



AirPrime EM73xx/MC73xx

AT Command Reference



SIERRA
WIRELESS®

4118014
Rev. 1

Important Notice

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

Safety and Hazards

Do not operate the Sierra Wireless modem in areas where blasting is in progress, where explosive atmospheres may be present, near medical equipment, near life support equipment, or any equipment which may be susceptible to any form of radio interference. In such areas, the Sierra Wireless modem **MUST BE POWERED OFF**. The Sierra Wireless modem can transmit signals that could interfere with this equipment.

Do not operate the Sierra Wireless modem in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Sierra Wireless modem **MUST BE POWERED OFF**. When operating, the Sierra Wireless modem can transmit signals that could interfere with various onboard systems.

Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. Sierra Wireless modems may be used at this time.

The driver or operator of any vehicle should not operate the Sierra Wireless modem while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

Limitation of Liability

The information in this manual is subject to change without notice and does not represent a commitment on the part of Sierra Wireless. SIERRA WIRELESS AND ITS AFFILIATES SPECIFICALLY DISCLAIM LIABILITY FOR ANY AND ALL DIRECT, INDIRECT, SPECIAL, GENERAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXEMPLARY DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUE OR ANTICIPATED PROFITS OR REVENUE ARISING OUT OF THE USE OR INABILITY TO USE ANY SIERRA WIRELESS PRODUCT, EVEN IF SIERRA WIRELESS AND/OR ITS AFFILIATES HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR THEY ARE FORESEEABLE OR FOR CLAIMS BY ANY THIRD PARTY.

Notwithstanding the foregoing, in no event shall Sierra Wireless and/or its affiliates aggregate liability arising under or in connection with the Sierra Wireless product, regardless of the number of events, occurrences, or claims giving rise to liability, be in excess of the price paid by the purchaser for the Sierra Wireless product.

Patents

This product may contain technology developed by or for Sierra Wireless Inc. This product includes technology licensed from QUALCOMM®. This product is manufactured or sold by Sierra Wireless Inc. or its affiliates under one or more patents licensed from InterDigital Group and MMP Portfolio Licensing.

Copyright

© 2015 Sierra Wireless. All rights reserved.

Trademarks

Sierra Wireless®, AirPrime®, Skylight™, and the Sierra Wireless logo are registered trademarks of Sierra Wireless.

Windows® is a registered trademark of Microsoft Corporation.

QUALCOMM® is a registered trademark of QUALCOMM Incorporated. Used under license.

Other trademarks are the property of their respective owners.

Contact Information

Sales Desk:	Phone:	1-604-232-1488
	Hours:	8:00 AM to 5:00 PM Pacific Time
	E-mail:	sales@sierrawireless.com
Post:	Sierra Wireless 13811 Wireless Way Richmond, BC Canada V6V 3A4	
Fax:	1-604-231-1109	
Web:	www.sierrawireless.com	

Consult our website for up-to-date product descriptions, documentation, application notes, firmware upgrades, troubleshooting tips, and press releases:

www.sierrawireless.com

Revision History

Revision number	Release date	Changes
1	Sep 2015	<ul style="list-style-type: none">• Created document, replacing 4114485 (EM version) and 4114486 (MC version)• Added +CGXCONT, \$DIAG, !HWID, !LTEINFO, !PATEMP, !SCACT• Added !CUSTOM value: "FLOWNOTIDISABLE"• Updated !BAND (length of bandwidth parameters), !GPSNMEA (reset required), !GPSXTRADATAENABLE (<enable> and <dloadInt> parameters, and added <validityTime> parameter), !GPSXTRATIMEENABLE (<enable> parameter), !NVSPCODE (removed assignment format), !PCTEMP and !PCVOLT state parameters, !UDUSBCOMP (query command response details), +WANTGNSSPWR (min f/w)• Updated CFUNPERSISTEN customization usage

»» Contents

About This Guide	11
Introduction.	11
Command access.	11
Command timing	11
Interval timing	11
Escape sequence guard time	12
Result codes.	12
References.	12
Terminology and acronyms	12
Current firmware versions	12
Version	12
Upgrading	12
Document structure	12
Conventions	19
AT Password Commands	21
Introduction.	21
Command summary.	21
Command reference.	22
Modem Status, Customization, and Reset Commands	25
Introduction.	25
Command summary.	25
Command reference.	27
Diagnostic Commands	67
Introduction.	67
Command summary.	67
Command reference.	68

Test Commands	71
Introduction	71
Command summary	72
Command reference	74
Memory Management Commands	99
Introduction	99
Command summary	99
Command reference	100
GPS Commands	101
Introduction	101
Command summary	101
Command reference	103
Error codes	132
SIM Commands	135
Introduction	135
Command summary	135
Command reference	136
OMA-DM Commands	139
Introduction	139
Command summary	139
Command reference	140
SAR Backoff and Thermal Control Commands	151
Introduction	151
Command summary	151
Command reference	152

Audio Commands	155
Introduction.	155
Command summary.	155
Command reference.	157
Supported GSM/WCDMA AT Commands	185
Band Definitions	195
ASCII Table	197
Index (AT commands)	199
Index	205

1: About This Guide

Introduction

This document describes supported standard and proprietary AT commands available for Sierra Wireless AirPrime® Mini Card (MC) and Embedded Module (EM) products, 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)*.

Note: When designing applications that use these AT commands, use Skylight™ or other Sierra Wireless applications as functionality templates to ensure proper use of command groups. For questions or concerns relating to command implementation, please contact your Sierra Wireless account representative.

Command access

Most commands in this reference are password-protected. To use these commands, you must enter the correct password using **ATIINTERCND** on page 22. 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 **ATIINTERCND** 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 **ATIDAFTMACT**. If **ATIDASBAND** 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 AirPrime 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.

[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	22
!SETCND	Set AT command password	23

[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	27
!BAND	Select/return frequency band set	28
!BOOTHOLD	Reset modem and wait in bootloader for firmware download	29
+CGXCONT	Edit/display 3GPP2 profiles (CDMA only)	30
!CUSTOM	Set/return customization settings	32
!DARPEN	Enable/disable DARP for SAIC	37
\$DIAG	Enable/disable DIAG service	37
!DTMEN	Enable/disable Dual Transfer Mode stack functionality	38
!EDAEN	Configure protocol stack for EDA	38
!GCFEN	Enable/disable GCF test mode	39
!GCFUIMTYPE	Set/return current SIM type	39
!GETBAND	Return the current active band	40
!GETRAT	Return the current active radio access technology (RAT)	40
!GOBIIMPREF	Query/set Gobi Image Management preferences	41
!GRESET	Reset the modem	42
!GSTATUS	Return operational status	42
!GVER	Return firmware version	42
!GVERBT	Return bootloader version	43
!HWID	Display hardware version	43
!LTEINFO	Display LTE network information	44
!LTENAS	Configure LTE NAS settings	46
^MODE	Set/report system mode indication state	47
!NASREL	Set/report system mode indication state	47

Table 1-2: Modem status commands (Continued)

Command	Description	Page
!INVCRYPTIMEI	Write unencrypted IMEI to modem	48
!INVNSCODE	Return Network Subset codes	49
!INVPLMN	Provision PLMN list for Network Personalization locking	50
!INVSPCODE	Return Network Service Provider code list	50
!PACKAGE	Return package version string	51
!PATEMP	Return PA temperature information	51
!PCINFO	Return power control status information	52
!PCOFFEN	Set/return Power Off Enable state	52
!PCTEMP	Return Power control temperature information	53
!PCTEMPLIMITS	Set/report temperature state limit values	54
!PCVOLT	Return current power supply voltage information	55
!PCVOLTLIMITS	Set/report power supply voltage state limit values	56
!POWERDOWN	Power down system	57
!PRIID	Set/report module PRI part number and revision	57
!REL	Set/report active protocol/revision	58
!RESET	Reset modem	58
!SCACT	Activate/deactivate data connection	59
!SELACQ	Select RAT acquisition order	60
!SELMODE	Set/return current service domain	61
!SIMRSTC	Set/report SIM refresh reset notification state	61
!UDINFO	Return information from active USB descriptor	62
!UDPID	Set/report product ID in USB descriptor	63
!UDUSBCOMP	Set/report USB interface configuration	64
&V	Return operating mode AT configuration parameters	65

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	68
!ERR	Display/clear diagnostic information	69
!GCCLR	Clear crash dump data	69

Table 1-3: Diagnostic commands (Continued)

Command	Description	Page
!GCDUMP	Display crash dump data	69
!RXDEN	Enable/disable WCDMA/LTE receive diversity	70

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
!DAFTMACT	Put modem into Factory Test Mode	74
!DAFTMDEACT	Put modem into online mode from Factory Test Mode	74
!DAGGAVGRSSI	Return averaged RSSI value in dBm (GSM only)	75
!DAGGRSSI	Return the RSSI value in dBm (GSM only)	75
!DAGGRSSIRAW	Return raw RSSI value (GSM only)	76
!DAGINFO	Return GSM mode RF information (GSM only)	77
!DAGSLOCK	Return synthesizer lock state (GSM only)	78
!DAGSRXBURST	Set GSM receiver to burst mode (GSM only)	78
!DAGSRXCONT	Set GSM receiver continuously on (GSM only)	79
!DAGSTXBURST	Set GSM transmitter to burst mode (GSM only)	79
!DAGSTXFRAME	Set GSM Tx frame structure (GSM only)	80
!DALGAVGAGC	Return averaged Rx AGC value (LTE only)	81
!DALGRXAGC	Return Rx AGC value (LTE only)	82
!DALGTXAGC	Return Tx AGC value and transmitter parameters (LTE only)	83
!DALSPARANGE	Set LTE PA range (LTE only)	84
!DALSRXBW	Set LTE Rx bandwidth (LTE only)	85
!DALSTXBW	Set LTE Tx bandwidth (LTE only)	85
!DALSTXINDEX	Set LTE Tx gain index (LTE only)	86
!DALSWAVEFORM	Set LTE TX waveform (LTE only)	86
!DAOFFLINE	Place modem offline	87
!DASBAND	Set frequency band	88
!DASCHAN	Set modem channel (frequency)	89
!DASLNAGAIN	Set LNA gain state	90
!DASPDM	Set PDM value	91

Table 1-4: Test commands (Continued)

Command	Description	Page
!DASTXOFF	Turn Tx PA off	91
!DASTXON	Turn Tx PA on	92
!DAWGAVGAGC	Return averaged Rx AGC value (WCDMA only)	92
!DAWGRXAGC	Return Rx AGC value (WCDMA only)	93
!DAWINFO	Return WCDMA mode RF information (WCDMA only)	94
!DAWSCONFIGRX	Set WCDMA receiver to factory calibration settings (WCDMA only)	95
!DAWSPARANGE	Set PA range state machine (WCDMA only)	96
!DAWSSCHAIN	Enable secondary receive chain (WCDMA only)	96
!DAWSCHAINTCM	Place receive chain in test call mode (WCDMA only)	97
!DAWSTXCW	Set waveform used by the transmitter (WCDMA only)	97
!DAWSTXPWR	Set desired Tx power level (WCDMA mode only)	98

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
!RMARESET	Restore device to original settings	100

GPS Commands—Supported on GPS-enabled modems only.

Table 1-6: GPS commands

Command	Description	Page
!GPSAUTOSTART	Configure GPS auto-start features	103
!GPSCLRASSIST	Clear specific GPS assistance data	104
!GPSOLDSTART	Clear all GNSS assistance data	105
!GPSSEND	End an active session	105
!GPSFIX	Initiate GPS position fix	106
!GPSKEEPWARM	Configure Keep Warm functionality	107
!GPSLBSAPN	Set GPS LBS APNs	108
!GPSLOC	Return last known location of the modem	110
!GPSMOMETHOD	Set/report GPS MO method	111
!GPSMTLRSETTINGS	Set/report MT location request settings	112
!GPSNIQOSTIME	Set/report GPS QoS timeout period for network-initialized fixes	112

Table 1-6: GPS commands (Continued)

Command	Description	Page
!GPSNMEA	Enable/disable GPS session autostart when NMEA opens	113
!GPSNMEACONFIG	Enable and set NMEA data output rate	114
!GPSNMEASENCE	Set/report NMEA sentence type	115
!GPSONLY	Configure GNSS for GPS only, or GPS and GLONASS	117
!GPSPORTID	Set/report port ID to use over TCP/IP	117
!GPSPOSMODE	Configure support for GPS positioning modes	118
!GPSSATINFO	Request satellite information	119
!GPSSTATUS	Request current status of a position fix session	120
!GPSUPLURL	Set/report SUPL server URL	121
!GPSUPLVER	Set/report SUPL server version	122
!GPSTRACK	Initiate local tracking (multiple fix) session	123
!GPSTRANSSEC	Control GPS transport security	124
!GPSXTRAAPN	Set GPS XTRA APNs	125
!GPSXTRADATAENABLE	Set/report GPS XTRA settings	127
!GPSXTRADATAURL	Set/report GPS XTRA data server URLs	128
!GPSXTRAINITDNLD	Initiate gpsOneXTRA data download and inject operation	128
!GPSXTRASTATUS	Return current status of gpsOneXTRA	129
!GPSXTRATIME	Inject GPS or UTC time into gpsOneXTRA system	130
!GPSXTRATIMEENABLE	Set/report GPS XTRA time settings	131
!GPSXTRATIMEURL	Set/report GPS XTRA SNTP server URLs	132

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

Table 1-7: SIM commands

Command	Description	Page
+CPINR	Display remaining number of SIM unlock retries	136
!ICCID	Return (U)SIM card's ICCID	137

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
!HOSTDEVINFO	Configure host device details	140
!IDSAUTOFOTA	Configure automatic settings for FOTA updates	141
!IDSAUTOSDM	Configure Subscriber Device Management response to server request	142
!IDSCONFIGACC	Configure DM account authentication mode and XML format	143
!IDSCREATEACC	Enter DM account credentials	144
!IDSDFLTACC	Set DM account to use for device-initiated sessions	145
!IDSPID	Set profile ID for DM data connection types	145
!IDSROAM	Configure DM client roaming support	146
!IDSSUPPORT	Configure DM sessions	147
!IMSTESTMODE	Enable/disable IMS test mode	148
!OSINFO	Configure host device operating system information	149

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	152
!SARINTGPIOMODE	Set/report default pull mode for SAR interrupt GPIOs	153

Audio Commands—Commands used to configure and manage audio-capable devices

Table 1-10: Audio commands

Command	Description	Page
!AVALAUDIO	Play/record audio file (.wav format)	157
!AVALAUDIOLOOPBK	Start/stop audio loopback	158
!AVCFG	Bind audio profile to device/physical interface	159
!AVDEF	Reset configurable audio parameters to default settings	160
!AVEC	Enable/disable Echo Cancellation mode for audio profile	161
!AVFLTREN	Enable/disable Tx/Rx FIR/IIR functions	162
!AVMUTE	Mute/unmute earpiece/microphone/call waiting tone	163
!AVNS	Enable/disable Noise Suppression mode for audio profile	164

Table 1-10: Audio commands (Continued)

Command	Description	Page
!AVRXAGC	Enable/disable Rx AGC	164
!AVRXAVC	Enable/disable Rx AVC	165
!AVRXG	Query/set audio profile's decoder gain select setting	166
!AVSETPROFILE	Select/configure audio profile for CS call	167
!AVSETVOL	Query/set audio profile's Rx volume level	168
!AVSTG	Query/set/enable/disable audio profile's audio front end sidetone gain	169
!AVTONEPLAY	Play a tone	170
!AVTXAGC	Enable/disable Tx AGC	171
!AVTXG	Query/set audio profile's encoder gain select setting	172
!AVTXVOL	Query/set audio profile's Tx volume gain	173
+CMEP	Preview SMS message	174
*CNTI	Display current, available, or supported network types (technologies)	175
!MADC	Display ADC values	176
!MLDTMFEN	Enable/disable local DTMF	176
+PRLVER	Display current PRL version	177
+VTD	Set DTMF tone duration	177
+VTS	Send DTMF tone	178
+VTSBST	Send burst DTMF tone (CDMA only)	179
+WANTGNSSPWR	Enable/disable GNSS antenna power	180
+WANTS	Perform GNSS antenna diagnostic check	180
+WFSH	Send flash to base station to initiate call holding or three-way calling	181
+WIOR	Read GPIO value	182
+WIOW	Write GPIO value	182
+WSOS	Enter/exit emergency mode	183

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

AT commands described in this document are password-protected. This chapter describes how to enter and change the password.

Command summary

[Table 2-1](#) on page 21 lists the commands described in this chapter.

