number (IMEI) 42
3.15. +GCAP Command: Request Complete TA Capability List 42
3.16. +CALD Command: Delete Alarm 42
3.17. +CALA Command: Set Alarm Time 43
3.18. +WIMEI Command: IMEI Write and Read 44

4. CALL CONTROL COMMANDS 46

4.1. H Command: Hook Control 46
4.2. D Command: Dial Number 46

5. MOBILE EQUIPMENT CONTROL AND STATUS COMMANDS 47

5.1. +CCLK Command: Real Time Clock 47
5.2. +CLAC Command: List Available AT Commands 47
5.3. +GST Command: General System Status Information 48
5.4. +CFUN Command: Set Phone Functionality 49
5.5. +CMER Command: Mobile Equipment Event Reporting 50
5.6. +CMEE Command: Report Mobile Termination Error 51
5.7. +CCID Command: Request SIM Card Identification 51
5.8. +FMR Command: Request Revision Identification 52
5.9. +CPIN Command: Enter Pin 52
5.10. *PSRDBS Command: Change Frequency Band 54
5.11. +CPAS Command: Phone Activity Status 54
5.12. +CSQ Command: Signal Quality 55
5.13. +KCELL Command: Cell Environment Information 56
5.14. +KSYNC Command: Application Synchronization Signal 57
5.15. +KGPIO Command: Hardware IO Control 58
5.16. +KGPIOCFG Command: GPIO Configuration 60
5.17. +KADC Command: Analog Digital Converter 62
5.18. +CSIM Command: Generic SIM Access 63
5.19. +CLAN Command: Read Language 63
5.20. +CCHO Command: Open Logical Channel 64
5.21. +CCHC Command: Close Logical Channel 64
5.22. +CGLA Command: Generic UICC Logical Channel Access 65
5.23. +CRLA Command: Restricted UICC Logical Channel Access 65

5.24. +CUAD Command: UICC Application Discovery 66
5.25. +CRSM Command: Restricted SIM Access 67
5.26. +CEAP Command: EAP Authentication 69
5.27. +CERP Command: EAP Retrieve Parameters 69
5.28. +KTEMPMON Command: Temperature Monitor 70
5.29. +KBND Command: Current Networks Band Indicator 71
5.30. +KSRAT Command: Set Radio Access Technology 72
5.31. +CTZU Command: Automatic Time Zone Update 72
5.32. +CTZR Command: Time Zone Reporting 73
5.33. +XDATACHANNEL Command: Configure Data Channel 74
5.34. +XCELLINFO Command: Provide Cell Information 75
5.35. +KCCINFO Command: Camped Cell Information 76
5.36. +KSLEEP Command: Power Management Control for UART 77
5.37. +HBHV Command: Configure General System Behavior 78
5.38. +CESQ Command: Extended Signal Quality 79
5.39. +XCSQ Command: Radio Signal Strength and Quality with URC Support 81
5.40. +XCESQ Command: Extended Signal Quality with URC Support 82
5.41. +KSREP Command: Mobile Start-up Reporting 84
5.42. +KSIMDET Command: SIM Detection 87
5.43. +KRIC Command: Ring Indicator Control 88
5.44. +KUSBCOMP Command: Set USB Composition 90
5.45. +XPINCNT Command: Get Remaining SIM PIN Attempts 91
5.46. +KGSMAD Command: GSM, UMTS and LTE Antenna Detection 91

6. NETWORK SERVICE RELATED COMMANDS 93

6.1. +CAOC Command: Advice of Charge 93
6.2. +CUSD Command: Unstructured Supplementary Service Data 93
6.3. +CLCK Command: Facility Lock 94
6.4. +CNUM Command: Subscriber Number 96
6.5. +COLP Command: Connected Line Identification Presentation 96
6.6. +COPN Command: Read Operator Name 97
6.7. +COPS Command: Operator Selection 98
6.8. +CPOL Command: Preferred PLMN List 99
6.9. +CPWD Command: Change Password 100
6.10. +CREG Command: Network Registration 101
6.11. +CSSN Command: Supplementary Service Notification 102
6.12. +CPLS Command: Select Preferred PLMN List 103
6.13. +CEREG Command: EPS Network Registration Status 104
6.14. +CEMODE Command: UE Modes of Operation for EPS 105
6.15. +WEXTCLK Command: External Clocks Setting 105

7. PHONE BOOK MANAGEMENT 107
7.1. +PBREADY URC: Phonebook Ready 107
8. SMS COMMANDS 108
8.1. Parameters Definition 108
8.1.1. Message Storage Parameters 108
8.1.2. Message Data Parameters 109
8.2. +CMGD Command: Delete Message 110
8.3. +CMGF Command: Set Message Format 111
8.4. +CMGL Command: List Messages 112
8.5. +CMGR Command: Read Message 112
8.6. +CMGS Command: Send Message 113
8.7. +CMGW Command: Write Message to Memory 114
8.8. +CMSS Command: Send Message from Storage 115
8.9. +CNMI Command: New Message Indication 115
8.10. +CSCB Command: Select Cell Broadcast Message Type 117
8.11. +CSCA Command: Service Center Address 117
8.12. +CSMP Command: Set Text Mode Parameters 118
8.13. +CSMS Command: Select Message Service 118
8.14. +CPMS Command: Preferred Message Storage 119
8.15. +CSDH Command: Show Text Mode Parameters 120
9. PACKET DOMAIN COMMANDS 121
9.1. +CGATT Command: PS Attach or Detach 121
9.2. +CGACT Command: Activate or Deactivate PDP Context 121
9.3. +CGANS Command: PDP Context Activation Manual Response 122
9.4. +CGCMOD Command: Modify PDP Context 123
9.5. +CGTFT Command: Traffic Flow Template 123
9.6. +CGDCONT Command: Define PDP Context 125
9.7. +CGDSCONT Command: Define Secondary PDP Context 127
9.8. +CGDATA Command: Enter Data State 128
9.9. +CGEREP Command: Packet Domain Event Reporting 129
9.10. +CGAUTO Command: Automatic Response 130
9.11. +CGPADDR Command: Show PDP Address 131
9.12. +CGQMIN Command: Quality of Service Profile (Minimum) 132
9.13. +CGEQMIN Command: 3G Quality of Service Profile (Minimum) 133
9.14. +CGQREQ Command: Request Quality of Service Profile 135
9.15. +CGEQREQ Command: 3G Request Quality of Service Profile 136
9.16. +CGEQNEG Command: 3G Negotiated Quality of Service Profile 138
9.17. +CGREG Command: GPRS Network Registration Status 139
9.18. +CGSMS Command: Select Service for MO SMS Messages 140

9.19. +CRLP Command: Select Radio Link Protocol 141
9.20. +XDNS Command: Dynamic DNS Request 141
9.21. +CGPIAF Command: Printing IP Address Format 142
9.22. +WPPP Command: PDP Context Authentication Configuration 143
10. SIM APPLICATION TOOLKIT AT COMMANDS 145
10.1. +STKPRO Command: Display List of Supported Proactive Commands 145
10.2. +STKTR Command: Enter Response 148
10.3. +STKENV Command: Send a SIM APPL TK Envelope Command 151
10.4. +STKPROF Command: Terminal Profile Data 152
10.5. +STKCC Notification: SIM – APPL – TK Call Control 152
10.6. +STKCNF Notification: SIM – APPL – TK Proactive Session Status 153
10.7. *PSSTKI Command: SIM ToolKit Interface Configuration 153
11. PROTOCOL SPECIFIC COMMANDS 157
11.1. Preliminary Comments 157
11.2. IP Address Format in AT Commands 157
11.3. Session ID 157
11.4. Connection of PDP Contexts 157
11.5. Buffer Length of AT Commands 157
11.6. Parameter Format of AT Commands 158
11.7. Connection Configuration 158
11.7.1. +KCNXCFG Command: GPRS Connection Configuration 158
11.7.2. +KCNXTIMER Command: Connection Timer Configuration 159
11.7.3. +KCNXPROFILE Command: Current Profile Connection Configuration 160
11.7.4. +KCGPADDR Command: Display PDP Address 161
11.7.5. +KCNX_IND Notification: Connection Status 162
11.7.6. +KCNXUP Command: Bring up the PDP Connection 162
11.7.7. +KCNXDOWN Command: Bring Down the PDP Connection 163
11.8. Common Configuration 164
11.8.1. +KPATTERN Command: Custom End of Data Pattern 164
11.8.2. +KURCCFG Command: Enable or Disable the URC from TCP Commands 165
11.8.3. +KIPOPT Command: General Options Configuration 166
11.9. TCP Specific Commands 168
11.9.1. +KTCPCFG Command: TCP Connection Configuration 168
11.9.2. +KTCPCNX Command: TCP Start Connection 170
11.9.3. +KTCPRCV Command: Receive Data through a TCP Connection 170
11.9.4. +KTCPSND Command: Send Data through a TCP Connection 171
11.9.5. +KTCPCLOSE Command: Close Current TCP Operation 172
11.9.6. +KTCPDEL Command: Delete a Configured TCP Session 173
11.9.7. +KTCP_SRVREQ Notification: Incoming Client Connection Request 173
11.9.8. +KTCP_DATA Notification: Incoming Data through a TCP Connection 175
11.9.9. +KTCP_IND_CFG Command: TCP Status Configuration 175
11.9.10. +KTCP_IND Notification: TCP Status 176
11.9.11. +KTCPSTAT Command: Get TCP Socket Status 176

11.9.12. +KTCPSTART Command: Start a TCP Connection in Direct Data Flow 177
11.9.13. +KTCP_ACK Notification: Status Report for Latest TCP Data 178
11.9.14. +KTCPACKINFO Command: Poll ACK Status for the Latest Data 178
11.10. UDP Specific Commands 179
11.10.1. +KUDPCFG Command: UDP Connection Configuration 179
11.10.2. +KUDPRCV Command: Receive Data through a UDP Connection 181
11.10.3. +KUDPSND Command: Send Data through a UDP Connection 182
11.10.4. +KUDPCLOSE Command: Close Current UDP Operation 183
11.10.5. +KUDPDEL Command: Delete a Configured UDP Session 183
11.10.6. +KUDP_IND Notification: UDP Status 184
11.10.7. +KUDP_DATA Notification: Incoming Data through a UDP Connection 184
11.11. FTP Client Specific Commands 185
11.11.1. +KFTPCFG Command: FTP Configuration 185
11.11.2. +KFTPCNX Command: FTP Start Connection 186
11.11.3. +KFTPRCV Command: Receive FTP Files 187
11.11.4. +KFTPSND Command: Send FTP Files 188
11.11.5. +KFTPDEL Command: Delete FTP Files 189
11.11.6. +KFTP_IND Notification: FTP Status 190
11.11.7. +KFTPCLOSE Command: Close Current FTP Connection 190
11.11.8. +KFTPCFGDEL Command: Delete a Configured FTP Session 191
11.12. HTTP Client Specific Commands 191
11.12.1. +KHTTPCFG Command: HTTP Connection Configuration 191
11.12.2. +KHTTPCNX Command: HTTP Start Connection 193
11.12.3. +KHTTPHEADER Command: Set the HTTP Request Header 193
11.12.4. +KHTTPGET Command: Perform HTTP GET 194
11.12.5. +KHTTPHEAD Command: Retrieve HTTP Headers 195
11.12.6. +KHTTPPOST Command: Perform HTTP POST 195
11.12.7. +KHTTPCLOSE Command: Close HTTP Connection 196
11.12.8. +KHTTPDEL Command: Delete a Configured HTTP Session 197
11.12.9. +KHTTP_IND Notification: HTTP Status 197
11.13. HTTPS Client Specific Commands 198
11.13.1. +KHTTPSCFG Command: HTTPS Connection Configuration 198
11.13.2. +KHTTPSCNX Command: HTTPS Start Connection 200
11.13.3. +KHTTPSHEADER Command: Set the HTTPS Request Header 200
11.13.4. +KHTTPSGET Command: Perform HTTPS GET 201
11.13.5. +KHTTPSHEAD Command: Retrieve HTTP Headers 202
11.13.6. +KHTTPSPOST Command: Perform HTTPS POST 202
11.13.7. +KHTTPSCLOSE Command: Close HTTPS Connection 203
11.13.8. +KHTTPSDEL Command: Delete a Configured HTTPS Session 204
11.13.9. +KHTTPS_IND Notification: HTTPS Status 204
11.14. SSL Certificate Manager 205
11.14.1. +KCERTSTORE Command: Store Root CA and Local Certificates to Internal Storage 205
11.14.2. +KPRIVKSTORE Command: Store Private Key Associated to a Local Certificate 206
11.14.3. +KCERTDELETE Command: Delete Local Certificate from the Index 207
11.14.4. +KPRIVKDELETE Command: Delete Private Key from the Index 207

12. AVMS COMMANDS 209
12.1. +WDSA Command: Change Account for DM Connection 209
12.2. +WDSC Command: Device Services Configuration 210
12.3. +WDSD Command: Device Services Local Download 212
12.4. +WDSE Command: Device Services Error 213
12.5. +WDSF Command: Device Services Fallback 214
12.6. +WDSG Command: Device Services General Status 215
12.7. +WDSI Command: Device Services Indication 216
12.8. +WDSR Command: Device Services Reply 219
12.9. +WDSS Command: Device Services Session 220
12.10. +WDSM Command: Manage Device Services 221
13. TEST COMMANDS 223
13.1. +WMTXPOWER Command: Test RF Tx 223
13.2. +WMRXPOWER Command: Test RF Rx 224
13.3. +WMANTSEL Command: Select Main/Diversity Antenna 225
14. NV RELATED COMMANDS 227
14.1. Auto Generation of NV Backup Files 227
14.2. Auto Recovery from Backup NV Files 227
14.3. +NVBU Command: NV Backup Status and Control 228
14.4. +NVBU_IND: NV Backup Status Notification 230
15. CARRIER COMMANDS 231
15.1. +DBGCFG Command: Debug Message Configuration 231
15.2. SKT Carrier Commands 231
15.2.1. *SKT*DBG Command: Debug Message for SKT 231
15.2.2. *SKT*SYSINFO Command: Current System Information for SKT 234
15.2.3. SKT Data Connection 235
15.3. KT Carrier Commands 235
15.3.1. KTDBUG Command: Debug Message for KT 235
15.3.2. KTSYSINFO Command: Current System Information for KT 238
15.3.3. KTCFUN Command: Change Modem Status 239
15.3.4. KTSPC Command: Control Service Programming Code 239
15.3.5. KTIMEI Command: Read IMEI 239
15.3.6. KTSWV Command: Read Software Version 240
15.3.7. KTNSI Command: Read Network Status 240
15.3.8. +KCMGR Command: Read SMS 241
15.3.9. KTCARD Command: Read Type of CARD 241
15.3.10. KTNULLSIM Command: Check Registration of USIM 242
15.3.11. KTOPEN Command: Start OTA 242
15.3.12. KTOTASTATUS Command: Read OTA Status 242
15.3.13. KTOTALOG Command: Read TIME of OTA 243
15.3.14. KT Data Connection 243

15.4. LG U+ Carrier Commands....244
15.4.1. IP Address Format....244
15.4.2. Session ID....244
15.4.3. Buffer Length....244
15.4.4. $LGTRESET Command: Reset Modem....245
15.4.5. $LGTMIN Command: Read MSIN....245
15.4.6. $LGTMCC Command: Read MCC....245
15.4.7. $LGTMNC Command: Read MNC....246
15.4.8. $LGTTIME Command: Read Network Time....246
15.4.9. $LGTVER Command: Read Modem Firmware Version....246
15.4.10. $LGTLOCALADDR Command: Read Modem IP Address....247
15.4.11. $LGTRSSI Command: Read RSSI Value....247
15.4.12. $LGTINTRS Command: Register RSSI Indicator....247
15.4.13. $LGTLTESTATE Command: Read LTE Quality....248
15.4.14. $LGTADDR Command: Read Server IP Address....248
15.4.15. $LGTTCPOP Command: Connect TCP Session....249
15.4.16. $LGTTCPWR Command: Send Data....249
15.4.17. $LGTTCPRD Notification: Receive Data Indicator....250
15.4.18. $LGTTCPCL Command: Close Current TCP Connection....250
15.4.19. $TCPCLOSE Notification: Remote Server Close TCP Indicator....251
15.4.20. $LGTTCPSTATE Command: Read Current TCP Status....251
15.4.21. $LGTPREL Command: Disconnect PDP Connection....252
15.4.22. $LGTISNULL Command: USIM Status....252
15.4.23. $LGTOTA_STATUS Command: OTA Status....252
15.4.24. $LGTOPEN Command: Start USIM OTA....253
15.4.25. $LGTMDN Command: Request MSISDN....254
15.4.26. $LGTDBG Command: Debug Message for LGU+....254
15.4.27. $LGTSYSINFO Command: System Information for LG U+....256
15.4.28. TCP Commands Examples (ASCII Mode)....257
15.4.29. TCP Commands Examples (Binary Mode)....257
15.4.30. LG U+ Data Connection....258
15.5. SKT M2M Platform Commands....259
15.5.1. *M_PARAMK Command: Read GMMP Parameters File....259
15.5.2. *M_PARACLR Command: Delete GMMP Parameters File....260
15.5.3. *M_SERVERREG Command: Set IP and Port of M2M Server....260
15.5.4. *M_SETDOMAIN Command: Set M2M Domain Code....261
15.5.5. *M_START Command: Connect M2M Server....261
15.5.6. *M_DELIVERY Command: Set M2M Data Type to Send....262
15.5.7. *M_WR Command: Send M2M Data....263
15.5.8. *M_DEREG Command: Deregister from M2M Platform....264
15.5.9. *M_CTL_READY Command: Get Control Message....264
15.5.10. *M_CTL_DATA Command: Deliver Control Message Response to M2M Server....265
15.5.11. *M_FW_READY Command: Get Firmware Update Message....265
15.5.12. *M_FW_DATA Command: Deliver Firmware Data....266
15.5.13. *M_STATUS Command: Set Device Status....266
15.5.14. *M_RESET Notification: M2M Reset Indication....267
15.5.15. *M_TURNOFF Notification: M2M Turn Off Indication....267

15.5.16. *PERIODREPORT Notification: M2M Period Report Indication 267
15.5.17. *M_TIME_SYNC Notification: M2M Time Sync Indication 268
15.5.18. *M_REPORT Notification: M2M Report On/Off Indication 268
15.5.19. *M_RUN Notification: M2M Restart/Pause Indication 268
15.6. LG U+ M2M Platform Commands 269
15.7. LG U+ RASS Commands 269
15.7.1. $LGTRRASSON Command: Close All Socket Sessions and Restart 269
15.7.2. $LGTRMODRDY Notification: Ready Indication 269
15.7.3. $LGTRMSISDN Command: Read MSISDN 270
15.7.4. $LGTRTIME Command: Read Network Time 270
15.7.5. $LGTRVER Command: Read Modem RASS Version 270
15.7.6. $LGTRMTYPE Command: Read Modem Manufacture Code 271
15.7.7. $LGTRBAND Command: Read Band & Antenna Status 271
15.7.8. $LGTRBANDST: Set Band & Antenna Setting 271
15.7.9. $LGTRSTA Command: Read Debug Information 272
15.7.10. $LGTRQOS Command: Read Quality of Service 273
15.7.11. $LGTRCHINF Command: Read Channel Information 274
15.7.12. $LGTRIP Command: Read Modem IP Address 274
15.7.13. $LGTRSVRIP Command: Set Server IP Address 274
15.7.14. $LGTRDNS Command: Set Server Domain Address 275
15.7.15. $LGTRTPS Command: Start Throughput Record 275
15.7.16. $LGTRTPR Notification: Throughput Test Indication 276
15.7.17. $LGTRMCUFWI Command: MCU Firmware Download 276
15.7.18. $LGTRMCUFWS Notification: MCU Firmware Indication 277
15.7.19. $LGTRMCUFWUP Command: Read MCU Firmware Data 277
15.7.20. $LGTRMODFWI Command: Modem Firmware Download 277
15.7.21. $LGTRMODFW Notification: Modem Firmware Indication 278
15.7.22. $LGTRSEND Command: Send Data 278
15.7.23. $LGTRRCV Notification: Received Data Indication 279

16. APPENDIX 280

16.1. Result Codes and Unsolicited Messages 280
16.2. Error Codes 281
16.2.1. +CME Error Codes 281
16.2.2. +CEER Error Codes 283
16.2.3. +CMS Error Codes 287
16.2.4. +GPRS Error Codes 289
16.2.5. FTP Reply Codes 290
16.2.6. AVMS Error Codes 291
16.3. Commands without Pin Code Requirement 291
16.4. GSM 27.010 Multiplexing Protocol 292
16.5. TCP Commands Usage Examples 293
16.5.1. Client Mode 293
16.5.2. Server Mode 294
16.5.3. Polling for the Status of a Socket 295
16.5.4. End to End TCP Connection 296
16.5.5. Error Case for End to End TCP Connection 296

16.5.6. Use Cases for AT+KTCPACKINFO and <URC-ENDTCP-enable> Option.....297
16.6. UDP Commands Usage Examples 299
16.6.1. Client Mode.....299
16.6.2. Server Mode 300
16.6.3. Use Cases for KTCP_DATA and KUDP_DATA 301
16.7. FTP Commands Usage Examples 304
16.7.1. Client Mode.....304
16.7.2. "FTP Resume" Use Case 304
16.8. HTTP Commands Usage Examples 306
16.9. Switch Data/Command Mode DTR +++ ATO Behavior Table 307

1. Introduction

This document presents the AT Command Set for the AirPrime HL7528 module.

1.1. Reference Configuration

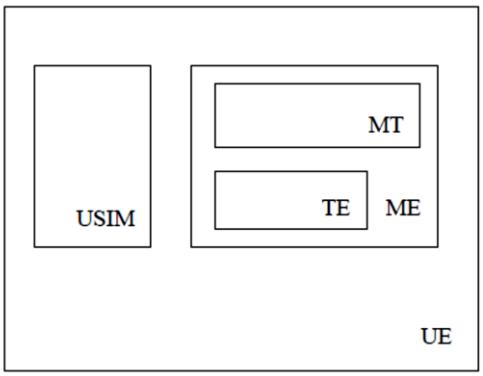


Figure 1. Reference Configuration

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:

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

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

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

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

1.2.2. Answers and Responses

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

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

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

1.2.3. Multiple AT Commands on the Same Command Line

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

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

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

Example:

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

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

OK

1.2.4. AT Commands on Separate Lines

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

1.3. Unsolicited Result Codes (URCs)

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

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

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

1.4. Document Modification

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

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

1.5. Abbreviations

Abbreviation	Definition
ACM	Accumulated Call Meter
ADC	Analog Digital Converter
ADN	Abbreviated Dialing Number (Phonebook)
AMR	Adaptive Multi-Rate
AMR-FR	AMR Full Rate (full rate speech version 3)
AMR-HR	AMR Half Rate (half rate speech version 3)
AOC	Advice Of Charge
APN	Access Point Name
ARN	Address Resolution Protocol
ARFCN	Absolute Radio Frequency Channel Number
ASCII	American Standard Code for Information Interchange
AT	Attention; Hayes Standard AT command Set
BCCH	Broadcast Channel
BER	Bit Err Rate
BM	Broadcast Message Storage
CBM	Cell Broadcast Message
CB	Cell Broadcast
CCK	Corporate Control Key
CCM	Current Call Meter
CHV	Card Holder Verification
CHAP	Challenge handshake Authentication Protocol
CI	Cell Identifier
CLI	Client Line Identification
CNL	Cooperative Network List
CODEC	Coder Decoder
COLP	Connected Line Identification Presentation
CPHS	Common PCN Handset Specification
CPU	Central Processing Unit

Abbreviation	Definition
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
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

Abbreviation	Definition
IMSI	International Mobile Subscriber Identity
IN/OUT/IN_OUT	In, out or In Out
I/O	Input/Output
IP	Internet Protocol
LAC	Local Area Code
LED	Light Emitting Diode
LND	Last Number Dialed
LP	Language Preferred
LPI	Lines Per Inch
M	Mandatory
MCC	Mobile Country Code
ME	Mobile Equipment
MMI	Man Machine Interface
MNC	Mobile Network Code
MNP	Microcom Networking Protocol
MO	Mobile Originated
MOC	Mobile Originated Call (outgoing call)
MS	Mobile Station
MSB	Most Significant Bit
MSISDN	Mobile Station International ISDN Number
MT	Mobile Terminal
MTC	Mobile Terminated Call (incoming call)
N.A.	Not applicable
NCK	Network Control Key
NITZ	Network Information and Time Zone
NSCK	Network Subset Control Key
NTC	Negative Temperature Coefficient
N.U.	Not used
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

Abbreviation	Definition
PDU	Protocol Description Unit
PIN	Personal Identification Number
PLMN	Public Land Mobile Networks
PNN	PLMN Network Name
PPP	Point-to-Point Protocol/Peer to Peer
PSTN	Public Switched Telephone Network
PTS	Product Technical Specification
PUCT	Price per Unit and Currency Table
PUK	PIN Unlock Key
PWM	Pulse Width Modulation
QoS	Quality of Service
RAM	Random Access Memory
RDMS	Remote Device Management Services
RI	Ring Indicator
RIL	Radio Interface Layer
RLP	Radio Link Protocol
RSSI	Received Signal Strength Indication
RTS	Ready To Send signal
RX	Reception
SAP	Service Access Point
SC	Service Center
SDU	Service Data Unit
SIM	Subscriber Information Module
SMSR	Short Message Status Report
SMS	Short Message Service
SS	Supplementary Services
SPCK	Service Provider Control Key
SPN	Service Provider Name
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

HL7528	
Execute command Syntax **+++**	 Response **OK**
Reference V.25Ter	Notes • This command is only available during data mode. The +++ character sequence suspends the data flow over the AT interface and switches to command mode. This allows entering AT commands while maintaining the data connection to the remote device. • To return to data mode, use the ATO[n] command. • Line needs one second silence before and after (do not end with terminating character). • The +++ characters are not transmitted in the data flow.

2.2. A/ Command: Repeat Previous Command Line

HL7528	
Execute command Syntax **A/**	 Response Depends on the previous command
Reference V.25Ter	Notes Line does not need to end with terminating character.

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

HL7528	
Execute command Syntax **ATO[<n>]**	 Response TA returns to data mode from command mode: **CONNECT <text>**

HL7528	
	If connection is not successfully resumed: **NO CARRIER** Parameter **<n>** 0 Switch from command mode to data mode 1 – 200 Session ID; see section 11 Protocol Specific Commands
Reference V.25Ter	Notes ATO is the alternative command to the +++ escape sequence described in Chapter 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

2.4. E Command: Enable Echo Command

HL7528	
Execute command Syntax **ATE[<value>]**	Response **OK** or **+CME ERROR: <err>** Parameter **<value>** 0 Echo OFF 1 Echo ON
Notes	• This setting determines whether the TA echoes characters received from TE during the command state. • <value > is saved in non-volatile memory per AT port over module reboot.

2.5. Q Command: Set Result Code Presentation Mode

HL7528	
Execute command Syntax **ATQ[<n>]**	Response **OK** (if **<n>** = 0) Nothing (if **<n>** = 1) Parameter **<n>** 0 Result codes transmitted by TA 1 No result codes transmitted by TA
Notes	• Specifies whether the TA transmits any result code to the TE. Information text transmitted in response is not affected by this setting. • <n> is saved in non-volatile memory per AT port over module reboot.

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

HL7528	
Read command Syntax **ATS0?**	 Response **<n>** **OK**
Write command Syntax **ATS0=<n>**	 Response **OK** Parameter **<n>** 0 Automatic answering deactivated 1 – 255 Number of rings before automatically answering
Notes	In data mode (after any CONNECT), automatic call answering does not work. This means that incoming calls are not automatically answered during data mode.

2.7. S4 Command: Set Response Formatting Character

HL7528	
Read command Syntax **ATS4?**	 Response **<n>** **OK**
Write command Syntax **ATS4=<n>**	 Response **OK** Parameter **<n>** 10 Response formatting character <LF>: line feed
Notes	<n> determines the character recognized by TA to terminate answer line (10 = <LF> by default); it cannot be changed.

2.8. S7 Command: Set Delay for Connection Completion

HL7528	
Read command Syntax **ATS7?**	 Response **<n>** **OK**
Write command Syntax **ATS7=<n>**	 Response **OK** Parameter **<n>** 1 – 255 Number of seconds to wait for the connection to complete

2.9. V Command: TA Response Format

HL7528	
Execute command Syntax **ATV[value]**	 Response In case of information responses, the format is: for V0: **<text><CR><LF>** for V1: **<CR><LF><text><CR><LF>** In case of result codes, the format is: for V0: **<numeric code><CR>** for V1: **<CR><LF><verbose code><CR><LF>** or **+CME ERROR: <err>** Parameter **<value>** 0 Short result code format: <numeric code> 1 Long result code format: <verbose code>
Notes	<n> is saved in non-volatile memory per AT port over module reboot.

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

HL7528	
Execute command Syntax **AT&C<value>**	Response **OK** Parameter **<value>** 0 DCD line is always active 1 DCD line is active in the presence of data carrier only
Reference V.25Ter	Notes • DCD/AT&C is only applicable to the USB AT port; it has no effect on UART1. • <value> is saved in non-volatile memory per AT port over module reboot.

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

HL7528	
Execute command Syntax **AT&D<value>**	Response **OK** Parameter **<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 drops from active to inactive. Disconnect data call, change to command mode. Auto-answer is off during DTR inactive state
Reference V.25Ter	Notes • This command only applies to data calls. • DTR/AT&D is only applicable to the USB AT port; it has no effect on UART1. • <value> is saved in non-volatile memory per AT port over module reboot.

2.12. &F Command: Restore Factory Settings

HL7528	
Execute command Syntax **AT&F[<value>]**	Response **OK** Parameter **<value>** 0 or Omitted Restore STORED PROFILE 0 and 1 to factory settings

HL7528	
Reference V.25Ter	Notes This command also restores the factory settings to the active profile.
Examples	**AT&F** **OK** **AT&F0** **OK** **AT&F1** **ERROR**

2.13. IPR Command: Set Fixed Local/DTE Rate

HL7528	
Test command Syntax **AT+IPR=?**	Response **+IPR: (**list of supported auto detectable **<rate>**s**)[,(**list of fixed only **<rate>**s**)]** **OK**
Read command Syntax **AT+IPR?**	Response **+IPR: <baud_rate>** **OK**
Write command Syntax **AT+IPR=** **<baud_rate>**	Response **OK** or **+CME ERROR: <err>** Parameter **<baud_rate>** 115200 (default value) 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 230400, 460800, 500000, 750000, 921600, 1843200, 3000000, 3250000, 6000000
Notes	• Not all listed rates may be available as they are dependent on the target. • The full range of data rate values may be reduced depending on hardware or other criteria. • <baud_rate> is only for the UART port; the USB port is always in auto.

2.14. L Command: Monitor Speaker Loudness

HL7528	
Execute command Syntax **ATL [<volume>]**	 Response **OK** Parameter **<volume>** 0 – 9
Notes	This command has no effect.

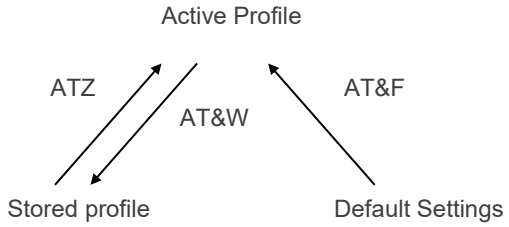
2.15. M Command: Monitor Speaker Mode

HL7528	
Write command Syntax **ATM[<mode>]**	 Response **OK** Parameter **<mode>** 0 – 65535
Notes	This command has no effect.

2.16. &W Command: Save Stored Profile

HL7528	
Execute command Syntax **AT&W[<value>]**	 Response **OK** Parameters **<value>** 0 or Omitted Save in STORED PROFILE 0 1 Save in STORED PROFILE 1
Reference V.25Ter	Notes This command saves the current configuration in a non-erasable location.
Examples	**AT&W** Save current configuration to Profile 0 **OK** **AT&W0** Save current configuration to Profile 0 **OK** **AT&W1** Save current configuration to Profile 1 **OK**

2.17. &V Command: Display Current Configuration

HL7528	
Execute command Syntax **AT&V[<value>]**	Response **ACTIVE PROFILE: <current configuration>** **STORED PROFILE 0: <user default configuration>** **STORED PROFILE 1: <manufactory configuration>** **OK** Parameter **<value>** 0 Profile number
Reference Sierra Wireless Proprietary	Notes • At startup, the latest profile stored with AT&W is restored to the active profile (no restoration if AT&W has not been used). • The configuration is a text string on multiple lines as shown in the example below. This string may vary depending on the manufacturer, the product and the user setup.
Example	E1 Q0 V1 X0 &C1 &D1 &S0 &K0 +FCLASS0 S00:0 S01:0 S04:10 S07:255 This command indicates the result of certain actions as shown below: 

2.18. &K Command: Flow Control Option

HL7528	
Execute command Syntax **AT&K<mode>**	Response **OK** Parameter **<mode>** 0 Disable all flow control 3 Enable bi-directional hardware flow control
Reference V.25ter	Notes • Use AT&V0 to display the current flow control setting. • Sierra Wireless recommends the use of hardware flow control. • AT&K3 hardware flow control is effective only for UART1 and +KSLEEP=2 (UART is always ON); it has no effect for USB AT port.

2.19. &S Command: DSR Option

HL7528	
Execute command Syntax **AT&S** **[<override>]**	 Response **OK** Parameter **<override>** 0 or omitted DSR signal always ON (0 is the default value) 1 DSR signal always OFF
Reference V.25Ter	Notes This is a dummy command and has no effect on the DSR signal.

3. General AT Commands

3.1. I Command: Request Identification Information

HL7528	
Execute command Syntax **ATI[<value>]**	Response If <value> = 0 or omitted: **<model>** **OK** If <value> = 1: **<short version name>** **OK** If <value> = 3: **<version tag>** **OK** If <value> = 9: **<version name>** **<model>** **<short version name>** **<chipset>** **<fuse state>** **<build date & time>** **<source rev>** **OK** If <value> = 10: **Modem-Firmware:** **<version name>** **<model>** **<short version name>** **<chipset>** **<fuse state>** **<build date & time>** **<source rev>** **Primary-Boot:** **<version name>** **<build date & time>** **<source rev>** **Secondary-Boot:** **<version name>** **<build date & time>** **<source rev>**

HL7528	
	Update-Agent: **<version name>** **<build date & time>** **<source rev>** **4G-Firmware:** **<4G FW version name>** **3G-Firmware:** **<4G FW version name>** **OK** Parameters **<model>** Model identifier **<version name>** Firmware version For example: AHL7528.2.0.TEST_144200.201412161718.x7160_1<…> (for test firmware) AHL7528.2.0.144200.201412161718.x7160_1.<…> (for official firmware) **<short version name>** Short version of the firmware name For example: HL7528_TEST.0.0 (for test firmware) HL7528.1.0 (for official firmware) **<chipset>** Chipset name, e.g. x7160l **<build date & time>** Souce code build time in format YYYY-MM-DD HH:MM:SS **<source rev>** Source code revision in version control **<fuse state>** Fuse state information FUSED Fused module NON-FUSED Non-fused module **<4G FW version name>** 4G Firmware version string **<3G FW version name>** 3G Firmware version string
Reference V.25ter	Notes See also AT+CGMR.
Examples	**ATI** **HL7528** **OK** **ATI0** **HL7528** **OK** # For test firmware, TEST given is the version name **ATI3** **AHL7528_TEST.0.0.144200.201412161718.x7160_1** **OK**

HL7528	
	# Examples for official firmware **ATI1** **HL7528.2.18** **OK** **ATI3** **AHL7528.2.18.152000.201511031739.x7160_1** **OK** **ATI4** **NON-FUSED** **OK** **ATI9** **AHL7528.2.18.152000.201511031739.x7160_1** **HL7528** **HL7528.2.18** **x7160** **NON-FUSED** **2015-11-03 17:39:56** **r963** **OK** **ATI10** **Modem-Firmware:** **AHL7528.2.18.152000.201511031739.x7160_1** **HL7528** **HL7528.2.18** **x7160** **NON-FUSED** **2015-11-03 17:39:56** **r963** **Primary-Boot:** **AHL7528.2.18.0200151022.201511031739.x7160_1** **2015-11-03 17:39:56** **r934** **Secondary-Boot:** **AHL7528.2.18.0200151022.201511031739.x7160_1** **2015-11-03 17:39:56** **r934** **Update-Agent:** **AHL7528.2.18.0200151022.201511031739.x7160_1** **2015-11-03 17:39:56** **r963** **4G-Firmware:** **7160.S3.561.05.3.519.01.0017** **3G-Firmware:** **202.514.180.42-54.35** **OK**

3.2. Z Command: Reset and Restore User Configuration

HL7528	
Execute command Syntax **ATZ<value>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<value>** 0 Reset and restore user configuration with profile 0 1 Reset and restore user configuration with profile 1

3.3. +CGMI Command: Request Manufacturer Identification

HL7528	
Test command Syntax **AT+CGMI=?**	 Response **OK**
Execute command Syntax **AT+CGMI**	 Response **(manufacturer identification text)** **OK**
Reference [27.007] § 5.1	Example **AT+CGMI** **Sierra Wireless** **OK**

3.4. +CGMM Command: Request Model Identification

HL7528	
Test command Syntax **AT+CGMM=?**	 Response **OK**

HL7528	
Execute command Syntax **AT+CGMM**	 Response **<mode>** **OK** Parameter **<model>** Model identifier
Reference [27.007] § 5.2	Example **AT+CGMM** **HL7528** **OK**

3.5. +CGMR Command: Request Revision Identification

HL7528	
Test command Syntax **AT+CGMR=?**	 Response **OK**
Execute command Syntax **AT+CGMR**	 Response **(model revision identification text)** **OK**
Reference [27.007] § 5.3	Notes Example of **(model revision identification text)** could be: **AHL7528_TEST.0.0.142102.201406222214.x7160_1** or **AHL7528.1.0.141506.201406241105.x7160_1**

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

HL7528	
Test command Syntax **AT+CGSN=?**	 Response **OK**

HL7528	
Execute command Syntax **AT+CGSN**	Response **<IMEI>** (identification text for determination of the individual ME) **OK**
Reference V.25ter	Notes • This command can work with or without a SIM card. • See also AT+KGSN, AT+GSN.

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

HL7528	
Test command Syntax **AT+KGSN=?**	Response **+KGSN: (**list of supported **<number type>**s**)** **OK**
Write command Syntax **AT+KGSN= <number type>**	Response If **<number type>** = 0: **+KGSN: <IMEI>** **OK** If **<number type>** = 1: **+KGSN: <IMEISV>** **OK** If **<number type>** = 2: **+KGSN: <IMEISV_STR>** **OK** If **<number type>** = 3: **+KGSN: <FSN>** **OK** If **<number type>** = 4: **+KGSN: <FSN-BB>** **OK** Parameters **<IMEI>** 15 digits IMEI (8 digits for TAC + 6 digits for SNR + 1 check digit) **<IMEISV>** 16 digits IMEISV (8 digits for TAC + 6 digits for SNR + 2 SVN digits) **<IMEISV_STR>** Formatted string; <15 digits>-<Check digit> SV: <Software version>

HL7528	
	<FSN> 14 digits Serial Number **<FSN-BB>** 16 digits Serial Number + BB
Reference Sierra Wireless Proprietary	Notes This command has been developed to provide the IMEI SV and Serial Number through an AT Command and it can work with or without SIM card.
Examples	**AT+KGSN=0** **+KGSN: 351578000023006** **OK** **AT+KGSN=1** **+KGSN: 3515780000230001** **OK** **AT+KGSN=2** **+KGSN: 35157800002300-6 SV:01** **OK** **AT+KGSN=3** **+KGSN: 0123456789ABCD** **OK** **AT+KGSN=4** **+KGSN: 0123456789ABCD01** **OK**

3.8. +HWREV Command: Request Hardware Revision

HL7528	
Test command Syntax **AT+HWREV=?**	 Response **OK**
Read command Syntax **AT+HWREV?**	 Response Hardware revision: **X.Y** **OK** Parameter **X.Y** These are the HH numbers in FSN (returned by TTYWWDNNNNPP**HH**-BB)
Reference Sierra Wireless Proprietary	Notes This command works with or without a SIM card.

HL7528	
Example	// Assuming FSN=TTYWWDNNNNPP**01**-BB **AT+HWREV?** **Hardware revision: 0.1** **OK**

3.9. +CSCS Command: Set TE Character Set

HL7528	
Test command Syntax **AT+CSCS=?**	 Response **+CSCS: (**list of supported **<vail>**s**)** **OK**
Read command Syntax **AT+CSCS?**	 Response **+CSCS: <vail>** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+CSCS=** **[<vail>]**	 Response **OK** or **+CME ERROR: <err>** Parameter **<vail>** "GSM" GSM default alphabet (3GPP TS 23.038) "HEX" Character strings only consist of hexadecimal numbers from 00 to FF. For example, “032FE6” equals three 8-bit characters with decimal values 3, 47 and 230. No converstions to the original MT character set shall be done "IRA" International reference alphabet (ITU-T T.50) "UCS2" 16-bit universal multiple-octet coded character set (ISO/IEC 10646)

3.10. +CIMI Command: Request International Mobile Subscriber Identity

HL7528	
Test command Syntax **AT+CIMI=?**	 Response **OK**
Execute command Syntax **AT+CIMI**	 Response **<IMSI>** **OK** or **+CME ERROR: <err>** Parameter **<IMSI>** International Mobile Subscriber Identity

3.11. +GMI Command: Request Manufacturer Identification

HL7528	
Test command Syntax **AT+GMI=?**	 Response **OK**
Execute command Syntax **AT+GMI**	 Response **(manufacturer identification text)** **OK**
Reference [27.007] § 5.1	Example **AT+GMI** **Sierra Wireless** **OK**

3.12. +GMM Command: Request Model Identification

HL7528	
Test command Syntax **AT+GMM=?**	 Response **OK**
Execute command Syntax **AT+GMM**	 Response **<model>** **OK** Parameter **<mode>** Model identifier
Reference [27.007] § 5.2	Example **AT+GMM** **HL7528** **OK**

3.13. +GMR Command: Request Revision Identification

HL7528	
Test command Syntax **AT+GMR=?**	 Response **OK**
Execute command Syntax **AT+GMR**	 Response **(model revision identification text)** **OK**
Reference [27.007] § 5.3	Notes The **(model revision identification text)** could be: **AHL7528_TEST.0.0.142102.201406222214.x7160_1** or **AHL7528.1.0.141506.201406241105.x7160_1**

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

Note: This command is identical to +CGSN.

HL7528	
Test command Syntax **AT+GSN=?**	 Response **OK**
Execute command Syntax **AT+GSN**	 Response **<IMEI>** (identification text for determination of the individual ME) **OK**
Reference V.25ter	Notes • This command can work with or without a SIM card. • See also AT+KGSN, AT+CGSN.

3.15. +GCAP Command: Request Complete TA Capability List

HL7528	
Execute command Syntax **AT+GCAP**	 Response **+GCAP:** list of **<name>**s **OK**
Example	**+GCAP:+FCLASS,+CGSM** **OK**

3.16. +CALD Command: Delete Alarm

HL7528	
Test command Syntax **AT+CALD=?**	 Response **+CALD: (**list of supported **<n>**s**)** **OK**

HL7528	
Write command Syntax **AT+CALD=<n>**	Response **OK** Parameter **<n>** Alarm index
Notes	• Only 1 alarm is possible to be set at one time; <n> must be always 1. • This command can be used without SIM.
Examples	**AT+CALD=1** **OK** **AT+CALD=2** **ERROR**

3.17. +CALA Command: Set Alarm Time

HL7528	
Test command Syntax **AT+CALA=?**	Response **+CALA: <time>,(**list of supported **<n>**s**)** **OK**
Read command Syntax **AT+CALA?**	Response **[+CALA: <time>,<n>]** **OK**
Write command Syntax **AT+CALA= <time>[,<n>]**	Response **OK** **+CALV: 1** // when an alarm occurs Parameters **<time>** Internal clock (refer to +CCLK). String type "yy/mm/dd,hh:mm:ss" is used **<n>** Alarm index
Notes	• When an alarm is timed out and executed, the unsolicited result code +CALV: 1 is returned. • Only 1 alarm is possible to be set at one time; <n> must be 1. • The alarm will wake up the module even it is already in off state, eg, turned off by AT+CFUN=0. The module will then boot up as normal, and there will not be any unsolicited result code “+CALV: 1” returned. • This command can be used without SIM.

HL7528	
Examples	**AT+CCLK="14/05/13,12:00:00+0"** // set the date and time **OK** **AT+CALA=" 14/05/13,12:00:10"** // set an alarm for the specified date and time **OK** **+CALV: 1** // when the alarm expires, unsolicited result code will be displayed **AT+CALA=?** **+CALA: ("yy/mm/dd,hh:mm:ss"),(1)** **OK**

3.18. +WIMEI Command: IMEI Write and Read

HL7528	
Test command Syntax **AT+WIMEI=?**	 Response **OK**
Read command Syntax **AT+WIMEI?**	 Response **+WIMEI: <IMEI>** **OK**
Write command Syntax **AT+WIMEI=** **<IMEI>**	 Response **+WIMEI: <IMEI>** **OK** Parameter **<IMEI>** 14 or 15-digit IMEI as defined in GSM 23.003
Notes	• The default IMEI is 012345678901237. • The write command can only be used once for IMEI programming. • The IMEI to be written must be different from the default IMEI. • If a 14-digit IMEI is entered, the 15th checksum digit is automatically calculated. • The NV backup of the static calibrated NV partition which stores the IMEI is automatically updated after successfully executing the write command (i.e. backup is updated when OK is returned).
Examples	**at+wimei?** **+WIMEI: 012345478901237** // Default IMEI **OK** **at+wimei=354610060035829** // Enter 15-digit IMEI **OK** **at+wimei?** **+WIMEI: 354610060035829** **OK**

HL7528		
	at+wimei=35461006003582 **OK** **at+wimei?** **+WIMEI: 354610060035829** **OK**	// Enter 14-digit IMEI

4. Call Control Commands

4.1. H Command: Hook Control

HL7528	
Execute command Syntax **ATH** or **ATH0**	 Response: **OK** or **ERROR**

4.2. D Command: Dial Number

HL7528	
Test command Syntax **ATD=?**	 Response **1 2 3 4 5 6 7 8 9 0 * # + A B C** **OK**
Read command Syntax **ATD?**	 Response **1 2 3 4 5 6 7 8 9 0 * # + A B C** **OK**
Execute command Syntax **ATD[<n>]**	 Response **OK** If successfully connected **CONNECT** Connection has been established **RING** The DCE has detected an incoming call signal from the network **NO CARRIER** The connection cannot be established **BUSY** Engaged (busy) signal detected **NO ANSWER** If no hang up is detected after a fixed network timeout **CONNECT <data rate>** Same as CONNECT but includes the data rate **RING CTM** The MS has detected an incoming CTM call signal from the network; this code is proprietary **CONNECT FAX** Same as CONNECT but includes the indication related to a fax call Parameter **<n>** String of dialing digits and optionally V.25ter modifiers (dialing digits): 0-9, * , #, +, A, B, C (maximum length: 20 digits)

5. Mobile Equipment Control and Status Commands

5.1. +CCLK Command: Real Time Clock

HL7528	
Test command Syntax **AT+CCLK=?**	 Response **OK**
Read command Syntax **AT+CCLK?**	 Response **+CCLK: <time>** or **+CME ERROR: <err>**
Write command Syntax **AT+CCLK= <time>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<time>** String type value; format is "yy/MM/dd,hh:mm:ss+/-TZ", where characters indicate year (last two digits), month, day, hour, minutes, seconds and time zone (optional).
Notes	Year must be 2004 or later.

5.2. +CLAC Command: List Available AT Commands

HL7528	
Execute command Syntax **AT+CLAC**	 Response **<AT command 1>** **[<CR><LF><AT command 2>[..]]** **OK** or **+CME ERROR: <err>** Parameter **<AT command>** AT command (including the prefix “AT”)

HL7528	
Reference Sierra Wireless Proprietary	Notes • This command provides the AT Command list available to the user. • AT+KCMGL and AT+KCMGR are only used for KT mode.

