EM759X Series

AT Command Reference

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Rev. 7

SIERRA WIRELESS®

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Revision History

Revision number	Release date	Changes
1	May 2022	Created document
2	Jul 2022	• Added !LEDPATTERN, +ODIS, !USBVID • Marked as Implemented: !ANTSEL, !CUSTOM, !ERR, !GCFEN, !IMSIM, !IMSTESTMODE, !NVBACKUP, !NVPLMN, !SARSTATE, !SARSTATEDFLT, !USBCOMP (<Config Type>=4) • Updated !CUSTOM (added “MBIMTYPE”; removed “IPV6ENABLE”), !IMAGE (execution format), !PCOFFEN (removed <state>=1) • Removed !HOSTDEVINFO, !OSINFO, !SARBACKOFF • Added usage details for some standard commands in Table 13-1, Table 13-2, Table 13-3
3	Aug 2022	• Added !CARRIERPROFILESRESET • Updated !CUSTOM (added “MGRFDISABLE”)
4	Oct 2022	• Marked as implemented: !CUSTOM customizations (NETWORKNAMEFMT, PCSCDISABLE, SINGLEAPNSWITCH, WAKEHOSTEN), !DATALOOPBACK • Added !SCUMMTU, !SWIFOTA • Updated !IMAGE, !GPSELNA; !GPSNMEASENTENCE, !RXDEN (removed TD-SCDMA), !SMSWAKE, Q (<value> details) • Updated Table 7-3 (error code descriptions)
5	Aug 2023	• Renamed document from EM7590 to EM759X Series AT Command Reference, to include EM7595 • Added +CGAUTH, !GPSCONF, !GPSXTRAAPN, !GPSXTRADATAENABLE, !GPSXTRA-DATAURL, !GPSXTRAINITDNLD, !GPSXTRASTATUS, !GPSXTRATIMEENABLE, !GPSXTRATIMEURL, !SARBACKOFF, !SELRAT • Updated !ANTSEL (execution and query responses); !GPSPOSMODE (corrected Password required), !HWID (Password not required for FW rel. 2.x and later), !LTECA (clarified response format, renamed response parameters, updated examples to include 3CA)
6	Oct 2023	• Updated !CUSTOM (updated MBIMTYPE default), !PCOFFEN (<state> values), !SARBACKOFF (corrected <Technology> value), !USBCOMP (removed GNSS|NMEA mutual exclusion note)

Revision number	Release date	Changes
7	Jan 2023	• Added +CCID, !GNSSNMEASENTENCE, !ICCID • Updated !GPSNMEACONFIG (<enable> options), !MAXPWR (LTE band support), !USBCOMP (<Config Type>/<Config Type Desc> options)

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1: About This Guide

Introduction

This document describes supported standard and proprietary AT commands available for Sierra Wireless EM759X Series (EM7590, EM7595) modules, and provides details where commands vary from the standards. These commands are intended for use by OEMs, and are supplemental to the standard AT commands for GSM devices defined by the 3GPP (3rd Generation Partnership Project) in *TS 27.007 AT command set for User Equipment (UE)* and *TS 27.005 Use of Data Terminal Equipment—Data Circuit terminating Equipment (DTE-DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (BSE)*.

Sierra Wireless also provides a forum for users of EM series modules, at forum.sierrawireless.com/c/modules/mc-em-series.

Command access

Most commands in this reference are password-protected. To use these commands, you must enter the correct password using AT!ENTERCND on page 17. Once the password is entered, all commands are available and remain available until the modem is reset or powered off and on.

The password assigned to **AT!ENTERCND** is unique to each carrier and is configured onto the modem during manufacture. If you do not know your password, contact your Sierra Wireless Account Manager.

Command timing

Interval timing

Some commands require time to process before additional commands are entered. For example, the modem returns OK when it receives **AT!DAFTMACT**. If **AT!DARCONFIG** is received too soon after this, the modem returns an error.

When building automated test scripts, ensure that sufficient delays are embedded, where necessary, to avoid these errors.

Escape sequence guard time

The AT escape sequence "**+++**" requires a guard time of 1.0 seconds before and after it is used.

Result codes

Result codes are not shown in the command tables unless special conditions apply. Generally the result code OK is returned when the command has been executed. ERROR may be returned if parameters are out of range, and is returned if the command is not recognized or is not permitted in the current state or condition of the modem.

References

This guide covers the command sets used by OEMs, designers and testers of Sierra Wireless products, plus general operational use commands.

You may also want to consult the other documents available on our website at www.sierrawireless.com.

Terminology and acronyms

This document makes wide use of acronyms that are in common use in data communications and cellular technology.

Current firmware versions

Version

To determine your firmware revision, enter the identification command **AT+GMR**.

Upgrading

If your modem firmware is an earlier version, you can acquire updated firmware by contacting your account manager.

Document structure

This document describes the proprietary commands listed in the tables below—each table corresponds to a specific chapter.

Note: AT commands that are not yet implemented, but will be supported before or by module commercial launch, are identified as "To be implemented".

AT Password Commands—Commands used to enable access to password-protected AT commands and to set the AT command password.

Table 1-1: AT password commands

Command	Description	Page
!ENTERCND	Enable access to password-protected commands	17
!SETCND	Set AT command password	18

Modem Status, Customization, and Reset Commands—Commands used to determine modem status, adjust customization settings, and reset the modem.

Table 1-2: Modem status commands

Command	Description	Page
!ANTSEL	Set/query external antenna select configuration	21
!BAND	Select/return frequency band set	23
!BOOTHOLD	Reset modem and wait in bootloader for firmware download	24
!CARRIERPROFILESRESET	Restore Carrier Default Profiles	25
!CUSTOM	Set/return customization settings	26
!DATALOOPBACK	Enable/disable and configure loopback mode	29
!GCFEN	Enable/disable GCF test mode	30
!GSTATUS	Return operational status	31
!HWID	Display hardware version	31
!IMAGE	List/delete stored firmware images	32
!IMPREF	Query/set Image Management preferences	34
!LEDPATTERN	Configure LED blink patterns	36
!LTECA	Enable/disable LTE Carrier Aggregation or Display supported LTE CA combinations	37
!LTEINFO	Display LTE network information	39
!NVPLMN	Provision/display PLMN list for Network Personalization locking	41
!PATEMP	Return module PA's current temperature information	41
!PATEMPLIMITS	Set/report module PA temperature state limit values	42
!PCINFO	Return power control status information	43
!PCOFFEN	Set/return Power Off Enable state	43
!PCTEMP	Return module CPU's current temperature information	44
!PCTEMPLIMITS	Set/report module CPU temperature state limit values	45
!PCVOLT	Return current power supply voltage information	46
!PCVOLTLIMITS	Set/report power supply voltage state limit values	47

Table 1-2: Modem status commands (Continued)

Command	Description	Page
!PRIID	Report module PRI part number and revision	48
!RESET	Reset modem	48
!SCUMMTU	Set/query MTU size	49
!SELRAT	Set/query preferred RAT	50
!TMSTATUS	Report Thermal Mitigation Status	51
!USBCOMP	Set/report USB interface configuration	52
!USBINFO	Return information from active USB descriptor	53
!USBPID	Set/report product ID in USB descriptor	54
!USBSPEED	Set/report USB speed	55
!USBVID	Set/report USB vendor ID	55
&V	Return operating mode AT configuration parameters	56

Diagnostic Commands—Commands used to select frequency bands and diagnose problems.

Table 1-3: Diagnostic commands

Command	Description	Page
!BCFWUPDATESTATUS	Report status of most recent firmware update attempt	58
!ERR	Display diagnostic information	59
!GCCLR	Clear crash dump data	59
!GCDUMP	Display crash dump data	59
!LTERXCONTROL	Enable/disable LTE receive (Rx) diversity during Carrier Aggregation	60
!RXDEN	Enable/disable WCDMA/LTE receive (Rx) diversity	61

Test Commands—Commands required to place the modem in particular modes of operation, test host connectivity, and to configure the transmitters and receivers for test measurements.

Table 1-4: Test commands

Command	Description	Page
!DACGPSCTON	Return GPS CtoN and frequency measurement	64
!DACGPSMASKON	Set CGPS IQ log mask	64
!DACGPSSTANDALONE	Enter/exit StandAlone (SA) RF mode	65
!DACGPSTESTMODE	Start/stop CGPS diagnostic task	65
!DAFTMACT	Put modem into Factory Test Mode	66

Table 1-4: Test commands (Continued)

Command	Description	Page
!DAFTMDEACT	Put modem into online mode from Factory Test Mode	66
!DAGFTMRXAGC	Get FTM Rx AGC (Primary or Diversity)	67
!DALGRXAGC	Return Rx AGC value (LTE only)	68
!DALGTXAGC	Return Tx AGC value and transmitter parameters (LTE only)	69
!DALTXCONTROL	Configure LTE Tx parameters (LTE only)	71
!DAOFFLINE	Place modem offline	72
!DARCONFIG	Set Band and Channel	72
!DARCONFIGDROP	Drop Radio Configurations	73
!DAWTXCONTROL	Configure WCDMA Tx Power (WCDMA only)	73

Memory Management Commands—Commands that control the data stored in non-volatile memory of the modem.

Table 1-5: Memory management commands

Command	Description	Page
!NVBACKUP	Back up device configuration	75
!RMARESET	Back up device configuration	77

GNSS Commands—Supported on GNSS-enabled modems only.

Table 1-6: GNSS commands

Command	Description	Page
!GNSSCONFIG	Set/report GNSS satellite constellation support	80
!GNSSNMEASENTENCE	Set/report NMEA 4.11 sentence type	80
!GPSAUTOSTART	Configure GPS auto-start features	82
!GPSCLRASSIST	Clear specific GPS assistance data	83
!GPSCOLDSTART	Clear all GNSS assistance data	84
!GPSCONF	Set/report GPS SUPL settings	85
!GPSELNA	Enable/disable GNSS LNA	86
!GPSEND	End an active session	86
!GPSFIX	Initiate GPS position fix	87
!GPSLBSAPN	Set GPS LBS APNs	88
!GPSLOC	Return last known location of the modem	90
!GPSMOMETHOD	Set/report GPS MO method	91

Table 1-6: GNSS commands (Continued)

Command	Description	Page
!GPSNMEACONFIG	Enable and set NMEA data output rate	92
!GPSNMEASENTENCE	Set/report NMEA 3.0 sentence type	93
!GPSPORTID	Set/report port ID to use over TCP/IP	94
!GPSPOSMODE	Set/report GPS Position Modes Support	95
!GPSSATINFO	Request satellite information	96
!GPSSTATUS	Request current status of a position fix session	97
!GPSSUPLURL	Set/report SUPL server URL	98
!GPSSUPLVER	Set/report SUPL server version	98
!GPSTRACK	Initiate local tracking (multiple fix) session	99
!GPSXTRAAPN	Set GPS XTRA APN	100
!GPSXTRADATAENABLE	Set/report GPS XTRA data configuration settings	101
!GPSXTRADATAURL	Set/report GPS XTRA data server URLs	102
!GPSXTRAINITDNLD	Initiate gpsOneXTRA data download and inject operation	103
!GPSXTRASTATUS	Return current status of gps OneXTRA	104
!GPSXTRATIMEENABLE	Set/report GPS XTRA time configuration settings	105
!GPSXTRATIMEURL	Set/report GPS XTRA SNTP server URL	106
+WANT	Enable/disable GNSS antenna power	107

SIM Commands—Commands used to communicate with an installed (U)SIM.

Table 1-7: SIM commands

Command	Description	Page
+CCID	Read active SIM ID (ICCID or EID)	110
!ICCID	Read SIM ICCID	111
!IMSIM	Update AUTO-SIM matching list	111
!UIMS	Select active SIM interface	113

OMA-DM Commands—Commands used to configure DM (Device Management) accounts, sessions, and host–device–server interactions.

Table 1-8: OMA-DM commands

Command	Description	Page
!IMSTESTMODE	Enable/disable IMS test mode	115
+ODIS	Get/set LwM2M device information	116

SAR Backoff and Thermal Control Commands—Commands used to configure SAR options, and thermal mitigation algorithm parameters and limits.

Table 1-9: SAR Backoff and Thermal Control commands

Command	Description	Page
!MAXPWR	Set/report maximum Tx power	118
!SARBACKOFF	Report SAR limit for specific RAT/band/SAR backoff state combination	119
!SARINTGPIOMODE	Set/report default pull mode for SAR interrupt GPIOs	119
!SARSTATE	Set/report SAR backoff state	120
!SARSTATEDFLT	Set/report default SAR backoff state	120

FOTA Commands—FOTA-related commands.

Table 1-10: FOTA commands

Command	Description	Page
!SWIFOTA	Execute FOTA action	125

Conventions

The following format conventions are used in this reference:

Character codes or keystrokes that are described with words or standard abbreviations are shown within angle brackets using a different font, such as <CR> for Carriage Return and <space> for a blank space character.

Numeric values are decimal unless prefixed as noted below.

Hexadecimal values are shown with a prefix of 0x, i.e. in the form 0x3D.

Binary values are shown with a prefix of 0b, i.e. in the form 0b00111101.

Command and register syntax is noted using an alternate font: **!CHAN=<c>[,b]**. The leading "**AT**" characters are not shown but must be included before all commands except as noted in the reference tables.

Characters that are required are shown in uppercase; parameters are noted in lowercase. Required parameters are enclosed in angle brackets (**<n>**) while optional parameters are enclosed within square brackets (**[x]**). The brackets are not to be included in the command string.

Commands are presented in table format. Each chapter covers the commands related to that subject and presents a summary table to help you locate a needed command. Commands are in ASCII alphabetical order in the body of each chapter.

Any default settings are noted in the command tables. Note that these are the factory default settings and *not* the default parameter value assumed if no parameter is specified.

Result Code This is a numeric or text code that is returned after all commands (except resets)—text codes are returned if verbose responses are enabled. Only one result code is returned for a command line regardless of the number of individual commands contained on the line.

Response This term indicates a response from the modem that is issued prior to a result code. Reading registers or issuing commands that report information will provide a response followed by a result code unless the command generates an error.

Responses and result codes from the modem, or host system software prompts, are shown in this font:

```
CONNECT 14400
```

2: AT Password Commands

Introduction

Many AT commands described in this document are password-protected. This chapter describes how to enter or change the password used to gain access to the protected commands.

Command summary

Table 2-1 on page 16 lists the commands described in this chapter.

Table 2-1: AT password commands

Command	Description	Page
!ENTERCND	Enable access to password-protected commands	17
!SETCND	Set AT command password	18

Command reference

Table 2-2: AT command password details

Command	Description
!ENTERCND	**Enable access to password-protected commands** To gain access to password-protected AT commands (unlock the commands), enter the password correctly using this command. The initial password is configured onto the modem during manufacture. After unlocking the protected command, the password can be changed using !SETCND. If you do not know the password, contact your Sierra Wireless account manager. Once the password has been entered correctly, the password-protected AT commands are available until the modem is reset or powered off and on. **Warning:** *!ENTERCND does not accept blank passwords. If the password has been cleared (using !SETCND), you will not be able to use password-protected commands, and will have to contact Sierra Wireless for help to reset the password.* **Password required:** Yes—Query format only. **Usage:** • Execution: **AT!ENTERCND=<"key">** Response: OK Purpose: Unlock password-protected commands. • Query: **AT!ENTERCND?** Response: <key> *(if unlocked)* Purpose: This command is password-protected. After entering the password correctly using the execution operation ("="), you can use this command to display the password as a reminder. **Parameters:** <"key"> (Password stored in NV memory) • Password must be entered with quotation marks. (For example, AT!ENTERCND="ExamplePW".) • Password length: 4–10 characters (0–9, A–Z, upper or lower case) • Characters may be entered in ASCII format, or in Hex format. (For example: "myPass3" or "ABCDEF01234".)

Table 2-2: AT command password details (Continued)

Command	Description
!SETCND	**Set AT command password** Change the password used for the !ENTERCND command. **Password required:** Yes **Usage:** • Execution: **AT!SETCND=<"key">** Response: OK Purpose: Sets <"Key"> as the new password for accessing protected commands. **Parameters:** <"key"> (New password) • Password must be entered with quotation marks (for example, AT!SETCND="NewPW"). • Password length: 4–10 characters (0–9, A–Z, upper or lower case) • Characters may be entered in ASCII format, or in Hex format. (For example: "myPass3" or "ABCDEF01234".) **Warning:** *Do NOT enter a null password (that is, the <"Key"> cannot be "") — you will NOT be able to use password-protected commands, and will have to contact Sierra Wireless for help to reset the password.*

3: Modem Status, Customization, and Reset Commands

Introduction

This chapter describes commands used to reset the modem, adjust customization settings, retrieve the hardware version, and monitor the temperature, voltage, and modem status.

Command summary

Table 3-1 lists the commands described in this chapter.

Table 3-1: Modem status commands

Command	Description	Page
!ANTSEL	Set/query external antenna select configuration	21
!BAND	Select/return frequency band set	23
!BOOTHOLD	Reset modem and wait in bootloader for firmware download	24
!CARRIERPROFILESRESET	Restore Carrier Default Profiles	25
!CUSTOM	Set/return customization settings	26
!DATALOOPBACK	Enable/disable and configure loopback mode	29
!GCFEN	Enable/disable GCF test mode	30
!GSTATUS	Return operational status	31
!HWID	Display hardware version	31
!IMAGE	List/delete stored firmware images	32
!IMPREF	Query/set Image Management preferences	34
!LEDPATTERN	Configure LED blink patterns	36
!LTECA	Enable/disable LTE Carrier Aggregation or Display supported LTE CA combinations	37
!LTEINFO	Display LTE network information	39
!NVPLMN	Provision/display PLMN list for Network Personalization locking	41
!PATEMP	Return module PA's current temperature information	41
!PATEMPLIMITS	Set/report module PA temperature state limit values	42
!PCINFO	Return power control status information	43
!PCOFFEN	Set/return Power Off Enable state	43
!PCTEMP	Return module CPU's current temperature information	44
!PCTEMPLIMITS	Set/report module CPU temperature state limit values	45

Table 3-1: Modem status commands (Continued)

Command	Description	Page
!PCVOLT	Return current power supply voltage information	46
!PCVOLTLIMITS	Set/report power supply voltage state limit values	47
!PRIID	Report module PRI part number and revision	48
!RESET	Reset modem	48
!SCUMMTU	Set/query MTU size	49
!SELRAT	Set/query preferred RAT	50
!TMSTATUS	Report Thermal Mitigation Status	51
!USBCOMP	Set/report USB interface configuration	52
!USBINFO	Return information from active USB descriptor	53
!USBPID	Set/report product ID in USB descriptor	54
!USBSPEED	Set/report USB speed	55
!USBVID	Set/report USB vendor ID	55
&V	Return operating mode AT configuration parameters	56

Command reference

Table 3-2: Modem status, customization, and reset commands

Command	Description
!ANTSEL	**Set/query external antenna select configuration** Configure the modem to use available GPIOs to select which antenna to use for each specified frequency band. (Any of the available GPIOs that are not needed for a specific band should be configured as not required.) When the modem switches to a frequency band that has been configured using this command, the GPIOs are driven as specified and the host uses them to tune the external antenna appropriately. (This applies whether this is a primary band, or as the secondary component carrier as part of LTE CA (Carrier Aggregation)). If the modem switches to a band that has not been configured, the host uses the default antenna. *Note: Frequency bands are RAT-independent. For example, Band 5 corresponds to any 850-band technology (CDMA, WCDMA, LTE, GSM).* When designing the system, and configuring the device: • Perform system level testing to ensure that the antenna switching feature does not introduce any handover issues. The tunable antenna should be designed to ensure that it can retune in < 5 µs (recommended) and < 10 µs (maximum). • Make sure there are no conflicts between primary (PCell) and secondary (SCell) cells for all supported LTE CA combinations, since a conflict can detune the PCell during LTE CA, resulting in reduced performance. (A conflict occurs when the primary band is configured to drive a GPIO one way (high or low), and the secondary is configured to drive the same GPIO the other way (low or high). **Password required:** Yes **Reset required to apply changes:** Yes **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!ANTSEL=<band>, <gpio1>, <gpio2>, <gpio3>[, <gpio4>]** Response: BAND <band>: <gpio1>,<gpio2>,<gpio3>[,<gpio4> Saved OK *or* Conflicts: *(Note: Heading appears only if there are conflicts.)* <band *q*>+<band *r*>: <gpio1>, <gpio2>, <gpio3>[, <gpio4>] *(Note: GPIOs in conflict appear as 'C')* Not saved OK Purpose: Configure the GPIOs for the specified <band>. • Query: **AT!ANTSEL?** Response: BAND <band *a*>: <gpio1>, <gpio2>, <gpio3>[, <gpio4>] BAND <band *b*>: <gpio1>, <gpio2>, <gpio3>[, <gpio4>] OK Purpose: Display the current external antenna select configuration. • Query List: **AT!ANTSEL=?** Purpose: Display valid parameter values and command format. (Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!ANTSEL (continued)	**Set/query external antenna select configuration (continued)** **Parameters:** <band> (RF band) • low- or high-frequency 3GPP band number, as appropriate. (See Table 14-2 on page 158 for a full list of low-, mid-, and high-frequency bands.) • Valid range: 1–71. Band support is product specific—refer to *EM759X Product Technical Specification (Doc# 41114425)* for details. <gpio1>, <gpio2>, <gpio3>, <gpio4> (GPIO configurations.) • 0—Logic low • 1—Logic high • 2—Not used for antenna selection (Default value for <gpio4> if not specified.) • Note: <gpio4> availability is device-specific—refer to *EM759X Product Technical Specification (Doc# 41114425)* for details. • gpio1–4 correspond to ANT_CTRL0–3 respectively **Example(s):** • Configure GPIOs for specified band—no conflicts, configuration saved: **AT!ANTSEL=2,1,0,1,1** B2:1,0,1,1 Saved OK • Configure GPIOs for specified band—conflicts, configuration not saved: **AT!ANTSEL=5,1,1,2,2** Conflicts: B2 +B5 :1,C,1,1 B5 +B2 :1,C,1,1 Not saved OK

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!BAND *Note: The 'Basic' command and response versions are used if you haven't entered the required password. (See Command access on page 8.)*	**Select/return frequency band set** Configure the modem to operate on a set of frequency bands, look up available sets, create new sets, or return the current selection. **Password required:** Yes—Execution (Extended) format **Usage:** • Execution (Basic): **AT!BAND=<Index>** Response: OK Purpose: Select an existing set of bands. • Execution (Extended): **AT!BAND=<Index>, "<Name>", <GWmask>[, <Lmask>[, <Lmask2>[, <Tdsmask>[, <Lmask3>,<Lmask4>]]]]** Response: OK Purpose: Create a new set of bands. • Query: **AT!BAND?** Response: Index, Name, GW Band Mask L Band Mask 1 TDS Band Mask L Band Mask 2 L Band Mask 3 L Band Mask 4 <CR><LF> <Index>, <Name> <GWmask> <Lmask1> <Tdsmask> <Lmask2> <Lmask3> <Lmask4> OK *or* *(If the current band mask doesn't match a band set)* Unknown band mask. Use AT!BAND to set band. <Index> OK Purpose: Report the current band selection. (Note—<GWmask>, <Lmask>, and <Tdsmask> appear only in Extended responses.) • Query List: **AT!BAND=?** Purpose: Returns valid parameter values. **Parameters:** <Index> (Index of a band set. Use the Query List command to display all supported sets) • Valid range: 0–13 (Hexadecimal. There are 20 possible values.) <Name> (Name of the band set) • ASCII string—Up to 30 characters <GWmask> (GSM/WCDMA bands included in the set) • Format: 64-bit bitmask • Example values (Available bands are device-dependent. Use the extended query command to display the list of bands available for your device.): 0000000000000001—BC0-A 0000000000000002—BC0-B ... 0000000080000000—BC15 0002000000000000—W900 1000000000000000—B19 (850) (Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!BAND (continued)	**Select/return frequency band set (continued)** <Lmask1> (LTE bands included in the set) • Format: 64-bit bitmask • Example values (Available bands are device-dependent. Use the extended query command to display the list of bands available for your device.): • 0000000000000001—Band 1 0000000000000002—Band 2 ... 0000800000000000—Band 48 ... • Note—The full list of bands in the set is spread across <Lmask1>–<Lmask4>. <Lmask2> (LTE bands included in the set) • Format: 64-bit bitmask • Example values (Available bands are device-dependent. Use the extended query command to display the list of bands available for your device.): • 0000000000000002—Band 66 • 0000000000000040—Band 71 • Note—The full list of bands in the set is spread across <Lmask1>–<Lmask4>. <Lmask3> (Reserved for future use) • Format: 64-bit bitmask • Required value: 0000000000000000 • Note—The full list of bands in the set is spread across <Lmask1>–<Lmask4>. <Lmask4> (LTE bands included in the set) • Format: 64-bit bitmask • Example values (Available bands are device-dependent. Use the extended query command to display the list of bands available for your device.): • 0800000000000000—B252 • 4000000000000000—B255 • Note—The full list of bands in the set is spread across <Lmask1>–<Lmask4>. <Tdsmask> (TD-SCDMA bands included in the set) • Note—This parameter always displays “0000000000000000” since TD-SCDMA is not supported by EM759X modules. The parameter remains in the Execution and Response formats for command compatibility with other Sierra Wireless modules. • Format: 64-bit bitmask
!BOOTHOLD	**Reset modem and wait in bootloader for firmware download** Prepare for a firmware download by resetting the modem and waiting in ‘boot and hold’ mode. **Password required:** No **Usage:** • Execution: **AT!BOOTHOLD** Response: OK Purpose: Force the modem to reset and then wait in boot and hold mode for a firmware download.