Table 2-1: AT password commands

Command	Description	Page
!ENTERCND	Enable access to password-protected commands	22
!SETCND	Set AT command password	23

Command reference

Table 2-2: AT command password details

Command	Description
!ENTERCND	<p>Enable access to password-protected commands</p> <p>Before you can use any password-protected AT commands, you must enter the password correctly using this command. The initial password is configured onto the modem during manufacture. You can change the password using !SETCND. If you do not know the password, contact your Sierra Wireless account manager.</p> <p>Once the password has been entered correctly, the password-protected AT commands are available until the modem is reset or powered off and on.</p> <p>Password required: Yes—Query format only.</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><"key"> (Password stored in NV memory)</p> <ul style="list-style-type: none"> • 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	<p>Set AT command password</p> <p>Change the password used for the !ENTERCND command. (Before you can change the password using !SETCND, you must enable access to this command using !ENTERCND.)</p> <p>Password required: Yes</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!SETCND=<"key"> Response: OK Purpose: Sets <"Key"> as the new password for accessing protected commands. <p>Parameters:</p> <p><"key"> (New password)</p> <ul style="list-style-type: none"> • 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".) <hr/> <p>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.</p> <hr/>

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	27
!BAND	Select/return frequency band set	28
!BOOTHOLD	Reset modem and wait in bootloader for firmware download	29
+CGXCONT	Edit/display 3GPP2 profiles (CDMA only)	30
!CUSTOM	Set/return customization settings	32
!DARPEN	Enable/disable DARP for SAIC	37
\$DIAG	Enable/disable DIAG service	37
!DTMEN	Enable/disable Dual Transfer Mode stack functionality	38
!EDAEN	Configure protocol stack for EDA	38
!GCFEN	Enable/disable GCF test mode	39
!GCFUIMTYPE	Set/return current SIM type	39
!GETBAND	Return the current active band	40
!GETRAT	Return the current active radio access technology (RAT)	40
!GOBIIMPREF	Query/set Gobi Image Management preferences	41
!GRESET	Reset the modem	42
!GSTATUS	Return operational status	42
!GVER	Return firmware version	42
!GVERBT	Return bootloader version	43
!HWID	Display hardware version	43
!LTEINFO	Display LTE network information	44
!LTENAS	Configure LTE NAS settings	46

Table 3-1: Modem status commands (Continued)

Command	Description	Page
^MODE	Set/report system mode indication state	47
!NASREL	Set/report system mode indication state	47
!INVCRYPTIMEI	Write unencrypted IMEI to modem	48
!INVNSCODE	Return Network Subset codes	49
!INVPLMN	Provision PLMN list for Network Personalization locking	50
!INVSPCODE	Return Network Service Provider code list	50
!PACKAGE	Return package version string	51
!PATEMP	Return PA temperature information	51
!PCINFO	Return power control status information	52
!PCOFFEN	Set/return Power Off Enable state	52
!PCTEMP	Return Power control temperature information	53
!PCTEMPLIMITS	Set/report temperature state limit values	54
!PCVOLT	Return current power supply voltage information	55
!PCVOLTLIMITS	Set/report power supply voltage state limit values	56
!POWERDOWN	Power down system	57
!PRIID	Set/report module PRI part number and revision	57
!REL	Set/report active protocol/revision	58
!RESET	Reset modem	58
!SCACT	Activate/deactivate data connection	59
!SELACQ	Select RAT acquisition order	60
!SELMODE	Set/return current service domain	61
!SIMRSTC	Set/report SIM refresh reset notification state	61
!UDINFO	Return information from active USB descriptor	62
!UDPID	Set/report product ID in USB descriptor	63
!UDUSBCOMP	Set/report USB interface configuration	64
&V	Return operating mode AT configuration parameters	65

Command reference

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

Command	Description
!ANTSEL	<p>Set/query external antenna select configuration</p> <p>Configure the device to drive (high or low) up to four GPIOs for specific bands. (If a GPIO is not needed for a specific band, it is identified as not required.)</p> <p>When the device switches to a configured band, the GPIOs are driven as specified, and the host uses those GPIOs to tune the external antenna appropriately. Note that this feature is independent of the radio technology being used. For example, Band 5 corresponds to any 850-band technology (CDMA, WCDMA, LTE, GSM).</p> <hr/> <p><i>Note: System level testing should be performed 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).</i></p> <hr/> <p>Password required: Yes Reset required to apply changes: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!ANTSEL=<band>, <gpio1>, <gpio2>, <gpio3>[, <gpio4>] Response: 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 execution format and parameter values. <p>Parameters:</p> <p><band> (RF band)</p> <ul style="list-style-type: none"> • 3GPP band number. For a full listing of 3GPP band numbers, see Table 13-2 on page 196. • Valid range: 0–60. Band support is product specific—see the device's Product Specification or Product Technical Specification document for details. <p><gpio1>, <gpio2>, <gpio3>, <gpio4> (GPIO configurations. Note: <gpio4> availability is device-specific—see the appropriate Product Technical Specification for details.)</p> <ul style="list-style-type: none"> • 0=Logic low • 1=Logic high • 2=Not used for antenna selection (Default value for <gpio4>.)

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

Command	Description
<p>!BAND</p> <hr/> <p><i>Note: The 'Basic' command and response versions are used if you haven't entered the required password. (See Command access on page 11.)</i></p> <hr/>	<p>Select/return frequency band set</p> <p>Configure the modem to operate on a set of frequency bands, look up available sets, create new sets, or return the current selection.</p> <p>Password required: Yes—Execution (Extended) format</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution (Basic): <ul style="list-style-type: none"> Command: AT!BAND=<Index> Response: OK Purpose: Select an existing set of bands. • Execution (Extended): <ul style="list-style-type: none"> Command: AT!BAND=<Index>,"<Name>",<GWmask>[,<Lmask>,<Lmask>] Response: OK Purpose: Create a new set of bands. • Query: AT!BAND? <ul style="list-style-type: none"> Response: Index, Name, GW Band Mask L Band Mask <Index>, <Name>, <GWmask> <Lmask> 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. (<GWmask> and <Lmask> may only appear in Extended responses.) • Query List: AT!BAND=? <ul style="list-style-type: none"> Response: Index, Name[, GW Band Mask [L Band Mask]] <Index1>, <Name1>[, <GWmask1> [, <Lmask1>]] ... <IndexN>, <NameN>[, <GWmaskN> [, <LmaskN>]] OK Purpose: Display allowed <Index> values and descriptions of the associated band sets. <p>(Continued on next page)</p>

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

Command	Description
!BAND (continued)	<p>Select/return frequency band set (continued)</p> <p>Parameters:</p> <p><Index> (Index of a band set. Use the Query List command to display all supported sets)</p> <ul style="list-style-type: none"> Valid range: 0–13 (Hexadecimal. There are 20 possible values.) <p><Name> (Name of the band set)</p> <ul style="list-style-type: none"> ASCII string—Up to 30 characters <p><GWmask> (GSM/WCDMA bands included in the set)</p> <ul style="list-style-type: none"> 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 0000000000000003—BC0 (BC0-A and BC0-B) 0000000000000004—BC1 0000000000000080—G1800 0000000000000300—G900 (EGSM/GSM) 0000000000000400—BC6 0000000000004000—BC10 (800) 0000000000080000—G850 0000000000200000—G1900 0000000000400000—W2100 0000000000800000—W1900 0000000002000000—W1700 0000000004000000—W850 0000000008000000—W800 0000000080000000—BC15 0002000000000000—W900 1000000000000000—B19 (850) <p><Lmask> (LTE bands included in the set)</p> <ul style="list-style-type: none"> 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 ... 0000008000000000—Band 40 0000100000000000—Band 41
!BOOTHOLD	<p>Reset modem and wait in bootloader for firmware download</p> <p>Prepare for a firmware download by resetting the modem and waiting in 'boot and hold' mode.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT!BOOTHOLD Response: OK Purpose: Force the modem to backup user NV options, 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
+CGXCONT	<p>Edit/display 3GPP2 profiles (CDMA only) Edit or display 3GPP2 profiles (CDMA devices only). Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: <p style="margin-left: 20px;">AT+CGXCONT=<pid>,<iptype>[,<apnstr>[,<pdnlabelstr>[,<ratype>[,<inact ivetimervalue>[,<pcscfflag>[,<authprotocol>[,<useridstr>[,<passwordstr>]]]]]]</p> <p style="margin-left: 20px;">Response: OK, or ERROR</p> <p style="margin-left: 20px;">Purpose: Create or edit the specified profile (<pid>), or delete the profile by not listing any other parameters.</p> • Query: <p style="margin-left: 20px;">AT+CGXCONT?</p> <p style="margin-left: 20px;">Response: +CGXCONT: <pid>,<iptype>,<apnstr>,<pdnlabelstr>,<ratype>,<inactive- timervalue>,<pcscfflag>,<authprotocol>,<useridstr>,<passwordstr></p> <p style="margin-left: 40px;">...</p> <p style="margin-left: 40px;">OK</p> <p style="margin-left: 40px;"><i>or (if no profiles are available)</i></p> <p style="margin-left: 20px;">+CGXCONT: OK</p> <p style="margin-left: 20px;">Purpose: Display the settings for all available profiles.</p> • Query list: <p style="margin-left: 20px;">AT+CGXCONT=?</p> <p style="margin-left: 20px;">Purpose: Display the assignment command format and valid parameter options.</p> <p>Parameters:</p> <p><pid> (3GPP2 profile ID)</p> <ul style="list-style-type: none"> • Valid values: 0, 101–107 <p><iptype> (Internet protocol type)</p> <ul style="list-style-type: none"> • String format (quotation marks required) • Valid values: <ul style="list-style-type: none"> • "IP", "ip" (Default value) • "IPV6", "ipv6" • "IPV4V6", "ipv4v6" <p>(Continued on next page)</p>

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

Command	Description
+CGXCONT (continued)	<p>Edit/display 3GPP2 profiles (CDMA only) (continued)</p> <p><apnstr> (Access Point Name (APN))</p> <ul style="list-style-type: none"> String format (quotation marks required) Default value: "" If string is null ("") or not specified, the subscription value is requested. <p><pdnlabelstr> (Public Data Network (PDN) name)</p> <ul style="list-style-type: none"> String format (quotation marks required) Default value: "" Used for customer interface display <p><ratttype> (3GPP RAT type)</p> <ul style="list-style-type: none"> Valid values: <ul style="list-style-type: none"> 1=HRPD 2=EHRPD 3=HRPD_EHRPD (Default value) <p><inactivetimer> (Inactive PDN timer)</p> <ul style="list-style-type: none"> Number of minutes that device can remain in inactive state before the PDN connection is released Valid values: 0–65535 Default value: 0 <p><pcscfflag> (P-CSCF address flag)</p> <ul style="list-style-type: none"> Indicates whether P-CSCF (Proxy CSCF) address is required Valid values: <ul style="list-style-type: none"> 0=Address not required 1=Address required <p><authprotocol> (PPP authentication protocol type)</p> <ul style="list-style-type: none"> Valid values: <ul style="list-style-type: none"> 0=none (Default value) 1=PAP 2=CHAP 3=PAP_CHAP 4=EAP <p><useridstr> (User ID string)</p> <ul style="list-style-type: none"> User ID used for PPP authentication String format (quotation marks required) Default value: "" Note: The '#' symbol must not be used in the user id. <p><passwordstr> (Password string)</p> <ul style="list-style-type: none"> Password used for PPP authentication String format (quotation marks required) Default value: "" Note: The '#' symbol must not be used in the user id.

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

Command	Description
<p>!CUSTOM</p> <hr/> <p><i>Note: Some customizations may not be available for certain chipsets, firmware revisions, or devices.</i></p> <hr/>	<p>Set/return customization settings Set or return several customization values. Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATICUSTOM=<customization>, <value> Response: OK Purpose: Assign <value> to a specific <customization> setting. • Query: ATICUSTOM? Response: (list of enabled <customization>s) OK Purpose: Display customizations that are currently enabled. • Query list: ATICUSTOM=? Purpose: Return a list of valid <customization> values. <p>Parameters:</p> <p><value> (Value being assigned to a specific <customization> setting)</p> <ul style="list-style-type: none"> • Descriptions are included in each of the customizations described below. • Numeric value. Valid range depends on the <customization> type. <p><customization> (String identifying customization setting. The default value for all customizations is 0.)</p> <hr/> <p><i>Note: Use quotation marks around the customization string. For example, AT!CUSTOM="CSDOFF",0.</i></p> <hr/> <ul style="list-style-type: none"> • "AUTONETWORKMODE"—Indicate if UE should revert to Automatic Network mode after 60 seconds of Manual Network mode. <value>: <ul style="list-style-type: none"> • 0 = Remain in Manual. (Default) • 1 = Revert to Automatic. • 2 = Remain in Manual if UE is attached to the network, otherwise switch to Automatic. • "CFUNPERSISTEN"—Enable/disable persistence (across power cycles) of AT+CFUN setting. <value>: <ul style="list-style-type: none"> • 0 = Disable (+CFUN setting does not persist across power cycle) Note: If the modem is in P-LPM (persistent low power mode—AT+CFUN mode 0) when this option is used, persistence remains enabled until the modem is put into online mode using an AT or QMI command. • 1 = Enable (+CFUN setting persists across power cycle) • Note: This customization does not affect operating mode persistence set using other interfaces. For example, the QMI interface can still be used to set the operating mode to LPM or P-LPM, even if this customization is disabled. • "CMCLIENT"—Assign a default communication manager (CM) client. <value>: <ul style="list-style-type: none"> • 0 = No CM client specified (default) • 1 = Verizon Access Manager • 2 = Cisco CM <p>(Continued on next page)</p>

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

Command	Description
!CUSTOM (continued)	<p>Set—query customization settings (continued)</p> <ul style="list-style-type: none"> • “CSVOICEREJECT”—Enable/disable ability to ignore incoming voice call pages from the network. <value>: <ul style="list-style-type: none"> • 0 = Process pages as per device capabilities (default) • 1 = Ignore paging (type 1 and 2) messages • 2 = Reject call setup (voice and circuit-switched VT), returning cause code 88 (Incompatible destination) • 3 = Process voice pages as per device capabilities, and reject call setup (circuit-switched VT), returning cause code 88 (Incompatible destination) • 4 = Reject voice pages, returning cause code 65 (Bearer service not implemented), and reject call setup (circuit-switched VT), returning cause code 88 (Incompatible destination) • “FASTENUMEN”—Enable/disable fast enumeration for warm/cold boot. <value>: <ul style="list-style-type: none"> • 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 • “FLOWNOTIDISABLE”—Enable/disable QoS AMI notification events. <value>: <ul style="list-style-type: none"> • 0–255 (Default value = 0—all events enabled) <ul style="list-style-type: none"> • Bit 0: Flow activated event (0=Enable, 1=Disable) • Bit 1: Flow modified event (0=Enable, 1=Disable) • Bit 2: n/a • Bit 3: Flow deleted event (0=Enable, 1=Disable) • Bit 4: Flow suspended event (0=Enable, 1=Disable) • Bit 5: Flow enabled event (0=Enable, 1=Disable) • Bit 6: Flow disabled event (0=Enable, 1=Disable) • Bit 7: n/a • “GMMCAUSE7REMAP”—Enable/disable remapping of GMM Cause 7 instances to GMM Cause 14. <value>: <ul style="list-style-type: none"> • 0 = Do nothing • 1 = Remap all GMM Cause 7 instances to GMM Cause 14. • “GOBIIMEN”—Enable/disable Gobi Image Management. <value>: <ul style="list-style-type: none"> • 0 = Disable (Default) • 1 = Enable • “GPIOSARENABLE”—Indicate whether SAR backoff is controlled by GPIOs or by AT commands. <value>: <ul style="list-style-type: none"> • 0 = Controlled by AT commands (default) • 1 = Controlled by GPIOs <p>(Continued on next page)</p>

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

Command	Description
!CUSTOM (continued)	<p>Set/query customization settings (continued)</p> <ul style="list-style-type: none"> • “GPSENABLE”—Enable/disable the GPS feature. <value>: <ul style="list-style-type: none"> • 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>: <ul style="list-style-type: none"> • 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>: <ul style="list-style-type: none"> • 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>: <ul style="list-style-type: none"> • 0 = Use dedicated GPS antenna (Default) • 1 = Use shared GPS/Rx diversity antenna • “IMSIREFRESH”—Allow/prohibit IMSI Refresh during active PDP context. <value>: <ul style="list-style-type: none"> • 0 = Do not allow (Default) • 1 = Allow • “ISVOICEN”—Enable/disable voice functionality. <value>: <ul style="list-style-type: none"> • 0 = Disable voice • 1 = Enable voice • “LTEREJDELAY”—Set delay before LTE attach requests are sent after TAU or service request rejection. <value>: <ul style="list-style-type: none"> • 0–255 = Delay in 10 msec units. (e.g. 10=100 msec) • Actual range is 0–2.55 sec • Delay is cancelled if RRC connection is released early. • Suggested value (if delay is being enabled) is 50 (500 msec). Adjust the value as necessary based on testing. <p>(Continued on next page)</p>

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

Command	Description
!CUSTOM (continued)	<p>Set/query customization settings (continued)</p> <ul style="list-style-type: none"> • “NETWORKNAMEFMT”—Set MBIM provider name format for vanui (roaming). <value>: <ul style="list-style-type: none"> • 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.) • “NMEAENABLE”—Enable/disable the NMEA port. <value>: <ul style="list-style-type: none"> • 0 = Disable (default) • 1 = Enable • “NOROAM”—Enable/disable roaming indicator display. <value>: <ul style="list-style-type: none"> • 0 = Enable—Display indicator if roaming • 1 = Disable—Never display indicator • 2 = Disable—Never display when on Home MCC • “PCSCDISABLE”—Determine functionality of PCSC, GSM Algorithm and Authenticate commands, and +CIMI command. <value>: <ul style="list-style-type: none"> • 0–7 (Default value = 0—all functions enabled) <ul style="list-style-type: none"> • 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) • “QMIDETACHEN”—Enable/disable QMI NAS detach. <value>: <ul style="list-style-type: none"> • 0 = Disable—QMI detach request returns NO_EFFECT response, and no action is taken. • 1 = Enable—QMI detach request is acted on, and appropriate response is returned based on the detach result. • “REL8FASTDORMDIS”—Enable/disable the Release 8 fast dormancy feature. <value>: <ul style="list-style-type: none"> • 0 = Enable (default) • 1 = Disable • “RRCREL7CAPDIS”—Configure RRC Release 7 capability <value>: <ul style="list-style-type: none"> • 0 = Enable CPC, enable EF-DPCH (default) • 1 = Disable CPC, enable EF-DPCH • 2 = Disable CPC, disable EF-DPCH • “SIMHOTSWAPDIS”—Configure SIM hotswap feature <value>: <ul style="list-style-type: none"> • 0 = Enable UIM1 and UIM2 (default) • 1 = Disable UIM1, enable UIM2 • 2 = Enable UIM1, disable UIM2 • 3 = Disable UIM1 and UIM2 <p>(Continued on next page)</p>

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

Command	Description
!CUSTOM (continued)	<p>Set/query customization settings (continued)</p> <ul style="list-style-type: none"> • “SIMLPM”—Indicate default SIM power state during Low Power Mode. <value>: <ul style="list-style-type: none"> • 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>: <ul style="list-style-type: none"> • 0 = Do nothing • 1 = Device detaches and re-attaches after changing APN information • 2 = Power-cycle the UE • “STKUIEN”—Enable/disable SIM toolkit UI. <value>: <ul style="list-style-type: none"> • 0 = Enable for QMI interface • 1 = Reserved • 2 = Enable for AT interface • “UBISTENABLE”—Enable/disable UBIST support. <value>: <ul style="list-style-type: none"> • 0 = Disable (Default) • 1 = Enable • “USBSERIALENABLE”—Use IMEI as serial number in USB descriptor (USBID). <value>: <ul style="list-style-type: none"> • 0 = Same as 1 (Default) • 1 = Use IMEI as USB serial number • 2 = Do not use a serial number in the USBID. • “WAKEHOSTEN”—Enable/disable host wake-up via SMS or incoming data packet. <value>: <ul style="list-style-type: none"> • 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. • “WIN7MBOPTIONS”—Configure Windows7 MB options. <value> (Bitmap): <ul style="list-style-type: none"> • Bit 0: Hide profile <ul style="list-style-type: none"> • 0=Default behavior • 1=Force OSP to hide all profiles from host • Bit 1: Connect Auth Type Re-map <ul style="list-style-type: none"> • 0='NONE' from host maps to CHAP or PAP if UN and/or PWD present • 1='NONE' from host maps only to PAP if UN and/or PWD present