5.3. +GST Command: General System Status Information

HL7528	
Test command Syntax **AT+GST=?**	 Response **+GST:** (list of supported **< mode>**s) **OK**
Read command Syntax **AT+GST?**	 Response **Same as AT+GST=0**
Write command Syntax **AT+GST=<mode>**	 Response For <mode> = 0 **… (display all responses of <mode>s)** **OK** For <mode> = 1 **+GST: <rtc_time>,<up_time>** **OK** For <mode> = 2 **+GST: <port device string>** **OK** Parameters **<mode>** 0 Display all status info described below 1 Display the RTC time in seconds since 1970 Jan 1, and system boot up time in seconds 2 Display the module port device string, e.g. /USBCDC/0 **<rtc_time>** RTC time in seconds since 1970 Jan 1 **<up_time>** System boot up time in seconds **<port device string>** Unique device string of the AT port, in string type. e.g. “/USBCDC/0” /USBCDC/0 ==> ACM0 AT port /USBCDC/2 ==> ACM2 AT port

5.4. +CFUN Command: Set Phone Functionality

HL7528	
Test command Syntax **AT+CFUN=?**	Response **+CFUN:** (list of supported **<fun>**s), (list of supported **<rst>**s) **OK** or **+CME ERROR: <err>**
Read command Syntax **AT+CFUN?**	Response **+CFUN: <power_mode>,<STK_mode>** or **+CME ERROR: <err>**
Write command Syntax **AT+CFUN=<fun> [,<rst>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<fun>** 0 Switch off MS 1 Full functionality 4 Disable both phone's transmit and receive RF circuits; airplane mode Note that when <fun> = 0, the OK response may be missed due to race conditions, as MT may switch off by the time the OK response is triggered. **<rst>** Reset value 0 Do not reset MT before resetting it to <fun> power level 1 Reset MT before setting it to <fun> power level **<power_mode>** 1 MS is switched ON 2 Invalid mode 4 Airplane mode **<STK_mode>** 0 Inactive state 6 Enable the SIM-toolkit interface and fetching of proactive commands by SIM-APPL from the SIM card

5.5. +CMER Command: Mobile Equipment Event Reporting

HL7528	
Test command Syntax **AT+CMER=?**	Response **+CMER: (**list of supported **<mode>**s**),(**list of supported **<keyp>**s**),(**list of supported **<disp>**s**),(**list of supported **<ind>**s**),(**list of supported **<bfr>**s**)** **OK**
Read command Syntax **AT+CMER?**	Response **+CMER: <mode>,<keyp>,<disp>,<ind>,<bfr>** **OK**
Write command Syntax **AT+CMER=** **[<mode>[,<keyp>** **[,<disp>[,<ind>** **[,<bfr>]]]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<mode>** 1 Discard unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE. 2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation; otherwise forward them directly to the TE. **<keyp>** 0 No keypad event reporting **<disp>** 0 No display event reporting **<ind>** 0 No indicator event reporting 1 Indicator event reporting using result code +CIEV: <ind>,<value>. <ind> indicates the indicator order number and <value> is the new value of indicator. **<bfr>** 0 TA buffer of unsolicited result codes defined within this command is cleared when <mode> = 1 is entered

5.6. +CMEE Command: Report Mobile Termination Error

HL7528	
Test command Syntax **AT+CMEE=?**	 Response **+CMEE:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CMEE?**	 Response **+CMEE: <n>** **OK**
Write command Syntax **AT+CMEE=[<n>]**	 Response **OK** Parameter **<n>** 0 Disable +CME ERROR: <err> result code and use ERROR instead 1 +CME ERROR: <err> result code and use numeric <err> values 2 +CME ERROR: <err> result code and use verbose <err> values
Notes	<n> is saved in non-volatile memory per AT port over module reboot.

5.7. +CCID Command: Request SIM Card Identification

HL7528	
Test command Syntax **AT+CCID=?**	 Response **OK**
Read command Syntax **AT+CCID?**	 Response **+CCID: <ICCID>** **OK** or **+CME ERROR: <err>**

HL7528	
Execute command Syntax **AT+CCID**	Response **+CCID: <ICCID>** **OK** or **+CME ERROR: <err>** Parameter **<ICCID>** Integrated Circuit Card ID of the SIM card

5.8. +FMR Command: Request Revision Identification

HL7528	
Test command Syntax **AT+FMR=?**	Response **OK**
Execute command Syntax **AT+FMR**	Response **(model revision identification text)** **OK**
Reference [27.007] § 5.3	Notes The **(model revision identification text)** could be: **AHL7528_TEST.0.0.142102.201406222214.x7160_1** or **AHL7528.1.0.141506.201406241105.x7160_1**

5.9. +CPIN Command: Enter Pin

HL7528	
Test command Syntax **AT+CPIN=?**	Response **OK**

HL7528	
Read command Syntax **AT+CPIN?**	 Response **+CPIN: <code>** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+CPIN=<pin> [,<newpin>]**	 Response **OK** or **+CME ERROR: <err>** Parameters **<code>** Values when queried using the read command READY MT is not pending for any password SIM PIN MT is waiting for SIM PIN to be given SIM PUK MT is waiting for SIM PUK to be given SIM PIN2 MT is waiting SIM PIN2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered right after the failure, it is recommended that MT does not block its operation) SIM PUK2 MT is waiting SIM PUK2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that ME does not block its operation). PH-NET PIN MT is waiting for the network personalization password to be given PH-NET PUK MT is waiting network personalization unblocking password to be given PH-NETSUB PIN MT is waiting network subset personalization password to be given PH-NETSUB PUK MT is waiting network subset personalization unblocking password to be given PH-SP PIN MT is waiting service provider personalization password to be given PH-SP PUK MT is waiting service provider personalization unblocking password to be given PH-CORP PIN MT is waiting corporate personalization password to be given PH-CORP PUK MT is waiting corporate personalization unblocking password to be given **<pin>, <newpin>** String type values

5.10. *PSRDBS Command: Change Frequency Band

HL7528	
Test command Syntax **AT*PSRDBS=?**	 Response ***PSRDBS:** (list of supported **<mode>**s), (list of supported **<band>**s) **OK**
Read command Syntax **AT*PSRDBS?**	Get current band Response ***PSRDBS: <band>** **OK**
Write command Syntax **AT*PSRDBS= <mode>,<band>**	Set current mode Response **OK** Parameters **<mode>** 0 Set <band> at next switch on 1 Set <band> immediately **<band>** Bit field type parameter. To set several bands, sum up the values. 2048 BAND_LTE_1 8192 BAND_LTE_3 32768 BAND_LTE_5 65536 BAND_LTE_7
Reference Sierra Wireless Proprietary	Notes One or more (up to four) LTE bands can be selected.

5.11. +CPAS Command: Phone Activity Status

HL7528	
Test command Syntax **AT+CPAS=?**	 Response **+CPAS:** (list of supported **<pas>**es) **OK** or **+CME ERROR: <err>**
Execute command Syntax **AT+CPAS**	 Response **+CPAS: <pas>** **OK**

HL7528	
	or **+CME ERROR: <err>** Parameter **<pas>** 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)

5.12. +CSQ Command: Signal Quality

HL7528	
Test command Syntax **AT+CSQ=?**	 Response **+CSQ:** (list of supported **<rssi>**s),(list of supported **<ber>**s) **OK**
Execute command Syntax **AT+CSQ**	 Response **+CSQ: <rssi>,<ber>** **OK** Parameters **<rssi>** Received signal strength indication; integer type 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
Notes	• <rssi> is scaled from the current radio signal strength (RSRP) value of the serving cell; this is the calculated value of (113 + RSRP)/2 in the range from -113 dBm to -51 dBm. RSRP is defined according to 3GPP TS 36.133 section 9.1.4, from -140 dBm to -44 dBm with 1 dB resolution. • <ber> is scaled to 0 – 7 from RSRQ signal quality 34 – 0; it is the calculated value of (7-(7/34)xRSRQ). RSRQ is defined according to specification 3GPP 36.133 section 9.1.7, from -19.5 dBm to -3 dBm with 0.5 dB resolution.

5.13. +KCELL Command: Cell Environment Information

HL7528	
Test command Syntax **AT+KCELL=?**	 Response **+KCELL:** (list of supported **<revision>**s) **OK**
Read command Syntax **AT+KCELL?**	Get current band Response **OK**
Write command Syntax **AT+KCELL= <revision>**	 Response **+KCELL: <nbLTEcells>[,<cell_type>,<PLMN>,<LTE_CI>,<PhyCellIID>, <TrackingAreacode>,<RSRPResult>,<RSRQResult>,<TA>][<cell_type>,[[Earfcn>, [<PhyCellID>,[<RSRPResult>,[<RSRQResult>]]]][…]]** **OK** Parameters **<revision>** Reserved for future development (only 0 for the moment) **<nbLTEcells>** Number of LTE base stations available. ($0 \leq k \leq 33$) **<cell_type>** 5 LTE serving cell 6 LTE neighbor cell **<PLMN>** PLMN identifiers (3 bytes) in hexadecimal format, made of MCC (Mobile Country Code), and MNC (Mobile Network Code) **<LTE_CI>** Cell Identity, 8 hexadecimal digits, length 28 bits (Ref: 3GPP TS 36.331, 6.3.4, CellIdentity IE) **<PhyCellID>** 0 – 503 Integer type, Physical Cell ID (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE) **<TrackingAreacode>** Integer type, Tracking Area Code, length 16 bits (Ref: 3GPP TS 36.331, 6.3.4, Tracking AreaCode IE) **<RSRPResult>** 0 – 97 Integer type, Reference Signal Received Power (Ref: 3GPP TS 36.331, 6.3.5, RSRP-Range IE) **<RSRQResult>** 0 – 34 Integer type, Reference Signal Received Quality (Ref: 3GPP TS 36.331, 6.3.5, RSRQ-Range IE) **<TA>** Timing Advance (as per [3GPP 36.321]). Integer type. In RRC_IDLE state, range is 0 – 1282, but in RRC_Connected state, range is 0 – 63. **<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)

HL7528	
Reference Sierra Wireless Proprietary	Notes • This command provides information related to the network environment and can be used for example for localization calculation • SIM card must be inserted to support this command. The cell information can only be retrieved when the UE stays in an attached mode.

5.14. +KSYNC Command: Application Synchronization Signal

HL7528	
Test command Syntax **AT+KSYNC=?**	Response **+KSYNC: (**list of supported **<mod>**s**),(**list of supported **<IO>**s**),(**range of **<Duty Cycle>**s**),** **(**range of **<Pulse Duration>**s**)** **OK**
Read command Syntax **AT+KSYNC?**	Response **+KSYNC: <mod>,<IO>,<Duty Cycle>,<Pulse Duration>** **OK**
Write command Syntax **AT+KSYNC= <mod>[,<IO> [,<Duty Cycle> [,<Pulse Duration>]]]**	Response **OK** Parameters **<mod>** Mode 0 Disable the generation of synchronization signal 1 Manage the generation of signal according to <Duty Cycle> and <Pulse Duration>. The waveform of the signal is controlled only by these two parameters; Network status would not affect the waveform 2 Manage the generation of signal according to CS network status; **PERMANENTLY OFF** Not register/Initialization/Register denied/no SIM card **600 ms ON / 600ms OFF** Not registered but searching **75 ms ON / 3s OFF** Right connected to the network <Duty Cycle> and <Pulse Duration> are not used in mode 2 3 Manage the generation of signal according to PS network registration status: **OFF** Not registered/Initialization/Register denied/no SIM card **ON** Registered to the network <Duty Cycle> and <Pulse Duration> are not used in mode 3 **<IO>** 1 – 8, 10, 11,13 – 15 Defines which GPIO is used as output **<Duty Cycle>** 1 – 100 Integer type; only used in mode 1 **<Pulse Duration>** 1 – 65535 Pulse duration in milliseconds; only used in mode 1

HL7528	
Notes	• The setting of <mod>, <IO>, <Duty Cycle>, <Pulse Duration> was automatically saved. • Check with +KGPIOCFG when using +KSYNC command. • GPIOs may already be used by SIM detection and temperature monitoring, so when using this +KSYNC command, also check with the related commands, eg +KSIMDET and +KTEMPMON. • This command can be used without SIM. • This command will force the GPIO pins as output, regardless of the AT+KGPIOCFG configuration. • Only 1 GPIO signal can be generated at a time. • Factory default values are <mod> = 0, <IO> = 1, <Duty Cycle> = 50, <Pulse Duration> = 1000.

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

5.15. +KGPIO Command: Hardware IO Control

HL7528	
Test command Syntax **AT+KGPIO=?**	 Response **+KGPIO:** (list of supported **<IO>**s),(list of supported **<cde>**s) **OK**
Read command Syntax **AT+KGPIO?**	 Response **OK**

HL7528	
Write command Syntax **AT+KGPIO=<IO>, <cde>**	Response If <cde> = 2 **+KGPIO: <IO>,<current_value>** **OK** else **OK** Parameters **<IO>** 1 – 8, 10, 11,13 – 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
Reference Sierra Wireless Proprietary	Notes • The current configuration is kept in non-volatile memory after a reset. • Check the configuration of +KGPIOCFG when +CME ERROR: 3 issued. • GPIO 3 is used by SIM detection by default; it cannot be configured. • GPIOs assigned to a specific purpose are not listed. • This command can be used without SIM.

Examples	// Make GPIO1 output high/low level
	AT+KGPIOCFG=1,0,2 // Configure GPIO1 as output; <pull mode> must be "no pull"
	OK
	
	AT+KGPIO=1,1 // Set GPIO1
	OK
	
	AT+KGPIO=1,0 // Reset GPIO1
	OK
	
	// Define input/output mode for GPIO1
	AT+KGPIOCFG=1,1,0 **//** Configure GPIO1 as input; <pull mode> is "pull down"
	OK
	
	AT+KGPIO=1,2 **//** Request the current value of GPIO1
	+KGPIO: 1,1 **//** Value is HIGH for GPIO1
	OK
	
	at+kgpio=?
	+KGPIO: (1,2,4,5,6,7,8,10,11,13,14,15),(0-2)
	OK
	
	at+kgpio=9,1 **//** Setting GPIO9 returns ERROR
	+CME ERROR: 3

5.16. +KGPIOCFG Command: GPIO Configuration

HL7528	
Test command Syntax **AT+KGPIOCFG=?**	Response **+KGPIOCFG:** (list of supported **<n>**s),(list of supported **<dir>**s), (list of supported **<pull mode>**s) **OK**
Read command Syntax **AT+KGPIOCFG?**	Response **+KGPIOCFG: <n>,<dir>,<pull mode>[<CR><LF>** **+KGPIOCFG: <n>,<dir>,<pull mode>** **[...]]** **OK**
Write command Syntax **AT+KGPIOCFG=<n>,<dir>,<pull mode>**	Response **OK** Parameters **<n>** 1 - 8, 10, 11,13 – 15 GPIO number **<dir>** Direction 0 Output 1 Input **<pull mode>** 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
Reference Sierra Wireless Proprietary	Notes • This command provides configuration for +KGPIO command. • The current configuration is saved in non-volatile memory before a reset. • By default, GPIO 3 is being in used by SIM detection, so it cannot be configured. • Pull down/up mode would provide a stable input level. • The command AT+KGPIOCFG=? and AT+KGPIOCFG? return a dynamic list of supported GPIO available. GPIOs assigned to a specific purpose are not listed. • This command can be used without SIM.
Examples	**at+kgpiocfg=1,0,0** // When setting GPIO1 as Output, with incorrect <pull mode> **ERROR** **at+kgpiocfg=1,0,1** // When setting GPIO1 as Output, with incorrect <pull mode> **ERROR** **at+kgpiocfg=1,0,2** // When setting GPIO1 as Output, with correct <pull mode> **OK** **at+kgpiocfg=1,1,0** // When setting GPIO1 as Input, with pull down **OK**

HL7528	
	at+kgpiocfg=1,1,1 // When setting GPIO1 as Input, with pull up **OK** **at+kgpiocfg=1,1,2** // When setting GPIO1 as Input, with incorrect <pull mode> **ERROR** **at+kgpiocfg=?** **+KGPIOCFG: (1,2,4,5,6,7,8,10,11,13,14,15),(0-1),(0-2)** **OK** **at+kgpiocfg?** // GPIO 9 is not available to be used. **+KGPIOCFG: 1,0,2** **+KGPIOCFG: 2,0,2** **+KGPIOCFG: 4,0,2** **+KGPIOCFG: 5,0,2** **+KGPIOCFG: 6,0,2** **+KGPIOCFG: 7,0,2** **+KGPIOCFG: 8,0,2** **+KGPIOCFG: 10,0,2** **+KGPIOCFG: 11,0,2** **+KGPIOCFG: 13,0,2** **+KGPIOCFG: 14,0,2** **+KGPIOCFG: 15,0,2** **OK** **at+kgpiocfg=9,1,0** // When setting GPIO9, it returns ERROR **+CME ERROR: 3** **at+kgpiocfg?** **+KGPIOCFG: 1,0,2** **+KGPIOCFG: 2,0,2** **+KGPIOCFG: 4,0,2** **+KGPIOCFG: 5,0,2** **+KGPIOCFG: 6,0,2** **+KGPIOCFG: 7,0,2** **+KGPIOCFG: 8,0,2** **+KGPIOCFG: 10,0,2** **+KGPIOCFG: 11,0,2** **+KGPIOCFG: 13,0,2** **+KGPIOCFG: 14,0,2** **+KGPIOCFG: 15,0,2** **OK**

5.17. +KADC Command: Analog Digital Converter

HL7528	
Test command Syntax **AT+KADC=?**	Response **+KADC:** (list of supported **<Meas id>**s),(list of supported **<Meas time>**s) **OK**
Write command Syntax **AT+KADC= <Meas id>, <Meas time>**	Response **+KADC: <Meas result>, <Meas id>, <Meas time>[,<Temperature>]** Parameters **<Meas id>** Measurement id 0 VBATT – "VBATT" voltage 1 VCOIN – "BAT_RTC" Backup battery voltage. 2 THERM – Connected to RT400 (the thermistor on board which is located close to the 26MHz VCTCXO) 3 Reserved 4 Reserved 5 Reserved 6 Reserved 7 ADC1 **<Meas time>** Measurement time 1 During TX 2 Far from TX 3 No constraint **<Meas result>** Measurement result is in µV **<Temperature>** Temperature in degrees Celsius
Reference Sierra Wireless Proprietary	Notes • 10 bits converter • 4, 5, and 6 values are reserved • VBATT does not support no constraint measurement time. • This AT command does not require a SIM card. • Available range for input: **<Meas id>** — **Range (V)** VBATT — 3.2 - 4.5 VCOIN — 0 - 1.8 THERM — 0 - 1.2 ADC1 — 0 - 1.2

5.18. +CSIM Command: Generic SIM Access

HL7528	
Test command Syntax **AT+CSIM =?**	 Response **OK**
Write command Syntax **AT+CSIM= <length>, <command>**	 Response **+CSIM: <length>,<response>** **OK** or **+CME ERROR: <err>** Parameters **<length>** Integer type; length of the characters that are sent to TE in <command> or <response> **<command>** Command passed on by MT to the SIM in hexadecimal format **<response>** Response to the command passed on by the SIM to the MT in hexadecimal format

5.19. +CLAN Command: Read Language

HL7528	
Test command Syntax **AT+CLAN=?**	 Response **OK**
Read command Syntax **AT+CLAN?**	 Response **+CLAN: <ln>** Parameter **<ln>** Two letter abbreviation of the language. The language codes, as defined in ISO 639, consists of two characters, e.g. "sv", "en", etc.

5.20. +CCHO Command: Open Logical Channel

HL7528	
Test command Syntax **AT+CCHO=?**	 Response **OK**
Write command Syntax **AT+CCHO= <dfname>**	 Response **<session_id>** **OK** or **+CME ERROR: <err>** Parameters **<dfname>** DF name coded on 1 to 16 bytes that references to all selectable application in the UICC **<session_id>** Session ID to be used in order to target a specific application on the smart card using logical channels mechanism (string without double quotes that represents a decimal value).
Notes	The +CCHO execute command gives the <session_id> when it receives SIM application response status words as shown below: • '90' '00' – normal ending of the command • '91' 'XX' – normal ending of the command with extra information from the proactive UICC containing a command for the terminal.length 'XX' of the response data • '92' 'XX' – normal ending of the command with extra information concerning an ongoing data transfer session

5.21. +CCHC Command: Close Logical Channel

HL7528	
Test command Syntax **AT+CCHC=?**	 Response **OK**
Write command Syntax **AT+CCHC= <session_id>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<session_id>** Session ID to be used to target a specific application on the smart card using logical channels mechanism (string without double quotes that represents a decimal value).

5.22. +CGLA Command: Generic UICC Logical Channel Access

HL7528	
Write command Syntax **AT+CGLA= <sessionid>, <length>, <command>**	Response **+CGLA: <length>,<response>** **OK** or **+CME ERROR: <err>** Parameters **<sessionid>** Integer type; used as the identifier of the session to be used to send the APDU commands to the UICC. It is mandatory to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0"). **<length>** Integer type; length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response). **<command>** Command passed on by the MT to the UICC in the format as described in 3GPP TS 31.101 in hexadecimal format (refer to +CSCS). **<response>** Response to the command passed on by the UICC to the MT in the format as described in 3GPP TS 31.101 in hexadecimal format (refer to +CSCS).

5.23. +CRLA Command: Restricted UICC Logical Channel Access

HL7528	
Write command Syntax **AT+CRLA= <sessionid>, <command> [,<file id>[,<P1>, <P2>,<P3> [,<data> [,<pathid>]]]]>**	Response **+CRLA: <sw1>,<sw2>[,<response>]** **OK** or **+CME ERROR: <err>** Parameters **<sessionid>** Integer typewhich identifies the session to be used to send the APDU commands to the UICC. It is mandatory to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0"). **<command>** 176 READ BINARY 178 READ RECORD 192 GET RESPONSE

HL7528	
	214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS 219 SET DATA All other values are reserved **<fileid>** Integer type that identifies the elementary datafile on SIM. Mandatory for every <command> except STATUS. **<P1>, <P2>, <P3>** Integer type; parameters passed on by the MT to the UICC. These parameters are mandatory for every command, except GET RESPONSE and STATUS. **<data>** Information which shall be written to the SIM in hexadecimal format **<pathid>** String type containing the path of an elementary file on the UICC in hexadecimal format **<sw1>, <sw2>** Integer type; information from the UICC about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command **<response>** Response of a successful completion of the command previously issued in hexadecimal format. STATUS and GET RESPONSE returns data, which gives information about the current elementary datafield. This information includes the type of file and its size (refer to 3GPP TS 31.101). After READ BINARY, READ RECORD or RETRIEVE DATA command the requested data will be returned.
Notes	By using this command instead of generic UICC access command, +CGLA, the TE application has an easier but more limited access to the UICC database.

5.24. +CUAD Command: UICC Application Discovery

HL7528	
Test command Syntax **AT+CUAD=?**	 Response **OK**
Execute command Syntax **AT+CUAD**	 Response **<response>** **OK** or **+CME ERROR: <err>** Parameter **<response>** Content of the EFDIR. String type in hexadecimal format.

5.25. +CRSM Command: Restricted SIM Access

HL7528	
Test command Syntax **AT+CRSM=?**	 Response **OK**
Write command Syntax **AT+CRSM= <command> [,<fileid>[,<P1>, <P2>,<P3> [,<data> [,<pathid>]]]]**	 Response **+CRSM: <sw1>,<sw2>[,<response>]** **OK** or **+CME ERROR: <err>** Parameters **<command>** 176 READ BINARY 178 READ RECORD 192 GET RESPONSE 214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS **<fileid>** Integer type; this is the identifier of an elementary data file on the SIM. Mandatory for every command except STATUS. 28423 IMSI file (6F07) 28473 ACM file (6F39) 28481 PUKT file (6F41) 28482 SMS file (6F42) **<P1>, <P2>, <P3>** Integer type defining the request. These parameters are mandatory for every command, except GET RESPONE and STATUS. The values are described in GSM 51.011 **<data>** Information which shall be written to the SIM (hexadecimal character format; refer +CSCS) **<sw1>, <sw2>** Integer type containing SIM information 0x90 0x00 Normal entry of the command 0x9F 0xXX Length XX of the response data 0x92 0x0X Update successful but after using an internal retry routine X times 0x92 0x40 Memory problem 0x94 0x00 No EF selected 0x94 0x02 Out of range (invalid address) 0x94 0x04 File ID not found; pattern not found 0x94 0x08 File is inconsistent with the command 0x98 0x02 No CHV initialized 0x98 0x04 Access cond. Not fullfiled / unsuccessful CHV verify / authentication failed 0x98 0x08 In contradiction with CHV status 0x98 0x10 In contradiction with invalidation status 0x98 0x40 Unsucc. CHV-verif. Or UNBLOCK CHF / CHV blocked /UNBL.blocked 0x98 0x50 Increase can not be performed. Maximum value reached 0x61 0xXX SW2 indicates the number of response bytes still available. Use Get Response to access this data.

HL7528	
	0x62 0xXX Warning - state unchanged 0x62 0x00 Warning - no information provided 0x62 0x81 Warning - part of returned data may be corrupt 0x62 0x82 Warning - end of file/record reached (bad cmd) 0x62 0x83 Warning - selected file invalidated 0x62 0x84 Warning - bad file control information format 0x63 0xXX Warning - state unchanged 0x63 0x00 Warning - no information provided 0x63 0x81 Warning - file filled up with last write 0x63 0xCx Warning - counter value is x 0x64 0xXX Error - state unchanged 0x65 0xXX Error - state changed 0x65 0x00 Error - no information provided 0x65 0x81 Error - memory failure 66 xx Security Error 0x66 0xXX Security Error 0x67 0xXX Incorrect parameter P3 0x68 0xXX Check Error - CLA function not supported 0x68 0x00 Check Error - no information provided 0x68 0x81 Check Error - logical channel not supported 0x68 0x82 Check Error - secure messaging not supported 0x69 0xXX Check Error - command not allowed 0x69 0x00 Check Error - no information provided 0x69 0x81 Check Error - command incompatible with file structure 0x69 0x82 Check Error - security status not satisfied 0x69 0x83 Check Error - authentication method blocked 0x69 0x84 Check Error - referenced data invalidated 0x69 0x85 Check Error - conditions of use not satisfied 0x69 0x86 Check Error - command not allowed (no current EF) 0x69 0x87 Check Error - expected SM data objects missing 0x69 0x88 Check Error - SM data objects incorrect 0x6A 0xXX Check Error - wrong parameters 0x6A 0x00 Check Error - no information provided 0x6A 0x80 Check Error - incorrect parameters in data field 0x6A 0x81 Check Error - function not supported 0x6A 0x82 Check Error - file not found 0x6A 0x83 Check Error - record not found 0x6A 0x84 Check Error - not enough memory space in the file 0x6A 0x85 Check Error - Lc vailable on with TLV structure 0x6A 0x86 Check Error - vailable on parameters P1-P2 0x6A 0x87 Check Error - Lc vailable on with P1-P2 0x6A 0x88 Check Error - referenced data not found 0x6B 0xXX Incorrect parameter P1 or P2 0x6C 0xXX Check Error - wrong length - xx is the correct length 0x6D 0xXX Unknown instruction code given in the command 0x6E 0xXX Wrong instruction class given in the command 0x6F 0xXX Technical problem with no diagnostic given **<response>** Response of successful completion of the command previously issued in hexadecimal character format; refer to +CSCS. STATUS and GET RESPONSE returns data, which gives information about the current elementary datafield. This information includes the type of file and its size (refer to GSM 51.011 [28]). After READ BINARY or READ RECORD commands, the requested data will be returned. <response> is not returned after a successful UPDATE BINARY or UPDATE RECORD command.

HL7528	
	<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).
Notes	By using this command instead of generic SIM access command, +CSIM, the DTE application has an easier but more limited accessto the SIM database.

5.26. +CEAP Command: EAP Authentication

HL7528	
Write command Syntax **AT+CEAP= <dfname>, <EAPMethod>, <EAP packet data>[,<DFeap>]**	Response **+CEAP: <EAPsessionid>,<EAP packet response>** **OK** or **+CME ERROR: <err>** Parameters **<dfname>** String type in hexadecimal format. All selectable applications are represented in the UICC by an AID coded on 1 to 16 bytes. **<EAPMethod>** String type in hexadecimal format. The value range for 1 byte format and for 8 bytes expanded format is defined in RFC 3748 **<EAP packet data>** String type in hexadecimal format **<DFeap>** String type in hexadecimal format **<EAPsessionid>** 1 – 4294967295 Identifier of the EAP session to be used in order to retrieve the EAP parameters with +CERP command **<EAP packet response>** String type in hexadecimal format

5.27. +CERP Command: EAP Retrieve Parameters

HL7528	
Write command Syntax **AT+CERP= <EAPsessionid>, <EAPparameter>**	Response **+CERP: <EAP parameter response>** **OK** or **+CME ERROR: <err>**

HL7528	
	Parameters **<EAPparameter>** 1 Keys 2 Status 3 Identity 4 Pseudonym **<EAPsessionid>** 1 – 4294967295 Identifier of the EAP session to be used in order to retrieve the EAP parameters corresponding to an active EAP session **<EAP parameter response>** String type in hexadecimal format

5.28. +KTEMPMON Command: Temperature Monitor

HL7528	
Test command Syntax **AT+KTEMPMON=?**	Response **+KTEMPMON: (**list of supported **<mod>**s**),(**list of supported **<temperature>**s**),(**list of supported **<urcMode>**s**),(**list of supported **<action>**s**),(**list of supported **<hystTime>**s**),(**list of supported **<repGPIO>**s**)** **OK**
Read command Syntax **AT+KTEMPMON?**	Response **+KTEMPMON: <mod>,<temperature>,<urcMode>,<action>,<hystTime>,<repGPIO>** **OK**
Write command Syntax **AT+KTEMPMON=<mod>,[<temperature>[,<urcMode>[,<action>[,<hystTime>[,<repGPIO>]]]]]**	Response **+KTEMPMON: <level>,<value>** **OK** Parameters **<mod>** 0 Disable the monitor of the module internal temperature 1 Enable the monitor of the module internal temperature **<temperature>** Temperature (default value = 0) above this value will make the module act as defined by <action> **<urcMode>** 0 Disables the presentation of the temperature monitor URC 1 Enables the presentation of the temperature monitor URC **<action>** 0 No action 1 Automatic shut-down when the temperature is beyond <temperature> 2 The output pin <repGPIO> is tied HIGH when <temperature> are reached; when the temperature is normal the output pin <repGPIO> is tied LOW. If this <action> is required, it is mandatory to set the <repGPIO> parameter

HL7528	
	<hyst_time> 0 – 255 Hysteresis time in seconds (30 by default). All actions happen only if <temperature> is maintained at least for this period. This parameter is mandatory if <action> is not zero. **<repGPIO>** 1 – 8, 10, 11, 13 – 15 Defines which GPIO is used as output pin (6 by default). This parameter is mandatory only if <action>=2 is required.
Notes	• When the module's internal temperature reaches either operating or extreme levels; the unsolicited message is in the format: **+KTEMPMEAS: <level>,<value>** where: <level> - threshold level -2 Extreme temperature lower bound (-40°C) -1 Operating temperature lower bound (-20°C) 0 Normal temperature 1 Operating temperature upper bound (+55°C) 2 Extreme temperature upper bound (+85°C) <value> - actual temperature expressed in Celsius degrees Due to temperature measurement uncertainty, there is tolerance as follows: ▪ 2°C for temperature range -10°C to 85°C ▪ 3 to 5°C for temperature range -11°C to -40°C • Check available GPIO with **+KGPIOCFG** when using **+KTEMPMON** command.

5.29. +KBND Command: Current Networks Band Indicator

HL7528	
Test command Syntax **AT+KBND=?**	 Response **+KBND:** (list of supported **<bnd>**s) **OK**
Read command Syntax **AT+KBND?**	Get current band Response **+KBND: <bnd>** **OK** Parameter **<bnd>** Band in hexadecimal format 0x00000400 BAND_LTE_1 0x00001000 BAND_LTE_3 0x00004000 BAND_LTE_5 0x00008000 BAND_LTE_7
Reference Sierra Wireless Proprietary	Notes • This command returns the LTE band that the modem is currently using. • A SIM card must be inserted to support this command.

5.30. +KSRAT Command: Set Radio Access Technology

HL7528	
Test command Syntax **AT+KSRAT=?**	 Response **+KSRAT:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+KSRAT?**	Get current band Response **+KSRAT: <mode>** **OK** Parameter **<mode>** 5 LTE only
Reference Sierra Wireless Proprietary	Notes • This command works without a SIM card inserted in the modem. • <mode> are stored in persistent memory.

5.31. +CTZU Command: Automatic Time Zone Update

HL7528	
Test command Syntax **AT+CTZU=?**	 Response **+CTZU:** (list of supported **<onoff>**s) **OK**
Read command Syntax **AT+CTZU?**	 Response **+CTZU: <onoff>** **OK**
Write command Syntax **AT+CTZU** **=<onoff>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<onoff>** 0 Disable automatic time zone update via NITZ 1 Enable automatic time zone update via NITZ

5.32. +CTZR Command: Time Zone Reporting

HL7528	
Test command Syntax **AT+CTZR=?**	 Response **+CTZR:** (list of supported **<onoff>**s) **OK**
Read command Syntax **AT+CTZR?**	 Response **+CTZR: <onoff>** **OK**
Write command Syntax **AT+CTZR =<onoff>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<onoff>** 0 Disable time zone change event reporting 1 Enable time zone change event reporting
Unsolicited Notification	Response **+CTZV: <tz>,<time>** **XNITZINFO: <timzone_variance>,<time>** **+CTZDST: <dst>** Parameters **<tz>** Integer value indicating the time zone **<time>** String type value in format “YY/MM/dd,hh:mm:ss” wherein the characters indicate year, month, date, hour, minutes and seconds **<dst>** Daylight sabings time value 0 Disable time zone change event reporting and URC +XNITZINFO, +CTZDST 1 Enable time zone change event reporting and URC +XNITZINFO, +CTZDST **<timzone_variance>** String of format “GMT+HH:MM” or “GMT-HH:MM” (for example, GMT+5:30)
Reference [27.007] §8.41	Notes • The Time Zone reporting is not affected by the Automatic Time Zone setting command +CTZU. • If the reporting is enabled the MT returns the unsolicited result code +CTZV: <tz> whenever the time zone is changed.

5.33. +XDATACHANNEL Command: Configure Data Channel

HL7528	
Test command Syntax **AT+ XDATACHANNEL =?**	Response **+XDATACHANNEL:** (list of **<mode>**s),(list of **<csd_gprs_flag>**s),(list of **<connect_flag>**s),(list of supported **<cid>**s) **OK**
Write command Syntax **AT+ XDATACHANNEL =<mode>, <csd_gprs_flag>, <ctrl_tid_path>, <tid_path> [,<connect_flag> [,<cid>]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<mode>** 0 Disable routing 1 Enable routing 2 Query current setting for the channel where the command is executed (other parameters will be ignored) **<csd_gprs_flag>** 0 Configure channel for a CSD connection 1 Configure channel for a GPRS connection **<ctrl_tid_path>** Terminal for which the data routing mechanism shall be enabled in string format (e.g.: “/mux/5”) **<tid_path>** Terminal to which a data call shall be routed in string format (e.g.: “/mux/5”) **<connect_flag>** 0 No reporting on the data channel (neither CONNECT nor NO CARRIER) 1 Reporting on the data channel enabled (CONNECT and NO CARRIER) 2 Reporting on the control channel enabled (CONNECT and NO CARRIER) **<cid>** Numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands)
Notes	• The control channel must be in OPEN state when the +XDATACHANNEL command is sent. • +XDATACHANNEL settings will only apply while control channel DLC is OPEN and will be reset as soon as DLC is closed. • When this command is sent with <cid> parameter, then the data channel (<tid_path>) must be in OPEN state and the given <cid> should already be defined. • If the <cid> is deleted or undefined, the XDATACHANNEL settings pertaining to the <cid> are not retained. • Connection must be established (start and stop) through <ctrl_tid_path> for data to be properly routed. • +XDATACHANNEL query (mode=2) does not return the <cid> associated with the control channel, as the data routing of a control channel can be configured for multiple <cid>s.

HL7528	
	• <connect_flag> affects both AT+CGDATA and ATD PS data call setup commands, but should only be used with AT+CGDATA for proper NCM connection setup. • When <connect_flag>=2, "CONNECT" and "NO CARRIER" are sent as unsolicited response codes in the control channel specified by <ctrl_tid_path>, and the OK terminal response is still returned as a terminal response for AT+CGDATA.

5.34. +XCELLINFO Command: Provide Cell Information

HL7528	
Test command Syntax **AT+XCELLINFO=?**	 Response **+XCELLINFO: (range of <mode>s)** **OK**
Read command Syntax **AT+XCELLINFO?**	 Response For serving cell: **+XCELLINFO: <mode>,<type><MCC>,<MNC>,<CI>,<PhyCellInd>, <TrackingAreaCode>,<RSRPResult>,<RSRQResult>,<TA>** For neighbor cell: **+XCELLINFO: <mode>, <type>,[[<Earfcn>,[<PhyCellID>,[<RSRPResult>, [<RSRQResult>]]]]]** **OK**
Write command Syntax **AT+XCELLINFO= <mode>**	 Response **OK** or **+CME ERROR: <err>** Parameters **<mode>** 0 Disable periodic reporting 1 Enable reporting 2 Currently not used (for backward compatibility) **<type>** 5 LTE serving cell 6 LTE neighbor cell **<MCC>** 0 – 999 Mobile country code **<MNC>** 0 – 999 Mobile network code **<CI>** Cell identity; 28-bits integer type **<PhysCellId>** 0 – 503 Physical cell ID

HL7528	
	<TrackingAreaCode> Tracking area code; 16-bits integer type **<RSRPResult>** 0 – 97 Reference signal received power **<RSRQPResult>** 0 – 34 Reference signal reference quality **<TA>** 0 – 1282 Timing advance **<Earfcn>** Carrier frequency of the neighbor cell designated by the EUTRA absolute radio frequency **<PhyCellID>** 0 – 503 Physical cell ID of the neighbor cell **<RSRPResult>** 0 – 97 Average RSRP of the neighbor cell **<RSRQResult>** 0 – 34 Average RSRQ of the neighbor cell
Unsolicited Notification	Response For serving cell: **+XCELLINFO: <mode>,<type><MCC>,<MNC>,<CI>,<PhyCellInd>, <TrackingAreaCode>,<RSRPResult>,<RSRQResult>,<TA>** or For neighbor cell: **+XCELLINFO: <mode>, <type>,[[<Earfcn>,[<PhyCellID>,[< RSRPResult>,[<RSRQResult>]]]]]**

5.35. +KCCINFO Command: Camped Cell Information

HL7528	
Test command Syntax **AT+KCCINFO=?**	 Response **+KCCINFO:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+KCCINFO?**	Get current mode and camped cell information Response **+KCCINFO: <mode>,<CI>,<RAC>,<TAC>** **OK**
Write command Syntax **AT+KCCINFO= <mode>**	Enable/disable unsolicited camped cell parameter change event notifications. Response **OK** Parameters **<mode>** 0 Camped cell parameters change event notification is disabled 1 Camped cell parameters change event notification is enabled

HL7528	
	<CI> Four-byte location area code in hexadecimal format (e.g. “000000C3” equals 195 in decimal) **<RAC>** One-byte routing area code in hexadecimal format. FF will be displayed if routing area identity information is invalid. **<TAC>** Two-byte tracking area code in hexadecimal format (e.g. “00C3” equals 195 in decimal). FFFF will be displayed if tracking area identity information is invalid.
Unsolicited Notification	Response **+KCCINFOI: <CI>,<RAC>,<TAC>**
Reference Sierra Wireless Proprietary	Notes • This command used to enable/disable the unsolicited response which informs about any change in camped cell parameters. • This command works with a SIM card inserted in the modem. • <mode> is automatically stored in persistent memory. • The setting takes effect immediately.

5.36. +KSLEEP Command: Power Management Control for UART

HL7528			
Test command Syntax **AT+KSLEEP=?**	Response **+KSLEEP:** (list of supported **<mngt>**s) **OK**		
Read command Syntax **AT+KSLEEP?**	Response **+KSLEEP: <mngt>** **OK**		
Write command Syntax **AT+KSLEEP= <mngt>**	Response **OK** Parameter		
	<mngt>	0	The UART doesn’t go in sleep mode if DTR is active (low level). DTR must be active to send AT commands
		1	The UART decides by itself (internal timing) when it will go to sleep mode, and it will be woken up by a character.
		2	The UART never goes in sleep mode regardless of the DTR state

HL7528	
Reference Sierra Wireless Proprietary	Notes • The current configuration is kept in non-volatile memory over module reboot. • This command only controls UART power management, and does not affect the USB AT command port. • This command can be used without a SIM. • When AT+KSLEEP=1 and the module is in sleep mode, the user needs to input a character to wake the module up. After which, AT commands can be input normally.
Examples	**AT+KSLEEP=?** **+KSLEEP: (0-2)** **OK** **AT+KSLEEP?** **+KSLEEP: 2** **OK** **AT+KSLEEP=0** // Change setting to mode 0 **OK** **AT+KSLEEP?** **+KSLEEP: 0** **OK** **AT+KSLEEP=2** // Change setting to mode 2 **OK** **AT+KSLEEP?** **+KSLEEP: 2** **OK**

5.37. +HBHV Command: Configure General System Behavior

HL7528	
Test command Syntax **AT+HBHV=?**	 Response **+HBHV: (0,2,3),(0-1)** **OK**
Read command Syntax **AT+HBHV?**	 Response **+HBHV: 0,<ppp_dun_mode>** **+HBHV: 2,<pdp_unlock_mode>** **+HBHV: 3,<show_orig_apn>** **OK**

HL7528	
Write command Syntax **AT+HBHV=0,<ppp_dun_mode>** or **AT+HBHV=2,<pdp_unlock_mode>** or **AT+HBHV=3,<show_orig_apn>**	Response **OK** Parameters **<ppp_dun_mode>** Behavior of PPP dial-up networking 0 PDP context is brought up after LCP negotiation 1 PDP context is brought up before LCP negotiation **<pdp_unlock_mode>** PDP unlock mode 0 Protects the reserved PDP contexts (1) from being modified accidentally 1 Unlocks the protection on the reserved PDP contexts **<show_orig_apn>** Enables showing the original APN saved in non-volatile memory (updated by AT+CGDCONT=…), this is effective for PDP context 1 (LTE default bearer) with PDP context reading (AT+CGDCONT?) 0 Disabled, shows APN that is given by network (e.g. "ltemobile.apn.mnc720.mcc302.gprs", "vzwims.mnc480.mcc311.gprs") 1 Enabled, shows the original APN saved in flash

5.38. +CESQ Command: Extended Signal Quality

HL7528	
Test command Syntax **AT+CESQ=?**	Response **+CESQ: (**list of supported **<rxlev>**s**),(**list of supported **<ber>**s**),(**list of supported **<rscp>**s**),(**list of supported **<ecno>**s**),(**list of supported **<rsrq>**s**),(**list of supported **<rsrp>**s**)** **OK**
Execute command Syntax **AT+CESQ**	Response **+CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>** **OK** Parameters **<rxlev>** Integer type; received signal strength level (see 3GPP TS 45.008 [20] subclause 8.1.4) 0 rssi < -110 dBm 1 -110 dBm ≤ rssi < -109 dBm 2 -109 dBm ≤ rssi < -108 dBm … 61 -50 dBm ≤ rssi < -49 dBm 62 -49 dBm ≤ rssi < -48 dBm 63 -48 dBm ≤ rssi 99 not known or not detectable **<ber>** Integer type; channel bit error rate (in percent) 0 – 7 As RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99 Not known or not detectable

HL7528	
	<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 rscp < -120 dBm 1 -120 dBm ≤ rscp < -119 dBm 2 -119 dBm ≤ rscp < -118 dBm … 94 -27 dBm ≤ rscp < -26 dBm 95 -26 dBm ≤ rscp < -25 dBm 96 -25 dBm ≤ 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 Ec/Io < -24 dB 1 -24 dB ≤ Ec/Io < -23.5 dB 2 -23.5 dB ≤ Ec/Io < -23 dB … 47 -1 dB ≤ Ec/Io < -0.5 dB 48 -0.5 dB ≤ Ec/Io < 0 dB 49 0 dB ≤ Ec/Io 255 Not known or not detectable **<rsrq>** Integer type; reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7) 0 rsrq < -19.5 dB 1 -19.5 dB ≤ rsrq < -19 dB 2 -19 dB ≤ rsrq < -18.5 dB … 32 -4 dB ≤ rsrq < -3.5 dB 33 -3.5 dB ≤ rsrq < -3 dB 34 -3 dB ≤ rsrq 255 Not known or not detectable **<rsrp>** Integer type; reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4) 0 rsrp < -140 dBm 1 -140 dBm ≤ rsrp < -139 dBm 2 -139 dBm ≤ rsrp < -138 dBm … 95 -46 dBm ≤ rsrp < -45 dBm 96 -45 dBm ≤ rsrp < -44 dBm 97 -44 dBm ≤ rsrp 255 Not known or not detectable
Notes	• If the current serving cell is not a GERAN cell, <rxlev> and <ber> are set to value 99. • If the current serving cell is not a UTRA FDD or UTRA TDD cell, <rscp> is set to 255. • If the current serving cell is not a UTRA FDD cell, <ecno> is set to 255. • If the current serving cell is not an E-UTRA cell, <rsrq> and <rsrp> are set to 255.

5.39. +XCSQ Command: Radio Signal Strength and Quality with URC Support

HL7528	
Test command Syntax **AT+XCSQ=?**	 Response **+XCSQ: (**list of supported **<n>**s**)** **OK**
Read command Syntax **AT+XCSQ?**	 Response **+XCSQ: <n>,<rssi>,<rsrq>** **OK**
Write command Syntax **AT+XCSQ=<n>**	 Response **OK** or **+CME ERROR: <err>** Parameters **<n>** 0 Disable radio signal strength and quality indication URC 1 Enable radio signal strength and quality indication URC **<rssi>** Radio signal strength indication; integer type 0 -113 dBm or less 1 – 30 -111 to -53 dBm 31 -51 dBm or greater 99 Not known or not detectable **<rsrq>** Received signal quality. Range of values = 0 – 34 according to specification 3GPP 36.133 section 9.1.7
Unsolicited Notification	Response **+XCSQ: <rssi>,<rsrq>**
Notes	<rssi> is scaled from the current radio signal strength (RSRP) value of the serving cell; this is the calculated value of (113 + RSRP)/2 in the range from -113 dBm to -51 dBm. RSRP is defined according to 3GPP TS 36.133 section 9.1.4, from -140 dBm to -44 dBm with 1 dB resolution.

5.40. +XCESQ Command: Extended Signal Quality with URC Support

HL7528	
Test command Syntax **AT+XCESQ=?**	 Response **+XCESQ: (**list of supported **<n>**s**),(**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**),(**list of supported **<rssnr>**s**)** **OK**
Read command Syntax **AT+XCESQ?**	 Response **+XCESQ: <n>,<rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>,<rssnr>** **OK**
Write command Syntax **AT+XCESQ=[<n>]**	 Response **OK** or **+CME ERROR: <err>** Parameters **<n>** 0 Disable the display of +XCESQ unsolicited response 1 Enable the display of +XCESQ unsolicited response **<rxlev>** Integer type; received signal strength level (see 3GPP TS 45.008 [20] subclause 8.1.4) 0 rssi < -110 dBm 1 -110 dBm ≤ rssi < -109 dBm 2 -109 dBm ≤ rssi < -108 dBm … 61 -50 dBm ≤ rssi < -49 dBm 62 -49 dBm ≤ rssi < -48 dBm 63 -48 dBm ≤ rssi 99 Not known or not detectable **<ber>** Integer type; channel bit error rate (in percent) 0 – 7 As RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99 Not known or not detectable **<rscp>** Integer type; received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3) 0 rscp < -120 dBm 1 -120 dBm ≤ rscp < -119 dBm 2 -119 dBm ≤ rscp < -118 dBm … 94 -27 dBm ≤ rscp < -26 dBm 95 -26 dBm ≤ rscp < -25 dBm 96 -25 dBm ≤ rscp 255 Not known or not detectable

HL7528	
	<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 Ec/Io < -24 dB 1 -24 dB ≤ Ec/Io < -23.5 dB 2 -23.5 dB ≤ Ec/Io < -23 dB … 47 -1 dB ≤ Ec/Io < -0.5 dB 48 -0.5 dB ≤ Ec/Io < 0 dB 49 0 dB ≤ Ec/Io 255 Not known or not detectable **<rsrq>** Integer type; reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7) 0 rsrq < -19.5 dB 1 -19.5 dB ≤ rsrq < -19 dB 2 -19 dB ≤ rsrq < -18.5 dB … 32 -4 dB ≤ rsrq < -3.5 dB 33 -3.5 dB ≤ rsrq < -3 dB 34 -3 dB ≤ rsrq 255 Not known or not detectable **<rsrp>** Integer type; reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4) 0 rsrp < -140 dBm 1 -140 dBm ≤ rsrp < -139 dBm 2 -139 dBm ≤ rsrp < -138 dBm … 95 -46 dBm ≤ rsrp < -45 dBm 96 -45 dBm ≤ rsrp < -44 dBm 97 -44 dBm ≤ rsrp 255 Not known or not detectable **<rssnr>** Integer type; radio signal strength noise ration value -100 RSSNR ≤ -50 dB -99 -50 dB < RSSNR ≤ -49.5 dB -98 -49.5 dB < RSSNR ≤ -49 dB … -1 -1 dB < RSSNR ≤ -0.5 dB 0 -0.5 dB < RSSNR ≤ 0 dB 1 0 dB < RSSNR ≤ 0.5 dB … 98 49 dB ≤ RSSNR < 49.5 dB 99 49.5 dB ≤ RSSNR < 50 dB 100 50 dB ≤ RSSNR 255 Not known or not detectable
Unsolicited Notification	Response **+XCESQI: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>,<rssnr>**

HL7528	
Notes	• If the current serving cell is not a GERAN cell, <rxlev> and <ber> are set to value 99. • If the current serving cell is not a UTRA FDD or UTRA TDD cell, <rscp> and <ecno> are set to 255. • If the current serving cell is not an E-UTRA cell, <rsrq>, <rsrp> and <rssnr> are set to 255.