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!CARRIERPROFILESRESET	**Restore Carrier Default Profiles** Restore all carrier profiles to their default PRI configurations, and delete any extra profiles that have been created. (This includes restoring any carrier profiles that were deleted by the user.) **Password required:** Yes **Usage:** • Execution: AT!CARRIERPROFILESRESET Response: OK Purpose: Restore all carrier profiles to default PRI configurations. **Parameters:** None **Example(s):** • Carrier PRI with two default profiles: **AT+CGDCONT?** AT+CGDCONT: 1,”IPV4V6”,”test1_apn”,”0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0”,0,0,0,0 AT+CGDCONT: 2,”IPV4V6”,”test2_apn”,”0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0”,0,0,0,0 User changes the APN of profile 2: **AT+CGDCONT=** 2,”IPV4V6”,”random_apn”,”0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0”,0,0,0,0 OK User adds profile 3: **AT+CGDCONT=** 3,”IPV4V6”,”sample_apn”,”0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0”,0,0,0,0 OK **AT+CGDCONT?** AT+CGDCONT: 1,”IPV4V6”,”test1_apn”,”0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0”,0,0,0,0 AT+CGDCONT: 2,”IPV4V6”,”random_apn”,”0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0”,0,0,0,0 AT+CGDCONT: 3,”IPV4V6”,”sample_apn”,”0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0”,0,0,0,0 User restores carrier default profiles (profiles 1 and 2 return to default PRI configurations, and profile 3 is deleted) **AT!CARRIERPROFILESRESET** OK **AT+CGDCONT?** AT+CGDCONT: 1,”IPV4V6”,”test1_apn”,”0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0”,0,0,0,0 AT+CGDCONT: 2,”IPV4V6”,”test2_apn”,”0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0”,0,0,0,0

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!CUSTOM *Note: Some customizations may not be available for certain chipsets, firmware revisions, or devices.*	**Set/return customization settings** Set or return several customization values. **Password required:** Yes **Usage:** • Execution: **AT!CUSTOM=<customization>, <value>** Response: OK Purpose: Assign <value> to a specific <customization> setting. • Query: **AT!CUSTOM?** Response: (list of enabled <customization>s) OK Purpose: Display customizations that are currently enabled. • Query list: **AT!CUSTOM=?** Purpose: Return a list of valid <customization> values. **Parameters:** <value> (Value being assigned to a specific <customization> setting) • Descriptions are included in each of the customizations described below. • Numeric value. Valid range depends on the <customization> type. <customization> (String identifying customization setting. The default value for all customizations is 0.) *Note: Use quotation marks around the customization string. For example, AT!CUSTOM="CSDOFF",0.* • "CFUNPERSISTEN"—Enable/disable persistence (across power cycles) of AT+CFUN setting. <value>: • 0—Disable (+CFUN setting does not persist across power cycle) • 1 — Enable (+CFUN setting persists across power cycle) • "FASTENUMEN"—Enable/disable fast enumeration for warm/cold boot. <value>: • 0 — Disable fast enumeration (Default) • 1 — Enable fast enumeration for cold boot and disable for warm boot • 2 — Enable fast enumeration for warm boot and disable for cold boot • 3 — Enable fast enumeration for warm and cold boot • "GPIOSARENABLE"—Indicate whether SAR backoff is controlled by GPIOs or by AT commands. <value>: • 0 — Controlled by AT commands (default) • 1 — Controlled by GPIOs (Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!CUSTOM (continued)	**Set—query customization settings (continued)** • "GPSENABLE"—Enable/disable the GPS feature. <value>: • 0 — GPS disabled • 1 — MO & MT enabled regardless of GPS_DISABLE setting • 2 — MO enabled regardless of GPS_DISABLE setting • 3 — MT enabled regardless of GPS_DISABLE setting • 4 — MO & MT enabled but are gated by GPS_DISABLE setting • 5 — MO enabled but is gated by GPS_DISABLE setting • 6 — MT enabled but is gated by GPS_DISABLE setting • <value> + 80 — Disable GLONASS (For example, 84 = MO & MT narrow-band GPS enabled, but gated by GPS_DISABLE setting.) • "GPSLPM"—Enable/disable GPS in Low Power Mode. <value>: • 0 — Enable—GPS engine remains enabled when modem enters LPM (Default) • 1 — Disable—GPS engine is disabled when modem enters LPM • "GPSREFLOC"—Enable/disable reference GPS location reporting. <value>: • 0 — Enable (Default) • 1 — Disable • "GPSSEL"—Select GPS antenna (useful only for devices with both a GPS and a shared GPS/Rx diversity antenna). <value>: • 0 — Use dedicated GPS antenna (Default) • 1 — Use shared GPS/Rx diversity antenna • "MBIMTYPE"—Configure SMS device type. <value>: • 0 — Remote • 1 — Embedded (Default). SMS messages will be visible in the Microsoft Messages app. • "MGRFDISABLE"—Enable/disable managed roaming feature <value>: • 0 — Enable (Default) • 1 — Disable • "NETWORKNAMEFMT"—Set MBIM provider name format for vanui (roaming). <value>: • 0 — Display one of: SPN, LongName, or ShortName, by order of priority (Default QCT behavior) • 1 — Display one of: LongName or ShortName • 2 — Display [SPN] - [LongName/ShortName] (Note: May be truncated.) • 3 — Display [LongName/ShortName] - [SPN] (Note: May be truncated.) (Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!CUSTOM (continued)	**Set/query customization settings (continued)** • "PCSCDISABLE"—Determine functionality of PCSC, GSM Algorithm and Authenticate commands, and +CIMI command. <value>: • 0–7 (Default value = 0—all functions enabled) • Bit 0: PCSC (0—Enable, 1—Disable) • Bit 1: GSM Algorithm and Authenticate commands (0—Enable, 1—Disable) • Bit 2: AT+CIMI outputs IMSI (0—Enable, 1—Disable) • "SIMHOTSWAPDIS"—Configure SIM hotswap feature <value>: • 0 — Enable UIM1 and UIM2 (default) • 1 — Disable UIM1, enable UIM2 • 2 — Enable UIM1, disable UIM2 • 3 — Disable UIM1 and UIM2 • "SIMLPA"—Enable/disable LPA (Local Profile Assistant) eSIM feature on the host <value>: • 0—Disable (Default) • 1—Enable • "SIMLPM"—Indicate default SIM power state during Low Power Mode. <value>: • 0 — QCT default behavior (same as <value>=2) (Default) Note—The default behavior could change in future revisions. Use <value>=2 if you need to guarantee the described behavior. • 1 — SIM remains powered in LPM • 2—Power down SIM with AT+CFUN=0; Power up SIM with AT+CFUN=1 • "SINGLEAPNSWITCH"—Indicate device behavior when changing APN name, username, or password. <value>: • 0 — Do nothing • 1 — Device detaches and re-attaches after changing APN information • 2 — Power-cycle the UE • "TXONINDICATION"—Enable/disable TX_ON indication. <value>: • 0 — Disable (Default) • 1 — Enable. A TX_ON indication will be received when pin 61 (TX_ON) changes state to indicate Tx activity state begins (signal goes high) or ends (signal goes low). (Note—Pin 61 can be used as ANT_CTRL1 or TX_ON.) • "UIM2ENABLE"—Enable/disable UIM2 slot support. <value>: • 0 — Disable • 1 — Enable (Default) (Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!CUSTOM (continued)	**Set/query customization settings (continued)** • "USBSERIALENABLE"—Use IMEI as serial number in USB descriptor (USBD). <value>: • 0 — Same as 1 (Default) • 1 — Use IMEI as USB serial number • 2 — Set serial number as NULL in the USBD • 3 — Use hard-coded default (0123456789ABCDEF) in the USBD • "WAKEHOSTEN"—Enable/disable host wake-up via SMS or incoming data packet. <value>: • 0 — Disable—Host will not wake when SMS or incoming data packet is received. (Default) • 1 — Wake host when simple SMS is received. • 2 — Wake host when incoming data packet is received. • 3 — Wake host when simple SMS or incoming data packet is received.
!DATALOOPBACK	**Enable/disable and configure loopback mode** Enable or disable loopback mode and the loopback multiplier, or display the current settings. **Password required:** Yes **Reset required to apply changes:** Yes **Persistent across power cycles:** Yes **Usage:** • Query: **AT!DATALOOPBACK?** Response: !DATALOOPBACK: Data Loopback Mode; <loopback_mode> Replication Count: <loopback_multiplier> OK Purpose: Display the loopback mode state, and loopback multiplier. • Execution: **AT!DATALOOPBACK=<loopback_mode>, <loopback_multiplier>** Response: OK Purpose: Enable/disable loopback mode, and set the loopback multiplier. • Query list: **AT!DATALOOPBACK=?** Purpose: Returns a list of valid parameter values. **Parameters:** <loopback_mode> (Loopback mode state) • 0—Disable data loopback mode • 1—Enable data loopback mode <loopback_multiplier> (Number of downlink bytes sent for each uplink byte (replication count)) • Decimal value • Maximum=6

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!GCFEN	**Enable/disable GCF test mode** Place the modem in GCF testing mode or normal operating mode. **Password required:** Yes—Execution format only **Usage:** • Execution: **AT!GCFEN=<enableFlag>** Response: OK Purpose: Place the modem in GCF testing mode or normal operating mode. • Query: **AT!GCFEN?** Response: !GCFEN: <enableFlag> OK Purpose: Display the modem's current mode. • Query List: **AT!GCFEN=?** Purpose: Return a list of supported <enableFlag> values. **Parameters:** <enableFlag> (Enable/disable GCF testing) • 0 — Disable GCF test mode (Default) — This value is used for normal operations. • 1 — Enable GCF test mode.

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!GSTATUS	**Return operational status** Return specific details about the current operational status of the modem. The response details vary depending on the current RAT. Contact Sierra Wireless for further details if required. **Password required:** No **Usage:** • Query: **AT!GSTATUS?** Response (Example shown is for LTE; fields will vary depending on RAT) !GSTATUS: Current Time: <ctime> Temperature: <temp> Reset Counter: <rcounter> Mode: <mode> System mode: <smode> PS state: <PSstate> LTE band: <lband> LTE bw: <lbw> LTE Rx chan: <lrchan> LTE Tx chan: <ltchan> LTE SCC1 state: <sccstate> LTE SCC1 band: <lband> LTE SCC1 bw: <lbw> LTE SCC1 chan: <lrchan> LTE SCC2 state: <sccstate> LTE SCC2 band: <lband> LTE SCC2 bw: <lbw> LTE SCC2 chan: <lrchan> EMM state: <emmstate> <emmsubstate> RRC state: <emmconn> IMS Reg State: <imsstate> [IMS mode: <ims mode>] PCC RxM RSSI: <rssi> PCC RxM RSRP: <rsrp> PCC RxD RSSI: <rssi> PCC RxD RSRP: <rsrp> SCC1 RxM RSSI: <rssi> SCC1 RxM RSRP:<rsrp> SCC1 RxD RSSI: <rssi> SCC1 RxD RSRP:<rsrp> SCC2 RxM RSSI: <rssi> SCC2 RxM RSRP:<rsrp> SCC2 RxD RSSI: <rssi> SCC2 RxD RSRP:<rsrp> Tx Power: <txpwr> TAC: <tac> RSRQ (dB): <rsrq> Cell ID: <Cell ID> SINR (dB): <sinr> OK
!HWID	**Display hardware version** Display the device's hardware version number. **Password required:** No (F/W release 2.x and later); Yes (F/W release 1.x) **Usage:** • Query: **AT!HWID?** Response: Revision: <MajorVer>.<MinorVer> OK Purpose: Display hardware version number. • Query List: **AT!HWID=?** Purpose: Return the query command format. **Parameters:** <MajorVer> (Major versioning number) • 0–9 <MinorVer> (Minor versioning number) • 0–9

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!IMAGE	**List/delete stored firmware images** List or delete stored firmware (FW) and configuration (PRI) images. *Note: This command is intended for use by advanced users who are familiar with the nuances of firmware and PRI image storage requirements and naming conventions.* **Password required:** No **Usage:** • Execution: **AT!IMAGE=<op>[,<type>[,<slot>[,<build_id>,<unique_id>]]]** Response: OK Purpose: Delete or list stored FW and/or PRI images. • Query: **AT!IMAGE?** Response:! TYPE SLOT STATUS LRU FAILURES UNIQUE_ID BUILD_ID <ty> <slot> <status> <lru> <f1> <f2> <unique_id> <build_id> ... Max FW images: <max_fw> Active FW image is at slot <slot> TYPE SLOT STATUS LRU FAILURES UNIQUE_ID BUILD_ID <ty> <slot> <status> <lru> <f1> <f2> <unique_id> <build_id> ... Max PRI images: <max_fpri> OK Purpose: Display lists of stored firmware and PRI images, the maximum number of slots for each image type, and indicate the active firmware image. **Parameters:** <op> (Operation) • 0—Delete (Note: Valid only for Execution format.) • 2—List Max FW images or Max PRI images, depending on <type> <type> (Image type) • 0—FW (Firmware) • 1—CONFIG (PRI configuration) • This is used in the Execution format. It corresponds to <ty> in the Query response. <slot> (Firmware/PRI image slot ID) • Valid range: 0–FF • Field is ignored for PRI images <status> (Image status) • EMPTY • GOOD <lru> (Least Recently Used count) • Indicates how recently the image has been used • Used automatically during slot selection process to determine which image to remove if a new image is being loaded and there are no empty slots. <f1> (Programming failure count) • 0–255 <f2> (Switching failure count) • 0–255 (Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!IMAGE (continued)	**List stored firmware images (continued)** <unique_id> (Unique ID) • ASCII string, including double-quotes (e.g. “001.000_000”) <ty> (Image type) • “FW”—Firmware • “PRI”—PRI configuration • This is used in the Query format. It corresponds to <type> in the Execution format. <build_id> (Build ID) • ASCII string, including double-quotes (e.g. “01.00.04.00_ATT”) <max_fw> (Maximum number of firmware images that can be stored) • 3 <max_pri> (Maximum number of PRI images that can be stored) • 50 **Example(s):** • Delete all stored FW and PRI images: **AT!IMAGE=0** • Delete all stored FW images: **AT!IMAGE=0,0** • Delete FW at slot 2 **AT!IMAGE=0,0,2** • Delete a particular PRI by build/unique ID: **AT!IMAGE=0,1,,"01.00.01.00_TMO","000.001_000"** • Display lists of FW and PRI images **AT!IMAGE?** TYPE SLOT STATUS LRU FAILURES UNIQUE_ID BUILD_ID FW 1 GOOD 1 0 0 ?_? 01.01.00.00_? FW 2 GOOD 2 0 0 ?_? 00.00.05.05_? FW 3 EMPTY 0 0 0 Max FW images: 3 Active FW image is at slot 2 TYPE SLOT STATUS LRU FAILURES UNIQUE_ID BUILD_ID PRI FF GOOD 0 0 0 000.000_000 01.01.00.00_GENERIC PRI FF GOOD 0 0 0 005.027_000 00.00.05.05_TMO Max PRI images: 50 OK

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!IMPREF	**Query/set Image Management preferences** Indicate which firmware image (firmware plus carrier configuration) should be selected from those available on the device, or enable SIM-based image switching. Use the query format to list the configuration pairs that are currently downloaded and preferred. **Password required:** No **Usage:** • Execution: **AT!IMPREF=<preference>** Response: OK Purpose: Indicate which image should be used (the preferred image), or enable SIM-based image switching. • Query: **AT!IMPREF?** Response:! !IMPREF: preferred fw version: <firmware-ver> preferred carrier name: <carrier-name> preferred config name: <carrier-config> preferred subpri index: <carrier-sub-config> current fw version: <firmware-ver> current carrier name: <carrier-name> current config name: <carrier-config> current subpri index: <carrier-sub-config> [<mismatch information>] OK *or* !IMPREF <invalid image> OK Purpose: Query (show) the preferred and current images (firmware plus carrier configuration pairs), or if an image setting does not exist, a message will be displayed, as shown. **Parameters:** <preference> (The preferred carrier, or a flag to enable SIM-based image switching) • Valid values: • <carrier-name>—Module will search for a matching carrier PRI and the firmware required for that PRI. If found, the new image preference is set. • "AUTO-SIM"—Enable SIM-based switching. (To disable SIM-based switching, select a <carrier-name> instead.) <carrier-name> (Unique code identifying the carrier that the firmware was designed for) • ASCII string <firmware-ver> (Unique firmware version number assigned by Sierra Wireless) • ASCII string <carrier-config> (Unique code identifying the carrier and configuration details) • ASCII string (Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description

!IMPREF	**Query/set Image Management preferences (continued)**
	<carrier-sub-config> (Reserved—refer to note below)
	• Note—This parameter always displays “000” since it is currently unused by EM759X modules. The parameter remains in the Response format for command compatibility with other Sierra Wireless modules.
	• ASCII string
	<mismatch information> (Message indicating a field mismatch between the current and preferred image settings)
	• ASCII string (quotation marks do not appear):
	  • “fw version mismatch”
	  • “carrier name mismatch”
	  • “config name mismatch”
	<invalid image> (Message indicating an image does not exist)
	• ASCII string (quotation marks do not appear):
	  • “preferred image setting does not exist”
	  • “current image setting does not exist”
	Example(s):
	• **AT!IMPREF=″ABC″** *(where “ABC” is a carrier name)*
	• **AT!IMPREF=″AUTO-SIM″** *(to enable SIM-based switching)*

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description

!LEDPATTERN	**Configure LED blink patterns**
	
	Display or set the module's blink patterns.
	Password required: No
	Usage:
	• Execution: **AT!LEDPATTERN=<state>,<total_cycle_time>,<on_percentage>**
	Response: OK
	Purpose: Configure the LED blink patterns.
	• Query: **AT!LEDPATTERN?**
	Response: <state>,<total_cycle_time>,<on_percentage>
	...
	OK
	Purpose: Display the blink pattern configurations for all modem states.
	• Query List: **AT!LEDPATTERN=?**
	Purpose: Return valid parameter values.
	Parameters:
	<state> (Modem state)
	• 0 — Offline
	• 1 — In Service
	• 2—No Service
	• 3—Data Active
	• 4—LPM
	• 5—Roaming
	<total_cycle_time> (Cycle duration, in seconds)
	• The length of time for one LED blink cycle.
	• Valid values: 0.5, 1, 2, 4, 5, 10, 20
	<on_percentage> (Percentage of cycle during which the LED is ON)
	• Valid values: Multiple of 5 (i.e., 5, 10, 15, ..., 90, 95, 100)
	Example(s):
	Set the LED to blink On/Off every 0.25 seconds while data is active:
	• **AT!LEDPATTERN=3,0.5,50**
	// The cycle time is 0.5 seconds, and the LED will be on for 50% of that time (i.e., 0.25 seconds).
	Set the LED to be on for 16 seconds and off for 4 seconds while roaming:
	• **AT!LEDPATTERN=5,20,80**
	// The cycle time is 20 seconds, and the LED will be on for 80% of that time (i.e., 16 seconds).
	Set the LED to be always on in "In Service" state:
	• **AT!LEDPATTERN=1,4,100**
	// The cycle time can be any value, and the LED will be always on (100%).
	Set the LED to be always off while Offline:
	• **AT!LEDPATTERN=0,5,0**
	// The cycle time can be any value, and the LED will be always off (0%).

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!LTECA	**Enable/disable LTE Carrier Aggregation or Display supported LTE CA combinations** Enable or disable LTE Carrier Aggregation (CA), or (when enabled) display the list of LTE CA combinations supported by the hardware. **Password required:** No **Usage:** • Execution: **AT!LTECA=<flag>** Response: OK Purpose: Enable or disable LTE CA. • Query: **AT!LTECA?** Response: <band_DL><class>[_<band_DL><class>[_<band_DL><class>]] ... :<band_UL><class> [,<band_UL><class>[,<band_UL><class>]] ... OK *or* CA is disabled OK Purpose: Return a list of supported LTE CA combinations—downlink combinations, then uplink combinations. • Query List: **AT!LTECA=?** Purpose: Return the execution command format and valid parameter values. **Parameters:** <flag> (Enable/disable LTE CA) • 0—Disable CA • 1—Enable CA <band_DL> (LTE downlink band) • Band numbers vary depending on device type, SKU, and PRI configuration. To view the device's supported bands, see !BAND. <band_UL> (LTE uplink band) • Band numbers vary depending on device type, SKU, and PRI configuration. To view the device's supported bands, see !BAND. <class> (Aggregated transmission bandwidth configuration) • Valid values: 'A'–'I' (Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!LTECA (continued)	**Enable/disable LTE Carrier Aggregation or Display supported LTE CA pairs (continued)** **Example(s):** **AT!LTECA?** 1A_3A_5A ← *Downlink combinations list begins* 1A_3A_7A ... 66A_66A_71A 2C_29A 40D 41D 42D 48D 66D ← *Downlink combinations list ends* :1C ← *Uplink combinations list begins* :3C :5B :7C :41C :43C :48C ← *Uplink combinations list ends* OK

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!LTEINFO	**Display LTE network information** Display LTE network information. **Password required:** No **Usage:** • Query: **AT!LTEINFO?** Response: !LTEINFO: Serving: ...<list of applicable parameters> IntraFreq: ...<list of applicable parameters> InterFreq: ...<list of applicable parameters> GSM: ...<list of applicable parameters> WCDMA: ...<list of applicable parameters> CDMA 1x: ...<list of applicable parameters> CDMA HRPD: ...<list of applicable parameters> Purpose: Return LTE network measurements. **Parameters:** <earfcn> (E-UTRA absolute radio frequency channel number of the serving cell) • 16-bit decimal <mcc> (MCC code) • 16-bit decimal <mnc> (MNC code) • 16-bit decimal <tac> (Tracking area code) • 16-bit decimal <cid> (LTE Serving cell id) • 16-bit hexadecimal <bd> (Serving cell operating band) • 8-bit decimal <d> (Transmission bandwidth configuration of serving cell on the downlink) • 8-bit decimal <u> (Transmission bandwidth configuration of serving cell on the uplink) • 8-bit decimal <snr> (Average RSSNR of the serving cell over last measurement period in decibels) • 8-bit decimal <pci> (Physical cell ID) • 16-bit decimal <rsrq> (Current Reference Signal Receive Quality as measured by L1) • 16-bit decimal <rsrp> (Current Reference Signal Receive Power in dBm x10 as measured by L1) • 16-bit decimal <rssi> (Current Received Signal Strength Indication as measured by L1) • 16-bit decimal (Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!LTEINFO (continued)	**Display LTE network information (continued)** <rxlv> (Cell selection Rx level (Srxlev) value) • 16-bit decimal <thresholdlow> (Cell Srxlev low threshold) • 8-bit decimal <thresholdhi> (Cell Srxlev high threshold) • 8-bit decimal <priority> (Cell reselection priority) • 8-bit decimal <threshl> (Reselection threshold for low priority layers) • 8-bit decimal <threshh> (Reselection threshold for high priority layers) • 8-bit decimal <prio> (Priority of this frequency group) • 8-bit decimal <ncc> (Bitmask identifying whether neighbor with a particular Network Color Code is to be reported) • 8-bit decimal <arfcn> (GSM frequency being reported) • 16-bit decimal <1900> (Band indicator for the GSM ARFCN, only valid if arfcn is in the overlapping region) • boolean <valid> (Flag indicating whether the BSIC ID is valid) • boolean <bsic> (BSIC ID) • 8-bit decimal <uarfcn> (WCDMA layer frequency) • 16-bit decimal <psc> (Scrambling code) • 16-bit decimal <rscp> (Absolute power level of the CPICH as received by the UE in dBm x10) • 16-bit decimal <ecn0> (Ratio of received energy per PN chip for the CPICH to the total received power spectral density at the UE antenna connector) • 16-bit decimal <chan> (Channel number) • 16-bit decimal <bc> (Band class) • 16-bit decimal <offset> (The neighbor cell Pilot PN offset) • 16-bit decimal <phase> (The neighbor cell Pilot PN phase) • 16-bit decimal <str> (The neighbor cell Pilot EC/IO) • 16-bit decimal