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

Command	Description
!DARPEN	<p>Enable/disable DARP for SAIC</p> <p>Enable or disable Downlink Advanced Receiver Performance (DARP) for Single-Antenna Interference Cancellation (SAIC).</p> <p>Password required: Yes—Execution format only</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DARPEN=<enableFlag> Response: OK Purpose: Enable or disable SAIC-DARP. • Query: AT!DARPEN? Response: !DARPEN: <enableFlag> OK Purpose: Display the current <enableFlag> setting—this shows whether SAIC-DARP is enabled or disabled. If the command returns ERROR, SAIC-DARP is assumed to be enabled. • Query list: AT!DARPEN=? Purpose: Display a list of valid <enableFlag> values. <p>Parameters:</p> <p><enableFlag> (Enable/disable SAIC-DARP mode)</p> <ul style="list-style-type: none"> • 0 = Disable SAIC-DARP • 1 = Enable SAIC-DARP (Default) — This value is used for normal operations.
\$DIAG	<p>Enable/disable DIAG service</p> <p>Enable or disable the DIAG service. This command is available only on devices that are factory-configured to support the DIAG service.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT\$DIAG=<oper> Response: OK Purpose: Enable or disable the DIAG service. • Query: AT\$DIAG? Response: \$DIAG: <status> OK Purpose: Display the current state of the DIAG service. <p>Parameters:</p> <p><oper> (Enable/disable DIAG service)</p> <ul style="list-style-type: none"> • 0 = Disable • 1 = Enable <p><status> (Current state of DIAG service)</p> <ul style="list-style-type: none"> • 0 = Disabled • 1 = Enabled

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

Command	Description
!DTMEN	<p>Enable/disable Dual Transfer Mode stack functionality</p> <p>Enable or disable Dual Transfer Mode (DTM) and Enhanced DTM (EDTM) functionality in the stack.</p> <p>Password required: Yes—Execution format only</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DTMEN=<enableDTM, <enableEDTM> Response: OK Purpose: Enables or disables DTM and EDTM. • Query: AT!DTMEN? Response: !DTMEN: DTM: 01 EDTM: 01 OK Purpose: Indicates the current state (disabled/enabled) of DTM and EDTM support. If the command returns ERROR, DTM and EDTM are assumed to be enabled. • Query list: AT!DTMEN=? Purpose: Returns a list of valid <enableDTM> and <enableEDTM> values. <p>Parameters:</p> <p><enableDTM> (Enable/disable Dual Transfer Mode)</p> <ul style="list-style-type: none"> • 0 = Disable DTM • 1 = Enable DTM (Default) — Value used for normal operations. <p><enableEDTM> (Enable/disable Enhanced Dual Transfer Mode)</p> <ul style="list-style-type: none"> • 0 = Disable EDTM • 1 = Enable EDTM (Default) — Value used for normal operations.
!EDAEN	<p>Configure protocol stack for EDA</p> <p>Enable or disable EDA (Extended Dynamic Allocation) functionality in the stack.</p> <p>Password required: Yes—Execution format only</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!EDAEN=<enableFlag> Response: OK Purpose: Enable or disable EDA. • Query: AT!EDAEN? Response: !EDAEN: <enableFlag> OK Purpose: Display the current <enableFlag> setting—this shows whether EDA is enabled or disabled. If ERROR is returned, assume that EDA is enabled. • Query list: AT!EDAEN=? Purpose: Return a list of valid <enableFlag> values. <p>Parameters:</p> <p><enableFlag> (Enable/disable EDA)</p> <ul style="list-style-type: none"> • 0 = Disable • 1 = Enable (Default) — This value is used for normal operations.

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

Command	Description
!GCFEN	<p>Enable/disable GCF test mode</p> <p>Place the modem in GCF testing mode or normal operating mode.</p> <p>Password required: Yes—Execution format only</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><enableFlag> (Enable/disable GCF testing)</p> <ul style="list-style-type: none"> • 0 = Disable GCF test mode (Default) — This value is used for normal operations. • 1 = Enable GCF test mode.
!GCFUIMTYPE	<p>Set/return current SIM type</p> <p>Indicate (for GCF testing) the type of SIM that is installed in the module.</p> <p>Password required: Yes—Execution format only</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!GCFUIMTYPE? Response: !GCFUIMTYPE: <simType> Purpose: Return the type of SIM that is installed in the module (the current <simType> value). • Query list: AT!GCFUIMTYPE=? Purpose: Return a list of supported SIM types. • Execution: AT!GCFUIMTYPE=<simType> Response: OK Purpose: Indicate the type of SIM that is installed. <p>Parameters:</p> <p><simType> (Installed SIM type)</p> <ul style="list-style-type: none"> • 0 = 2G SIM • 1 = 3G USIM • 2 = USB UICC (Default) — This value should be used for normal operations. • 3 = USB UICC RST HIGH

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

Command	Description
<p>!GETBAND</p>	<p>Return the current active band Return the active band currently being used by the modem. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!GETBAND? Response: !GETBAND: <active band description> OK or Unknown OK or No Service OK <p>Purpose: Return a description of the current active band, or return an error message.</p> <hr/> <p><i>Note: Due to stack implementation requirements, !GETBAND reports W800 for both W800 and W850.</i></p>
<p>!GETRAT</p>	<p>Return the current active radio access technology (RAT) Return the RAT currently being used by the modem. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!GETRAT? Response: !GETRAT: <active RAT description> OK or Unknown OK or No Service OK <p>Purpose: Return a description of the current RAT, or return an error message.</p>

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

Command	Description
!GOBIIMPREF	<p>Query/set Gobi Image Management preferences</p> <p>Indicate (set) which firmware image (firmware plus carrier configuration pair) should be downloaded to the module, or list (query) the configuration pairs that are currently downloaded and preferred.</p> <p>Contact your Sierra Wireless representative if you need assistance identifying the correct components of the <pref> parameter.</p> <hr/> <p><i>Note: If Gobi Image Management is disabled, you can use the Execution format to set a new preferred configuration, but the change will not take effect until Gobi Image Management is enabled. Use ATICUSTOM="GOBIIMEN",1 to enable Gobi Image Management.</i></p> <hr/> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GOBIIMPREF=<pref>re Response: OK Purpose: Indicate which firmware plus carrier configuration pair (the preferred pair) should be used. • Query: AT!GOBIIMPREF? Response:! GOBIIMPREF: preferred fw version: <firmware_tag> preferred carrier name: <carrier_name> preferred config name: <carrier_configuration_tag> current fw version: <firmware_tag> current carrier name: <carrier_name> current config name: <carrier_configuration><tag> OK Purpose: Query (show) the preferred and current firmware plus carrier carrier configuration pairs. <p>Parameters:</p> <p><pref> (Preferred firmware image)</p> <ul style="list-style-type: none"> • ASCII string in following format (quotation marks are entered as shown) "<firmware_tag>" or "<firmware_tag>","<carrier_name>","<carrier_configuration_tag>" <p><firmware_tag> (Unique firmware version number assigned by Sierra Wireless)</p> <ul style="list-style-type: none"> • ASCII string <p><carrier_name> (Unique code identifying the carrier that the firmware was designed for)</p> <ul style="list-style-type: none"> • ASCII string <p><carrier_configuration_tag> (Unique code identifying the carrier and configuration details)</p> <ul style="list-style-type: none"> • ASCII string <p>Example(s):</p> <ul style="list-style-type: none"> • AT!GOBIIMPREF="01.02.03.04","ABC","ABC_001.123_000"

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

Command	Description
!GRESET	<p>Reset the modem Perform a modem reset. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Query: ATIGRESET Response: OK Purpose: Instruct system to perform a reset. <hr/> <p><i>Note: This command is identical in function to !RESET.</i></p>
!GSTATUS	<p>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</p> <p>Usage:</p> <ul style="list-style-type: none"> Query: ATIGSTATUS? Response (Example shown is for LTE, actual fields may vary) !GSTATUS: Current Time: <ctime> Temperature: <temp> Bootup Time: <btime> Mode: <mode> System mode: <smode> PS state: <PSstate> LTE band: <lband> LTE bw: <lbw> LTE Rx chan: <lrchan> LTE Tx chan: <ltchan> GMM (PS) state: <gmmstate> <gmmsubstate> MM (CS) state: <mmstate> <mmsubstate> <p>RSSI (dBm): <rssi> SINR (dB): <sinr> RSRP (dBm): <rsrp> TAC: <tac> RSRQ (dB): <rsrq> Cell ID: <Cell ID> OK</p>
!GVER	<p>Return firmware version Return the modem's firmware version. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Query: ATIGVER? Response: !GVER: <version> OK <p>Parameters: <version> (Firmware version information string)</p> <ul style="list-style-type: none"> ASCII string Example: "SWI9X15C_05.05.11.00 r19942 carmd-fwbuild1 2014/01/08 22:36:58"

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

Command	Description
!GVERBT	<p>Return bootloader version Return the modem's bootloader version. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!GVERBT? Response: !GVERBT: <version> OK <p>Parameters: <version> (Bootloader version information string)</p> <ul style="list-style-type: none"> • ASCII string • Example: "SWI9X15C_05.05.11.00 r19942 carmd-fwbuild1 2014/01/08 22:36:58"
!HWID	<p>Display hardware version Display the device's hardware version number. Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!HWID? Response: Revision: <MajorVer>.<MinorVer> OK Purpose: Display hardware version number. <p>Parameters: <MajorVer> (Major versioning number)</p> <ul style="list-style-type: none"> • 0–9 <p><MinorVer> (Minor versioning number)</p> <ul style="list-style-type: none"> • 0–9

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

Command	Description
!LTEINFO	<p>Display LTE network information Display LTE network information. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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> <p>Purpose: Return LTE network measurements.</p> <p>Parameters:</p> <p><earfcn> (E-UTRA absolute radio frequency channel number of the serving cell)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><mcc> (MCC code)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><mnc> (MNC code)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><tac> (Tracking area code)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><cid> (LTE Serving cell id)</p> <ul style="list-style-type: none"> • 16-bit hexadecimal <p><bd> (Serving cell operating band)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><d> (Transmission bandwidth configuration of serving cell on the downlink)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><u> (Transmission bandwidth configuration of serving cell on the uplink)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><snr> (Average RSSNR of the serving cell over last measurement period in decibels)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><pci> (Physical cell ID)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><rsrq> (Current Reference Signal Receive Quality as measured by L1)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><rsrp> (Current Reference Signal Receive Power in dBm x10 as measured by L1)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><rssi> (Current Received Signal Strength Indication as measured by L1)</p> <ul style="list-style-type: none"> • 16-bit decimal <p>(Continued on next page)</p>

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

Command	Description
!LTEINFO (continued)	<p>Display LTE network information (continued)</p> <p><rxlv> (Cell selection Rx level (Srxlev) value)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><thresholdlow> (Cell Srxlev low threshold)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><thresholdhi> (Cell Srxlev high threshold)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><priority> (Cell reselection priority)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><threshl> (Reselection threshold for low priority layers)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><threshh> (Reselection threshold for high priority layers)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><prio> (Priority of this frequency group)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><ncc> (Bitmask identifying whether neighbor with a particular Network Color Code is to be reported)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><arfcn> (GSM frequency being reported)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><1900> (Band indicator for the GSM ARFCN, only valid if arfcn is in the overlapping region)</p> <ul style="list-style-type: none"> • boolean <p><valid> (Flag indicating whether the BSIC ID is valid)</p> <ul style="list-style-type: none"> • boolean <p><bsic> (BSIC ID)</p> <ul style="list-style-type: none"> • 8-bit decimal <p><uarfcn> (WCDMA layer frequency)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><psc> (Scrambling code)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><rscp> (Absolute power level of the CPICH as received by the UE in dBm x10)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><ecn0> (Ratio of received energy per PN chip for the CPICH to the total received power spectral density at the UE antenna connector)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><chan> (Channel number)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><bc> (Band class)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><offsey> (The neighbor cell Pilot PN offset)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><phase> (The neighbor cell Pilot PN phase)</p> <ul style="list-style-type: none"> • 16-bit decimal <p><str> (The neighbor cell Pilot EC/IO)</p> <ul style="list-style-type: none"> • 16-bit decimal

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

Command	Description
!LTENAS	<p>Configure LTE NAS settings Configure LTE NAS-related settings. Note: To support test equipment that may use the NULL integrity algorithm, turn on (set to '1') <bitmask> Bit0 and Bit3. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!LTENAS=<bitmask><FPLMNtime> Response: <bitmask> <FPLMNtime> Purpose: Set LTE NAS-related settings. • Query: AT!LTENAS? Response: LSTI: <lsti> GERAN Cap: <geran> Disable GUTI Security check: <guti> Temp Forbidden PLMN: <FPLMNtime> <p>OK</p> <ul style="list-style-type: none"> • Purpose: Report the current settings. • Query List: AT!LTENAS=? Purpose: Return the command format and the supported parameter values. <p>Parameters:</p> <p><bitmask> (8-bit mask that identifies LTE NAS-related settings)</p> <ul style="list-style-type: none"> • Displayed/entered as hexadecimal value • Bit 0: <lsti> • Bit 1: <geran> • Bit 2: <guti> • Bit 3: <>nullIntegrity> <p><FPLMNtime> (Temporary Forbidden PLMN backoff time)</p> <ul style="list-style-type: none"> • Displayed/entered as hexadecimal value • 0x0=Disable feature (Default) • 0x1–0xFFFFFFFF=Backoff time (in ms) • 0xFFFFFFFF=Use the user equipment's Timer T3402 time as backoff time <p><lsti> (LSTI (LTE/SAE Trial Initiative))</p> <ul style="list-style-type: none"> • 0=Disabled • 1=Enabled <p><geran> (GERAN Cap)</p> <ul style="list-style-type: none"> • 0=Disabled • 1=Enabled <p><guti> (Disable GUTI and NAS security check)</p> <ul style="list-style-type: none"> • 0=Disabled (This means the security check is *enabled*.) • 1=Enabled (This means the security check is *disabled*.) <p><>nullIntegrity> (NULL Integrity Algorithm)</p> <ul style="list-style-type: none"> • 0=Disabled • 1=Allowed

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

Command	Description
^MODE	<p>Set/report system mode indication state</p> <p>Enable or disable system mode indications (unsolicited ^MODE messages).</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT^MODE=<mode> Response: OK Purpose: Enable or disable system mode indication support. • Query: AT^MODE? Response: !MODE: <mode> OK Purpose: Report current system mode indication support state (enabled/disabled). • Query List: AT^MODE=? Purpose: Return the execution command format and the supported parameter values. <p>Parameters:</p> <p><mode> (System mode indication support state)</p> <ul style="list-style-type: none"> • 0 = Disabled • 1 = Enabled (Default)
!NASREL	<p>Set/report supported NAS release compliance version</p> <p>Configure the modem to support a specific NAS (Non-Access Stratum) release compliance version.</p> <p>Password required: Yes—Execution format only</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!NASREL=<nasrel> Response: OK Purpose: Set the desired version (<nasrel>). • Query: AT!NASREL? Response: !NASREL: NAS Release: Release 5 (<i>or Release 99</i>) OK Purpose: Report the NAS release compliance version currently being used. • Query List: AT!NASREL=? Purpose: Return the command format (for !NASREL =) and the supported parameter values. <p>Parameters:</p> <p><nasrel> (NAS release compliance version)</p> <ul style="list-style-type: none"> • 00 = Release 99 • 01 = Release 5 • 02 = Release 6 (Default) • 03 = Release 7 <hr/> <p><i>Note: If you use !REL, use the default value (1) for that command's <sgsnr> and <mscr> parameters. You must choose the appropriate compliance version using !NASREL.</i></p> <hr/>