5.41. +KSREP Command: Mobile Start-up Reporting

HL7528	
Test command Syntax **AT+KSREP=?**	 Response **+KSREP: (**list of supported **<act>**s**)** **OK**
Read command Syntax **AT+KSREP?**	 Response **+KSREP: <act>,<stat>,<PB ready>** **OK**
Write command Syntax **AT+KSREP= <act>**	 Response **OK** Parameters **<act>** Indicates if the module must send an unsolicited code during the startup 0 The module doesn't send an unsolicited code 1 The module will send an unsolicited code **<stat>** This code indicates the status of the module 0 The module is ready to receive commands for the TE. No access code is required 1 The module is waiting for an access code. (The AT+CPIN? command can be used to determine this) 2 The SIM card is not present 3 The module is in "SIMlock" state 4 unrecoverable error 5 unknown state **<PB ready>** Indicates if +PBREADY URC received or not 0 Phonebook not ready 1 Phonebook ready for read and write
Reference Sierra Wireless Proprietary	Notes • The module uses unsolicited code once after the boot process **+KSUP: <stat>** • If <act>=0, +PBREADY and +SIM URC notifications will not be sent at the start up process. However, they will still be sent afterwards during normal modem operation.

HL7528	

Examples	// 1) SIM detect is enabled, AT+KSIMDET=1
	// Reboot module with SIM card inserted and +KSREP disabled; no +KSUP, +PBREADY, // and +SIM URC at start-up
	at+ksimdet?
	+KSIMDET: 1 // SIM detect enabled
	OK
	
	at+ksrep?
	+KSREP: 0,0,1 // Start-up reporting is disabled; module is ready, +PBREADY is // received
	OK
	+SIM: 0 // remove SIM card
	
	at+ksrep?
	+KSREP: 0,2,0 // Start-up reporting is disabled; SIM card not present, +PBREADY not // received
	OK
	
	+SIM: 1 // insert SIM card
	+PBREADY
	
	at+ksrep?
	+KSREP: 0,0,1 // Start-up reporting is disabled; module is ready, +PBREADY is // received
	OK
	
	at+ksrep=1 // enable start-up reporting
	OK
	
	// reboot module
	+SIM: 1 // URC display at start-up
	+KSUP: 0 // module is ready
	+PBREADY
	
	at+ksrep?
	+KSREP: 1,0,1n // Start-up reporting is enabled; module is ready, +PBREADY is // received
	OK
	
	+SIM: 0 // remove SIM card
	
	at+ksrep?
	+KSREP: 1,2,0 // Start-up reporting is enabled; SIM card not present, +PBREADY not // received
	OK
	
	+SIM: 1 // insert SIM card
	+PBREADY
	
	at+ksrep?
	+KSREP: 1,0,1 // Start-up reporting is enabled; module is ready, +PBREADY is // received
	OK // SIM card present

HL7528	

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

HL7528	

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

5.42. +KSIMDET Command: SIM Detection

HL7528	
Test command Syntax **AT+KSIMDET=?**	 Response **+KSIMDET:** (list of supported **<mod>**) **OK**
Read command Syntax **AT+KSIMDET?**	 Response **+KSIMDET: <mod>** **OK**
Write command Syntax **AT+KSIMDET= <mod>**	 Response **OK** Parameter **<mod>** 0 Disable SIM detection 1 Enable SIM detection

HL7528	
Notes	• If a change in the SIM status is detected, the module is notified by URC **+SIM: <status>**, where <status> = 0 means the SIM is extracted and <status> = 1 means the SIM is inserted. • This command can be supported even without SIM card. • The setting of <mod> will be kept after module reboot. • The value of +KSIMDET should be set before inserting a SIM card.

Examples	// A SIM card is inserted
	AT+KSIMDET? // read current setting
	+KSIMDET: 1
	OK
	
	+SIM: 0 // Active SIM card is removed
	+SIM: 1 // Active SIM card is inserted
	
	AT+KSIMDET=? // check supported setting
	+KSIMDET: (0-1)
	OK
	
	AT+KSIMDET=0 // disable SIM detection
	OK
	
	// no URC indication when SIM cars is removed or inserted
	AT+KSIMDET? // read current setting
	+KSIMDET: 0
	OK
	
	// reboot module
	AT+KSIMDET? // read current setting
	+KSIMDET: 0
	OK

5.43. +KRIC Command: Ring Indicator Control

HL7528	
Test command Syntax **AT+KRIC=?**	 Response **+KRIC:** (list of supported **<masks>**s),(list of supported **<shape>**s) **OK**
Read command Syntax **AT+KRIC?**	 Response **+KRIC: <masks>,<shape>** **OK**

HL7528	
Write command Syntax **AT+KRIC=<masks>[,<shape>]**	Response **OK** Parameters **<masks>** Use of RI signal 0x00 RI not used 0x01 RI activated on incoming calls (+CRING, RING) 0x02 RI activated on SMS (+CMT, +CMTI) 0x04 RI activated on SMS-CB (+CBM, +CBMI) 0x08 RI activated on USSD (+CUSD) 0x10 RI activated on network state (+CIEV) **<shape>** Signal shape – available only for incoming calls 0 Repeat pulses. The total length of the pulse is equivalent to the transfer of the RING or CRING notification 1 Always active. The signal is set to active during the whole incoming call notification.
Reference Sierra Wireless Proprietary	Notes • The current configuration is kept in flash after a reset. • For SMS and other unsolicited messages, only one pulse is set, regardless of <shape>. • The width of the pulse is 1s. For repeated pulse on incoming calls, pulse width is 1s, and then rest for 4 second, and then repeated. • Do not use the command while an incoming call, SMS, SMSCB, USSD, etc. • This command can be used without SIM. • If <shape> is omitted, the previously saved value will be used.
Examples	**AT+KRIC=?** **+KRIC: (0-31),(0-1)** **OK** **AT+KRIC?** **+KRIC: 15,0** **OK** **AT+KRIC=1,1** // RI activated on incoming call with always acitve **OK** **AT+KRIC?** **+KRIC: 1,1** **OK** **AT+KRIC=2** // RI activated on SMS **OK** **AT+KRIC?** **+KRIC: 2,1** **OK**

5.44. +KUSBCOMP Command: Set USB Composition

HL7528	
Test command Syntax **AT+KUSBCOMP=?**	Response **+KUSBCOMP: (**list of supported **<mode>**s**)** **OK**
Read command Syntax **AT+KUSBCOMP?**	Response **+KUSBCOMP: <mode>** **OK**
Write command Syntax **AT+KUSBCOMP=<mode>**	Response **OK** Parameter **<mode>** 0 3 CDC-ACM and 4 CDC-NCM mode with Selective Suspend, (PID: 0x0443) NCM1 – Network adapter port NCM2 – Network adapter port NCM3 – Network adapter port NCM4 – Network adapter port USB0 – AT / modem port USB1 – Mobile Analyzer traces port USB2 – AT / modem port 1 1 CDC-ACM mode with Selective Suspend, (PID: 0x0443) USB0 – AT / modem port 2 1 CDC-ACM mode without Selective Suspend, (PID: 0x0443) USB0 – AT / modem port
Reference Sierra Wireless Proprietary	Notes • The current configuration is kept in non-volatile memory. • The new configuration will only be activated after the module reboots. • The factory preset value of **<mode>** is 0. • This command can be used without SIM.
Examples	**AT+KUSBCOMP=0** // Set to 3 CDC-ACM and 4 CDC-NCM mode with Selective // Suspend support **OK** **AT+KUSBCOMP=1** // Set to 1 CDC-ACM mode with Selective Suspend support **OK** **AT+KUSBCOMP=2** // Set to 1 CDC-ACM mode **OK** **AT+KUSBCOMP?** **+KUSBCOMP: 2** **OK**

HL7528	
	<<<< Reboot module >>>> **AT+KUSBCOMP?** **+KUSBCOMP: 2** **OK**

5.45. +XPINCNT Command: Get Remaining SIM PIN Attempts

HL7528	
Test command Syntax **AT+XPINCNT=?**	 Response **OK**
Execute command Syntax **AT+XPINCNT**	 Response **+XPINCNT: <PIN attempts>,<PIN2 attempts>,<PUK attempts>,<PUK2 attempts>** **OK** or **+CME ERROR: <err>** Parameter **<PIN attempts>** Number of remaining attempts to enter PIN. Default value = 3 **<PIN2 attempts>** Number of remaining attempts to enter PIN2. Default value = 3 **<PUK attempts>** Number of remaining attempts to enter PUK. Default value = 10 **<PUK2 attempts>** Number of remaining attempts to enter PUK2. Default value = 10

5.46. +KGSMAD Command: GSM, UMTS and LTE Antenna Detection

HL7528	
Test command Syntax **AT+KGSMAD=?**	 Response **+KGSMAD:** (list of supported **<mod>**s),(list of supported **<urcmode>**s),(list of supported **<interval>**s),(list of supported **<detGPIO>**s),(list of supported **<repGPIO>**s) **OK**

HL7528	
Read command Syntax **AT+KGSMAD?**	 Response **+KGSMAD: <mod>,<urcmode>,<interval>,<detGPIO>,<repGPIO>** **OK**
Write command Syntax **AT+KGSMAD=<mod>,[<urcmode>[,<interval>[,<detGPIO>[,<repGPIO>]]]]**	 Response **OK** Parameters **<mod>** 0 Disable antenna detection 1 Periodic antenna detection 2 Instantaneous antenna detection **<urcmode>** URC presentation mode. This parameter only has meaning if <mod>=1 0 Disable the presentation of antenna detection URC 1 Enable the presentation of antenna detection URC **<interval>** 45 – 3600s Interval between two detections (default value = 120). Only used when <mod> = 1 **<detGPIO>** 1 – 8, 10, 11,13 – 15 Defines which GPIO is to be used as input by the antenna detection algorithm (default value = 5) **<repGPIO>** 1 – 8, 10, 11,13 – 15 Defines which GPIO is to be used as output by the antenna detection algorithm to report antenna condition (default value = 7). Only used when <mod> = 1
Notes	• **<repGPIO>** is set to LOW when the antenna is connected; otherwise this is set to HIGH. • If the antenna detection algorithm detects a change in the antenna status, the module is notified by URC **+KGSMAD: <presence>**, where <presence> = 0 Antenna connected 1 Antenna connector short circuited to ground 2 Antenna connector short circuited to power 3 Antenna not detected (open) • Check with +KGPIOCFG when using +KGSMAD command. GPIOs may be already used by +KSIMDET, +KSYNC, and +KTEMPMON. • Instantaneous activation doesn't affect a periodic activation eventually started earlier.

6. Network Service Related Commands

6.1. +CAOC Command: Advice of Charge

HL7528	
Test command Syntax **AT+CAOC=?**	 Response **+CAOC**: (list of supported **<mode>**s) **OK**
Read command Syntax **AT+CAOC?**	 Response **+CAOC: <mode>** **OK**
Write command Syntax **AT+CAOC=** **[<mode>]**	 Response **+CAOC: <ccm>** **OK** or **+CME ERROR: <err>** Parameters **<mode>** 0 Query CCM value 1 Deactivate unsolicited notification (+CCCM) 2 Activate unsolicited notification **<ccm>** String type; three bytes of the current call meter value in hexadecimal format
Unsolicited Notification	Response **+CCCM: <ccm>**

6.2. +CUSD Command: Unstructured Supplementary Service Data

HL7528	
Test command Syntax **AT+CUSD=?**	 Response **+CUSD:** (list of supported **<n>**s) **OK**

HL7528	
Read command Syntax **AT+CUSD?**	Response **+CUSD: <n>** **OK**
Write command Syntax **AT+CUSD=[<n>[,<str>[,<dcs>]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<n>** Enables or disables the presentation of an unsolicited result code 0 Disable the result code presentation to the TE (default value if no parameter) 1 Enable the result code presentation to the TE 2 Cancel session (not applicable to read command response) **<str>** String type USSD-string (when <str> parameter is not given, network is not interrogated) **<dcs>** Cell Broadcast Data Coding Scheme in integer format (default value: 0) **<m>** 0 No further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation) 1 Further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation) 2 USSD terminated by network 3 Other local client has responded 4 Operation not supported 5 Network time out
Unsolicited Notification	Response **+CUSD: <m>[,<str>,<dcs>]**

6.3. +CLCK Command: Facility Lock

HL7528	
Test command Syntax **AT+CLCK=?**	Response **+CLCK:** (list of supported **<fac>**s) **OK** or **+CME ERROR: <err>**

HL7528

Write command

Syntax

AT+CLCK=<fac>, <mode> [,<passwd> [,<class>]]

Response

If **<mode>** = 2 and command is successful

OK

+CLCK: <status>[,<class1>[<CR>,<LF>
+CLCK: <status>,class2…]]

or

+CME ERROR: <err>

Parameters

<fac> Values reserved by the present document:

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

<classx> Sum of integers each representing a class of information (default value = 7)

2	Data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64 and 128)
4	Fax (facsimile services)
8	Short message service
16	Data circuit sync
32	Data circuit async
64	Dedicated packet access
128	Dedicated PAD access

6.4. +CNUM Command: Subscriber Number

HL7528	
Test command Syntax **AT+CNUM=?**	 Response **OK**
Execute command Syntax **AT+CNUM**	 Response **+CNUM: [<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]][<CR><LF>** **+CNUM: [<alpha2>],<number2>,<type2>[,<speed>,<service>[,<itc>]][...]]** **OK** or **+CME ERROR: <err>** Parameters **<alphax>** Optional alphanumeric string associated with <numberx>; used character set should be the one selected with command +CSCS **<numberx>** String type phone number of format specified by <typex> **<typex>** Type of address octet in integer format **<speed>** As defined in 27.007 sub clause 6.7, corresponding to +CBST setting **<service>** Service related to the phone number 0 Asynchronous modem 1 Synchronous modem 2 PAD Access (asynchronous) 3 Packet Access (synchronous) 5 Fax **<itc>** Information transfer capability 0 3.1kHz 1 UDI

6.5. +COLP Command: Connected Line Identification Presentation

HL7528	
Test command Syntax **AT+COLP=?**	 Response **+COLP:** (list of supported **<n>**s) **OK**

HL7528	
Read command Syntax **AT+COLP?**	 Response **+COLP: <n>,<m>** **OK**
Write command Syntax **AT+COLP=[<n>]**	 Response **OK** or **+CME ERROR: <err>** Parameters **<n>** 0 Disable result code presentation status to the TE 1 Enable result code presentation status to the TE **<m>** 0 COLP not provisioned 1 COLP provisioned 2 Unknown (e.g. no network, etc.)
Notes	If the connected line identity of the called party is enabled, (and called subscriber allows it), the intermediate result code **+COLP: <number>,<type>[,<subaddr>, <satype>[,<alpha>]]** is returned from TA to TE.

6.6. +COPN Command: Read Operator Name

HL7528	
Test command Syntax **AT+COPN=?**	 Response **OK**
Execute command Syntax **AT+COPN**	 Response **+COPN: <numeric1>,<alpha1>[<CR><LF>** **+COPN: <numeric2>,<alpha2>** **[...]]** **OK** or **+CME ERROR: <err>** Parameters **<numeric>** String type; operator in numeric format (see +COPS) **<alpha>** String type; operator in long alphanumeric format (see +COPS)
Notes	If the matching PLMN name is not found then the numeric PLMN ID (MCCMNC) will be displayed.

6.7. +COPS Command: Operator Selection

HL7528

Test command

Syntax
AT+COPS=?

Response
+COPS: [list of supported (**<stat>**, long alphanumeric **<oper>**, short alphanumeric **<oper>**, numeric **<oper>[,< AcT>,<plmn_list>**)s][,,(list of supported **<mode>**s),(list of supported **<format>**s)]
OK

or
+CME ERROR: <err>

Read command

Syntax
AT+COPS?

Response
+COPS: <mode>[,<format>,<oper>[,<AcT>]]
OK

or
+CME ERROR: <err>

Write command

Syntax
AT+COPS=
[<mode>
[,<format>
[,<oper>
[,< AcT>]]]]

Response
OK

or
+CME ERROR: <err>

Parameters

<mode>	0	Automatic; in this case other fields are ignored and registration is done automatically by ME
	1	Manual (other parameters like format and operator need to be passed)
	2	Deregister from network
	3	Sets <format> value. In this case <format> becomes a mandatory input
	4	Manual/automatic; if manual selection fails then automatic mode is entered
<format>	0	Long alphanumeric; if network name is not available it displays a combination of MCC and MNC in string format
	1	Short alphanumeric
	2	Numeric

<oper> String type given in format <format>; this field may be up to 16 characters long for long alphanumeric format, up to 8 characters for short alphanumeric format and 5 characters long for numeric format (MCC/MNC codes)

<stat>	0	Unknown networks
	1	Network available
	2	Current (registered)
	3	Forbidden network
<AcT>	7	LTE

HL7528	
	<plmn_list> 0 PLMN is present on the EHPLMN list 1 PLMN is present on the user-controlled PLMN list 2 PLMN is present on the operator-controlled PLMN list Note that this parameter only supports R7 Protocol Stack onwards.
Notes	• This command forces an attempt to select and register the GSM, UMTS network. • Set command sets automatic network selection or selects network and a certain access technology AcT. • Read command returns current network. • Test command returns available networks and lists of supported <mode>s and <format>s. • This command is abortable. The port shall be freed for issuing another command. No network abort shall be triggered. • <mode>=0,1,2,4 and <oper> are saved in non-volatile memory over module reboot. • <format> is saved in non-volatile memory per AT port over module reboot.

6.8. +CPOL Command: Preferred PLMN List

HL7528	
Test command Syntax **AT+CPOL=?**	Response **+CPOL:** (list of supported **<index>**es),(list of supported **<format>**s) **OK** or **+CME ERROR: <err>**
Read command Syntax **AT+CPOL?**	Response **+CPOL: <index1>,<format>,<oper1>[,<GSM_AcT1>,<GSM_Compact_AcT1>, <UTRAN_AcT1>][<CR><LF>** **+CPOL: <index2>,<format>,<oper2>[,<GSM_AcT2>,<GSM_Compact_AcT2>, <UTRAN_AcT2>] [...]]** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+CPOL= [<index>] [,<format> [,<oper> [,<GSM_AcT>, <GSM_Compact_ AcT>,<UTRAN_ AcT>,<EUTRAN_ AcT>]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<index>** Integer type; order number of operator in the SIM/USIM preferred operator list

HL7528	
	<format> 0 Long format alphanumeric <oper> 1 Short format alphanumeric <oper> 2 Numeric <oper> **<opern>** String type; <format> indicates if the format is alphanumeric or numeric **<GSM_AcT>** 0 GSM access technology not selected 1 GSM access technology selected **<GSM_Comp_AcT>** 0 GSM compact access technology not selected 1 GSM compact access technology selected **<UTRA_AcT>** 0 UTRA access technology not selected 1 UTRA access technology selected **<EUTRA_AcT>** 0 UTRA access technology not selected 1 UTRA access technology selected
Notes	• The read command can have “n” RAT values. • If matching PLMN name is not found, then numeric PLMN ID (MCCMNC) will be displayed.

6.9. +CPWD Command: Change Password

HL7528	
Test command Syntax **AT+CPWD=?**	Response **+CPWD:** list of supported (**<fac>,<pwdlength>**)s **OK**
Write command Syntax **AT+CPWD= <fac>,<oldpwd>, <newpwd>**	Response **OK** or **+CME ERROR: <err>** Parameters **<fac>** "PS" PH-SIM (lock Phone to SIM/UICC card installed in the currently selected card slot) (MT asks for the password when other than current SIM/UICC card is inserted; MT may remember certain previously used cards thus not requiring password when they are inserted) "SC" SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command issued) "AO" BAOC (Barr All Outgoing Calls) "OI" BOIC (Barr Outgoing International Calls) "OX" BOIC-exHC (Barr Outgoing International Calls except to Home Country) "AI" BAIC (Barr All Incoming Calls)

HL7528	
	"IR" BIC-Roam (Barr Incoming Calls when Roaming outside the home country) "FD" SIM card or active application in the UICC (GSM or USIM) fixed dialing memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as <passwd>) "PN" Network Personalization "PU" Network subset Personalization "PP" Service Provider Personalization "PC" Corporate Personalization **<oldpwd>** String type containing the old password **<newpwd>** String type containing the new password **<pwdlength>** Length of password

6.10. +CREG Command: Network Registration

HL7528	
Test command Syntax **AT+CREG=?**	Response **+CREG:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CREG?**	Response **+CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]]** **OK**
Write command Syntax **AT+CREG=[<n>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<n>** 0 Disable network registration unsolicited result code 1 Enable network registration unsolicited result code **+CREG: <stat>** 2 Enable network registration and location information unsolicited result code **+CREG: <stat>[,<lac>,<ci>[,<Act>]]** **<stat>** 0 Not registered, ME is not currently searching a new operator to register to 1 Registered, home network 2 Not registered, but ME is currently searching a new operator to register to 3 Registration denied 4 Unknown 5 Registered, roaming **<lac>** String type; two-byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

HL7528	
	<ci> String type; four-byte E-UTRAN cell ID in hexadecimal format **<AcT>** 7 E-UTRAN
Unsolicited Notification	Response When <n>=1 and there is a change in the ME network registration status code: **+CREG: <stat>** When <n>=2 and there is a change in the network cell: **+CREG: <stat>[,<lac>,<ci>[,<Act>]]**
Notes	<n> is saved in non-volatile memory per AT port over module reboot

6.11. +CSSN Command: Supplementary Service Notification

HL7528	
Test command Syntax **AT+CSSN=?**	Response **+CSSN:** (list of supported **<n>**s), (list of supported **<m>**s) **OK**
Read command Syntax **AT+CSSN?**	Response **+CSSN: <n>,<m>** **OK**
Write command Syntax **AT+CSSN=[<n>[,<m>]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<n>** 0 Disable +CSSI result code presentation status to the TE 1 Enable +CSSI result code presentation status to the TE **<m>** 0 Disable +CSSU result code presentation status to the TE 1 Enable +CSSU result code presentation status to the TE
Unsolicited Notification	Response **+CSSI: <code1>[,<index>]** **+CSSU: <code2>[<index> [,<number>,<type>]]** Parameters **<code1>** 0 Unconditional call forwarding is active 1 Some of the conditional call forwarding are active 2 Call has been forwarded

HL7528			
		3	Call is waiting
		4	This is a CUG call (also <index> present)
		5	Outgoing calls are barred
		6	Incoming calls are barred
		7	CLIR suppression rejected
		8	Call has been deflected
	<index>	0 – 9	Index
		10	No index (prefer to take from subscriber data)
	<code2>	0	This is a forwarded call (MT call setup)
		1	This is a CUG call (<index> present) (MT call setup)
		6	Forward check SS message received (can be received whenever)
		8	Call has been connected with the other remote party in explicit call transfer operation (during an MT call setup)
		9	This is a deflected call (MT call setup)
		10	Additional incoming call forwarded
	<number>	String type phone of format specified by <type>	
	<type>	Type of address octet in Integer format	
Notes	<n> and <m> are saved in non-volatile memory per AT port over module reboot		

6.12. +CPLS Command: Select Preferred PLMN List

HL7528	
Test command Syntax **AT+CPLS=?**	Response **+CPLS:** (list of supported **<cpls_list>**s) **OK**
Read command Syntax **AT+CPLS?**	Response **+CPLS: <cpls_list>** **OK**
Write command Syntax **AT+CPLS= [<cpls_list>]**	Response **OK** or **+CME ERROR: <err>** Parameter **<cpls_list>** 0 User controlled PLMN selector with access technology EFPLMNwAcT, but iff not found in the SIM/UICC, then the PLMN preferred list is EFPLMNsel 1 Operator controlled PLMN selector with access technology EFOPLMNwAcT 2 HPLMN selector with access technology EFHPLMNwAcT

6.13. +CEREG Command: EPS Network Registration Status

HL7528	
Test command Syntax **AT+CEREG=?**	Response **+CEREG:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CEREG?**	Response **+CEREG: <n>,<stat>[,<tac>,<ci>[,<AcT>]]** **OK**
Write command Syntax **AT+CEREG=[<n>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<n>** 0 Disable network registration unsolicited result code 1 Enable network registration unsolicited result code **+CEREG: <stat>** 2 Enable network registration unsolicited result code **+CEREG: <stat>[,<tac>,<ci>[,<AcT>]]** **<stat>** 0 Not registered, MT is not currently searching an operator to register to 1 Registered on the 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 5 Registered, roaming 8 Attached for emergency bearer services only (not available) **<tac>** String type; two-byte tracking area code in hexadecimal format (e.g. “00C3” is equals to 195 in decimal) **<ci>** String type; four-byte E-UTRAN cell ID in hexadecimal format **<AcT>** 7 E-UTRAN

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

HL7528	
Test command Syntax **AT+CEMODE=?**	 Response **+CEMODE:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+CEMODE?**	 Response **+CEMODE: <mode>** **OK**
Write command Syntax **AT+CEMODE=[<mode>]**	 Response **OK** or **+CME ERROR: <err>** Parameter **<mode>** Indicates mode of operation 0 PS mode 2 of operation 1 Type not supported 2 CS/PS mode 2 of operation 3 PS mode 1 of operation
Notes	<mode> is saved in non-volatile memory over module reboot.

6.15. +WEXTCLK Command: External Clocks Setting

HL7528	
Test command Syntax **AT+WEXTCLK=?**	 Response **+WEXTCLK: (**list of supported **<output>**s**),(**list of supported **<status>**es**)** **OK**
Read command Syntax **AT+WEXTCLK?**	 Response **+WEXTCLK: <output>,<status>** **+WEXTCLK: <output>,<status>** **OK**

HL7528	
Write command Syntax **AT+WEXTCLK= <output>, <status>**	Response **+WEXTCLK: <output>,<status>** **OK** Parameters **<output>** 0 32kHz output (32K_CLKOUT) 1 26MHz output (26M_CLKOUT) **<status>** 0 Disabled 1 Enabled
Notes	• This command allows generating 32 kHz and 26 MHz on the output clock pins of the module. • The parameters are saved in non-volatile memory. • This command is available when the module has finished its initialization. • This command works without SIM card.

7. Phone Book Management

7.1. +PBREADY URC: Phonebook Ready

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

8. SMS 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; the total size of the broadcast message storage is 4.
"ME"	ME message storage; default value
"MT"	Any of the storages associated with ME
"SM"	(U)SIM message storage
"TA"	TA message storage
"SR"	Status report storage

<mem2> String type; memory to which writing and sending operations are made (commands Send Message from Storage +CMSS and Write Message to Memory +CMGW); refer <mem1> for defined values. Default value is “ME”.

<mem3> String type; preferred memory to which received SMs are to be stored (unless forwarded directly to TE; refer command New Message Indications +CNMI); refer <mem1> for defined values. Default value is “ME”.

<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 command +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 command +CSCS). Type of address is given by <toda>.

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

- if <dcs> indicates that GSM 7-bit default alphabet is used and <fo> indicates that user data header indication is not set
  - if TE character set other than "HEX" (refer to command +CSCS): ME/TA converts GSM alphabet into current TE character set
  - if TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7-bit default alphabet into two IRA character long hexadecimal number (e.g. character Π (GSM 7-bit default alphabet 23) is presented as 17 (IRA 49 and 55))
- if <dcs> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that user data header indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))

In the case of CBS: CBM Content of Message in text mode responses; format:

- if <dcs> indicates that GSM 7-bit default alphabet is used
  - if TE character set other than "HEX" (refer to command +CSCS); ME/TA converts GSM alphabet into current TE character set
  - if TE character set is "HEX"; ME/TA converts each 7-bit character of the GSM 7-bit default alphabet into two IRA character long hexadecimal number
- if <dcs> indicates that 8-bit or UCS2 data coding scheme is used; ME/TA converts each 8-bit octet into two IRA character long hexadecimal number

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

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

<mid> CBM Message Identifier in integer format

<mn> TP-Message-Number in integer format

<mr> Message reference in integer format

<oa> Origiantion address address value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command +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 command +CSCS); type of address is given by <tora>
<sca>	String value enclosed in quotes indicating the service center address. Note that BCD numbers are converted to characters; type of address is given by <tosca>
<scts>	Service centre time stamp in time-string format (refer to <dt>)
<sn>	CBM Serial Number in integer format
<st>	Status in integer format
<toda>	Type of address octet in integer format. Default value is 145 if the first character of <da> is “+”; otherwise, default value is 129
<tooa>	Originating address type of address octet in integer format (refer to <toda> for the default value)
<tora>	Recipient address type of address octet in integer format (refer to <toda> for the default value)
<tosca>	SC address type of address octet in integer format (refer to <toda> for the default value)
<vp>	Depending on SMS-SUBMIT <fo> setting: TP-Validity-Period either in integer format (default value = 167) or in time-string format (refer to <dt>)
<vp>	Validity period in either integer format (default value = 167) or in time-string format depending on <fo> settings
<dcs>	SMS Data Coding Scheme (default value = 0), or Cell Broadcast Data Coding Scheme in integer format
<dt>	Discharge time in time-string format “yy/MM/dd,hh:mm:ss+zz” where the characters indicate year, month, day, hour, minutes, seconds and time zone. For example, May 6, 1994, 10:10 pm GMT+2 hours is equals to “94/05/06,22:10:00+08”
<fo>	First octet of SMS-DELIVER, SMS-SUBMIT (default value = 17), SMS-STATUS-REPORT, or SMS-COMMAND (default value = 2) in integer format depending on command or result code

8.2. +CMGD Command: Delete Message

HL7528	
Test command Syntax **AT+CMGD=?**	Response **+CMGD:** (list of supported **<index>**es)[,(list of supported **<delflag>**s)] **OK**
Write command Syntax **AT+CMGD=<index>[,<delflag>]**	Response **OK** or **+CMS ERROR: <err>**

HL7528	
	Parameter **<delflag>** Integer indicating multiple message deletion request 0 (or omitted) Delete the message specified in <index> 1 Delete all read messages from preferred message storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched 2 Delete all read messages from preferred message storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched 3 Delete all read messages from preferred message storage, sent and unsent mobile originated messages leaving unread messages untouched 4 Delete all messages from preferred message storage including unread messages
Notes	Execution command deletes message from preferred message storage <mem1>, location <index>. If <delflag> is present and not set to 0 then the ME shall ignore <index> and follow the rules for <delflag> shown above.

8.3. +CMGF Command: Set Message Format

HL7528	
Test command Syntax **AT+CMGF=?**	Response **+CMGF:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+CMGF?**	Response **+CMGF: <mode>** **OK**
Write command Syntax **AT+CMGF= [<mode>]**	Response **OK** or **+CMS ERROR: <err>** Parameters **<mode>** 0 PDU mode (default when implemented) 1 Text mode
Notes	<mode> is saved in non-volatile memory per AT port over module reboot.

8.4. +CMGL Command: List Messages

HL7528	
Test command Syntax **AT+CMGL=?**	Response **+CMGL:** (list of supported **<stat>**s) **OK**
Execute command Syntax **AT+CMGL [=<stat>]**	Response If in text mode, command is successful and SMS-SUBMITs and/or SMS-DELIVERs: **+CMGL: <index>,<stat>, <oa/da>,[<alpha>], [<scts>][,<tooa/toda>,<length>] <CR><LF><data>[<CR><LF>** **+CMGL: <index>,<stat>, <da/oa>,[<alpha>], [<scts>][,<tooa/toda>, <length>] <CR><LF><data>** **[...]]** If in text mode, command is successful and SMS-STATUS-REPORTs: **+CMGL: <index>, <stat>,<fo>, <mr>, [<ra>], [<tora>], <scts>, <d-t>,<st>[<CR><LF>** **+CMGL: <index>, <stat>, <fo>, <mr>,[<ra>], [<tora>],<scts>,<d_t>,<st>[...]]** If in text mode, command is successful and SMS-COMMANDs: **+CMGL: <index>,<stat>,<fo>,<ct> [<CR><LF>** **+CMGL: <index>,<stat>, <fo>,<ct>[...]]** If in text mode, command is successful and CBM storage: **+CMGL: <index>,<stat>,<sn>, <mid>, <page>,<pages> <CR><LF><data>[<CR><LF>** **+CMGL: <index>,<stat>,<sn>, <mid>,<page>,<pages><CR><LF><data>[...]]** If in PDU mode and command is successful: **+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu>** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 8.1 Parameters Definition.

8.5. +CMGR Command: Read Message

HL7528	
Test command Syntax **AT+CMGR=?**	Response **OK**

HL7528	

Write command
 	
Syntax
AT+CMGR=<index>
	Response
	If text mode (+CMGF=1), command is successful, and SMS-DELIVER:
	+CMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>
	
	if text mode (+CMGF=1), command is successful, and SMS-SUBMIT:
	+CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>
	
	if text mode (+CMGF=1), command is successful, and SMS-STATUS-REPORT:
	+CMGR: <stat>,<fo>,<mr>,[<ra>], [<tora>],<scts>,<d_t>,<st>
	
	if text mode (+CMGF=1), command is successful, and SMS-COMMAND:
	+CMGR: <stat>, <fo>,<ct>[, <pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]
	
	if text mode (+CMGF=1), command is successful, and CBM storage:
	+CMGR: <stat>,<sn>, <mid>,<dcs>,<page>,<pages><CR><LF><data>
	
	if PDU mode (+CMGF=0) and command is successful:
	+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu>
	
	or
	+CMS ERROR: <err>
	
	Parameters
	For parameter information and values, refer to section 8.1 Parameters Definition.

Notes	After ME SMS storage is full, the receiving SMS may lose because of network behavior.

8.6. +CMGS Command: Send Message

HL7528	
Test command Syntax **AT+CMGS=?**	Response **OK**
Write command Syntax If text mode (+CMGF=1): **AT+CMGS=<da>[,<toda>]<CR>** **text is entered** **<ctrl-Z/ESC>**	Response If text mode (+CMGF=1) and sending is successful: **[+CMGS: <mr>[,<scts>]]** **OK** if PDU mode (+CMGF=0) and sending is successful: **[+CMGS: <mr>]** **OK** or **+CMS ERROR: <err>**

HL7528	
If PDU mode (+CMGF=0): **AT+CMGS= <length><CR> PDU is given <ctrl-Z/ESC>**	Parameters For parameter information and values, refer to section 8.1 Parameters Definition.
Notes	• The TA shall send a four-character sequence <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>; after that PDU can be given from TE to ME/TA. • The PDU shall be hexadecimal format (similarly as specified for <pdu>) and given in one line; ME/TA converts this coding into the actual octets of PDU. • When the length octet of the SMSC address (given in the PDU) equals zero, the SMSC address set with command Service Centre Address +CSCA is used; in this case the SMSC Type-of-Address octet shall not be present in the PDU, i.e. TPDU starts right after SMSC length octet. • Sending can be cancelled by giving <ESC> character. • <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

HL7528	
Test command Syntax **AT+CMGW=?**	Response **OK**
Write command Syntax If text mode (+CMGF=1): **AT+CMGW[= <oa/da> [,<tooa/toda> [,<stat>]]]<CR> text is entered <ctrl-Z/ESC>** If PDU mode (+CMGF=0): **AT+CMGW= <length>[,<stat>] <CR> PDU is given <ctrl-Z/ESC>**	Response **+CMGW: <index>** **OK** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 8.1 Parameters Definition.
Notes	• Execution command stores a message to memory storage <mem2>, and memory location <index> of the stored message is returned. • By default, message status will be set to 'stored unsent', but parameter <stat> also allows other status values to be given. (ME/TA manufacturer may choose to use different default <stat> values for different message types.) • Entering of PDU is done similarly as specified in command +CMGS.

8.8. +CMSS Command: Send Message from Storage

HL7528	
Test command Syntax **AT+CMSS=?**	 Response **OK**
Write command Syntax **AT+CMSS= <index>[,<da> [,<toda>]]**	 Response If text mode (+CMGF=1) and sending issuccessful: **+CMSS: <mr>[,<scts>]** If PDU mode (+CMGF=0) and sending is successful: **+CMSS: <mr>** **OK** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 8.1 Parameters Definition.
Notes	• Execution command sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address <da> is given for SMS-SUBMIT, it shall be used instead of the one stored with the message. • Reference value <mr> is returned to the TE on successful message delivery. Optionally (when +CSMS <service> value is 1 and network supports the feature), <scts> is returned in text mode.

8.9. +CNMI Command: New Message Indication

HL7528	
Test command Syntax **AT+CNMI=?**	 Response **+CNMI:** (list of supported **<mode>**s), (list of supported **<mt>**s), (list of supported **<bm>**s), (list of supported **<ds>**es), (list of supported **<bfr>**s) **OK**
Read command Syntax **AT+CNMI?**	 Response **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>** **OK**

HL7528

Write command

Syntax

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

Response

OK

or

+CMS ERROR: <err>

Parameters

<mode>
- 0 Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.
- 1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved. Otherwise forward them directly to the TE.
- 2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.

<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
- 3 Acknowledgement command must be sent when +CSMS <service> = 1

<bm>
- 0 No CBM indications are routed to the TE.
- 1 If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: **+CBMI: <mem>,<index>**
- 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)
- 3 Class 3 CBMs are routed directly to TE using unsolicited result codes defined in <bm>=2. If CBM storage is supported, messages of other classes result in indication as defined in <bm>=1

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

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

Notes

- <mode>, <mt>, <bm> and <ds> are saved in non-volatile memory over module reboot; URC is available on the port that executes the command.
- If SMS-DELIVER, when an SMS is received as defined in <mt>=1, there is an unsolicited result code **+CMTI:<memory>,<index>** for SKT and KT.

8.10. +CSCB Command: Select Cell Broadcast Message Type

HL7528	
Test command Syntax **AT+CSCB=?**	 Response **+CSCB:** (list of supported **<mode>**s) **OK**
Read command Syntax **AT+CSCB?**	 Response **+CSCB: <mode>,<mids>,<dcss>** **OK**
Write command Syntax **AT+CSCB=** **[<mode>** **[,<mids>]]**	 Response **OK** or **+CMS ERROR: <err>** Parameters **<mode>** 0 Accepts messages that are defined in <mids> and <dcss> 1 Does not accept messages that are defined in <mids> and <dcss> **<mids>** String type; combinations of CBM message IDs (e.g. "0,1,5,320-478,922"). Default value is an empty string. The number of ranges in <mids> parameter string is limited to 6. Note that intervals are not allowed. **<dcss>** String type; all different possible combinations of CBM data coding schemes. Default value is an empty string.

8.11. +CSCA Command: Service Center Address

HL7528	
Test command Syntax **AT+CSCA=?**	 Response **OK**
Read command Syntax **AT+CSCA?**	 Response **+CSCA: <sca>,<tosca>** **OK**

HL7528	
Write command Syntax **AT+CSCA=<sca>[,<tosca>]**	Response **OK** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 8.1 Parameters Definition.

8.12. +CSMP Command: Set Text Mode Parameters

HL7528	
Test command Syntax **AT+CSMP=?**	Response **OK**
Read command Syntax **AT+CSMP?**	Response **+CSMP: <fo>,<vp>,<pid>,<dcs>** **OK**
Write command Syntax **AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]**	Response **OK** Parameters For parameter information and values, refer to section 8.1 Parameters Definition.

8.13. +CSMS Command: Select Message Service

HL7528	
Test command Syntax **AT+CSMS=?**	Response **+CSMS:** (list of supported **<service>**s) **OK**
Read command Syntax **AT+CSMS?**	Response **+CSMS: <service>,<mt>,<mo>,<bm>** **OK**

HL7528	
Write command Syntax **AT+CSMS=<service>**	Response **+CSMS: <mt>,<mo>,<bm>** **OK** or **+CMS ERROR: <err>** Parameters **<service>** 0 3GPP TS 23.040 and 3GPP TS 23.041 1 3GPP TS 23.040 and 3GPP TS 23.041 (the requirement of setting <service> =1 is mentioned in the corresponding command description) **<mt>** Message terminated messages 0 Type not supported 1 Type supported **<mo>** Message originated messages 0 Type not supported 1 Type supported **<bm>** Broadcast type messages 0 Type not supported 1 Type supported

8.14. +CPMS Command: Preferred Message Storage

HL7528	
Test command Syntax **AT+CPMS=?**	Response **+CPMS:** (list of supported **<mem1>**s), (list of supported **<mem2>**s), (list of supported **<mem3>**s) **OK**
Read command Syntax **AT+CPMS?**	Response **+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>** **OK** or **+CMS ERROR: <err>**

HL7528	
Write command Syntax **AT+CPMS= <mem1> [,<mem2> [,<mem3>]]**	Response **+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>** **OK** or **+CMS ERROR: <err>** Parameters For parameter information and values, refer to section 8.1 Parameters Definition.
Notes	<mem1>, <mem2> and <mem3> are saved in non-volatile memory over module reboot.

8.15. +CSDH Command: Show Text Mode Parameters

HL7528	
Test command Syntax **AT+CSDH=?**	Response **+CSDH:** (list of supported **<show>**s) **OK**
Read command Syntax **AT+CSDH?**	Response **+CSDH: <show>** **OK**
Write command Syntax **AT+CSDH= [<show>]**	Response **OK** or **+CME ERROR: <err>** Parameter **<show>** 0 Do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in +CMGL, +CMGR result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in +CMGR result code, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata> 1 Show values in result codes

9. Packet Domain Commands

9.1. +CGATT Command: PS Attach or Detach

HL7528	
Test command Syntax **AT+CGATT=?**	 Response **+CGATT:** (list of supported **<state>**s) **OK**
Read command Syntax **AT+CGATT?**	 Response **+CGATT: <state>** **OK**
Write command Syntax **AT+CGATT= [<state>]**	 Response **OK** or **ERROR** Parameters **<state>** State of PS attachment 0 Detached 1 Attached

9.2. +CGACT Command: Activate or Deactivate PDP Context

HL7528	
Test command Syntax **AT+CGACT=?**	 Response **+CGACT:** (list of supported **<state>**s) **OK**
Read command Syntax **AT+CGACT?**	 Response **+CGACT: <cid>, <state>** **OK**

HL7528	
Write command Syntax **AT+CGACT= [<state> [,<cid> [,<cid> [,...]]]]**	Response **OK** or **ERROR** Parameters **<state>** State of PDP context activation 0 Deactivated 1 Activated **<cid>** Numeric parameter which specifies a particular PDP context definition
Notes	Up to three (3) PDP contexts can be active at once.

9.3. +CGANS Command: PDP Context Activation Manual Response

HL7528	
Test command Syntax **AT+CGANS=?**	Response **+CGANS:** (list of supported **<response>**s), (list of supported **<L2P>**s) **OK**
Write command Syntax **AT+CGANS= [<response>, [<L2P> ,[<cid>]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<response>** 0 Reject the request (default value if omitted) 1 Accept and request that the PDP context be activated **<L2P>** String parameter indicating the layer 2 protocol to be used (see +CGDATA) **<cid>** Numeric parameter that specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT). Parameter <response> allows the TE to accept or reject the request.

HL7528	
Notes	• Commands following the +CGANS command in the AT command line shall not be processed by the MT. • If the <L2P> parameter value is unacceptable to the MT, the MT shall return an ERROR or +CME ERROR response. Otherwise, the MT issues the intermediate result code CONNECT and enters V.250 online data state. If no <cid> is given or if there is no matching context definition, the MT will attempt to activate the context using the values for PDP type and PDP address provided by the network, together with any other relevant information known to the MT. The other context parameters will be set to their default values. • If the activation is successful, data transfer may proceed. Note that this is not the same as if the MT issues a +CGDATA (or +CGACT) command after receiving a +CRING unsolicited result code. +CGDATA (or +CGACT) does not command the MT to acknowledge the network request but rather to make a new request for context activation. The network request would be ignored.

9.4. +CGCMOD Command: Modify PDP Context

HL7528	
Test command Syntax **AT+CGCMOD=?**	Response **+CGCMOD:** (list of **<cid>**s addociated with active contexts) **OK**
Write command Syntax **AT+CGCMOD=[<cid>[,<cid>[,...]]]**	Response **OK** or **+CME ERROR: <err>** Parameter **<cid>** Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT)

9.5. +CGTFT Command: Traffic Flow Template

HL7528	
Test command Syntax **AT+CGTFT=?**	Response **+CGTFT: <PDP_type>,** (list of supported **<packet filter identifier>**s) , (list of supported **<evaluation precedence index>**s), (list of supported **<source address and subnet mask>**s), (list of supported **<protocol number (ipv4) / next header (ipv6)>**s), (list of supported **<destination port range>**s), (list of supported **<source port range>**s), (list of supported **<ipsec security parameter index (spi)>**s), (list of supported **<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>**s), (list of supported **<flow label (ipv6)**>s), (list of supported **<direction>**s)

HL7528	
	[<CR><LF>+CGTFT: <PDP_type>, (list of supported **<packet filter identifier>**s), (list of supported **<evaluation precedence index>**s), (list of supported **<source address and subnet mask>**s), (list of supported **<protocol number (ipv4) / next header (ipv6)>**s), (list of supported **<destination port range>**s),(list of supported **<source port range>**s), (list of supported **<ipsec security parameter index (spi)>**s), (list of supported **<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>**s), (list of supported **<flow label (ipv6)**>s), (list of supported **<direction>**s)**[...]]**
Read command Syntax **AT+CGTFT?**	Response **+CGTFT: <cid>, <packet filter identifier>,<evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)>, <direction>** **[<CR><LF>+CGTFT: <cid>, <packet filter identifier>, <evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)>, <direction>** **[...]]**
Write command Syntax **AT+CGTFT= [<cid>,[<packet filter identifier>, <evaluation precedence index> [,<source address and subnet mask> [,<protocol number (ipv4) / next header (ipv6)> [,<destination port range> [,<source port range> [,<ipsec security parameter index (spi)> [,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask> [,<flow label (ipv6)>, <direction>]]]]]]]]]**	Response **OK** or **ERROR** Parameters **<cid>** Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT) **<packet filter identifier>** Numeric parameter with value range from 1 to 16 **<evaluation precedence index>** Numeric parameter with value range from 0 to 255 **<source address and subnet mask>** String type 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 **<protocol number (ipv4) / next header (ipv6)>** Numeric parameter with value range from 0 to 255 **<destination port range>** String type given as a dot-separated numeric (0 – 65535) parameter on the form ‘f.t.’ **<source port range>** String type given as a dot-separated numeric (0 – 65535) parameter on the form ‘f.t.’ **<ipsec security parameter index (spi)>** Numeric value in hecadecimal format with value range from 00000000 to FFFFFFFF **<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>** String type given as a dot-separated numeric (0 – 255) parameter on the form ‘t.m.’

HL7528	
	<flow label (ipv6)> Numeric value in hecadecimal format with value range from 00000 to FFFFF. Valid for IPv6 only **<direction>** Specifies the transmission direction in which the packet filter shall be applied 1 Uplink 2 Downlink 3 Birectional (up and downlink; default if omitted)
Notes	Some of the listed attributes above may coexist in a Packet Filter while others mutually exclude each other. For the list of possible combinations, refer to 3GPP TS 23.060.