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!NVPLMN	**Provision/display PLMN list for Network Personalization locking** Provision or display the list of PLMN (MCC/MNC pairs) used for Network Personalization locking. Use the execution format to provision the list ONE TIME ONLY. After the list is provisioned, it can only be displayed, not updated. **Password required:** Yes **Usage:** • Query: **AT!NVPLMN?** Response: <MCC> <MNC> ... OK Purpose: Return a list of up to fifty NV items that can be read or written. • Execution: **AT!NVPLMN=<MCC1>, <MNC1>, ..., <MCCn>, <MNCn>** Response: OK Purpose: Add up to six MCC/MNC pairs to the PLMN list Note: Execution can be performed one time only (all MCC/MNC pairs must be set at the same time). **Parameters:** <MCC> (Mobile Country Code) • 3 digits <MNC> (Mobile Network Code) • 2 digits
!PATEMP	**Return module PA's current temperature information** Return the temperature state and actual temperature of the module's PA (power amplifier). (The module has two PA sensors. This command returns the highest temperature.) **Password required:** No **Usage:** • Query: **AT!PATEMP?** Response: Temp state: <state> Temperature: <temperature> C OK Purpose: Return the module PA's temperature information. **Parameters:** <state> (Temperature state): • Valid values: • "High Critical" • "High Warning" • "Normal" • "Low Warning" • "Low Critical" <temperature> (Current temperature): • Current temperature in degrees Celsius. This is the temperature reported by a thermistor positioned near the power amplifiers. • Decimal ASCII

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!PATEMPLIMITS	**Set/report module PA temperature state limit values** Certain modem functionality is affected by the temperature state of the module's power amplifier (PA). The possible temperature states are high critical, high warning, high normal, low normal, and low critical. Use this command to report or set the limits that correspond to these temperature states. To display the current temperature and temperature state, see !PATEMP on page 41. *Note: All temperatures are in Celsius.* **Password required:** Yes **Usage:** • Execution: **AT!PATEMPLIMITS=<hc>,<hw>,<hn>,<ln>,<lc>** Response: OK Purpose: Set the temperature limits for each state (all five values must be specified). • Query: **AT!PATEMPLIMITS?** Response: HI CRIT: <hc> HI WARN: <hw> HI NORM: <hn> LO NORM: <ln> LO CRIT: <lc> Purpose: Return the temperature limits for each state. **Parameters:** <hc> (High Critical, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types) <hw> (High Warning, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types) <hn> (High Normal, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types) <ln> (Low Normal, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types) <lc> (Low Critical, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!PCINFO	**Return power control status information** Return the modem's power control status information. **Password required:** No **Usage:** • Query: **AT!PCINFO?** Response: State: <state> LPM voters - Temp:<vote>, Volt:<vote>, User:<vote>, W_DISABLE: <vote>, IMSWITCH:<vote>, LWM2M:<vote> LPM persistence - <userlpm> OK Purpose: Return power control information. **Parameters:** <state> (The modem's power mode) • "Low Power Mode" • "Online" • "Offline" <vote> (LPM requested flag) • 0—LPM requested • 1—LPM not requested <userlpm> (Current state of user-initiated Low Power Mode) • 0—Host GUI has not requested LPM • 1—Host GUI has requested LPM
!PCOFFEN	**Set/return Power Off Enable state** The modem can be configured to enter low power mode or power off when W_DISABLE is asserted. (This is called the Power Off Enable feature.) Use this command to indicate or set the Power Off Enable feature state. **Password required:** Yes **Usage:** • Execution: **AT!PCOFFEN=<state>** Response: OK Purpose: Set the current state. • Query: **AT!PCOFFEN?** Response: <state> OK Purpose: Report the current <state>. **Parameters:** <state> (Current state of Power Off Enable) • 0—Modem will enter LPM (low power mode) when W_DISABLE is asserted. • 1—Power off the modem when W_DISABLE is asserted. • 2—Ignore changes on W_DISABLE.

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description

!PCTEMP	**Return module CPU's current temperature information**
	
	Return the module CPU's temperature state and actual temperature.
	Password required: No
	Usage:
	• Query: **AT!PCTEMP?**
	Response: Temp state: <state>
	Temperature: <temperature> C
	OK
	Purpose: Return the module CPU's temperature information.
	Parameters:
	<state> (Temperature state):
	• Valid values:
	  • "High Critical"
	  • "High Warning"
	  • "Normal"
	  • "Low Warning"
	  • "Low Critical"
	<temperature> (Current temperature):
	• Current temperature in degrees Celsius. This is the temperature reported by a thermistor positioned near the CPU.
	• Decimal ASCII

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!PCTEMPLIMITS	**Set/report module CPU temperature state limit values** Certain modem functionality is affected by the temperature state of the module's CPU. The possible temperature states are high critical, high warning, high normal, low normal, and low critical. Use this command to report or set the limits that correspond to these temperature states. To display the current temperature and temperature state, see !PCTEMP on page 44. *Note: All temperatures are in Celsius.* **Password required:** Yes **Usage:** • Execution: **AT!PCTEMPLIMITS=<hc>,<hw>,<hn>,<ln>,<lc>** Response: OK Purpose: Set the temperature limits for each state (all five values must be specified). • Query: **AT!PCTEMPLIMITS?** Response: HI CRIT: <hc> HI WARN: <hw> HI NORM: <hn> LO NORM: <ln> LO CRIT: <lc> Purpose: Return the temperature limits for each state. **Parameters:** <hc> (High Critical, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types) <hw> (High Warning, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types) <hn> (High Normal, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types) <ln> (Low Normal, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types) <lc> (Low Critical, in °C) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default temperature limits vary between Sierra Wireless module types)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!PCVOLT	**Return current power supply voltage information** Return the module's power control supply state and actual voltage. **Password required:** No **Usage:** • Query: **AT!PCVOLT?** Response: Volt state: Normal Power supply voltage: <voltage> mV (ADC: <raw>) OK Purpose: Return the module's voltage information. **Parameters:** <state> (Power supply state): • Valid values: • "High Critical" • "High Warning" • "Normal" • "Low Warning" • "Low Critical" <voltage>: • Current voltage reading in mV. • Decimal ASCII <raw>: • ADC (Analog/digital converter) reading • Decimal ASCII

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!PCVOLTLIMITS	**Set/report power supply voltage state limit values** Certain modem functionality is affected by the modem's power supply voltage state. The possible voltage states are high critical, high warning, high normal, low normal, and low critical. Use this command to report or set the limits that correspond to these voltage states. **Password required:** Yes **Usage:** • Execution: **AT!PCVOLTLIMITS=<hc>,<hw>,<hn>,<ln>,<lc>** Response: OK Purpose: Set the voltage limits for each state (all five values must be specified). • Query: **AT!PCVOLTLIMITS?** Response: HI CRIT: <hc> HI WARN: <hw> HI NORM: <hn> LO NORM: <ln> LO CRIT: <lc> Purpose: Return the voltage limits for each state. **Parameters:** <hc> (High Critical, in mV) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default voltage limits vary between Sierra Wireless module types) <hw> (High Warning, in mV) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default voltage limits vary between Sierra Wireless module types) <hn> (High Normal, in mV) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default voltage limits vary between Sierra Wireless module types) <ln> (Low Normal, in mV) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default voltage limits vary between Sierra Wireless module types) <lc> (Low Critical, in mV) • Integer • Refer to *EM759X Product Technical Specification (Doc# 41114425)* (Default voltage limits vary between Sierra Wireless module types)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!PRIID	**Report module PRI part number and revision** Report the module's customer and carrier PRI part numbers and revisions. **Password required:** No **Usage:** • Query: **AT!PRIID?** Response: PRI Part Number: <priPn> Revision: <priRevDisplay> Customer: <pri_cust> Carrier PRI: <bcVersion> OK Purpose: Return the module's PRI information. **Parameters:** <priPn> (PRI part number) • 7-character alphanumeric ASCII string • Example: 999123A <priRev> (PRI revision number being written to the module) • 4-digit ASCII: XXYY (implied '.' between XX and YY) • Example: 0100 <priRevDisplay> (PRI revision number being read from the module) • 4-digit ASCII: XX.YY • Example: 01.00 <pri_cust> (PRI customer name) • ASCII string • Example: "Generic Operator" <bcVersion> (BC version) • ASCII string
!RESET	**Reset modem** Perform a modem reset. **Password required:** No **Usage:** • Execution: **AT!RESET** Response: OK Purpose: Reset the modem.

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!SCUMMTU	**Set/query MTU size** Use this command to set or query the maximum transmission unit (MTU) size. **Password required:** Yes **Usage:** • Execution: **AT!SCUMMTU=<mtu>** Response: OK Purpose: Set the MTU size. • Query: **AT!SCUMMTU?** Response: !SCUMMTU: MTU: <mtu> OK Purpose: Query the current MTU settings. • Query List: **AT!SCUMMTU=?** Purpose: Display the execution format and parameter values. **Parameters:** <mtu> (Maximum transmission unit (MTU)) • Valid values: • 0—Use the default value. (Note—The default is carrier PRI-dependent.) • 576–1500—Other values required by the carrier

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!SELRAT	**Set/query preferred RAT** Set the preferred RAT mode(s) for acquisition. **Password required:** No **Reset required to apply changes:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!SELRAT=<ratInd>** Response: OK Purpose: Set the desired RAT. • Query: **AT!SELRAT?** Response: <ratInd>, <ratName> OK *or* Unknown RAT mode. Use AT!SELRAT to set mode. <ratInd> OK Purpose: Return the current RAT (<ratInd>) and description. If the <ratInd> is undefined, an error message is returned. • Query List: **AT!SELRAT=?** Purpose: Display valid parameter values. **Parameters:** <ratInd> (RAT index) • Valid values: • 00—Automatic • 01—WCDMA only • 06—LTE only • 11—WCDMA and LTE only

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!TMSTATUS	**Report Thermal Mitigation Status** Report the thermal mitigation status of all available Thermal Mitigation Devices (TMD) in the module. **Password required:** No **Usage:** • Query: **AT!TMSTATUS?** Response: Device Level pa <status> modem <status> OK Purpose: Display the thermal mitigation status of the module's TMDs. • Query List: **AT!TMSTATUS=?** Purpose: Display valid execution format and parameter values. **Parameters:** <status> (Mitigation level) • Valid range: 0–3 • 'modem' mitigation levels: • 0—No mitigation • 1—DL data rate throttling • 3—No data calls • 'pa' mitigation levels: • 0—No mitigation • 1—UL data rate throttling • 2—UL rate throttling and Tx power limiting • 3—No data calls

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description

!USBCOMP	**Set/report USB interface configuration**
	
	Set or display the device's USB interface configuration.
	
	By default, devices are typically configured to use a USB composition that presents a minimal set of interfaces from a list of available interfaces. This command is used to add or remove interfaces from the configuration.
	Password required: Yes
	Usage:
	• Execution: **AT!USBCOMP=<Config Index>,<Config Type>,<Interface bitmask>**
	Response: OK
	Purpose: Set the current composition. For the change to take effect, you must reset the modem.
	• Query: **AT!USBCOMP?**
	Response: Config Index: <Config Index>
	Config Type: <Config Type> <Config Type Desc>
	Interface bitmask: <Interface bitmask> <Bitmask Desc>
	OK
	Purpose: Report the current interface composition.
	• Query List: **AT!USBCOMP=?**
	Purpose: Display valid execution format and parameter values, and examples.
	Parameters:
	<Config Index> (USB composition)
	• Valid value: 1
	• Use **AT!USBCOMP=?** to view the configurations available for the device. Available configurations are identified as "SUPPORTED".
	<Config Type> (USB composition)
	• 1—USBIF-MBIM
	• 3—Legacy-Generic
	• 4—RNDIS
	<Config Type Desc> (Configuration description)
	• "(USBIF-MBIM)"—Description of <Config Type> = 1
	• "(Legacy-Generic)"—Description of <Config Type> = 3
	• "(RNDIS)"—Description of <Config Type> = 4.
	<Interface bitmask> (USB composition)
	• Bitmask representing all enabled interfaces
	• Format: 32-bit bitmask
	• Valid values (available interfaces are device-dependent):
	  • 0x00000001—DIAG
	  • 0x00000004—NMEA
	  • 0x00000008—MODEM
	  • 0x00000010—GNSS
	  • 0x00000100—RMNET0
	  • 0x00001000—MBIM
	• Note—GNSS is used for Location Sensor in Windows 10/11.
	
	(Continued on next page)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!USBCOMP (continued)	**Set/report USB interface configuration (continued)** <Bitmask Desc> (Interface bitmask description) • List of interface descriptions corresponding to <Interface bitmask> components • Example: “(diag, nmea, modem, mbim)”
!USBINFO	**Return information from active USB descriptor** Return information from the active USB descriptor. **Password required:** No **Usage:** • Query: **AT!USBINFO?** Response: VID: <vendor_id> APP PID: <app_product_id> BOOT PID: <boot_product_id> Manufacturer: <product_manufacturer> Product: <product_name> Purpose: Display USB descriptor information. **Parameters:** <vendor_id> (Vendor ID): • Valid range: 0000–FFFF <app_product_id> (Product ID used when modem is in application mode): • Valid range: 0000–FFFF <boot_product_id> (Product ID used when modem is in boot loader mode): • Valid range: 0000–FFFF <product_manufacturer> (Manufacturer string): • ASCII string (32 characters maximum) • Example: “Sierra Wireless, Incorporated” <product_name> (Product string): • ASCII string (64 characters maximum) • Example: “EM7565”

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!USBPID	**Set/report product ID in USB descriptor** Use this command to set the device's product ID in the USB descriptor. (Some devices may support more than one product ID.) *Note: If a custom PID is used for <app product_id>, then the <boot product_id> must be set at the same time.* **Password required:** Yes **Usage:** • Execution: **AT!USBPID=<app product_id> [,<boot product_id>]** Response: OK Purpose: Set the application and boot product IDs in the USB descriptor. • Query: **AT!USBPID?** Response: !USBPID: <app product_id>, <boot product_id> OK Purpose: Report the product ID that is stored in the USB descriptor. • Query List: **AT!USBPID=?** Purpose: Display a list of default (non-custom) product IDs for the device. **Parameters:** <app product_id> • Hexadecimal ASCII value. • Valid range: 0000–FFFF <boot product_id> • Hexadecimal ASCII value. • Valid range: 0000–FFFF • In the Execution command format, if the <app product_id> is a custom PID>, then the <boot product_id> must be set at the same time. (To check if the <app product_id> is a custom PID, use AT!USBPID=? to see a list of all available non-custom PIDs.)

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
!USBSPEED	**Set/report USB speed** Use this command to set the device's maximum supported USB speed, and to display the maximum supported speed and current speed. **Password required:** Yes **Reset required to apply changes:** Yes **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!USBSPEED=<max_supported_speed>** Response: OK Purpose: Set the device's maximum supported USB speed. • Query: **AT!USBSPEED?** Response: SUPPORTED: <max_supported_speed> CURRENT : <current_usb_speed> OK Purpose: Report the device's maximum and current speeds. • Query List: **AT!USBSPEED=?** Purpose: Display valid execution format and parameter values. **Parameters:** <max_supported_speed> • 0—High Speed (USB 2.0) • 1—Super Speed (USB 3.0) <current_usb_speed> • ASCII string (quotation marks not included) • Valid values: • "Super-Speed" • "High-Speed"
!USBVID	**Set/report USB vendor ID** Set or query the vendor ID in the USB descriptor. **Password required:** Yes **Usage:** • Execution: **AT!USBVID=<vendor_id>** Response: OK Purpose: Set the device's USB vendor ID. • Query: **AT!USBVID?** Response: VID: <vendor_id> OK Purpose: Return the device's USB vendor ID. **Parameters:** <vendor_id> • Hexadecimal ASCII value. • Valid range: 0000–FFFF **Example(s):** **AT!USBVID** VID: 0x9999 OK

Table 3-2: Modem status, customization, and reset commands (Continued)

Command	Description
&V	**Return operating mode AT configuration parameters** Return the status of all AT command parameters that apply to the current operating mode. **Password required:** No **Usage:** • Execution: **AT&V** Response: &C: 2; &D: 2; &F: 0; E: 1; L: 0; M: 0; Q: 0; V: 1; X: 0; Z: 0; S0: 0; S2: 43; S3: 13; S4: 10; S5: 8; S6: 2; S7: 50; S8: 2; S9: 6; S10: 14; S11: 95; +FCLASS: 0; +ICF: 3,3; +IFC: 2,2; +IPR: 115200; +DR: 0; +DS: 0,0,2048,6;+WS46: 12; +CBST: 0,0,1;+CRLP: (61,61,48,6,0),(61,61,48,6,1),(240,240,52,6,2);+CV120: 1,1,1,0,0,0; +CHSN: 0,0,0,0; +CSSN: 0,0; +CREG: 0; +CGREG: 0;+CFUN:; +CSCS: "IRA"; +CSTA: 129; +CR: 0; +CRC: 0; +CMEE: 2; +CGDCONT: (1,"IP","","",0,0); +CGDSCONT: ; +CGTFT: ; +CGEQREQ: ; +CGEQMIN: ; +CGQREQ: ; +CGQMIN: ;+CGEREP: 0,0; +CGDATA: "PPP"; +CGCLASS: "A"; +CGSMS: 3; +CSMS: 0;+CMGF: 0; +CSCA: "",; +CSMP: ,,0,0; +CSDH: 0; +CSCB: 0,"",""; +FDD: 0;+FAR: 0; +FCL: 0; +FIT: 0,0; +ES: ,,; +ESA: 0,,,,0,0,255,; +CMOD: 0;+CVHU: 0; +CPIN: ,; +CMEC: 0,0,0; +CKPD: 1,1; +CGATT: 0; +CGACT: 0;+CPBS: "SM"; +CPMS: "SM","SM","SM"; +CNMI: 0,0,0,0,0; +CMMS: 0; +FTS: 0;+FRS: 0; +FTH: 3; +FRH: 3; +FTM: 96; +FRM: 96; +CCUG: 0,0,0;+COPS: 0,0,""; +CUSD: 0; +CAOC: 1; +CCWA: 0; +CPOL: 0,2,""; +CTZR: 0;+CLIP: 0; +COLP: 0; +CMUX: 0,0,5,31,10,3,30,10,2;!CMUX: 0,0,5,31,10,3,30,10,2 OK *Note: this is an example only. The supported commands may vary by device/SKU.* Purpose: Display command parameters.

4: Diagnostic Commands

Introduction

This chapter describes commands used to diagnose modem problems.

Command summary

The table below lists the commands described in this chapter.

Table 4-1: Diagnostic commands

Command	Description	Page
!BCFWUPDATESTATUS	Report status of most recent firmware update attempt	58
!ERR	Display diagnostic information	59
!GCCLR	Clear crash dump data	59
!GCDUMP	Display crash dump data	59
!LTERXCONTROL	Enable/disable LTE receive (Rx) diversity during Carrier Aggregation	60
!RXDEN	Enable/disable WCDMA/LTE receive (Rx) diversity	61

Command reference

Table 4-2: Diagnostic command details

Command	Description
!BCFWUPDATESTATUS	**Report status of most recent firmware update attempt** Return the status of the most recent firmware update attempt made since the last cold restart. **Password required:** No **Usage:** • Execution: **AT!BCFWUPDATESTATUS** Response: !BCFWUPDATESTATUS: <result> *or* !BCFWUPDATESTATUS: <result> Failed IMG TYPE <type>, DATA <data>, PART <part> OK Purpose: Return the status of the most recent firmware update attempt. The second response format appears only if <result> = “FAILED”. **Parameters:** <result> (Status of last firmware update attempt) • ASCII string: • “UNKNOWN”—Status of last attempt is unknown. • “SUCCESS” —Last update was successful. • “FAILED”—Last update failed. <type> (Firmware image type that failed to update) • ASCII string • Note: Parameter appears only if <result> is FAILED <data> (Reference data for failed image) • Location of the reference data as an offset in the CWE image • Valid range: 0–(2^{32}-1) • Note: Parameter appears only if <result> is FAILED <part> (Partition associated with the failed image) • ASCII string • Applies only to configuration updates • Note: Parameter appears only if <result> is FAILED

Table 4-2: Diagnostic command details (Continued)

Command	Description
!ERR	**Display diagnostic information** This command is used to display diagnostic information (logged error conditions) that Sierra Wireless uses to assist in resolving technical issues. **Password required:** No **Usage:** • Execution: **AT!ERR=0** Response: OK Purpose: Clear the logged error conditions. Use this command before running tests to make sure that details displayed using AT!ERR are relevant to the tests being performed. • Query: **AT!ERR** Response: 00 [F] <count> <file> <line> ... nn [F] <count> <file> <line> OK Purpose: Return all logged error conditions that are stored in NVRAM. **Parameters:** <count> (Number of occurrences) • Valid range: 0x00–0xFF <file> (Log file name) • Name of log file using ASCII characters <line> (Line number in log file) • Valid range: 1–99999
!GCCLR	**Clear crash dump data** Clear crash dump data. **Password required:** No **Usage:** • Execution: **AT!GCCLR** Response: Crash data cleared OK Purpose: Clear crash dump data. **Parameters:** None
!GCDUMP	**Display crash dump data** Display crash dump data. **Password required:** No **Usage:** • Execution: **AT!GCDUMP** Response: <crash dump data> OK or No crash data available OK Purpose: Display crash dump data.

Table 4-2: Diagnostic command details (Continued)

Command	Description
!LTERXCONTROL	**Enable/disable LTE receive (Rx) diversity during Carrier Aggregation** Enable or disable LTE receive diversity for individual component carriers (PCC or SCC) during Carrier Aggregation (CA). The new state takes effect immediately, and reverts to the default state when the modem is reset. *Note: !LTERXCONTROL should be issued during an active CA call.* *Note: When using !LTERXCONTROL to disable any chain, make sure !RXDEN is set to enable all chains.* *Note: Due to firmware design, LTE open-loop Tx power should be set to 20 dBm when measuring SISO sensitivity with Rx diversity as the primary path.* **Password required:** Yes **Reset required to apply changes:** No **Persistent across power cycles:** No **Usage:** • Execution: **AT!LTERXCONTROL=<cc_id>,<selection>** Response: OK Purpose: Configure the component carrier as primary Rx, diversity Rx, or both. • Query List: **AT!LTERXCONTROL=?** Purpose: Returns the command format and valid parameter values. **Parameters:** <cc_id> (Component carrier ID) • 0—PCC (Primary cell) • 1—SCC1 (Secondary cell) • 2—SCC2 (Secondary cell) • 3—SCC3 (Secondary cell) <selection> (Rx chain to enable) • 1—Primary Rx only • 2—Diversity Rx only • 3—Primary Rx and Diversity Rx

Table 4-2: Diagnostic command details (Continued)

Command	Description
!RXDEN	**Enable/disable WCDMA/LTE receive (Rx) diversity** Enable or disable WCDMA/LTE receive diversity, or establish receive diversity as the primary path. The new state takes effect the next time the modem is reset. *Note: During LTE Carrier Aggregation (CA), this command works only on the Primary Component Carrier (PCC). To control Secondary Component Carrier (SCC) chains, use !LTERXCONTROL.* *If !LTERXCONTROL is used to also control the PCC, !RXDEN must not be used.* *Note: When using !LTERXCONTROL to disable any chain, make sure !RXDEN is set to enable all chains.* *Note: Due to firmware design, LTE open-loop Tx power should be set to 20 dBm when measuring SISO sensitivity with Rx diversity as the primary path.* **Password required:** Yes—Execution format only **Usage:** • Execution: **AT!RXDEN=<state>** Response: OK Purpose: Set the current receive diversity state. • Query: **AT!RXDEN?** Response: !RXDEN: <state> OK Purpose: Return the current receive diversity <state>. • Query List: **AT!RXDEN=?** Purpose: Return a list of available <state> values to use in this command. **Parameters:** <state> (Current/ requested receive diversity state) • 0 — Rx diversity disabled • 1 — Rx diversity enabled • 2 — Rx diversity is primary path (See note above for measuring SISO sensitivity.)