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

Command	Description																																																								
!NVENCRYPTIMEI	<p>Write unencrypted IMEI to modem</p> <p>Write an unencrypted IMEI to a modem <i>if</i> the modem does not already have an IMEI—the command can only be used once per modem.</p> <p>The IMEI is a fifteen digit string formed by concatenating the following elements:</p> <ul style="list-style-type: none"> TAC code (8 digits) SN (Serial number) (6 digits) CheckDigit (1 digit calculated from TAC code and SN) <p>The CheckDigit is calculated as follows:</p> <ol style="list-style-type: none"> 1. Label the fourteen digits in the TAC and SN as: TAC: D14..D7 SN: D6..D1 For example: TAC = 12345678 ('1' is D14, '8' is D7) SN = 901234 ('9' is D6, '4' is D1) 2. Double the value of each odd-labeled digit (D13, D11, ..., D1). 3. Add the values of each individual digit from the result of Step 2. 4. Add the even-labeled digits (D14, D12, ..., D2) to the result of Step 3. 5. Check the last digit of the result of Step 4. If it is '0', the CheckDigit is 0; if it is not '0', subtract it from 10 to get the CheckDigit. <p>For example:</p> <p>TAC (12345678) SN (901234)</p> <p>Step 1: Label the digits of the TAC and SN.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">D14</td><td style="text-align: center;">D13</td><td style="text-align: center;">D12</td><td style="text-align: center;">D11</td><td style="text-align: center;">D10</td><td style="text-align: center;">D9</td><td style="text-align: center;">D8</td><td style="text-align: center;">D7</td><td style="text-align: center;">D6</td><td style="text-align: center;">D5</td><td style="text-align: center;">D4</td><td style="text-align: center;">D3</td><td style="text-align: center;">D2</td><td style="text-align: center;">D1</td> </tr> <tr> <td style="text-align: center;">1</td><td style="text-align: center;">2</td><td style="text-align: center;">3</td><td style="text-align: center;">4</td><td style="text-align: center;">5</td><td style="text-align: center;">6</td><td style="text-align: center;">7</td><td style="text-align: center;">8</td><td style="text-align: center;">9</td><td style="text-align: center;">0</td><td style="text-align: center;">1</td><td style="text-align: center;">2</td><td style="text-align: center;">3</td><td style="text-align: center;">4</td> </tr> </table> <p>Step 2: Double the odd-labeled values:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">D14</td><td style="text-align: center;">D13</td><td style="text-align: center;">D12</td><td style="text-align: center;">D11</td><td style="text-align: center;">D10</td><td style="text-align: center;">D9</td><td style="text-align: center;">D8</td><td style="text-align: center;">D7</td><td style="text-align: center;">D6</td><td style="text-align: center;">D5</td><td style="text-align: center;">D4</td><td style="text-align: center;">D3</td><td style="text-align: center;">D2</td><td style="text-align: center;">D1</td> </tr> <tr> <td style="text-align: center;">1</td><td style="text-align: center;">4</td><td style="text-align: center;">3</td><td style="text-align: center;">8</td><td style="text-align: center;">5</td><td style="text-align: center;">12</td><td style="text-align: center;">7</td><td style="text-align: center;">16</td><td style="text-align: center;">9</td><td style="text-align: center;">0</td><td style="text-align: center;">1</td><td style="text-align: center;">4</td><td style="text-align: center;">3</td><td style="text-align: center;">8</td> </tr> </table> <p>Step 3: Add <i>each</i> digit of the odd-labeled values: $4 + 8 + (1 + 2) + (1 + 6) + 0 + 4 + 8 = 34$</p> <p>Step 4: Add each digit of the even-labeled values to the Step 3 total: $1 + 3 + 5 + 7 + 9 + 1 + 3 + 34 = 63$</p> <p>Step 5: Check last digit of Step 4 total. CheckDigit = $10 - 3 = 7$</p> <p>Result: IMEI = TAC:SN:CheckDigit = 123456789012347</p> <p>Password required: Yes</p> <p>(Continued on next page)</p>	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	1	2	3	4	5	6	7	8	9	0	1	2	3	4	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	1	4	3	8	5	12	7	16	9	0	1	4	3	8
D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1																																												
1	2	3	4	5	6	7	8	9	0	1	2	3	4																																												
D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1																																												
1	4	3	8	5	12	7	16	9	0	1	4	3	8																																												

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

Command	Description
!INVENCRYPTIMEI (continued)	<p>Write unencrypted IMEI to modem (continued)</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATINVENCRYPTIMEI=<P1>, <P2>, <P3>, <P4>, <P5>, <P6>, <P7>, <P8> Response: OK Purpose: Write the unencrypted IMEI to the modem. <p>Parameters:</p> <p><P1> to <P8> (IMEI segments)</p> <ul style="list-style-type: none"> • <P1> = IMEI[0..1]; <P2> = IMEI[2..3]; ...; <P8> = IMEI[14..15] • <P1> to <P4> represent the TAC • <P5> to <P7> represent the SNR • <P8> represents the CheckDigit plus a padding digit ('0') <p>Example(s):</p> <p>Using the example IMEI shown above:</p> <p>ATINVENCRYPTIMEI=12,34,56,78,90,12,34,70</p>
!INVNSCODE	<p>Return Network Subset codes</p> <p>Return the provisioned list of Network Subset codes used for Network Subset Personalization locking.</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: ATINVNSCODE? Response: (list of <NSCode> items) OK Purpose: Return the list of Network Subset codes used for Network Subset Personalization locking. • Execution: ATINVNSCODE=<NSCode> Response: OK Purpose: Add a network subset code to the list used for Network Subset Personalization locking. Note: Execution can be performed one time only (all MCC/MNC pairs must be set at the same time). <p>Parameters:</p> <p><NSCode> (Network Subset Code)</p> <ul style="list-style-type: none"> • Format: 99—Two digit numeric code

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

Command	Description
!NVPLMN	<p>Provision PLMN list for Network Personalization locking</p> <p>Provision the list of PLMN (MCC/MNC pairs) used for Network Personalization locking. Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!NVPLMN? Response: <MCC> <MNC> ... OK • 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). <p>Parameters:</p> <p><MCC> (Mobile Country Code)</p> <ul style="list-style-type: none"> • 3 digits <p><MNC> (Mobile Network Code)</p> <ul style="list-style-type: none"> • 2 digits
!NVSPCODE	<p>Return Network Service Provider code list</p> <p>Display the list of Network Service Provider codes that are used for Network Service Provider Personalization locking. Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!NVSPCODE? Response: SP Code: (list of <SP Code> values) OK • Purpose: Return the list of Network Service Provider codes. <p>Parameters:</p> <p><SP Code> (Service Provider Code)</p> <ul style="list-style-type: none"> • Format: 1–2 digits

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

Command	Description
!PACKAGE	<p>Return package version string</p> <p>This command returns the FOTA package name loaded in the modem.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!PACKAGE? Response: !PACKAGE:<PackageName> OK <li style="padding-left: 40px;"><i>or</i> Unset OK Purpose: Return the package name string. <p>Parameters:</p> <p><PackageName></p> <ul style="list-style-type: none"> • Character string, maximum 126 characters • Example: MC7750_01.00.02.03_00_VZW_011.006_000
!PATEMP	<p>Return PA temperature information</p> <p>Return the module's PA temperature state and current temperature.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!PATEMP? Response: Temp state: <state> Temperature: <temperature> degC OK Purpose: Return the module's Power control temperature information. <p>Parameters:</p> <p><state> (Temperature state):</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • "Initializing" • "Normal" • "High Warning" • "High Critical" <p><temperature> (Current temperature):</p> <ul style="list-style-type: none"> • Decimal ASCII string • Current PA temperature in degrees Celsius. This is the temperature reported by a thermistor positioned near the power amplifiers. • Example: "32.3"

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

Command	Description
!PCINFO	<p>Return power control status information</p> <p>Return the modem's power control status information.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!PCINFO? Response: State: <state> LPM force flags: W_DISABLE: <ForceFlag>, User:<ForceFlag>, Temp:<ForceFlag>, Volt:<ForceFlag>, BIOS:<ForceFlag>, GOBIIIM:<ForceFlag> BIOS: <description> GOBIIIM: <description> OK Purpose: Return power control information. <p>Parameters:</p> <p><state> (The modem's power mode)</p> <ul style="list-style-type: none"> • 0 = Low Power Mode (LPM) • 1 = Online • 2 = Offline • 3 = Power off (internal) • 4 = Initialization (internal) <p><ForceFlag> (Conditions that caused modem to enter LPM. 0=did not cause, 1 = caused)</p> <ul style="list-style-type: none"> • W_DISABLE: W_DISABLE is asserted • USER: CnS/AT command was issued • TEMP: Temperature is outside operational limits • VOLT: Voltage is outside operational limits <p><description> (Explanation of associated information)</p> <ul style="list-style-type: none"> • ASCII string
!PCOFFEN	<p>Set/return Power Off Enable state</p> <p>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.)</p> <p>Use this command to indicate or set the Power Off Enable feature state.</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!PCOFFEN=<state> Response: OK Purpose: Set the current state. • Query: AT!PCOFFEN? Response: <state> OK Purpose: Report the current <state>. <p>Parameters:</p> <p><state> (Current state of Power Off Enable)</p> <ul style="list-style-type: none"> • 0 = Modem will enter LPM (low power mode) when W_DISABLE is asserted. • 2 = Ignore changes on W_DISABLE.

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

Command	Description
!PCTEMP	<p>Return Power control temperature information</p> <p>Return the module's power control temperature state and current temperature.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!PCTEMP? Response: Temp state: <state> Temperature: <temperature> degC OK Purpose: Return the module's power control temperature information. <p>Parameters:</p> <p><state> (Temperature state):</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • "Initializing" • "Normal" • "High Warning" • "High Critical" • "Low Critical" <p><temperature> (Current temperature):</p> <ul style="list-style-type: none"> • Decimal ASCII string • Current temperature in degrees Celsius. • Example: "32.3"

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

Command	Description
!PCTEMPLIMITS	<p>Set/report temperature state limit values</p> <p>Certain modem functionality is affected by the modem's temperature state. 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 53.</p> <hr/> <p><i>Note: All temperatures are in Celsius.</i></p> <hr/> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><hc> (High Critical)</p> <ul style="list-style-type: none"> • Temperature limit varies by device (see device Product Specification Document or Product Technical Specification). • Default = 108°C. <p><hw> (High Warning)</p> <ul style="list-style-type: none"> • Temperature limit varies by device (see device Product Specification Document or Product Technical Specification). • Default = 95°C. <p><hn>(High Normal)</p> <ul style="list-style-type: none"> • Temperature limit varies by device (see device Product Specification Document or Product Technical Specification). • Default = 85°C. <p><ln> (Low Normal)</p> <ul style="list-style-type: none"> • Temperature limit varies by device (see device Product Specification Document or Product Technical Specification). • Default = -15°C. <p><lc> (Low Critical)</p> <ul style="list-style-type: none"> • Temperature limit varies by device (see device Product Specification Document or Product Technical Specification). • Default = -25°C.

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

Command	Description
!PCVOLT	<p>Return current power supply voltage information</p> <p>Return the module's power control supply state and actual voltage.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!PCVOLT? Response: Volt state: Normal Power supply voltage: <voltage> mV (<raw> cnt) OK Purpose: Return the module's voltage information. <p>Parameters:</p> <p><state> (Power supply state):</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • "Initializing" • "Normal" • "High Critical" • "Low Warning" • "Low Critical" <p><voltage>:</p> <ul style="list-style-type: none"> • Current voltage reading in mV. • Decimal ASCII <p><raw>:</p> <ul style="list-style-type: none"> • ADC (Analog/digital convertor) reading • Decimal ASCII

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

Command	Description
!PCVOLTLIMITS	<p>Set/report power supply voltage state limit values</p> <p>Certain modem functionality is affected by the modem's power supply voltage state. The possible voltage states are high critical, high normal, low normal, low warning, and low critical. Use this command to report or set the limits that correspond to these voltage states.</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!PCVOLTLIMITS=<hc>,<hn>,<ln>,<lw>,<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 NORM: <hn> LO NORM: <ln> LO WARN: <lw> LO CRIT: <lc> Purpose: Return the voltage limits for each state. <p>Parameters:</p> <p><hc> (High Critical)</p> <ul style="list-style-type: none"> • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification) • Default = 4400 mV <p><hn> (High Normal)</p> <ul style="list-style-type: none"> • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification) • Default = 4300 mV <p><ln> (Low Normal)</p> <ul style="list-style-type: none"> • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification) • Default = 3300 mV <p><lw> (Low Warning)</p> <ul style="list-style-type: none"> • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification) • Default = 3200 mV <p><lc> (Low Critical)</p> <ul style="list-style-type: none"> • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification) • Default = 3100 mV

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

Command	Description
!POWERDOWN	<p>Power down system</p> <p>Power down the system. After using this command, the modem will not communicate with the host until it has been power cycled.</p> <hr/> <p><i>Note: This command initiates an IMSI_DETACH before the power down.</i></p> <hr/> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!POWERDOWN Response: OK Purpose: Power the system down. <hr/> <p><i>Note: This command should only be used when testing using an appropriate testing jig—do not use it when the modem is installed in a computer.</i></p> <hr/>
!PRIID	<p>Set/report module PRI part number and revision</p> <p>Report or set the module's customer and carrier PRI part numbers and revisions.</p> <p>Password required: Yes—Execution format only</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!PRIID=<priPN>,<priRev> Response: OK Purpose: Set the module's PRI part number (<priPn>) and revision (<priRev>). • Query: AT!PRIID? Response: PRI Part Number: <priPn> Revision: <priRevDisplay> <p style="margin-left: 40px;">Carrier PRI: None OK</p> <p>Purpose: Return the module's PRI part number (<priPn>) and revision (<priRevDisplay>). (In the example shown above, no Carrier PRI is present. If it were, then the Part Number and Revision would display.)</p> <p>Parameters:</p> <p><priPn> (PRI part number)</p> <ul style="list-style-type: none"> • 7-digit ASCII number • Example: 9991234 <p><priRev> (PRI revision number being written to the module)</p> <ul style="list-style-type: none"> • 4-digit ASCII: XXYY (implied '.' between XX and YY) • Example: 0100 <p><priRevDisplay> (PRI revision number being read from the module)</p> <ul style="list-style-type: none"> • 4-digit ASCII: XX.YY • Example: 01.00

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

Command	Description
<p>!IREL</p> <hr/> <p><i>Note: The actual parameter values or ranges used in the query (=?) and execution (=) forms of this command may vary slightly from this description depending on the device and firmware revision used.</i></p> <hr/> <p><i>Note: Devices should always use the default value (1) for <sgsnr> and <mscr>, and use !ATINASREL to choose the NAS Release Compliance version (Release 5, 6, 7, or Release 99).</i></p> <hr/>	<p>Set/report active protocol/revision</p> <p>Configure the modem to use specific protocol, SGSN, and MSC revisions, or indicate the current settings.</p> <p>Password required: Yes—Execution format only</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT!IREL=<wcdmarrc> [,<sgsnr>, <mscr>] Response: OK Purpose: Set the desired protocol (<wcdmarrc>), SGSN revision (<sgsnr>), and MSC revision (<mscr>). Query: AT!IREL? Response: IREL: Protocol: Release 5 (from <wcdmarrc>) SGSN Revision: Dynamic (from <sgsnr>) MSC Revision: Dynamic (from <mscr>) OK Purpose: Report the current operating protocol, SGSN revision, and MSC revision. Query List: AT!IREL=? Purpose: Return the command format (for !IREL =) and the supported values for each parameter (the supported ranges depend on modem models—see the parameter descriptions for details). <p>Parameters:</p> <p><wcdmarrc> (Protocol)</p> <ul style="list-style-type: none"> Default value is the highest release supported by the device. Two-digit number corresponding to 3GPP release (!IREL=? shows valid values) Example: 00 = Release 99 <p><sgsnr> (SGSN revision)</p> <ul style="list-style-type: none"> Two-digit number corresponding to SGSN revision (!IREL=? shows valid values) Example: 00 = Release 97 nn = Dynamic—Uses the revision broadcast by the network <p><mscr> (MSC revision)</p> <ul style="list-style-type: none"> Two-digit number corresponding to MSC revision (!IREL=? shows valid values) Example: 00 = Release 97 nn = Dynamic—Uses the revision broadcast by the network
<p>!RESET</p>	<p>Reset modem</p> <p>Perform a modem reset.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT!RESET Response: OK Purpose: Reset the modem. <hr/> <p><i>Note: This command is identical in function to !GRESET.</i></p> <hr/>

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

Command	Description
!SCACT	<p>Activate/deactivate data connection Activate or deactivate a specific data connection between the host and network.</p> <hr/> <p><i>Note: This command does not work on Windows 8 or Windows 7 systems operating in MBIM mode. For those systems, use Microsoft APIs to initiate/end a data connection.</i></p> <hr/> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!SCACT? [<pid>] Response: !SCACT: <pid>,<state> ... (additional <pid>/<state> combinations) OK • Purpose: Display a list of all defined connections and their current state, or display a specified connection and its state. • Execution: AT!SCACT=<state>,<pid> Response: OK Purpose: Activate or deactivate a specific data connection. <p>Parameters:</p> <p><pid> (PDN connection ID)</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • UMTS: <ul style="list-style-type: none"> • 1–16 • Default: 1 (all networks except Verizon), 3 (Verizon) • CDMA (MC7800 only): <ul style="list-style-type: none"> • 101–107 • Default: 101 (all networks except Verizon), 3 (Verizon) <p><state> (Current state of specified <pid>)</p> <ul style="list-style-type: none"> • 0= Deactivated • 1=Activated • Any other value causes command execution to return ERROR.

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

Command	Description
<p>!SELACQ</p>	<p>Select RAT acquisition order Select the acquisition order for RATs (Radio Access Technologies). Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATISELACQ=<mode1>[,<mode2>[,<mode3>[,<mode4>[,<mode5>]]]] Response: OK Purpose: Indicate the acquisition order for up to five RATs. See <mode> parameter description for details. • Query: ATISELACQ? Response: <mode1> <mode2> <mode3> <mode4> <mode5> Purpose: Show the current acquisition order for the supported RATs. • Query list: ATISELACQ=? Purpose: Display valid execution format and parameter values. <p>Parameters: <moden> (RAT types)</p> <ul style="list-style-type: none"> • Valid values (shown in default order): <ul style="list-style-type: none"> • “CDMA” • “LTE” • “WCDMA” • “HDR” • “GSM” • If the execution format is issued with fewer than five RATs, the missing entries are appended based on the default order shown above. • Example: If the command is issued as ATISELACQ=HDR,CDMA,GSM Then ATISELACQ? will show: HDR CDMA GSM LTE WCDMA <hr/> <p><i>Note: Even if the device does not support a specific RAT (for example, CDMA), the RAT will still appear in the Query response.</i></p>

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

Command	Description
!SELMODE	<p>Set/return current service domain Configure the modem to use a specific service domain. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!SELMODE=<sdInd> Response: OK Purpose: Set the desired service domain. • Query: AT!SELMODE? Response: <sdInd>, Service Domain description OK <i>or</i> Unknown service domain mask. Use AT!SELMODE to set service domain. OK Purpose: Return the current service domain index (<sdInd>) and description. If the <sdInd> is undefined, an error message is returned. • Query List: AT!SELMODE=? Purpose: Return a list of supported service domain indexes. <p>Parameters: <sdInd> (Service domain index):</p> <ul style="list-style-type: none"> • 00=CS only • 01=PS only • 02=CS and PS
!SIMRSTC	<p>Set/report SIM refresh reset notification state Set or report the state of the unsolicited SIM refresh reset notification (!SIMRSTN). Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!SIMRSTC=<n> Response: OK Purpose: Enable/disable the SIM refresh reset notification. • Query: AT!SIMRSTC? Response: !SIMRSTC: <n> Purpose: Show the current state of the SIM refresh reset notification. • Query list: AT!SIMRSTC=? Purpose: Display valid execution format and parameter values. <p>Parameters: <n> (Notification state)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable

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

Command	Description
!UDINFO	<p>Return information from active USB descriptor</p> <p>Return information from the active USB descriptor.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: ATIUDINFO? Response: VID: <vendor_id> APP PID: <app_product_id> BOOT PID: <boot_product_id> Interface: <interfaceType> Manufacturer: <manuString> Product: <prodString> Purpose: Display USB descriptor information. <p>Parameters:</p> <p><vendor_id> (Vendor ID):</p> <ul style="list-style-type: none"> • Valid range: 0000–FFFF <p><app_product_id> (Product ID used when modem is in application mode):</p> <ul style="list-style-type: none"> • Valid range: 0000–FFFF <p><boot_product_id> (Product ID used when modem is in boot loader mode):</p> <ul style="list-style-type: none"> • Valid range: 0000–FFFF <p><interfaceType> (USB interface type):</p> <ul style="list-style-type: none"> • ASCII string: <ul style="list-style-type: none"> • “DIP”—Direct IP interface • “QBI”—QBI interface • “QMI”—QMI interface <p><manuString> (Manufacturer string):</p> <ul style="list-style-type: none"> • ASCII string (32 characters maximum) • Example: “Sierra Wireless, Incorporated” <p><prodString> (Product string):</p> <ul style="list-style-type: none"> • ASCII string (64 characters maximum) • Example: “Mini Card”

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

Command	Description
!UDPID	<p>Set/report product ID in USB descriptor</p> <p>Use this command to set the device's product ID in the USB descriptor. (Some devices may support more than one product ID.)</p> <hr/> <p><i>Note: If a custom PID is used for <app product_id>, then the <boot product_id> must be set at the same time.</i></p> <hr/> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIUDPID=<app product_id> [,<boot product_id>] Response: OK Purpose: Set the application and boot product IDs in the USB descriptor. • Query: ATIUDPID? Response: !UDPID: APP: <product_id> BOOT: <boot product_id> OK Purpose: Report the product ID that is stored in the USB descriptor. • Query List: ATIUDPID=? Purpose: Display a list of default (non-custom) product IDs for the device. <p>Parameters:</p> <p><app product_id></p> <ul style="list-style-type: none"> • Hexadecimal ASCII value. • Valid range: 0000–FFFF <p>< boot product_id></p> <ul style="list-style-type: none"> • 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 ATIUDPID=? to see a list of all available non-custom PIDs.)