9.6. +CGDCONT Command: Define PDP Context

HL7528	
Test command Syntax **AT+CGDCONT=?**	Response **+CGDCONT:** (range of supported **<cid>**s), **<PDP_type>**,,,(list of supported **<d_comp>**s), (list of supported **<h_comp>**s),(list ofsupported **<IPv4Addr Alloc>**s),(list of supported **<emergency_indication>**s), (list of supported **<PCSCF_discovery>**s),(list of supported **<IM_CN_Signalling_Flag_Ind>**s) **[<CR><LF>+CGDCONT:** (range of supported **<cid>**s),**<PDP_type>**,,,(list of supported **<d_comp>**s),(list of supported **<h_comp>**s),(list ofsupported **<IPv4AddrAlloc>**s),(list of supported **<emergency_indication>**s),(list of supported **<PCSCF_discovery>**s),(list of supported **<IM_CN_Signalling_Flag_Ind>**s) **[...]]** **OK**
Read command Syntax **AT+CGDCONT?**	Response **[+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**

HL7528

Write command

Syntax
AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<IPv4AddrAlloc>[,<emergency_indication>[,<PCSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]]]]]]]

Response
OK

or
ERROR

Parameters
<cid> PDP Context Identifier. A numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of the permitted values (minimum value = 1) is returned by the test command. (Note that the range of CID is from 1 to 20 and the maximum count of PDP Context activation is 11.)

<PDP_type> Packet Data Protocol type
"IP" Internet Protocol
"IPV6" Internet Protocol, version 6
"IPV4V6" Virtual <PDP_type>introduced to handle dual IP stack UE capability
Note that “IPV6” and “IPV4V6” are only supported if FEAT_IPV6_SUPPORT is enabled.

<APN> Access Point Name
String parameter which is a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.

<PDP_address> String parameter that identifies the MT in the address space applicable to the PDP. If the value is null or omitted then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The read command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using the command +CGPADDR command.
Note that IPv6 address obtained on LTE will be prefixed with a constant 8-byte address "FE.80.00.00.00.00.00.00" if the network has not provided any.

<d_comp> PDP data compression (applicable for SNDCP only)
0 Off (default if value if omitted)
1 On (manufacturer preferred compression)
2 V.42 bis

<h_comp> PDP header compression
0 Off (default if value if omitted)
1 On (manufacturer preferred compression)
2 RFC1144 (applicable for SNDCP only)
3 RFC2507
4 RFC3095 (applicable for PDCP only)

<IPv4AddrAlloc> Numeric parameter that controls how MT/TA requests to get IPv4 address information
0 IPv4 address allocated through NAS signalling
1 IPv4 address allocated through DHCP

<emergency_indication> Indicates whether the PDP context is for emergency bearer services or not
0 PDP context is not for emergency bearer services
1 PDP context is for emergency bearer services

HL7528	
	<P-CSCF_discovery> Numeric parameter that influences how the MT/TA requests get the P-CSCF address 0 Preference of P-CSCF address discovery not influences by +CGDCONT 1 Preference of P-CSCF address discovery through NAS signalling **<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
Notes	• 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. • 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.

9.7. +CGDSCONT Command: Define Secondary PDP Context

HL7528	
Test command Syntax **AT+CGDSCONT=?**	Response **+CGDSCONT:** (range of **<cid>**s),(list of **<cid>**s for defined primary contexts), **<PDP_type>**,,,(list of supported **<d_comp>**s),(list of supported **<h_comp>**s),(list of supported **<IM_CN_Signalling_Flag_Ind>**s) **[<CR><LF>+CGDSCONT:** (range of **<cid>**s),(list of **<cid>**s for defined primary contexts), **<PDP_type>**,,,(list of supported **<d_comp>**s),(list of supported **<h_comp>**s),(list of supported **<IM_CN_Signalling_Flag_Ind>**s) **[...]]** **OK**
Read command Syntax **AT+CGDSCONT?**	Response **[+CGDSCONT: <cid>, <p_cid>, <d_comp>, <h_comp>** **[,<IM_CN_Signalling_Flag_Ind>]]** **[<CR><LF>+CGDSCONT: <cid>, <p_cid>, <d_comp>,<h_comp>** **[,<IM_CN_Signalling_Flag_Ind>]]** **[...]]]** **OK**

HL7528	
Write command Syntax **AT+CGDSCONT=[<cid>,<p_cid>[,<d_comp>[,<h_comp>[,<IM_CN_Signalling_Flag_Ind>]]]]**	Response **OK** or **ERROR** Parameters **<cid>** PDP Context Identifier. A numeric parameter that specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of the permitted values (minimum value = 1) is returned by the test command. **<p_cid>** Primary PDP Context Identifier. Numeric parameter that specifies a particular PDP context definition which has been specified by +CGDCONT. The parameter is local to the TE-MT interface. The list of permitted values is returned by the test command. **<d_comp>** PDP data compression (applicable for SNDCP only) 0 Off (default value if omitted) 1 On (manufacturer preferred compression) 2 V.42 bis **<h_comp>** PDP header compression 0 Off (default value if omitted) 1 On (manufacturer preferred compression) 2 RFC1144 (applicable for SNDCP only) 3 RFC2507 4 RFC3095 (applicable for PDCP only) **<IM_CN_Signalling_Flag_Ind>** Numeric parameter used to indicate whether the PDP context is for IM CN subsystem related signaling only or not 0 UE indicates that the PDP context is not for IM CN subsystem-related signaling only 1 UE indicates that the PDP context is for IM CN subsystem-related signaling only

9.8. +CGDATA Command: Enter Data State

HL7528	
Test command Syntax **AT+CGDATA=?**	Response **+CGDATA:** (list of supported **<L2P>**s) **OK**
Write command Syntax **AT+CGDATA = [<L2P> [,<cid> [,<cid> [,...]]]]**	Response **CONNECT** (followed by data transfer)

HL7528	
	or **CME ERROR: <err>** Parameter **<L2P>** String parameter that indicates the layer 2 protocol to be used between the TE and MT PPP Point-to-point protocol for a PDP such as IP M-OPT-PPP MS supports manufacturing specific protocol M-HEX MS supports manufacturing specific protocol M-RAW_IP MS supports manufacturing specific protocol **<cid>** Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT)

9.9. +CGEREP Command: Packet Domain Event Reporting

HL7528	
Test command Syntax **AT+CGEREP=?**	Response **+CGEREP:** (list of supported **<mode>**s),(list of supported **<bfr>**s) **OK**
Read command Syntax **AT+CGEREP?**	Response **+CGEREP: <mode>, <bfr>** **OK** or **ERROR**
Write command Syntax **AT+CGEREP=** **[<mode>[,<bfr>]]**	Response **OK** or **ERROR** Parameters **<mode>** 0 Buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE. 1 Discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE 2 Buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE

HL7528	
	<bfr> 0 MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered 1 MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes)
Unsolicited Notification	Response **+CGEV: NW DETACH** The network has forces a PS detach **+CGEV: NW CLASS <class>** The network has forced a change of MT class **+CGEV: ME CLASS <class>** The mobile termination has forced a change of MT class **+CGEV: ME PDN ACT <cid>[,<reason>]** The mobile termination has activated a context **+CGEV: NW ACT <p_cid>, <cid>, <event_type>** The network has activated a context **+CGEV: ME ACT <p_cid>, <cid>, <event_type>** The network has responded to an ME initiated context activation **+CGEV: NW PDN DEACT <cid>** The network has deactivated a context **+CGEV: ME PDN DEACT <cid>** The mobile termination has deactivated a context **+CGEV: NW DEACT <p_cid>, <cid>, <event_type>** The network has deactivated a context **+CGEV: ME DEACT <p_cid>, <cid>, <event_type>** The network has responded to an ME initiated context deactivation request **+CGEV: NW MODIFY <cid>, <change_reason>, <event_type>** The network has modified a context **+CGEV: ME MODIFY <cid>, <change_reason>, <event_type>** The mobile termination has modified a context Parameters **<reason>** 0 IPv4 only allowed 1 IPv6 only allowed 2 Single address bearers only allowed 3 Single address bearers only allowed and MT initiated context activation for a second address type bearer was not successful **<event_type>** 0 Informational event 1 Information request, acknowledgement required **<change_reason>** 0 TFT only changed 1 QoS only changed 2 Both TFT and QoS changed

9.10. +CGAUTO Command: Automatic Response

HL7528	
Test command Syntax **AT+CGAUTO=?**	Response **+CGAUTO:** (list of supported **<n>**s) **OK**

HL7528	
Read command Syntax **AT+CGAUTO?**	 Response **+CGAUTO: <n>** **OK**
Write command Syntax **AT+CGAUTO=[<n>]**	 Response **OK** or **+CME ERROR: <err>** Parameter **<n>** 0 Turn off automatic response for packet domain only 1 Turn on automatic response for packet domain only 2 Modem compatibility mode, packet domain only 3 Modem compatibility mode, packet domain and circuit switched calls 4 Turn on automatic negative response for packet domain only
Notes	When the +CGAUTO=1 command is received, the MT shall attempt to perform a PS attach if it is not already attached.

9.11. +CGPADDR Command: Show PDP Address

HL7528	
Test command Syntax **AT+CGPADDR=?**	 Response **+CGPADDR:** (list of supported **<cid>**s) **OK**
Write command Syntax **AT+CGPADDR[=<cid[,<cid>[,...]]]**	 Response **[+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]]** **[<CR><LF>** **+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]][...]]** **OK** Parameters **<cid>** Numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands). If no <cid> is specified the addresses for all defined contexts are returned. **<PDP_addr_1>, <PDP_addr_2>** String that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT and +CGDSCONT commands when the context was defined. For a dynamic address, it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. Both <PDP_addr_1> and <PDP_addr_2> are omitted if none are available.

HL7528	
	Both <PDP_addr_1> and <PDP_addr_2> are included when both Ipv4 and Ipv6 addresses are assigned, with <PDP_addr_1> containing the IPv4 address and <PDP_addr_2> containing the IPv6 address. The string is given as dot-separated numeric (0 – 255) parameter of the form: a1.a2.a3.a4 for IPv4 and a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6. Note that +CGPADDR only shows Link-Local IPV6 addresses, and therefore won't show Global IPv6 addresses.

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

HL7528	
Test command Syntax **AT+CGQMIN=?**	Response **+CGQMIN: <PDP_type>**, (list of supported **<precedence>**s), (list of supported **<delay>**s), (list of supported **<reliability>**s), (list of supported **<peak>**s), (list of supported **<mean>**s) **OK**
Read command Syntax **AT+CGQMIN?**	Response **+CGQMIN: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>** **OK**
Write command Syntax **AT+CGQMIN=** **[<cid>** **[,<precedence>** **[,<delay>** **[,<reliability>** **[,<peak>** **[,<mean>]]]]]]**	Response **OK** or **ERROR** Parameters **<cid>** Numeric parameter that specifies a particular PDP context definition. Refer to the defined values under the +CGDCONT command. **<precedence>** Numeric parameter for the precedence class **<delay>** Numeric parameter for the delay class **<reliability>** Numeric parameter for the reliability class **<peak>** Numeric parameter for the peak throughput class **<mean>** Numeric parameter for the mean throughput class
Notes	If a value is omitted for a particular class then the value is considered to be unspecified.

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

HL7528	
Test command Syntax **AT+CGEQMIN=?**	Response **+CGEQMIN: <PDP_type>**, (list_of supported **<Traffic_class>**es) ,(list of supported **<Maximum_bitrate_UL>**s) , (list of supported **<Maximum_bitrate_DL>**s), (list of supported **<Guaranteed_bitrate_UL>**s), (list of supported **<Guaranteed_bitrate_DL>**s) ,(list of supported **<Delivery_order>**s) ,(list of supported **<Maximum_SDU_size>**s) ,(list of supported **<SDU_error_ratio>**s) , (list of supported **<Residual_bit_error_ratio>**s) ,(list of supported **<Delivery_of_erroneous_SDUs>**s) , (list of supported **<Transfer_delay>**s) ,(list of supported **<Traffic_handling_priority>**s) [,(list of supported **<Source_statistics_descriptor>**s) ,(list of supported **<Signalling_indication>**s)] **[<CR><LF> +CGEQMIN: <PDP_type>**, (list of supported **<Traffic_class>**es) ,(list of supported **<Maximum_bitrate_UL>**s), (list of supported **<Maximum_bitrate_DL>**s) ,(list of supported **<Guaranteed_bitrate_UL>**s), (list of supported **<Guaranteed_bitrate_DL>**s), (list of supported **<Delivery_order>**s) ,(list of supported **<Maximum_SDU_size>**s) ,(list of supported **<SDU_error_ratio>**s),(list of supported **<Residual_bit_error_ratio>**s) ,(list of supported **<Delivery_of_erroneous_SDUs>**s) ,(list of supported **<Transfer_delay>**s) ,(list of supported **<Traffic_handling_priority>**s) [,(list of supported **<Source_statistics_descriptor>**s) ,(list of supported **<Signalling_indication>**s)**][...]]** **ERROR**
Read command Syntax **AT+CGEQMIN?**	Response **+CGEQMIN: <cid>, <Traffic_class>,<Maximum_bitrate_UL>, <Maximum_bitrate_DL> , <Guaranteed_bitrate_UL> ,<Guaranteed_bitrate_DL>,<Delivery_order>, <Maximum_SDU_size>,<SDU_error_ratio> ,<Residual_bit_error_ratio>, <Delivery_of_erroneous_SDUs>,<Transfer_delay> ,<Traffic_handling_priority> [,<Source_statistics_descriptor> ,<Signalling_indication>]** **[<CR><LF> +CGEQMIN: <cid>,<Traffic_class> ,<Maximum_bitrate_UL>, <Maximum_bitrate_DL> ,<Guaranteed_bitrate_UL>,<Guaranteed_bitrate_DL>, <Delivery_order>,<Maximum_SDU_size>,<SDU_error_ratio>, <Residual_bit_error_ratio>,<Delivery_of_erroneous_SDUs>,<Transfer_delay>, <Traffic_handling_priority>[,<Source_statistics_descriptor> ,<Signalling_indication>] [...]]** **Error**
Write command Syntax **AT+CGEQMIN= [<cid>[,<Traffic_ class>** **[,<Maximum_ bitrate_UL>** **[,<Maximum_ bitrate_DL>** **[,<Guaranteed_ bitrate_UL>** **[,<Guaranteed_ bitrate_DL>** **[,<Delivery_ order>** **[,<Maximum_ SDU_size>** **[,<SDU_error_ ratio>[,<Residual**	Response **OK** or **ERROR** Parameter **<cid>** Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands). **<Traffic_class>** UMTS bearer service application type 0 Conversational 1 Streaming 2 Interactive 3 Background

HL7528	
_bit_error_ratio> [,<Delivery_of_ erroneous_ SDUs> [,<Transfer_ delay>[,<Traffic_ handling_ priority> [,<Source_ statistics_ descriptor>, <Signalling_ indication>]]]]]]]]]]]]]]	**<Maximum_bitrate_UL>** Numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. **<Maximum_bitrate_DL>** Numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. **<Guaranteed_bitrate_UL>** Numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (if there is data to deliver). **<Guaranteed_bitrate_DL>** Numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (if there is data to deliver). **<Delivery_order>** Numeric parameter that indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not 0 No 1 Yes **<Maximum_SDU_size>** Numeric parameter that indicates the maximum allowed SDU size in octets **<SDU_error_ratio>** String parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. **<Residual_bit_error_ratio>** String parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as 'mEe'. **<Delivery_of_erroneous_SDUs>** Numeric parameter that indicates whether SDUs detected as erroneous shall be delivered or not 0 No 1 Yes 2 No detect **<Transfer_delay>** Numeric parameter that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds **<Traffic_handling_priority>** Numeric parameter that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers **<Source_Statistics_Descriptor>** Supported in R7 P S a numeric parameter that specifies characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as conversational or streaming 0 Characteristics of SDUs is unknown 1 Charactersitics of SDUs correspond to a speech source **<Signalling_Indication>** Supported in R7 P S a numeric parameter used to indicate content of submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as interactive 0 PDP context is not optimized 1 PDP context is optimized **<PDP_type>** Refer to +CGDCONT and +CGDSCONT commands.
Notes	If a value is omitted for a particular class then the value is considered to be unspecified.

9.14. +CGQREQ Command: Request Quality of Service Profile

HL7528	
Test command Syntax **AT+CGQREQ=?**	Response **+CGQREQ: <PDP_type>**, (list of supported **<precedence>**s), (list of supported **<delay>**s), (list of supported **<reliability>**s),(list of supported **<peak>**s), (list of supported **<mean>**s) **OK**
Read command Syntax **AT+CGQREQ?**	Response **+CGQREQ: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>** **OK**
Write command Syntax **AT+CGQREQ = [<cid> [,<precedence> [,<delay> [,<reliability> [,<peak> [,<mean>]]]]]]**	Response **OK** or **ERROR** Parameters **<cid>** Numeric parameter that specifies a particular PDP context definition. **<precedence>** Numeric parameter that specifies the precedence class **<delay>** Numeric parameter that specifies the delay class **<reliability>** Numeric parameter that specifies the reliability class **<peak>** Numeric parameter that specifies the peak throughput class **<mean>** Numeric parameter that specifies the mean throughput class.
Notes	• This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network • If a value is omitted for a particular class then the value is considered to be unspecified

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

HL7528	
Test command Syntax **AT+CGEQREQ=?**	Response **+CGEQREQ: <PDP_type>**, (list_of supported **<Traffic_class>**es) ,(list of supported **<Maximum_bitrate_UL>**s) ,(list of supported **<Maximum_bitrate_DL>**s), (list of supported **<Guaranteed_bitrate_UL>**s), (list of supported **<Guaranteed_bitrate_DL>**s) ,(list of supported **<Delivery_order>**s) ,(list of supported **<Maximum_SDU_size>**s) ,(list of supported **<SDU_error_ratio>**s) , (list of supported **<Residual_bit_error_ratio>**s) ,(list of supported **<Delivery_of_erroneous_SDUs>**s) ,(list of supported **<Transfer_delay>**s) ,(list of supported **<Traffic_handling_priority>**s) [,(list of supported **<Source_statistics_descriptor>**s) ,(list of supported **<Signalling_indication>**s)] [**<CR><LF>+CGEQREQ: <PDP_type>**, (list of supported **<Traffic_class>**es) ,(list of supported **<Maximum_bitrate_UL>**s), (list of supported **<Maximum_bitrate_DL>**s) ,(list of supported **<Guaranteed_bitrate_UL>**s), (list of supported **<Guaranteed_bitrate_DL>**s), (list of supported **<Delivery_order>**s) ,(list of supported **<Maximum_SDU_size>**s) ,(list of supported **<SDU_error_ratio>**s) ,(list of supported **<Residual_bit_error_ratio>**s) ,(list of supported **<Delivery_of_erroneous_SDUs>**s) ,(list of supported **<Transfer_delay>**s) ,(list of supported **<Traffic_handling_priority>**s) [,(list of supported **<Source_statistics_descriptor>**s),(list of supported **<Signalling_indication>**s)][...]]
Read command Syntax **AT+CGEQREQ?**	Response **+CGEQREQ: <cid>,<Traffic_class>,<Maximum_bitrate_UL>,<Maximum_bitrate_DL>, <Guaranteed_bitrate_UL>,<Guaranteed_bitrate_DL>,<Delivery_order>, <Maximum_SDU_size>,<SDU_error_ratio>,<Residual_bit_error_ratio>, <Delivery_of_erroneous_SDUs>,<Transfer_delay>,<Traffic_handling_priority> [,<Source_statistics_descriptor> ,<Signalling_indication>]** **[<CR><LF>+CGEQREQ: <cid>,<Traffic_class>,<Maximum_bitrate_UL>, <Maximum_bitrate_DL>,<Guaranteed_bitrate_UL>,<Guaranteed_bitrate_DL>, <Delivery_order>,<Maximum_SDU_size>,<SDU_error_ratio>, <Residual_bit_error_ratio>,<Delivery_of_erroneous_SDUs>,<Transfer_delay>, <Traffic_handling_priority>[,<Source_statistics_descriptor>,<Signalling_indication>] [...]]**
Write command Syntax **AT+CGEQREQ= [<cid>[,<Traffic_ class> [,<Maximum_ bitrate _UL> [,<Maximum_ bitrate_DL> [,<Guaranteed_ bitrate_UL> [,<Guaranteed_ bitrate_DL> [,<Delivery_ order> [,<Maximum_ SDU_size> [,<SDU_error_ ratio>[,<Residual _bit_error_ratio> [,<Delivery_of_**	Response **OK** or **ERROR** Parameters **<cid>** Numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands) **<Traffic_class>** UMTS bearer service application type 0 Conversational 1 Streaming 2 Interactive 3 Background

HL7528	
erroneous_ SDUs> [,<Transfer_ delay>[,<Traffic_ handling_ priority> [,<Source_ statistics_ descriptor>, <Signalling_ indication>]]]]]]]]]]]]]]	**<Maximum_bitrate_UL>** Numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. **<Maximum_bitrate_DL>** Numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. **<Guaranteed_bitrate_UL>** Numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (if there is data to deliver). **<Guaranteed_bitrate_DL>** Numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (if there is data to deliver). **<Delivery_order>** Numeric parameter that indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not 0 No 1 Yes **<Maximum_SDU_size>** Numeric parameter that indicates the maximum allowed SDU size in octets **<SDU_error_ratio>** String parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. **<Residual_bit_error_ratio>** String parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as 'mEe'. **<Delivery_of_erroneous_SDUs>** Numeric parameter that indicates whether SDUs detected as erroneous shall be delivered or not 0 No 1 Yes 2 No detect **<Transfer_delay>** Numeric parameter that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds **<Traffic_handling_priority>** Numeric parameter that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers **<Source_Statistics_Descriptor>** Supported in R7 P S a numeric parameter that specifies characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as conversational or streaming 0 Characteristics of SDUs is unknown 1 Charactersitics of SDUs correspond to a speech source **<Signalling_Indication>** Supported in R7 P S a numeric parameter used to indicate content of submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as interactive 0 PDP context is not optimized 1 PDP context is optimized **<PDP_type>** Refer to +CGDCONT and +CGDSCONT commands.
Notes	If a value is omitted for a particular class then the value is considered to be unspecified.

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

HL7528	
Test command Syntax **AT+CGEQNEG=?**	 Response **+CGEQNEG:** (list of **<cid>**s associated with active contexts)
Write command Syntax **AT+CGEQNEG=** **[<cid>[,<cid>** **[,...]]]**	 Response **+CGEQNEG: <cid>,<Traffic class>,<Maximum bitrate UL>,** **<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,** **<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,** **<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority>** **[<CR><LF>+CGEQNEG: <cid>,<Traffic class>,<Maximum bitrate UL>,** **<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,** **<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,** **<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority>[....]]** Parameters **<cid>** numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands) **<Traffic_class>** UMTS bearer service application type 0 Conversational 1 Streaming 2 Interactive 3 Background **<Maximum_bitrate_UL>** Numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. **<Maximum_bitrate_DL>** Numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. **<Guaranteed_bitrate_UL>** Numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (if there is data to deliver). **<Guaranteed_bitrate_DL>** Numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (if there is data to deliver). **<Delivery_order>** Numeric parameter that indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not 0 No 1 Yes **<Maximum_SDU_size>** Numeric parameter that indicates the maximum allowed SDU size in octets **<SDU_error_ratio>** String parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'.

HL7528	
	<Residual_bit_error_ratio> String parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as 'mEe'. **<Delivery_of_erroneous_SDUs>** Numeric parameter that indicates whether SDUs detected as erroneous shall be delivered or not 0 No 1 Yes 2 No detect **<Transfer_delay>** Numeric parameter that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds **<Traffic_handling_priority>** Numeric parameter that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers
Notes	If a value is omitted for a particular class then the value is considered to be unspecified.

9.17. +CGREG Command: GPRS Network Registration Status

HL7528	
Test command Syntax **AT+CGREG=?**	Response **+CGREG:** (list of supported **<n>**s) **OK**
Read command Syntax **AT+CGREG?**	Response **+CGREG: <n>,<stat>[,<lac>,<ci>[,<AcT>,<rac>]]** **OK**
Write command Syntax **AT+CGREG=[<n>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<n>** 0 Disable network registration unsolicited result code 1 Enable network registration unsolicited result code **+CGREG: <stat>** 2 Enable network registration and location information unsolicited result code **+CGREG: <stat>[,<lac>,<ci>[,<AcT>,<rac>]]** **<stat>** 0 Not registered, home network 1 Registered, home network

HL7528	
	2 Not registered, but ME is currently searching for a new operator to register to 3 Registration denied 4 Unknown 5 Registered, roaming 8 Attached for emergency bearer services only (not available) **<lac>** String type; two-byte location area code in hexadecimal format **<ci>** String type; four-byte E-UTRAN cell ID in hexadecimal format **<Act>** 7 E-UTRAN **<rac>** String type; one-byte routing area code in hexadecimal format
Unsolicited Notification	Response **+CGREG: <stat>** **+CGREG: <stat>[,<lac>,<ci>[,<AcT>,<rac>]]**

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

HL7528	
Test command Syntax **AT+CGSMS=?**	Response **+CGSMS:** (list of currently available **<service>**s) **OK**
Read command Syntax **AT+CGSMS?**	Response **+CGSMS: <service>** **OK**
Write command Syntax **AT+CGSMS=[<service>]**	Response **OK** or **ERROR** Parameter **<service>** Indicates the service or service preference to be used 0 Packet Domain 1 Circuit switched 2 Packet Domain preferred (use circuit switched if GPRS is not available) 3 Circuit switched preferred (use packet domain if circuit switched is not available)
Note	LG U+ does not support SMS.

9.19. +CRLP Command: Select Radio Link Protocol

HL7528	
Test command Syntax **AT+CRLP=?**	Response **+CRLP:** (list of supported **<iws>**es),(list of supported **<mws>**es),(list of supported **<T1>**s),(list of supported **<N2>**s) **OK**
Read command Syntax **AT+CRLP?**	Response **+CRLP: <iws>,<mws>,<T1>,<N2>** **OK**
Write command Syntax **AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>]]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<iws>** IWF to MS window size **<mws>** MS to IWF window size **<T1>** Acknowledgement timer (in units of 10 ms) **<N2>** Retransmission attempts

9.20. +XDNS Command: Dynamic DNS Request

HL7528	
Test command Syntax **AT+XDNS=?**	Response **+XDNS:** (list of supported **<cid>**s),(list of supported **<mode>**s) **OK**
Read command Syntax **AT+XDNS?**	Response **+XDNS: <cid>, <primary DNS>, <secondary DNS>** **[+XDNS: <cid>, <primary DNS>, <secondary DNS>** **[...]]** **OK**

HL7528	
Write command Syntax **AT+XDNS=<cid>, <mode>**	Response **OK** or **+CME ERROR: <err>** Parameters **<cid>** Context ID **<mode>** 0 Disable dynamic DNS request 1 Enable dynamic DNS request (IPv4) 2 Enable dynamic DNS request (IPv6) 3 Enable dynamic DNS request (IPv4v6) Note that <mode> = 2 or 3 will only be supported if the feature FEAT_IPV6_SUPPORT is enabled. **<primary DNS>, <secondary DNS>** Strings representing the DNS addresses and given as dot-separated numeric (0 – 255) parameters in the form of: a1.a2.a3.a4 for IPv4, a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6 and a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.a17.a18.a19.a20 for IPv4v6. (a1 to a4 here represents IPV4 and a5 to a20 represents IPv6) The DNS address is by default "0.0.0.0" which is not a valid address. Note that IPv6 address obtained on LTE will be prefixed with a constant 8-byte address "FE.80.00.00.00.00.00.00" if the network has not provided any.

9.21. +CGPIAF Command: Printing IP Address Format

HL7528	
Test command Syntax **AT+CGPIAF=?**	Response **+CGPIAF:** (list of supported **<IPv6_AddressFormat>**s),(list of supported **<IPv6_SubnetNotation>**s),(list of supported **<IPv6_LeadingZeros>**s),(list of supported **<IPv6_CompressZeros>**s)
Read command Syntax **AT+CGPIAF?**	Response **+CGPIAF: <IPv6_AddressFormat>,<IPv6_SubnetNotation>,<IPv6_LeadingZeros>, <IPv6_CompressZeros>** **OK**

HL7528	
Write command Syntax **AT+CGPIAF=[<IPv6_AddressFormat>[,<IPv6_SubnetNotation>[,<IPv6_LeadingZeros>[,<IPv6_CompressZeros>]]]]**	Response **OK** or **+CME ERROR: <err>** Parameters **<IPv6_AddressFormat>** 0 Use IPv4-like dot notation. IP address and subnetwork mask (if applicable) are dot-separated. 1 Use IPv6-like colon notation. IP address and subnetwork mask (if applicable and when given explicitly) are separated by a space. **<IPv6_SubnetNotation>** Specifies the subnet notation for remote address and subnet mask. This parameter setting does not apply if <IPv6_AddressFormat> = 0. 0 Both IP address and subnet mask are stated explicitly, and separated by a space 1 The printout format uses a slash (/) subnet-prefix Classless Inter-Domain Routing (CIDR) notation **<IPv6_LeadingZeros>** Specifies whether leading zeros are omitted or not. This parameter setting does not apply if <IPv6_AddressFormat> = 0. 0 Leading zeros are omitted 1 Leading zeros are inclued **<IPv6_CompressZeros>** Specifies whether 1-n instances of 16-bit zero values are replaced by "::".This parameter setting does not apply if <IPv6_AddressFormat> = 0. 0 No zero compression 1 Use zero compression If the address is unspecified (all bytes are zeros), "::" will be displayed.

9.22. +WPPP Command: PDP Context Authentication Configuration

HL7528	
Test command Syntax **AT+WPPP=?**	Response **+WPPP:** (list of supported **<Auth>**),[<list of supported <cid>s] **OK**
Read command Syntax **AT+WPPP?**	Response **+WPPP: <Auth>,[<cid>],[<username>],[<password>]** **OK**

HL7528	
Write command Syntax **AT+WPPP=<Auth>,[<cid>],[<username>],[<password>]**	Response **OK** **+CME ERROR <err>** Parameters **<Auth>** Type of authentication supported 0 None 1 PAP 2 CHAP **<cid>** 1 – 20 PDP context identifier used in CGDCONT. If omitted, the configuration is set for all PDP contexts. **<username>** Login for the APN. String type, up to 64 characters **<password>** Password for the APN. String type, up to 64 characters
Notes	+WPPP is available when SIM has been inserted and the pin code is entered.
Examples	**AT+WPPP=?** **+WPP: (0-2),(1-20)** **OK** **AT+WPPP=1,1,“myusername”,“mypassword”** **OK** **AT+WPPP?** **+WPPP: 1,1,“myusername”,“mypassword”** **OK**

10. SIM Application Toolkit AT Commands

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

HL7528	
Test command Syntax **AT+STKPRO=?**	Response **+STKPRO: (01,05,16,17,18,19,20,21,32,33,34,35,36,37,38,40,52,53,64)** **OK**
Unsolicited Notification	Response **+STKPRO: <proactive_cmd>...** Details of which are as follows: • **+STKPRO: 01, <type>** • **+STKPRO: 05, <event_list>** • **+STKPRO: 16, <number>, <subaddr>, <type>, <alpha_1>, <icon_id1>, <alpha_2>,<icon_id2>** • **+STKPRO: 17, <ss_data>, <alpha>, <icon_id>, <ref_number>** • **+STKPRO: 18, <dcs>, <hex_string>, <alpha>, <icon_id>, <ref_number>** • **+STKPRO: 19, <alpha>, <icon_id>, <ref_number>** • **+STKPRO: 20, <alpha>, <icon_id>, <dtmf_string>** • **+STKPRO: 21, <URL>, <alpha>, <icon_id>** • **+STKPRO: 32, <tone>, <unit>, <interval>, <alpha>, <icon_id>** • **+STKPRO: 33, <type>, <dcs>, <hex_string>, <icon_id>** • **+STKPRO: 34, <type>, <dcs>, <hex_string>, <icon_id>** • **+STKPRO: 35, <type>, <dcs>, <hex_string>, <max_rsp_len>, <min_rsp_len>, <defaulttext>, <icon_id>** • **+STKPRO: 36, <type>, <alpha>, <item_id>, <total_items>, <item_text>, <next_action>, <default_item>, <icon_id>, <icon_id_list_element>** • **+STKPRO: 37, <type>, <alpha>, <item_id>, <total_items>, <item_text>, <next_action>, <icon_id>, <icon_id_list_element>** • **+STKPRO: 38, <type>** • **+STKPRO: 40, <dcs>, <hex_string>, <icon_id>** • **+STKPRO: 52, <type>, <alpha>, <icon_id>** • **+STKPRO: 53, <language>** • **+STKPRO: 64, <cmd_qualifier>, <alpha_id>, <icon_refrence>, <dialing_number>, <reconnect_interval>, <reconnect_unit>, <idle_interval>, <idle_unit>, <bearer_type>, <bearer_parameter>, <buffer_size>, <login_dcs>, <login_text>, <password_dcs>, <password_text>, <transaport_level>, <transport_port>, <sub_address>, <destination_address_type>, <destination_address>** Parameters **<alpha>, <alpha_1>, <alpha_2>, <item_text>, <default text>** Text string

HL7528

<dsc> Data coding scheme

<default_item> Default items (s. item_id)

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

<hex_string> String containing data in hexadecimal format

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

<interval> Time duration in number of units

<item_id> Item identifier (identifier of item chosen, refer to GSM 11.14)

<language> 2-byte string indicating the language

<max rsp len> Maximum response length

<min rsp len> Minimum response length

<next_action> Next action

<number> Called party number

<proactive_cmd>
- 01 Refresh
- 05 Set up event list
- 16 Set up call
- 17 Send SS
- 18 Send USSD
- 19 Send SMS
- 20 Send DTMF
- 21 Launch browser
- 32 Play tone
- 33 Display text
- 34 Get inkey
- 35 Get input
- 36 Select item
- 37 Set up menu
- 38 Language setting
- 40 Set up idle mode text
- 52 Run AT command info
- 53 Language notification
- 64 Open channel
- 129 End of the proactive session

<ref_number> Reference number

<subaddr> Called party subaddress

HL7528

<ss_data> Data string

<type> Integer as command qualifier; possible value “4” means language

<tone>

01	Dial tone
02	Call subscriber busy
03	Congestion
04	Radio path acknowledge
05	Radio path not available
06	Error/special information
07	Call waiting tone
08	Ringing tone
10	General beep
11	Positive acknowledgement tone
12	Negative acknowledgement or error tone

<total items> Total items

<unit>

0	Minutes
1	Seconds
2	Tenth of a second

<URL> URL to be loaded

<reconnect_interval> 1 – 255 Duration for reconnect tries. The interval specifies the time interval of the duration in multiples of the time unit used. The value “0” indicated a non-existing duration object.

<reconnect_unit> Used with <reconnect_interval>

0	Minutes
1	Seconds
2	Tenth of a second

<idle_interval> 1 – 255 Defines the duration when an idle connection is released automatically. If not present, the terminal will never release a connection automatically. A value of “0” indicates a non-existing duration object.

<idle_unit> Used with <idle_interval>

0	Minutes
1	Seconds
2	Tenth of a second

<bearer_type>

1	Circuit switched
2	Packet switched
3	Default
255	Invalid

<bearer_parameter> Hex string that gived detailed information about the bearer type

<buffer_size> Buffer the terminal shall allocate for channel data. The terminal may allocate less or more than this.

<login_dcs> Data coding scheme of the text string. Text strings may be coded in 7-bit, 8-bit or UCS2 (16-bit) for user authentication data if requested by the bearer connection.

HL7528	
	<login_text> Specfies user authentication data is requested by the bearer connection. Coding based on <login_dcs>. **<password_dcs>** Data coding scheme of the text string. Text strings may be coded in 7-bit, 8-bit or UCS2 (16-bit) for user authentication data if requested by the bearer connection. **<password_text>** Specifies user authentication data if requested by the bearer connection. Coding based on <password_dcs>. **<transport_level>** Transport layer protocol of the UICC/terminal connection 1 UDP 2 TCP 255 Invalid; no transport protocol specified **<transport_port>** Integer that specifies the transport port **<sub_address>** Called party subaddress (for CS bearers only) **<dsc>** Data coding scheme **<destination_address_type>** 33 IPv4 IP address 87 IPv6 IP address 255 Invalid; unknown address type **<destination_address>** Hex string that specified the destination point of the connection

10.2. +STKTR Command: Enter Response

HL7528	
Test command Syntax **AT+STKTR=?**	Response **+STKTR: (01,05,16,17,18,19,20,21,32,33,34,35,36,37,38,40,52,53,64)** **OK**
Write command Syntax **AT+STKTR=1,0**	Response **OK** or **+CME ERROR: <err>**

HL7528

Write command

Syntax

AT+STKTR=<proactive_cmd>[,<result>,<add_result>[,<last_cmd>][,<dcs>][,<hexstring>]]

Response

Response depends on the proactive command

- **+STKTR: 01, <result>, [<add_result>]**
- **+STKTR: 05, <result>**
- **+STKTR: 16, <result>, [<add_result>]**
- **+STKTR: 17, <result>, <add_result>**
- **+STKTR: 18, <result>, <add_result>**
- **+STKTR: 19, <result>, <add_result>**
- **+STKTR: 20, <result>, [<add_result>]**
- **+STKTR: 21, <result>**
- **+STKTR: 32, <result>, <add_result>**
- **+STKTR: 33, <result>, <add_result>**
- **+STKTR: 34, <result>, <add_result>,0,<dcs>,<hex_string>**
- **+STKTR: 35, <result>, <add_result>,0,<dcs>,<hex_string>**
- **+STKTR: 36, <result>, <add_result>,0,<dcs>,<hex_string>**

Note: The "0" stands for the parameter <last_cmd> which is obsolete but not yet removed.

- **+STKTR: 37, <result>, <add_result>**
- **+STKTR: 38, <language as integer, e.g.28261>**
- **+STKTR: 40, <result>, <add_result>**
- **+STKTR: 52, <result>, <add_result>**
- **+STKTR: 53, <result>, <add_result>**

Note: For general results (<result>) 32, 33, 38, 52, 53, 55, 56, 57 and 58, it is mandatory for the ME to provide a specific cause value as additional information. For others, additional information will be ignored.

- **+STKTR: 64, <result>[,<add_result>,<last_cmd>,<buffer_size>,<open_channel_id>,<link_status>,<channel_status_state>,<bearer_description_type>,<bearer_description_params>,<address_type>,<address>]**

Parameters

<add_result>		Additional result
<dcs>		Data coding scheme
<hex_string>		String in hexadecimal format
<last_cmd>		Last command
<proactive_cmd>		Decimal code that indicates the proactive command (refer to +STKPRO)
<result>	0	Command performed succcessfuly
	1	Command performed with partial comprehension
	2	Command performed with missing information
	3	Refresh performed with additional EFS read
	4	Command performed successfully, but requested icon could not be displayed

HL7528

	5 Command performed but modified by call control by SIM 6 Command performed successfully, limited service 7 Command performed with modification 16 Proactive SIM session terminated by the user 17 Backward move in the proactive SIM session requested by the user 18 No response from user 19 Help information required by the user 20 USSD or SS transaction terminated by the user 32 ME currently unable to process command 33 Network currently unable to process the command 34 User did not accept call set-up request 35 User cleared down call before connection or network release 36 Action in contradiction with the current timer state 37 Interaction with call control by SIM, temporary problem 38 Launch browser generic error code 48 Command beyond ME's capabilities 49 Command type not understood by ME 50 Command data not understood by ME 51 Command number not known by ME 52 SS return error 53 SMS RP ERROR 54 Error, required values are missing 55 USSD return error 56 Multiple card command error (if class "a" is supported) 57 Interaction with call control by SIM or MO, short message control by SIM 58 Bearer independent protocol error (if class "e" is supported) **<buffer size>** Size of the allocated buffer **<open_channel_id>** 1 – 7 Channel ID 0 Invalid **<link_status>** Specifies whether link is established or packet data service is activated 1 Enabled 0 Disabled **<channel_status_state>** Link state 00 No further information can be given **<bearer_description_type>** Bearer type which can be used to decode the bearer description value 01 Circuit switched UTA_SIM_TK_BEARER 02 Packet switched UTA_SIM_TK_BEARER (GPRS) 03 Terminal default UTA_SIM_TK_BEARER 255 Invalid bearer value; indicates an unknown bearer type which is not supported by the interface version **<bearer_description_params>** Hexadecimal string; gives detailed information dependent on the bearer type **<address_type>** Type of address 33 IPv4 IP address 87 IPv6 IP address

HL7528	
	<address> Address data dependent on bearer type. IPv4 address representation shall follow the format x.x.x.x where 0<x≤255. IPv6 address representation shall follow the format x.x.x.x.x.x.x.x.x.x.x.x.x.x.x.x where 0<x≤255

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

HL7528	
Test command Syntax **AT+STKENV=?**	Response **+STKENV:** **OK**
Write command Syntax **AT+STKENV=<envelope_cmd>,<optional_ENV_data>**	Response **OK** or **+CME ERROR: <err>** Parameters **<cause>** 00 User termination 01 Error termination **<envelope_cmd>** Code 211 (hex: D3) Menu selection (needs) Code 214 (hex: D6) Event download (note that only one event can be included in the <event_list>) **<item_id>** Item identification **<help_requested>** 1 Help is requested 0 Help is not requested **<language>** Currently used language in the DTE (refer to +STKPROF) **<call_id>** Call ID **<call_direction>** 0 MT call 1 MO call **<optional_ENV_data>** D3 <item_identifier> (for code 211) D6 <event_list> (for code 214)

10.4. +STKPROF Command: Terminal Profile Data

HL7528	
Test command Syntax **AT+STKPROF=?**	Response **OK**
Read command Syntax **AT+STKPROF?**	Response **+STKPROF: <length>,<data>** **OK**
Write command Syntax **AT+STKPROF= <length>,<data>**	Response **OK** or **+CME ERROR: <err>** Parameters **<length>** Integer type; length of characters sent to TE in <data>. When set to “0”, forces a reset to the default terminal profile stored in the ME **<data>** Terminal profile data in hexadecimal format

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

HL7528	
Unsolicited Notification	Response **+STKCC: <cc_command>...** Details of which are as follows: • **+STKCC: 1,<res_val>,<alpha>,<number>** • **+STKCC: 2,<res_val>,<alpha>,<ss_code>** • **+STKCC: 3,<res_val>,<alpha>,<ussd_code>** • **+STKCC: 4,<res_val>,<alpha>,<ton_npi>,<sc_addr>,<ton_npi>,<dest_addr>** Parameters **<cc_command>** 1 Set up call 2 Send SS 3 Send USSD 4 Send SM **<res_val>** Call control result value **<alpha>** Text string

HL7528	
	<number> Called party number **<ton_npi>** Type of number and numbering plan **<sc_addr>** Service centre address **<dest_addr>** Destination address

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

HL7528	
Unsolicited Notification	Response **+STKCNF: <proactive_cmd>,<result>,<add_result>,<sw1>** Parameters **<proactive_cmd>** Decimal code that indicates the command that was finished (refer to +STKPRO) **<result>** General result code **<add_result>** Additional result code **<sw1>** 0 Command to SIM was suppressed because of multiple terminal response or wrong client. For other responses, refer to GSM 11.11

10.7. *PSSTKI Command: SIM ToolKit Interface Configuration

HL7528	
Test command Syntax **AT*PSSTKI=?**	Response ***PSSTKI:** (List of supported **<mode>**s) **OK**
Read command Syntax **AT*PSSTKI?**	Response ***PSSTKI: <mode>** **OK**

HL7528	
Write command Syntax **AT*PSSTKI= <mode>**	Response **OK** Parameter **<mode>** 0 No unsolicited result code will be sent to TE. TE won't send proactive command to Module. 1 Manual mode. Any unsolicited result code will be sent to TE. TE must acknowledge the +STKPRO notification. 2 Auto acknowledge mode. Module answers to STK without TE, any unsolicited result code will be sent to TE 3 Auto acknowledge mode without sending unsolicited result code to TE
Reference Sierra Wireless Proprietary	Notes • The aim of this AT command is to configure the AT interface for SIM ToolKit support • This command is only supported when SIM card is present • The setting of <mode> will be kept after module reboots • If <mode>=0 (STK is deactivated) is set, the module will restart automatically before the new mode takes effect • <mode>=2 and <mode>=3 are only possible for a subset of STK proactive commands with user interaction: ▪ Where basic Yes/No responses are expected ▪ SEND SMS ▪ SEND SS ▪ SEND USSD ▪ SET UP CALL ▪ Where MMI action is needed and Yes/No responses are expected when done (for the display part) ▪ SET UP IDLE MODE TEXT ▪ DISPLAY TEXT ▪ PLAY TONE ▪ REFRESH • If MO SMS control of USIM terminal profile is enabled and *PSSTKI is set to 1, +STKCC URC is displayed; *PSSTKI for SKT must be set to 0.
Examples	<SIM card with STK application is inserted> **AT*PSSTKI?** // read current setting ***PSSTKI: 0** **OK** **AT*PSSTKI=?** // check supported setting ***PSSTKI: (0-3)** **OK** **At*psstki=1** // set STK manual mode **OK** **+STKPRO: 33,0,4,"4D6F62696C65204F4B",0** **at+stktr=33,0** **OK** **At*psstki=0** // deactivate STK **OK**

HL7528	
	+SIM: 1 // module resets **+KSUP: 0** **+PBREADY** <Example: Manual Mode - proactive command SET UP MENU> **At*psstki=1** // activate STK manual mode **OK** // SET UP MENU **+STKPRO: 37,0,"GemXplore CASE",1,5,"User interaction",33,0,0** **+STKPRO: 37,0,"GemXplore CASE",2,5,"Mobile interaction",33,0,0** **+STKPRO: 37,0,"GemXplore CASE",3,5,"Network interaction",33,0,0** **+STKPRO: 37,0,"GemXplore CASE",4,5,"Card interaction",33,0,0** **+STKPRO: 37,0,"GemXplore CASE",128,5,"Common STK features",33,0,0** **at+stktr=37,0** // Terminal Response for SET UP MENU successful **OK** **+STKCNF: 37,0,255,145** // [ACK] SET UP MENU successful, session on-going **at+stkenv=211,2,0** // Select menu item #2 **+STKCNF: 129, 0, 255, 144** // [ACK] session end **OK** <Example: Manual Mode - proactive command SELECT ITEM> **+STKPRO: 36,0,"Choose an item :",1,5,"Play tone",0,0,0,0** **+STKPRO: 36,0,"Choose an item :",2,5,"Provide local info",0,0,0,0** **+STKPRO: 36,0,"Choose an item :",3,5,"Refresh",0,0,0,0** **+STKPRO: 36,0,"Choose an item :",4,5,"Timer management",0,0,0,0** **+STKPRO: 36,0,"Choose an item :",5,5,"Launch browser",0,0,0,0** **at+stktr=36,0,0,0,0,"03"** // Terminal Response SELECT ITEM #3 **OK** **+STKCNF: 36,0,255,145** // [ACK] SELECT ITEM successful **+STKPRO: 36,0,"Choose an item :",1,2,"Init and file change",0,0,0,0** **+STKPRO: 36,0,"Choose an item :",2,2,"Reset",0,0,0,0** **at+stktr=36,0,0,0,0,"02"** // Terminal Response SELECT ITEM #2 **OK** **+STKCNF: 36,0,255,145** // [ACK] SELECT ITEM successful <Example: Manual Mode - proactive command REFRESH> **+STKPRO: 01,4,,0,,0** // proactive command: REFRESH - SIM reset **at+stktr=01,0** // Terminal Response for REFRESH **OK** **+SIM: 0** // SIM reset **+STKCNF: 144, 0** // [ACK] Reset completed **+SIM: 1** **+STKPRO: 33,0,4,"4D6F62696C65204F4B",0** **+PBREADY**

HL7528	
	<Example: Automatic Mode - proactive command REFRESH> **At*psstki=2** // set STK automatic mode **OK** //Proactive command REFRESH is received **+STKPRO: 01,4,,0,, 0** // proactive command: REFRESH - SIM reset **+SIM: 0** // SIM reset **+STKCNF: 144, 0** // [ACK] Reset completed **+SIM: 1** **+STKPRO: 33,0,4,"4D6F62696C65204F4B",0** **+PBREADY** <Example: Silent Mode - proactive command REFRESH> **At*psstki=3** // set STK silent mode **OK** **+SIM: 0** // SIM reset **+SIM: 1** **+PBREADY** <SIM card is not inserted> **at+cpin?** **+CME ERROR: 10** **AT*PSSTKI?** // read current setting **+CME ERROR: 10** **AT*PSSTKI=?** // check supported setting **+CME ERROR: 10** **AT*PSSTKI=1** // deactivate STK **+CME ERROR: 10**

11. Protocol Specific Commands

11.1. Preliminary Comments

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

- TCP
- UDP
- FTP
- HTTP
- HTTPS

11.2. 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 HL7528:

- 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

11.3. 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 32.