5: Test Commands

Introduction

Note: Full test commands support is pending future firmware upgrade.

To obtain regulatory approval and carrier approvals for your product, you may be required to perform tests on the radio component of the embedded modem. This chapter describes AT commands used to perform those tests.

Command summary

The table below lists the commands described in this chapter.

Table 5-1: Test commands

Command	Description	Page
!DACGPSCTON	Return GPS CtoN and frequency measurement	64
!DACGPSMASKON	Set CGPS IQ log mask	64
!DACGPSSTANDALONE	Enter/exit StandAlone (SA) RF mode	65
!DACGPSTESTMODE	Start/stop CGPS diagnostic task	65
!DAFTMACT	Put modem into Factory Test Mode	66
!DAFTMDEACT	Put modem into online mode from Factory Test Mode	66
!DAGFTMRXAGC	Get FTM Rx AGC (Primary or Diversity)	67
!DALGRXAGC	Return Rx AGC value (LTE only)	68
!DALGTXAGC	Return Tx AGC value and transmitter parameters (LTE only)	69
!DALTXCONTROL	Configure LTE Tx parameters (LTE only)	71
!DAOFFLINE	Place modem offline	72
!DARCONFIG	Set Band and Channel	72
!DARCONFIGDROP	Drop Radio Configurations	73
!DAWTXCONTROL	Configure WCDMA Tx Power (WCDMA only)	73

Command reference

Table 5-2: Test command details

Command	Description
!DACGPSCTON	**Return GPS CtoN and frequency measurement** Return the GPS CtoN and frequency measurement. **Requirements:** 1. AT!DACGPSTESTMODE=1 *(to start CGPS diagnostic task)* 2. AT!DACGPSSTANDALONE=1 *(to enter SA RF mode)* 3. AT!DACGPSMASKON *(to enable log mask)* **Password required:** Yes **Usage:** • Execution: **AT!DACGPSCTON** Response: CtoN=<CtoN>, Freq=<freq> OK Purpose: Return CtoN and frequency measurements. **Parameters:** <CtoN> (Signal strength calculated in dBHz as part of WBIQ test) • Uint32 <freq> (Frequency in Hz calculated as part of WBIQ test) • Int32
!DACGPSMASKON	**Set CGPS IQ log mask** Set CGPS IQ (0x138a) log mask. **Password required:** Yes **Usage:** • Execution: **AT!DACGPSMASKON** Response: 730000000300000000000000001000000DC03 00000000000000000000000000000000000000 00000000000000000000000000000000000000 00000000000000000000000000000000000000 00000000000000000000000000000000000000 00000000000000000000000000000000000000 00000000000000000000000000000000000000 00000000000000004000000000000000000000 OK Purpose: Set log mask.

Table 5-2: Test command details (Continued)

Command	Description
!DACGPSSTANDALONE	**Enter/exit StandAlone (SA) RF mode** Enter/exit SA RF mode. **Requirements:** **1.** AT!DACGPSTESTMODE=1 *(to start CGPS diagnostic task)* **Password required:** Yes **Usage:** • Query: **AT!DACGPSSTANDALONE=<state>** Response: 4B0D65001400 OK or Error Purpose: Enter/exit SA RF mode **Parameters:** <state> (SA RF mode state) • 0—Enter SA RF mode • 1 — Exit SA RF mode
!DACGPSTESTMODE	**Start/stop CGPS diagnostic task** Start/stop the CGPS diagnostic task. **Password required:** Yes **Usage:** • Execution: **AT!DACGPSTESTMODE=<mode>** Response: *(for start):* 4B0D0800 OK *(for stop):* 4B0D0C00 OK or Error Purpose: Start or stop the CGPS diagnostic test. **Parameters:** <mode> (CGPS diagnostic task mode) • 0—Stop • 1 — Start

Table 5-2: Test command details (Continued)

Command	Description
!DAFTMACT	**Put modem into Factory Test Mode** Place the modem in FTM (Factory Test Mode). FTM is a non-signaling mode that allows the radio component to be manually configured to conduct certain types of tests. *Note: When this command executes successfully, the modem responds with the value 290300. Any other response indicates an error.* **Password required:** Yes **Usage:** • Query: **AT!DAFTMACT** Response: 290300 *(Success. Any other response indicates an error.)* OK Purpose: Place modem in FTM mode.
!DAFTMDEACT	**Put modem into online mode from Factory Test Mode** This command takes the modem out of FTM and puts the modem back into online mode. (The command !DAFTMACT puts the modem into FTM.) *Note: When this command executes successfully, the modem responds with the value 290400. Any other response indicates an error.* **Password required:** Yes **Usage:** • Query: **AT!DAFTMDEACT** Response: 290400 *(Success. Any other response indicates an error.)* OK Purpose: Place modem in online mode (from FTM mode).

Table 5-2: Test command details (Continued)

Command	Description
!DAGFTMRXAGC	**Get FTM Rx AGC (Primary or Diversity)** Get the FTM Rx AGC on the primary or diversity path. **Requirements:** Before using this command: • **!DAFTMACT** must be issued to put the modem into FTM. • **!DARCONFIG** must be issued to set the technology, band, and channel. **Password required:** Yes **Usage:** • Execution: **AT!DAGFTMRXAGC=<carrier>, <technology>, <LNA Index>, <path>** Response: <rssi> OK Purpose: Return the FTM Rx AGC value. **Parameters:** <carrier> (Carrier ID) • 0—PCC <technology> (Radio access technology (RAT)) • RAT support is device-dependent. • 0—CDMA • 1—WCDMA • 2—GSM • 3—LTE <LNA Index> (LNA offset index) • 0—R0 (Highest gain for both WCDMA and LTE) • 1—R1 • 2—R2 • 3—R3 (Lowest gain for WCDMA) • 4—R4 • 5—R5 • 6—R6 • 7—R7 (Lowest gain for LTE) <path> (Rx path) • 0—Primary Rx • 1—Diversity Rx <rssi> (RSSI, in dBm) • Dynamic Rx AGC

Table 5-2: Test command details (Continued)

Command	Description

!DALGRXAGC	**Return Rx AGC value (LTE only)**
	
	Return the Rx AGC (Automatic Gain Control) value and LNA gain states for each RF path (e.g. main and diversity).
	The AGC value can be converted to RSSI (Received Signal Strength Indicator) in dBm:
	if (<AGC_value> < 511)
	<RX_dBm> = -106 + ((<AGC_value> + 512) / 12)
	else
	<RX_dBm> = -106 + (((<AGC_value>-1024) + 512) / 12)
	Requirements:
	• The modem must be in LTE mode.
	Password required: Yes
	Usage:
	• Execution: **AT!DALGRXAGC** or **AT!DALGRXAGC?**
	Response: Paths: <paths>
	Rx<n>: AGC: <agc> dBm LNA: <lna> Chain: <chain>
	Rx<n>: AGC: <agc> dBm LNA: <lna> Chain: <chain>
	OK
	Purpose: Return the <AGC value> and LNA gain states for each RF path.
	Parameters:
	<paths> (Number of receive paths)
	• 2
	<agc> (AGC value in dBm)
	• Valid values: Dynamic Rx range
	<LNA Index> (LNA offset index)
	• 0 — R0 (Highest gain)
	• 1 — R1
	• 2 — R2
	• 3 — R3 (Lowest gain)
	<chain> (Receive paths)
	• 0 — Rx Main
	• 1 — Rx Diversity

Table 5-2: Test command details (Continued)

Command	Description
!DALGTXAGC	**Return Tx AGC value and transmitter parameters (LTE only)** Return the Tx AGC (Automatic Gain Control) value and other transmitter parameters. **Requirements:** • The modem must be in LTE mode. • Must be in an active call (for example, when connected to a call box or live network) **Password required:** Yes **Usage:** • Execution: **AT!DALGTXAGC** or **AT!DALGTXAGC?** Response: Paths: <paths> Tx<n>:AGC: <agc> dBm RBi: <rbi> RB: <rbn> PA: <pa> TxGainIdx: <txgi> MTPL: <mtpl> dBm IQgain: <iq> MPR: <mpr> AMPR: <ampr> NS: <ns> SARmpr: <sarmpr> PDet Mode: <mode> PDetAGC: <pagc> PDet: <pdbm> Traw: <traw> Tscaled: <tscaled> Tidx: <tidx> Trem: <trem> OK Purpose: Return transmitter parameters and the transmit <AGC value>. **Parameters:** <paths> (Number of transmit paths) • 1 (Tx) <agc> (Tx AGC value in dBm) • Valid range: -70 to +23 <rbi> • Start resource block index <rbn> (Number of resource blocks) • Valid range: 0–50 <pa> (PA gain state) • Valid range: 0–3 <txgi> • Tx gain index <mtpl> (Max Tx power limit) • Max value: +23 <iq> • Digital IQ gain scaling <mpr> (Maximum power reduction) • See 3GPP 36.101 for details <ampr> (Additional Max power reduction) • See 3GPP 36.101 for details <ns> (Network Signaled (NS) value) • See 3GPP 36.101 for details (Continued on next page)

Table 5-2: Test command details (Continued)

Command	Description

!DALGTXAGC (continued)	**Return Tx AGC value and transmitter parameters (LTE only) (continued)**
	
	<mode> (HDET (power detector) mode)
	• Valid values:
	  • L (Lower power)
	  • H (Higher power)
	
	<padc>
	• HDET ADC
	
	<pdbm>
	• HDET dBm
	
	<traw> (Raw thermistor ADC value)
	• Valid range: 0–4095
	
	<tscaled> (Scaled thermistor value)
	• Valid range: 0–255
	• Value is scaled from <traw> based on calibrated min/max <traw> values for the supported temperature range.
	
	<tidx> (Temperature compensation bin)
	• Valid range: 0–7
	
	<trem>
	• Temperature compensation remainder bin

Table 5-2: Test command details (Continued)

Command	Description
!DALTXCONTROL	**Configure LTE Tx parameters (LTE only)** Configure LTE Tx parameters, including Tx power, waveform, modulation, net signal values, number of resource blocks, and start resource block. **Requirements:** Before using this command: • **!DAFTMACT** must be issued to put the modem into FTM. • **!DARCONFIG** must be issued to set the technology, band, and channel. **Password required:** Yes **Usage:** • Execution: **AT!DALTXCONTROL=<carrier><enable>,[<tx_pwr>,<waveform>, <mod>,<ns_val>,<start_RB>,<num_RB>** Response: OK Purpose: Set the LTE Tx parameters. **Parameters:** <carrier> (Carrier ID) • 0—PCC <enable> (Enable/disable Tx power output) • 0—Disable • 1—Enable <tx_pwr> (Desired Tx power in dBm) • Valid range: -57 to 23 • Value is ignored if <enable>=0. <waveform> (Tx waveform) • 1 — LTE PUSCH (Physical Uplink Shared Channel) • 2 — LTE PUCCH (Physical Uplink Control Channel) • 3 — LTE PRACH (Physical Random Access Channel) • 4 — LTE SRS (Sounding Reference Signal) • 5 — UpPTS (Uplink Pilot Time Slot) <mod> (Tx modulation) • 0—QPSK • 1—16 QAM • 2—64 QAM <ns_val> (LTE NS (Net Sig)) • Valid range: 1–32 • This value affects maximum output power. <num_RB> (Number of resource blocks • Valid range: 0–100 <start_RB> (PUSCH starting resource block index) • Valid range: 0–255

Table 5-2: Test command details (Continued)

Command	Description
!DAOFFLINE	**Place modem offline** Put the modem offline. **Password required:** Yes **Usage:** • Execution: **AT!DAOFFLINE** Response: OK Purpose: Put the modem offline. **Parameters:** None
!DARCONFIG	**Set Band and Channel** Configure and tune the module's radio to a specific RAT, band, and channel. **Requirements:** Before using this command: • **!DAFTMACT** must be issued to put the modem into FTM. **Password required:** Yes **Usage:** • Execution: **AT!DARCONFIG=<carrier>,<technology>,<band>,<channel>[,<lte_bw>]** Response: OK Purpose: Set the selected RAT's band and channel (and bandwidth, for LTE). **Parameters:** <carrier> (Carrier ID) • 0—PCC <technology> (Radio access technology (RAT)) • RAT support is device-dependent • 0—CDMA • 1—WCDMA • 2—GSM • 3—LTE <band> (Band number) • Valid range: 1–71 • e.g. '1' is LTE B1 or WCDMA B1 <channel> (Uplink channel number for selected <band>) • Integer value • <band>-dependent <lte_bw> (LTE bandwidth) • 0—1.4 MHz • 1—3 MHz • 2—5 MHz • 3—10 MHz • 4—15 MHz • 5—20 MHz

Table 5-2: Test command details (Continued)

Command	Description
!DARCONFIGDROP	**Drop Radio Configurations** Drop the radio configurations that were previously set using !DARCONFIG. This command must be used when switching between technologies (RATs). **Requirements:** Before using this command: • **!DAFTMACT** must be issued to put the modem into FTM. **Password required:** Yes **Usage:** • Execution: **AT!DARCONFIGDROP=<technology>** Response: OK Purpose: Drop the current configurations for the selected RAT (<technology>). **Parameters:** <technology> (Radio access technology (RAT)) • RAT support is device-dependent • 0—CDMA • 1—WCDMA • 2—GSM • 3—LTE
!DAWTXCONTROL	**Configure WCDMA Tx Power (WCDMA only)** Configure the Tx power for WDCMA. **Requirements:** Before using this command: • The modem must be in WCDMA mode. • **!DAFTMACT** must be issued to put the modem into FTM. • **!DARCONFIG** must be issued to set the technology, band, and channel. **Password required:** Yes **Usage:** • Execution: **AT!DAWTXCONTROL=<enable>,<power_dBm>** Response: OK Purpose: Set the WCDMA Tx parameters. **Parameters:** <enable> (Enable/disable Tx power output) • 0—Disable • 1—Enable <power_dBm> (Desired Tx power in dBm) • Valid range: -57 to 23 • Value is ignored if <enable>=0.

6: Memory Management Commands

Introduction

The modem uses non-volatile memory to store:

- Factory calibration data
- Settings made in a host application

The commands in this chapter allow you to back up and restore the data in non-volatile memory.

Command summary

The table below lists the commands described in this chapter:

Table 6-1: Memory management commands

Command	Description	Page
!NVBACKUP	Back up device configuration	75
!RMARESET	Restore device to saved restore point	77

Command reference

Table 6-2: Memory management command details

Command	Description
!NVBACKUP	**Back up device configuration** Save the device's current configuration as a 'restore point'. The restore point can then be restored at a later time if necessary, using !IRMARESET on page 77. **Password required:** No **Usage:** • Execution: **AT!NVBACKUP=<restore point>[,<name>]** Response: !NVBACKUP: Items Saved: <saved> Items Skipped: <skipped> OK Purpose: Save the current device configuration to the indicated <restore point>. Note: The restore point replaces the existing same-numbered restore point (if present), and deletes higher-numbered restore points. • Query: **AT!NVBACKUP?** Response: !NVBACKUP: <restore point> <name> ... OK Purpose: Display all available restore points. **Usage notes:** • When saving a restore point: • The existing <restore point> is replaced (if present). • Higher-numbered restore points are deleted. • If a <name> is not specified, the file is saved as "unnamed" or "Latest", depending on the <restore point>. **Parameters:** <restore point> (Type of saved restore point) • Valid range: 0–3 • 0 — Factory-calibrated configuration (Cannot be replaced) • 1 — Sierra-provided SKU configuration (Cannot be replaced) • 2 — Save the current configuration using a specified file <name>. If no <name> is specified, save as "unnamed". • 3 — Save the current configuration as the 'Latest' restore point. Note: The category 3 restore point is also generated automatically after a successful reconfiguration (e.g. after an image switch or firmware update). (Continued on next page)

Table 6-2: Memory management command details (Continued)

Command	Description

!NVBACKUP (continued)	**Back up device configuration (continued)**
	
	<name> (Name used to store the restore point)
	• 0–32 ASCII characters
	  • <restore point> = 0—“Factory” (Factory-calibrated configuration, pre-SKU)
	  • <restore point> = 1—“Provision” (Sierra-provisioned SKU configuration)
	  • <restore point> = 2—User-defined name provided when restore point was saved, or “unnamed” if no name was provided
	  • <restore point> = 3—“Latest” (Latest saved configuration)
	
	<saved> (Number of saved items)
	• 0–(2^{32} - 1)
	
	<skipped> (Number of skipped items)
	• 0–(2^{32} - 1)
	• Note: Does not display if 0

Table 6-2: Memory management command details (Continued)

Command	Description
!RMARESET	**Restore device to saved restore point** Restore the device to a previously saved restore point. (To save a restore point, see !NVBACKUP on page 75.) **Password required:** Yes **Reset required to apply changes:** Yes **Usage:** • Execution: **AT!RMARESET=<restore point>** Response: !RMARESET: DEVICE REBOOT REQUIRED Items Restored: <restored count> Items Deleted: <deleted count> Items Defaulted: <defaulted count> Items Skipped: <skipped count> OK Purpose: Restore device to the specified <restore point> (configuration). A reboot is required to take effect. • Query: **AT!RMARESET?** Response: !RMARESET: <restore point> <name> ... OK Purpose: Display all available restore points. **Parameters:** <restore_point> (Saved restore point) • 0 — Factory-calibrated configuration (Note: For information only, cannot be restored.) • 1 — Sierra-provided SKU configuration • 2 — Restore to the restore point that was saved earlier using !NVBACKUP on page 75. • 3 — Restore to the latest saved restore point (saved earlier using !NVBACKUP or automatically when the device was successfully reconfigured, e.g. after an image switch or firmware update) <name> (Descriptive name of <restore_point>) • ASCII string, varies by <restore point>: • <restore point> = 0—“Factory” (Factory-calibrated configuration, pre-SKU) • <restore point> = 1—“Provision” (Sierra-provisioned SKU configuration) • <restore point> = 2—User-defined name provided when using !NVBACKUP to save a configuration, or “unnamed” if no name was provided • <restore point> = 3—User-defined name provided when using !NVBACKUP to save a configuration, or “Latest” (Latest saved configuration)

7: GNSS Commands

Introduction

This chapter describes commands used to access GNSS functionality in supporting modules.

When using these commands, the following considerations apply:

- GNSS is typically enabled by default; however, it may be disabled by default for some SKUs. If so, enable GNSS using **AT!CUSTOM="GPSENABLE"**
- If supported by the modem, gpsOneXTRA is enabled (over the NDIS interface) by default when GNSS is enabled, and it generates data traffic.

Command summary

The table below lists the commands described in this chapter.

Table 7-1: GNSS commands

Command	Description	Page
!GNSSCONFIG	Set/report GNSS satellite constellation support	80
!GNSSNMEASENTENCE	Set/report NMEA 4.11 sentence type	80
!GPSAUTOSTART	Configure GPS auto-start features	82
!GPSCLRASSIST	Clear specific GPS assistance data	83
!GPSCOLDSTART	Clear all GNSS assistance data	84
!GPSCONF	Set/report GPS SUPL settings	85
!GPSELNA	Enable/disable GNSS LNA	86
!GPSEND	End an active session	86
!GPSFIX	Initiate GPS position fix	87
!GPSLBSAPN	Set GPS LBS APNs	88
!GPSLOC	Return last known location of the modem	90
!GPSMOMETHOD	Set/report GPS MO method	91
!GPSNMEACONFIG	Enable and set NMEA data output rate	92
!GPSNMEASENTENCE	Set/report NMEA 3.0 sentence type	93
!GPSPORTID	Set/report port ID to use over TCP/IP	94
!GPSPOSMODE	Set/report GPS Position Modes Support	95
!GPSSATINFO	Request satellite information	96
!GPSSTATUS	Request current status of a position fix session	97
!GPSSUPLURL	Set/report SUPL server URL	98

Table 7-1: GNSS commands (Continued)

Command	Description	Page
!GPSSUPLVER	Set/report SUPL server version	98
!GPSTRACK	Initiate local tracking (multiple fix) session	99
!GPSXTRAAPN	Set GPS XTRA APN	100
!GPSXTRADATAENABLE	Set/report GPS XTRA data configuration settings	101
!GPSXTRADATAURL	Set/report GPS XTRA data server URLs	102
!GPSXTRAINITDNLD	Initiate gpsOneXTRA data download and inject operation	103
!GPSXTRASTATUS	Return current status of gps OneXTRA	104
!GPSXTRATIMEENABLE	Set/report GPS XTRA time configuration settings	105
!GPSXTRATIMEURL	Set/report GPS XTRA SNTP server URL	106
+WANT	Enable/disable GNSS antenna power	107

Command reference

Table 7-2: GNSS command details

Command	Description
!GNSSCONFIG	**Set/report GNSS satellite constellation support** Configure GNSS satellite constellation support by enabling/disabling specific constellations. **Password required:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!GNSSCONFIG=<gps>,<glo>,<bds>,<gal>,<qzs>** Response: OK *or* ERROR Purpose: Enable/disable each of the GNSS satellite constellations. • Query: **AT!GNSSCONFIG?** Response: GPS: <gps> GLONASS: <glo> BDS: <bds> GAL: <gal> QZSS: <qzs> OK Purpose: Display the current support for each satellite constellation. • Query List: **AT!GNSSCONFIG=?** Purpose: Display valid execution format and parameter options. **Parameters:** <gps> (GPS constellation support) • 1—Enable (Note—GPS cannot be disabled.) <glo> (GLONASS constellation support) • 0—Disable • 1—Enable <bds> (BeiDou constellation support) • 0—Disable • 1—Enable worldwide • 2—Enable outside US <gal> (Galileo constellation support) • 0—Disable • 1—Enable worldwide • 2—Enable outside US <qzss> (QZSS constellation support) • 0—Disable • 1—Enable worldwide • 2—Enable outside US

Table 7-2: GNSS command details (Continued)

Command	Description
!GNSSNMEASENTENCE	**Set/report NMEA 4.11 sentence type** Set or report the current GPS NMEA 4.11 sentence types configuration. **Requirements:** • NMEA streaming must be enabled using **!GPSNMEA** before this command will work. **Password required:** Yes **Usage:** • Execution: **AT!GNSSNMEASENTENCE=<nmea type>** Response: OK *or* ERROR Purpose: Enable or disable NMEA 4.11 sentence types. • Query: **AT!GNSSNMEASENTENCE?** Response: !GNSSNMEASENTENCE: <nmea type> OK Purpose: Indicate the currently enabled GNSS NMEA 4.11 sentence types configuration. • Query List: **AT!GNSSNMEASENTENCE=?** Response: !GNSSNMEASENTENCE: (00-1FFFFF) OK Purpose: Indicates Execution format. See parameter description below for details of supported values. **Parameters:** <nmea type> (NMEA sentence types mask) • 2-byte hex format mask (Note: In the execution format, do not include '0x' before the mask value) • Each bit: 0—Disabled; 1—Enabled • Bits 0–5 correspond to specific NMEA sentence types. Bits 6–10 correspond to specific satellite navigation constellations. The mask is used to enable specific sentence types for all selected constellations. For example, to enable GGA and VTG sentences for GPS, GLONASS, and Galileo, set <nmea type> = 1C9 (i.e., enable bits 0, 3, 6, 7, 8) • Bit 0: GGA (Position fix data) • Bit 1: RMC (Recommended minimum data) • Bit 2: GSA (Overall satellite data) • Bit 3: VTG (Vector track and speed over the ground) • Bit 4: GNS (Time, position, and fix-related data) • Bit 5: DTM (Datum reference information) • Bit 6: GPS constellation • Bit 7: GLONASS constellation • Bit 8: GALILEO constellation • Bit 9: QZSS constellation • Bit 10: BEIDOU constellation • Bit 11–31: Reserved