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

Command	Description
!UDUSBCOMP	<p>Set/report USB interface configuration</p> <p>Use this command with modems that have been configured with multiple USB compositions.</p> <p>By default, devices are typically configured to use a USB composition that presents a minimal set of interfaces. If the device also supports other compositions, this command is used to choose from any of the supported compositions.</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIUDUSBCOMP=<device_comp> Response: OK Purpose: Set the current composition. For the change to take effect, you must reset the modem. • Query: ATIUDUSBCOMP? Response: !UDUSBCOMP: <device_comp> OK Purpose: Report the current interface composition. • Query List: ATIUDUSBCOMP=? Response: Example response, details may differ (Note: On devices using firmware v6.x or newer, only supported compositions will appear in the list.): <pre> 0 - HIP DM NMEA AT MDM1 MDM2 MDM3 MS NOT SUPPORTED 1 - HIP DM NMEA AT MDM1 MS NOT SUPPORTED 2 - HIP DM NMEA AT NIC1 MS NOT SUPPORTED 3 - HIP DM NMEA AT MDM1 NIC1 MS NOT SUPPORTED 4 - HIP DM NMEA AT NIC1 NIC2 NIC3 MS NOT SUPPORTED 5 - HIP DM NMEA AT ECM1 MS NOT SUPPORTED 6 - DM NMEA AT QMI SUPPORTED 7 - DM NMEA AT RMNET1 RMNET2 RMNET3 SUPPORTED 8 - DM NMEA AT MBIM SUPPORTED 9 - MBIM SUPPORTED 10 - NMEA MBIM SUPPORTED 11 - DM MBIM SUPPORTED 12 - DM NMEA MBIM SUPPORTED OK </pre> <p>Purpose: Report the available interface compositions (<device_comp>)—the device can use any compositions that are listed as “SUPPORTED”.</p> <p>Parameters:</p> <p><device_comp> (USB composition)</p> <ul style="list-style-type: none"> • Integer value, 0 or greater • Use ATIUDUSBCOMP=? to view the configurations available for the device. Available configurations are identified as “SUPPORTED”.

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

Command	Description
<p>&V</p>	<p>Return operating mode AT configuration parameters Return the status of all AT command parameters that apply to the current operating mode. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT&V <p>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 <i>Note: this is an example only. The supported commands may vary by device/SKU.</i></p> <p>Purpose: Display command parameters.</p>

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	68
!ERR	Display/clear diagnostic information	69
!GCCLR	Clear crash dump data	69
!GCDUMP	Display crash dump data	69
!RXDEN	Enable/disable WCDMA/LTE receive diversity	70

Command reference

Table 4-2: Diagnostic command details

Command	Description
!BCFWUPDATESTATUS	<p>Report status of most recent firmware update attempt</p> <p>Return the status of the most recent firmware update attempt made since the last cold restart.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> 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". <p>Parameters:</p> <p><result> (Status of last firmware update attempt)</p> <ul style="list-style-type: none"> ASCII string: <ul style="list-style-type: none"> "UNKNOWN"—Status of last attempt is unknown. "SUCCESS"—Last update was successful. "FAILED"—Last update failed. <p><type> (Firmware image type that failed to update)</p> <ul style="list-style-type: none"> ASCII string <p><data> (Reference data for failed image)</p> <ul style="list-style-type: none"> Location of the reference data as an offset in the CWE image Valid range: 0–(2³²-1) <p><part> (Partition associated with the failed image)</p> <ul style="list-style-type: none"> ASCII string Applies only to the CUSTOM_IMG case

Table 4-2: Diagnostic command details (Continued)

Command	Description
!ERR	<p>Display/clear diagnostic information</p> <p>This command is used to display or clear diagnostic information (logged error conditions) that Sierra Wireless uses to assist in resolving technical issues.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIERR=0 Response: OK Purpose: Clear the logged error conditions. Use this command before running tests to make sure that details displayed using ATIERR are relevant to the tests being performed. • Query: ATIERR Response: 00 [F] <count> <file> <line> ... nn [F] <count> <file> <line> OK Purpose: Return all logged error conditions that are stored in NVRAM. <p>Parameters:</p> <p><count> (Number of occurrences)</p> <ul style="list-style-type: none"> • Valid range: 0x00–0xFF <p><file> (Log file name)</p> <ul style="list-style-type: none"> • Name of log file using ASCII characters <p><line> (Line number in log file)</p> <ul style="list-style-type: none"> • Valid range: 1–99999
!GCCLR	<p>Clear crash dump data</p> <p>Clear crash dump data.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GCCLR Response: Crash data cleared OK Purpose: Clear crash dump data. <p>Parameters:</p> <p>None</p>
!GCDUMP	<p>Display crash dump data</p> <p>Display crash dump data.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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
!RXDEN	<p>Enable/disable WCDMA/LTE receive diversity</p> <p>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.</p> <hr/> <p><i>Note: To change from <state=0> to <state=2> (or from <state=2> to <state=0>), you must issue AT!RXDEN=1, reset the modem, and then make the final state change.</i></p> <hr/> <p>Password required: Yes—Execution format only Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><state> (Current/ requested receive diversity state)</p> <ul style="list-style-type: none"> • 0 = Rx diversity disabled • 1 = Rx diversity enabled • 2 = Rx diversity is primary path

5: Test Commands

Introduction

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.

In most cases the modem must be in a particular mode before you can issue the AT commands to perform particular tests. Therefore, the order in which you issue certain commands is important. Three AT commands are important in setting the mode:

- **!DAFTMACT**—puts the modem in factory test mode (a non-signaling mode). You must issue **AT!DAFTMACT** before issuing any other command that starts with “!DA”.
- **!DASBAND**—selects the frequency band.

You must execute **AT!DASBAND** to select an LTE band to run these commands that test the LTE transceiver:

- **!DALGAVGAGC**
- **!DALGRXAGC**
- **!DALGTXAGC**

You must execute **AT!DASBAND** to select a WCDMA band to run these commands that test the WCDMA transceiver:

- **!DAWGRXAGC**
- **!DAWGAVGAGC**
- **!DAWSTXCW**
- **!DAWSPARANGE**
- **!DASTXOFF**
- **!DASTXON**
- **!DAWSCONFIGRX**

You must execute **AT!DASBAND** to select a GSM band to run these commands that test the GSM transceiver:

- **!DAGSRXBURST**
- **!DAGSRXCONT**
- **!DAGGRSSI**
- **!DAGGAVGRSSI**
- **!DAGGRSSIRAW**
- **!DAGSTXFRAME**
- **!DASCHAN**—selects the channel. This command must be run after you have selected the band with **!DASBAND**. (If you don't select a channel, the modem uses a default.)

Command summary

The table below lists the commands described in this chapter.

Table 5-1: Test commands

Command	Description	Page
!DAFTMACT	Put modem into Factory Test Mode	74
!DAFTMDEACT	Put modem into online mode from Factory Test Mode	74
!DAGGAVGRSSI	Return averaged RSSI value in dBm (GSM only)	75
!DAGGRSSI	Return the RSSI value in dBm (GSM only)	75
!DAGGRSSIRAW	Return raw RSSI value (GSM only)	76
!DAGINFO	Return GSM mode RF information (GSM only)	77
!DAGSLOCK	Return synthesizer lock state (GSM only)	78
!DAGSRXBURST	Set GSM receiver to burst mode (GSM only)	78
!DAGSRXCONT	Set GSM receiver continuously on (GSM only)	79
!DAGSTXBURST	Set GSM transmitter to burst mode (GSM only)	79
!DAGSTXFRAME	Set GSM Tx frame structure (GSM only)	80
!DALGAVGAGC	Return averaged Rx AGC value (LTE only)	81
!DALGRXAGC	Return Rx AGC value (LTE only)	82
!DALGTXAGC	Return Tx AGC value and transmitter parameters (LTE only)	83
!DALSPARANGE	Set LTE PA range (LTE only)	84
!DALSRXBW	Set LTE Rx bandwidth (LTE only)	85
!DALSTXBW	Set LTE Tx bandwidth (LTE only)	85
!DALSTXINDEX	Set LTE Tx gain index (LTE only)	86
!DALSWAVEFORM	Set LTE TX waveform (LTE only)	86
!DAOFFLINE	Place modem offline	87
!DASBAND	Set frequency band	88
!DASCHAN	Set modem channel (frequency)	89
!DASLNAGAIN	Set LNA gain state	90
!DASPDM	Set PDM value	91
!DASTXOFF	Turn Tx PA off	91
!DASTXON	Turn Tx PA on	92
!DAWGAVGAGC	Return averaged Rx AGC value (WCDMA only)	92
!DAWGRXAGC	Return Rx AGC value (WCDMA only)	93

Table 5-1: Test commands (Continued)

Command	Description	Page
!DAWINFO	Return WCDMA mode RF information (WCDMA only)	94
!DAWSCONFIGRX	Set WCDMA receiver to factory calibration settings (WCDMA only)	95
!DAWSPARANGE	Set PA range state machine (WCDMA only)	96
!DAWSSCHAIN	Enable secondary receive chain (WCDMA only)	96
!DAWSCHAINTCM	Place receive chain in test call mode (WCDMA only)	97
!DAWSTXCW	Set waveform used by the transmitter (WCDMA only)	97
!DAWSTXPWR	Set desired Tx power level (WCDMA mode only)	98

Command reference

Table 5-2: Test command details

Command	Description
!DAFTMACT	<p>Put modem into Factory Test Mode</p> <p>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. AT commands that start with “!DA” are only available when the modem is in FTM mode.</p> <hr/> <p><i>Note: When this command executes successfully, the modem responds with the value 290300. Any other response indicates an error.</i></p> <hr/> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> Query: AT!DAFTMACT Response: 290300 (Success. Any other response indicates an error.) OK Purpose: Place modem in FTM mode.
!DAFTMDEACT	<p>Put modem into online mode from Factory Test Mode</p> <p>This command takes the modem out of FTM and puts the modem back into online mode. (The command !DAFTMACT puts the modem into FTM.)</p> <hr/> <p><i>Note: When this command executes successfully, the modem responds with the value 290400. Any other response indicates an error.</i></p> <hr/> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> 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
!DAGGAVGRSSI	<p>Return averaged RSSI value in dBm (GSM only) Return an averaged RSSI (Received Signal Strength Indicator) value in dBm.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND must be used to set the device to a GSM band before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDAGGAVGRSSI=<channel>, <LNA Index> Response: OK Purpose: Return the averaged RSSI for the specified channel and LNA offset index. <p>Parameters:</p> <p><channel> (Channel number for the band specified using IDASBAND)</p> <ul style="list-style-type: none"> • Valid values depend on the selected band <p><LNA Index> (LNA offset index)</p> <ul style="list-style-type: none"> • 0=R0 (highest gain) • 1=R1 • 2=R2 • 3=R3 (lowest gain)
!DAGGRSSI	<p>Return the RSSI value in dBm (GSM only) Return the RSSI (Received Signal Strength Indicator) value in dBm using the calibration offsets (valid in GSM burst mode only—the command !DAGSRXBURST puts the modem into burst mode).</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDAGGRSSI Response: Channel:<chan> LNA:<lna> RXPWR:<pwr> dBm OK Purpose: Return the averaged RSSI for the specified channel and LNA offset index. <p>Parameters:</p> <p><chan> (Channel number for the band specified using IDASBAND)</p> <ul style="list-style-type: none"> • Valid values depend on the selected band <p><lna> (Current LNA state)</p> <ul style="list-style-type: none"> • Valid range: 0–3 <p><pwr> (RSSI converted to dBm)</p> <ul style="list-style-type: none"> • Signed value based on Rx power

Table 5-2: Test command details (Continued)

Command	Description
!DAGGRSSIRAW	<p>Return raw RSSI value (GSM only)</p> <p>Return a 32-bit raw RSSI value (valid in GSM mode only). The value is an average over multiple bursts.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAGGRSSIRAW <p>Response: <rss> OK</p> <p>Purpose: Return the raw RSSI value.</p> <p>Parameters</p> <p><rss> (RSSI, averaged over multiple bursts)</p> <ul style="list-style-type: none"> • 32-bit value

Table 5-2: Test command details (Continued)

Command	Description
!DAGINFO	<p>Return GSM mode RF information (GSM only) Return RF information for GSM mode.</p> <hr/> <p><i>Note: !DAWINFO provides RF information for WCDMA mode.</i></p> <hr/> <p>Requirements:</p> <ul style="list-style-type: none"> Device must be in online mode (not FTM mode) to use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT!DAGINFO Response: Channel: <channel> RSSI:<rssI> LNA:<lna> RXPWR:<rxPwr> dBm SNR:<snr> DC Offset_I:<iOffset> DC Offset_Q:<qOffset> Freq. Offset:<freqOffset> Timing Offset:<timingOffset> OK Purpose: Return the RF information. (If the modem is not in GSM mode, the command returns 'OK' with no information.) <p>Parameters</p> <p><channel> (GSM channel)</p> <ul style="list-style-type: none"> Valid range: 0–65535 <p><rssI> (Receive power)</p> <ul style="list-style-type: none"> Valid range: 0x00000000–0xFFFFFFFF <p><lna> (LNA gain state)</p> <ul style="list-style-type: none"> Valid range: 0–65535 <p><rxPwr> (Rx power in dBm (0.25 units))</p> <ul style="list-style-type: none"> Valid range: 0–65535 <p><snr> (Signal-to-noise ratio)</p> <ul style="list-style-type: none"> Valid range: 0–65535 <p><iOffset> (I offset)</p> <ul style="list-style-type: none"> Valid range: 0–65535 <p><qOffset> (Q offset)</p> <ul style="list-style-type: none"> Valid range: 0–65535 <p><freqOffset> (Frequency offset)</p> <ul style="list-style-type: none"> Valid range: 0–65535 <p><timingOffset> (Timing offset)</p> <ul style="list-style-type: none"> Valid range: 0–65535

Table 5-2: Test command details (Continued)

Command	Description
!DAGSLOCK	<p>Return synthesizer lock state (GSM only) Return a value indicating the lock state of the RF synthesizers.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAGSLOCK Response: <sLockState> OK • Purpose: Return the synthesizer lock state. <p>Parameters <sLockState> (Synthesizer lock state)</p> <ul style="list-style-type: none"> • 0=One or more synthesizers are out of lock • 1=All synthesizers locked
!DAGSRXBURST	<p>Set GSM receiver to burst mode (GSM only) Set the receiver to start or stop sending bursts. The receiver must be in burst mode to read the RSSI. (The command !DAGGRSSI returns the RSSI value.)</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAGSRXBURST=<function> Response: <function> OK • Purpose: Set the receiver to burst mode <p>Parameters: <function></p> <ul style="list-style-type: none"> • 0=Get RSSI (Burst mode) • 2=Stop continuous Rx

Table 5-2: Test command details (Continued)

Command	Description
!DAGSRXCONT	<p>Set GSM receiver continuously on (GSM only) Set the GSM receiver so that it is continuously on and not bursting.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDAGSRXCONT=<function> Response: <function> OK Purpose: Set the receiver to continuously on. <p>Parameters: <function></p> <ul style="list-style-type: none"> • 3=Receiver continuously on • 4=Receiver off
!DAGSTXBURST	<p>Set GSM transmitter to burst mode (GSM only) Set the transmitter to start or stop sending bursts.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDAGSTXBURST=<source>, <TSCindex>, <burstdur> Response: <source> <TSCindex> <burstdur> OK Purpose: Set the receiver to start/stop sending bursts. <p>Parameters: <source></p> <ul style="list-style-type: none"> • 0=Random data • 1=Tone • 2=Buffer data <p><TSCindex> (Training sequence index)</p> <ul style="list-style-type: none"> • Valid range: 0–9 <p><burstdur> Burst duration:</p> <ul style="list-style-type: none"> • 1=Continuous

Table 5-2: Test command details (Continued)