11.4. 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).

11.5. 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.

11.6. 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.

11.7. Connection Configuration

11.7.1. +KCNXCFG Command: GPRS Connection Configuration

HL7528	
Test command Syntax **AT+KCNXCFG=?**	 Response **+KCNXCFG: (**list of possible **<cnx conf>**s**),"GPRS",(**range of possible length of **<apn>), (**range of possible length of **<login>),(**range of possible length of **<password>), <af>,<ip>,<dns1>,<dns2>,<ipv6>,<dns1v6>,<dns2v6>** **OK**
Read command Syntax **AT+KCNXCFG?**	 Response **+KCNXCFG: <cnx cnf>, "GPRS", <apn>,<login>,<password>,<af>,<ip>,<dns1>,<dns2> [,<ip_v6>,<dns1_v6>,<dns2_v6>],<state>** **[...]** **OK**
Write command Syntax **AT+KCNXCFG= <cnx cnf>, "GPRS",<apn> [,[<login>] [,[<password>] [,<af>[,[<ip>] [,[<dns1>] [,<dns2>]]]] [,[<ip_v6>] [,[<dns1_v6>] [,<dns2_v6>]]]]]**	 Response **OK** Parameters **<cnx cnf>** 1 – 5 PDP context configuration. A 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 64 bytes), indicates the user name of the cnx **<password>** String type (max size 64 bytes), indicates the password of the cnx **<af>** Address family used for the connection. IPV4 IPv4 only IPV6 IPv6 only IPV4V6 IPv4 and IPv6

HL7528	
	<ip> String type. If the mobile is supposed to work with a dynamic address, the value should be “0.0.0.0” or an empty string. **<dns1>, <dns2>** String type. If the mobile is supposed to work with dynamic DNS addresses, the value should be “0.0.0.0” or an empty string. **<ip_v6>** IPV6 String type. If the mobile is supposed to work with a dynamic address, the value should be “::” or an empty string. **<dns1_v6>, <dns2_v6>** IPV6 String type. If the mobile is supposed to work with dynamic DNS addresses, the value should be “::” or an empty string. **<state>** Connection state 0 Disconnected 1 Connecting 2 Connected 3 Idle, down counting for disconnection 4 Disconnecting
Reference Sierra Wireless Proprietary	Notes • This AT command is used to configure the bearer to be used for the future IP Services. • By default, the IP and DNS address are dynamic (those values would be affected by the network during the PDP connection). • This connection will be used by the module to access to the IP services described on the following chapters. The AT+KCNXCFG command is only defined to set the current parameters. The defined connection will be automatically opened when needed by the IP services. (e.g. UDP service). • The use of IPV4 and/or IPV6 addresses is configured by PDP context configuration; <cnx_cfg>=3 corresponds to CID=3 in +CGDCONT/+CGACT. • When the connection is up, read command returns the actual values used by the connection interface. • If the PDP address is displayed by the +CGPADDR command, the module has already performed a PS. To start a TCP connection without attempting to perform a PS attach, the user must enter <ip> and <dns1> in +KCNXCFG. Otherwise, the user must perform a PS detach (+CGATT=0).

11.7.2. +KCNXTIMER Command: Connection Timer Configuration

HL7528	
Test command Syntax **AT+KCNXTIMER =?**	Response **+KCNXTIMER:** (list of supported **<cnx cnf>**s),(list of supported **<tim1>**s),(list of supported **<nbtrial>**s),(list of supported **<tim2>**s) ,(list of supported **<idletime>**s) **OK**

HL7528	
Read command Syntax **AT+KCNXTIMER?**	 Response **+KCNXTIMER: <cnx cnf>,<tim1>,<nbtrial>,<tim2>,<idletime>** **[…]** **OK**
Write command Syntax **AT+KCNXTIMER=<cnx cnf>[,[<tim1>][,[<nbrtrial>][,<tim2>][,<idletime>]]]]**	 Response **OK** Parameters **<cnx cnf>** 1 – 5 PDP context configuration. A numeric parameter which specifies a particular PDP context configuration **<tim1>** 1 – 120 s (default value = 30 s) 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>** 1 – 4 Number of attempt times (default value = 2) The module will try to activate the PDP context with a maximum of <nbtrial> times **<tim2>** 0 – 300 s (default value = 60 s; 0 = deactivated, the connection will not close by itself). For client sockets, the module will try to connect to server within <tim2>s, if <tim2> expires, it will give up the connection. **<idletime>** 0 – 1800 s (default value = 30 s) When all sessions are closed, the idle timer starts with the idle time. When this timer expires, it will try to deactivate the PDP context. Before the timer expires, connecting any session will stop this timer and the PDP context is reused.
Reference Sierra Wireless Proprietary	Notes This command has an impact on TCP, UDP, FTP-specific commands.

11.7.3. +KCNXPROFILE Command: Current Profile Connection Configuration

HL7528	
Test command Syntax **AT+KCNXPROFILE=?**	 Response **+KCNXPROFILE:** (list of possible **<cnx cnf>**s) **OK**
Read command Syntax **AT+KCNXPROFILE?**	 Response **+KCNXPROFILE: <cnx cnf>** **OK**

HL7528	
Write command Syntax **AT+ KCNXPROFILE= <cnx cnf>**	Response **OK** Parameter **<cnx cnf>** 1 – 5 PDP context configuration. A numeric parameter which specifies a particular PDP context configuration
Reference Sierra Wireless Proprietary	Notes This command sets the default PDP context configuration ID for KTCPCFG, KUDPCFG and KFTPCFG if <cnx cnf> parameter is not given in these commands.

11.7.4. +KCGPADDR Command: Display PDP Address

HL7528	
Test command Syntax **AT+KCGPADDR= ?**	Response **+KCGPADDR:** (list of possible **<cnx cnf>**s) **OK**
Write command Syntax For all <cnx_cnf>s: **AT+KCGPADDR** For a specific <cnx_cnf>: **AT+KCGPADDR= <cnx cnf>**	Response **+KCGPADDR: <cnx cnf>, <PDP_addr_1>** **[[+KCGPADDR: <cnx cnf>, <PDP_addr_2>]** **…]** **OK** Parameters **<cnx cnf>** 1 – 5 PDP context configuration. A numeric parameter which specifies a particular PDP context configuration **<PDP_addr>** A string that identifies the MT in the address space applicable to the PDP
Reference Sierra Wireless Proprietary	Notes • This AT command can be used after 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

11.7.5. +KCNX_IND Notification: Connection Status

HL7528	
Unsolicited Notification	Response **+KCNX_IND: <cnx cnf>,<status>,<af>** (for <status> = 0, 1) **+KCNX_IND: <cnx cnf>,<status>,<attempt>,<nbtrial>,<tim1>** (for <status> = 2) **+KCNX_IND: <cnx cnf>,<status>** (for <status> = 3, 6) **+KCNX_IND: <cnx cnf>,<status>,<attempt>** (for <status> = 4) **+KCNX_IND: <cnx cnf>,<status>,<idletime>** (for <status> = 5) Parameters **<cnx cnf>** 1 – 5 PDP context configuration. A numeric parameter which specifies a particular PDP context configuration **<status>** PDP connection status 0 Disconnected due to network 1 Connected 2 Failed to connect, <tim1> timer is started if <attempt> is less than <nbtrail> 3 Closed 4 Connecting 5 Idle time down counting started for disconnection 6 Idle time down counting canceled **<af>** 0 IPV4 1 IPV6 **<tim1>** Refer to +KCNXTIMER **<attempt>** Current attempt of bringing up of PDP connection **<nbtrial>** Refer to +KCNXTIMER **<idletime>** Refer to +KCNXTIMER

11.7.6. +KCNXUP Command: Bring up the PDP Connection

HL7528	
Test command Syntax **AT+KCNXUP=?**	Response **+KCNXUP:** (list of possible **<cnx cnf>**s) **OK**
Write command Syntax **AT+KCNXUP= <cnx cnf>**	Response **OK** Parameter **<cnx cnf>** 1 – 5 PDP context configuration. A numeric parameter which specifies a particular PDP context configuration

HL7528	
Reference Sierra Wireless Proprietary	Notes • This command activates the PDP context and reserves the activated PDP connection (i.e. keeps the PDP connection up even after the last session is closed). • If this command is not used, PDP context will be brought down after the last session is closed unless +KCNXDOWN is used.

11.7.7. +KCNXDOWN Command: Bring Down the PDP Connection

HL7528	
Test command Syntax **AT+KCNXDOWN =?**	Response **+KCNXDOWN:** (list of possible **<cnx cnf>**s),(list of possible **<mode>**s) **OK**
Write command Syntax **AT+KCNXDOWN =<cnx cnf> [,<mode>]**	Response **OK** Parameters **<cnx cnf>** 1 – 5 PDP context configuration. A numeric parameter which specifies a particular PDP context configuration **<mode>** 0 Cancels the reservation of activated PDP connection previously configured by +KCNXUP 1 Similar to 0, but it deactivates the PDP connection even if active sessions exist
Reference Sierra Wireless Proprietary	

11.8. Common Configuration

11.8.1. +KPATTERN Command: Custom End of Data Pattern

HL7528	
Test command Syntax **AT+KPATTERN=?**	Response **OK**
Read command Syntax **AT+KPATTERN?**	Response **+KPATTERN: <EOF pattern>** **OK**
Write command Syntax **AT+KPATTERN =<EOF pattern>**	Response **OK** or **+CME ERROR <err>** Parameter **<EOF pattern>** String type (max size 128 bytes). This is a pattern used to notify the end of data (or file) during data or file transfer. This string doesn't have to be human-readable (non-printable characters are allowed.)
Reference Sierra Wireless Proprietary	Notes • The default value of the pattern is: "--EOF--Pattern--". • It is the responsibility of the user to select an appropriate pattern according to the data transferred. (i.e. Numeric pattern for text files and Readable string for binary files). • The <EOF pattern> pattern is detected with 100ms or higher timeout and without following data. The timeout value is equal to <wait_time> of +KIPOPT. • The received data is stored with buffer size <send size v4> or <send size v6> so that <EOF pattern> with size larger than it is not detected. User application should ensure the value of <send size v4> or <send size v6> is larger than the size of <EOF pattern>.

11.8.2. +KURCCFG Command: Enable or Disable the URC from TCP Commands

HL7528	
Test command Syntax **AT+KURCCFG=?**	Response **+KURCCFG: (**list of supported **<protoopt>**s**),(**list of supported **<noti_act>**s**),(**list of supported **<indi_act>**s**)** **OK**
Read command Syntax **AT+KURCCFG?**	Response **+KURCCFG:** list of supported **(<protoopt>,<noti_act>,<indi_act>)** **OK**
Write command Syntax **AT+KURCCFG=<protoopt>,<noti_act>[,<indi_act>]**	Response **OK** Parameters **<protoopt>** Protocol option to enable/disable URC "TCPC" TCP client session "TCPS" TCP server session "UDPC" UDP client session "UDPS" UDP server session "FTP" FTP client session "HTTP" HTTP client session "HTTPS" HTTPS client session "TCP" Both TCP client and TCP server sessions "UDP" Both UDP client and UDP server sessions **<noti_act>** 1 Enable URC (such as +KTCP_NOTIF, +KFTP_ERROR, etc.) 0 Disable URC **<indi_act>** 1 Enable URC (such as +KTCP_SRVREQ, +KTCP_IND, +KTCP_DATA, +KUDP_DATA, +KUDP_RCV, +KFTP_IND, etc.) 0 Disable URC
Reference Sierra Wireless Proprietary	Notes • Enable/Disable +KTCP_NOTIF unsolicited messages, this is useful to use only a polling mode with +KTCPSTAT • If "disable": URCs are discarded and not stored • Can be used in 07.10 multiplexer

HL7528	

Examples	// To disable URC:
	AT+KURCCFG="TCP",0
	OK
	
	// Test and read command:
	AT+KURCCFG=?
	+KURCCFG:
	("TCPC","TCPS","UDPC","UDPS","FTP","HTTP","HTTPS","TCP","UDP"),(0-1),(0-1)
	OK
	
	AT+KURCCFG?
	+KURCCFG: "TCPC",1,1
	+KURCCFG: "TCPS",1,1
	+KURCCFG: "UDPC",1,1
	+KURCCFG: "UDPS",1,1
	+KURCCFG: "FTP",1,1
	+KURCCFG: "HTTP",1,1
	+KURCCFG: "HTTPS",1,1
	OK

11.8.3. +KIPOPT Command: General Options Configuration

HL7528	
Test command Syntax **AT+KIPOPT=?**	 Response **+KIPOPT: 0,<UDP>,(1-100),(8-1472),(8-1452)** **+KIPOPT: 0,<TCP-based>,(0-100),(0,8-1460),(0,8-1440)** **+KIPOPT: 1,(0-1)** **+KIPOPT: 2,(0-255)** **+KIPOPT: 3,(0-1),(0-1)** **+KIPOPT: 4,(0-1)** **OK**
Read command Syntax **AT+KIPOPT?**	 Response **+KIPOPT: 0,<proto>,<wait time>,<send size v4>,<send size v6>]** **[...]** **+KIPOPT: 1,<http_chunked>** **+KIPOPT: 2,<http_max_redirect>** **+KIPOPT: 3,<stop_on_error>, <stop_on_peer>** **+KIPOPT: 4,<ssl_ver>** **OK**

HL7528

Write command

Syntax

If <option_id>=0
AT+KIPOPT=<option_id>,<proto>,<wait time>[,<send size v4>[,<send size v6>]]

If <option_id>=1
AT+KIPOPT=<option_id>,<http_chunked>

If <option_id>=2
AT+KIPOPT=<option_id>,<http_max_redirect>

If <option_id>=3
AT+KIPOPT=<option_id>,<stop_on_error>,<stop_on_peer>

If<option_id>=4
AT+KIPOPT=<option_id>,<ssl_ver>

Response

OK

or

+CME ERROR <err>

Parameters

<option_id> Option ID

0 Wait time, send size threshold configuration
1 HTTP chunked transfer encoding
2 HTTP maximum redirection
3 PDP connection deactivation behavior
4 SSL version for use in KHTTPS

<proto> Protocol, string type

"TCPC" TCP client session
"TCPS" TCP server session
"UDPC" UDP client session
"UDPS" UDP server session
"FTP" FTP client session
"HTTP" HTTP client session
"HTTPS" HTTPS client session
"TCP" Both TCP client and TCP server sessions
"UDP" Both UDP client and UDP server sessions

<wait time> Timeout for sending buffered data to peer

This parameter specifies the timeout after which the buffered data received from the AT terminal will be sent to the peer irrespective of size of the data packet. Value in 100ms unit.

For UDP, range = 1 – 100 (default value = 2)

For TCP based protocol, range = 0 – 100 (default value = 1). Value 0 has the same effect as value 1 as limited by +KPATTERN detection timing.

<send size v4> Data size threshold for IPV4 sessions

When the buffered data received from the AT terminal reaches this threshold, the data is sent to the socket layer.

For UDP, range = 8 – 1472 (default value = 1020)

For TCP based protocol, range = 0, 8 – 1460; where 0 = disabled (default value = 0)

<send size v6> Data size threshold for IPV6 sessions

When the buffered data received from the AT terminal reaches this threshold, the data is sent to the socket layer.

For UDP, range = 8 – 1452 (default value = 1020)

For TCP based protocol, range = 0, 8 – 1440; where 0 = disabled (default value = 0)

<http_chunked> "chunked" transfer encoding for HTTP POST

0 Data sent with HTTP POST are not encoded (default)
1 Data sent with HTTP POST are encoded using "chunked" transfer encoding automatically

<http_max_redirect> Maximum redirection allowed for HTTP GET. Range = 8 – 255 (default value = 0)

HL7528	
	<stop_on_error> Behavior of PDP connection deactivation when a session was closed due to any errors 0 Do not request to stop the connection (default) 1 Request to stop the connection **<stop_on_peer>** Behavior of PDP connection deactivation when a session was closed by the peer/server 0 Do not request to stop the connection (default) 1 Request to stop the connection **<ssl_ver>** SSL version for use in KHTTPS 0 TLS version 1.1 1 TLS version 1.0
Reference Sierra Wireless Proprietary	Notes • "chunked" transfer encoding for HTTP POST is applicable and effective only for HTTP version 1.1 • The default setting of <option_id>=3 is (<stop_on_error>=0, <stop_on_peer>=0) after module boot-up, meaning that a PDP connection is requested to stop only when a session was closed by Internet AT command (e.g. +KTCPCLOSE) • For <send size v4> and <send size v6>, these thresholds control the maximum size of data received from the AT terminal to be buffered within timeout <wait time>, when the threshold is reached or after timeout, the buffered data are sent to the socket layer for transmission. for UDP, data 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 TCP based protocol, when <send size v4> and <send size v6> are disabled (= 0), threshold = 4000 is used internally. • The maximum transmission unit (MTU) is 1500 bytes • After starting a connection or running write commands of SSL Certificate, <ssl_ver> is fixed and cannot be changed until module reboot • <send size v4> and <send size v6> impacts the detection of <EOF pattern> , refer to the notes of +KAPTTERN for more information

11.9. TCP Specific Commands

11.9.1. +KTCPCFG Command: TCP Connection Configuration

HL7528	
Test command Syntax **AT+KTCPCFG=?**	Response **+KTCPCFG: (**list of possible **<cnx_cnf>**s**),(**list of possible **<mode>**s**),<remote-name/ip>,(**list of possible **<tcp_port >**s**),(**list of possible **<source_port>**s**),(**list of possible **<data_mode>**s**),(**list of possible **<URC-ENDTCP-enable>**s**),(**list of possible **<af>**s**)** **OK**

HL7528

Read command

Syntax
AT+KTCPCFG?

Response
+KTCPCFG: <session_id>,<status>,<cnx cnf>,<mode>[,<serverID>],<tcp remote address>,<tcp_port> [,<source_port>],<data_mode>,<URC-ENDTCP-enable>,<af> […]]

Write command

Syntax
AT+KTCPCFG= [<cnx cnf>], <mode>,[<tcp remote address>], <tcp_port>[[,[<source_port>][, [<data_mode>], [<URC-ENDTCP-enable>]]],<af>]

Response
+KTCPCFG: <session_id>
OK

Parameters
<cnx cnf> Index for 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)

<tcp remote address> IP address string or explicit name of the remote server. For server configurations, this parameter is left blank.

<tcp_port> 1 – 65535 TCP peer port. For server configurations, this parameter is the listening port

<status> Connection state of the selected socket
0 Disconnected
1 Connected

<serverID> Server session ID index. Only for socket in Child mode

<source_port> 0 – 65535 Specifies the local TCP port number. For server configurations, this parameter is left blank.

<data_mode>
0 Do not display <data> in URC
1 Display <data> in URC

<URC-ENDTCP-enable>
0 Do not display URC "+KTCP_ACK"
1 Display URC "+KTCP_ACK"

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

Reference
Sierra Wireless Proprietary

Notes
- If the socket is defined as a <CLIENT> socket, <tcp_port> and <tcp remote address> define the port and the IP address of the remote server we want to connect.
- Maximum <session_id> is 32.
- For child session, the property <data_mode> will be kept the same as the server socket's setting.
- This AT command can be used before setting up +KCNXCFG configuration. But the latter is required to start the connection properly.

11.9.2. +KTCPCNX Command: TCP Start Connection

HL7528	
Test command Syntax **AT+KTCPCNX=?**	 Response **+KTCPCNX:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+KTCPCNX=<session_id>**	 Response **OK** or **+CME ERROR: <err>** **+KTCP_NOTIF: <session_id>, <tcp_notif>** Parameters **<session_id>** TCP session index **<tcp_notif>** Indicates the cause of the TCP connection failure 0 Network error 1 No more sockets available; the maximum number has already been reached 2 Memory problem 3 DNS error 4 TCP disconnection by the server or remote client 5 TCP connection error 6 Generic error 7 Fail to accept client request's 8 Data sending is OK but KTCPSND was waiting more or less characters 9 Bad session ID 10 Session is already running 11 All sessions are used
Reference Sierra Wireless Proprietary	Notes This command is used for connecting to a remote server or listening to a bound port, depends on the selected mode of <session_id>.

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

HL7528	
Test command Syntax **AT+KTCPRCV=?**	 Response **+KTCPRCV:** (list of possible **<session_id>**s),(list of possible **<ndata>**) **OK**

HL7528	
Write command Syntax **AT+KTCPRCV= <session_id>, <ndata>**	Response **CONNECT** **…<EOF pattern>** **OK** or **+KTCP_NOTIF: <session_id>,<tcp_notif>** Parameters **<session_id>** TCP session index **<ndata>** Number of bytes the device wants to receive (max value 4294967295) **<tcp_notif>** See command AT+KTCPCNX
Reference Sierra Wireless Proprietary	Notes • This function is used to receive <ndata> data bytes through a previously opened TCP socket. • <ndata> indicates the max data number that the terminal wishes to receive. If the TCP socket contains more data than <ndata> bytes then only <ndata> bytes will be received. If the TCP socket contains less data than <ndata> bytes then only TCP socket's data will be received. • <EOF pattern> would be added at the end of data automatically. • When <ndata> (max value) bytes or only available data in the TCP socket have been received, the module returns to command state and returns OK. • Before using this command, it is highly recommended to configure the module for hardware flow control, using the command AT&K3. • The behavior of DTR drop is as per AT&D.

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

HL7528	
Test command Syntax **AT+KTCPSND=?**	Response **+KTCPSND:** (list of possible **<session_id>**s),(list of possible **<ndata>**) **OK**
Write command Syntax **AT+KTCPSND= <session_id>, <ndata>**	Response **CONNECT** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KTCP_NOTIF: <session_id>,<tcp_notif>**

HL7528	
	Parameters **<session_id>** TCP session index **<ndata>** Number of bytes (max value 4294967295) **<tcp_notif>** See command AT+KTCPCNX
Reference Sierra Wireless Proprietary	Notes • User must use <EOF pattern> to finish sending, then module returns to command mode. • All the data will be sent out ignoring <ndata>. If data sent is not equal to <ndata> then KTCP_NOTIF would appear. • <ndata> is the data size without <EOF pattern>. • Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3. • The behavior of DTR drop is as per AT&D. • "+++" aborts data; use ATO[n] to return to data mode.

11.9.5. +KTCPCLOSE Command: Close Current TCP Operation

HL7528	
Test command Syntax **AT+KTCPCLOSE=?**	Response **+KTCPCLOSE:** (list of possible **<session_id>**s), (list of possible **<closing_type>**s) **OK**
Write command Syntax **AT+KTCPCLOSE=<session_id>[,<closing_type>]**	Response **OK** or **+CME ERROR: <err>** **NO CARRIER** **+KTCP_NOTIF: <session_id>, <tcp_notif>** Parameters **<session_id>** TCP session index **<closing_type>** 0 Abort. Fast closing of the TCP connection (not supported) 1 The TCP connection is properly closed, which means that data sent to the module by AT+KTCPSND will be sent to the TCP server and acknowledged before the socket is closed. **<tcp_notif>** See command AT+KTCPCNX

HL7528	
Reference Sierra Wireless Proprietary	Notes • This function first closes the TCP socket and if there is no other session running then the PDP context is released. • AT+KTCPDEL=<session_id> can be used to delete the socket configuration after close.

11.9.6. +KTCPDEL Command: Delete a Configured TCP Session

HL7528	
Test command Syntax **AT+KTCPDEL=?**	Response **+KTCPDEL:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+KTCPDEL=<session_id>**	Response **OK** or **+CME ERROR: <err>** Parameter **<session_id>** TCP session index
Reference Sierra Wireless Proprietary	Notes The session must be closed (+KTCPCLOSE) before using this command.

11.9.7. +KTCP_SRVREQ Notification: Incoming Client Connection Request

HL7528	
Unsolicited Notification	Response **+KTCP_SRVREQ: <session_id>,<subsession_id>,client_ip>,<client_port>** Parameters **<session_id>** TCP session index **<subsession_id>** Newly created TCP session index **<client_ip>** Incoming socket IP address string **<client_port>** 0 – 65535 Incoming client port

HL7528	
Reference Sierra Wireless Proprietary	Notes • This notification is sent when a client requests a connection to the server. The connection is automatically accepted. • The created session is driven as any other TCP session with its own session ID. Use KTCPSND, KTCPRCV, KTCPCLOSE, etc. to provide the service associated to this TCP server. • The TCP server corresponding to the session ID is still able to receive connection requests from other clients. These requests are notified with KTCP_SRVREQ. • The client ip address and port can also be checked by “AT+KTCPCFG?” after client is connected to the TCP server.

Examples	// Configure the module to TCP servers
	AT+KCNXCFG=0,"GPRS","szsjmc.gd";+KTCPCFG=0,1,,179
	+KTCPCFG: 1
	OK
	
	AT+KCNXCFG=0,"GPRS","szsjmc.gd";+KTCPCFG=0,1,,180
	+KTCPCFG: 2
	OK
	
	// Start the TCP servers
	AT+KTCPCNX=1 // listen on port 179
	OK
	
	AT+KTCPCNX=2 // listen on port 180
	OK
	
	// Show the TCP servers’ ip address
	AT+KCGPADDR
	+KCGPADDR: 0,"192.168.1.49"
	OK
	
	// Incoming connection request from remote client, shows ip address and port of remote
	// client
	
	+KTCP_SRVREQ: 1,3,"192.168.0.32",4614
	// incoming a connection request from “192.168.0.32” via listening port 179, the remote port
	// is 4614
	
	+KTCP_SRVREQ: 2,4,"10.10.10.110",4665
	// incoming a connection request from “10.10.10.110” via listening port 180, the remote port
	// is 4665
	
	+KTCP_SRVREQ: 2,5,"10.10.10.110",4668
	// incoming a connection request from the same ip via the same listening port, the remote
	// port is 4668
	
	+KTCP_SRVREQ: 1,6,"192.168.1.117",1739
	// incoming a connection request from “192.168.1.117” via listening port 179, the remote
	// port is 1739
	
	+KTCP_NOTIF: 4,4
	// the connection of sub session id 4 (on listening port 180) is closed.
	
	+KTCP_SRVREQ: 2,4,"10.10.10.8",4672
	// incoming a connection request from “10.10.10.8” via listening port 180, the remote port is
	// 4672

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

HL7528	
Unsolicited Notification	Response **+KTCP_DATA: <session_id>,<ndata available>[,<data>]** Parameters **<session_id>** TCP session index **<ndata available>** Maximum number of bytes to be read in the TCP receive buffer when <data_mode> = 0; maximum number of bytes to be read in <data> when <data_mode> = 1 **<data>** Data in octet. The length of data is specified by <ndata_available>
Reference Sierra Wireless Proprietary	Notes • As soon as the connection is established, the module can receive data through the TCP socket. This notification is sent when data are available in the receive buffer. • This notification is sent for each TCP packet received. • When <data_mode> was set to 1, <ndata_available> will range 1~1500 in the URC. If user application sent over 1500 bytes data to module, module will display those data with several URCs.

11.9.9. +KTCP_IND_CFG Command: TCP Status Configuration

HL7528	
Test command Syntax **AT+ KTCP_IND_CFG =?**	Response **+KTCP_IND_CFG: (**list of possible **<value>**s) **OK**
Read command Syntax **AT+ KTCP_IND_CFG?**	Response **+KTCP_IND_CFG: <value>** **OK**
Write command Syntax **AT+ KTCP_IND_CFG= <value>**	Response **OK** or **+CME ERROR <err>** Parameter **<value>** 0 Disable +KTCP_IND notification using +KTCPCLOSE 1 Enable +KTCP_IND notification using +KTCPCLOSE

HL7528	
Reference Sierra Wireless Proprietary	Notes The parameter will not be saved into non-volatile memory. It will resume to its default value after reset.

11.9.10. +KTCP_IND Notification: TCP Status

HL7528	
Unsolicited Notification	Response **+KTCP_IND: <session_id>,<status>** Parameter **<session_id>** TCP session index **<status>** TCP session status 0 Status us closed using +KTCPCLOSE 1 Session is set up and ready for operation
Reference Sierra Wireless Proprietary	Notes To enable +KTCP_IND notification using +TCP_CLOSE, run AT+KTCP_IND_CFG=1 before starting a TCP connection.

11.9.11. +KTCPSTAT Command: Get TCP Socket Status

HL7528	
Test command Syntax **AT+KTCPSTAT=?**	Response **OK**
Read command Syntax **AT+KTCPSTAT?**	Response **OK**
Write command Syntax For all TCP <session_id>s: **AT+KTCPSTAT** For specific TCP <session_id>s: **AT+KTCPSTAT=<session_id>**	Response **+KTCPSTAT: <session_id>,<status>,<tcp_notif>,<rem_data>,<rcv_data>** **[…]** **OK** or **+KTCPSTAT: <status>,<tcp_notif>,<rem_data>,<rcv_data>** **OK** Parameters **<session_id>** TCP session index

HL7528	
	<status> TCP socket state 0 Socket not defined, use KTCPCFG to create a TCP socket 1 Socket is only defined but not used 2 Socket is opening and connecting to the server, cannot be used 3 Connection is up, socket can be used to send/receive data 4 Connection is closing, it cannot be used, wait for status 5 5 Socket is closed **<tcp_notif>** -1 if socket/connection is OK, <tcp_notif> if an error has happened **<rem_data>** Remaining bytes in the socket buffer, waiting to be sent **<rcv_data>** Received bytes, can be read with +KTCPRCV command
Reference Sierra Wireless Proprietary	Notes • Size of socket buffer for sending is 17520 bytes. • This command returns +CME ERROR: 910 (Bad Session ID) for undefined <session_id>.

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

HL7528	
Test command Syntax **AT+ KTCPSTART=?**	 Response **OK**
Read command Syntax **AT+ KTCPSTART?**	 Response **OK**
Write command Syntax **AT+ KTCPSTART= <session_id>**	 Response **CONNECT** **OK** or **+CME ERROR: an error occurs, syntax error** **+KTCP_NOTIF: <session_id>,<tcp_notif> : an error occurs** Parameters **<session_id>** TCP session index **<tcp_notif>** See command AT+KTCPCNX

HL7528	
Reference Sierra Wireless Proprietary	Notes • This function is used to send and receive data bytes through a TCP socket. • Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3. • The behavior of DTR drop is as per AT&D. • +++ can be used to switch in command mode. • ATO<session_id> can be used to switch back in data mode. • Only 1 KTCPSTART session can be used. • Can be used in 07.10 multiplexer. • If the session is successfully connected by +KTCPCNX, this command does not restart the connection and module enters direct data flow directly.

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

HL7528			
Unsolicited Notification	Response **+KTCP_ACK: <session_id>,<result>CR><LF>** Parameters **<session_id>**		TCP session index
	<result>	0	Data sent failure: not all data has been received by remote side
		1	Data sent success: all the data has already been received by the remote side
Reference Sierra Wireless Proprietary	Notes This URC is enabled or disabled by parameter <URC-ENDTCP-enable> of command “+KTCPCFG”. The URC is disabled by default.		

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

HL7528	
Test command Syntax **AT+ KTCPACKINFO =?**	Response **OK**
Read command Syntax **AT+ KTCPACKINFO?**	Response **OK**

HL7528	
Write command Syntax For all TCP <session_id>s with <URC-ENDTCP-enable>=1: **AT+ KTCPACKINFO** Else: **AT+ KTCPACKINFO= <session_id>**	Response **+KTCPACKINFO: <session_id>,<result>** **[…]** **OK** or **+KTCPACKINFO: <session_id>,<result>** **OK** **+CME ERROR: <err>** Parameters **<session_id>** TCP session index **<result>** 0 Data sent failure: not all data has been received by remote side. 1 Data sent success: all the data has already been received by the remote side, or no data transfer happens yet 2 The status is unknown yet
Reference Sierra Wireless Proprietary	Notes • The command will return ERROR if <URC-ENDTCP-enable> of command "+KTCPCFG" is 0 • After TCP session is connected and before any data transfer, +KTCPACKINFO returns 1

11.10. UDP Specific Commands

11.10.1. +KUDPCFG Command: UDP Connection Configuration

HL7528	
Test command Syntax **AT+KUDPCFG =?**	Response **+KUDPCFG: (**list of possible **<cnx cnf>**s**), (**list of possible **<mode>**s**), (**list of possible **<port>**s**), (**list of possible **<data_mode>**s**),<remote-name/ip>,(**list of possible **<udp_port>**s**), (**list of possible **<af>**s**)** **OK**
Read command Syntax **AT+KUDPCFG?**	Response **+KUDPCFG: <session_id>,<cnx cnf>,<mode>,<port>,<data_mode>,<udp remote address>,<udp_port>,<af>** **[…]** **OK**

HL7528

Write command

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

Response
+KUDPCFG: <session_id>
OK

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

Parameters
<session_id> UDP session index

<mode> 0 Client
1 Server

<port> 0 – 65535 Port number. Selecting 0 = random

<cnx cnf> 1 –5 PDP context configuration. Numeric parameter that specifies a particular PDP context configuration (see +KCNXCFG).

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

<data_mode> 0 Do not display <data> in URC
1 Display <data> in URC

<udp remote address> IP address string or explicit name of the remote host, Default is empty (given by +KUDPSND)

<udp_port> 0 – 65535 UDP peer port. Selecting 0 means the peer port will given by +KUDPSND.

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

Reference
Sierra Wireless Proprietary

Notes
- For UDP socket in server mode, it is bound to a defined port number, incoming connection are notified by KUDP_DATA. If remote address and port are given, they are saved for use in +KUDPSND.
- Maximum <session_id> is 32.
- When more than two different APN are used in +KCNXCFG, only one of them can be used in TCP or UDP services.
- +KCNXCFG configuration should be set up to start the connection properly.

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

HL7528	
Test command Syntax **AT+KUDPRCV =?**	 Response **+KUDPRCV:** (list of possible **<session_id>**s),(list of possible **<ndata>s**) **OK**
Write command Syntax **AT+KUDPRCV= <session_id>, <ndata>**	 Response **CONNECT** **…<EOF pattern>** **OK** **+KUDP_RCV: <udp remote address>,<udp remote port>,<ndata available>** or **NO CARRIER** **+CME ERROR: <err>** **+KUDP_NOTIF: <session_id>, <udp_notif>** **+KUDP_DATA_MISSED: <session_id>, <ndata missed>** Parameters **<session_id>** UDP session index **<ndata>** Number of bytes the device wants to receive (max value = 4294967295) **<udp remote address>** IP address string of the remote host **<udp remote port>** 0 – 65535 Remote port number **<ndata available>** Number of bytes to be read in first received packet **<udp_notif>** See command AT+KUDPCFG **<ndata missed>** Number of bytes left (and lost) in the UDP socket
Reference Sierra Wireless Proprietary	Notes • This function is used to receive <ndata> data bytes through a previously opened UDP socket. • <ndata> indicates the 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. • Before using this command, it is highly recommended to configure the module for hardware flow control, using the command AT&K3. • The behavior of DTR drop is as per AT&D.

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

HL7528	
Test command Syntax **AT+KUDPSND =?**	Response **+KUDPSND: (**list of possible **<session_id>**s**),<remote-name/ip>,(**list of possible **<udp_port>**s**), (**list of possible **<ndata>**s**)** **OK**
Write command Syntax **AT+KUDPSND= <session id>, [<udp remote address>] [,<udp_port>] [,<ndata>]**	Response **CONNECT** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KUDP_NOTIF: <session_id>,<udp_notif>** Parameters **<session_id>** UDP session index **<udp remote address>** IP address string or explicit name of the remote host **<udp_port>** 1 – 65535 UDP peer port **<ndata>** Number of bytes (max value = 4294967295) **<udp_notif>** See command AT+KUDPCFG
Reference Sierra Wireless Proprietary	Notes • User must use <EOF pattern> to finish sending, then module returns to command mode. • All the data will be sent out ignoring <ndata>. If data sent is not equal to <ndata> then KUDP_NOTIF would appear. • <ndata> is the data size without <EOF pattern>. • Before using this command, it is highly recommended to configure the module for Hardware flow control, using the command AT&K3. • The behavior of DTR drop is as per AT&D. • "+++" aborts data; use ATO[n] to return to data mode. • The maximum transmission unit (MTU) is 1500 Bytes. • The <udp remote address> and <udp_port> are saved internallysuch 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 values are 1020 bytes.

11.10.4. +KUDPCLOSE Command: Close Current UDP Operation

HL7528	
Test command Syntax **AT+ KUDPCLOSE=?**	 Response **+KUDPCLOSE:** (list of possible **<session_id>**s),(list of possible **<keep_cfg>**s) **OK**
Write command Syntax **AT+ KUDPCLOSE= <session_id> [,<keep_cfg>]**	 Response **OK** or **+KUDP_NOTIF: <session_id>, <udp_notif>** Parameters **<session_id>** UDP session index **<udp_notif>** See command AT+KUDPCFG **<keep_cfg>** Indicates whether the session configuration should be deleted after closing 0 Delete the session configuration 1 Keep the session configuration
Reference Sierra Wireless Proprietary	Notes • This function closes the UDP session. If there is no other session running, the PDP context would be released. • This function will delete the session configuration if <keep_cfg> = 0.

11.10.5. +KUDPDEL Command: Delete a Configured UDP Session

HL7528	
Test command Syntax **AT+KUDPDEL =?**	 Response **+KUDPDEL:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+KUDPDEL= <session_id>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<session_id>** UDP session index

HL7528	
Reference Sierra Wireless Proprietary	Notes The session must be closed (using +KUDPCLOSE) before using this command

11.10.6. +KUDP_IND Notification: UDP Status

HL7528	
Unsolicited Notification	Response **+KUDP_IND: <session_id>,<status>** Parameters **<session_id>** UDP session index **<status>** UDP session status 1 Session is set up and ready for operation

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

HL7528	
Unsolicited Notification	Response **+KUDP_DATA: <session_id>,<ndata available>[,<udp remote address>,<udp remote port>,<data>]** Parameters **<session_id>** UDP session index **<ndata available>** Number of bytes to be read **<udp remote address>** IP address string of the remote host **<udp remote port>** 0 – 65535 UDP remote port **<data>** Data in octet. The length of data is specified by <ndata_available>
Reference Sierra Wireless Proprietary	Notes • As soon as the UDP socket is created, the module can receive data through this socket. This notification is sent when data are available in the receive buffer. • This notification will be sent one time. When <data_mode> was set to 0 (Do not display data in URC), the controlling software must read the buffer with KUDPRCV to activate the notification again. • When <data_mode> was set to 1, <ndata_available> will range 1~1500 in the URC. If user application sent over 1500 bytes data to module, module will display those data with several URCs. This is possible for other application (e.g. from Windows) to send >=1472 bytes UDP packet to the module but the packet is segmented and reassembled by network stack. • When <data_mode> was set to 1, URC “+KUDP_RCV” will not be displayed after “+KUDP_DATA”. • When <data_mode> was set to 1, the fields <udp remote address> and <udp remote port> will be displayed in URC “+KUDP_DATA”. When <data_mode> was set to 0, they will be displayed in URC “+KUDP_RCV”.

11.11. FTP Client Specific Commands

11.11.1. +KFTPCFG Command: FTP Configuration

HL7528	
Test command Syntax **AT+KFTPCFG=?**	Response **+KFTPCFG: (**list of possible **<cnx_cnf>**s**),<server-name/ip,(**range of possible length of **<login>),(**range of possible length of **<password>),(**list of possible **<port_number>**s**),(**list of possible **<mode>**s**),(**list of possible **<start>**s**),(**list of possible **<af>**s**)** **OK**
Read command Syntax **AT+KFTPCFG?**	Response **+KFTPCFG:<session_id>,<cnx cnf>,<server_name>,<login>,<password>, <port_number>,<mode>,<started>,<af>**
Write command Syntax **AT+KFTPCFG= [<cnx cnf>], <server_name> [,<login> [,<password> [,<port_ number> [,<mode>] [,<start>][,<af>]]]]**	Response **+KFTPCFG: <session_id>** **OK** or **+KFTP_ERROR: <session_id>, <ftp cause>** Parameters **<cnx cnf>** 1 – 5 PDP context configuration. Numeric parameter which specifies a particular PDP context configuration **<session_id>** FTP session index **<server_name>** IP address string of the ftp server or domain name of the server **<login>** String type indicating the user name to be used during the FTP connection **<password>** String type indicating the password to be used during the FTP connection **<port_number>** 1 – 65535 Remote command port (default value = 21) **<mode>** FTP connection initiator 0 Active. The server is initiator of the FTP data connection 1 Passive. The client is initiator of the FTP data connection in order to avoid the proxy filtrate. The passive data transfer process “listens” on the data port for a connection from the active transfer process to open the data connection. **<start>** Indicates whether to start the FTP connection immediately or not 0 Start the FTP connection later using +KFTPCNX 1 Start the FTP connection immediately **<started>** Indicates whether the FTP connection is started or not 0 FTP connection is not started yet 1 FTP connection is started

HL7528	
	<af> Address family used for the connection 0 IPV4 1 IPV6 **<ftp_cause>** FTP connection failure cause 0 The sending or the retrieving was impossible due to request timeout 1 It is impossible to connect to the server due to DNS resolution failure 2 It is impossible to download a file due to connection troubles. 3 The download was impossible due to connection timeout 4 No network available 5 Flash access trouble 6 Flash memory full 7 Network error XXX Reply codes from FTP server. Refer to section 16.2.5 FTP Reply Codes for details
Reference Sierra Wireless Proprietary	Notes • Execution command sets the server name, the login, the password, the port number and the mode for ftp operations. • Only one ftp session is currently supported, <session_id> is always 0. • This AT command with <start>=0 can be used before setting up +KCNXCFG configuration. But the latter is required to start the connection properly.
Examples	**AT+KFTPCFG=0,"ftp.connect.com","username","password",21,0** // The connection timeout for TCP socket is about 9seconds with 3 retransmissions of // 3 seconds delay. The result of the FTP connection is notified using unsolicited response.

11.11.2. +KFTPCNX Command: FTP Start Connection

HL7528	
Test command Syntax **AT+KFTPCNX=?**	 Response **+KFTPCNX:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+KFTPCNX= <session_id>**	 Response **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KFTP_ERROR :<session_id>, <ftp cause>** Parameters **<session_id>** FTP session index **<ftp_cause>** Refer to +KFTPCFG

HL7528	
Reference Sierra Wireless Proprietary	Notes • This command is used for starting the FTP connection created by +KFTPCFG with <start>=0. • +KFTPRCV, +KFTPSND, +KFTPDEL automatically starts the connection if it was not started before using AT+KHTTPSCNX. • The result of the FTP connection is notified using unsolicited response.

11.11.3. +KFTPRCV Command: Receive FTP Files

HL7528	
Test command Syntax **AT+KFTPRCV =?**	Response **+KFTPRCV: (**list of possible **<session_id>**s**),<local_uri>,<server_path>,<file_name>,(**list of possible **<type_of_file>**s**),(**list of possible **<offset>**s**)** **OK**
Write command Syntax **AT+KFTPRCV= <session_id>, [<local_uri>], [<server_path>], <file_name> [,<type_of_file> [,<offset>]]**	Response **CONNECT** **<EOF_pattern>** **OK** or **+CME ERROR<err>** **NO CARRIER** **+KFTP_ERROR :<session_id>, <ftp cause>** Parameters **<session_id>** FTP session index **<local_uri>** This parameter must be empty; it is reserved for compatibility of command syntax. **<server_path>** Indicates the path of the file to be downloaded. An empty string or no string indicates the downloading is done from the path given by the FTP server **<file_name>** Indicates the name of the file to download **<type_of_file>** Indicates the type of file (ASCII or binary) to transfer 0 Binary 1 ASCII **<offset>** 0 – 4294967295 Indicates the offset to “resume transfer”. When downloading file and transmitting to serial link, module will use the <offset> value and “resume transfer” from this position. **<EOF_pattern>** End of file notification. See +KPATTERN for values **<ftp_cause>** Refer to +KFTPCFG

HL7528	
Reference Sierra Wireless Proprietary	Notes • Before using this command, an FTP connection must have been achieved using AT+KFTPCFG. • After sending the +KFTPRCV command, the user will receive the entire data stream. • The user can abort the downloading by sending any character from the host. In this case, the module will end the transfer by transmitting the EOF followed by ERROR. • The user can terminate the download by deasserting DTR (with AT&D2), or by using the escape sequence +++. After which the module will return: NO CARRIER. • If AT&C1 is set, DCD will be ON after CONNECT and DCD will be OFF after download is done. • "Resume transfer" feature shall be supported by the FTP server to be used. • If the FTP server does not support the resume feature, module will output KFTP_ERROR. The <ftp_cause> will be in the sets {500, 501, 502, 421, 530}. See section 16.2.5 FTP Reply Codes for error codes.

11.11.4. +KFTPSND Command: Send FTP Files

HL7528	
Test command Syntax **AT+KFTPSND=?**	Response **+KFTPSND: (**list of possible **<session_id>**s**),<local_uri>,<server_path>,<file_name>, (**list of possible **<type of file>**s**), (**list of possible **<append>**s**)** **OK**
Write command Syntax **AT+KFTPSND= <session_id>, [<local_uri>], [<server_path>], <file_name> [,<type of file>] [,<append>]**	Response **CONNECT** **data …** **<EOF pattern>** **OK** or **+CME ERROR <err>** **NO CARRIER** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<session_id>** FTP session index **<local_uri>** This parameter must be empty; it is reserved for compatibility of command syntax **<server_path>** Indicates the path of the file to be uploaded. An empty string or no string indicates the uploading is done from the path given by the FTP server **<file_name>** Indicates the name of the file to upload **<type of file>** Indicates the type of file (ASCII or binary) to transfer 0 Binary 1 ASCII

HL7528	
	<append> Indicates whether to use "append" when uploading or not 0 Do not use "append". If the file already exists then the file will be overridden 1 Use "append". If the file already exists then the data will be appended at the end of the file; otherwise the file will be created **<EOF pattern>** End of file notification. See +KPATTERN for values **<ftp_cause>** Refer to +KFTPCFG
Reference Sierra Wireless Proprietary	Notes • Before using this command, an FTP connection must have been achieved using AT+KFTPCFG. • After sending the +KFTPSND command, the host must send the entire data stream of the file. • The user can terminate the upload by deasserting DTR (with AT&D2), or by using the escape sequence +++. The module will then return OK. • ATO is not available for this command. • If AT&C1 is set, DCD will be ON after CONNECT, and it will be OFF after the upload done. • If the requested file is unavailable on the FTP server, this command returns NO CARRIER immediately.

11.11.5. +KFTPDEL Command: Delete FTP Files

HL7528	
Test command Syntax **AT+KFTPDEL=?**	Response **+KFTPDEL: (**list of possible **<session_id>**s**),<server_path>,<file_name>,** **(**list of possible **<type>**s**)** **OK**
Write command Syntax **AT+KFTPDEL=<session_id>,[<server_path>,]<file_name>[,<type>]**	Response **OK** or **+CME ERROR <err>** **NO CARRIER** **+KFTP_ERROR: <session_id>,<ftp cause>** Parameters **<session_id>** FTP session index **<server_path>** Indicates the path of the file to be deleted. An empty string or no string indicates the deleting is done from the path given by the FTP server **<file_name>** String type that indicates the name of the file to delete **<type>** Indicates the type of file (ASCII or binary) to transfer 0 Binary 1 ASCII

HL7528	
	<ftp_cause> Refer to +KFTPCFG
Reference Sierra Wireless Proprietary	Notes • Before using this command, an FTP connection must have been achieved using AT+KFTPCFG. • The result of the delete operation is notified using unsolicited response.

11.11.6. +KFTP_IND Notification: FTP Status

HL7528	
Unsolicited Notification	Response **+KFTP_IND: <session_id>,<status>[,<data_len>]** Parameters **<session_id>** FTP session index **<status>** FTP session status 1 Session is set up and ready for operation 2 The last FTP command is executed successfully **<data_len>** Byte length of data downloaded/uploaded to/from the terminal (refer to +KFTPRCV and +KFTPSND)
Reference Sierra Wireless Proprietary	

11.11.7. +KFTPCLOSE Command: Close Current FTP Connection

HL7528	
Test command Syntax **AT+KFTPCLOSE =?**	Response **+KFTPCLOSE:** (list of possible **<session_id>**s), (list of possible **<keep_cfg>**s) **OK**
Write command Syntax **AT+KFTPCLOSE = <session_id> [,<keep_cfg>]**	Response **OK** Parameters **<session_id>** FTP session index **<keep_cfg>** Indicates whether to delete the session configuration after closing it or not 0 Delete the session configuration 1 Keep the session configuration

HL7528	
Reference Sierra Wireless Proprietary	Notes This command will close the connection to the FTP server.