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSAUTOSTART	**Configure GPS auto-start features** Configure the GPS auto-start features. Any changes take effect the next time the modem is reset. *Note: If auto-start is enabled, another GPS session cannot be started.* **Password required:** No **Usage:** • Execution: **AT!GPSAUTOSTART=<function>[, <fixtype>, <maxtime>, <maxdist>, <fixrate>]** Response: OK *or* ERROR Purpose: Assign start values for various GPS settings • Query: **AT!GPSAUTOSTART?** Response: !GPSAUTOSTART function: <function> fixtype: <fixtype> maxtime: <maxtime> seconds maxdist: <maxdist> meters fixrate: <fixrate> seconds OK Purpose: Display the current values for auto-start features • Query List: **AT!GPSAUTOSTART=?** Purpose: Return the expected command format. **Parameters:** <function> (Enable/disable the feature) • 0 — Disabled • 1 — Enabled at boot (GPS tracking session starts automatically when modem is reset) • 2 — Enabled when NMEA port is opened <fixtype> (Type of fix to establish) • 1 — Standalone (not supported by a mobile station) • 2 — MS-based only • 3 — MS-assisted only <maxtime> (Maximum time to wait for a position fix) • Valid range: 0–255—Number of seconds to wait <maxdist> (Requested accuracy of fix) • Entered in decimal format • Valid range: • 0–4294967279 meters • 4294967280 — No preference <fixrate> (Time to wait between fixes) • Valid range: 1–65535 seconds

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSCLRASSIST	**Clear specific GPS assistance data** Clear one or more types of assistance data from the modem. This forces a cold start for GPS acquisition the next time a session starts. The command is only available when there is no active GPS session—the GPS receiver is off and no position fix is being calculated. This command is equivalent to **!GPSCOLDSTART** when all parameters (except <alm>) are set to '1'. **Password required:** Yes **Usage:** • Execution: **AT!GPSCLRASSIST=<eph>, <alm>, <pos>, <time>, <iono>** Response: OK *or* Command ignored OK Purpose: Clear each assistance data type that is flagged as '1'. • Query List: **AT!GPSCLRASSIST=?** Purpose: Return the expected command format and supported values. **Parameters:** <eph> (Ephemeris assistance data) • 0 — Ignore (Do not clear the ephemeris assistance data) • 1 — Clear this assistance data type—Clears GPS, GLONASS, and SBAS ephemeris assistance data. <alm> (Almanac assistance data) • 0 — Ignore (Do not clear the almanac assistance data) • 1 — Clear this assistance data type—Clears GPS, GLONASS, and SBAS almanac assistance data. <pos> (Position assistance data) • 0 — Ignore (Do not clear the position assistance data) • 1 — Clear this assistance data type <time> (Time reference) • 0 — Ignore (Do not clear the time reference) • 1 — Clear the time reference <iono> (Ionosphere assistance data) • 0 — Ignore (Do not clear the ionosphere assistance data) • 1 — Clear this assistance data type

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSCOLDSTART	**Clear all GNSS assistance data** Clear GNSS assistance details from the modem and put the modem into a coldstart state. Data cleared includes Ephemeris, Previous Position, Ionosphere, and GPS time—almanac data is not cleared. This forces a cold start for GPS acquisition the next time a session starts. The command is only available when there is no active GPS session—the GPS receiver is off and no position fix is being calculated. **Requirements:** • Before using this command, end all active GNSS sessions using **AT!GPSEND=0,255** **Password required:** Yes **Usage:** • Execution: **AT!GPSCOLDSTART** Response: OK Purpose: Clear the modem's GPS details **Parameters:** None

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSCONF	**Set/report GPS SUPL settings** Set or report GPS SUPL settings in the GPS configure file (gps.conf). Any changes take effect the next time the modem is reset. **Password required:** Yes **Reset required to apply changes:** Yes **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!GPSCONF=<item>,<value>** Response: OK *or* ERROR Purpose: Set the GPS SUPL settings. • Query: **AT!GPSCONF?** Response: <value1>,<value2>,<value3>,<value4> OK Purpose: Return the GPS SUPL settings. Note—If an item value has been changed using the Execution format, this response shows the new value but the new value does not take effect until the modem is reset. • Query List: **AT!GPSCONF=?** Purpose: Return the execution format and valid parameter values. **Parameters:** <item> (GPS SUPL configuration item) • 1—Emergency SUPL • 2—Emergency PDN • 3—SUPL APN • 4—SUPL IP type <value>, <value1>, <value2>, <value3>, <value4> (GPS SUPL configuration item value) • The <value> entered in the Execution format is for the corresponding <item>, and the Query response displays the values for each <item> as <value1> ... <value4>. • Valid values are <item>-dependent: • <value1> (Value for item 1—Emergency SUPL) • 0—Disable • 1—Enable • <value2> (Value for item 2—Emergency PDN) • 0—Disable • 1—Enable • <value3> (Value for item 3—SUPL APN) • SUPL APN URL (e.g., google.supl.com) • Quotation marks not required for Execution format (e.g., google.supl.com) • Quotation marks are included in Query response (e.g., “google.supple.com”) • <value4> (Value for item 4—SUPL IP type) • 4—IP type v4 (IPv4) • 6—IP type v6 (IPv6) • 10—IP type v4 and v6 (IPv4v6)

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSELNA	**Enable/disable GNSS LNA** Enable or disable the GNSS LNA inside the module. **Password required:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!GPSELNA=<enable>** Response: OK *or* ERROR Purpose: Enable or disable the GNSS LNA inside the module. • Query: **AT!GPSELNA?** Response: Preferred: <enable> Current: <enable> OK Purpose: Return the preferred GNSS eLNA state and the current state. • Query List: **AT!GPSELNA=?** Purpose: Return valid execution format and parameter values. **Parameters:** <enable> (GNSS eLNA state) • 0—Disable • 1—Enable when GNSS starts fix • 2—Enable when GNSS starts fix and GNSS antenna power (+WANT) is disabled
!GPSEND	**End an active session** End an active position fix session. **Password required:** No **Usage:** • Execution: **AT!GPSEND=<sessType>[, <sessionID>]** Response: ERRCODE = <value> OK *or* OK Purpose: End the current session. **Parameters:** <sessType> (Type of session to end) • 0 — Position fix session <sessionID> (ID of the session to end) • 255 — End all sessions • 0–254 — Reserved <value> (Error code returned when command fails for any reason) • See Table 7-3 on page 107 for a list of possible error codes. • N/A — Not available

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSFIX	**Initiate GPS position fix** Initiate a GPS position fix. **Password required:** No **Usage:** • Execution: **AT!GPSFIX=<fixType>, <maxTime>, <maxDist>** Response: Fix initiated OK *or* ERROR CODE = <value> OK Purpose: Initiate a time-limited position fix with a specified accuracy. • Query List: **AT!GPSFIX=?** Purpose: Return supported <fixType>, <maxTime>, and <maxDist> values. **Parameters:** <fixType> (Type of fix to establish) • 1 — Standalone (not supported by a mobile station) • 2 — MS-based only • 3 — MS-assisted only <maxTime> (Maximum time to wait for a position fix) • Valid range: 0–255 seconds <maxDist> (Requested accuracy of fix) • Entered in decimal format • Valid range: • 0–4294967279 meters • 4294967280 — No preference <value> (Error code returned when command fails for any reason) • See Table 7-3 on page 107 for a list of possible error codes. • N/A—Not available **Example(s):** • Request a standalone position fix to 10 meters accuracy: `AT!GPSFIX=1,15,10` ← *The request will fail (timeout) if the modem cannot determine a position fix within 15 seconds.* **Related commands:** • **!GPSSTATUS** (page 97)—Use this command while the tracking session is in progress. • **!GPSLOC** (page 90)—Use this command after the session completes to obtain the result.

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSLBSAPN	**Set GPS LBS APNs** Set the GPS LBS APNs to be used for various RATs (Radio Access Technologies). **Password required:** Yes **Usage:** • Execution (Add): **AT!GPSLBSAPN=<operation>,<ratmask>,<IPtype>,<APN>** Execution (Delete one): **AT!GPSLBSAPN=<operation>,<ratmask>** Execution (Delete all): **AT!GPSLBSAPN=<operation>** Response: OK *or* ERROR Purpose: Set the APN to be used for the specified <ratmask>, or delete the APN for a single <ratmask> or all RATs. • Query: **AT!GPSLBSAPN?** Response: <ratmask>, <IPType>, <APN> <ratmask>, <IPType>, <APN> ... OK *or* OK *(if no ID has been set)* Purpose: Display the APNs currently assigned for each RAT. • Query List: **AT!GPSLBSAPN=?** Purpose: Display valid parameter options. **Parameters:** <operation> (Add or delete APNs) • 1 — Add an APN for a specific <ratmask> and <IPtype>. Note: All parameters are required. *Note: To change an APN that has been set for a RAT, you must first delete the current APN, then add the new APN.* • 2 — Delete the APN for a specific <ratmask> Note: Only <ratmask> is required. • 3—Delete all APNs Note: No other parameters are required. <ratmask> (Radio access technology) • Valid values (values shown are in hexadecimal format): • 01 — CDMA • 02 — HDR • 04 — GSM • 08 — WCDMA • 10 — LTE (Continued on next page)

Table 7-2: GNSS command details (Continued)

Command	Description

!GPSLBSAPN (continued)	**Set GPS LBS APNs (continued)**
	
	<IPtype> (Internet Protocol version)
	• Character string, entered without quotation marks
	• Valid values:
	  • IPV4
	  • IPV6
	  • IPV4V6
	
	<APN> (Access Point Name)
	• Character string, entered with quotation marks
	• Examples: “mycompany.mnc987.mcc123.gprs”, “ourinternet”

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSLOC	**Return last known location of the modem** Return the details obtained during the most recent position location session, if available. **Password required:** No **Usage:** • Query: **AT!GPSLOC?** Response: Unknown *(No information is available)* OK *or* Not Available *(No information is available)* OK *or* Lat: <latitude> Lon: <longitude> Time: <time> LocUncAngle: <luAngle> LocUncA: <luA> LocUncP: <luP> HEPE: <hepe> <fixType> Altitude: <altitude> LocUncVe: <luV> Heading: <heading> VelHoriz: <vH> VelVert: <vV> OK *(Altitude and heading only appear if data was collected as part of the most recent fix.)* Purpose: Return last position location details. **Parameters:** <latitude> (Latitude at last position fix) • Example: “49 Deg 10 Min 21.49 Sec N (0x008BDE6C)” <longitude> (Longitude at last position fix) • Example: “123 Deg 4 Min 14.76 Sec W (0xFEA1EE9A)” <time> (Time at which last position fix was taken) • Example: “2009 01 30 4 20:27:18 (GPS)” <luAngle> (Location uncertainty angle of returned position) • Example: “11.2 deg” <luA> (Standard deviation of axis along <luAngle>) • Example: “6.0 m” <luP> (Standard deviation of axis perpendicular to <luAngle>) • Example: “6.0 m” <hepe> (Horizontal Estimated Positional Error) • Example: “8.485 m” <fixType> (2D or 3D fix) • Example: “2D Fix” or “3D Fix” <altitude> (Altitude in meters at which last position fix was taken) • Only present if <fixType> is 3D • Example: “-1 m” <luV> (Vertical uncertainty in meters) • Only present if <fixType> is 3D • Example: “3.0 m” (Continued on next page)

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSLOC (continued)	**Return last known location of the modem (continued)** <heading> (Direction of MS) • Example: “0.0 deg” <vH> (Horizontal velocity) • Example: “0.0 m/s” <vV> (Vertical velocity) • Example: “0.0 m/s”
!GPSMOMETHOD	**Set/report GPS MO method** Set or report the GPS MO method (session type) that a mobile-originated GPS session should use (Control plane or User plane). **Password required:** Yes **Reset required to apply changes:** Yes **Usage:** • Execution: **AT!GPSMOMETHOD=<MO_method>** Response: OK *or* ERROR Purpose: Indicate the MO method to use. • Query: **AT!GPSMOMETHOD?** Response: <MO_method> OK Purpose: Return the current <MO_method> setting. **Parameters:** <MO_method> (MO method) • 0 — CP (Control Plane) • 1 — UP (User Plane)

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSNMEACONFIG	**Enable and set NMEA data output rate** Enable or disable NMEA data output, and set the output rate for use with !GPSTRACK. **Requirements:** • NMEA streaming must be enabled using **!GPSNMEA** before this command will work. **Password required:** Yes **Usage:** • Execution: **AT!GPSNMEACONFIG=<enable>[,<outputRate>]** Response: OK *or* ERROR Purpose: Enable or disable NMEA output and set rate. • Query: **AT!GPSNMEACONFIG?** Response: Enabled: <enable> Output Rate: <outputRate> OK Purpose: Return the current <timeout> period. • Query List: **AT!GPSNMEACONFIG=?** Purpose: Return valid parameter values. **Parameters:** <enable> (Enable/disable NMEA data output) • 0—Disable. (Note: <outputRate> is ignored) • 1—Enable NMEA 3.0 (Note: <outputRate> is required) • 2—Enable NMEA 4.11 (Note: <outputRate> is reqiured) <outputRate> (NMEA data output rate—time between outputs) • Valid range: 1–255 seconds

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSNMEASENTENCE	**Set/report NMEA 3.0 sentence type** Set or report the current GPS NMEA 3.0 sentence types. **Requirements:** • NMEA streaming must be enabled using **!GPSNMEA** before this command will work. **Password required:** Yes **Usage:** • Execution: **AT!GPSNMEASENTENCE=<nmea type>** Response: OK *or* ERROR Purpose: Enable or disable NMEA sentence types. • Query: **AT!GPSNMEASENTENCE?** Response: !GPSNMEASENTENCE: <nmea type> OK Purpose: Indicate the currently enabled GPS NMEA sentence types. • Query List: **AT!GPSNMEASENTENCE=?** Response: !GPSNMEASENTENCE: (00-1FFFFF) OK Purpose: Indicates Execution format. See parameter description below for details of supported values. **Parameters:** <nmea type> (NMEA sentence types) • 2-byte hex format mask (Note: In the execution format, do not include '0x' before the mask value) • Each bit: 0 — Disabled; 1 — Enabled • Bit 0: GPGGA (GPS fix data) • Bit 1: GPRMC (GPS recommended minimum data) • Bit 2: GPGSV (GPS satellites in view) • Bit 3: GPGSA (GPS overall satellite data) • Bit 4: GPVTG (GPS vector track and speed over the ground) • Bit 5: Reserved • Bit 6: GLGSV (GLONASS satellites in view) • Bit 7: GNGSA (GLONASS overall satellite data) • Bit 8: GNGNS (Time, position, and fix related data for GPS/GLONASS/Galileo receiver) • Bit 9: GARMC (Galileo recommended minimum data) • Bit 10: GAGSV (Galileo satellites in view) • Bit 11: GAGSA (Galileo overall satellite data) • Bit 12: GAVTG (Galileo Vector track and speed over the ground) • Bit 13: PSTIS (GPS session start indication) • Bit 14: Reserved • Bit 15: GAGGA (Galileo time, position, and fix related data) • Bit 16: PQGSA (QZSS GSA) • Bit 17: PQGSV (QZSS GSV) • Bit 18: Reserved • Bit 19: GPDTM (GPS datum reference information) • Bit 20: Proprietary sentences for debugging

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSPORTID	**Set/report port ID to use over TCP/IP** Set or report the port ID of the SUPL server to use when using TCP/IP as the transport mechanism for SUPL. The command can also be used when the FQDN is auto-generated from the IMSI. **Password required:** Yes **Usage:** • Execution: **AT!GPSPORTID=<portid>** Response: OK *or* ERROR Purpose: Queue the request to set the port ID. • Query: **AT!GPSPORTID?** Response: <portid> OK Purpose: Return the port ID currently being used **Parameters:** <port ID> (Port ID to use over TCP/IP) • Valid range: 0–65535 **Related commands** • !GPSSUPLURL (p.98)—Set/return SUPL server URL used for TCP/IP

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSPOSMODE	**Set/report GPS Position Modes Support** Set or report supported GPS positioning modes. **Password required:** Yes **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!GPSPOSMODE=<mask>** Response: OK *or* ERROR Purpose: Set the supported GPS positioning modes. • Query: **AT!GPSPOSMODE?** Response: MASK: <mask> OK Purpose: Display the supported GPS positioning modes. • Query List: **AT!GPSPOSMODE=?** Response: !GPSNMEASENTENCE: (00-1FFFFF) OK Purpose: Display valid execution format and parameter values. **Parameters:** <mask> (GPS positioning modes bitmask) • Bitmask entered in hex format (leading '0x' is not required). Example: AT!GPSPOSMODE=1f • Each bit enables a supported positioning mode: • Bit 0—Standalone • Bit 1—UP MS-based • Bit 2—UP MS-assisted • Bit 3—CP MS-based (2G) • Bit 4—CP MS-assisted (2G) • Bit 5—CP MS-based (3G) • Bit 6—CP MS-assisted (3G) • Bit 7—UP network measurement report (2G) • Bit 8—UP MS-based (4G) • Bit 9—UP MS-assisted (4G) • Bit 10—CP MS-based (4G) • Bit 11—CP MS-assisted (4G) • Bits 12–15 —Reserved • Bit 16—Enabling of autonomous fallback for SUPL-MSB • Bit 17—A-GLONASS UP MS-based (3G) • Bit 18—A-GLONASS UP MS-assisted (3G) • Bit 19—A-GLONASS CP MS-based (3G) • Bit 20—A-GLONASS CP MS-assisted (3G) • Bit 21—A-GLONASS UP MS-based (4G) • Bit 22—A-GLONASS UP MS-assisted (4G) • Bit 23—A-GLONASS CP MS-based (4G) • Bit 24—A-GLONASS CP MS-assisted (4G) **Related commands** • !GPSSUPLURL (p.98)—Set/return SUPL server URL used for TCP/IP

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSSATINFO	**Request satellite information** Return the following information for satellites in view (including those used in the latest position fix): satellite vehicle number (SV), elevation (ELEV), azimuth (AZI), and signal to noise ratio (SNR). The information returned is valid regardless of the current fix mode or whether the PDE or the modem performs the fix calculations. **Password required:** No **Usage:** • Query: **AT!GPSSATINFO?** Response: NO SAT INFO OK *or* Satellites in view: <numSats> (Timestamp of sat. info) * SV: <SV 1> ELEV:<ELEV 1> AZI:<AZI 1> SNR:<SNR 1> SV: <SV 2> ELEV:<ELEV 2> AZI:<AZI 2> SNR:<SNR 2> * SV: <SV 3> ELEV:<ELEV 3> AZI:<AZI 3> SNR:<SNR 3> SV: <SV 4> ELEV:<ELEV 4> AZI:<AZI 4> SNR:<SNR 4> ... * SV: <SV n> ELEV:<ELEV n> AZI:<AZI n> SNR:<SNR n> OK Purpose: Return the number of satellites in view (including those used in the latest position fix) and details for each satellite (or return an error message). *Note: An asterisk (*) at the beginning of a line indicates the satellite was used in the fix location calculation.* **Parameters:** <numSats> (Number of satellites in view) • Integer, ≥ 1 <SV n> (Satellite vehicle number for the nth satellite in the list) • Valid ranges: • 1–32 (GPS) • 65–96 (GLONASS) • 193–197 (QZS) • 201–237 (BeiDou) • 301–336 (Galileo) <ELEV n> (Satellite elevation relative to modem location, in degrees) • Valid range: 0–90 <AZI n> (Satellite azimuth relative to modem location, in degrees) • Valid range: 0–360 <SNR n> (Signal to noise ratio, in dB) • Valid range: 0–99

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSSTATUS	**Request current status of a position fix session** Return the current status of a position fix session. **Password required:** No **Usage:** • Query: **AT!GPSSTATUS?** Response: <year> <month> <day> <day of week> <time of day> Last Fix Status = <status> <year> <month> <day> <day of week> <time of day> Fix Session Status = <status> Purpose: Return timestamps and status of a position fix session. **Parameters (Timestamp):** <year> • Example: “2007” <month> • 01–12 (Jan–Dec) <day> • 01–31 <day of week> • 0–6 (0=Monday) <time of day> • 24-hour clock format • Example: “13:25:48” **Parameters (Status):** <status> (Session status) • “NONE”: No session of this type has occurred since the modem powered up. • The timestamp is the current time. • “ACTIVE”: A session of this type is currently active. • The timestamp is the time when the session entered this state. • “SUCCESS”: The most recent session of this type succeeded. • The timestamp is the time when the previous session completed successfully. • “FAIL”: The most recent session of this type failed. • The timestamp is the time when the previous session failed. • An error code is displayed with the “FAIL” string. See Table 7-3 on page 107 for a list of error codes. **Example(s):** **AT!GPSSTATUS?** 2007 01 06 6 00:25:01 Last Fix Status = SUCCESS 2007 01 06 6 00:25:02 Fix Session Status = ACTIVE

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSSUPLURL	**Set/report SUPL server URL** Set or return the URL of the SUPL server to be used when TCP/IP is used as the transport mechanism for location processing. Use !GPSPORTID to set the port ID. **Password required:** Yes **Usage:** • Execution: **AT!GPSSUPLURL="<suplURL>"** Response: OK or ERROR Purpose: Identify the SUPL server URL. • Query: **AT!GPSSUPLURL?** Response: <suplURL> OK Purpose: Return the SUPL server's URL. • Query List: **AT!GPSSUPLURL=?** Purpose: Return the execution command format. **Parameters:** <suplURL> (SUPL server URL) • Must be a fully qualified domain name (FQDN) or address • Examples: "supl.url.net", "123.123.123.123" • The <suplURL> is not checked for correctness—if the string is invalid, the modem will not be able to perform MS-assisted GPS fixes. **Example(s):** • Set the SUPL server using a FQDN: **AT!GPSSUPLURL="supl.url.net"** • Set the SUPL server using an IP address: **AT!GPSSUPLURL="123.123.123.123"**
!GPSSUPLVER	**Set/report SUPL server version** Set or return the version of the SUPL server. **Password required:** Yes **Usage:** • Execution: **AT!GPSSUPLURL=<supl ver>"** Response: OK or ERROR Purpose: Identify the SUPL server version. • Query: **AT!GPSSUPLVER?** Response: <supl ver> OK Purpose: Return the SUPL server's version. • Query List: **AT!GPSSUPLVER=?** Purpose: Return the execution command format. **Parameters:** <supl ver> (SUPL server version) • 1—SUPL version 1 • 2—SUPL version 2

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSTRACK	**Initiate local tracking (multiple fix) session** Initiate a local tracking session comprising a specific number of position fixes taken at regular time intervals. **Password required:** No **Usage:** • Execution: **AT!GPSTRACK = <fixType>, <maxTime>, <maxDist>, <fixCount>, <fixRate>** Response: Fix initiated OK *or* ERROR CODE = <value> OK Purpose: Initiate a series of time-limited position fixes. • Query List: **AT!GPSTRACK=?** Purpose: Return supported <fixType>, <maxTime>, <maxDist>, <fixCount>, and <fixRate> values. **Parameters:** <fixType> (Type of fix to establish) • 1 — Standalone (not supported by a mobile station) • 2 — MS-based only • 3 — MS-assisted only <maxTime> (Maximum time to wait for satellite information) • Valid range: 0–255 seconds <maxDist> (Requested accuracy of fix) • Entered in decimal format • Valid range: • 0–4294967279 meters • 4294967280 — No preference <fixCount> (Number of position fixes requested) • Valid range: 1–1000 (1000—Take a continuous series of position fixes) <fixrate> (Amount of time to wait between fix attempts) • Valid range: 0–1799999 seconds **Failure conditions:** The request fails if the tracking session fails to initiate. If the request fails, the message ERROR CODE = <value> is returned. See Table 7-3 on page 107 for a list of error codes. *Note: The 'time to first fix' may require more time than subsequent fixes, if almanac, ephemeris, or location data needs to be updated. (Almanac data is valid for 3–4 days, ephemeris for 30–120 minutes, and location data for 4 minutes). To avoid a timeout error (time spent > <maxtime>), your application could precede the **!GPSTRACK** call with a single position fix (**AGPSFIX**) with a greater <maxTime> value.* (Continued on next page)