Command	Description
!DAGSTXFRAME	<p>Set GSM Tx frame structure (GSM only)</p> <p>This command configures the Tx slots for GSM operation. It must be issued eight times to set all eight slots.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAGSTXFRAME=<slotnum>, <onoff>, <pwr>, <mcs> • Response: <slotnum> <onoff> <pwr> <mcs> OK • Purpose: Set the Tx frame structure. <p>Parameters:</p> <p><slotnum> (Slot number)</p> <ul style="list-style-type: none"> • Valid range: 0–7 (eight available Tx slots) <p><onoff> (Enable/disable the specified slot)</p> <ul style="list-style-type: none"> • 0=Off (disable) • 1=On (enable) <p><pwr> (Slot power level)</p> <ul style="list-style-type: none"> • Measured in dB*100 • Maximum values: <ul style="list-style-type: none"> • GMSK Mode <ul style="list-style-type: none"> 850/900 bands: 3200 (32 dBm) 1800/1900 bands: 2900 (29 dBm) • 8PSK (EDGE) Mode <ul style="list-style-type: none"> 850/900 bands: 2700 (27 dBm) 1800/1900 bands: 2600 (26 dBm) <p><mcs> (Modulation code scheme)</p> <ul style="list-style-type: none"> • Valid range: 0–8 (MCS1 to MCS9)

Table 5-2: Test command details (Continued)

Command	Description
!DALGAVGAGC	<p>Return averaged Rx AGC value (LTE only)</p> <p>Return the averaged AGC (Automatic Gain Control) readings for a specific uplink channel on the main and diversity paths.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in LTE mode. • IDASBAND and IDALSRXBW must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DALGAVGAGC=<channel>, <LNA Index> <p>Response: Paths: <paths> Rx<n>: AGC: <agc> dBm LNA: <lna> Chain: <chain> Rx<n>: AGC: <agc> dBm LNA: <lna> Chain: <chain> OK</p> <p>Purpose: Return the averaged AGC for <channel> on the main and diversity paths.</p> <p>Parameters:</p> <p><channel> (Uplink channel number (UARFCN) for the band specified using IDASBAND)</p> <ul style="list-style-type: none"> • Valid values depend on the selected band <p><LNA Index> (LNA offset index)</p> <ul style="list-style-type: none"> • 0=R0 (Highest gain) • 1=R1 • 2=R2 • 3=R3 (Lowest gain) <p><paths> (Number of receive paths)</p> <ul style="list-style-type: none"> • 2 <p><agc> (AGC value in dBm)</p> <ul style="list-style-type: none"> • Valid values: Dynamic Rx range <p><chain> (Receive paths)</p> <ul style="list-style-type: none"> • 0=Rx Main • 1=Rx Diversity

Table 5-2: Test command details (Continued)

Command	Description
!DALGRXAGC	<p>Return Rx AGC value (LTE only)</p> <p>Return the Rx AGC (Automatic Gain Control) value and LNA gain states for each RF path. The AGC value can be converted to RSSI (Received Signal Strength Indicator) in dBm:</p> <pre> if (<AGC_value> < 511) <RX_dBm> = -106 + ((<AGC_value> + 512) / 12) else <RX_dBm> = -106 + ((<AGC_value>-1024) + 512) / 12) </pre> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in LTE mode. • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDALGRXAGC or ATIDALGRXAGC? Response: <AGC value> OK Purpose: Return the <AGC value> for either the main or diversity path. If no <path> is specified, the main path is assumed. <p>Parameters:</p> <p><path> (For modules supporting diversity)</p> <ul style="list-style-type: none"> • 0=Main path • 1=Diversity path <p><AGC value> (Rx AGC value for specified path)</p> <ul style="list-style-type: none"> • Valid range: -512 to +511

Table 5-2: Test command details (Continued)

Command	Description
!DALGTXAGC	<p>Return Tx AGC value and transmitter parameters (LTE only) Return the Tx AGC (Automatic Gain Control) value and other transmitter parameters.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in LTE mode. • Device must be in an active call (for example, when connected to a call box or live network). • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDALGTXAGC or ATIDALGTXAGC? <p>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: <pdem> Traw: <traw> Tscaled: <tscald> Tidx: <tidx> Trem: <trem> OK</p> <p>Purpose: Return transmitter parameters and the transmit <AGC value>.</p> <p>Parameters:</p> <p><paths> (Number of transmit paths)</p> <ul style="list-style-type: none"> • 1 (Tx) <p><agc> (Tx AGC value in dBm)</p> <ul style="list-style-type: none"> • Valid range: -70 to +23 <p><rbi></p> <ul style="list-style-type: none"> • Start resource block index <p><rbn> (Number of resource blocks)</p> <ul style="list-style-type: none"> • Valid range: 0–50 <p><pa> (PA gain state)</p> <ul style="list-style-type: none"> • Valid range: 0–3 <p><txgi></p> <ul style="list-style-type: none"> • Tx gain index <p><mtpl> (Max Tx power limit)</p> <ul style="list-style-type: none"> • Max value: +23 <p><iq></p> <ul style="list-style-type: none"> • Digital IQ gain scaling <p><mpr> (Maximum power reduction)</p> <ul style="list-style-type: none"> • See 3GPP 36.101 for details <p><ampr> (Additional Max power reduction)</p> <ul style="list-style-type: none"> • See 3GPP 36.101 for details <p><ns> (Network Signaled (NS) value)</p> <ul style="list-style-type: none"> • See 3GPP 36.101 for details <p>(Continued on next page)</p>

Table 5-2: Test command details (Continued)

Command	Description
!DALGTXAGC (continued)	<p>Return Tx AGC value and transmitter parameters (LTE only) (continued)</p> <p><mode> (HDET (power detector) mode)</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • L (Lower power) • H (Higher power) <p><padc></p> <ul style="list-style-type: none"> • HDET ADC <p><pdbm></p> <ul style="list-style-type: none"> • HDET dBm <p><traw> (Raw thermistor ADC value)</p> <ul style="list-style-type: none"> • Valid range: 0–4095 <p><tscald> (Scaled thermistor value)</p> <ul style="list-style-type: none"> • Valid range: 0–255 • Value is scaled from <traw> based on calibrated min/max <traw> values for the supported temperature range. <p><tidx> (Temperature compensation bin)</p> <ul style="list-style-type: none"> • Valid range: 0–7 <p><trem></p> <ul style="list-style-type: none"> • Temperature compensation remainder bin
!DALSPARANGE	<p>Set LTE PA range (LTE only)</p> <p>Set the LTE PA (Power Amplifier) range.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • !DASBAND, !DASCHAN, and !DALSTXBW must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDALSPARANGE=<pa_range> Response: OK Purpose: Set the LTE PA range. <p>Parameters:</p> <p><pa_range> (PA range)</p> <ul style="list-style-type: none"> • 0 • 1 • 2 • 3

Table 5-2: Test command details (Continued)

Command	Description
!DALSRXBW	<p>Set LTE Rx bandwidth (LTE only) Set the LTE Rx bandwidth.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • IDASBAND must be issued before you can use this command. • This command must be issued before you can use IDALGAVGAGC. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDALSRXBW=<bw> Response: OK Purpose: Set the LTE Rx bandwidth. <p>Parameters: <bw> (LTE bandwidth)</p> <ul style="list-style-type: none"> • 0=1.4 MHz • 1=3 MHz • 2=5 MHz • 3=10 MHz • 4=15 MHz • 5=20 MHz
!DALSTXBW	<p>Set LTE Tx bandwidth (LTE only) Set the LTE Tx bandwidth.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • IDASBAND must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDALSTXBW=<bw> Response: OK Purpose: Set the LTE Tx bandwidth. <p>Parameters: <bw> (LTE bandwidth)</p> <ul style="list-style-type: none"> • 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
!DALSTXINDEX	<p>Set LTE Tx gain index (LTE only) Set the LTE Tx gain index.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode • IDASBAND, IDASCHAN, and !DALSTXBW must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DALSTXINDEX=<tx_index> Response: OK Purpose: Set the LTE Tx gain index. <p>Parameters:</p> <p><tx_index> (LTE Tx gain index)</p> <ul style="list-style-type: none"> • Valid range: 0–127
!DALSWAVEFORM	<p>Set LTE TX waveform (LTE only) Set the LTE Tx waveform characteristics.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode • IDASBAND, IDASCHAN, and !DALSTXBW must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DALSWAVEFORM=<waveform>[,<PUSCH_RBs>,<PUCCH_RBs>,<PUSCH_start_RB_index>] Response: OK Purpose: Set the LTE Tx waveform characteristics. <p>Parameters:</p> <p><waveform> (Tx waveform)</p> <ul style="list-style-type: none"> • 0=1 MHz offset CW • 1=LTE PUSCH (Physical Uplink Shared Channel) • 2=LTE PUCCH (Physical Uplink Control Channel) • 3=LTE PRACH (Physical Random Access Channel) • 4=LTE SRS • 5=UpPTS (Uplink Pilot Time Slot) <p><PUSCH_RBs> (Number of PUSCH resource blocks)</p> <ul style="list-style-type: none"> • Valid range: 0–100 <p><PUCCH_RBs> (Number of PUCCH resource blocks)</p> <ul style="list-style-type: none"> • Valid range: 0–12 <p><PUSCH_start_RB_index> (PUSCH starting resource block index)</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none">• Execution: AT!DAOFFLINEResponse: OKPurpose: Put the modem offline. Parameters: None

Table 5-2: Test command details (Continued)

Command	Description
!DASBAND	<p>Set frequency band</p> <p>Set the modem to use a particular frequency band. You must use this command to select an appropriate band before running LTE, WCDMA, or GSM commands. See page 71.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DASBAND=<rband> • Response: <rband> OK • Purpose: Set frequency band. <p>Parameters:</p> <p><rband> (Unique value corresponding to an RF band and technology.)</p> <ul style="list-style-type: none"> • This is a unique value that maps to an RF band and technology. It is not an actual 3GPP band number. For example, '18' is GSM 850, which corresponds to 3GPP band 5 (on a GSM network). • Band support is product specific—see the device's Product Specification or Product Technical Specification document for details. • Examples (for a full listing, see Table 13-1 on page 195): <ul style="list-style-type: none"> • GSM <ul style="list-style-type: none"> • 10=GSM 900 • 11=GSM 1800 • 12=GSM 1900 • 18=GSM 850 • WCDMA <ul style="list-style-type: none"> • 9=WCDMA 2100 • 16=WCDMA 1900B • 22=WCDMA 850 • 29=WCDMA 900 (BC8) • LTE <ul style="list-style-type: none"> • 34=LTE B1 • 35=LTE B7 • 36=LTE B13 • 37=LTE B17 • 42=LTE B4 • 44=LTE B3 • 47=LTE B8 • 56=LTE B20

Table 5-2: Test command details (Continued)

Command	Description
!DASCHAN	<p>Set modem channel (frequency)</p> <p>Set the modem to operate on a particular frequency channel. Before using this command, use the command !DASBAND (described on page 88) to set the band.</p> <p>Once a channel is set, the modem continues to use that channel until the modem is reset or powered off and on.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • !DASBAND must be issued before you can use this command. • In LTE mode, !DALSRXBW and !DALSTXBW must also be issued before you can use this command. <p>Password required: Yes</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DASCHAN=<rfchannel> • Response: <rfchannel> OK • Purpose: Set modem channel (frequency). <p>Parameters:</p> <p><rfchannel> (Uplink channel number (ARFCN)—depends on frequency band being used)</p> <ul style="list-style-type: none"> • 128–251: GSM 850 MHz • 1–24: GSM 900 MHz • 975–1023: GSM 900 MHz • 512–885: GSM 1800 MHz • 512–810: GSM 1900 MHz • 9612–9888: WCDMA 2100 • 9262–9538: WCDMA 1900 • 4132–4233: WCDMA 850 • 2712–2863: WCDMA 900 • 18000–18599: LTE B1 • 19200–19949: LTE B3 • 19950–20399: LTE B4 • 20750–21449: LTE B7 • 21450–21799: LTE B8 • 23180–23279: LTE B13 • 23730–23849: LTE B17 • 24150–24449: LTE B20

Table 5-2: Test command details (Continued)

Command	Description
!DASLNAGAIN	<p>Set LNA gain state</p> <p>Set the LNA (Low Noise Amplifier) range for the main or diversity path (if applicable), in either WCDMA or GSM mode.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in WCDMA or GSM mode. • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!LNAGAIN=<gain index>[, <path>] • Response: <gain index> OK • Purpose: Set the LNA gain state for either the main or diversity paths. <p>Parameters:</p> <p><gain index></p> <ul style="list-style-type: none"> • 0=R0 (highest gain) Approximate switch from low to high gain: WCDMA (< -72 dBm); GSM (< -73 dBm) • 1=R1 Approximate switch from low to high gain: WCDMA (< -72 up to -46 dBm); GSM (< -73 up to -58 dBm) • 2=R2 Approximate switch from low to high gain: WCDMA (< -46 up to -36 dBm); GSM (< -58 up to -41 dBm) • 3=R3 (lowest gain) Approximate switch from low to high gain: WCDMA (> -36 dBm); GSM (< -41 dBm) <hr/> <p><i>Note: The LNA gain state is set based on the expected receive power level. The gain state values listed above are provided as a guideline. The values are approximations and subject to change over time. The values are different than those from high to low gain.</i></p> <hr/> <p><path> (For modules supporting diversity)</p> <ul style="list-style-type: none"> • 0=Main path • 1=Secondary (diversity) path

Table 5-2: Test command details (Continued)

Command	Description
!DASPDM	<p>Set PDM value</p> <p>Adjust the PDM (Pulse Duration Modulation), allowing you to apply frequency offset to the LO (Local Oscillator) or Tx AGC.</p> <p>When you adjust the Tx AGC (<PDM ID> = 2), the modem does not use a calibrated result but uses the raw AGC value. The resulting change in Tx power will vary from modem to modem, so it is usually necessary to tune this value by executing the command repeatedly with different settings for the <PDMvalue> until you obtain the desired Tx power.</p> <p>When adjusting the tracking LO, you also need to execute the command repeatedly with different settings for the <PDMvalue> until you obtain the desired frequency offset.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DASPDM=<PDM ID>, <PDMvalue> • Response: <PDM ID> <PDMvalue> OK • Purpose: Set the tracking LO and Tx AGC PDM. <p>Parameters:</p> <p><PDM ID> (LO (Local Oscillator) or Tx AGC (Automatic Gain Control) to adjust)</p> <ul style="list-style-type: none"> • 0=Tracking LO adjust (GSM only) • 2=Tx AGC adjust (WCDMA only) • 4=Tracking LO adjust (WCDMA only) <p><PDMvalue> (Frequency offset value)</p> <ul style="list-style-type: none"> • If <PDM ID>=0: 0–511 • If <PDM ID>=2: 0–511 • If <PDM ID>=5: 0–65536
!DASTXOFF	<p>Turn Tx PA off</p> <p>Turn the transceiver PA off, after it has been turned on with IDASTXON.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DASTXOFF • Response: OK • Purpose: Turn the Tx PA off. <p>Parameters:</p> <p>None</p>

Table 5-2: Test command details (Continued)

Command	Description
!DASTXON	<p>Turn Tx PA on</p> <p>Turn on the transceiver PA (either the WCDMA PA or the GSM PA, depending on the mode set with !DASBAND). The PA then remains on until you turn it off using the !DASTXOFF command, or until you reset or power the modem down and up.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • !DASBAND and !DASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DASTXON • Response: OK • Purpose: Turn the Tx PA on. <p>Parameters:</p> <p>None</p>
!DAWGAVGAGC	<p>Return averaged Rx AGC value (WCDMA only)</p> <p>Return the averaged AGC (Automatic Gain Control) reading for a specific band for either the main path or diversity path (if applicable).</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in WCDMA mode. • !DASBAND must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAWGAVGAGC=<channel>, <LNA Index>[, <path>] • Response: <agc> OK • Purpose: Return the averaged AGC for <channel> on the main path or diversity path. <p>Parameters:</p> <p><channel> (Uplink channel number (UARFCN) for the band specified using !DASBAND)</p> <ul style="list-style-type: none"> • Valid values depend on the selected band <p><LNA Index> (LNA offset index)</p> <ul style="list-style-type: none"> • 0=R0 (Highest gain) • 1=R1 • 2=R2 • 3=R3 (Lowest gain) <p><path> (For modules supporting diversity)</p> <ul style="list-style-type: none"> • 0=Main path • 1=Diversity path <p><agc> (Averaged Rx AGC in dBm)</p> <ul style="list-style-type: none"> • Example: -78.9

Table 5-2: Test command details (Continued)

Command	Description
!DAWGRXAGC	<p>Return Rx AGC value (WCDMA only)</p> <p>Return the Rx AGC (Automatic Gain Control) value of the main path or diversity path (if applicable).</p> <p>This value can be converted to RSSI (Received Signal Strength Indicator) in dBm:</p> <p>if (<AGC_value> < 511) <RX_dBm> = -106 + ((<AGC_value> + 512) / 12) else <RX_dBm> = -106 + (((<AGC_value>-1024) + 512) / 12)</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in WCDMA mode. • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAWGRXAGC?[<path>] Response: <AGC value> OK Purpose: Return the <AGC value> for either the main or diversity paths. If no <path> is specified, the main path is assumed. <p>Parameters:</p> <p><path> (For modules supporting diversity)</p> <ul style="list-style-type: none"> • 0=Main path • 1=Diversity path <p><AGC value> (Rx AGC value for specified path)</p> <ul style="list-style-type: none"> • Valid range: -512 to +511

Table 5-2: Test command details (Continued)

Command	Description
!DAWINFO	<p>Return WCDMA mode RF information (WCDMA only)</p> <p>Return RF information for WCDMA mode when the modem is in CELL_DCH (Designated Channel) state.</p> <hr/> <p><i>Note: IDAGINFO provides RF information for GSM mode.</i></p> <hr/> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in WCDMA mode. • Device must be in online mode. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAWINFO <p>Response: RXAGC:<rxAGC> TXAGC:<txAGC> TXADJ:<txAdj> TXLIM:<txLim> LNA:<lnaRange> PA ON:<paOn> TX ON:<txOn> PA Range:<paRange> RxD RXAGC:<RXDrxAGC> RxD LNA:<RXDlnaRange> HDET:<hdet> OK</p> <p>Purpose: Return the RF information.</p> <p>Parameters:</p> <p><rxAGC> (Rx AGC value)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><txAGC> (Tx AGC value)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><txAdj> (Tx AGC value after linearization (adjustment))</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><txLim> (Tx AGC limit)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><lnaRange> (State of the LNA)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><paOn> (State of PA_ON0)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><txOn> (State of TX_ON)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><paRange> (State of PA_R1: PA_R0)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><RXDrxAGC> (RxD Rx AGC value)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><RXDlnaRange> (State of the RxD LNA)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p><hdet> (Raw HDET (High Power Detector) data)</p> <ul style="list-style-type: none"> • Valid range: 0–255