11.11.8. +KFTPCFGDEL Command: Delete a Configured FTP Session

HL7528	
Test command Syntax **AT+ KFTPCFGDEL=?**	 Response **+KFTPCFGDEL:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+ KFTPCFGDEL= <session_id>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<session id>** FTP session index
Reference Sierra Wireless Proprietary	Notes The session must be closed (using +KFTPCLOSE) before using this command.

11.12. HTTP Client Specific Commands

11.12.1. +KHTTPCFG Command: HTTP Connection Configuration

HL7528	
Test command Syntax **AT+KHTTPCFG =?**	 Response **+KHTTPCFG:** (list of possible **<cnx_cnf>**s),<server-name/ip>,(list of possible **<http_port>**s),(list of possible **<http_version>**s),(range of possible length of **<login>**),(range of possible length of **<password>**),(list of possible **<started>**s),(list of possible **<af>**s) **OK**

HL7528	
Read command Syntax **AT+KHTTPCFG ?**	 Response **+KHTTPCFG: <session_id>,<cnx cnf>,<http_server>,<http_port>,<http_version>, <login>,<password>,<started>,<af>** **OK**
Write command Syntax **AT+KHTTPCFG =[<cnx cnf>], <http_server> [,<http_port> [,<http_version [,<login> [,<password>] [,<start>][,<af>]]]]**	 Response **+KHTTPCFG: <session_id>** **OK** or **+CME ERROR: <err>** Parameters **<cnx cnf>** 1 – 5 PDP context configuration. Numeric parameter which specifies a particular PDP context configuration (see +KCNXCFG) **<session_id>** HTTP session index **<http_server>** IP address string or explicit name of the remote server **<http_port>** 1 – 65535 HTTP port. Default value = 80 **<http_version>** 0 HTTP 1.1 1 HTTP 1.0 **<login>** User name to be used during the HTTP connection **<password>** Password to be used during the HTTP connection **<start>** Indicates whether to start the HTTP connection immediately 0 Start the HTTP connection later using +KHTTPCNX 1 Start the HTTP connection immediately **<started>** Indicates whether the HTTP connection has been started 0 HTTP connection has not been started 1 HTTP connection has been started **<af>** Address family used for the connection 0 IPV4 1 IPV6
Reference Sierra Wireless Proprietary	Notes • <http_port> and <http_server> define the port and the IP address of the remote server one wants to connect. • This AT command can be used before setting up +KCNXCFG configuration. But the latter is required to start the connection properly. • For <af> = 1 (IPV6), server address (<http_server>) in IP address string format can be optionally quoted with square brackets “[]”, e.g. [FEDC:BA98:7654:3210:FEDC:BA98:7654:3210]

11.12.2. +KHTTPCNX Command: HTTP Start Connection

HL7528	
Test command Syntax **AT+KHTTPCNX=?**	 Response **+KHTTPCNX:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+KHTTPCNX=<session_id>**	 Response **OK** or **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>, <http_notif>** Parameters **<session_id>** HTTP session index **<http_notif>** Refer to +KHTTPGET
Reference Sierra Wireless Proprietary	Notes • This command is used to start the HTTP connection created by +KHTTPCFG with <start>=0. • +KHTTPGET, +KHTTPHEAD, +KHTTPPOST automatically starts the connection if it was not started before using AT+KHTTPCNX.

11.12.3. +KHTTPHEADER Command: Set the HTTP Request Header

HL7528	
Test command Syntax **AT+KHTTPHEADER=?**	 Response **+KHTTPHEADER:** (list of possible **<session_id>**s), <local_uri> **OK**
Read command Syntax **AT+KHTTPHEADER?**	 Response **+KHTTPHEADER: <session_id>,<count>** **[…]**
Write command Syntax **AT+KHTTPHEADER=<session_id>[,<local_uri>]**	 Response **OK** or **+CME ERROR: <err>**

HL7528	
	Parameters **<session_id>** HTTP session index **<local_uri>** This parameter must be empty; reserved for compatibility of command syntax **<count>** HTTP headers count
Reference Sierra Wireless Proprietary	Notes <EOF pattern> must be used to finish sending; the module will then return to command mode.

11.12.4. +KHTTPGET Command: Perform HTTP GET

HL7528	
Test command Syntax **AT+KHTTPGET=?**	Response **+KHTTPGET:** (list of possible **<session_id>**s),**<request_uri >**,(list of possible **<show_resp>**s) **OK**
Write command Syntax **AT+KHTTPGET=<session_id>,<request_uri>[,<show_resp>]**	Response **CONNECT** **…<EOF pattern>** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>, <http_notif>** Parameters **<session_id>** HTTP session index **<request_uri>** Information URL to get during the HTTP connection **<http_notif>** Cause of the HTTP connection failure 4 DNS error 5 HTTP connection error due to internal trouble 6 HTTP connection timeout 9 Triple plus (+++) error (switch to command mode) 10 HTTP has no data 11 HTTP has partial data **<show_resp>** Indicates whether to show HTTP response and HTTP headers 0 Do not show 1 Show

HL7528	
Reference Sierra Wireless Proprietary	Notes • The user can abort the download by sending “End of Data pattern” from the host. In this case, the module will end the transfer by transmitting EOF followed by NO CARRIER. • Download can also be aborted (disconnected) by +++ or the DTR as per Table 1 Switch Data/Command Mode Behaviour Table.

11.12.5. +KHTTPHEAD Command: Retrieve HTTP Headers

HL7528	
Test command Syntax **AT+KHTTPHEAD=?**	 Response **+KHTTPHEAD:** (list of possible **<session_id>**s), <request_uri > **OK**
Write command Syntax **AT+KHTTPHEAD=<session_id>, <request_uri>**	 Response **CONNECT** **…<EOF pattern>** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>, <http_notif>** Parameters **<session_id>** HTTP session index **<request_uri>** Information URL get during the HTTP connection **<http_notif>** Refer to +KHTTPGET
Reference Sierra Wireless Proprietary	Notes • HTTP does not support DTR1. • This method is identical to GET except that the server MUST NOT return a message-body in the response. The meta-information contained in the HTTP headers in response to a HEAD request should be identical to the information sent in response to a GET request.

11.12.6. +KHTTPPOST Command: Perform HTTP POST

HL7528	
Test command Syntax **AT+KHTTPPOST=?**	 Response **+KHTTPPOST:** (list of possible **<session_id>**s), **<local_uri>,<request_uri>**,(list of possible **<show_resp>**s) **OK**

HL7528	
Write command Syntax **AT+KHTTPPOST =<session_id>, <local_uri>, <request_uri> [,<show_resp>]**	Response **CONNECT** **…<EOF pattern>** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTP_ERROR: <session_id>, <http_notif>** Parameters **<session_id>** HTTP session index **<local_uri>** This argument must be empty; reserved for compatibility of command syntax **<request_uri>** Request data of the HTTP connection **<http_notif>** Refer to +KHTTPGET **<show_resp>** Indicates whether to show HTTP response and HTTP headers 0 Do not show 1 Show
Reference Sierra Wireless Proprietary	Notes • Before using this command, it is highly recommended to configure the module for hardware flow control using the command AT&K3. • Upload can be ended (disconnected) by +++ or by DTR as per Table 1 Switch Data/Command Mode Behaviour Table. • ATO is not available for this command.

11.12.7. +KHTTPCLOSE Command: Close HTTP Connection

HL7528	
Test command Syntax **AT+ KHTTPCLOSE=?**	Response **+KHTTPCLOSE:** (list of possible **<session_id>**s), (list of possible **<keep_cfg>**s) **OK**
Write command Syntax **AT+ KHTTPCLOSE= <session_id> [,<keep_cfg>]**	Response **OK** or **+CME ERROR: <err>** Parameters **<session_id>** HTTP session index

HL7528	
	<keep_cfg> Indicates whether to delete the session configuration after closing it 0 Delete the session configuration 1 Keep the session configuration
Reference Sierra Wireless Proprietary	

11.12.8. +KHTTPDEL Command: Delete a Configured HTTP Session

HL7528	
Test command Syntax **AT+KHTTPDEL=?**	Response **+KHTTPDEL:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+KHTTPDEL=<session_id>**	Response **OK** or **+CME ERROR: <err>** Parameter **<session_id>** HTTP session index
Reference Sierra Wireless Proprietary	Notes The session must be closed (using +KHTTPCLOSE) before using this command.

11.12.9. +KHTTP_IND Notification: HTTP Status

HL7528	
Unsolicited Notification	Response **+KHTTP_IND: <session_id>,<status>[,<data_len>,<st_code>,<st_reason>]** Parameters **<session_id>** HTTP session index **<status>** HTTP session status 1 Session is set up and ready for operation 3 Last HTTP command was executed successfully **<data_len>** Byte length of data downloaded/uploaded to/from the terminal (+KHTTPHEAD/+KHTTPGET/+KHTTPPOST)

HL7528	
	<st_code> HTTP response status code **<st_reason>** HTTP response status reason string
Reference Sierra Wireless Proprietary	

11.13. HTTPS Client Specific Commands

11.13.1. +KHTTPSCFG Command: HTTPS Connection Configuration

HL7528	
Test command Syntax **AT+KHTTPSCFG =?**	Response **+KHTTPSCFG:** (list of possible **<cnx_cnf>**s),**<server-name/ip>**,(list of possible **<http_port>**s),(list of possible **<http_version>**s),(list of possible **<cipher_suite>**s) ,(list of possible **<sec_level>**s) ,(range of possible length of **<login>**),(range of possible length of **<password>**),(list of possible **<started>**s), (list of possible **<af>**s) **OK**
Read command Syntax **AT+KHTTPSCFG ?**	Response **+KHTTPSCFG: <session_id>,<cnx cnf>,<http_server>,<https_port>,<http_version>, <cipher suite>,<sec_level>,<login>,<password>,<started>,<af>** **OK**
Write command Syntax **AT+KHTTPSCFG =[<cnx cnf>], <http_server> [,<https_port> [,<http_version [,<cipher_suite> [,<sec_level> [,<login> [,<password>] [,<start>][,<af>]]]]]]**	Response **+KHTTPCFG: <session_id>** **OK** or **+CME ERROR: <err>** Parameters **<cnx cnf>** 1 – 5 PDP context configuration; numeric parameter which specifies a particular PDP context configuration (see +KCNXCFG) **<session_id>** HTTPS session index **<http_server>** IP address string or explicit name of the remote server **<https_port>** 1 – 65535 HTTPS port. Default value = 443 **<http_version>** 0 HTTP 1.1 1 HTTP 1.0

HL7528

<cipher_suite>

0	TLS_RSA_CHOOSE_BY_SERVER
1	TLS_RSA_WITH_RC4_128_MD5
2	TLS_RSA_WITH_RC4_128_SHA
3	TLS_RSA_WITH_DES_CBC_SHA (not supported)
4	TLS_RSA_WITH_3DES_EDE_CBC_SHA (not supported)
5	TLS_RSA_EXPORT1024_WITH_DES_CBC_SHA (not supported)
6	TLS_RSA_WITH_AES_128_CBC_SHA
7	TLS_RSA_WITH_AES_256_CBC_SHA

<sec_level>

1	No authentication
2	Manage server authentication (not fully functional; re-negotiation of client certificate is not supported)
3	Manage server and client authentication if requested by remote server (not fully functional; re-negotiation of client certificate is not supported)

<login> User name to be used during the HTTPS connection

<password> Password to be used during the HTTPS connection

<start> Indicates whether to start the HTTPS connection immediately

0 Start the HTTPS connection later using +KHTTPSCNX

1 Start the HTTPS connection immediately

<started> Indicates whether the HTTPS connection has been started

0 HTTPS connection has not been started

1 HTTPS connection has been started

<af> Address family used for the connection

0 IPV4

1 IPV6

Reference

Sierra Wireless Proprietary

Notes

- <https_port> and <http_server> define the port and the IP address of the remote server to connect to.
- For <sec_level>=2 or 3, certificates or private keys must be loaded from internal storage. See 11.14 SSL Certificate Manager.
- Any certificates referenced in HTTPS should be DER encoded.
- Any private keys referenced in HTTPS should be DER- PKCS#8 encoded.
- This AT command can be used before setting up +KCNXCFG configuration, but the latter is required to start the connection properly.
- For <af> = 1 (IPV6), server address (<http_server>) in IP address string format can be optionally quoted with square brackets “[]”, e.g. [FEDC:BA98:7654:3210:FEDC:BA98:7654:3210]
- SSL version is TLS 1.1 by default. Refer to <ssl_ver> of +KIPOPT for configuration.

11.13.2. +KHTTPSCNX Command: HTTPS Start Connection

HL7528	
Test command Syntax **AT+ KHTTPSCNX=?**	 Response **+KHTTPSCNX:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+ KHTTPSCNX= <session_id>**	 Response **OK** or **+CME ERROR: <err>** **+KHTTPS_ERROR: <session_id>, <http_notif>** Parameters **<session_id>** HTTPS session index **<http_notif>** Refer to +KHTTPSGET
Reference Sierra Wireless Proprietary	Notes • This command is used to start the HTTPS connection created by +KHTTPSCFG with <start>=0. • +KHTTPSGET, +KHTTPSHEAD, +KHTTPSPOST automatically starts the connection if it was not started before using AT+KHTTPSCNX.

11.13.3. +KHTTPSHEADER Command: Set the HTTPS Request Header

HL7528	
Test command Syntax **AT+KHTTPS HEADER=?**	 Response **AT+KHTTPSHEADER:** (list of possible **<session_id>**s), **<local_uri>** **OK**
Read command Syntax **AT+KHTTPS HEADER?**	 Response **+KHTTPSHEADER: <session_id>,<count>** **[…]**
Write command Syntax **AT+KHTTPS HEADER= <session_id> [,<local_uri>]**	 Response **OK** or **+CME ERROR: <err>**

HL7528	
	Parameters **<session_id>** HTTPS session index **<local_uri>** This parameter must be empty; reserved for compatibility of command syntax **<count>** HTTP headers count
Reference Sierra Wireless Proprietary	Notes <EOF pattern> must be used to finish sending; the module will then return to command mode.

11.13.4. +KHTTPSGET Command: Perform HTTPS GET

HL7528	
Test command Syntax **AT+ KHTTPSGET=?**	Response **+KHTTPSGET:** (list of possible **<session_id>**s),**<request_uri>**,(list of possible **<show_resp>**s) **OK**
Write command Syntax **AT+ KHTTPSGET= <session_id>, <request_uri> [,<show_resp>]**	Response **CONNECT** **…<EOF pattern>** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTPS_ERROR: <session_id>, <http_notif>** Parameters **<session_id>** HTTPS session index **<request_uri>** Information URL to get during the HTTPS connection **<http_notif>** Cause of the HTTPS connection failure 4 DNS error 5 HTTP connection error due to internal trouble 6 HTTP connection timeout 9 Triple plus (+++) error (switch to command mode) 10 HTTP has no data 11 HTTP has partial data 12 Validate server's certificate error 13 Initialize SSL error **<show_resp>** Indicates whether to show HTTP response and HTTP headers 0 Do not show 1 Show

HL7528	
Reference Sierra Wireless Proprietary	Notes • Download can be aborted by sending “End of Data pattern” from the host. In this case, the module will end the transfer by transmitting EOF followed by NO CARRIER. • Download can also be aborted (disconnected) by +++ or by DTR as per Table 1 Switch Data/Command Mode Behaviour Table.

11.13.5. +KHTTPSHEAD Command: Retrieve HTTP Headers

HL7528	
Test command Syntax **AT+ KHTTPSHEAD= ?**	 Response **+KHTTPSHEAD:** (list of possible **<session_id>**s),**<request_uri>** **OK**
Write command Syntax **AT+ KHTTPSHEAD= <session_id>, <request_uri>**	 Response **CONNECT** **…<EOF pattern>** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTPS_ERROR: <session_id>, <http_notif>** Parameters **<session_id>** HTTPS session index **<request_uri>** Information URL to get during the HTTPS connection
Reference Sierra Wireless Proprietary	Notes • HTTPS does not support DTR1. • This method is identical to GET except that the server MUST NOT return a message-body in the response. The meta-information contained in the HTTP headers in response to a HEAD request should be identical to the information sent in response to a GET request.

11.13.6. +KHTTPSPOST Command: Perform HTTPS POST

HL7528	
Test command Syntax **AT+ KHTTPSPOST= ?**	 Response **+KHTTPSPOST:** (list of possible **<session_id>**s),**<local_uri>,<request_uri>**,(list of possible **<show_resp>**s) **OK**

HL7528	
Write command Syntax **AT+ KHTTPSPOST= <session_id>, <local_uri>, <request_uri> [,<show_resp>]**	Response **CONNECT** **…<EOF pattern>** **OK** or **NO CARRIER** **+CME ERROR: <err>** **+KHTTPS_ERROR: <session_id>, <http_notif>** Parameters **<session_id>** HTTPS session index **<local_uri>** This parameter must be empty; reserved for compatibility of command syntax **<request_uri>** Request data of the HTTPS connection **<http_notif>** Refer to +KHTTPSGET **<show_resp>** Indicates whether to show HTTP response and HTTP headers 0 Do not show 1 Show
Reference Sierra Wireless Proprietary	Notes • Before using this command, it is highly recommended to configure the module for hardware flow control using the command AT&K3. • Upload can be ended (disconnected) by +++ or by DTR as per Table 1 Switch Data/Command Mode Behaviour Table. • ATO is not available for this command.

11.13.7. +KHTTPSCLOSE Command: Close HTTPS Connection

HL7528	
Test command Syntax **AT+ KHTTPSCLOSE =?**	Response **+KHTTPSCLOSE:** (list of possible **<session_id>**s), (list of possible **<keep_cfg>**s), **OK**
Write command Syntax **AT+ KHTTPSCLOSE =<session_id> [,<keep_cfg>]**	Response **OK** or **+CME ERROR: <err>**

HL7528	
	Parameters **<session_id>** HTTPS session index **<keep_cfg>** Indicates whether to delete the session configuration after closing it 0 Delete the session configuration 1 Keep the session configuration
Reference Sierra Wireless Proprietary	

11.13.8. +KHTTPSDEL Command: Delete a Configured HTTPS Session

HL7528	
Test command Syntax **AT+ KHTTPSDEL=?**	 Response **+KHTTPSDEL:** (list of possible **<session_id>**s) **OK**
Write command Syntax **AT+ KHTTPSDEL= <session_id>**	 Response **OK** or **+CME ERROR: <err>** Parameter **<session_id>** HTTPS session index
Reference Sierra Wireless Proprietary	Notes The session must be closed (using +KHTTPSCLOSE) before using this command.

11.13.9. +KHTTPS_IND Notification: HTTPS Status

HL7528	
Unsolicited Notification	Response **+KHTTPS_IND: <session_id>,<status>[,<data_len>]** Parameters **<session_id>** HTTPS session index **<status>** HTTPS session status 1 Session is set up and ready for operation 2 The last HTTPS command was executed successfully **<data_len>** Byte length of data downloaded/uploaded to/from the terminal (+KHTTPSHEAD/+KHTTPSGET/+KHTTPSPOST)

HL7528	
Reference Sierra Wireless Proprietary	

11.14. SSL Certificate Manager

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

HL7528	
Test command Syntax **AT+ KCERTSTORE= ?**	 Response **+KCERTSTORE:** (list of possible **<data_type>**s),(range of possible length of **<NbData>**), (list of possible **<index>**es) **OK**
Read command Syntax **AT+ KCERTSTORE?**	 Response **+KCERTSTORE** **[root_cert, <index>,<NbData><CR><LF>** **<File_data><CR><LF>]** **[local_cert,<index>,<NbData><CR><LF>** **<File_data> <CR><LF>]** **[...]** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+ KCERTSTORE= <data_type> [,<NbData> [,<index>]]**	 Response **CONNECT** **OK** or **+CME ERROR: <err>** Parameters **<data_type>** 0 Root certificate 1 Local certificate **<NbData>** 1 – 3000 Number of bytes to read/write **<index>** Index of the stored root/local certificate. If a root/local certificate is already stored at the index, it will be overloaded. Default value = 0 Value range if <data_type> = 0: 0 Value range if <data_type> = 1: 0 – 2

HL7528	
	<File_data> File data in bytes
Reference Sierra Wireless Proprietary	Notes • <index> is the link between a local certificate and a private key (see +KPRIVKSTORE and +KCERTDELETE). • If <NbData> is not given, the input should be terminated by +++ or by the DTR signal.

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

HL7528	
Test command Syntax **AT+ KPRIVKSTORE= ?**	 Response **+KPRIVKSTORE:** (list of possible **<index>**s), (range of possible length of **<NbData>**) **OK**
Read command Syntax **AT+ KPRIVKSTORE?**	 Response **+KPRIVKSTORE** **private_key,<index>,<NbData><CR><LF>** **<File_data> <CR><LF>** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+ KPRIVKSTORE= <index> [,<NbData>]**	 Response **CONNECT** **OK** or **+CME ERROR: <err>** Parameters **<index>** 0 – 2 Index of the stored local certificate associated to this private key **<NbData>** 1 – 3000 Number of bytes to read/write (mandatory for both reading and writing) **<File_data>** File data in bytes
Reference Sierra Wireless Proprietary	Notes If <NbData> is not given, the input should be terminated by +++ or by the DTR signal.

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

HL7528	
Test command Syntax **AT+ KCERTDELETE =?**	 Response **+KCERTDELETE:** (list of possible **<data_type>**s),(list of possible **<index>**s) **OK**
Read command Syntax **AT+ KCERTDELETE ?**	 Response **+KCERTDELETE:** **OK** or **+CME ERROR: <err>**
Write command Syntax **AT+ KCERTDELETE =<data_type> [,<index>]**	 Response **OK** or **+CME ERROR: <err>** Parameters **<data_type>** 0 Root certificate 1 Local certificate **<index>** Index of the stored local certificate. Default value = 0 Value range if <data_type> = 0: 0 Value range if <data_type> = 1: 0 – 2
Reference Sierra Wireless Proprietary	

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

HL7528	
Test command Syntax **AT+ KPRIVKDELETE =?**	 Response **+KPRIVKDELETE:** (list of possible **<index>**s) **OK**

HL7528	
Write command Syntax **AT+ KPRIVKDELETE =<index>**	Response **OK** or **+CME ERROR: <err>** Parameter **<index>** 0 – 2 Index of the stored private key
Reference Sierra Wireless Proprietary	

12. AVMS Commands

12.1. +WDSA Command: Change Account for DM Connection

HL7528	
Test command Syntax **AT+WDSA=?**	 Response **+WDSA:** (list of supported **<ServerId>**s) **OK**
Read command Syntax **AT+WDSA?**	 Response **+WDSA: <ServerId>** **OK**
Write command Syntax **AT+WDSA= <serverId>**	 Response **OK** **+CME ERROR <err>** Parameter **<ServerId>** String type; server ID associated with the account
Reference Sierra Wireless Proprietary Command	Notes This command is available when the embedded module has finished the Device Services initialization (see +WDSI command description) and when the AVMS services are in activated state (see +WDSG command).
Examples	**AT+WDSA=?** **+WDSA: (“Cingular”, “Cingularlab”,“WAVECOM-RDMS-SERVER”)** **OK** **AT+WDSA=“WAVECOM-RDMS-SERVER”** **OK** **AT+WDSA?** **+WDSA: “WAVECOM-RDMS-SERVER”** **OK**

12.2. +WDSC Command: Device Services Configuration

HL7528	
Test command Syntax **AT+WDSC=?**	 Response **+WDSC: (0-2), (**list of supported **<State>**s**)** **+WDSC: 3, (**list of supported **<State>**s**)** **+WDSC: 4, (**list of supported **<Timer_n>**s**)** **OK**
Read command Syntax **AT+WDSC?**	 Response **+WDSC: 0,<State>** **+WDSC: 1,<State>** **+WDSC: 2,<State>** **+WDSC: 3,<State>** **+WDSC: 4,<Timer_1>[[,<Timer_2>]…[,<Timer_n]]** **OK**
Write command Syntax For <Mode>= 0, 1, 2 or 3 **AT+WDSC= <Mode>,<State>** For <Mode>= 4 **AT+WDSC= <Mode>, <Timer_1> [[,<Timer_2>]… [,<Timer_n>]]**	 Response **OK** or **+CME ERROR <err>** Parameters **<Mode>** Integer type 0 User agreement for connection When this mode is activated and when a notification SMS is received by the embedded module, an indication (see +WDSI for more information) is returned by the embedded module to request for an agreement before connecting to the AirPrime Management Services server 1 User agreement for package download When this mode is activated, an indication (see +WDSI for more information) is returned by the embedded module to request for an agreement before downloading any package 2 User agreement for package install When this mode is activated, an indication (see +WDSI for more information) is returned by the embedded module to request for an agreement before installing any package 3 Polling mode The embedded module will initiate a connection to the Device Services server according to the defined timer 4 Retry mode If an error occurs during a connection to the Device Services server (GPRS establishment failed, http error code received), the embedded module will initiate a new connection according to the defined timers. This mechanism is persistent to the reset.

HL7528	
	<State> Mode status For <Mode> = 0, 1 or 2: 0 Disabled 1 Enabled For <Mode>=3 Value in range from 0 – 525600 minutes 0 The polling mode is deactivated **<Timer_1>** 0 – 20160 Timer in minutes between the first failed connection and the next attempt. Default value = 15; 0 = retry mode is deactivated **<Timer_n>** 1 – 20160 Timer in minutes between the n^{th} failed attempt connection and the $(n+1)^{th}$ connection (n<=8) Default values: <Timer_2> = 60 <Timer_3> = 240 <Timer_4> = 960 <Timer_5> = 2880 <Timer_6> = 10080 <Timer_7> = 10080
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished the Device Services initialization (see +WDSI command description) and when the AVMS services are in prohibited state (see +WDSG command). • Parameters <State> and <Timer_1> to <Timer_n> are stored in non-volatile memory without sending &W command. &F command has no impact on these values. • The network registration is considered as “failed” when all connections configured by the retry mode have failed. This registration is forbidden while the APN is not set by the +WDSS command.
Examples	**AT+WDSC=?** **+WDSC:(0-2),(0-1)** **+WDSC:3,(0-525600)** **+WDSC:4,(0-20160),(1-20160),(1-20160),(1-20160),(1-20160),(1-20160),(1-20160),(1-20160)** **OK** **AT+WDSC?** *// All modes are deactivated except retry mode which is used with default timers* **+WDSC: 0,0** **+WDSC: 1,0** **+WDSC: 2,0** **+WDSC: 3,0** **+WDSC: 4,15,60,240,960,2880,10080,10080** **OK** **AT+WDSC=0,1** **OK** **AT+WDSC?** **+WDSC: 0,1** **+WDSC: 1,0** **+WDSC: 2,0** **+WDSC: 3,0** **+WDSC: 4,15,60,240,960,2880,10080,10080** **OK**

12.3. +WDSD Command: Device Services Local Download

HL7528	
Test command Syntax **AT+WDSD=?**	 Response **+WDSD:** (list of supported **<Size>**s) **OK**
Write command Syntax **AT+WDSD=<Size>**	 Response **<NACK>** *// User send data* **OK** or **+CME ERROR <err>** Parameter **<Size>** 1 – 24643584 Package size in bytes
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished its initialization. • The response to AT+WDSD=<Size> command is <NACK> character when the device is ready to receive data using 1K-Xmodem protocol. • The flow control of the TE has to be set to 'Hardware'. • This command will automatically activate the user agreement for install (see +WDSC command description). • No reset is made during the package download. • A timeout will happen (and a +CME ERROR: 3 is returned) if no data is sent to the device within 5 minutes.
Examples	**AT+WDSD=?** **+WDSD: (1-24643584)** **OK** **AT+WDSD=1024** //Download a 1kBytes package **<NACK>** //The device is ready to receive data //Send Data **OK** //All data are well received by the Module **+WDSI: 3** //A package is ready to install (see +WDSI and +WDSR commands)

12.4. +WDSE Command: Device Services Error

HL7528	
Execute command Syntax **AT+WDSE**	Response **[+WDSE:<HTTP_Status>]** **OK** **+CME ERROR <err>** Parameter **<HTTP_Status>** Last HTTP response received by the module 100 Continue 101 Switching Protocols 200 OK 201 Created 202 Accepted 203 Non-Authoritative Information 204 No Content 205 Reset Content 206 Partial content 300 Multiple Choices 301 Moved Permanently 302 Found 303 See Other 304 Not Modified 305 Use Proxy 307 Temporary Redirect 400 Bad Request 401 Unauthorized 402 Payment Required 403 Forbidden 404 Not Found 405 Method Not Allowed 406 Not Acceptable 407 Proxy Authentication Required 408 Request time-out 409 Conflict 410 Gone 411 Length Required 412 Precondition Failed 413 Request Entity too large 414 Request URI too large 415 Unsupported Media type 416 Request range unsatisfiable 417 Expectation failed 500 Internal server error 501 Not implemented 502 Bad Gateway 503 Service unavailable 504 Gateway time-out 505 HTTP version not supported If no session was made with the server, AT+WDSE only returns OK, without +WDSE: <HTTP_Status> intermediary response
Reference Sierra Wireless Proprietary Command	Notes This command is available when the embedded module has finished the Device Services initialization (see +WDSI command description) and when the AVMS services are in activated state (see +WDSG command).

HL7528	
Examples	**AT+WDSS=1,1** *// A session was made with the server* **OK** **AT+WDSE** **+WDSE: 200** *// The last HTTP response received is "OK"* **OK**

12.5. +WDSF Command: Device Services Fallback

HL7528	
Test command Syntax **AT+WDSF=?**	 Response **+WDSF:** (list of supported **<Mode>**s) **OK**
Read command Syntax **AT+WDSF?**	 Response **+WDSF: 1,<FallbackInfo>** **+WDSF: 2,<EraseInfo>** **OK**
Write command Syntax **AT+WDSF=<Mode>**	 Response **OK** **+CME ERROR <err>** Parameters **<Mode>** 1 Downgrade to a previous installation 2 Delete the downloaded package which contains the reverse patch **<FallbackInfo>** Indicates the presence of the previous package 0 Previous package is not present 1 Previous package is present **<EraseInfo>** Indicates if a package can be deleted. Note that erasing the package will disable the possibility of making any recovery or manual fallback 0 The package cannot be deleted 1 The package can be deleted
Reference Sierra Wireless Proprietary Command	Notes This command is available when the embedded module has finished the Device Services initialization (see +WDSI).

HL7528	
Examples	**AT+WDSF?** // a reverse package is present, deletion impossible **+WDSF: 1,1** **+WDSF: 2,0** **OK** **AT+WDSF=1** // downgrade to the previous installation **OK** **+WDSI: 17,1** // downgrade the package successfully done, displayed only if +WDSI // indication is activated

12.6. +WDSG Command: Device Services General Status

HL7528	
Test command Syntax **AT+WDSG=?**	 Response **OK**
Execute command Syntax **AT+WDSG**	 Response **+WDSG: <Indication>,<State>** **[+WDSG: <Indication>,<State>[…]]** **OK** **+CME ERROR <err>** Parameters **<Indication>** 0 Device services activation state 1 Session and package indication **<State>** Indication status For <Indication>=0: 0 Device services are prohibited. Devices services will never be activated. 1 Device services are deactivated. Connection parameters to a device services have to be provisioned. 2 Device services have to be provisioned. NAP parameters have to be provisioned. 3 Device services are activated If a device has never been activated (first use of device services on this device), the <State> is set to 1. The connection parameters are automatically provisioned, no action are needed by the user For <Indication>=1: 0 No session or package. 1 A session is under treatment 2 A package is available on the server. 3 A package was downloaded and ready to install When a package was installed or a recovery was made, the <State> is set to 0.
Notes	This command is available when the embedded module has finished the Device Services initialization (see +WDSI command description).

HL7528	
Examples	**AT+WDSG=?** **OK** **AT+WDSG** **+WDSG: 0,3** *// Device services are activated,* **+WDSG: 1,0** *// no session to the server, no patch to download or to install* **OK**

12.7. +WDSI Command: Device Services Indication

HL7528	
Read command Syntax **AT+WDSI=?**	Response **+WDSI:** (list of supported **<Level>**s) **OK**
Read command Syntax **AT+WDSI?**	Response **[+WDSI: <Level>]** **OK**
Write command Syntax **AT+WDSI=** **<Level>**	Response **OK** **+CME ERROR <err>** Parameters **<Level>** Indication level, bit field (default value = 0) Bit set to 0: indication deactivated Bit set to 1: indication activated 0 No indication 1 Activate the initialization end indication (<Event> = 0) 2 Activate the server request for a user agreement indication (<Event>=1, 2 and 3) 4 Activate the authentication indications (<Event> = 4 and 5) 8 Activate the session start indication (<Event> = 6, 7 and 8) 16 Activate the package download indications (<Event> = 9,10 and 11) 32 Activate the certified downloaded package indication (<Event> = 12 and13) 64 Activate the update indications (<Event> = 14,15 and 16) 128 Activate the fallback indication (<Event> = 17) 256 Activate download progress indication (<Event> = 18) 512 Reversed 1024 Reversed 2048 Activate provisioning indication (<Event> = 21) 4096 Reserved **<Event>** 0 Device services are initialized and can be used. Devices services are initialized when the SIM PIN code is entered and a dedicated NAP is configured (see +WDSS command)

HL7528		
	1	The Device Services server requests the device to make a connection. The device requests a user agreement to allow the embedded module to make the connection. The response can be sent using +WDSR command and this indication can be returned by the device if the user has activated the user agreement for connection (see +WDSC command for more information)
	2	The Device Services server requests the device to make a package download. The device requests a user agreement to allow the embedded module to make the download. The response can be sent using +WDSR command and this indication can be returned by the device if the user has activated the user agreement for download (see +WDSC command for more information).
	3	The device has downloaded a package. The device requests a user agreement to install the downloaded package. The response can be sent using +WDSR command and this indication can be returned by the device if the user has activated the user agreement for install (see +WDSC command for more information).
	4	The embedded module starts sending data to the server
	5	Authentication with the server failed
	6	Authentication has succeeded, a session with the server started
	7	Session with the server failed
	8	Session with the server is finished
	9	A package is available on the server and can be downloaded by the embedded module. A <Data> parameter is returned indicating the package size in kB
	10	A package was successfully downloaded and stored in flash
	11	An issue happens during the package download. If the download has not started (+WDSI: 9 indication was not returned), this indication indicates that there is not enough space in the device to download the update package. If the download has started (+WDSI: 9 indication was returned), a flash problem implies that the package has not been saved in the device
	12	Downloaded package is certified to be sent by the AirPrime Management Services server
	13	Downloaded package is not certified to be sent by the AirPrime Management Services server
	14	Update will be launched
	15	OTA update client has finished unsuccessfully
	16	OTA update client has finished successfully
	17	A fallback mechanism was launched
	18	Download progress. This event is returned without <Data> parameter to indicate that a download starts. During the download, a percentage progress is indicated in <Data> parameter
	19	Reserved
	20	A Bootstrap SMS was received and a User Pin is requested (See +WDSB command for more information)
	21	A provision was made by the AirVantage Management Services server
	22	Reserved
	<Data> Specific data for some <Event> For<Event>=9, <Data> indicates the package size in bytes, which will be downloaded For<Event>=17, <Data> indicates if the fallback was asked by the user or applied because a recovery was necessary: 0 Automatic recovery (a recovery mechanism was made) 1 Fallback asked by the user (see +WDSF command for more information) For<Event>=18, <Data> indicates the download progress in percentage	

HL7528	
	For<Event>=21, <Data> indicates the provisioned parameters: 0 Reserved 1 Reserved 2 Reserved 3 Reserved 4 Reserved 5 Reserved 6 Reserved 7 Reserved 8 Reserved 9 Device Service Polling mode (see +WDSC command for more information) 10 Reserved 11 Reserved 12 Reserved 13 Reserved
Unsolicited Notification	Response **+WDSI: <Event>[,<Data>]**
Reference Sierra Wireless Proprietary Command	Notes • This command is available when the embedded module has finished its initialization. • To receive +WDSI indications, the Device Services should be in activated state (see +WDSG command for more information). • The <Level> parameter is stored in non-volatule memory without using AT&W command. The default value can be restored using AT&F.
Exxamples	**AT+WDSI=?** **+WDSI: (0-2047)** **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

12.8. +WDSR Command: Device Services Reply

HL7528	
Test command Syntax **AT+WDSR=?**	 Response **+WDSR:** (list of supported **<Reply>**s),(list of supported **<Timer>**s) **OK**
Write command Syntax **AT+WDSR= <Reply> [,<Timer>]**	 Response **OK** or **+CME ERROR <err>** Parameters **<Reply>** Reply to user agreement request (see +WDSI) 0 Delay or refuse the connection to the server 1 Accept the connection to the server 2 Delay or refuse the download 3 Accept the download 4 Accept the install 5 Delay the install **<timer>** Timer until a new User agreement request is returned by the module. This parameter is only available for <Reply>=0, 2 or 5. Units: minutes. Range is from 0 to 1440. Default value = 30. Value 0 indicates that the application refuses the user agreement (impossible when <Reply>=5).
Notes	• This command is available when the embedded module has finished the Device Services initialization (see +WDSI command description) and when the AVMS services are in activated state (see +WDSG command) • It is not possible to refuse an install request (AT+WDSR=5,0) and will return +CME ERROR: 3. • After an install delay if the embedded module is powered down until after the delay, it is not powered on and the new user agreement request should be returned at the new start up.
Examples	**AT+WDSR=?** **+WDSR: (0-5),(0-1440)** **OK** **+WDSI: 1** // The device Services server requests the device to make a // connection to the server. The user is requested to allow the connection. **AT+WDSR=1** **OK** **+WDSI: 3** // a user agreement is requested to install a package **AT+WDSR=5,10** // A delay of 10 minutes is requested **OK** **+WDSI: 3** // 10 minutes later, a new user agreement is requested to install a package **AT+WDSR=4** // The install is requested **OK**

12.9. +WDSS Command: Device Services Session

HL7528	
Test command Syntax **AT+WDSS=?**	 Response **+WDSS:** 0,(Max length for **<Apn>**),(Max length for **<User>**),(Max length for **<Pwd>**) **[+WDSS: 1,** (list of supported **<Action>**s for this **<Mode>**)**]** **OK**
Read command Syntax **AT+WDSS?**	 Response **[+WDSS: 0,<Apn>[,<User>]]** **[+WDSS: 1,<Action>]** **OK**
Write command Syntax For <Mode>=0: **AT+WDSS=<Mode>,<Apn>[,<User>[,<Pwd>]]** For <Mode>=1: **AT+WDSS=<Mode>,<Action>**	 Response **OK** **+CME ERROR <err>** Parameters **<Mode>** 0 PDP context configuration for Device Services 1 User Initiated connection to the Device services server **<Apn>** Access Point Name for Devices Services. String type up to 50 characters **<User>** Login for the APN. String type, up to 30 characters **<Pwd>** Password for the APN. String type, up to 30 characters **<Action>** Action for <Mode>=1 only 0 Release the current connection to the Device Services Server 1 Establish a connection to the Device Services Server
Notes	• This command is available when the embedded module has finished the Device Services initialization (see +WDSI command description) • <Apn>, <User> and <Pwd> parameters are stored in flash without using &W command. &F has no effect on these parameters • AT+WDSS? command returns only OK if no APN is defined. • When a request is sent to the embedded module to resume an inexistent or unsuspended session, +CME ERROR: 3 is returned. • When a request is sent to the embedded module to release an inexistent session, +CME ERROR: 3 is returned. • Depending on +WDSM configuration, when no dedicated NAP is defined using +WDSS command and a session is asked (by AT command or notify by SMS), the embedded module will use a NAP defined by +CGDCONT command to activate the dedicated PDP context. This NAP will be recorded to configure the NAP Device Services and it will be used to activate the dedicated PDP context for the next sessions. • When the PDP context cannot be activated because of bad AirPrime Management Services NAP configuration, the embedded module will use a NAP defined by +CGDCONT command to activate the dedicated PDP context (but the initial NAP configuration is not erased).

HL7528	
	• The activation is done if the embedded module is registered on the network. If the embedded module is not registered when the command is performed, the activation will be done at the next network registration (even if the embedded module resets). • No GPRS connection to the AirPrime Management Services server is possible when a registration is not completed. • HL7528 uses CID 5 for AVMS PDP activiation.
Examples	**AT+WDSS?** **OK** // No APN defined **AT+WDSS=?** **+WDSS: 0, 50,30,30** **OK** **AT+WDSS=0,"Sierra Wireless"** // Define the APN for the Device Services **OK** // Sierra Wireless **AT+WDSS=?** **+WDSS: 0, 50,30,30** **+WDSS: 1,(0-1)** **OK** **AT+WDSS?** **+WDSS: 0,"Sierra Wireless"** **+WDSS: 1,0** **OK** **AT+WDSS=1,1** // Iinitiation of a connection to the Device Services server **OK** **AT+WDSS=1,0** // Release connection to the Device Services server **OK**

12.10. +WDSM Command: Manage Device Services

HL7528	
Test command Syntax **AT+WDSM=?**	 Response **+WDSM:** (list of supported **<Mode>**s),(list of supported **<State>**s) **OK**
Read command Syntax **AT+WDSM?**	 Response **+WDSM: 0,<State>** **+WDSM: 1,<State>** **OK**

HL7528	
Write command Syntax **AT+WDSM= <Mode>,<State>**	Response **OK** **+CME ERROR <err>** Parameters **<Mode>** APN backup 0 If AVMS APN (filled with +WDSS command) is not correct, the module will use the APN defined by +CGDCONT command. 1 If AVMS APN has not been filled with +WDSS command, the module will use the APN defined by +CGDCONT command. Each APN will be used until successful session activation. If an AVMS session succeeds, the corresponding APN is copied in the +WDSS command and remains after the AVMS session end. **<State>** Status of <Mode> 0 Disable 1 Enable (not supported)
Reference Sierra Wireless Proprietary	Notes <State> is stored in non-volatile memory. AT&F command has no impact on these values.
Examples	**AT+WDSM=?** **+WDSM: (0-1),(0)** **OK** **AT+WDSM?** **+WDSM: 0,0** **+WDSM: 1,0** **OK** *// all modes are activated* **AT+WDSM=0,0** **OK** **AT+WDSM?** **+WDSM: 0,0** **+WDSM: 1,0** **OK**

13. Test Commands

The following commands are used for testing purposes.

13.1. +WMTXPOWER Command: Test RF Tx

HL7528	
Test command Syntax **AT+ WMTXPOWER=?**	Response **+WMTXPOWER: (**list of supported **<ENABLE>**s**),(**list of supported 4G **<BAND>**s**), (**list of supported 4G **<CHANNEL>**s**), (**list of supported 4G **<POWER_LEVEL>**s**),(**list of supported **<BANDWIDTH>**s**)** **OK**
Read command Syntax **AT+ WMTXPOWER?**	Response **+WMTXPOWER: <ENABLE>[,<BAND>,<CHANNEL>,<POWER_LEVEL>,<BANDWIDTH>]** **OK** Note that parameters <BAND>, <CHANNEL>, <POWER_LEVEL> and <BANDWIDTH> are only available if <ENABLE>=1.
Write command Syntax **AT+ WMTXPOWER= <ENABLE> [,<BAND>, <CHANNEL>, <POWER_ LEVEL>, <BANDWIDTH>]**	Response **OK** Parameters **<ENABLE>** 0 Stop the burst emission 1 Start the burst emission **<BAND>** Tx burst band emission. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. 1 IMT (2.1GHz) 3 DCS (1.8GHz) 5 Cellular 850 (850MHz) 7 IMT-E (2.6GHz) **<CHANNEL>** Tx burst channel emission. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. If <BAND>=1 18000 - 18599 If <BAND>=3 19200 - 19949 If <BAND>=5 20400 - 20649 If <BAND>=7 20750 - 21449 **<POWER_LEVEL>** Tx burst power. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. For all <BAND>s 0 (0 dBm) to 368 (23 dBm)

HL7528	
	<BANDWIDTH> Defines the bandwidth of Tx burst emissions. This parameter is not allowed if <ENABLE>=0. 0 1.4MHz 1 3 MHz 2 5 MHz 3 10 MHz 4 15 MHz 5 20 MHz
Reference Sierra Wireless Proprietary	Notes • Only one burst can be emitted at a time. • This AT command is not available if AT+WMRXPOWER is enabled. • The module must be restarted after using this command.
Example	**at+wmtxpower?** **+WMTXPOWER: 255** // +WMTXPOWER not start yet **OK** **at+wmtxpower=1,1,18300,0,0** // emits a Tx burst (0 dBm) at band 1, earfcn = // 18300 with bandwidth = 1.4MHz **OK** **at+wmtxpower?** **+WMTXPOWER: 1,1,18300,0,0** **OK**

13.2. +WMRXPOWER Command: Test RF Rx

HL7528	
Test command Syntax **AT+ WMRXPOWER=?**	Response **+WMRXPOWER: (**list of supported **<ENABLE>**s**),(**list of supported 4G **<BAND>**s**), (**list of supported 4G **<CHANNEL>**s**)** **OK**
Read command Syntax **AT+ WMRXPOWER?**	Response **+WMRXPOWER: <ENABLE>[,<BAND>,<CHANNEL>]** **OK** Note that parameters <BAND> and <CHANNEL> are only available if <ENABLE>=1.
Write command Syntax **AT+ WMRXPOWER= <ENABLE> [,<BAND>, <CHANNEL>]**	Response **+WMRXPOWER: <POWER1>,<POWER2>** **OK**

HL7528	
	Parameters **<ENABLE>** 0 Stop the Rx measurement 1 Start the Rx measurement **<BAND>** Rx band to read. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. 1 IMT (2.1GHz) 3 DCS (1.8GHz) 5 Cellular 850 (850MHz) 7 IMT-E (2.6GHz) **<CHANNEL>** Rx channel to read. This is a mandatory parameter if <ENABLE>=1, but is not allowed if <ENABLE>=0. If <BAND>=1 0 - 599 If <BAND>=3 1200- 1949 If <BAND>=5 2400 - 2649 If <BAND>=7 2750 - 3449 **<POWER1>** Received power in dBm at primary antenna **<POWER2>** Received power in dBm at secondary antenna
Reference Sierra Wireless Proprietary	Examples **at+wmrxpower?** **+WMRXPOWER: 255** **OK** **at+wmrxpower=?** **+WMTXPOWER: (0-1),(1,3,5,7),(0-599,1200-1949,2400-2649,2750-3449)** **OK** **at+wmrxpower=1,1,300** // read LTE band 1, earfcn=300 **+WMRXPOWER: -5.2,-44.7** // Rx power -5.2 dBm at primary antenna // Rx power -44.7 dBm at secondary antenna **OK**

13.3. +WMANTSEL Command: Select Main/Diversity Antenna

HL7528	
Test command Syntax **AT+WMANTSEL =?**	 Response **+WMANTSEL:** (list of supported **<MODE>**s) **OK**
Read command Syntax **AT+WMANTSEL?**	 Response **+WMANTSEL: <MODE>** **OK**

HL7528	
Write Command Syntax **AT+WMANTSEL=<MODE>**	Response **OK** Parameter **<MODE>** 0 Use main and diversity antenna on LTE 1 Use only main antenna on LTE 2 Use only diversity antenna on LTE
Reference Sierra Wireless Properietary	Notes • This command works with or without a SIM card • <MODE> will not be saved into the non-volatile memory; after reset, it will again have its default value • This command should be issued when network registration is disabled; it will be effective when network registration is re-enabled
Examples	**at+wmantsel?** **+WMANTSEL: 0** **OK** **at+cops=2** // disable network registration **OK** **at+wmantsel=1** // to select only main antenna **OK** **at+cops=0** // re-enable network registration **OK** **at+cops=2** // disable network registration **OK** **at+wmantsel=2** // to select only diversity antenna **OK** **at+cops=0** // re-enable network registration **OK**

14. NV Related Commands

14.1. Auto Generation of NV Backup Files

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

- Static Calibrated NV partition
- Static Fixed NV partition
- Dynamic NV partition

NV backup is per partition based, with one NV backup file per partition. These are labelled with <file id>=0, 1, 2 in the NV log and by firmware design.

The firmware automatically generates NV backup files from existing NV data at approximately 8 seconds after boot if one of the following conditions are met:

- NV backup of a partition does not exist, or it has been corrupted unexpectedly.
- NV backup files exist, but the firmware version has changed while the IMEI has not changed in comparison to the records in the backup file.
- NV backup files exist, but the firmware version has changed and a valid IMEI has been updated in comparison to the records in the backup file.

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

14.2. Auto Recovery from Backup NV Files

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

The firmware automatically recovers NV data from available NV backups when one or more NV items are corrupted. This is notified with +NVBU_IND with <status>=3 on all AT ports.

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

The firmware will try to recover corrupted or missing NV data items instead of all NV data items (partial restore) if possible; otherwise, the firmware restores all NV data items (full restore).