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSTRACK (continued)	**Initiate local tracking (multiple fix) session (continued)** **Example(s):** • Request a series of 20 standalone position fixes to 10 meters accuracy, with fixes taken every 60 seconds: **AT!GPSTRACK=1,15,10,20,60** One of the following responses will be received: • "OK" if the request is successful, or • "ERROR CODE = <value>" if the request fails for any reason. See Table 7-3 on page 107 for a list of error codes. **Related commands:** • **!GPSSTATUS**—Use this command while the tracking session is in progress. • **!GPSLOC**—Use this command after the session completes to obtain the result.
!GPSXTRAAPN	**Set GPS XTRA APN** Set the GPS XTRA APN to be used for XTRA connections. **Password required:** Yes **Reset required to apply changes:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!GPSXTRAAPN=<apn_profile_id>** Response: OK or ERROR Purpose: Set the APN to be used for XTRA connections. • Query: **AT!GPSXTRAAPN?** Response: <apn_profile_id> OK Purpose: Display the APN profie ID for XTRA connections. • Query List: **AT!GPSXTRAAPN=?** Purpose: Display valid parameter options. **Parameters:** <apn_profile_id> (APN profile ID) • APN profile ID—This ID must be the same as the <cid> used by +CGDCONT to identify the APN. • Decimal format. • Valid range: 1–255

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSXTRADATAENABLE	**Set/report GPS XTRA data configuration settings** Enable/disable GPS XTRA data and configure GPS XTRA data configuration settings. **Password required:** Yes **Reset required to apply changes:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!GPSXTRADATAENABLE=<enable>[,<retries>,<retryInt>[,<dload>,<dloadInt>]]** Response: OK or ERROR Purpose: Enable/disable GPS XTRA data, and optionally set other configuration parameters. • Query: **AT!GPSXTRADATAENABLE?** Response: XTRA Data Enabled: <enable> XTRA Data Retry Number: <retries> XTRA Data Retry Interval: <retryInt> XTRA Data Autodownload Enabled: <dload> XTRA Data Autodownload Interval: <dloadInt> OK Purpose: Display the current GPS XTRA data settings. • Query List: **AT!GPSXTRADATAENABLE=?** Purpose: Display valid parameter values and execution command format. **Parameters:** <enable> (Enable/disable gpsOneXTRA functionality) • 0—Disable. Note—To fully disable gpsOneXTRA, this configuration must be disabled, and AT!GPSXTRATIMEENABLE=0 must be called to disable gpsOneXTRA time functionality. • 1—Enable <retries> (Number of download retries) • Valid range: 0–10 <retryInt> (Interval between download retries, in minutes) • Valid range: 1–120 <retries> (Number of download retries) • Valid range: 0–10 <retryInt> (Interval between download retries, in minutes) • Valid range: 1–120 <dload> (Enable/disable automatic downloads) • 0—Disable • 1—Enable <dloadInt> (Interval between automatic downloads, in hours) • Valid range: 1–168

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSXTRADATAURL	**Set/report GPS XTRA data server URLs** Set/report the URLs for up to three GPS XTRA data servers. **Password required:** Yes **Reset required to apply changes:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!GPSXTRADATAURL=<urlIndex>,<url>** Response: OK or ERROR Purpose: Set the URL of the primary, secondary, or tertiary data server. • Query: **AT!GPSXTRADATAURL?** Response: XTRA Primary Server: <url1> XTRA Secondary Server: <url2> XTRA Tertiary Server: <url3> OK Purpose: Display the URLs of the GPS XTRA data servers. **Parameters:** <urlIndex> (XTRA Data Server index) • 1—Primary server • 2—Secondary server • 3—Tertiary server <url> (Data server URL) • ASCII string, quotation marks and “https://” required Examples (Note—Dummy URLS shown as examples): • For url1: “https://path1.xtracloud.net/xtra3grcej.bin” • For url2: “https://path2.xtracloud.net/xtra3grcej.bin” • For url3: “https://path3.xtracloud.net/xtra3grcej.bin” • Maximum string length: 128 characters

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSXTRAINITDNLD	**Initiate gpsOneXTRA data download and inject operation** Initiate a gpsOneXTRA data download and inject operation using the data server specified in the !GPSXTRADATAURL command. **Password required:** Yes **Reset required to apply changes:** No **Persistent across power cycles:** No **Usage:** • Execution: **AT!GPSXTRAINITDNLD** Response: Xtra command sent successfully OK *or* Error code = <err> OK Purpose: Initiate the download and inject oepration. If the command fails, an error code (<err>) is returned. **Parameters:** <err> (Error code returned if command fails) • 1—GPS data injection failed • 3—Bad CRC for XTRA data file • 4—GPS subsystem busy • 5—Error reading xtra.bin file • 6—The XTRA data retrieved from the XTRA server is too old (exceeds the Time Of Applicability). • 7—GPS XTRA data disabled

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSXTRASTATUS	**Return current status of gps OneXTRA** Return the status of the most recent time and data injection operations. **Password required:** Yes **Reset required to apply changes:** No **Usage:** • Query: **AT!GPSXTRASTATUS?** Response: XTRA Time status: <timeStatus> XTRA Data status: <dataStatus> Validity Start: <timeStamp> Validity End: <timeStamp> OK Purpose: Return the status of the most recent time and data injection operations. **Parameters:** <timeStatus> • ASCII string. Note—Returned string does not include quotation marks (they are used in this description for clarity.) • Values: • "Unknown"—Default value if time injection operation has not been performed yet, or if the operation was incomplete. • "Valid"—GPS time injection succeeded • "Invalid"—GPS time injection failed <dataStatus> • ASCII string. Note—Returned string does not include quotation marks (they are used in this description for clarity.) • Values: • "Unknown"—Default value if data injection operation has not been performed yet, or if the operation was incomplete. • "Valid"—GPS data injection succeeded • "Invalid"—GPS data injection failed • "xtra.bin file has bad crc" • "GPS Busy, end current session first" • "bad TOA in xtra.bin file"—The XTRA data retrieved from the XTRA server is too old (exceeds the Time Of Applicability). <timeStamp> (GPS time stamp) • Format: <year> <month> <day> <dayOfWeek> <time> • <year>—4 digits (Example: 2008) • <month>—2 digits (01–12) • <day>—2 digits (01–31) • <dayOfWeek>—1 digit (0–6) where 0=Monday • <time>—Time of day (Example: 13:15:45) • Example: 2008 02 28 5 13:15:45 represents Thursday 28 Feb 2008 at 1:15:45 PM

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSXTRATIMEENABLE	**Set/report GPS XTRA time configuration settings** Enable/disable GPS XTRA time information and configure GPS XTRA time settings. **Password required:** Yes **Reset required to apply changes:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!GPSXTRATIMEENABLE=<enable>[,<thresh>,<delay>]** Response: OK or ERROR Purpose: Enable/disable GPS XTRA time information, and set other configuration parameters. • Query: **AT!GPSXTRATIMEENABLE?** Response: XTRA Time Info Enabled: <enable> XTRA Time Uncertainty Threshold: <thresh> XTRA Time Delay Threshold: <delay> OK Purpose: Display the current GPS XTRA time settings. • Query List: **AT!GPSXTRATIMEENABLE=?** Purpose: Display supported execution parameter values. **Parameters:** <enable> (Enable/disable gpsOneXTRA time information) • 0—Disable. Note—To fully disable gpsOneXTRA, this configuration must be disabled, and AT!GPSXTRADATAENABLE=0 must be called to disable gpsOneXTRA data functionality. • 1—Enable <thresh> (XTRA time uncertainty threshold, in ms) • Valid range: 100–30000 <delay> (Time to delay before retrying with backup server, in ms) • Valid range: 100–10000

Table 7-2: GNSS command details (Continued)

Command	Description
!GPSXTRATIMEURL	**Set/report GPS XTRA SNTP server URL** Set/report the URL for the GPS XTRA SNTP (Simple Network Time Protocol) server. **Password required:** Yes **Reset required to apply changes:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!GPSXTRATIMEURL=<url>** Response: OK or ERROR Purpose: Set the URL of the SNTP server. • Query: **AT!GPSXTRATIMEURL?** Response: XTRA SNTP Server: <url> OK Purpose: Display the URL of the SNTP server. • Query List: **AT!GPSXTRATIMEURL=?** Purpose: Display valid parameter options. **Parameters:** <url> (SNTP server URL) • ASCII string, quotation marks allowed but not required e.g., “time.xtracloud.net”; time.xtracloud.net • Maximum string length: 128 characters

Table 7-2: GNSS command details (Continued)

Command	Description

+WANT	**Enable/disable GNSS antenna power**
	
	Enable or disable GNSS antenna power (3.3V).
	Requirements:
	• Power will only be provided to the GNSS antenna power if:
	  • This command is used to enable the power, and
	  • GNSS is enabled using the AT!CUSTOM="GPSENABLE" customization, and
	  • The dedicated GPS antenna is selected using AT!CUSTOM="GPSSEL",0.
	Password required: No
	Persistent across power cycles: Yes
	Usage:
	• Execution: **AT+WANT=<enable>**
	Response: OK
	Purpose: Enable or disable the GNSS antenna power (3.3V).
	• Query: **AT+WANT?**
	Response: Preferred: <enable>
	Current: <enable>
	OK
	Purpose: Return the preferred GNSS antenna power state and the current GNSS antenna power state.
	• Query List: **AT+WANT=?**
	Purpose: Display valid execution format and parameter values.
	Parameters:
	<enable> (Enable/disable GNSS antenna power)
	• 0 — Disable
	• 1 — Enable

Error codes

Table 7-3 describes error codes that can be returned by **!GPSEND** (page 86), **!GPSSTATUS** (page 97), and **!GPSTRACK** (page 99).

Table 7-4 on page 108 describes error codes that can be returned by **!GPSFIX** (page 87)

Table 7-3: AT command error codes (!GPSEND, !GPSSTATUS, !GPSTRACK)

Error code	Description
1	Phone is GPS-locked
2	Session ended because of error condition
3	User ended the session
4	Timeout (for GPS search)

Table 7-4: AT command error codes (!GPSFIX)

Error code	Description
0	No error
1	Invalid client ID
2	Bad service parameter
3	Bad session type parameter
4	Incorrect privacy parameter
5	Incorrect download parameter
6	Incorrect network access parameter
7	Incorrect operation parameter
8	Incorrect number of fixes parameter
9	Incorrect server information parameter
10	Error in timeout parameter
11	Error in QOS accuracy threshold parameter
12	No active session to terminate
13	Session is active
14	Session is busy
15	Phone is offline
16	Phone is CDMA locked
17	GPS is locked
18	Command is invalid in current state
19	Connection failure with PDE
20	PDSM command buffer unavailable to queue command
21	Search communication problem
22	Temporary problem reporting position determination results
23	Error mode not supported
24	Periodic NI in progress
25	Unknown error
26	Unknown error

8: SIM Commands

Introduction

This chapter describes commands used to communicate with an installed (U)SIM.

Command summary

Table 8-1 lists the commands described in this chapter:

Table 8-1: SIM command passwords

Command	Description	Page
+CCID	Read active SIM ID (ICCID or EID)	110
!ICCID	Read SIM ICCID	111
!IMSIM	Update AUTO-SIM matching list	111
!UIMS	Select active SIM interface	113

Command reference

Table 8-2: SIM command details

Command	Description
+CCID	**Read active SIM ID (ICCID or EID)** Read the ICCID and/or EID from the active SIM or eSIM. **Password required:** No **Usage:** • Execution: **AT+CCID** Response: +CCID: [<iccid>][,<eid>] OK Purpose: Display the ICCID and/or EID of the active SIM/eSIM. **Parameters:** <iccid> (Integrated Circuit Card ID (ICCID) of the active SIM): • ASCII string (digits only, i.e. '0'–'9') • Length: 20 digits <eid> (Embedded Identity Document (EID) of the eSIM, if the eSIM is the active SIM): • ASCII string (digits only, i.e. '0'–'9') • Length: 32 digits **Example(s):** • Active SIM: Regular SIM (only <iccid> appears) **AT+ICCID** +CCID: 89860000000000000001 OK • Active SIM: eSIM with no profile (only <eid> appears) **AT+ICCID** +CCID: ,89033023426200000000024793236209 OK • Active SIM: eSIM with profile (<iccid> and <eid> both appear) **AT+ICCID** +CCID: 89001010001234560637,89033023422140000000000247625523 OK • No SIM inserted (error appears) **AT+ICCID** +CME ERROR: SIM failure

Table 8-2: SIM command details (Continued)

Command	Description
!ICCID	**Read SIM ICCID** Read the ICCID (Integrated Circuit Card ID) from the active SIM. **Password required:** No **Usage:** • Execution: **AT!ICCID** Response: ICCID: <iccid> OK Purpose: Display the ICCID of the active SIM. **Parameters:** <iccid> (ICCID of the active SIM): • ASCII string (digits only, i.e. '0'–'9') • Length: 20 digits
!IMSIM	**Update AUTO-SIM matching list** Update the module's image switching AUTO-SIM matching list, which the module uses to select the correct carrier PRI and firmware to use with the detected SIM. The module is pre-loaded with a SKU-specific matching list of carrier configurations. This command can be used to: • Add SIM entries for any of the carrier configurations in the pre-loaded matching list • Reset carrier configurations (i.e., remove user-entered SIM entries) to the pre-loaded settings **Password required:** Yes (execution format) **Usage:** • Execution: **AT!IMSIM=<carrier_name>[,<type>,<key>,<rank>]** Response: OK Purpose: Either add a new SIM for the specified carrier (all parameters are required), or reset the specified carrier configuration to its pre-loaded version. • Query: **AT!IMSIM?[<carrier_name>]** Response: !IMSIM: configuration: <configuration>, Firmware: <firmware>, count: <count> Type Key Rank Source <type> <key> <rank> <source> ... OK Purpose: Display the SIM entries associated with each carrier configuration in the matching list (do not include <carrier_name>), or the entries for a single specified carrier (<carrier_name>). • Query List: **AT!IMSIM=?** Purpose: Return the command format and the supported parameter values. **Usage notes:** • Each pre-loaded carrier configuration includes one or more SIM entries. Users can add up to 50 additional SIM entries per carrier configuration. (Continued on next page)

Table 8-2: SIM command details (Continued)

Command	Description

!IMSIM (continued)	**Update AUTO-SIM matching list (continued)**
	Parameters:
	<carrier_name> (Carrier identifier):
	• ASCII string
	• e.g., ATT = AT&T, GENERIC = Generic, etc.
	• The list of supported carriers is SKU-dependent.
	<configuration> (Carrier PRI ID):
	• e.g., GENERIC_002.023_000
	<Firmware> (Firmware version to use for the carrier's SIMs that are included in the carrier's configuration)
	• e.g., 01.11.00.00
	<count> (Number of SIM entries in the carrier's configuration):
	• Minimum: 1. See Usage notes above.
	<type> (Entry type):
	• 1—MCC/MNC (i.e., the SIM's PLMN)
	• The numeric value is used in the Execution format, and the string equivalent is displayed by the Query format.
	<key> (Entry value):
	• Valid formats:
	• MCC/MNC value—The MCC and MNC must be separated by ':', the MCC must be 3 digits, and the MNC must be 2 or 3 digits. (e.g., 313:100, 432:65, etc.)
	<rank> (Image switch ranking):
	• Used to choose between applicable PRIs when switching images. e.g., if two PRIs are suitable, the PRI with the highest rank is used.
	• Valid values:
	  • 0–127
	  • 255 (-1)—Lowest rank (indicates the PRI should be used only if no better choice is available). Note—255 is used in the Execution format and appears as -1 in the Query output format.
	<Source> (Entry origin):
	• Indicates the source of the SIM entry (i.e., how it was added to the list)
	• Valid values:
	  • PRI—Included in the pre-loaded list. The entry cannot be deleted.
	  • CUST—Added by the customer using !IMSIM. The entry can be deleted.

Table 8-2: SIM command details (Continued)

Command	Description
!UIMS	**Select active SIM interface** On a module that supports multiple SIM interfaces, select the active SIM interface. To enable/disable UIM2 slot support, use AT!CUSTOM="UIM2ENABLE". See page 28 for option values. **Password required:** No **Usage:** • Execution: **AT!UIMS=<uim_slot>** Response: OK Purpose: Configure the module to use the selected SIM interface. • Query: **AT!UIMS?** Response: !UIMS: <uim_slot> OK Purpose: Display the currently selected interface. • Query List: **AT!UIMS=?** Purpose: Return the command format and the supported parameter values. **Parameters:** <uim> (SIM interface): • 0 — UICC1—External UIM interface #1 • 1 — UICC2—External UIM interface #2

9: OMA-DM Commands

Introduction

This chapter describes commands used to configure DM (Device Management) accounts, sessions, and host–device–server interactions.

Command summary

The table below lists the commands described in this chapter.

Table 9-1: OMA-DM commands

Command	Description	Page
!IMSTESTMODE	Enable/disable IMS test mode	115
+ODIS	Get/set LwM2M device information	116

Command reference

Table 9-2: OMA-DM command details

Command	Description
!IMSTESTMODE	**Enable/disable IMS test mode** Enable/disable IMS (IP Multimedia Subsystem) test mode. If IMS test mode is enabled: • IMS registration attempts will not occur • SMS over IMS is not supported **Password required:** Yes **Usage:** • Execution: **AT!IMSTESTMODE=<mode>** Response: OK Purpose: Enable/disable IMS test mode. • Query: **AT!IMSTESTMODE?** Response: IMS Test Mode Enabled *or* IMS Test Mode Disabled Purpose: Return the current state of IMS Test Mode. **Parameters:** <mode> (IMS Test Mode state) • 0 — Disable • 1 — Enable

Table 9-2: OMA-DM command details (Continued)

Command	Description
+ODIS	**Get/set LwM2M device information** Configure the host device details that will be reported by OMA DM for AT&T devices, to comply with AT&T requirements. **Password required:** No **Usage:** • Execution: **AT+ODIS=<instance>, <hostplasmaid>, <hostman>, <hostmod>, <hostsw>** Response: OK Purpose: Set LwM2M device information. • Query: **AT+ODIS?** Response: Instance Number: <instance1> Host Device Manufacturer: <hostman1> Host Device Model: <hostmod1> Host Device Software Version: <hostswv1> Instance Number: <instance2> Host Device Manufacturer: <hostman2> Host Device Model: <hostmod2> Host Device Software Version: <hostswv2> OK Purpose: Display the information for all device instances. **Parameters:** <instance> (Device instance number) • Valid values: 0–1 • The EM759X module has 2 device instances. <hostplasmaid> (Host device unique ID) • ASCII string—Up to 255 characters <hostman> (Host device manufacturer) • ASCII string—Up to 255 characters <hostmod> (Host device model) • ASCII string—Up to 255 characters <hostswv> (Host device software version) • ASCII string—Up to 255 characters

10: SAR Backoff and Thermal Control Commands

Introduction

This chapter describes:

- SAR-related commands (Specific Absorption Rate)—SAR commands are used to meet regulatory requirements for the OEM host device by managing the modem's SAR backoff state. OEMs should carefully evaluate their use of these commands and their impact on device operation.

Note: Operators may require OEMs to disclose SAR settings and theory of operation for applicable certifications.

- Thermal mitigation-related commands—These commands may affect the host device's performance. OEMs should carefully evaluate their use of these commands to ensure that the device meets performance expectations.

Command summary

The table below lists the commands described in this chapter.

Table 10-1: SAR backoff and thermal control commands

Command	Description	Page
!MAXPWR	Set/report maximum Tx power	118
!SARBACKOFF	Report SAR limit for specific RAT/band/SAR backoff state combination	119
!SARINTGPIOMODE	Set/report default pull mode for SAR interrupt GPIOs	119
!SARSTATE	Set/report SAR backoff state	120
!SARSTATEDFLT	Set/report default SAR backoff state	120

Command reference

Table 10-2: Thermal mitigation command details

Command	Description

!MAXPWR	**Set/report maximum Tx power**
	
	Set or report the maximum Tx power for a specific band.
	
	Caution: *Any adjustments of Tx power may impact regulatory certification of the module in the host platform. The OEM is responsible for ensuring that the final module configuration in the host platform meets all regulatory requirements.*
	
	Note: Increasing the Tx power affects the module's current consumption and thermal performance.
	
	Password required: Yes
	Usage:
	• Execution: **AT!MAXPWR=<band>,<tech>,<max_tx_pwr>**
	Response: OK
	Purpose: Set the maximum Tx power for the specified band/technology combination.
	• Query: **AT!MAXPWR?<band>,<tech>**
	Response: <maxpwr> dBm
	OK
	Purpose: Indicate the maximum Tx power for the specified band/technology combination.
	• Query list: **AT!MAXPWR=?**
	Purpose: Display valid execution format and parameter values.
	Parameters:
	<band> (RF band)
	• Integer, 3GPP band number. (For a full listing of 3GPP band numbers, see Table 14-2 on page 158.)
	• Supported bands:
	  • LTE: B2, B4, B5, B7, B12, B13, B14, B25, B26, B41, B48, B66, B71
	  • WCDMA: B2, B4, B5
	• For example, <band>=2 indicates either WCDMA B2 or LTE B2, depending on the <tech> parameter.
	
	<tech> (Network technology)
	• 0 — WCDMA
	• 2 — LTE
	
	<maxpwr> (Maximum Tx power in dB)
	• All values are in 0.5 dB increments (e.g., 21.0, 21.5, 22.0, etc.)
	• Valid range (band-dependent):
	  • B48: 21.0–23.0
	  • Other bands: 22.5–24.5

Table 10-2: Thermal mitigation command details (Continued)

Command	Description
!SARBACKOFF	**Report SAR limit for specific RAT/band/SAR backoff state combination** Report the configured SAR limit for a specific RAT/band/backoff state combination. **Password required:** Yes **Usage:** • Query: **AT!SARBACKOFF?<Technology>,<Band>,<State>** Response: Band: <sarlimit> dBm OK or ERROR Purpose: Display the SAR limit for the specified RAT/band/SAR backoff state combination. • Query list: **AT!SARBACKOFF=?** Purpose: Display valid execution and query formats, and parameter values. **Parameters:** <Technology> (Network Radio Access Technology (RAT)) • 0—WCDMA • 2 — LTE <Band> (RF band) • Valid range: 1–71. Band support is product specific—refer to *EM759X Product Technical Specification (Doc# 41114425)* for details. <state> (SAR backoff state) • 0 — No backoff (i.e., !MAXPWR) • 1–8 — Backoff state 1 to 8
!SARINTGPIOMODE	**Set/report default pull mode for SAR interrupt GPIOs** Set or report the default pull mode (high/low) for SAR interrupt GPIOs. This setting applies to all SAR interrupt GPIOs. **Password required:** Yes **Usage:** • Execution: **AT!SARINTGPIOMODE=<mode>** Response: OK Purpose: Set the default pull mode for all SAR interrupt GPIOs. • Query: **AT!SARINTGPIOMODE?** Response: <mode> OK Purpose: Indicate the default pull mode. • Query list: **AT!SARINTGPIOMODE=?** Purpose: Display valid execution format and parameter values. **Parameters:** <mode> (SAR GPIO interrupt pull mode default setting) • 0 — Standard mode—Default pull is HIGH/DAL_GPIO_PULL_UP • 1 — Inverse mode—Default pull is LOW/DAL_GPIO_PULL_DOWN

Table 10-2: Thermal mitigation command details (Continued)

Command	Description
!SARSTATE	**Set/report SAR backoff state** Set or report the current SAR (Specific Absorption Rate) backoff state. *Note: This setting is not persistent. To change the default backoff state (persistent), use !SARSTATEDFLT.* **Password required:** No **Persistent across power cycles:** No **Usage:** • Execution: **AT!SARSTATE=<state>** Response: OK Purpose: Temporarily set the SAR backoff state. • Query: **AT!SARSTATE?** Response: !SARSTATE: <state> OK Purpose: Indicate the current SAR backoff state. • Query list: **AT!SARSTATE=?** Purpose: Display valid execution format and parameter values. **Parameters:** <state> (SAR backoff state) • 0 — No backoff • 1–8 — Backoff state 1 to 8
!SARSTATEDFLT	**Set/report default SAR backoff state** Set or report the default (persistent) SAR (Specific Absorption Rate) backoff state. *Note: This setting is persistent. To temporarily change the backoff state, use !SARSTATE.* **Password required:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!SARSTATEDFLT=<state>** Response: OK Purpose: Set the default SAR backoff state. • Query: **AT!SARSTATEDFLT?** Response: !SARSTATEDFLT: <state> OK Purpose: Indicate the default SAR backoff state. • Query list: **AT!SARSTATEDFLT=?** Purpose: Display valid execution format and parameter values. **Parameters:** <state> (SAR backoff state) • 0 — No backoff • 1–8 — Backoff state 1 to 8

11: SMS Wake Commands

Introduction

This chapter describes commands used for the SMS host wake-up feature.