Table 5-2: Test command details (Continued)

Command	Description
!DAWSCONFIGRX	<p>Set WCDMA receiver to factory calibration settings (WCDMA only)</p> <p>Configure the WCDMA receiver according to factory calibration settings stored in the modem's NV (Non-Volatile memory). This allows for accurate measurement of Rx AGC levels. The command performs these steps:</p> <ol style="list-style-type: none"> 1. Sets the channel. 2. Selects and sets LNA range (or LNA gain). 3. Sets the VGA gain offset based on the channel. 4. Sets the LNA range offset. <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • !DASBAND and !DASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIDAWSCONFIGRX=<channel>,<Rx_Level_dBm> • Response: <LNA Index>, <LNA Value> OK • Purpose: Configure the receiver. <p>Parameters (Input):</p> <p><channel> (Uplink channel number (ARFCN))</p> <ul style="list-style-type: none"> • Value based on the selected band <p><Rx_Level_dBm> (Approximate signal level (in dBm) being applied to the modem receiver)</p> <ul style="list-style-type: none"> • Valid range: -113 to 20 <p>Parameters (Output):</p> <p><LNA Index> (LNA offset index)</p> <ul style="list-style-type: none"> • 0=R0 (highest gain) • 1=R1 • 2=R2 • 3=R3 (lowest gain) <p><LNA Value></p> <ul style="list-style-type: none"> • Internal use only

Table 5-2: Test command details (Continued)

Command	Description
!DAWSPARANGE	<p>Set PA range state machine (WCDMA only) Set the PA range state machine in WCDMA operation.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in WCDMA mode. • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAWSPARANGE=<PA range> Response: <PA range> OK • Purpose: Set the PA range state machine. <p>Parameters: <PA range></p> <ul style="list-style-type: none"> • 0=Low gain state of the PA — Limited to about 16 dBm output power (R0=0, R1=0) • 3=High gain state of the PA — Up to the maximum output power of the modem (R0=1, R1=1)
!DAWSSCHAIN	<p>Enable secondary receive chain (WCDMA only) Enable or disable the secondary receive chain.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in WCDMA mode. • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAWSSCHAIN=<state> Response: OK • Purpose: Enable or disable the secondary receive chain. <p>Parameters: <state> (Requested state for secondary receive chain)</p> <ul style="list-style-type: none"> • 0=Off (Disable) • 1=On (Enable)

Table 5-2: Test command details (Continued)

Command	Description
!DAWSCHAITCM	<p>Place receive chain in test call mode (WCDMA only) Place one or both of the primary and secondary receive chains in test call mode.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in WCDMA mode. • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAWSCHAITCM=<chain> Response: OK Purpose: Place requested receive chain(s) in test call mode. <p>Parameters:</p> <p><chain> (Receive chain to place in test call mode)</p> <ul style="list-style-type: none"> • 0=Main • 1=Secondary • 2=Both
!DAWSTXCW	<p>Set waveform used by the transmitter (WCDMA only) Set the waveform used by the transmitter—the modem can transmit either in carrier wave or WCDMA modulated.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in WCDMA mode. • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • IDASBAND and IDASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAWSTXCW=<waveform> Response: OK Purpose: Set the transmitter waveform. <p>Parameters:</p> <p><waveform> (Waveform used by the transmitter)</p> <ul style="list-style-type: none"> • 0=WCDMA • 1=Carrier wave (no modulating signal applied)

Table 5-2: Test command details (Continued)

Command	Description
!DAWSTXPWR	<p>Set desired Tx power level (WCDMA mode only)</p> <p>Set the desired Tx power level in dBm. When this occurs, the PA range and PDM are automatically updated as well. (When this command is used, you do not need to use !DAWSPARANGE and !DASPDM.)</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must be in WCDMA mode. • Device must be in FTM mode (Use !DAFTMACT to enter FTM mode.) • !DASBAND and !DASCHAN must be issued before you can use this command. <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!DAWSTXPWR=<dBm>[,<use_temp_comp>] Response: <pa_range>, <pdm> OK Purpose: Set the Tx power level to the requested <dBm> level, and automatically set the PA range and PDM. <p>Parameters:</p> <p><dBm> (Desired Tx power in dBm)</p> <ul style="list-style-type: none"> • Valid range: -57 to 28 <p><use_temp_comp> (Apply temperature compensation to set desired Tx power.)</p> <ul style="list-style-type: none"> • Frequency compensation is always applied. • 0=No (default) • 1=Yes <p><pa_range> (PA range set as a result of the command)</p> <ul style="list-style-type: none"> • Valid range: 0–3 <p><pdm> (PDM set as a result of the command)</p> <ul style="list-style-type: none"> • Valid range: 0–255

6: Memory Management Commands

Introduction

The modem uses non-volatile memory to store:

- Factory calibration data
- Settings made in a host application such as Skylight.

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
!RMARESET	Restore device to original settings	100

Command reference

Table 6-2: Memory management command details

Command	Description
!RMARESET	<p>Restore device to original settings Restore the device to the original provisioned (OEM default) state.</p> <p>Supporting devices: EM, MC Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!RMARESET=<category> Response: !RMARESET: <category> RESET OK Purpose: Restore device to original provisioned (OEM default) state. <p>Parameters:</p> <p><category> (Type of restoration)</p> <ul style="list-style-type: none"> • OEM=Default OEM provisioned state • RTN=OEM provisioned state plus activation and Sprint-related settings

7: GPS Commands

Introduction

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

When using these commands, the following considerations apply:

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

Command summary

The table below lists the commands described in this chapter.

Table 7-1: GPS commands

Command	Description	Page
!GPSAUTOSTART	Configure GPS auto-start features	103
!GPSCLRASSIST	Clear specific GPS assistance data	104
!GPSCOLDSTART	Clear all GNSS assistance data	105
!GPSEND	End an active session	105
!GPSFIX	Initiate GPS position fix	106
!GPSKEEPWARM	Configure Keep Warm functionality	107
!GPSLBSAPN	Set GPS LBS APNs	108
!GPSLOC	Return last known location of the modem	110
!GPSMOMETHOD	Set/report GPS MO method	111
!GPSMTLRSETTINGS	Set/report MT location request settings	112
!GPSNIQOSTIME	Set/report GPS QoS timeout period for network-initialized fixes	112
!GPSNMEA	Enable/disable GPS session autostart when NMEA opens	113
!GPSNMEACONFIG	Enable and set NMEA data output rate	114
!GPSNMEASENTENCE	Set/report NMEA sentence type	115
!GPSONLY	Configure GNSS for GPS only, or GPS and GLONASS	117
!GPSPORTID	Set/report port ID to use over TCP/IP	117

Table 7-1: GPS commands (Continued)

Command	Description	Page
!GPSPOSMODE	Configure support for GPS positioning modes	118
!GPSSATINFO	Request satellite information	119
!GPSSTATUS	Request current status of a position fix session	120
!GPSSUPLURL	Set/report SUPL server URL	121
!GPSSUPLVER	Set/report SUPL server version	122
!GPSTRACK	Initiate local tracking (multiple fix) session	123
!GPSTRANSSEC	Control GPS transport security	124
!GPSXTRAAPN	Set GPS XTRA APNs	125
!GPSXTRADATAENABLE	Set/report GPS XTRA settings	127
!GPSXTRADATAURL	Set/report GPS XTRA data server URLs	128
!GPSXTRAINITDNLD	Initiate gpsOneXTRA data download and inject operation	128
!GPSXTRASTATUS	Return current status of gpsOneXTRA	129
!GPSXTRATIME	Inject GPS or UTC time into gpsOneXTRA system	130
!GPSXTRATIMEENABLE	Set/report GPS XTRA time settings	131
!GPSXTRATIMEURL	Set/report GPS XTRA SNTP server URLs	132

Command reference

Table 7-2: GPS command details

Command	Description
!GPSAUTOSTART	<p>Configure GPS auto-start features</p> <p>Configure the GPS auto-start features. Any changes take effect the next time the modem is reset.</p> <hr/> <p><i>Note: If auto-start is enabled, another GPS session cannot be started.</i></p> <hr/> <p>Password required: No Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSAUTOSTART=<enable>[, <fixtype>, <maxtime>, <maxdist>, <fixrate>] Response: OK or ERROR Purpose: Assign start values for various GPS settings • Query: AT!GPSAUTOSTART? Response: !GPSAUTOSTART enable: <enable> 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. <p>Parameters:</p> <p><enable> (Enable/disable the feature)</p> <ul style="list-style-type: none"> • 0=Disabled • 1=Enabled (GPS tracking session starts automatically when modem is reset) <p><fixtype> (Type of fix to establish)</p> <ul style="list-style-type: none"> • 1=Standalone (not supported by a mobile station) • 2=MS-based only • 3=MS-assisted only <p><maxtime> (Maximum time to wait for a position fix)</p> <ul style="list-style-type: none"> • Valid range: 0–255—Number of seconds to wait <p><maxdist> (Requested accuracy of fix)</p> <ul style="list-style-type: none"> • Entered in decimal format • Valid range: <ul style="list-style-type: none"> • 0–4294967279 meters • 4294967280=No preference <p><fixrate> (Time to wait between fixes)</p> <ul style="list-style-type: none"> • Valid range: 1–65535 seconds

Table 7-2: GPS command details (Continued)

Command	Description
!GPSCLRASSIST	<p>Clear specific GPS assistance data</p> <p>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.</p> <p>This command is equivalent to !GPS COLDSTART when all four parameters are set to '1'.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must not have an active GPS session (the GPS receiver is off and no position fix is being calculated). <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><eph> (Ephemeris assistance data)</p> <ul style="list-style-type: none"> • 0=Ignore (Do not clear the ephemeris assistance data) • 1=Clear this assistance data type—Clears GPS, GLONASS, and SBAS ephemeris assistance data. <p><alm> (Almanac assistance data)</p> <ul style="list-style-type: none"> • 0=Ignore (Do not clear the almanac assistance data) • 1=Clear this assistance data type—Clears GPS, GLONASS, and SBAS almanac assistance data. <p><pos> (Position assistance data)</p> <ul style="list-style-type: none"> • 0=Ignore (Do not clear the position assistance data) • 1=Clear this assistance data type <p><time> (Time reference)</p> <ul style="list-style-type: none"> • 0=Ignore (Do not clear the time reference) • 1=Clear the time reference <p><iono> (Ionosphere assistance data)</p> <ul style="list-style-type: none"> • 0=Ignore (Do not clear the ionosphere assistance data) • 1=Clear this assistance data type

Table 7-2: GPS command details (Continued)

Command	Description
!GPSCOLDSTART	<p>Clear all GNSS assistance data</p> <p>Clear all GNSS assistance details from the modem and put the modem into a coldstart state. Data cleared includes Almanac, Ephemeris, Previous Position, Ionosphere, and GPS time. This forces a cold start for GPS acquisition the next time a session starts.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • Device must not have an active GPS session (the GPS receiver is off and no position fix is being calculated). <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSCOLDSTART Response: OK Purpose: Clear the modem's GPS details <p>Parameters:</p> <p>None</p>
!GPSEND	<p>End an active session</p> <p>End an active position fix session.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSEND=<sessType> Response: ERRCODE = <value> OK <i>or</i> OK Purpose: End the current session. <p>Parameters:</p> <p><sessType> (Type of session to end)</p> <ul style="list-style-type: none"> • 0=Position fix session <p><value> (Error code returned when command fails for any reason)</p> <ul style="list-style-type: none"> • See Table 7-3 on page 132 for a list of possible error codes.

Table 7-2: GPS command details (Continued)

Command	Description
!GPSFIX	<p>Initiate GPS position fix Initiate a GPS position fix.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><fixType> (Type of fix to establish)</p> <ul style="list-style-type: none"> • 1=Standalone (not supported by a mobile station) • 2=MS-based only • 3=MS-assisted only <p><maxTime> (Maximum time to wait for a position fix)</p> <ul style="list-style-type: none"> • Valid range: 0–255 seconds <p><maxDist> (Requested accuracy of fix)</p> <ul style="list-style-type: none"> • Entered in decimal format • Valid range: <ul style="list-style-type: none"> • 0–4294967279 meters • 4294967280=No preference <p><value> (Error code returned when command fails for any reason)</p> <ul style="list-style-type: none"> • See Table 7-3 on page 132 for a list of possible error codes. <p>Example(s): AT!GPSFIX=1, 15, 10 requests a standalone position fix to 10 meters accuracy. The request will fail (timeout) if the modem cannot determine a position fix within 15 seconds.</p> <p>Related commands:</p> <ul style="list-style-type: none"> • IGPSSTATUS (page 120)—Use this command while the tracking session is in progress. • IGPSLOC (page 110)—Use this command after the session completes to obtain the result.

Table 7-2: GPS command details (Continued)

Command	Description
!GPSKEEPWARM	<p>Configure Keep Warm functionality</p> <p>Set, clear, or report the modem's 'keep warm' functionality. This functionality downloads GPS assistance data from the GPS server.</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSKEEPWARM=<enableFlag> Response: OK Purpose: Enable/disable the keep warm functionality. • Query: AT!GPSKEEPWARM? Response: KeepWarm Enabled: <enableFlag> Warm Status: <warmStatus> Purpose: Display the current status (<enableFlag>) of the keep warm functionality and indicate if GPS is in 'warm' state (<warmStatus>). • Query List: AT!GPSKEEPWARM=? Purpose: Display valid <enableFlag> options. <p>Parameters:</p> <p><enableFlag> (Enable/disable keep warm functionality)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable <p><warmStatus> (GPS is in Warm state)</p> <ul style="list-style-type: none"> • 0=No • 1=Yes <p>Example(s):</p> <p>AT!GPSKEEPWARM? returns: KeepWarm Enabled: 1 Warm Status: 1 In this example, KeepWarm is enabled, and GPS is in Warm state.</p>

Table 7-2: GPS command details (Continued)

Command	Description
!GPSLBSAPN	<p>Set GPS LBS APNs Set the GPS LBS APNs to be used for various RATs (Radio Access Technologies).</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution (Add): AT!GPSLBSAPN=<operation>,<ratmask>,<IType>,<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>, <IType>, <APN> <ratmask>, <IType>, <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. <p>Parameters:</p> <p><operation> (Add or delete APNs)</p> <ul style="list-style-type: none"> • 1=Add an APN for a specific <ratmask> and <IType>. Note: All parameters are required. <hr/> <p><i>Note: To change an APN that has been set for a RAT, you must first delete the current APN, then add the new APN.</i></p> <hr/> <ul style="list-style-type: none"> • 2=Delete the APN for a specific <ratmask> Note: Only <ratmask> is required. • 3=Delete all APNs Note: No other parameters are required. <p><ratmask> (Radio access technology)</p> <ul style="list-style-type: none"> • Valid values (values shown are in hexadecimal format): <ul style="list-style-type: none"> • 01=CDMA • 02=HDR • 04=GSM • 08=WCDMA • 10=LTE <p>(Continued on next page)</p>

Table 7-2: GPS command details (Continued)

Command	Description
!GPSLBSAPN (continued)	Set GPS LBS APNs (continued) <IPtype> (Internet Protocol version) <ul style="list-style-type: none">• Character string, entered without quotation marks• Valid values:<ul style="list-style-type: none">• IPV4• IPV6• IPV4V6 <APN> (Access Point Name) <ul style="list-style-type: none">• Character string, entered with quotation marks• Examples: "mycompany.mnc987.mcc123.gprs", "ourinternet"

Table 7-2: GPS command details (Continued)

Command	Description
!GPSLOC	<p>Return last known location of the modem Return the details obtained during the most recent position location session, if available.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!GPSLOC? Response: Unknown (<i>No information is available</i>) OK or Not Available (<i>No information is available</i>) 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 (<i>Altitude and heading only appear if data was collected as part of the most recent fix.</i>) <p>Purpose: Return last position location details.</p> <p>Parameters:</p> <p><latitude> (Latitude at last position fix) • Example: "49 Deg 10 Min 21.49 Sec N (0x008BDE6C)"</p> <p><longitude> (Longitude at last position fix) • Example: "123 Deg 4 Min 14.76 Sec W (0xFEA1EE9A)"</p> <p><time> (Time at which last position fix was taken) • Example: "2009 01 30 4 20:27:18 (GPS)"</p> <p><luAngle> (Location uncertainty angle of returned position) • Example: "11.2 deg"</p> <p><luA> (Standard deviation of axis along <luAngle>) • Example: "6.0 m"</p> <p><luP> (Standard deviation of axis perpendicular to <luAngle>) • Example: "6.0 m"</p> <p><hepe> (Horizontal Estimated Positional Error) • Example: "8.485 m"</p> <p><fixType> (2D or 3D fix) • Example: "2D Fix" or "3D Fix"</p> <p><altitude> (Altitude in meters at which last position fix was taken) • Only present if <fixType> is 3D • Example: "-1 m"</p> <p><luV> (Vertical uncertainty in meters) • Only present if <fixType> is 3D • Example: "3.0 m"</p> <p>(Continued on next page)</p>

Table 7-2: GPS command details (Continued)

Command	Description
!GPSLOC (continued)	<p>Return last known location of the modem (continued)</p> <p><heading> (Direction of MS)</p> <ul style="list-style-type: none"> • Example: "0.0 deg" <p><vH> (Horizontal velocity)</p> <ul style="list-style-type: none"> • Example: "0.0 m/s" <p><vV> (Vertical velocity)</p> <ul style="list-style-type: none"> • Example: "0.0 m/s"
!GPSMOMETHOD	<p>Set/report GPS MO method</p> <p>Set or report the GPS MO method.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><MO_method> (MO method)</p> <ul style="list-style-type: none"> • 0=CP (Control Plane) • 1=UP (User Plane)

Table 7-2: GPS command details (Continued)