If the firmware crashes with 10 consecutive loops and a full restore has not been performed before, the firmware performs a full restore of all NV data items. Only consecutive crashes that happened within 8 seconds after the module boots is counted for this reset loop detection.

14.3. +NVBU Command: NV Backup Status and Control

HL7528	
Test command Syntax **AT+NVBU=?**	 Response **+NVBU: (0-2)** **OK**
Read command Syntax **AT+NVBU?**	Returns list of NV backup with the format: **+NVBU: <file id>,<backup date>,<backup firmware version>** Response **[+NVBU: 0,<backup date>,<backup firmware version>]** **[+NVBU: 1,<backup date>,<backup firmware version>]** **[+NVBU: 2,<backup date>,<backup firmware version>]** **OK** Parameters **<file id>** Backup file ID corresponding to an NV partition in flash **<backup date>** NV backup generation date **<backup firmware version>** Firmware version used to generate the NV backup
Write command Syntax For <mode>=0 or 1 **AT+NVBU=** **<mode>** **[,<parti_id>]** For <mode>=2 **AT+NVBU=** **<mode>[,<clear>]**	 Response For <mode>=0 or 1 **OK** For <mode>=2 and <clear>=0 **<log data 0>** **[<log data 1>]** **…** **[<log data n>]** **OK** For <mode>=2 and <clear>=1 **OK** Parameters **<mode>** 0 Generate backup of all NV data to NV backup partition 1 Restore all NV data from the NVM backup partition 2 List logs of NV backup operations **<log data>** NV backup operations log data **<parti_id>** 0 Static Calibrated NV 1 Static Fixed NV partition 2 Dynamic NV partition 3 All NV partitions

HL7528	
	<clear log> 0 Read log 1 Clear log
Reference Sierra Wireless Proprietary	Notes • Status of operations for <mode>=0 and <mode>=1 is notified by +NVBU_IND unsolicited notifications with <status>=0 and <status>=1 respectively on the AT port that executed the write command. • Execution of the write command with <mode>=1 is followed by a modem reboot automatically; NVs are restored to their default values on booting. • The number of lines of <log data> ranges from 1 to 2142 lines. • No SIM card is required for this command. • <mode>=2 is for retrieving log for R&D analysis and not fully documented, generally: ▪ USER=0 for operations triggered by the firmware ▪ USER=1 for manual operations
Examples	# automatic backup files generation after FW upgrade, notified by +NVBU_IND **+NVBU_IND: 0,0,"2015/07/22 04:23:33","RHL75xx.2.15.142600.201507220405.x7160_2"** **+NVBU_IND: 0,1,"2015/07/22 04:23:33","RHL75xx.2.15.142600.201507220405.x7160_2"** **+NVBU_IND: 0,2,"2015/07/22 04:23:33","RHL75xx.2.15.142600.201507220405.x7160_2"** # manual generation of backup files from existing NV partitions **AT+NVBU=0,3** **OK** **+NVBU_IND: 0,0,"2015/07/22 04:23:39","RHL75xx.2.15.142600.201507220405.x7160_2"** **+NVBU_IND: 0,1,"2015/07/22 04:23:39","RHL75xx.2.15.142600.201507220405.x7160_2"** **+NVBU_IND: 0,2,"2015/07/22 04:23:39","RHL75xx.2.15.142600.201507220405.x7160_2"** # manual restore of backup files to original NV partitions **AT+NVBU=1,3** **OK** **+NVBU_IND: 1,0,"2015/07/22 04:23:39","RHL75xx.2.15.142600.201507220405.x7160_2"** **+NVBU_IND: 1,1,"2015/07/22 04:23:39","RHL75xx.2.15.142600.201507220405.x7160_2"** **+NVBU_IND: 1,2,"2015/07/22 04:23:39","RHL75xx.2.15.142600.201507220405.x7160_2"** **<module reboots automatically>** # to retrieve the list of NV related operations done by the Firmware **at+nvbu=2** **[2015/07/22 04:02:49] BULO: MDM-RHL75xx.2.15.142600.201507220405.x7160_2** **[2015/07/22 04:02:49] BUFL: GENERATE USER=0 FILE=3 LAS=0,0,0** **[2015/07/22 04:02:49] BUFM: ENCODE F=0 REF=0 CNT=15/15 41** **[2015/07/22 04:02:49] BUFM: ENCODE F=1 REF=0 CNT=16/16 31** **[2015/07/22 04:02:49] BUFM: ENCODE F=2 REF=42 CNT=41/41 57** **[2015/07/22 04:23:39] BUFL: GENERATE USER=1 FILE=3 LAS=0,0,0** **[2015/07/22 04:23:39] BUFM: ENCODE F=0 REF=0 CNT=15/15 41** **[2015/07/22 04:23:39] BUFM: ENCODE F=1 REF=0 CNT=16/16 31** **[2015/07/22 04:23:39] BUFM: ENCODE F=2 REF=42 CNT=41/41 57** **[2015/07/22 04:23:43] BUFL: RESTORE USER=1 FILE=3 LAS=0,0,0** **[2015/07/22 04:23:43] BUFM: DECODE-2 F=0 REF=1 CNT=15/15 15,41** **[2015/07/22 04:23:43] BUFM: DECODE-2 F=1 REF=1 CNT=16/16 16,31** **[2015/07/22 04:23:43] BUFM: DECODE-2 F=2 REF=43 CNT=41/41 41,57** **OK**

14.4. +NVBU_IND: NV Backup Status Notification

HL7528	
Unsolicited Notification	Response **+NVBU_IND: <status>,<file id>,…** For <status>=0 **+NVBU_IND: <status>,<file id>,<backup date>,<backup firmware version>** For <status>=1 **+NVBU_IND: <status>,<file id>,<backup date used for restore>,<backup firmware version used for restore>** For <status>=2 **+NVBU_IND: <status>,<file id>,<backup date used for restore>,<backup firmware version used for restore>,<num NV>** **<NV ID 1>[<NV ID 2>...[<NV ID 16><CR><LF>]]** **…** Parameters **<status>** NV backup status 0 Indicates completion of NV backup generation 1 Indicates completion of NV backup restore 2 Indicates that backup data were restored when the NV corruption was detected during NV initialization **<backup date>** NV backup generation date **<backup firmware version>** Firmware version used to generate the NV backup **<backup date used for restore>** Generation date of the NV backup that was used for the NV restore **<backup firmware version used for restore>** Firmware version used to generate the NV backup that was used for the NV restore **<num NV>** Total number of NV items restored **<NV ID>** List of NV item IDs with data restored, expressed in hexadecimal number delimited by spaces, and delimited by <CR><LF> every 16 numbers.
Reference Sierra Wireless Properietary	Notes The list of <NV ID> is expressed in 16 hexadecimal numbers per line.
Examples	# recovery in calibrated NV partition after Firmware boot # note that the data is also logged by NV log (i.e. AT+NVBU=2) **+NVBU_IND: 2,0,"2015/07/22 04:23:39","RHL75xx.2.15.142600.201507220405.x7160_2",15 10034900 10034901 10034401 10034402 10034902 10035400 10035401 10035402 10035403 10035500 10035501 10035502 10050000 10310000 10370000**

15. Carrier Commands

15.1. +DBGCFG Command: Debug Message Configuration

HL7528	
Test command Syntax **AT+DBGCFG=?**	 Response **+DBGCFG: (0-1)**
Read command Syntax **AT+DBGCFG?**	 Response **+DBGCFG: 0**
Write command Syntax **AT+DBGCFG= <VALUE>**	 Response **OK** Parameter **<VALUE>** 0 Disable to capture LTE debug information 1 Enable to capture LTE debug information
Notes	The parameter will not be saved into the NVM. It will resume to its default value after reset.
Examples	**AT+DBGCFG?** **+DBGCFG: 0** **OK**

15.2. SKT Carrier Commands

15.2.1. *SKT*DBG Command: Debug Message for SKT

HL7528	
Execute command Syntax **AT*SKT*DBG**	Get current parameters of the debug message Response ***SKT*DBG: <PsServiceState>,<DL_EARFCN>,<rrc_state>,<MCC>,<MNC>,<LTE_CI>, <PhyCellInd>,<TrackingAreacode>,<RSRPResult>,<RSRQResult>,<RSSI>,<RSSNR>, <BandWidth>,<ANT>,<drx_cycle_length>,<EMMState>,<EMMSubState>,<MTMSI[0]>, <MTMSI[1]>,<MTMSI[2]>,<MTMSI[3]>,<MMEGID[0]>,< MMEGID[1]>,<MMEC>, <EMMRejectCause>,<TotalPUSCHTxPower>** **OK**

HL7528	
	Parameters **<PsServiceState>** Service state 1 EMM1_MM_SST_NO_NETWORK_AVAILABLE 2 EMM1_MM_SST_SEARCH_FOR_NETWORK 3 EMM1_MM_SST_EMERGENCY_CALLS_ONLY 4 EMM1_MM_SST_LIMITED_SERVICE 5 EMM1_MM_SST_FULL_SERVICE 6 EMM1_MM_SST_PLMN_LIST_AVAILABLE 7 EMM1_MM_SST_DISABLED 8 EMM1_MM_SST_DETACHED 9 EMM1_MM_SST_NO_GPRS_CELL 10 EMM1_MM_SST_SUSPENDED **<DL_EARFCN>** Carrier frequency of the Serving cell in decimal format. The range can be found at 3GPP TS 25.101 **<rrc_state>** E-UTRA RRC states of the LTE serving cell 0 NULL 1 IDLE 2 CONNECTED 3 WAIT_RRC_CONFIRM 4 RELEASING **<MCC>** Numeric format representing 3-digit country code. If the SKT network is acquired, the value is 450. **<MNC>** Numeric format representing 2- or 3-digit network code. If the SKT network is acquired, the value is 05. **<LTE_CI>** Cell Identity; decimal digits **<PhyCellInd>** 0 – 503 Physical Cell ID (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE) **<TrackingAreacode>** Integer type, Tracking Area Code, length 16 bits, (Ref: 3GPP TS 36.331, 6.3.4, Tracking AreaCode IE) **<RSRPResult>** Reference Signal Received Power, in dBm **<RSRQResult>** Reference Signal Received Quality, in dB **<RSSI>** 0 to -120 Received Signal Strength Indicator, in dBm **<RSSNR>** RSSNR of the LTE serving cell **<BandWidth>** Download bandwidth; initial value = 0 0 1.4MHz 1 3 MHz 2 5 MHz 3 10 MHz 4 15 MHz 5 20 MHz **<ANT>** ANT Number

HL7528	
	<drx_cycle_length> DRX Cycle Length value, 2^k **<EMMState>** EMM State 0 EMM_NULL 1 EMM_DEREGISTERED 2 EMM_REGISTERED_INITIATED 3 EMM_REGISTERED 4 EMM_DEREGISTERED_INITIATED 5 EMM_TRACKING_AREA_UPDATING_INITIATED 6 EMM_SERVICE_REQUEST_INITIATED **<EMMSubState>** EMM SubState 0 EMM_SUBSTATE_ANY 1 EMM_SUBSTATE_NORMAL_SERVICE 2 EMM_SUBSTATE_LIMITED_SERVICE 3 EMM_SUBSTATE_PLMN_SEARCH 4 EMM_SUBSTATE_NO_CELL_AVAILABLE 5 EMM_DEREGISTERED_ATTEMPTING_TO_ATTACH 6 EMM_DEREGISTERED_NO_IMSI 7 EMM_DEREGISTERED_ATTACH_NEEDED 8 EMM_REGISTERED_ATTEMPTING_TO_UPDATE 9 EMM_REGISTERED_UPDATE_NEEDED 10 EMM_REGISTERED_ATTEMPTING_TO_UPDATE_MM 11 EMM_REGISTERED_IMSI_DETACH_INITIATED **<MTMSI>** M-TMSI[0] to M-TMSI[4] MME Temporary Mobile Subscriber Identity (M-TMSI) **<MMEGID>** MMEGID[0] to MMEGID[1] MME Group ID Default value = ucMmeGroupId[]={0xFF,0xFF} **<MMEC>** MME Code; default value = 0xFF **<EMMRejectCause>** EMM Causes; default value = 0 (Ref: 3GPP TS 24.301 sec 9.9.3.9) **<TotalPUSCHTxPower>** Tx Power; default value = -50
Reference Sierra Wireless Proprietary	Notes • Run AT+DBGCFG=1 prior to running this command to ensure that LTE debug information is being captured. • This command provides information related to the network environment and can be used for example for localization calculation • SIM card must be inserted to support this command. The cell information can only be retrieved when the UE stays in an attached mode.

15.2.2. *SKT*SYSINFO Command: Current System Information for SKT

HL7528	
Execute command Syntax **AT*SKT*SYSINFO**	Get current parameters of Debug message Response ***SKT*SYSINFO: <srv_status>,<svc_domain>,<roam_status>,<network_name>,<rat>,<band>,<RSRPResult>** **OK** Parameters **<srv_status>** System service status 0 Service unavailable (NO_SRV) 1 Limited Service (LIMITRD) 2 Valid Service (SRV) 3 Limited Regional Service (LIMITED_REGION) **<srv_domain>** System service domain 0 Service unavailable 1 CS service only 2 PS service only 3 PS+CS service **<roam_status>** Roaming status 0 Non-roaming 1 Roaming **<network_name>** Current Network Name (SKTelecom) **<rat>** Radio Access Technology 2 LTE Only **<band>** Band info 1 BAND_LTE_1 3 BAND_LTE_3 5 BAND_LTE_5 7 BAND_LTE_7 **<RSRPResult>** Reference Signal Received Power, in dBm
Reference Sierra Wireless Proprietary	Notes • This command provides information related to the network environment and can be used for example for localization calculation • SIM card must be inserted to support this command. The cell information can only be retrieved when the UE stays in an attached mode.

15.2.3. SKT Data Connection

Note the following when using a sequential data connection:

- Sequential data connection is only available on the HL7528 Firmware 2.15 or newer.
- NCM (Network Control Model) and Sierra Wireless TCP must not be used at the same time; this capability is not supported.
- Do not use dial-up network connection in the SKT network.
- A lot of exceptions may be generated when using a mixed data connection; Sierra Wireless does not recommend using this feature.
- If the module has been set to +COPS=2 before booting up, the module is not automatically connected to the carrier network. The module must be set to +COPS=0 for it to automatically connect to the carrier network.
- If the module cannot connect to the carrier network, it must be reset after setting it to +COPS=0.
- The module may take three to more than 30 seconds to connect to the network. The time delay depends on the carrier network.
- The IP address must be changed when using a sequential data connection.

		Second Data Connection	
		Network Interface (NCM)	**Sierra Wireless TCP**
First Data Connection	**Network Interface (NCM)**	Supported	AT+COPS=2 AT+COPS=0 AT+COPS? Available after normal connection to the network
	Sierra Wireless TCP	AT+KCNXDOWN=1,1 AT+COPS? Available after normal connection to the network	Supported

15.3. KT Carrier Commands

15.3.1. KTDBUG Command: Debug Message for KT

HL7528	
Read command Syntax **ATKTDBUG**	Get current parameters of Debug message Response **KTDBUG: <PsServiceState>,<DL_EARFCN>,<rrc_state>,<MCC>,<MNC>, <LTE_CI>,<PhyCellInd>,<TrackingAreacode>,<RSRPResult>,<RSRQResult>, <RSSI>,<RSSNR>,<BandWidth>,<ANT>,<drx_cycle_length>,<EMMState>, <EMMSubState>,<MTMSI[0]>,<MTMSI[1]>,<MTMSI[2]>,<MTMSI[3]>,<MMEGID[0]>, <MMEGID[1]>,<MMEC>,<EMMRejectCause>,<TotalPUSCHTxPower>** **OK**

HL7528

Parameters

<PsServiceState> Service state

1 EMM1_MM_SST_NO_NETWORK_AVAILABLE
2 EMM1_MM_SST_SEARCH_FOR_NETWORK
3 EMM1_MM_SST_EMERGENCY_CALLS_ONLY
4 EMM1_MM_SST_LIMITED_SERVICE
5 EMM1_MM_SST_FULL_SERVICE
6 EMM1_MM_SST_PLMN_LIST_AVAILABLE
7 EMM1_MM_SST_DISABLED
8 EMM1_MM_SST_DETACHED
9 EMM1_MM_SST_NO_GPRS_CELL
10 EMM1_MM_SST_SUSPENDED

<DL_EARFCN> Carrier frequency of the Serving cell in decimal format. The range can be found at 3GPP TS 25.101

<rrc_state> E-UTRA RRC states of the LTE serving cell

0 NULL
1 IDLE
2 CONNECTED
3 WAIT_RRC_CONFIRM
4 RELEASING

<MCC> Numeric format representing 3-digit country code. If the KT network is acquired, the value is 450.

<MNC> Numeric format representing 2- or 3-digit network code. If the KT network is acquired, the value is 08 or 02.

<LTE_CI> Cell Identity; decimal digits

<PhyCellInd> 0 – 503 Physical Cell ID (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE)

<TrackingAreacode> Integer type, Tracking Area Code, length 16 bits, (Ref: 3GPP TS 36.331, 6.3.4, Tracking AreaCode IE)

<RSRPResult> Reference Signal Received Power, in dBm

<RSRQResult> Reference Signal Received Quality, in dB

<RSSI> 0 to -120 Received Signal Strength Indicator, in dBm

<RSSNR> RSSNR of the LTE serving cell

<BandWidth> Download bandwidth, initial value = 0

0 1.4MHz
1 3 MHz
2 5 MHz
3 10 MHz
4 15 MHz
5 20 MHz

HL7528	
	<ANT> ANT Number **<drx_cycle_length>** DRX Cycle Length value, 2^k **<EMMState>** EMM State 0 EMM_NULL 1 EMM_DEREGISTERED 2 EMM_REGISTERED_INITIATED 3 EMM_REGISTERED 4 EMM_DEREGISTERED_INITIATED 5 EMM_TRACKING_AREA_UPDATING_INITIATED 6 EMM_SERVICE_REQUEST_INITIATED **<EMMSubState>** EMM SubState 0 EMM_SUBSTATE_ANY 1 EMM_SUBSTATE_NORMAL_SERVICE 2 EMM_SUBSTATE_LIMITED_SERVICE 3 EMM_SUBSTATE_PLMN_SEARCH 4 EMM_SUBSTATE_NO_CELL_AVAILABLE 5 EMM_DEREGISTERED_ATTEMPTING_TO_ATTACH 6 EMM_DEREGISTERED_NO_IMSI 7 EMM_DEREGISTERED_ATTACH_NEEDED 8 EMM_REGISTERED_ATTEMPTING_TO_UPDATE 9 EMM_REGISTERED_UPDATE_NEEDED 10 EMM_REGISTERED_ATTEMPTING_TO_UPDATE_MM 11 EMM_REGISTERED_IMSI_DETACH_INITIATED **<MTMSI>** M-TMSI[0] to M-TMSI[4] MME Temporary Mobile Subscriber Identity (M-TMSI) **<MMEGID>** MMEGID[0] to MMEGID[1] MME Group ID Default value = ucMmeGroupId[]={0xFF,0xFF} **<MMEC>** MME Code; default value = 0xFF **<EMMRejectCause>** EMM Causes; default value = 0 (Ref: 3GPP TS 24.301 sec 9.9.3.9) **<TotalPUSCHTxPower>** Tx Power; default value = -50
Reference Sierra Wireless Proprietary	Notes • Run AT+DBGCFG=1 prior to running this command to ensure that LTE debug information is being captured. • This command provides information related to the network environment and can be used for example for localization calculation • SIM card must be inserted to support this command. The cell information can only be retrieved when the UE stays in an attached mode.

15.3.2. KTSYSINFO Command: Current System Information for KT

HL7528	
Read command Syntax **ATKTSYSINFO**	Get current parameters of Debug message Response **KTSYSINFO: <srv_status>,<svc_domain >,<roam_status>,<network_name>,<rat>, <band>,<RSRPResult>,<emm_reject>,<esm_reject>,<attempt_cnt>** **OK** Parameters **<srv_status>** System service status 0 Service unavailable (NO_SRV) 1 Limited Service (LIMITRD) 2 Valid Service (SRV) 3 Limited Regional Service (LIMITED_REGION) **<srv_domain>** System service domain 0 Service unavailable 1 CS service only 2 PS service only 3 PS+CS service **<roam_status>** Roaming status 0 Non-roaming 1 Roaming **<network_name>** Current Network Name **<rat>** Radio Access Technology 2 LTE Only **<band>** Band info 1 BAND_LTE_1 3 BAND_LTE_3 5 BAND_LTE_5 7 BAND_LTE_7 **<RSRPResult>** Reference Signal Received Power, in dBm **<emm_reject>** EMM_reject_cause **<esm_reject>** ESM_reject_cause **<attempt_cnt>** Attempt_count
Reference Sierra Wireless Proprietary	Notes • This command provides information related to the network environment and can be used for example for localization calculation. • SIM card must be inserted to support this command. The cell information can only be retrieved when the UE stays in an attached mode.

15.3.3. KTCFUN Command: Change Modem Status

HL7528	
Write command Syntax **ATKTCFUN=<fac>**	 Response **OK** Parameter **<fac>** 1 Online mode 2 Offline mode 3 Lower power mode 4 Reset
Notes	SIM card must be inserted to support this command.

15.3.4. KTSPC Command: Control Service Programming Code

HL7528	
Execute command Syntax **ATKTSPC=147359**	 Response **KTSPC: 0** **OK** Parameter **<spc_lock>** 0 SPC is unlocked 1 SPC is locked
Notes	SIM card must be inserted to support this command.

15.3.5. KTIMEI Command: Read IMEI

HL7528	
Read command Syntax **ATKTIMEI?**	 Response **KTIMEI: <IMEI>** **OK** Parameter **<IMEI>** 14 or 15-digit IMEI as defined in GSM 23.003
Notes	• SIM card must be inserted to support this command. • SPC must be unlocked to support this command. • Run ATKTSPC=147359 prior to running this command to read IMEI.

15.3.6. KTSWV Command: Read Software Version

HL7528	
Read command Syntax **ATKTSWV?**	Response **KTSWV: <short version name>** **OK** Parameter **<short version name>** Short version of the firmware name
Notes	SIM card must be inserted to support this command.

15.3.7. KTNSI Command: Read Network Status

HL7528	
Execute command Syntax **ATKTNSI**	Response **KTNSI: <rscp>,<svc_status>,<net_name>,<roam>,<rat>** **OK** Parameters **<rscp>** RSCP Strength 0 -113 dBm or less 1 -130 to -127 dBm 2 -127 to -120 dBm 3 -120 to -112 dBm 4 -95 dBm or greater e **<svc_status>** Service status “NO SRV” “LIMITED” “IN SRV” “LIMITED REGIONAL” “PWR SAVE” **<net_name>** Network name "olleh" "sktelecom" "lgu" **<roam>** Roaming status “HOME” 국내 “ROAM” 해외 **<rat>** Radio Access Technology “LTE”
Notes	SIM card must be inserted to support this command.

15.3.8. +KCMGR Command: Read SMS

HL7528	
Write command Syntax **AT+KCMGR=<index>**	Response If in text mode (+CMGF=1) and command is successful: **+KCMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>** **OK** if in PDU mode (+CMGF=0) and command is successful: **+KCMGR: <stat>,[<alpha>],<length><CR><LF><pdu>** **OK** Parameters **<stat>** 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 **<index>** Index number of the message **<oa>** Originator address **<alpha>** Originator name (if available in the phonebook) **<scts>** Time Stamp **<data>** The content of the text message
Notes	• Refer to +CMGR of 3GPP TS 27.005. • This command displays the sent time of originated messages. • Memory storage must be set to "ME" to support this command.

15.3.9. KTCARD Command: Read Type of CARD

HL7528	
Read command Syntax **ATKTCARD?**	Response **KTCARD: <card_type>** **OK** Parameter **<card_type>** 0 UNKNOWN CARD 1 KT CARD 2 SKT CARD 3 LGU CARD

HL7528	
	4 OVERSEAS CARD 5 GCF CARD
Notes	SIM card must be inserted to support this command.

15.3.10. KTNULLSIM Command: Check Registration of USIM

HL7528	
Read command Syntax **ATKTNULLSIM?**	 Response **KTNULLSIM: <result>** **OK** Parameter **<result>** 0 Registered USIM 1 Need USIM OTA
Notes	SIM card must be inserted to support this command.

15.3.11. KTOPEN Command: Start OTA

HL7528	
Execute command Syntax **ATKTOPEN= "*147359*682*"**	 Response **OK**
Notes	SIM card must be inserted to support this command.

15.3.12. KTOTASTATUS Command: Read OTA Status

HL7528	
Execute command Syntax **ATKTOTASTATUS**	 Response **KTOTASTATUS: <status>** **OK** Parameter **<status>** -1 USIM_OTA_RESERVED 0 USIM_OTA_NOT_OPEN

HL7528	
	1 USIM_OTA_OPENING 2 USIM_OTA_OPEN_FAIL 3 USIM_OTA_OPEN_NEED_RESET 4 USIM_OTA_OPEN_RESET
Notes	SIM card must be inserted to support this command.

15.3.13. KTOTALOG Command: Read TIME of OTA

HL7528	
Read command Syntax **ATKTOTALOG?**	 Response **KTOTALOG: <ota_time>** **OK** Parameter **<ota_time>** The last time executed OTA
Execute command Syntax **ATKTOTALOG =DEL**	 Response **OK** Example **ATKTOTALOG=DEL** **OK**
Notes	SIM card must be inserted to support this command.

15.3.14. KT Data Connection

Note the following when using a sequential data connection:

- Sequential data connection is only available on the HL7528 Firmware 2.15 or newer.
- NCM (Network Control Model), DUN (Dial-Up Network) and Sierra Wireless TCP must not be used at the same time; this capability is not supported.
- A lot of exceptions may be generated when using a mixed data connection; Sierra Wireless does not recommend using this feature.
- If the module has been set to +COPS=2 before booting up, the module is not automatically connected to the carrier network. The module must be set to +COPS=0 for it to automatically connect to the carrier network.
- If the module cannot connect to the carrier network, it must be reset after setting it to +COPS=0.
- The module may take three to more than 30 seconds to connect to the network. The time delay depends on the carrier network.
- The IP address must be changed when using a sequential data connection.

		Second Data Connection		
		Network Interface (NCM)	**Dial-Up Network**	**Sierra Wireless TCP**
First Data Connection	**Network Interface (NCM)**	Supported	Not supported	AT+COPS=2 AT+COPS=0 AT+COPS? Available after normal connection to the network
	Dial-Up Network	AT+COPS=2 AT+COPS=0 AT+COPS? Available after normal connection to the network	Supported	AT+COPS=2 AT+COPS=0 AT+COPS? Available after normal connection to the network
	Sierra Wireless TCP	AT+KCNXDOWN=1,1 AT+COPS? Available after normal connection to the network	AT+KCNXDOWN=1,1 AT+COPS? Available after normal connection to the network	Supported

15.4. LG U+ Carrier Commands

15.4.1. IP Address Format

The following format is used for IPv4 address fields in AT commands described in this chapter: dot-separated decimal (0-255) parameters of the form a1.a2.a3.a4.

15.4.2. Session ID

Commands in this chapter share the same range of session IDs. The session ID <session_id> is a unique number and ranges from 0 to 9.

15.4.3. Buffer Length

The maximum length of AT commands in this chapter is 1024 characters; any AT command input longer than this limit will produce an error response. If the maximum length of a parameter is not specified, it may vary but still bound by this limit.

15.4.4. $LGTRESET Command: Reset Modem

HL7528	
Execute command Syntax **AT$LGTRESET**	 Response **$LGTRESET: <result>** **OK** Parameter **<result>** 1 Success 0 Fail
Reference LGU+ Proprietary	Notes This AT command will reset the modem.

15.4.5. $LGTMIN Command: Read MSIN

HL7528	
Read command Syntax **AT$LGTMIN?**	 Response **$LGTMIN: <msin>** **OK** Parameter **<msin>** Mobile Station Identity Number
Reference LGU+ Proprietary	Notes This command is for MSIN

15.4.6. $LGTMCC Command: Read MCC

HL7528	
Read command Syntax **AT$LGTMCC?**	 Response **$LGTMCC: <mcc>** **OK**
Reference LGU+ Proprietary	Notes This command is for MCC of connected network.

15.4.7. $LGTMNC Command: Read MNC

HL7528	
Read command Syntax **AT$LGTMNC?**	 Response **$LGTMNC: <mnc>** **OK**
Reference LGU+ Proprietary	Notes This command is for MNC of connected network.

15.4.8. $LGTTIME Command: Read Network Time

HL7528	
Read command Syntax **AT$LGTTIME?**	 Response **$LGTTIME: <network_time>** **OK** Parameter **<network_time>** year/month/day - hour:minute:second
Reference LGU+ Proprietary	Notes This command is for time of connected network.

15.4.9. $LGTVER Command: Read Modem Firmware Version

HL7528	
Read command Syntax **AT$LGTVER?**	 Response **$LGTVER: <version>** **OK**
Write command Syntax **AT$LGTVER=** **<recv_type>** **[,<recv_int>]**	 Response **OK** Parameters **<recv_type>** Read indicator type 0 Indicator with at command “$LGTTCPRD:<session_id>,<length>,<data>” 1 Indicator without at command, DM mode connect. **<recv_int>** Read indicator interval (default value = 50ms)
Reference LGU+ Proprietary	Notes <recv_type> and <recv_int> values will be reset to default values when the modem is reset.

15.4.10. $LGTLOCALADDR Command: Read Modem IP Address

HL7528	
Read command Syntax **AT$ LGTLOCALADDR ?**	Response **$LGTLOCALADDR: <ip_addr>** **OK** Parameter **<ip_addr>** IPv4 address
Reference LGU+ Proprietary	Notes Read modem IP Address given from network.

15.4.11. $LGTRSSI Command: Read RSSI Value

HL7528	
Read command Syntax **AT$LGTRSSI?**	Response **$LGTRSSI: <rssi>** **OK** Parameter **<rssi>** 0 to -120 Received Signal Strength Indicator
Reference LGU+ Proprietary	Notes This command may take a maximum of 10 seconds when it's first called.

15.4.12. $LGTINTRS Command: Register RSSI Indicator

HL7528	
Write command Syntax **AT$LGTINTRS= <interval>**	Response **$LGTINTRS: <interval>** **OK** **…** **$LGTRSSI: <rssi>** Parameters **<interval>** RSSI Indicator interval, in seconds. Default value = 0 **<rssi>** Received Signal Strength Indicator
Reference LGU+ Proprietary	Notes • This function is used for receiving RSSI. • If <interval> is set to 0, the indicator will be stopped.

15.4.13. $LGTLTESTATE Command: Read LTE Quality

HL7528	
Read command Syntax **AT$ LGTLTESTATE?**	Response **$LGTLTESTATE: <rssi>,<rsrp>,<rsrq>,<sinr>,<rx_pwr>,<tx_pwr>** **OK** Parameters **<rssi>** 0 to -120 Received Signal Strength Indicator, in dBm **<rsrp>** Reference Signal Received Power, in dBm **<rsrq>** Reference Signal Received Quality, in dB **<sinr>** Signal-to-Interface plus Noise Ratio **<rx_pwr>** Rx Power **<tx_pwr>** Tx Power

15.4.14. $LGTADDR Command: Read Server IP Address

HL7528	
Read and Write commands Syntax For all <session_id>s **AT$LGTADDR?** For a specific <session_id> **AT$LGTADDR= <session_id>**	Response **$LGTADDR: <session_id_1>,<ip_addr>,<port>** **…** **$LGTADDR: <session_id_10>,<ip_addr>,<port>** **OK** or **$LGTADDR: <session_id>,<ip_addr>,<port>** **OK** Parameters **<session_id>** TCP session index **<ip_addr>** IP Address set by AT$LGTTCPOP **<port>** Port number set by AT$LGTTCPOP
Reference LGU+ Proprietary	Notes Read IP address and port for all TCP sessions.

15.4.15. $LGTTCPOP Command: Connect TCP Session

HL7528	
Write command Syntax **AT$LGTTCPOP=<session_id>,<ip_addr>,<port>**	Response **$LGTTCPOP: <session_id>,<result>** **OK** or, if AT$LGTVER=1 **$LGTTCPOP: <session_id>,<result>** **OK** **CONNECT** Parameters **<session_id>** TCP session index **<ip_addr>** Server IP address to connect to **<port>** Server port number to connect to **<result>** Result code 0 Success 4 Fail to connect **CONNECT** String notification of data mode connect
Reference LGU+ Proprietary	Notes • This command connects to a remote TCP server. • If TE needs to send or receive binary data, AT$LGTVER=1 have to be set prior to this command.

15.4.16. $LGTTCPWR Command: Send Data

HL7528	
Write command Syntax **AT$LGTTCPWR=<session_id>,<length>,<data>**	Response **OK** (if AT$LGTVER=0) Parameters **<session_id>** TCP session index **<length>** length of <data> **<data>** String type. ASCII only **<result>** String type. Indicates the name of the file to upload
Reference LGU+ Proprietary	Notes • If AT$LGTVER=0, use ASCII string for <data>, not binary data. • If AT$LGTVER=1, data mode is connected, binary data is acceptablem and there is no response after data is sent.

15.4.17. $LGTTCPRD Notification: Receive Data Indicator

HL7528	
Unsolicited Notification	Response If AT$LGTVER=0: **$LGTTCPRD:<session_id>,<length>,<data>** If AT$LGTVER=1: **[binary data]** Parameters **<session_id>** TCP session index **<length>** Length for <data> **<data>** String type data
Reference LGU+ Proprietary	Notes Before using this command, a TCP connection must have been achieved using AT$LGTTCPOP.

15.4.18. $LGTTCPCL Command: Close Current TCP Connection

HL7528	
Write command Syntax **AT$LGTTCPCL= <session_id>**	Response **$LGTTCPCL: <session_id>,<result>** **OK** Parameters **<session_id>** TCP session index **<result>** Result code 0 Success 4 Failed to connect
Reference LGU+ Proprietary	Notes This command will close the connection to the TCP server.

15.4.19. $TCPCLOSE Notification: Remote Server Close TCP Indicator

HL7528	
Unsolicited Notification	Response If AT$LGTVER=0: **$TCPCLOSE: <session_id>** If AT$LGTVER=1: **NO CARRIER** Parameter **<session_id>** TCP session index
Reference LGU+ Proprietary	Notes Indicator for closing the session of a remote server.

15.4.20. $LGTTCPSTATE Command: Read Current TCP Status

HL7528	
Read and Write commands Syntax For all <session_id>s: **AT$ LGTTCPSTATE?** For a specific <session_id>: **AT$ LGTTCPSTATE= <session_id>**	Response **$LGTTCPSTATE: <status_1>,<status_2>,<status_3>,<status_4>,<status_5>, <status_6>,<status_7>,<status_8>,<status_9>,<status_10>** **OK** or **$LGTTCPSTATE: <session_id>,<status>** **OK** Parameters **<session_id>** TCP session index **<status>** Status 0 STATE NONE 1 WAITING FOR PPP CONNECT 2 PPP CONNECTED 3 WAITING FOR TCP CONNECT 4 TCP CONNECTED 5 WAITING FOR TCP DISCONNECTED 6 TCP CLOSED 7 WAITING FOR PPP DISCONNECTED 8 PPP CLOSED
Reference LGU+ Proprietary	Notes Read Current TCP State for all sessions.

15.4.21. $LGTPREL Command: Disconnect PDP Connection

HL7528	
Execute command Syntax **AT$LGTPREL**	 Response **OK**
Reference LGU+ Proprietary	Notes • PDP disconnection. • The IP address will be changed; and will be take about 5 seconds. Do not try to reconnect before the IP address has been changed. The IP address can be checked using “AT$LGTLOCALADDR?”.

15.4.22. $LGTISNULL Command: USIM Status

HL7528	
Test command Syntax **AT$LGTISNULL =?**	 Response **ERROR**
Read command Syntax **AT$LGTISNULL?**	 Response **ERROR**
Execute command Syntax **AT$LGTISNULL**	 Response **$LGTISNULL: <state>** **OK** Parameter **<status>** USIM status 0 No SIM inserted 1 SIM not registered, need OTA 2 SIM ready 3 Not LG U+ USIM

15.4.23. $LGTOTA_STATUS Command: OTA Status

HL7528	
Test command Syntax **AT$LGTOTA_ STATUS=?**	 Response **ERROR**

HL7528	
Read command Syntax **AT$LGTOTA_ STATUS?**	 Response **ERROR**
Execute command Syntax **AT$LGTOTA_ STATUS**	 Response **$LGTOTA_STATUS: <state>** **OK** Parameter **<status>** USIM OTA status -1 Reserved 0 Not opened, need OTA 1 Opening 2 Open failed 3 Open closed, need reset

15.4.24. $LGTOPEN Command: Start USIM OTA

HL7528	
Test command Syntax **AT$LGTOPEN=?**	 Response **ERROR**
Read command Syntax **AT$LGTOPEN?**	 Response **ERROR**
Write command Syntax **AT$LGTOPEN= #5487587#682#**	 Response **OK**
Notes	AT+XBIPCFG should be executed prior to using this command. AT+XBIPCFG settings is dependent on whether the SIM card has been used before or not. For SIM cards that have never been registered before: **AT+XBIPCFG=1,"ota.lguplus.co.kr"** **OK** **AT$LGTOPEN=#5487587#682#** **OK** For SIM cards that have been used before: **AT+XBIPCFG=1,"internet.lguplus.co.kr"** **OK** **AT$LGTOPEN=#5487587#682#** **OK**

15.4.25. $LGTMDN Command: Request MSISDN

HL7528	
Test command Syntax **AT$LGTMDN=?**	 Response **ERROR**
Read command Syntax **AT$LGTMDN?**	 Response **ERROR**
Execute command Syntax **AT$LGTMDN**	 Response **$LGTMDN: <msisdn>** **OK** Parameter **<msisdn>** Module's MSISDN

15.4.26. $LGTDBG Command: Debug Message for LGU+

HL7528	
Execute command Syntax **AT$LGTDBG**	Get current parameters of debug message Response **$LGTDBG: <PsServiceState>,<DL_EARFCN>,<rrc_state>,<MCC>,<MNC>,<LTE_CI>, <PhyCellInd>,<TrackingAreacode>,<RSRPResult>,<RSRQResult>,<RSSI>,<RSSNR>, <BandWidth>,<ANT>,<drx_cycle_length>,<EMMState>,<EMMSubState>,<MTMSI[0]>, <MTMSI[1]>,<MTMSI[2]>,<MTMSI[3]>,<MMEGID[0]>,< MMEGID[1]>,<MMEC>** **OK** Parameters **<PsServiceState>** Service state 1 EMM1_MM_SST_NO_NETWORK_AVAILABLE 2 EMM1_MM_SST_SEARCH_FOR_NETWORK 3 EMM1_MM_SST_EMERGENCY_CALLS_ONLY 4 EMM1_MM_SST_LIMITED_SERVICE 5 EMM1_MM_SST_FULL_SERVICE 6 EMM1_MM_SST_PLMN_LIST_AVAILABLE 7 EMM1_MM_SST_DISABLED 8 EMM1_MM_SST_DETACHED 9 EMM1_MM_SST_NO_GPRS_CELL 10 EMM1_MM_SST_SUSPENDED **<DL_EARFCN>** Carrier frequency of the serving cell in decimal format. The range can be found at 3GPP TS 25.101 **<rrc_state>** E-UTRA RRC states of the LTE serving cell 0 NULL 1 IDLE

HL7528	
	2 CONNECTED 3 WAIT_RRC_CONFIRM 4 RELEASING **<MCC>** Numeric format representing 3-digit country code. If the LGU+ network is acquired, the value is 450. **<MNC>** Numeric format representing 2- or 3-digit network code. If the LGU+ network is acquired, the value is 06. **<LTE_CI>** Cell Identity; decimal digits **<PhyCellInd>** Integer type, Physical Cell ID, range: (0..503), (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE) **<TrackingAreacode>** Integer type, Tracking Area Code, length 16 bits, (Ref: 3GPP TS 36.331, 6.3.4, Tracking AreaCode IE) **<RSRPResult>** Reference Signal Received Power, in dBm **<RSRQResult>** Reference Signal Received Quality, in dB **<RSSI>** 0 to -120 Received Signal Strength Indicator, in dBm **<RSSNR>** RSSNR of the LTE serving cell **<BandWidth>** Download bandwidth; initial value = 0 0 1.4MHz 1 3 MHz 2 5 MHz 3 10 MHz 4 15 MHz 5 20 MHz **<ANT>** ANT number **<drx_cycle_length>** DRX Cycle Length value, 2^k **<EMMState>** EMM State 0 EMM_NULL 1 EMM_DEREGISTERED 2 EMM_REGISTERED_INITIATED 3 EMM_REGISTERED 4 EMM_DEREGISTERED_INITIATED 5 EMM_TRACKING_AREA_UPDATING_INITIATED 6 EMM_SERVICE_REQUEST_INITIATED **<EMMSubState>** EMM SubState 0 EMM_SUBSTATE_ANY 1 EMM_SUBSTATE_NORMAL_SERVICE 2 EMM_SUBSTATE_LIMITED_SERVICE 3 EMM_SUBSTATE_PLMN_SEARCH 4 EMM_SUBSTATE_NO_CELL_AVAILABLE 5 EMM_DEREGISTERED_ATTEMPTING_TO_ATTACH 6 EMM_DEREGISTERED_NO_IMSI

HL7528	
	7 EMM_DEREGISTERED_ATTACH_NEEDED 8 EMM_REGISTERED_ATTEMPTING_TO_UPDATE 9 EMM_REGISTERED_UPDATE_NEEDED 10 EMM_REGISTERED_ATTEMPTING_TO_UPDATE_MM 11 EMM_REGISTERED_IMSI_DETACH_INITIATED **<MTMSI>** M-TMSI[0] to M-TMSI[4] MME Temporary Mobile Subscriber Identity (M-TMSI) **<MMEGID>** MMEGID[0] to MMEGID[1] MME Group ID Default value = ucMmeGroupId[]={0xFF,0xFF} **<MMEC>** MME Code; default value = 0xFF
Reference Sierra Wireless Proprietary	Notes • Run **AT+DBGCFG=1** prior to running this command to ensure that LTE debug information is being captured. • This command provides information related to the network environment and can be used for localization calculation, for example. • SIM card must be inserted to support this command. The cell information can only be retrieved when the UE stays in an attached mode.

15.4.27. $LGTSYSINFO Command: System Information for LG U+

HL7528	
Read command Syntax **AT$ LGTSYSINFO**	Get current parameters of Debug message Response **$LGTSYSINFO:<srv_status>,<svc_domain >,<roam_status >,<network_name>,<rat>, <band>,<RSRPResult>,<EMM_Cause>,<ESM_Cause>,< max_attempts_flag>** **OK** Parameters **<srv_status>** System service status 0 Service unavailable (NO_SRV) 1 Limited Service (LIMITRD) 2 Valid Service (SRV) **<srv_domain>** System service domain 0 Service unavailable 1 CS service only 2 PS service only 3 PS+CS service **<roam_status>** Roaming status 0 Non-roaming 1 Roaming **<network_name>** Current Network Name (LG U+)

HL7528	
	<rat> Radio Access Technology 2 LTE only Other value None **<band>** Band info 1 BAND_LTE_1 3 BAND_LTE_3 5 BAND_LTE_5 7 BAND_LTE_7 **<RSRPResult>** Reference Signal Received Power, in dBm **<EMM_Cause>** Network error causes (Ref:3GPP TS 24.008 Annex G) **<ESM_Cause>** PDP context reject code (Ref:3GPP 24.008 10.5.6.6) **<max_attempts_flag>** Indicates whether the maximum attempts for PS registration has been reached 1 Indicates that the maximum number of attempts has been reached for Attach 0 Default
Reference Sierra Wireless Proprietary	Notes • This command provides information related to the network environment and can be used for example for localization calculation. • SIM card must be inserted to support this command. The cell information can only be retrieved when the UE stays in an attached mode.

15.4.28. TCP Commands Examples (ASCII Mode)

AT$LGTTCPOP=1,10.160.29.68,9000 **$LGTTCPOP: 1,0** **OK**	Connect to remote server Server connection success
AT$LGTTCPWR=1,36,abcdefghijklmnopqrstuvwxyz0123456789 **OK** **$LGTTCPRD:1,10,0123456789**	Send ASCII string Send success Data read indicator
AT$LGTTCPCL=1 **$LGTTCPCL: 1,0** **OK**	Disconnect to remote server Disconnect success

15.4.29. TCP Commands Examples (Binary Mode)

AT$LGTVER=1 **OK**	Set to Binary mode
AT$LGTTCPOP=1,10.160.29.68,9000 **$LGTTCPOP: 1,0** **OK**	Connect to remote server Server connection success Data mode connected

CONNECT	
…<Send Binary Data>…	Send Binary data
…<Recv Binary Data>…	Data read indicator
--EOF--Pattern--	Disconnect Data mode to remote server
NO CARRIER	Disconnect success

15.4.30. LG U+ Data Connection

Note the following when using a sequential data connection:

- Sequential data connection is only available on the HL7528 Firmware 2.15 or newer.
- NCM (Network Control Model), DUN (Dial-Up Network), LG U+ TCP and Sierra Wireless TCP must not be used at the same time; this capability is not supported.
- A lot of exceptions may be generated when using a mixed data connection; Sierra Wireless does not recommend using this feature.
- If the module has been set to +COPS=2 before booting up, the module is not automatically connected to the carrier network. The module must be set to +COPS=0 for it to automatically connect to the carrier network.
- If the module cannot connect to the carrier network, it must be reset after setting it to +COPS=0.
- The module may take three to more than 30 seconds to connect to the network. The time delay depends on the carrier network.
- The IP address must be changed when using a sequential data connection.

		Second Data Connection			
		Network Interface (NCM)	**Dial-Up Network**	**LG U+ TCP**	**Sierra Wireless TCP**
First Data Connection	**Network Interface (NCM)**	Supported	Not supported	AT+COPS=2 AT+COPS=0 AT+COPS? Available after normal connection to the network	AT+COPS=2 AT+COPS=0 AT+COPS? Available after normal connection to the network
	Dial-Up Network	AT+COPS=2 AT+COPS=0 AT+COPS? Available after normal connection to the network	Supported	AT+COPS=2 AT+COPS=0 AT+COPS? Available after normal connection to the network	AT+COPS=2 AT+COPS=0 AT+COPS? Available after normal connection to the network
	LG U+ TCP	AT$LGTPREL AT+COPS? Available after normal connection to the network	AT$LGTPREL AT+COPS? Available after normal connection to the network	Supported	AT$LGTPREL AT+COPS? Available after normal connection to the network

First Data Connection	**Sierra Wireless TCP**	AT+KCNXDOWN=1,1 AT+COPS? Available after normal connection to the network	AT+KCNXDOWN=1,1 AT+COPS? Available after normal connection to the network	AT+KCNXDOWN=1,1 AT+COPS? Available after normal connection to the network	Supported

15.5. SKT M2M Platform Commands

The following commands are used to set and configure SKT's M2M platform.

15.5.1. *M_PARAMK Command: Read GMMP Parameters File

HL7528	
Read command Syntax **AT*M_PARAMK?**	Response ***M_PARAMK:<doc>,<gid>,<gmfid>,<gmn>,<auid>,<auk>,<did>,<gfwv>,<gswv>,<ghwv>,<sip>,<spt>,<dmfid>,<enc>** **OK** or **ERROR** Parameters **<doc>** Domain code **<gid>** Gateway ID **<gmfid>** Gateway manufacturer ID **<gmn>** Gateway model name **<auid>** Authentication ID **<auk>** Authentication key **<did>** Device ID (TE) **<gfwv>** Gateway firmware version **<gswv>** Gateway software version **<ghwv>** Gateway hardware version **<sip>** SKT M2M server IP **<spt>** SKT M2M server port **<dmfid>** Device manufacturer ID **<enc>** Encryption; default value = 0

HL7528	
Notes	• This command reads the gmmp_param file in the NV folder. • GMMP (Global M2M Protocol) is an SKTelecom-owned internal specification that performs functions such as device registration, reporting cycle and device control.

15.5.2. *M_PARACLR Command: Delete GMMP Parameters File

HL7528	
Execute command Syntax **AT*M_PARACLR**	 Response **OK**

15.5.3. *M_SERVERREG Command: Set IP and Port of M2M Server

HL7528	
Write command Syntax **AT*M_SERVERREG=<sip>,<spt>**	 Response **OK**
Read command Syntax **AT*M_SERVERREG?**	 Response ***M_SERVERREG:<sip>,<spt>** **OK** or **ERROR** Parameters **<sip>** Server IP. When the device is registered in the M2M portal, the IP is automatically notified by the M2M portal. **<spt>** Server port. When the device is registered in the M2M portal, the port is automatically notified by the M2M portal.
Notes	This command specifies the IP and port of the M2M server. Both IP and port must be set before starting the first M2M platform.