Command summary

Table 11-1 lists the commands described in this chapter.

Table 11-1: SMS Wake commands

Command	Description	Page
!SMSWAKE	Enable/disable SMS host wake-up feature	122
!SMSWAKEWIDTH	Set/read SMS Wake signal width	123

Command reference

Table 11-2: SMS Wake commands

Command	Description
!SMSWAKE	**Enable/disable SMS host wake-up feature** Enable/disable the SMS host wake-up feature. Using this feature, an SMS message can be used to wake a tethered host processor (e.g. a laptop). **Password required:** Yes **Reset required to apply changes:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!SMSWAKE=<Enabled>** Response: OK or ERROR Purpose: Disable or enable the SMS host wake up feature. • Query: **AT!SMSWAKE?** Response: !SMSWAKE: Enabled OK or !SMSWAKE: Disabled OK Purpose: Report the current state of the SMS host wake-up feature. • Query List: **AT!SMSWAKE=?** Purpose: Return the supported parameter values. **Parameters:** <Enabled> (SMS wake-up feature state) • 0—Disabled • 1—Enabled

Table 11-2: SMS Wake commands (Continued)

Command	Description
!SMSWAKEWIDTH	**Set/read SMS Wake signal width** Set/read the SMS Wake signal width. **Password required:** Yes **Reset required to apply changes:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!SMSWAKEWIDTH=<width>** Response: OK or ERROR Purpose: Set the wake signal width. • Query: **AT!SMSWAKEWIDTH?** Response: !SMSWAKEWIDTH: <width> OK Purpose: Report the configured wake signal width. • Query List: **AT!SMSWAKEWIDTH=?** Purpose: Return the execution command format and the supported parameter values. **Parameters:** <width> (SMS Wake signal width, in milliseconds) • Integer • Valid range: 1–65535

12: FOTA Commands

Introduction

This chapter describes Firmware Over The Air (FOTA) related commands.

Command summary

The table below lists the commands described in this chapter.

Table 12-1: FOTA commands

Command	Description	Page
!SWIFOTA	Execute FOTA action	125

Command reference

Table 12-2: FOTA command details

Command	Description
!SWIFOTA	**Execute FOTA action** Execute a Firwmare Over The Air (FOTA) action. **SIM card required:** Yes **Password required:** No **Usage:** • Execution: **AT!SWIFOTA=<action>[,<value>]** Response: OK *// Unsolicited response* SWIFOTA: <response> *or* ERROR Purpose: Execute the specified FOTA action. • Query List (To be implemented): **AT!SWIFOTA=?** Purpose: Display the execution command format and parameter values. **Parameters:** <action> (FOTA action) • start—Trigger (start) the FOTA check and if a firmware image is available, download the image. (Note—Do not add a a <value> parameter.) • update—Trigger (start) the FOTA update. Note that this can only be done after the 'start' action has been executed. (Note—Do not add a a <value> parameter.) • downgrade—Configure the module to perform either a firmware upgrade or a firmware downgrade the next time FOTA is executed. The <value> parameter is required: <value>: • 0—Configure the module to perform a firmware upgrade. • 1—Configure the module to perform a firmware downgrade. • serverURL—Update the FOTA server URL. The <value> parameter is required: <value>: • Valid IPv4, IPv6, or FQDN <value> • Used only for 'downgrade' and 'serverURL' actions only. See <action> description for details. <response> • ASCII string (printable characters)

13: Supported GSM/WCDMA AT Commands

This chapter identifies standard AT commands that are supported by most Sierra Wireless modules. These commands:

- Control serial communications over an asynchronous interface (*ITU-T Serial Asynchronous Dialling and Control (Recommendation V.250*), available on the International Telecommunication Union web site, www.itu.int).
  See Table 13-1 below.
- Control SMS functions for devices on GSM/WCDMA networks (*3GPP TS 27.005*, available on the 3GPP web site, www.3gpp.org)
  See Table 13-2 on page 131.
- Control devices operating on GSM/WCDMA networks (*3GPP TS 27.007,* available on the 3GPP web site, www.3gpp.org)
  See Table 13-3 on page 136.

The tables below identify whether each command is supported on the EM759X module. An “N/A” in the Supported column of the table indicates that the command is related to a feature (such as voice) that is not available on the modems.

Commands that are partially supported include descriptions identifying any limitations on command usage. Also, some commands are described in more detail in other chapters—the descriptions for these commands link to those detailed entries (for example, **&V** in Table 13-1 on page 126).

Table 13-1: Supported ITU-T Recommendation V.250 AT commands

Command	Description	Supported ✔=Yes; ✘=No
&C	Set Data Carrier Detected (DCD; Received line signal detector) function mode **Usage:** • AT&C<dcd> **Parameters:** <dcd> (DCD mode) • 0—Circuit 109 (CF) always ON • 1—Circuit 109 (CF) ON in accordance with the specified service • 2—Circuit 109 (CF) always on except briefly switch on/off one time on channel disconnect	✔
&D	Set Data Terminal Ready function mode **Usage:** • AT&D<dtr> **Parameters:** <dtr> (DTR mode) • 0—Ignores circuit 108/2 (CD) • 1—Enters Online Command state following ON-to-OFF transition of circuit 108/2 • 2—Enters Command state following ON-to-OFF transition of circuit 108/2	✔

Table 13-1: Supported ITU-T Recommendation V.250 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
&F	Set parameters to manufacturer's defaults **Usage:** • AT&F<value> **Parameters:** <value> (Parameters to reset) • 0—Only the factory profile base section parameters are considered • 1—Factory profile base section and extended section parameters are considered (full factory profile)	✔
&S	Set DSR signal **Usage:** • AT&S<value> **Parameters:** <value> (DSR signal behavior) • 0—Always ON • 1—Follows the GSM traffic channel indication • 2—ON when connected • 3—ON when device is ready to receive commands (factory default)	✔
&T	Auto tests	✘
&V	Return operating mode AT configuration parameters Dumps the status of all AT parameters applicable to the current operating mode. **Usage:** • AT&V **Parameters:** None	✔
&W	Store current parameter to user-defined profile **Usage:** • AT&W[<value>] **Parameters:** <value> (Profile number) • Valid values: 0–1 • Default value if omitted: 0 (i.e., equivalent to AT&W0)	✔
+DR	V42bis data compression report	✘
+DS	V42bis data compression	✘
+GCAP	Request complete TA capabilities list **Usage:** • AT+GCAP	✔
+GMI	Request manufacturer identification	✔

Table 13-1: Supported ITU-T Recommendation V.250 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+GMM	Request TA model identification **Usage notes:** • Command is processed regardless of SIM state. **Usage:** • AT+GMM <response> OK	✔
+GMR	Request TA revision identification **Usage notes:** • Command is processed regardless of SIM state. **Usage:** • AT+GMR <response> OK	✔
+GOI	Request global object identification	✘
+GSN	Request TA serial number identification **Usage notes:** • Command is processed regardless of SIM state. **Usage:** • AT+GSN <response> OK	✔
+ICF	Set TE-TA control character framing **Usage:** • AT+ICF= <format> <parity> **Parameters:** <format> • Valid values: 3 <parity> • Valid values: Per specification.	✔
+IFC	Set TE-TA local data flow control **Usage:** • AT+IFC=<by_te>,<by_ta> **Parameters:** <by_te> (Flow control option for data received by DTE) • 0—No flow control • 1—XON/XOFF filtered • 2—C105 (RTS) (Factory default) • 3—XON/XOFF not filtered <by_ta> (Flow control option for data sent by modem) • 0—No flow control • 1—XON/XOFF • 2—C106 (CTS) (Factory default)	✔

Table 13-1: Supported ITU-T Recommendation V.250 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+ILRR	Set TE-TA local rate reporting mode	✘
+IPR	Set fixed local rate **Usage:** • AT+IPR=<rate> **Parameters:** <rate> (Local data rate) • Valid values: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 921600, 2000000, 2900000, 3000000, 3200000, 3686400, 4000000	✔
A	Answer incoming call	✘
A/	Re-issues last AT command given	✔
D	Dial **Usage:** • ATD<dial string>	✔
D><MEM><N>	Originate call to phone number in memory <MEM>	✘
D><N>	Originate call to phone number in current memory	✘
D><STR>	Originate call to phone number in memory which corresponds to alphanumeric field <STR>	✘
DL	Redial last telephone number used	✘
E	Set command echo mode **Usage:** • ATE<value> **Parameters:** <value> (Echo mode state) • 0—Disable • 1—Enable	✔
H	Disconnect existing connections **Usage:** • ATH<value> **Parameters:** <value> (Option) • 0—Disconnect from line and terminate call	✔
I	Display product identification information	✔
L	Set monitor speaker loudness	✘
M	Set monitor speaker mode	✘
O	Switch from command mode to data mode	✔
P	Select pulse dialing	✘

Table 13-1: Supported ITU-T Recommendation V.250 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
Q	Set Result code presentation mode **Usage:** • ATQ<value> **Parameters:** <value> (Result code presentation state) • 0—Enable result codes • 1—Disable result codes	✔
S0	Set number of rings before automatically answering the call	✘
S10	Set disconnect delay after indicating the absence of data carrier **Usage:** • ATS10=<value> **Parameters:** <value> (Amount of time to remain connected after loss of signal, in tenths of a second)	✔
S3	Set command line termination character	✔
S4	Set response formatting character	✔
S5	Set command line editing character	✔
S6	Set pause before blind dialing	✘
S7	Set number of seconds to wait for connection completion **Usage:** • ATS7=<value> **Parameters:** <value> (Number of seconds to establish end-to-end data connection) • Valid range: 1–255	✔
S8	Set number of seconds to wait when comma dial modifier used	✘
T	Select tone dialing	✘
V	Set result code format mode **Usage:** • ATV<value> **Parameters:** <value> (Result code format) • 0—Display result codes in numeric form • 1—Display result codes in verbose form	✔

Table 13-1: Supported ITU-T Recommendation V.250 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
X	Set connect result code format and call monitoring **Usage:** • ATX<value> **Parameters:** <value> (Result code format and call monitoring) • 0—"CONNECT" result code is issued upon entering online data state. • 1–4—"CONNECT <speed>" result code is issued upon entering online data state, where <speed> is the downlink maximum bit rate shown in the response. • Default/factory-programmed value: 4	✔
Z	Set all current parameters to user-defined profile **Usage:** • ATZ<value> **Parameters:** <value> (User profile number)	✔

Table 13-2: Supported 27.005 AT commands

Command	Description	Supported ✔=Yes; ✘=No
+CBM	Cell broadcast message directly displayed	✘
+CBMI	Cell broadcast message stored in memory at specified <index> location	✘
+CDS	SMS status report after sending a SMS	✘
+CDSI	Incoming SMS status report	✘
+CMGC	Send command	✔
+CMGD	Delete message **Usage:** • AT+CMGD=<index>, [<deflag>] **Parameters:** <index> (Message index) <deflag> (Messages to delete) • 0 or omitted—Delete the message specified by <index>. • 1—Delete all read messages, and leave unread messages and stored mobile messages (whether sent or not) untouched. • 2—Delete all read messages, and leave unread messages and unsent mobile-originated messages untouched. • 3—Delete all read messages, and leave unread messages untouched. • 4—Delete all messages.	✔

Table 13-2: Supported 27.005 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CMGF	Message format **Usage:** • AT+CMGF=<mode> **Parameters:** <mode> • 0—PDU mode, as defined in GSM 3.40 and GSM 3.41. (Factory default) • 1—Text mode	✔
+CMGL	List messages **Usage:** • AT+CMGL=<stat> **Parameters:** <stat> (Messages to list) • 0—New messages • 1—Read messages • 2—Stored messages that are not yet sent • 3—Stored messages that are already sent • 4—All messages	✔
+CMGR	Read message **Usage:** • AT+CMGR=<index> **Parameters:** <index> (Message index)	✔
+CMGS	Send message **Usage:** • AT+CMGS=<da>,<toda> **Parameters:** <da> (Destination address number) <toda> (Type of destination address)	✔
+CMGW	Write message to memory **Usage:** • AT+CMGW=<da>, <toda>, <stat> **Parameters:** <da> (Destination address number) <toda> (Type of destination address) <stat> (Message status)	✔

Table 13-2: Supported 27.005 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CMMS	More messages to send **Usage:** • AT+CMMS=[<n>] **Parameters:** <n> • 0—Disable (Default) • 1—Keep enabled until the time between the response from latest message send command (e.g., +CMGS) and the next send command exceeds 5 seconds. • 2—Keep permanently enabled	✔
+CMNA	New message acknowledgement to ME/TA	✘
+CMS ERROR: <err>	SMS error (mobile or network error)	✔
+CMSS	Send message from storage **Usage:** • AT+CMSS=<index>, <da>, <toda> **Parameters:** <index> (Location value in the message storage to send) <da> (If provided, use this destination address instead of the address stored with the message.) <toda> (Type of destination address)	✔
+CMT	Incoming message directly displayed	✘
+CMTI	Incoming message stored in <mem> (“SM” - (U)SIM message storage) at location <index>	✘
+CNMA	New message acknowledgement to mobile equipment	✔
+CNMI	New message indications to TE **Usage:** • AT+CNMI=<mode>, <mt>, <bm>, <ds>, <bfr> **Parameters:** <mode> (Unsolicited result codes buffering option) • Valid values: 0–2 <mt> (Result code indication reporting for SMS-DELIVER) • Valid values: 0–3 <bm> (Broadcast reporting option) • Valid values: 0, 2 <ds> (SMS-STATUS-REPORTs reporting option) • Valid values: 0, 2 <bfr> (Buffered result codes handling method) • Valid values: 0, 1	✔

Table 13-2: Supported 27.005 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No

+CPMS	Preferred message storage
	Usage:
	• AT+CPMS=<mem1>[,<mem2>[,<mem3>]]
	Parameters:
	<mem1>,
	<mem2>,
	<mem3>
	• Valid values:
	  • ME—Internal storage (read only, no delete)
	  • SM—SIM SMS storage area
	  • MT—MT & SM, ME preferred
	  • SR—Status Report message storage area
	<ds>
	• Valid values: 0, 2
	<bfr>
	• Valid values: 0, 1
		✔

+CRES	Restore settings **Usage:** • AT+CRES[=<profile>] **Parameters:** <profile> (Specific SMS profile index from where to read the message service settings) • Valid values: 0 (i.e., only profile 0 is supported)	✔
+CSAS	Save settings **Usage:** • AT+CSAS[=<profile>] **Parameters:** <profile> (Specific SMS profile index where active message settings are to be stored) • Valid values: 0 (i.e., only profile 0 is supported)	✔
+CSCA	Service center address **Usage:** • AT+CSCA=<sca>, <tosca> **Parameters:** <sca> (Service center address) <tosca> (Type of address of <sca>)	✔

Table 13-2: Supported 27.005 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CSCB	Select cell broadcast message types **Usage:** • +CSCB=[<mode>[,<mids>[,<dcss>]]] **Parameters:** <mode> • 0—Message types defined by <mids> and <dcss> are accepted. (Factory default) • 1—Message types defined by <mids> and <dcss> are rejected. <mids> (Message identifiers) • All different possible combinations of the CBM message identifiers • Default: "" (i.e., empty string) <dcss> (Data Coding Schemes) • All different possible combinations of CBM data coding schemes	✔
+CSDH	Show text mode parameters **Usage:** • AT+CSDH=<show> **Parameters:** <show> • 0—Do not show detailed SMS header information. (Default) • 1—Show detailed SMS header information	✔
+CSMP	Set text mode parameters **Usage:** • AT+CSMP=<fo>, <vp>, <pid>, <dcs> **Parameters:** <fo> (First octet of the SMS TPDU) <vp> • Format: Depends on the values of <fo> bit 3 and bit 4. <pid> (TP Protocol Identifier) • Default: 0 <dcs> (Data Coding Scheme) • Default: 0	✔
+CSMS	Select message service **Usage:** • AT+CSMS=<service> **Parameters:** <mode> (AT command syntax) • 0—Compatible with 3GPP TS 27.005 phase 2. Phase 2+ features may be supported if no new command syntax is required. • 1—Compatible with 3GPP TS 27.005 phase 2+.	✔

Table 13-3: Supported 27.007 AT commands

Command	Description	Supported ✔=Yes; ✘=No
C	ITU T V.24 circuit 109 carrier detect signal behavior command	✘
+CACM	Accumulated call meter	✘
+CACSP	Voice Group or Voice Broadcast Call State Attribute Presentation	✘
+CAEMLPP	eMLPP Priority Registration and Interrogation	✘
+CAHLD	Leave an ongoing Voice Group or Voice Broadcast Call	✘
+CAJOIN	Accept an incoming Voice Group or Voice Broadcast Call	✘
+CALA	Alarm	✘
+CALCC	List current Voice Group and Voice Broadcast Calls	✘
+CALD	Delete alarm	✘
+CALM	Alert sound mode	✘
+CAMM	Accumulated call meter maximum	✘
+CANCHEV	NCH Support Indication	✘
+CAOC	Advice of Charge	✘
+CAPD	Postpone or dismiss an alarm	✘
+CAPTT	Talker Access for Voice Group Call	✘
+CAREJ	Reject an incoming Voice Group or Voice Broadcast Call	✘
+CAULEV	Voice Group Call Uplink Status Presentation	✘
+CBC	Battery charge	✔
+CBST	Select bearer service type	✘
+CCCM	Current call meter value	✘
+CCFC	Call forwarding number and conditions	✘
+CCHC	Close logical channel	✔
+CCHO	Open logical channel	✔
+CCLK	Clock **Usage:** • AT+CCLK=<time> **Parameters:** <time> • Format: "yy/MM/dd,hh:mm:ss+TZ"	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CCUG	Closed user group **Usage:** • AT+CCUG=<n>, <index>, <info> **Parameters:** <n> • 0—CUG temporarily disabled (Default) • 1—CUG temporarily enabled **Parameters:** <index> • 0–9—CUG index • 10—No index (Preferred CUG is taken from subscriber data.) • Default: 0 <info> • 0—No information (Default) • 1—Suppress OA • 2—Suppress preferential CUG • 3—Suppress OA and preferential CUG	✔

+CCWA	Call waiting
	Usage:
	• AT+CCWA=[<n>[,<mode>[,<class>]]]
	Parameters:
	<n> (Enable/disable the URC +CCWA)
	• 0—Disable
	• 1—Enable
	<mode>
	• 0—Disable
	• 1—Enable
	• 2—Query status
	• If <mode> is not specified, no request is sent to the network.
	<class> (Sum of numbers representing an information class)
	• Default:
	  • If <class> is not set and <mode> is 0 or 1, the default value is 3.
	  • If <class> is not set and <mode> is 2, the default value is 255.
		✔

+CCWE	Call Meter maximum event	✘
+CDIP	Called line identification presentation	✘
+CDIS	Display control	✘
+CEER	Extended error report	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CFUN	Set phone functionality **Usage:** • AT+CFUN = [<fun> [, <rst>]] **Parameters:** <fun> • 0—Lower Power Mode (SIM power off) • 1—ONLINE • 4—Lower Power Mode (SIM power on) • 5—FTM • 6—RESET • 7—OFFLINE <rst> (Reset mode) • This parameter can be used only when <fun> is 1 or 4. • 0—Do not reset the MT before setting it to the selected <fun> (Default) • 1—Perform an MT silent reset (with detach from network and saving of NVM parameters) with reset of the SIM card before setting it to the selected <fun>.	✔
+CGACT	PDP context activate or deactivate ITU T V.24 circuit 109 carrier detect signal behavior command **Usage:** • AT+CGACT=[<state> [,<cid>[,<cid>[,…]]]] **Parameters:** <state> • 0—Deactivated • 1—Activated <cid> (Context) • Valid values: 1–24	✔
+CGANS	Manual response to a network request for PDP context activation	✘
+CGATT	PS attach or detach **Usage:** • AT+CGATT=[<state>] **Parameters:** <state> • 0—Detached • 1—Attached	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CGAUTH	Define PDP context authentication parameters **Usage:** • AT+CGATT=<cid>[,<auth_prot>[,<userid>[,<password>]]] **Parameters:** <cid> (Context) • Valid values: 1–34 <auth_prot> (Authentication protocol used for this PDP context) • 0—None. Used to indicate that no authentication protocol is used for this PDP context. Username and password are removed if previously specified. • 1—PAP • 2—CHAP <userid> (User name for access to the IP network) • ASCII string <password> (Password for access to the IP network) • ASCII string	✔
+CGAUTO	Automatic response to a network request for PDP context activation	✘
+CGCLASS	GPRS mobile station class **Usage:** • AT+CGCLASS=[<class>] **Parameters:** <class> • A—Class A mode of operation	✔
+CGCLOSP	Configure local octet stream PAD parameters	✘
+CGCMOD	PDP Context Modify **Usage:** • AT+CGCMOD=[<cid> [,<cid> [,…]]] **Parameters:** <cid> (Context) • Valid values: 1–24	✔
+CGDATA	Enter data state **Usage:** • AT+CGDATA=[<L2P>, [<cid> [,<cid> [,…]]]] **Parameters:** <L2P> • ASCII string indicating the layer 2 protocol to be used between the DTE and MT <cid> (Context) • Valid values: 1–24	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CGDCONT	Define PDP Context **Usage:** • AT+CGDCONT=<cid>, <PDP_Type>, <APN>, <PDP_addr>, <d_comp>, <h_comp>,<IPv4AddrAlloc>,<request_type>, ,,,,,,, <ssc_mode>,<s_nssai>,<pref_access_type>,,, <always_on_req> **Parameters:** <cid> (Context) • Valid values: 1–24 <PDP_type> • Valid values: IP, IPv6, IPv4v6, PPP <APN> • ASCII string <PDP_addr> • ASCII string <d_comp> • Valid values: 0, 2 <h_comp> • Valid values: 0, 4 <IPv4AddrAlloc> • Valid values: 0, 1 <request_type> • Valid values: 0, 1 <ssc_mode> • Valid values: 0, 1 <s_nssai> • ASCII string, hexadecimal format <Pref_access_type> • Valid values: 0, 1 <Always_on_req> • Valid values: 0, 1	✔
+CGDSCONT	Define Secondary PDP Context **Usage:** • AT+CGDSCONT= [<cid> ,<p_cid> [,<d_comp> [,<h_comp>]]] **Parameters:** <cid> (Context) • Valid values: 1–24 <p_cid> (Context) • Valid values: 1–24 <d_comp> • Valid values: 0, 2 <h_comp> • Valid values: 0, 4	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No

+CGEQMIN	3G Quality of Service Profile (Minimum acceptable)
	Usage:
	• AT+CGEQMIN = <cid>, <Traffic_class>, <maximum_bitrate_UL>, <maximum_bitrate_DL>, <Guaranteed_bitrate_UL>, <Guaranteed_bitrate_DL>, <Delivery_order>, <Maximum_SDU_size>, <SDU_error_ratio>, <Residual_bit_error_ratio>, <Delivery_of_erroneous_SDUs>, <Transfer_delay>, <Traffic_handling_priority>, <Source Statistics Descriptor>, <Signaling Indication>
	Parameters:
	<cid> (Context)
	• Valid values: 1–24
	<Traffic_class>
	• Valid values: 0–4
	<maximum_bitrate_UL>
	• Valid values: 0–384
	<maximum_bitrate_DL>
	• Valid values: 0–384
	<Guaranteed_bitrate_UL>
	• Valid values: 0–384
	<Guaranteed_bitrate_DL>
	• Valid values: 0–384
	<Delivery_order>
	• Valid values: 0–2
	<Maximum_SDU_size>
	• Valid values: 0–1520
	<SDU_error_ratio>
	• Valid values:
	  • 0E0
	  • 1E1
	  • 1E2
	  • 7E3
	  • 1E3
	  • 1E4
	  • 1E5
	  • 1E6
	(Continued on next page)
		✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No

+CGEQMIN (continued)	3G Quality of Service Profile (Minimum acceptable) (continued)
	<Residual_bit_error_ratio>
	• Valid values:
	  • 0E0
	  • 5E2
	  • 1E2
	  • 5E3
	  • 4E3
	  • 1E3
	  • 1E4
	  • 1E5
	  • 1E6
	  • 6E8
	<Delivery_of_erroneous_SDUs>
	• Valid values: 0–3
	<Transfer_delay>
	• Valid values: 0, 100–4000
	<Traffic_handling_priority>
	• Valid values: 0–31
	<Source Statistics Descriptor>
	• Valid values: 0–1
	<Signalling Indication>
	• Valid values: 0–1
		✔

+CGEQNEG	3G Quality of Service Profile (Negotiated)	✘

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No

+CGEQREQ	3G Quality of Service Profile (Requested)
	Usage:
	• 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_erroneous_SDUs>, <Transfer_delay>, <Traffic_handling_priority>, <Source Statistics Descriptor>, <Signaling Indication>
	Parameters:
	<cid> (Context)
	• Valid values: 1–24
	<Traffic_class>
	• Valid values: 0–4
	<maximum_bitrate_UL>
	• Valid values: 0–384
	<maximum_bitrate_DL>
	• Valid values: 0–384
	<Guaranteed_bitrate_UL>
	• Valid values: 0–384
	<Guaranteed_bitrate_DL>
	• Valid values: 0–384
	<Delivery_order>
	• Valid values: 0–2
	<Maximum_SDU_size>
	• Valid values: 0–1520
	<SDU_error_ratio>
	• Valid values:
	  • 0E0
	  • 1E1
	  • 1E2
	  • 7E3
	  • 1E3
	  • 1E4
	  • 1E5
	  • 1E6
	(Continued on next page)
		✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No

+CGEQREQ (continued)	3G Quality of Service Profile (Requested) (continued)
	<Residual_bit_error_ratio>
	• Valid values:
	  • 0E0
	  • 5E2
	  • 1E2
	  • 5E3
	  • 4E3
	  • 1E3
	  • 1E4
	  • 1E5
	  • 1E6
	  • 6E8
	<Delivery_of_erroneous_SDUs>
	• Valid values: 0–3
	<Transfer_delay>
	• Valid values: 0, 100–4000
	<Traffic_handling_priority>
	• Valid values: 0–31
	<Source Statistics Descriptor>
	• Valid values: 0–1
	<Signalling Indication>
		✔

+CGEREP	Packet Domain event reporting **Usage:** • AT+CGEREP=[<mode>[,<bfr>]] **Parameters:** <mode> • Controls the processing of URCs specified within this command. • 0—Buffer URCs in the MT. If the buffer is full, the oldest ones will be discarded. • 1—Discard URCs when link is reserved (online), otherwise forward them directly to the DTE. • 2—Buffer URCs in the MT when link is reserved (online) and flush them to the DTE when the link becomes available, otherwise forward them directly to the DTE. <bfr> • Controls the effect on buffered codes when <mode> is 1 or 2. • 0—MT buffer of URCs defined within this command is cleared when <mode> is 1 or 2. • 1—MT buffer of URCs defined within this command is flushed to the DTE when <mode> is 1 or 2 (OK is returned before flushing the codes).	✔
+CGEV	GPRS network event indication	✘
+CGLA	Generic UICC logical channel access	✔
+CGMI	Request manufacturer identification	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CGMM	Request model identification	✔
+CGMR	Request revision identification	✔
+CGPADDR	Show PDP address **Usage:** • AT+CGPADDR=[<cid> [,<cid> [,…]]] **Parameters:** <cid> (Context) • Valid values: 1–24	✔
+CGQMIN	Quality of Service Profile (Minimum acceptable) **Usage:** • AT+CGQMIN=<cid>, <precedence>, <delay>, <reliability>, <peak>, <mean> **Parameters:** <cid> (Context) • Valid values: 1–24 <precedence> (Precedence class) • Valid values: 1–3 <delay> (Delay class, per 3GPP TS 24.008) • Valid values: 1–4 <reliability> (Reliability class) • Valid values: 1–5 <peak> (Peak throughput class) • Valid values: 1–4 <mean> (Mean throughput class) • Valid values: 1–18, 31	✔
+CGQREQ	Quality of Service Profile (Requested) **Usage:** • AT+CGQREQ=<cid>, <precedence>, <delay>, <reliability>, <peak>, <mean> **Parameters:** <cid> (Context) • Valid values: 1–24 <precedence> (Precedence class) • Valid values: 1–3 <delay> (Delay class, per 3GPP TS 24.008) • Valid values: 1–4 <reliability> (Reliability class) • Valid values: 1–5 <peak> (Peak throughput class) • Valid values: 1–4 <mean> (Mean throughput class) • Valid values: 1–18, 31	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CGREG	GPRS network registration status **Usage:** • AT+CGREG=[<n>] **Parameters:** <n> • Valid values: 0–2	✔
+CGSMS	Select service for MO SMS messages **Usage:** • AT+CGSMS=[<service>] **Parameters:** <service> • 0—Packet domain • 1—Circuit switched • 2—Packet domain preferred • 3—Circuit-switched preferred	✔
+CGSN	Request product serial number identification	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CGTFT	Traffic Flow Template **Usage:** • 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)>]]]]]]]] **Parameters:** <cid> (Context) • Valid values: 1–24 <packet_filter_identifier> (Packet filter ID) • Numeric <evaluation_precedence_index> • Numeric • Identifies an evaluation precedence index that is unique within all TFTs associated with the PDP contexts that share the same PDP address. <source_address_and_subnet_mask> (Source address and subnet mask attribute of a valid packet filter) <protocol_number_(ipv4)-next_header_(ipv6)> • Specifies the Protocol Number/Next Header attribute of a valid packet filter. <destination_port_range> • String—Dot-separated numbers in the form "f.t" that specifies the destination port range attribute of a valid packet filter. <source_port_range> • String—Dot-separated numbers in the form "f.t" that specifies the source port range attribute of a valid packet filter. <ipsec_security_parameter_index_(spi)> • Numeric • Specifies the IPSec SPI attribute (32-bit) of a valid packet filter. <type_of_service_(tos)_(ipv4)_and_mask-traffic_class_(ipv6)_and_mask> • String—Dot-separated numbers in the form "t.m" that specifies the Type of Service/Traffic Class and Mask attribute of a valid packet filter. <flow_label(ipv6)> • Parameter is valid for IPv6 only. • Specifies the Flow Label attribute of a valid packet filter.	✔
+CHLD	Call related supplementary services	✘
+CHSA	HSCSD non-transparent asymmetry configuration	✘
+CHSC	HSCSD current call parameters	✘
+CHSD	HSCSD device parameters	✘
+CHSR	HSCSD parameters report	✘
+CHST	HSCSD transparent call configuration	✘
+CHSU	HSCSD automatic user initiated upgrading	✘

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CHUP	Hangup call	✘
+CIEV	Indicator event	✘
+CIMI	Request international mobile subscriber identity	✔
+CIND	Indicator control **Usage:** • AT+CIND=<ind>, <ind>, …	✔
+CKEV	Key press or release event	✘
+CKPD	Keypad control	✘
+CLAC	List all available AT commands	✔
+CLAE	Language Event	✘
+CLAN	Set Language	✘
+CLCC	List current calls	✘
+CLCK	Facility lock **Usage:** • AT+CLCK=<fac>, <mode>, <passwd>, <class> **Parameters:** <fac> (Facility values) <mode> • 0—Unlock • 1—Lock • 2—Query status <passwd> • ASCII string • Same as the password specified for the facility from the MT user interface or with the +CPWD command. <class> • Sum of numbers each representing a class of information	✔
+CLIP	Calling line identification presentation	✘
+CLIR	Calling line identification restriction	✘
+CLVL	Set/return internal loudspeaker volume	✘
+CMAR	Master Reset	✘
+CME ERROR: <err>	Mobile Termination error result code	✔
+CMEC	Mobile Termination control mode	✘
+CMEE	Report Mobile Termination error **Usage:** • AT+CMEE= <n>	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CMER	Mobile Termination event reporting **Usage:** • AT+CMER=<mode>, <keyp>, <disp>, <ind>, <bfr> **Parameters:** <mode> • 0—Buffer URCs in TA • 1—Discard or forward • 2—Buffer and forward • 3—Forward <keyp> • 0—No keypad event reporting <disp> • 0—No display event reporting <ind> (Indicator event reporting) • 0—No indicator event reporting <bfr> • 0—MT buffer of URCs defined within this command is cleared when <mode> is 1–3. • 1—MT buffer of URCs defined within this command is flushed to the DTE when <mode> is 1–3. (Note that the OK response is returned before flushing the codes.)	✔
+CMOD	Call mode	✘
+CMUT	Enable/disable uplink voice muting	✘
+CMUX	Multiplexing mode	✘
+CNUM	Subscriber number	✔
+COLP	Connected line identification presentation	✘
+COPN	Read operator names	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+COPS	Operator selection **Usage:** • AT+COPS=[<mode>[,<format>[,<oper>[,<AcT>]]]] **Parameters:** <mode> (Network selection method) • Choose whether network selection is done automatically by the MT, or if the operator (<oper>) forces selection using this command. • 0—Automatic (<oper> field is ignored) • 1—Manual (<oper> field is required, and <AcT> is optional) • 2—Deregister from network • 3—Set only the <format> (for read command +COPS?), do not attempt registration/deregistration (<oper> and <AcT> fields are ignored); this value is not applicable in read command response • 4—Manual/automatic (<oper> field is required); if manual selection fails, automatic mode (<mode>=0) is entered <format> (Format of <oper> parameter) • 0—Long alphanumeric (Factory-programmed value) • 1—Short alphanumeric • 2—Numeric <oper> • ASCII string • Values (based on <format> parameter): • If <format>=0, maximum string length=16 • If <format>=1, maximum string length=8 • If <format>=2, string length=5–6 (MCC/MNC codes) • Factory-programmed default: FFFF (undefined) <AcT> (Radio access technology) • 0—GSM • 2—UTRAN	✔
+CPAS	Phone activity status	✘
+CPBF	Find phonebook entries **Usage:** • AT+CPBF=<find text>	✔
+CPBR	Read phonebook entries This command returns a specific of range phonebook entries from the current phonebook's memory storage. **Usage:** • AT+CPBR=<index1>, <index2> **Parameters:** <index1>, <index2> (Phonebook entry locations) • <index1>—Starting location in current phonebook memory storage • <index2>—Ending location in current phonebook memory storage	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No

+CPBS	Select phonebook memory storage
	Usage:
	• AT+CPBS=<storage>,<password>
	Parameters:
	<storage> (Phonebook memory storage type)
	• Valid values:
	  • SM—SIM phonebook (May not be available when FDN is enabled, depending on the SIM card.)
	  • LD—SIM last-dialling phonebook
	  • DC—MT dialed calls list
	  • FD—SIM fixed dialing phonebook (only valid with PIN2)
	  • MC—MT missed (unanswered received) calls list
	  • ME—MT phonebook
	  • RC—MT received calls list
	  • EN—Active application in the UICC (GSM or USIM) or SIM card (or MT) emergency number
	  • ON—Own number phone-block (read/write). Content is also shown by +CNUM)
	<password> (PIN2 code)
	• ASCII string
	• Required if the selected <storage> type uses a PIN2 code (e.g., <storage> type FD requires a PIN2 code)
		✔

+CPBW	Write phonebook entry **Usage:** • AT+CPBW=<index>, <number>, <type>, <text>,<group>,<adnumber>,<adtype>,<secondtext>,<email> **Parameters:** <index> (Location number of phonebook entry in phonebook memory) <number> (Phone number of type <type>) <type> (Address type) <text> (First text string associated with the number) <group> (Group that the phonebook entry may belong to) <adnumber> (Additional phone number of type <adtype>) <adtype> (Type of address) <secondtext) (Second text string associated with the number) <email> (Email address)	✔
+CPIN	Enter PIN **Usage:** • AT +CPIN=<pin>,<newpin> **Limitations:** • Only SIM PIN/PUK and PIN2/PUK2 are supported	✔
+CPINR	Remaining PIN retries	✘

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CPLS	Preferred PLMN list selection **Usage:** • AT+CPLS=<list> **Parameters:** <list> • Valid values: 0–2	✔
+CPOL	Preferred operator list **Usage:** • AT+CPOL=[<index>][, <format>[,<oper> [,<GSM_AcT>, <GSM_Compact_AcT>,<UTRAN_AcT>]]] **Parameters:** <index> (Order number of operator in the SIM preferred operator list)) • Valid values: 1–85 <format> (Format of <oper> parameter) • 0—Long alphanumeric (Factory-programmed value) • 1—Short alphanumeric • 2—Numeric <oper> • ASCII string • Values (based on <format> parameter): • If <format>=0, maximum string length=16 • If <format>=1, maximum string length=8 • If <format>=2, maximum string length=5–6 (MCC/MNC codes) • Factory-programmed default: FFFF (undefined) <GSM_AcT> (GSM access technology) • 0—Access technology not selected • 1—Access technology selected <GSM_Compact_AcT> (GSM compact access technology) • 0—Access technology not selected • 1—Access technology selected <UTRAN_AcT> (UTRA access technology) • 0—Access technology not selected • 1—Access technology selected	✔
+CPROT	Enter protocol mode	✘
+CPUC	Price per unit and currency table	✘
+CPWC	Power class	✘

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CPWD	Change password **Usage:** • AT+CPWD=<fac>, <oldpwd>, <newpwd> **Parameters:** <fac> (Facility lock) • Valid values: AB, AC, AG, AI, AO, IR, OI, OX, P2, SC <oldpwd> (Old password) <newpwd> (New password)	✔
+CR	Service reporting control **Usage:** • AT+CR=<mode> **Parameters:** <mode> • 0—Disable reporting (Default; Factory-programmed value) • 1—Enable reporting	✔
+CRC	Cellular result codes **Usage:** • AT+CRC=<mode> **Parameters:** <mode> • 0—Extended format disabled (Default; Factory-programmed value) • 1—Extended format enabled	✔
+CREG	Network registration **Usage:** • AT+CREG=[<n>] **Parameters:** <n> • 0—Disable network registration URC (Default) • 1—Enable network registration URC • 2—Enable network registration and location information URC	✔
+CRING	Incoming call type	✘
+CRLP	Radio link protocol	✘
+CRMP	Ring Melody Playback	✘
+CRSL	Ringer sound level	✘

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CRSM	Restricted SIM access **Usage:** • AT+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>,<pathid>]]] **Parameters:** <command> • 176—Read binary • 178—Read record • 192—Get response • 214—Update binary • 220—Update record • 242—Status <fileid> (Elementary datafile on SIM) • Mandatory for every <command> except 242 (Status). <P1>, <P2>, <P3> (Request definition) • These parameters define the request. These are mandatory every <command> except 192 (Get response) and 242 (Status). <data> (Information that will be written to the SIM) • Hexadecimal format <pathid> (Path of elementary file on the SIM/UICC) • Hexadecimal format	✔
+CSCC	Secure control command	✘
+CSCS	Select TE character set **Usage:** • AT+CSCS= <chset> **Parameters:** <chset> • Valid values: IRA, GSM, UCS2	✔
+CSDF	Settings date format **Usage:** • AT+CSDF=[[<mode>][,<auxmode>]] **Parameters:** <mode> • Valid values: 1–7 <auxmode> • Valid values: 1–2	✔
+CSGT	Set Greeting Text	✘
+CSIL	Silence Command	✘
+CSIM	Generic SIM access	✔
+CSNS	Single numbering scheme	✘
+CSQ	Signal quality	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CSSN	Supplementary service notifications **Usage:** • AT+CSSN=[<n>[,<m>]] **Parameters:** <n> (Set/show the +CSSI result code presentation status) • 0—Disabled (Default) • 1—Enabled <m> (Set/show the +CSSU result code presentation status) • 0—Disabled (Default) • 1—Enabled	✔
+CSTA	Select type of address	✘
+CSTF	Settings time format **Usage:** • AT+CSTF=[<mode>] **Parameters:** <mode> • 1—HH:MM (24-hour clock) • 2—HH:MM a.m./p.m.	✔
+CSVM	Set Voice Mail Number	✘
+CTFR	Call deflection	✘
+CTZR	Time Zone Reporting **Usage:** • AT+CTZR=<onoff> **Parameters:** <onoff> (Enable/disable time zone change event reporting) • 0—Disable (Default) • 1—Enable	✔
+CTZU	Automatic Time Zone Update **Usage:** • AT+CTZU=<onoff> **Parameters:** <onoff> (Enable/disable automatic time zone update via NITZ) • 0—Disable • 1—Enable (Default)	✔

Table 13-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✔=Yes; ✘=No
+CUSD	Unstructured supplementary service data **Usage:** • AT+CUSD=<n>, <str>, <dcs> **Parameters:** <n> • 0—Disable the result code presentation • 1—Enable the result code presentation • 2—Cancel session (not applicable to read command response) <str> (USSD-string converted in the current character set in use) <dcs> (Data coding scheme (see 3GPP TS 23.038) used for sending the USSD string)	✔
+CV120	V.120 rate adaptation protocol	✘
+CVHU	Voice Hangup Control	✘
+CVIB	Vibrator mode	✘
D	ITU T V.25ter dial command	✔
D*99#	Sets up a packet data call (PDP context) based on profile ID #1	✔
D*99*<n>#**	Sets up a packet data call (PDP context) based on profile ID #<n> (<n> is the <cid> in the +CGDCONT command)	✔
+VTD	Tone duration	✘
+VTS	DTMF and arbitrary tone generation	✘
+WS46	PCCA STD 101 select wireless network	✘

14: Band Definitions

Some commands described in this document include input and/or output ‘band’ parameters, where the band value is one of the following:

- An enumerated value representing a network technology and band (Table 14-1)
- A 3GPP band number (Table 14-2 on page 158)

Note: Refer to EM759X Product Technical Specification (Doc# 41114425) for specific band support.

Table 14-1: Band/technology enumerations[a]

<band>	Description	<band>	Description	<band>	Description	<band>	Description
0	CDMA	25	WCDMA BC3	44	LTE B3	63	LTE B27
2	Sleep	26	CDMA BC14	45	LTE B5	64	LTE B28
5	CDMA 800	27	CDMA BC11	46	LTE B6	65	LTE B29
6	CDMA 1900	28	WCDMA BC4	47	LTE B8	66	LTE B30
7	HDR	29	WCDMA BC8	48	LTE B9	67	LTE B31
8	CDMA 1800	30	MF 700	49	LTE B10	68	LTE B32
9	WCDMA IMT	31	WCDMA BC9	50	LTE B12	69	LTE B33
10	GSM 900	32	CDMA BC15	51	LTE B14	70	LTE B34
11	GSM 1800	33	CDMA BC10	52	LTE B15	71	LTE B35
12	GSM 1900	34	LTE B1	53	LTE B16	72	LTE B36
14	JCDMA	35	LTE B7	54	LTE B18	73	LTE B37
15	WCDMA 1900A	36	LTE B13	55	LTE B19	74	LTE B39
16	WCDMA 1900B	37	LTE B17	56	LTE B20	75	WCDMA BC19
17	CDMA 450	38	LTE B38	57	LTE B21	76	LTE B41
18	GSM 850	39	LTE B40	58	LTE B22	77	LTE B42
19	IMT	40	WCDMA BC11	59	LTE B23	83	LTE B66
20	HDR 800	41	LTE B11	60	LTE B24	88	LTE B43
21	HDR 1900	42	LTE B4	61	LTE B25	96	LTE B48
22	WCDMA 800	43	LTE B2	62	LTE B26	97	LTE B71

a. Band values not listed (e.g. 1, 3, 4) are reserved.

Table 14-2: 3GPP bands

Band	Type	Frequency bands (MHz)	
		Rx	Tx
1	Mid	1920–1980	2110–2170
2	Mid	1850–1910	1930–1990
3	Mid	1710–1785	1805–1880
4	Mid	1710–1755	2110–2155
5	Low	824–849	869–894
6	Low	830–840	875–885
7	High	2500–2570	2620–2690
8	Low	880–915	925–960
9	Mid	1749.9–1784.9	1844.9–1879.9
10	Mid	1710–1770	2110–2170
11	Mid	1427.9–1447.9	1475.9–1495.9
12	Low	699–716	729–746
13	Low	777–787	746–756
14	Low	788–798	758–768
15	-	Reserved	Reserved
16	-	Reserved	Reserved
17	Low	704–716	734–746
18	Low	815–830	860–875
19	Low	830–845	875–890
20	Low	832–862	791–821
21	Mid	1447.9–1462.9	1495.9–1510.9
22	-	Reserved	Reserved
23	Mid	2000–2020	2180–2200
24	Mid	1626.5–1660.5	1525–1559
25	Mid	1850–1915	1930–1995
26	Low	814–849	859–894
27	-	Reserved	Reserved
28	Low	703–748	758–803
29	Low	N/A	717–728
30	High	2305–2315	2350–2360
31	Low	452.5–457.5	462.5–467.5
32	Mid	N/A	1452–1496
33	-	Reserved	Reserved
34	Mid	2010–2025	
35	-	Reserved	Reserved
36	-	Reserved	Reserved
37	Mid	1910–1930	
38	High	2570–2620	
39	Mid	1880–1920	
40	High	2300–2400	
41	High	2496–2690	
42	High	3400–3600	
43	High	3600–3800	
44	Low	703–803	
45	-	Reserved	Reserved
46	High	5150–5925	
47	High	5855–5925	
48	High	3550–3700	
49	High	3550–3700	
50	Mid	1432–1517	
51	Mid	1427–1432	
52	High	3300–3400	
53	High	2483.5–2495	
54–64	-	Reserved	Reserved
65	Mid	1920–2010	2110–2200
66	Mid	1710–1780	2110–2200
67	Low	N/A	738–758
68	Low	698–728	753–783
69	High	N/A	2570–2620
70	Mid	1695–1710	1995–2020
71	Low	663–698	617–652
72	Low	451–456	461–466
73	Low	450–455	460–465
74	Mid	1427–1470	1475–1518
75	Mid	N/A	1432–1517
76	Mid	N/A	1427–1432
77–84	-	Reserved	Reserved
85	Low	698–716	728–746
86	-	Reserved	Reserved
87	Low	410–415	420–425
88	Low	412–417	422–427
89–93	-	Reserved	Reserved

15: ASCII Table

Table 15-1: ASCII values

Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
NUL	0	00	SP	32	20	@	64	40	‘	96	60
SOH	1	01	!	33	21	A	65	41	a	97	61
STX	2	02	“	34	22	B	66	42	b	98	62
ETX	3	03	#	35	23	C	67	43	c	99	63
EOT	4	04	$	36	24	D	68	44	d	100	94
ENQ	5	05	%	37	25	E	69	45	e	101	95
ACK	6	06	&	38	26	F	70	46	f	102	96
BEL	7	07	’	39	27	G	71	47	g	103	97
BS	8	08	(	40	28	H	72	48	h	104	98
HT	9	09	)	41	29	I	73	49	i	105	99
LF	10	0A	*	42	2A	J	74	4A	j	106	6A
VT	11	0B	+	43	2B	K	75	4B	k	107	6B
FF	12	0C	,	44	2C	L	76	4C	l	108	6C
CR	13	0D	-	45	2D	M	77	4D	m	109	6D
SO	14	0E	.	46	2E	N	78	4E	n	110	6E
SI	15	0F	/	47	2F	O	79	4F	o	111	6F
DLE	16	10	0	48	30	P	80	50	p	112	70
XON	17	11	1	49	31	Q	81	51	q	113	71
DC2	18	12	2	50	32	R	82	52	r	114	72
XOFF	19	13	3	51	33	S	83	53	s	115	73
DC4	20	14	4	52	34	T	84	54	t	116	74
NAK	21	15	5	53	35	U	85	55	u	117	75
SYN	22	16	6	54	36	V	86	56	v	118	76
ETB	23	17	7	55	37	W	87	57	w	119	77
CAN	24	18	8	56	38	X	88	58	x	120	78
EM	25	19	9	57	39	Y	89	59	y	121	79
SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
ESC	27	1B	;	59	3B	[	91	5B	{	123	7B
FS	28	1C	<	60	3C	\	92	5C	|	124	7C
GS	29	1D	=	61	3D	]	93	5D	}	125	7D
RS	30	1E	>	62	3E	^	94	5E	~	126	7E
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