15.5.4. *M_SETDOMAIN Command: Set M2M Domain Code

HL7528	
Write command Syntax **AT*M_SETDOMAIN=<doc>**	 Response **OK**
Read command Syntax **AT*M_SETDOMAIN?**	 Response ***M_SETDOMAIN:<doc>** **OK** Parameter **<doc>** Domain code
Notes	This command sets the M2M domain code. The domain code must be set before starting the first M2M platform.

15.5.5. *M_START Command: Connect M2M Server

HL7528	
Write command Syntax **AT*M_START=<dmfid>**	 Response **OK** ***M_START=<result>,<did>** Parameters **<dmfid>** Device manufacturer ID **<result>** 0 Success 1 Network error 2 GW register error 3 GW profile error 4 DV register error 5 DV profile error 99 GW status busy **<did>** Device ID
Notes	This command connects the module with the M2M server and registers the gateway and the device.

15.5.6. *M_DELIVERY Command: Set M2M Data Type to Send

HL7528	
Write command Syntax **AT*M_DELIVERY =<report>, <media>,<len>**	Response **OK** ***M_DELIVERY=<result>** Parameters **<report>** Report Type 1 Collect data 2 Alarm data 3 Event data 4 Alarm clear **<media>** Media type 0x01 Text/plain (UTF-8) 0x02 Text/xml (UTF-8) 0x03 Text/csv (UTF-8) 0x04 Text/html (UTF-8) 0x05 Text/javascript 0x10 Image/gif 0x11 Image/jpeg 0x12 Image/png 0x13 Image/tiff 0x20 Audio/basic 0x21 Audio/mp4 0x22 Audio/mpeg 0x23 Audio/ogg 0x30 Video/mpeg 0x31 Video/mp4 0x32 Video/ogg 0x33 Video/quicktime 0x40 Multipart/mixed 0x41 Multipart/alternative 0x42 Multipart/related 0x43 Multipart/form-data 0x44 Multipart/signed 0x45 Multipart/encrypted 0x50 Message/http 0x51 Message/imdn+xml 0x52 Message/partial 0x53 Message/rfc822 0x54 Message/encrypted 0x61 Application/atom+xml 0x62 Application/ecmascript 0x63 Application/EDI-X12 0x64 Application/EDIFACT 0x65 Application/json 0x66 Application/javascript 0x67 Application/octet-stream

HL7528	
	0x68 Application/ogg 0x69 Application/pdf 0x6a Application/postscript 0x6b Application/rss+xml 0x6c Application/soap+xml 0x6d Application/font-woff 0x6e Application/xhtml+xml 0x6f Application/xml-dtd 0x70 Application/xop+xml 0x71 Application/zip 0x72 Application/x-gzip **<len>** Data length **<result>** Result (after server connection) 0 Success 1 Network error 2 Device function off 99 Gateway is busy

15.5.7. *M_WR Command: Send M2M Data

HL7528	
Write command Syntax **AT*M_WR=<more>,<len>,<raw_data>**	Response **OK** ***M_WR=<result>** Parameters **<more>** More bit 0 Last data 1 Intermediate data **<len>** Data length. If a value greater than 512 is entered, ERROR is displayed. **<raw_data>** Raw data. If data entered exceeds 512 bytes, ERROR is displayed. **<result>** Result (after sending data) 0 Success 1 Failure

15.5.8. *M_DEREG Command: Deregister from M2M Platform

HL7528	
Write command Syntax **AT*M_DEREG=<sel>**	Response **OK** ***M_DEREG=<result>** Parameters **<sel>** Selection 0 Gateway deregistration 1 Device deregistration If the device was registered, the gateway must also be deregistered after the device is deregistered. **<result>** Result (after sending data) 0 Success 1 Network error 2 Unknown
Notes	This command deregisters the module from the M2M platform.

15.5.9. *M_CTL_READY Command: Get Control Message

HL7528	
Write command Syntax **AT*M_CTL_READY=<available>**	Response **OK** Parameter **<available>** Availability 0 Ready 1 Not ready
Unsolicited Notification	Response ***M_CTL_READY:<size>** Parameter **<size>** Length of received data
Notes	This command gets a user-defined control message.

15.5.10. *M_CTL_DATA Command: Deliver Control Message Response to M2M Server

HL7528	
Execute command Syntax **AT*M_CTL_DATA =<result>**	 Response **OK** Parameter **<result>** Result 0 OK 1 ERROR
Unsolicited Notification	Response ***M_CTL_DATA:<size>,<more>,<raw_data>** Parameters **<size>** Length of received data **<more>** More bit 0 Last data 1 Intermediate data **<raw_data>** Data output as a hexadecimal string
Notes	This command delivers the response of a user-defined control message to the M2M server.

15.5.11. *M_FW_READY Command: Get Firmware Update Message

HL7528	
Write command Syntax **AT* M_FW_READY= <available>**	 Response **OK** Parameter **<available>** Availability 0 Ready 1 Not ready
Unsolicited Notification	Response ***M_FW_READY:<size>** Parameter **<size>** Length of received data
Notes	This command gets a firmware update message.

15.5.12. *M_FW_DATA Command: Deliver Firmware Data

HL7528	
Write command Syntax **AT*M_FW_DATA =<result>**	 Response **OK** Parameters **<result>** Result 0 OK 1 ERROR
Unsolicited Notification	Response ***M_FW_DATA:<size>,<more>,<raw_data>** Parameters **<size>** Length of received data **<more>** More bit 0 Last data 1 Intermediate data **<raw_data>** Raw data output as a hexadecimal string
Notes	This command delivers the firmware data.

15.5.13. *M_STATUS Command: Set Device Status

HL7528	
Execute command Syntax **AT*M_STATUS= <result>,<run>**	 Response **OK** Parameters **<report>** Report status 0 Report off 1 Report on **<run>** Run status 0 Pause 1 Running
Unsolicited Notification	Response ***M_STATUS**
Notes	• This command sets the status of the device. • If the module is set to get the notification *M_STATUS, send the status of the device to the M2M server.

15.5.14. *M_RESET Notification: M2M Reset Indication

HL7528	
Unsolicited Notification	Response ***M_RESET:<sel>** Parameter **<sel>** 0 Gateway reset. The gateway is rebooting automatically 1 Device reset. Please reset the device
Notes	This notification from the gateway provides the M2M reset indication.

15.5.15. *M_TURNOFF Notification: M2M Turn Off Indication

HL7528	
Unsolicited Notification	Response ***M_TURNOFF:<sel>** Parameters **<sel>** 0 Gateway is turned off. The gateway is not supported 1 Device reset. Please reset the device
Notes	This notification from the gateway provides the M2M turn off indication.

15.5.16. *PERIODREPORT Notification: M2M Period Report Indication

HL7528	
Unsolicited Notification	Response ***M_PERIODREPORT**
Notes	• This notification from the gateway provides the M2M period report indication. • If there are data to be reported after receiving this string, use AT*M_DELIVERY to report the data type to the M2M server.

15.5.17. *M_TIME_SYNC Notification: M2M Time Sync Indication

HL7528	
Unsolicited Notification	Response ***M_TIME_SYNC:<utime>** Parameter **<utime>** Unix time information (= POSIX time)
Notes	This notification from the gateway provides the M2M time sync indication.

15.5.18. *M_REPORT Notification: M2M Report On/Off Indication

HL7528	
Unsolicited Notification	Response ***M_REPORT:<status>** Parameter **<status>** Report status 0 Device report is off 1 Device report in on
Notes	This notification from the gateway provides the M2M report on/off indication.

15.5.19. *M_RUN Notification: M2M Restart/Pause Indication

HL7528	
Unsolicited Notification	Response ***M_RUN:<status>** Parameter **<status>** Report status 0 Pause 1 Restart
Notes	This notification from the gateway provides the M2M restart/pause indication.

15.6. LG U+ M2M Platform Commands

LG U+ M2M platform AT commands are documented in **M2MM-DEVICE 연동 규격서** from LG U+.

Please contact LG U+ directly for more details regarding these commands.

15.7. LG U+ RASS Commands

The following commands are applicable to LG U+ RASS services only. Note that RASS and AVMS services cannot work at the same time.

15.7.1. $LGTRRASSON Command: Close All Socket Sessions and Restart

HL7528	
Execute command Syntax **AT$ LGTRRASSON**	Response **$LGTRRASSON:<result>** **OK** Parameter **<result>** 1 Success 0 Fail
Reference LGU+ Proprietary	Notes This command closes all TCP sessions after which all server sessions are restarted again.

15.7.2. $LGTRMODRDY Notification: Ready Indication

HL7528	
Write command Syntax **AT$ LGTRMODRDY= <ready>**	Response **OK** Parameter **<ready>** 1 Success 0 Fail
Unsolicited Notification	Response **$LGTRMODRDY**
Reference LGU+ Proprietary	Notes The module sends an unsolicited notification to the UE. The UE would then reply with the ready status.

15.7.3. $LGTRMSISDN Command: Read MSISDN

HL7528	
Read command Syntax **AT$ LGTRMSISDN?**	 Response **$LGTRMSISDN:<value>** **OK** Parameter **<value>** NDC + SN only with “0”
Reference LGU+ Proprietary	Notes MSISDN (Mobile Station International ISDN Number) = CC + NDC + SN

15.7.4. $LGTRTIME Command: Read Network Time

HL7528	
Read command Syntax **AT$LGTRTIME?**	 Response **$LGTRTIME:<network_time>** **OK** Parameter **<network_time>** YYYYMMDDhhmmss
Examples	**AT$LGTRTIME?** **$LGTRTIME:20160923133136** // 23th of September 2016, 13:31:36 **OK**
Reference LGU+ Proprietary	Notes This command is for displaying the time of the network connected to.

15.7.5. $LGTRVER Command: Read Modem RASS Version

HL7528	
Read command Syntax **AT$LGTRVER?**	 Response **$LGTRVER:<version>** **OK** Parameter **<version>** 00 – 99 RASS version
Reference LGU+ Proprietary	Notes This command is for reading the RASS version and not the module’s software version.

15.7.6. $LGTRMTYPE Command: Read Modem Manufacture Code

HL7528	
Read command Syntax **AT$LGTRMTYPE ?**	Response **$LGTRMTYPE:<code>** **OK** Parameter **<code>** Manufacture code given by LG U+ (default value = 'B')
Reference LGU+ Proprietary	Notes This command returns the module's manufacture code which is defined by LG U+

15.7.7. $LGTRBAND Command: Read Band & Antenna Status

HL7528	
Read command Syntax **AT$LGTRBAND?**	Response **$LGTRBAND:<band>,<antenna>** **OK** Parameters **<band>** 800 Band 5 (800 MHz) 2100 Band 1 (2100 MHz) 2600 Band 7 (2600 MHz) **<antenna>** 1 Primary + Diversity 2 Primary Only
Reference LGU+ Proprietary	Notes This command returns the current band and antenna status.

15.7.8. $LGTRBANDST: Set Band & Antenna Setting

HL7528	
Write command Syntax **AT$ LGTRBANDST= <band>, <antenna>**	Response **$LGTRBANDST:<result>** **OK** Parameters **<band>** 800 Band 5 (800 MHz) 2100 Band 1 (2100 MHz) 2600 Band 7 (2600 MHz)

HL7528	
	<antenna> 1 Primary + Diversity 2 Primary Only **<result>** 1 Success 0 Fail
Reference LGU+ Proprietary	Notes This command sets the current band and antenna.

15.7.9. $LGTRSTA Command: Read Debug Information

HL7528	
Read command Syntax **AT$LGTRSTA?**	Response **$LGTRSTA:<rat>,<service>,<fdd>,<lte_mode>,<earfcn>,<band>,<bandwidth>,<antenna>,<rssi>,<tx_pwr>,<rsrp>** **OK** Parameters **<rat>** 0 GSM 1 UMTS 2 LTE **<service>** 0 No SRV 1 Limited 2 Service Available 3 Limited Reginal Service 4 Power Save | Deep Sleep **<fdd>** 0 None FDD State 1 FDD State **<lte_mode>** 0 Init 1 LTE Idle 2 LTE FDD Rx Warmup 3 LTE FDD RxTx 4 LTE TDD Warmup 5 LTE TDD RxTx 6 LTE Sleep **<earfcn>** EARFCN value of Serving Cell **<band>** 1 Band 1 (2100MHz) 5 Band 5 (800MHz) 7 Band 7 (2600MHz) **<bandwidth>** Downlink bandwidth **<rssi>** -120 to 0 Radio signal strength indication in dBm

HL7528			
	<tx_pwr>	-100 to 100	TX POWER in dBm
	<rsrp>	-140 to -44	Reference signal received power in dBm

15.7.10. $LGTRQOS Command: Read Quality of Service

HL7528	
Read command Syntax **AT$LGTRQOS?**	Response **$LGTRQOS:<rsrp>,<rsrq>,<sinr>,<cqi>,<mcs>,<tx_pwr>,<rssi>,<ri>,<DL throughput>,<UL throughput>,<time>,<band>** **OK** Parameters **<rsrp>** -140 to -44 Reference Signal Received Power in dBm **<rsrq>** -20 to -3 Reference Signal Received Quality in dB **<sinr>** 0 – 250 Signal to Interference-Plus-Noise Radio **<cqi>** 0 – 15 Channel Quality Indicator **<mcs>** 0 – 28 Modulation and Coding Scheme **<tx_pwr>** -100 to 100 TX power in dBm **<rssi>** -120 to 0 Radio Signal Strength Indication in dBm **<ri>** 1 or 2 Rank Indicator **<DL throughput>** ###### (####.## Mbps) **<UL thoughput>** ###### (####.## Mbps) **<time>** Throughput check time **<band>** 800 Band 5 (800 MHz) 2100 Band 1 (2100 MHz) 2600 Band 7 (2600 MHz)
Reference LGU+ Proprietary	Notes • This command returns the radio quality under throughput check procedure. • This command must be called after **AT$LGTRTPS**.

15.7.11. $LGTRCHINF Command: Read Channel Information

HL7528	
Read command Syntax **AT$LGTRCHINF?**	Response **$LGTRCHINF:<pci>,<band>,<bandwidth>** **OK** Parameters **<pci>** 0 – 504 Physical Cell Identifier **<band>** 800 Band 5 (800 MHz) 2100 Band 1 (2100 MHz) 2600 Band 7 (2600 MHz) **<bandwidth>** Downlink Bandwidth

15.7.12. $LGTRIP Command: Read Modem IP Address

HL7528	
Read command Syntax **AT$LGTRIP?**	Response **$LGTRIP:<ip_addr>** **OK** Parameter **<ip_addr>** IPv4 address
Reference LGU+ Proprietary	Notes This command returns the module's IP address given from the network.

15.7.13. $LGTRSVRIP Command: Set Server IP Address

HL7528	
Write command Syntax **AT$LGTRSVRIP=<ip>,<port>**	Response **$LGTRSVRIP:<result>** **OK** Parameters **<result>** 1 Success 0 Fail

HL7528	
Reference LGU+ Proprietary	Notes • This command functions the same as **AT$LGTRDNS**. • This command must be called prior to **AT$LGTRSEND**.

15.7.14. $LGTRDNS Command: Set Server Domain Address

HL7528	
Write command Syntax **AT$LGTRDNS= <domain>,<port>**	Response **$LGTRDNS:<result>** **OK** Parameters **<domain>** Server domain name **<port>** Server port number **<result>** 1 Success to find domain address 0 Fail to find domain address
Reference LGU+ Proprietary	Notes • This command functions the same as **AT$LGTRDNS**. • This command must be called prior to **AT$LGTRSEND**.

15.7.15. $LGTRTPS Command: Start Throughput Record

HL7528	
Write command Syntax **AT$LGTRTPS= <ip_port>,<id>, <pwd>,<dl>, <file_name>, <duration>**	Response **$LGTRTPS:<result>** **OK** Parameters **<ip_port>** FTP Server IP:port (210.75.14.4:21) **<id>** FTP ID **<pwd>** FTP password **<dl>** 0 Download 1 Upload **<file_name>** File path + name

HL7528	
	<duration> Test duration limit (second) **<result>** 1 Success 0 Fail
Reference LGU+ Proprietary	Notes • <file_name> must include file path + file name in the download test. • <file_name> only includes the file path in the upload test.

15.7.16. $LGTRTPR Notification: Throughput Test Indication

HL7528	
Unsolicited Notification	Response **$LGTRTPR:<result>** **OK** Parameter **<result>** 0 Test started 1 Test finished 2 Test failed

15.7.17. $LGTRMCUFWI Command: MCU Firmware Download

HL7528	
Write command Syntax **AT$LGTRMCUFWI=<ip_port>,<id>,<pwd>,<file_name>**	Response **$LGTRMCUFWI:<result>** **OK** Parameters **<ip_port>** FTP Server ip:port (210.75.14.4:21) **<id>** FTP ID **<pwd>** FTP password **<file_name>** FTP file path + file name **<result>** 1 Success 0 Fail
Reference LGU+ Proprietary	Notes When download is finished, $LGTRMCUFWS notification will be sent to the UE.

15.7.18. $LGTRMCUFWS Notification: MCU Firmware Indication

HL7528	
Unsolicited Notification	Response **$LGTRMCUFWS:<size>,<count>** Parameters **<size>** Firmware size in bytes **<count>** Total sequence ((Firmware size / 256) + 1)
Reference LGU+ Proprietary	Notes • When download is finished, $LGTRMCUFWS notification will be sent to the UE. • If download fails, <size> is set to 0 and <count> is set to 0.

15.7.19. $LGTRMCUFWUP Command: Read MCU Firmware Data

HL7528	
Read command Syntax **AT$ LGTRMCUFWUP =<index>**	Response **$LGTRMCUFWUP:<index>,<length>,<data>** **OK** Parameters **<index>** Firmware data index **<length>** Length of the current data (max value = 512) **<data>** Packet data (data converted to HEX, e.g. 012 is convert to 303132)
Reference LGU+ Proprietary	Notes Max length is limited to 512; real data size is 256.

15.7.20. $LGTRMODFWI Command: Modem Firmware Download

HL7528	
Write command Syntax **AT$ LGTRMODFWI= <ip_port>,<id>, <pwd>, <file_name>**	Response **$LGTRMODFWI:<result>** **OK**

HL7528	
	Parameters **<ip_port>** FTP Server ip:port (210.75.14.4:21) **<id>** FTP ID **<pwd>** FTP password **<file_name>** FTP file path + file name **<result>** 1 Success 0 Fail
Reference LGU+ Proprietary	Notes When download is finished, $LGTRMODFW notification will be sent to the UE.

15.7.21. $LGTRMODFW Notification: Modem Firmware Indication

HL7528	
Unsolicited Notification	Response **$LGTRMODFW:<result>** Parameter **<result>** 0 Start 1 Finished 2 Failed

15.7.22. $LGTRSEND Command: Send Data

HL7528	
Write command Syntax **AT$LGTRSEND=<ack>,<more>,<length>,<data>**	Response **$LGTRSEND:<result>** **OK** Parameters **<ack>** 0 Not need server response data 1 Need server response data **<more>** 0 Last packet 1 More packet will be following **<length>** Length of current packet (max value = 512) **<data>** Payload data to send, Converted to HEX

HL7528			
	<result>	0	Fail
		1	OK
		2	Server connect fail
		3	DNS fail
Reference LGU+ Proprietary	Notes All data is converted to HEX mode (e.g. “012” becomes “303132”).		

15.7.23. $LGTRRCV Notification: Received Data Indication

HL7528			
Unsolicited Notification	Response **$LGTRRCV:<more>,<length>,<data>** Parameters		
	<more>	0	Last packet
		1	More packet will be following
	<length>	Length of this packet	
	<data>	Received data, converted to HEX	

16. Appendix

16.1. Result Codes and Unsolicited Messages

Verbose Result Code	Numeric	Type	Description
+CCCM: <ccm>	like verbose	Unsolicited	
+CME ERROR: <err>	like verbose	Final	
+CMS ERROR: <err>	like verbose	Final or unsolicited	
+CMTI	like verbose	Unsolicited	
+CBM	like verbose	Unsolicited	
+CDS	like verbose	Unsolicited	
+COLP: <number>,<type>[,<subaddr> , <satype>[,<alpha>]]	like verbose	Intermediate	
+CR: <type>	like verbose	Intermediate	
+CREG: <stat>[,<lac>,<ci>]	like verbose	Unsolicited	
+CRING: <type>	like verbose	Unsolicited	
+CSSI: <code1>[,<index>]	like verbose	Intermediate	
+CSSU: <code2>[,<index>[,<number>,<type> [,<subaddr>,<satype>]]]	like verbose	Unsolicited	
+CUSD: <m>[,<str>,<dcs>]	like verbose	Unsolicited	
BUSY	6	Final	
CONNECT	1	Intermediate	connection has been established
CONNECT <text>	manufacturer specific	Intermediate	like CONNECT but manufacturer specific <text> gives additional information (e.g. connection data rate)
ERROR	4	Final	command not accepted
NO ANSWER	7	Final	connection completion timeout
NO CARRIER	3	Final	connection terminated
NO DIALTONE	5	Final	no dial tone detected
OK	0	Final	acknowledges execution of a command line
RING	2	Unsolicited	incoming call signal from network

16.2. Error Codes

16.2.1. +CME Error Codes

<err> Code	Meaning
0	Phone failure
1	No connection to phone
2	Phone-adapter link reserved
3	Operation not allowed
4	Operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
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

<err> Code	Meaning
50	Incorrect parameters
99	Resource limitation
100	Synchronization error
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
650	General AVMS error
651	Communication error
652	Session in progress
654	RDMS services are in “deactivated” state
655	RDMS services are in “prohibited” stae (see +WDSG command)
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 32)
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

<err> Code	Meaning
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	Length of a parameter is invalid
932	Format of a parameter is invalid

16.2.2. +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 ENQUIIRY
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

<cause>	<description>
49	Quality of service unavailable
50	Requested facility not subscribed
55	Incoming calls barred with in the CUG
57	Bearer capability not authorized
58	Bearer capability not presently available
63	Service or option not available, unspecified
65	Bearer service not implemented
68	ACM equal to or greater than AC Mmax
69	Requested facility not implemented
70	Only restricted digital information bearer capability is available
79	Service or option not implemented, unspecified
81	Invalid transaction identifier value
87	User not member of CUG
88	Incompatible destination
91	Invalid transit network selection
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message type not compatible with protocol state
99	Information element non-existent or not implemented
100	Conditional IE error
101	Message not compatible with protocol state
102	Recovery on timer expiry
103	Illegal MS
106	Illegal ME
107	GPRS service not allowed
111	Protocol error, unspecified
112	Location area not allowed
113	Roaming not allowed in this location area
124	MBMS bearer capabilities insufficient for the service
125	LLC or SNDCP 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

<cause>	<description>
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 authentification error
212	APN restriction
256	Internal unspecified
257	Out of memory
258	Invalid parameters
259	Data call active
260	Speech call active
262	Missing ACM information
263	Temporary forbidden
264	Called party is blacklisted
265	Blacklist is full
266	No service
267	Limited service
268	Client conflict
269	Dual Service call active
271	Unknown SIM error
274	Active client is gone
277	SIM status failure
278	Rejected by call control
279	FDN failed
280	BDN failed
283	CCBS possible
284	Invalid alternate service line
285	LND overview
287	MM network failure unspecified
288	MM no service
289	MM access class barred
290	MM RR no resource
291	MM ME busy
292	MM unspecified
301	MMI not registered
303	Rejected by user
304	Rejected due to time out

<cause>	<description>
306	Disconnected due to SIM TK call setup
307	Pending SIM TK call setup
310	SIM reset
340	MM sapi3 release
341	MM lower layer failure
342	MM authentification 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

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

16.2.3. +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

<err> Code	Meaning
95	Invalid message, unspecified
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message not compatible with short message protocol state
99	Information element non-existent or not implemented
111	Protocol error, unspecified
127	Interworking, unspecified
128	Telematic interworking not supported
129	Short message Type 0 not supported
130	Cannot replace short message
143	Unspecified TP-PID error
144	Data coding scheme (alphabet) not supported
145	Message class not supported
159	Unspecified TP-DCS error
160	Command cannot be executed
161	Command unsupported
175	Unspecified TP-Command error
176	TPDU not supported
192	SC busy
193	No SC subscription
194	SC system failure
195	Invalid SME address
196	Destination SME barred
197	SM Rejected-Duplicate SM
198	TP-VPF not supported
199	TP-VP not supported
208	D0 SIM SMS storage full
209	No SMS storage capability in SIM
210	Error in MS
211	Memory Capacity Exceeded
212	SIM Application Toolkit Busy
213	SIM data download error
255	Unspecified error cause
300	ME failure
301	SMS service of ME reserved
302	Operation not allowed
303	Operation not supported
304	Invalid PDU mode parameter
305	Invalid text mode parameter
310	SIM not inserted
311	SIM PIN required
312	PH-SIM PIN required
313	SIM failure

<err> Code	Meaning
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
513	SMS timer expired

16.2.4. +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.

16.2.5. FTP Reply Codes

FTP Reply Code	Meaning
110	Restart marker reply
120	Service ready in nnn minutes
125	Data connection already open: transfer starting
150	File status okay; about to open data connection
200	Command okay
202	Command not implemented, superfluous at this site
211	System status or system help reply
212	Directory status
213	File status
214	Help message
215	NAME system type
220	Service ready for new user
221	Service closing control connection. Logged out if appropriate. Unassigned (unallocated) number
225	Data connection open; no transfer in progress
226	Closing data connection. Requested file action successful (for example, file transfer or file abort)
227	Entering Passive Mode (h1, h2, h3, h4, p1, p2)
22	User logged in, proceed
250	Requested file action okay, completed
257	"PATHNAME" created
331	User name okay, need password
332	Need account for login
350	Requested file action pending further information
421	Service not available, closing control connection. This may be a reply to any command if the service knows it must shut down
425	Can't open data connection
426	Connection closed; transfer aborted
450	Requested file action not taken. File unavailable (e.g., file busy)
451	Requested action aborted: local error in processing
452	Requested action not taken. Insufficient storage space in system
500	Syntax error, command unrecognized. This may include errors such as command line too long
501	Syntax error in parameters or arguments
502	Command not implemented
503	Bad sequence of commands
504	Command not implemented for that parameter
530	Not logged in
532	Need account for storing files
550	Requested action not taken. File unavailable (e.g., file not found, no access)
551	Requested action aborted: page type unknown
552	Requested file action aborted. Exceeded storage allocation (for current directory or dataset)
553	Requested action not taken. File name not allowed

16.2.6. AVMS Error Codes

<err> Code	Meaning
3	Parameter is out of range; Device Services is not in a good state
24	Parameters <APN>, <User> or <Pwd> are too long
650	General error
651	Communication error
652	Session in progress
654	AVMS services are in DEACTIVATED state (see +WDSG)
655	AVMS services are in PROHIBITED state (see +WDSG)
656	AVMS services are in TO BE PROVISIONED state (see +WDSG)

16.3. Commands without Pin Code Requirement

Most AT Commands are rejected (i.e. an error is returned to the DTE) if the valid PIN code has not been entered.

The **main** commands which can be sent without the PIN code include:

- ATD (emergency calls)
- AT+CPIN
- ATI
- AT+CGMI, AT+GMI
- AT+CGMM, AT+GMM
- AT+CGMR, AT+GMR
- AT+CGSN, AT+GSN
- AT+CPAS
- AT+CMEE
- AT+IPR
- ATE, ATV, ATS, ATZ
- AT&F, AT&D, AT&C
- AT+CBST
- AT+CLVL

This list may be modified in case of special needs from the customer (contact Sierra Wireless directly to treat this kind of request)

Note: Some commands require the PIN2 code.

16.4. GSM 27.010 Multiplexing Protocol

Main Options	BASIC	YES
	ADVANCED	YES
	advanced WITH ERROR RECOVERY	NO
Frames	SABM	YES
	UA	YES
	DM	YES
	DISC	YES
	I (ERM)	NO
	RR (ERM)	NO
	RNR (ERM)	NO
	REJ (ERM)	NO
	UI	YES
	UIH	YES
Multiplexer Controls	DLC parameters negotiation (PN) (optional)	YES
	Power Saving control (PSC)	YES
	Multiplexer Close Down (CLD)	YES
	Test Command (Test)	YES
	Flow control On Command (Fcon)	YES
	Flow control Off Command (Fcoff)	YES
	Modem Status Command (MSC)	YES
	Non-Supported Command response (NSC)	YES
	Remote Port Negotiation (RPN) (optional)	NO
	Remote Line Status command (RLS) (optional)	YES
	Service Negotiation Command (SNC)	NO
Convergence Layers	Type 1 - Unstructured Octet Stream	YES
	Type 2 - Unstructured Octet Stream with flow control, break signal handling and transmission of v24 signal states	YES
	Type 3 – Uninterruptible Framed Data	NO
	Type 4 - Interruptible Framed Data	NO
Others	Wake up procedure (see [RE2] sub clause 5.4.7)	YES
	Priority management	YES
	DLCI number limitation	8

16.5. TCP Commands Usage Examples

16.5.1. Client Mode

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0","0.0.0.0","0.0.0.0" OK	Set GPRS parameters (APN, login, password, etc.)
AT+KTCPCFG=1,0,"www.google.com",80 +KTCPCFG: 1 OK	Set IP address and port number Returns the session_id : 1
AT+KTCPCNX=1 OK	Initiate the connection
AT+KTCPSND=1,18 CONNECT …Data send… OK	Send data with the EOF string at the end. e.g. “GET / HTTP/1.0 --EOF--Pattern--"
+KTCP_DATA: 1,1380	
AT+KTCPRCV=1, 1380 CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 … a lot of data… --EOF--Pattern-- OK	DATA read
+KTCP_DATA: 1,1380	+KTCP_DATA notification
AT+KTCPRCV=1,1380 CONNECT er{padding-bottom:7px !important}#gbar,#guser{font- … a lot of data… --EOF--Pattern-- OK	Read received data
+KTCP_DATA: 1,1380	
AT+KTCPCLOSE=1,1 OK	Close session 1
AT+KTCPDEL=1 OK	Delete session 1
AT+KTCPCFG? OK	No session is available

16.5.2. Server Mode

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

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0","0.0.0.0","0.0.0.0" OK	Set GPRS parameters (APN, login, password, etc.)
AT+KTCPCFG=1,1,,13 +KTCPCFG: 1 OK	Set TCP listener and port number Returns the session_id : 1
AT+KTCPCNX=1 OK	Initiate the server
AT+KCGPADDR +KCGPADDR: 0,"10.35.125.89" OK	Get the IP address to initiate a connection request with a client
+KTCP_SRVREQ: 1,2	A client requests a connection (session ID 2)
AT+KTCPSND=2,15 CONNECT …Date and time… OK	DATA sent to the client read
+KTCP_SRVREQ: 1,3 +KTCP_NOTIF: 2, 4	Another client requests a connection (session ID 3) CHILD mode for session 3 Client (session 2) closes the connection.
AT+KTCPSND=3,15 CONNECT …Date and time… OK	DATA sent to the client
AT+KTCPCLOSE=3,1 OK	Close client session 3 and then session 3 is deleted automatically (CHILD mode for session 3)
AT+KTCPCLOSE=1,1 OK	Close server: session 1
AT+KTCPDEL=1 OK	Delete session 1

16.5.3. Polling for the Status of a Socket

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0", "0.0.0.0", "0.0.0.0" OK	Set GPRS parameters (APN, login, password, etc.)
AT+KTCPCFG=1,0,"www.google.com",80 +KTCPCFG: 1 OK	Set TCP Server address and port number Returns the session_id: 1
AT+KURCCFG="TCP",0 OK	Disable TCP unsolicited messages
AT+KTCPCNX=1 OK	Initiate the connection, use session 1
AT+KTCPSTAT=1 +KTCPSTAT: 3,-1,0,0 OK	Poll the connection status: Connection is UP
AT+KTCPSND=1,3000 CONNECT <…Data send…> OK	Send data on socket 1 for 3000 bytes or less. Data can be sent after CONNECT To finish, send the EOF string. The EOF string should be defined with the +KPATTERN command.
AT+KTCPSTAT=1 +KTCPSTAT: 3,-1,1234,0 OK	Poll the connection status: Connection is UP, there are 1234 bytes not yet sent
AT+KTCPSTAT=1 +KTCPSTAT: 3,-1,100,0 OK	Poll the connection status: Connection is UP, there are 100 bytes not yet sent
AT+KTCPSTAT=1 +KTCPSTAT: 3,-1,0,0 OK	Poll the connection status: Connection is UP, all bytes have been sent
AT+KTCPSTAT=1 +KTCPSTAT: 3,-1,0,320 OK	Poll the connection status: Connection is UP, 320 bytes are available for reading
AT+KTCPRCV=1,320 CONNECT **<… a lot of data…>** --EOF--Pattern-- OK	Read 320 bytes on socket 1 Data are sent after CONNECT
AT+KTCPCLOSE=1,1 OK	Close session 1
AT+KTCPDEL=1 OK	Delete session 1

16.5.4. End to End TCP Connection

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0", "0.0.0.0", "0.0.0.0" OK	Set GPRS parameters (APN, login, password, etc.)
AT+KTCPCFG=1,0,"www.google.com",80 +KTCPCFG: 1 OK	Set TCP Server address and port number Returns the session_id: 1
AT+KTCPSTART=1 CONNECT …Data sent……Data received……Data sent… …Data sent……Data received……Data sent… +++ OK	Initiate the connection, use session 1 Message CONNECT: connection to server is established, data can be sent Use +++ to enter in command mode
ATO1 CONNECT …Data sent……Data received……Data sent… …Data sent……Data received……Data sent… OK	Use ATO<session_id> to switch back in data mode Toggle DTR (if AT&D1 or AT&D2 configuration) to enter in command mode
AT+KTCPCLOSE=1,1 OK	Use KTCPCLOSE to close the session
AT+KTCPDEL=1 OK	Delete the configured session

16.5.5. Error Case for End to End TCP Connection

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

16.5.6. Use Cases for AT+KTCPACKINFO and <URC-ENDTCP-enable> Option

This section describes the behavior of AT+KTCPACKINFO when the <URC-ENDTCP-enable> option is used with AT+KTCPCFG.

16.5.6.1. <URC-ENDTCP-enable> is Disabled (default setting)

AT+KCNXCFG=1,"GPRS","CMNET" OK	
AT+KTCPCFG=1,0,"202.170.131.76",2000 +KTCPCFG: 1 OK	
AT+KTCPCFG? +KTCPCFG: 1,0,0,0,,"202.170.131.76",2000,,0,0 OK	<URC-ENDTCP-enable> is disabled
AT+KTCPCNX=1 OK	connect to TCP server
AT+KTCPSND=1,10 CONNECT 0123456789--EOF--Pattern-- OK	Use command to send 10 bytes write to serial
AT+KTCPACKINFO=1 +CME ERROR: operation not allowed	The URC “+KTCP_ACK” is not displayed This returns error as <URC-ENDTCP-enable> is disabled

16.5.6.2. <URC-ENDTCP-enable> is Enabled

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

AT+KTCPCNX=1 OK	connect to TCP server
AT+KTCPSND=1,10 CONNECT 0123456789--EOF--Pattern-- OK	Use command to receive those 10 bytes connect to TCP server write to serial
+KTCP_ACK: 1, 1	After a short while, URC “+KTCP_ACK” tells us the latest TCP data arrived at the remote side
AT+KTCPACKINFO=1 +KTCPACKINFO: 1, 1 OK	Poll the status of the latest TCP data
AT+KTCPSND=1,1000 CONNECT <1000bytes and --EOF--Pattern--> OK	Use command to send 1000 bytes write to serial
	URC “+KTCP_ACK” is not displayed yet
AT+KTCPACKINFO=1 +KTCPACKINFO: 1, 2 OK	Poll the status of the latest TCP data The status is unknown
+KTCP_ACK: 1, 0	Since the “OK” of the latest “+KTCPSND”, 64 seconds elapsed. URC “+KTCP_ACK” indicates that data did not arrive at the remote side. Network may be too bad.
AT+KTCPACKINFO=1 +KTCPACKINFO: 1, 0 OK	Poll the status of the latest TCP data. The status of the latest TCP data is “failure”: not all data are received by the remote side

16.6. UDP Commands Usage Examples

16.6.1. Client Mode

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password",,, OK	Set GPRS parameters (APN, login, password…)
AT+KUDPCFG=1,0 +KUDPCFG: 1 OK	Create a new UDP socket (returned session 1) with the parameters associated to the connection profile id number 0
AT+KUDPSND= 1,"82.234.17.52",32,18 CONNECT <…Data sent…> --EOF--Pattern-- OK	Send UDP data after “CONNECT”
+KUDP_DATA: 1,35	Received notification that indicates the presence of 35 bytes in the socket
AT+KUDPRCV=1, 35 CONNECT This is a simple UDP Protocol test. -EOF--Pattern-- OK	Try to read 35 bytes from session 1
+KUDP_RCV: "82.234.17.52",32	
+KUDP_DATA: 1,35	Received notification that indicates the presence of 35 bytes in the socket
AT+KUDPRCV=1, 18 CONNECT This is an example -EOF--Pattern-- OK	Same test but try to read 16 bytes from session 1:
+KUDP_DATA_MISSED: 1,17	There are 17 unread bytes left and missed in the UDP socket
AT+KUDPCLOSE=1 OK	Close the UDP session
AT+KUDPCFG? **OK**	No sessions are available now

16.6.2. Server Mode

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0", "0.0.0.0", "0.0.0.0" OK	Set GPRS parameters (APN, login, password, etc.)
AT+KUDPCFG=1,1,3000 +KUDPCFG: 1 OK	Set UDP listener (Port 3000) Initiate the server. Session ID is 1
AT+KUDPCFG? +KUDPCFG: 1,0,1,3000 OK	Check the server be initiated
AT+KCGPADDR +KCGPADDR: 0, "192.168.0.71" OK	Get local IP address
+KUDP_DATA: 1,9	Data come in from some client
AT+KUDPRCV=1,9 CONNECT DATA TEST--EOF--Pattern-- OK	Read received data
+KUDP_RCV: "10.10.10.5",1111	The data was sent from "10.10.10.5"(Port:1111)
AT+KUDPSND=1,"10.10.10.5",3100,18 CONNECT <18 bytes data ended with "-EOF--Pattern--"> OK	Send 18 bytes to a remote server(Port:3100)
AT+KUDPCLOSE=1 OK	Close the UDP server and at the same time session is deleted
AT+KUDPCFG? OK	No sessions are available now

16.6.3. Use Cases for KTCP_DATA and KUDP_DATA

16.6.3.1. KTCP_DATA and KUDP_DATA without Data Auto Retrieval – Client Mode

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

16.6.3.2. KTCP_DATA and KUDP_DATA without Data Auto Retrieval – Server Mode

AT+KTCPCFG=1,1,,13 +KTCPCFG: 1 OK	Configure a TCP server socket
AT+KTCPCNX=1 OK	Open the listen port
AT+KCGPADDR +KCGPADDR: 0,”10.35.125.89” OK	
+KTCP_SRVREQ: 1,2	Session 2 is connected
+KTCP_SRVREQ: 1,3	Session 3 is connected
+KTCP_DATA: 2,10	URC tells us that 10 bytes arrived at session 2
+KTCP_DATA: 3,8	URC tells us that 8 bytes arrived at session 3
AT+KTCPRCV=2,10 CONNECT 0123456789--EOF--Pattern-- OK	Use command to receive those 10 bytes in session 2
AT+KTCPRCV=3,8 CONNECT 01234567--EOF--Pattern-- OK	Use command to receive the 8 bytes in session 3
AT+KUDPCFG=1,1,3000 +KUDPCFG: 4 OK	Open a UDP socket, server mode
+KUDP_DATA: 4,8	URC tells us that 8 bytes arrived
AT+KUDPRCV=4,8 CONNECT 01234567--EOF--Pattern-- OK +KUDP_RCV: "202.170.131.76",2001	Use command to receive those 8 bytes

16.6.3.3. KTCP_DATA and KUDP_DATA with Data Auto Retrieval – Client Mode

AT+KCNXCFG=1,"GPRS","CMNET"	
OK	
AT+KTCPCFG=0,0,"202.170.131.76",2000,,1	When **<data_mode> =** 1, data will be received by the URC "+KTCP_DATA
+KTCPCFG: 1	
OK	
AT+KTCPCNX=1	Connect to TCP server
OK	
+KTCP_DATA: 1,10,0123456789	10 bytes arrived. The data are presented in URC directly
AT+KUDPCFG=0,0,3000,1	When <data_mode> = 1, data will be received by the URC "+KUDP_DATA:
+KUDPCFG: 2	
OK	
+KUDP_DATA: 2,8,"202.170.131.76",2001,01234567	8 bytes arrived. The data are presented in URC directly

16.6.3.4. KTCP_DATA and KUDP_DATA with Data Auto Retrieval – Server Mode

AT+KTCPCFG=1,1,,13,1	When <data_mode> = 1, all child connection will display data in URC mode. Data will be received by the URC "+KTCP_DATA:"
+KTCPCFG: 1	
OK	
AT+KTCPCNX=1	Open the listen port
OK	
AT+KCGPADDR	
+KCGPADDR: 1,"10.35.125.89"	
OK	
+KTCP_SRVREQ: 1,2	
+KTCP_SRVREQ: 1,3	
+KTCP_DATA: 2,10,0123456789	10 bytes and 8 bytes data arrived at session 2 and session 3 respectively. The data are presented in URC directly
+KTCP_DATA: 3,8,01234567	
AT+KUDPCFG=1,1,3000,1	Open a UDP socket, server mode
+KUDPCFG: 4	Data will be received by the URC "+KUDP_DATA:"
OK	
+KUDP_DATA: 4,8,"202.170.131.76",2001,01234567	8 bytes arrived. The data are presented in URC directly

16.7. FTP Commands Usage Examples

16.7.1. Client Mode

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password",,, OK	Set GPRS parameters (APN, login, password, etc.)
AT+KFTPCFG=1,"ftp.test.fr","userlogin","userpassword",21,0 OK	Set FTP server address, login, password and port number
AT+KPATTERN="--EOF--Pattern--" OK	Customize the End Of File pattern
AT+KFTPSND=0,,"Dir","TestFile.txt",0 CONNECT …send Data … **...send<--EOF—Pattern>...** OK	Send data, store them in “TestFile.txt” file. The data should be ended with the EOF string.
AT+KFTPRCV=0,,"Dir","Testfile.txt",0 CONNECT F6E6E656374696F6E20746573742E--EOF--Pattern-- OK	Read the file named "TestFile.txt" from ftp server, data are presented with the EOF string.
AT+KFTPDEL=0,"Dir","TestFile.txt" OK	Delete the file called "TestFile.txt" in ftp server
AT+KFTPCLOSE=0 OK	Close the connection

16.7.2. "FTP Resume" Use Case

16.7.2.1. Resume Feature when Transmitting Data to Serial Link

AT+KCNXCFG=1,"GPRS","CMNET" OK **AT+KFTPCFG=1,"202.170.131.76","administrator","8ik,(OL>",21,0** +KFTPCFG: 1 OK	

AT+KFTPRCV=1,,,"111111.txt",0 **CONNECT** 750aaaaaaaaa….. aaaaa250bbbbbbb--EOF--Pattern-- +KFTP_ERROR: 1, 421 **AT+KFTPRCV=1,,,"111111.txt",0,760** bbb**bbb……bbbbbbbbend--EOF--Pattern--** **OK**	Count the total data from serial link, it is 760 The result code indicates that the download met some problems, it may be due to control or data connection lost Try to resume transfer by using the offset 760 Count the total data from serial link, it is 240 Combining the data received from the 2 separate downloads, the complete file “111111.txt” can be obtained.

16.7.2.2. Use Case when FTP Server does not Support the Resume Feature

AT+KCNXCFG=1,"GPRS","CMNET" OK **AT+KFTPCFG=1,"202.170.131.76","administrator","8ik,(OL>",21,0** +KFTPCFG: 1 OK **AT+KFTPRCV=1,,,"111111.txt",0** CONNECT 750aaaaaaaaa….. aaaaa250bbbbbbb--EOF--Pattern-- +KFTP_ERROR: 1, 421 **AT+KFTPRCV=1,,,"111111.txt",0,760** CONNECT --EOF--Pattern-- +KFTP_ERROR: 1, 502	Count the total data from serial link, it is 760 The result code indicates that the download met some problems, it may be due to control or data connection lost ERROR 502 means that resume command is not supported by the server

16.8. HTTP Commands Usage Examples

AT&K3 OK	Hardware flow control activation
AT+KCNXCFG=1,"GPRS","APN","log","password","0.0.0.0", "0.0.0.0", "0.0.0.0" OK	Set GPRS parameters (APN, login, password, etc.)
AT+KCNXTIMER=1,60,2,70 OK	Set Timers
AT+KHTTPCFG=1,"www.google.com",80,1 +KHTTPCFG: 1 OK	Set HTTP address, port number and http version
AT+KHTTPHEADER=1 CONNECT Accept: text/html If-Modified-Since: Saturday, 15-January-2000 14:37:11 GMT OK	Set the header of the request Send HTTP data after “CONNECT”. The data should be ended with the EOF string.
AT+KHTTPGET=1, "/index.html" CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 Date: Tue, 24 Jun 2008 02:11:35 GMT Expires: -1 Content-Type: text/html; charset=ISO-8859-1 Set-Cookie: PREF=ID=ae1c663417e7799e:NW=1:TM=1214273495:LM=1214273495:S=5Uq9kExK4aTEv_cx; expires=Thu, 24-Jun-2010 02:11:35 GMT; path=/; domain=.google.com Server: gws Connection: Close <html><head><meta http-equiv="content-type" … a lot of data… --EOF--Pattern-- OK	Get the web page HTTP server response
AT+KHTTPHEAD=1, "/index.html" CONNECT HTTP/1.0 200 OK Cache-Control: private, max-age=0 Date: Tue, 24 Jun 2008 02:11:35 GMT Expires: -1 Content-Type: text/html; charset=ISO-8859-1 Set-Cookie: PREF=ID=ae1c663417e7799e:NW=1:TM=1214273495:LM=1214273495:S=5Uq9kExK4aTEv_cx; expires=Thu, 24-Jun-2010 02:11:35 GMT; path=/; domain=.google.com Server: gws	Get the headers of the web page HTTP server response

Connection: Close OK **AT+KHTTPHEADER=1** CONNECT Accept: text/html Context-Length: 64 OK **AT+KHTTPPOST=1,, "/get.cgi"** CONNECT <…Data send…> HTTP/1.0 200 OK Content-Type: text/plain Context-Length: 37 Your data have been accepted. --EOF--Pattern-- OK	Send the data to the HTTP server Length of HTTP 1.0 POST data should be specified by HTTP header field Context-Length, otherwise HTTP server may not expect any data to be uploaded and should close the connection. 64 bytes of data Send HTTP data after "CONNECT" HTTP server response

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

When module is in Data mode and the connection encounters error, NO CARRIER terminal response is shown and module is switched back to Command mode.

When a connection is running fine, the table shows the behavior when trying to switch mode:

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

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

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

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

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

Table 1. Switch Data/Command Mode Behaviour Table

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

	Case1/Case5 +++/ATO[n]	**Case2/Case5 DTR1/ATO[n]**	**Case3/Case5 DTR2/ATO[n]**	**Case4/Case5 DTR0**
FTP: +KFTPRCV: Download FTP files +KFTPSND: Upload FTP files	OK/NO CARRIER (disconnect)	OK/NO CARRIER (disconnect)	NO CARRIER/NO CARRIER (disconnect)	NO IMPACT
HTTP: +KHTTPGET: Get information +KHTTPHEAD: Get head of information +KHTTPPOST: Send data +KHTTPHEADER: Set the HTTP Request Header	OK/NO CARRIER (disconnect)	OK/NO CARRIER (disconnect)	NO CARRIER/NO CARRIER (disconnect)	NO IMPACT
HTTPS: +KHTTPSGET: Get information +KHTTPSHEAD: Get head of information +KHTTPSPOST: Send data +KHTTPSHEADER: Set the HTTPS Request Header	OK/NO CARRIER (disconnect)	OK/NO CARRIER (disconnect)	NO CARRIER/NO CARRIER (disconnect)	NO IMPACT
SSL: +KCERTSTORE: Store root CA +KPRIVKSTORE: Store private key	OK/NO CARRIER (abort)	OK/NO CARRIER (abort)	NO CARRIER/NO CARRIER (abort)	NO IMPACT