Command	Description
!GPSMTLRSETTINGS	<p>Set/report MT location request settings</p> <p>Set or report the current MT (mobile-terminated) Location Request settings, which control how the UE responds to network-initiated notifications.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSMTLRSETTINGS=<notifResp> Response: OK or ERROR Purpose: Indicate how MT location request will be handled. • Query: AT!GPSMTLRSETTINGS? Response: Notification Response Setting: <notifResp> OK Purpose: Return the current <notifResp> setting. • Query List: AT!GPSMTLRSETTINGS=? Purpose: Return valid <notifResp> values. <p>Parameters:</p> <p><notifResp> (Notification response setting)</p> <ul style="list-style-type: none"> • 0=Default setting as defined in <i>3GPP specification 29.002</i>, 'NotificationToM-User' enumeration. • 1=Accept all MT location requests. • 2=Reject all MT location requests. • 3=Verify all—User will be asked to accept or reject every MT location request.
!GPSNIQOSTIME	<p>Set/report GPS QoS timeout period for network-initialized fixes</p> <p>Set or report the current GPS QoS timeout period for network-initiated fixes.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSNIQOSTIME=<timeout> Response: OK or ERROR Purpose: Set the new timeout period. • Query: AT!GPSNIQOSTIME? Response: QoS time: <timeout> OK Purpose: Return the current <timeout> period. <p>Parameters:</p> <p><timeout> (GPS QoS timeout period)</p> <ul style="list-style-type: none"> • Timeout period (in seconds)

Table 7-2: GPS command details (Continued)

Command	Description
!GPSNMEA	<p>Enable/disable GPS session autostart when NMEA opens Enable or disable the automatic start of a GPS session when NMEA opens.</p> <p>Password required: No Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSNMEA=<enable> Response: OK Purpose: Enable or disable automatic start of GPS session when NMEA opens. • Query: AT!GPSNMEA? Response: Enabled: <enable> OK Purpose: Return the enable/disable state. <p>Parameters: <enable> (Enable/disable GPS autostart)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable (Default)

Table 7-2: GPS command details (Continued)

Command	Description
!GPSNMEACONFIG	<p>Enable and set NMEA data output rate Enable or disable NMEA data output, and set the output rate for use with !GPSTRACK.</p> <p>Requirements:</p> <ul style="list-style-type: none"> NMEA streaming must be enabled using !GPSNMEA before using this command. <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT!GPSNMEACONFIG=<enable>[,<outputRate>] Response: OK or ERROR Purpose: Enable or disable NMEA output and set rate. Query: AT!GPSNMEACONFIG? Response: Enabled: 0 Output Rate: <outputRate> or Enabled Output Rate: <outputRate> OK Purpose: Return the current <timeout> period. Query List: AT!GPSNMEACONFIG=? Purpose: Return valid parameter values. <p>Parameters:</p> <p><enable> (Enable/disable NMEA data output)</p> <ul style="list-style-type: none"> 0=Disable. (Note: <outputRate> is ignored) 1=Enable. (Note: <outputRate> is required) <p><outputRate> (NMEA data output rate—time between outputs)</p> <ul style="list-style-type: none"> Valid range: 1–255 seconds

Table 7-2: GPS command details (Continued)

Command	Description
!GPSNMEASENTENCE	<p>Set/report NMEA sentence type Set or report the current GPS NMEA sentence types.</p> <p>Requirements:</p> <ul style="list-style-type: none"> NMEA streaming must be enabled using !GPSNMEA before using this command. <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT!GPSNMEASENTENCE=<nmea type> Response: OK <i>or</i> 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=? Purpose: Return valid parameter values. <p>(Continued on next page)</p>

Table 7-2: GPS command details (Continued)

Command		Description	
!GPSNMEASSENTENCE (continued)		Set/report NMEA sentence type (continued)	
		Parameters: <nmea type> (NMEA sentence types) <ul style="list-style-type: none"> • 2-byte hex format mask (Note: In the execution format, do not include '0x' before the mask value) • Each bit: 0=Disabled; 1=Enabled 	
FW version < 07.00.00.00		FW version 07.00.00.00 and later	
Bit	Description	Bit	Description
0	GGA (Fix information)	0	GGA (Fix information)
1	RMC (Recommended minimum data for GPS)	1	RMC (Recommended minimum data for GPS)
2	GSV (Detailed satellite data)	2	GSV (Detailed satellite data)
3	GSA (Overall satellite data)	3	GSA (Overall satellite data)
4	VTG (Vector track and speed over the ground)	4	VTG (Vector track and speed over the ground)
5	PQXFI (Proprietary Qualcomm eXtended Fix Information)	5	PQXFI (Proprietary Qualcomm eXtended Fix Information)
6	GLGSV (GLONASS GSV)	6	GLGSV (GLONASS GSV)
7	GNGSA (GLONASS GSA)	7	GNGSA (GLONASS GSA)
8	GNGNS (Time, position, fixed related data for GLONASS receiver)	8	GNGNS (Time, position, fixed related data for GLONASS receiver)
9		9	GARMC (Galileo NMEA RMC)—Not Implemented
10		10	GAGSV (Galileo Satellites in View)
11	GRS (GPRGRS—GPS Range Residuals)	11	GAGSA (Galileo DOP and Active Satellites)—Not Implemented
12	DR_EXT (Dead Reckoning)	12	GAVTG (Galileo VTG - Course Over Ground and Ground Speed)—Not Implemented
13	PSTIS (GPS session start indication)	13	PSTIS (GPS session start indication)
14		14	GSV_EXTENDED (Enable/disable Extended GGSV)
15		15	GAGGA (Galileo GGA)—Not Implemented
16		16	GRS (GPRGRS—GPS Range Residuals)

Table 7-2: GPS command details (Continued)

Command	Description
!GPSONLY	<p>Configure GNSS for GPS only, or GPS and GLONASS Configure GNSS engine mode to support GPS only, or GPS and GLONASS.</p> <p>Password required: No Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSONLY=<enable> Response: OK Purpose: Enable or disable GLONASS support. • Query: AT!GPSONLY? Response: !GPSONLY: <enable> OK Purpose: Display the current GNSS mode. • Query List: AT!GPSONLY=? Purpose: Return the expected command format. <p>Parameters: <enable> (GNSS mode—GPS only, or GPS and GLONASS)</p> <ul style="list-style-type: none"> • 0=Disabled (GPS + GLONASS) • 1=Enabled (GPS only)
!GPSPORTID	<p>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.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSPORTID=<portid> Response: OK <i>or</i> ERROR Purpose: Queue the request to set the port ID. • Query: AT!GPSPORTID? Response: <portid> OK Purpose: Return the port ID currently being used <p>Parameters: <port ID> (Port ID to use over TCP/IP)</p> <ul style="list-style-type: none"> • Valid range: 0–65535 <p>Related commands:</p> <ul style="list-style-type: none"> • !GPSSUPLURL (p.121)—Set/return SUPL server URL used for TCP/IP

Table 7-2: GPS command details (Continued)

Command	Description
!GPSPOSMODE	<p>Configure support for GPS positioning modes Enable or disable support for several GPS positioning modes.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSPOSMODE=<mask> Response: OK or ERROR Purpose: Use a single byte hexadecimal format mask to indicate which GPS positioning modes are to be supported. • Query: AT!GPSPOSMODE? Response: MASK: <mask> OK Purpose: Return a <mask> value indicating which GPS positioning modes are currently supported. • Query List: AT!GPSPOSMODE=? Purpose: Return supported <mask> values. <p>Parameters:</p> <p><mask> (Bitmap value representing supported GPS positioning modes)</p> <ul style="list-style-type: none"> • 1-byte hex format mask (do not include '0x' before the mask value) • 'On' bits identify modes that are supported • 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 UE-based (3G) • Bit 6: CP UE-assisted (3G) • Bit 7: Unused <p>Example(s): AT!GPSPOSMODE=2a enables support for Bit 5 (CP UE-based), Bit 3 (CP MS-based), and Bit 1 (UP MS-based)</p>

Table 7-2: GPS command details (Continued)

Command	Description
!GPSSATINFO	<p>Request satellite information</p> <p>Return the following information for up to twelve 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).</p> <p>The information returned is valid regardless of the current fix mode or whether the PDE or the modem performs the fix calculations.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!GPSSATINFO? Response: NO SAT INFO OK or Satellites in view: <numSats> * SV: <SV 1> ELEV:<ELEV 1> AZI:<AZI 1> SNR:<SNR 1> ... * SV: <SV n> ELEV:<ELEV n> AZI:<AZI n> SNR:<SNR n> OK <p>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).</p> <hr/> <p><i>Note: An asterisk (*) at the beginning of a line indicates the satellite was used in the fix location calculation.</i></p> <hr/> <p>Parameters:</p> <p><numSats> (Number of satellites in view)</p> <ul style="list-style-type: none"> • Valid range: 1–12 <p><SV n> (Satellite vehicle number for the nth satellite in the list)</p> <ul style="list-style-type: none"> • Valid range: 1–32 <p><ELEV n> (Satellite elevation relative to modem location, in degrees)</p> <ul style="list-style-type: none"> • Valid range: 0–90 <p><AZI n> (Satellite azimuth relative to modem location, in degrees)</p> <ul style="list-style-type: none"> • Valid range: 0–360 <p><SNR n> (Signal to noise ratio, in dB)</p> <ul style="list-style-type: none"> • Valid range: 0–99

Table 7-2: GPS command details (Continued)

Command	Description
!GPSSTATUS	<p>Request current status of a position fix session Return the current status of a position fix session.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters (Timestamp):</p> <p><year></p> <ul style="list-style-type: none"> • Example: "2007" <p><month></p> <ul style="list-style-type: none"> • 01–12 (Jan–Dec) <p><day></p> <ul style="list-style-type: none"> • 01–31 <p><day of week></p> <ul style="list-style-type: none"> • 0–6 (0=Monday) <p><time of day></p> <ul style="list-style-type: none"> • 24-hour clock format • Example: "13:25:48" <p>Parameters (Status):</p> <p><status> (Session status)</p> <ul style="list-style-type: none"> • "NONE": No session of this type has occurred since the modem powered up. <ul style="list-style-type: none"> • The timestamp is the current time. • "ACTIVE": A session of this type is currently active. <ul style="list-style-type: none"> • The timestamp is the time when the session entered this state. • "SUCCESS": The most recent session of this type succeeded. <ul style="list-style-type: none"> • The timestamp is the time when the previous session completed successfully. • "FAIL": The most recent session of this type failed. <ul style="list-style-type: none"> • 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 132 for a list of error codes. <p>Example(s):</p> <p>AT!GPSSTATUS? returns: 2007 01 06 6 00:25:01 Last Fix Status = SUCCESS 2007 01 06 6 00:25:02 Fix Session Status = ACTIVE</p>

Table 7-2: GPS command details (Continued)

Command	Description
!GPSSUPLURL	<p>Set/report SUPL server URL</p> <p>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.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><suplURL> (SUPL server URL)</p> <ul style="list-style-type: none"> • 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. <p>Example(s):</p> <p>AT!GPSSUPLURL="supl.url.net" AT!GPSSUPLURL="123.123.123.123"</p>

Table 7-2: GPS command details (Continued)

Command	Description
!GPSSUPLVER	<p>Set/report SUPL server version Set or return the version of the SUPL server.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters: <supl ver> (SUPL server version)</p> <ul style="list-style-type: none"> • 1—SUPL version 1 • 2—SUPL version 2

Table 7-2: GPS command details (Continued)

Command	Description
!GPSTRACK	<p>Initiate local tracking (multiple fix) session</p> <p>Initiate a local tracking session comprising a specific number of position fixes taken at regular time intervals.</p> <p>Password required: No Reset required to apply changes: No Persistent across power cycles: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><fixType> (Type of fix to establish)</p> <ul style="list-style-type: none"> • 1=Standalone (not supported by a mobile station) • 2=MS-based only • 3=MS-assisted only <p><maxTime> (Maximum time to wait for satellite information)</p> <ul style="list-style-type: none"> • Valid range: 0–255 seconds <p><maxDist> (Requested accuracy of fix)</p> <ul style="list-style-type: none"> • Entered in decimal format • Valid range: <ul style="list-style-type: none"> • 0–4294967279 meters • 4294967280=No preference <p><fixCount> (Number of position fixes requested)</p> <ul style="list-style-type: none"> • Valid range: 1–1000 (1000—Take a continuous series of position fixes) <p><fixrate> (Amount of time to wait between fix attempts)</p> <ul style="list-style-type: none"> • Valid range: 0–1799999 seconds <p>Failure conditions:</p> <p>The request fails if the tracking session fails to initiate.</p> <p>If the request fails, the message ERROR CODE = <value> is returned. See Table 7-3 on page 132 for a list of error codes.</p> <hr/> <p><i>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.</i></p> <hr/> <p>(Continued on next page)</p>

Table 7-2: GPS command details (Continued)

Command	Description
!GPSTRACK (continued)	<p>Initiate local tracking (multiple fix) session (continued)</p> <p>Example(s): AT!GPSTRACK=1, 15, 10, 20, 60 requests a series of 20 standalone position fixes to 10 meters accuracy—fixes are taken every 60 seconds. One of the following responses will be received:</p> <ul style="list-style-type: none"> • “OK” if the request is successful, or • “ERROR CODE = <value>” if the request fails for any reason. See Table 7-3 on page 132 for a list of error codes. <p>Related commands:</p> <ul style="list-style-type: none"> • !GPSSTATUS—Use this command while the tracking session is in progress. • !GPSLOC—Use this command after the session completes to obtain the result.
!GPSTRANSSEC	<p>Control GPS transport security</p> <p>Enable or disable GPS transport security for SUPL GPS fixes.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSTRANSSEC=<security> Response: OK or ERROR Purpose: Indicate if transport security is used. • Query: AT!GPSTRANSSEC? Response: Transport security: <security> OK Purpose: Return the current <security> setting.

Table 7-2: GPS command details (Continued)

Command	Description
!GPSXTRAAPN	<p>Set GPS XTRA APNs Set the GPS XTRA APNs to be used for various RATs (Radio Access Technologies).</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution (Add): <code>AT!GPSXTRAAPN=<operation>,<ratmask>,<IType>,<APN></code> Execution (Delete one): <code>AT!GPSXTRAAPN=<operation>,<ratmask></code> Execution (Delete all): <code>AT!GPSXTRAAPN=<operation></code> 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!GPSXTRAAPN? Response: <operation>, <ratmask>, <IType>, <APN> <operation>, <ratmask>, <IType>, <APN> ... OK or OK (if no ID has been set) Purpose: Display the APNs currently assigned for each RAT. • Query List: AT!GPSXTRAAPN=? Purpose: Display valid parameter options. <p>Parameters:</p> <p><operation> (Add or delete APNs)</p> <ul style="list-style-type: none"> • 1=Add an APN for a specific <ratmask> and <IType> Note: All parameters are required. <hr/> <p><i>Note: To change an APN that has been set for a RAT, you must first delete the current APN, then add the new APN.</i></p> <hr/> <ul style="list-style-type: none"> • 2=Delete the APN for a specific <ratmask> Note: Only <ratmask> is required. • 3=Delete all APNs Note: No other parameters are required. <p><ratmask> (Radio access technology)</p> <ul style="list-style-type: none"> • Valid values (hexadecimal format): <ul style="list-style-type: none"> • 01=CDMA • 02=HDR • 04=GSM • 08=WCDMA • 10=LTE <p>(Continued on next page)</p>

Table 7-2: GPS command details (Continued)

Command	Description
!GPSXTRAAPN (continued)	Set GPS XTRA APNs (continued) <IPtype> (Internet Protocol version) <ul style="list-style-type: none">• Character string, entered without quotation marks• Valid values:<ul style="list-style-type: none">• IPV4• IPV6• IPV4V6 <APN> (Access Point Name) <ul style="list-style-type: none">• Character string, entered with quotation marks• Examples: "mycompany.mnc987.mcc123.gprs", "ourinternet"

Table 7-2: GPS command details (Continued)

Command	Description
!GPSXTRADATAENABLE	<p>Set/report GPS XTRA settings</p> <p>Enable or disable gpsOneXTRA data and set or report gpsOneXTRA data configuration settings.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSXTRADATAENABLE=<enable>,<retries>,<retryInt>,<dload>,<dloadInt>,<validityTime>]]] Response: OK or ERROR Purpose: Enable or disable gpsOneXTRA data. You can set the retry parameters only if <enable> = 2, and you can set the download parameters only if the retry parameters are set. • 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> XTRA Data Validity Time: <validityTime> Purpose: Return the current GPS XTRA data settings. • Query List: AT!GPSXTRADATAENABLE=? Purpose: Display the command format and valid parameter options. <p>Parameters:</p> <p><enable> (Enable or disable gpsOneXTRA data information)</p> <ul style="list-style-type: none"> • 0=Disable. To fully disable gpsOneXTRA, you must also call !GPSXTRATIMEENABLE=0 to disable gpsOneXTRA time functionality. • 1=Reserved • 2=Enable <p><retries> (Number of download retries)</p> <ul style="list-style-type: none"> • Valid range: 0–10 <p><retryInt> (Interval between download retries, in minutes)</p> <ul style="list-style-type: none"> • Valid range: 1–120 <p><dload> (Enable or disable automatic downloads)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable <p><dloadInt> (Interval between automatic downloads, in hours)</p> <ul style="list-style-type: none"> • Valid range: 24–168 • Note: If <dload> is 0 (disable), a value must still be entered for the interval (although it will not be used) <p><validityTime> (Length of time that XTRA data is considered to be valid, in hours)</p> <ul style="list-style-type: none"> • Valid range: 1–168

Table 7-2: GPS command details (Continued)

Command	Description
!GPSXTRADATAURL	<p>Set/report GPS XTRA data server URLs Set or report the URLs of up to three GPS XTRA data servers.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSXTRADATAURL=<urlIndex>,<url> Response: OK or ERROR • Purpose: Set the URL used for 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: Return the URLs of the primary, secondary, and tertiary data servers. <p>Parameters:</p> <p><urlIndex> (Server index)</p> <ul style="list-style-type: none"> • 1=Primary server • 2=Secondary server • 3=Tertiary server <p><url> (Server URL)</p> <ul style="list-style-type: none"> • URL string includes quotes • Example: "http://xtra1.gpsoneextra.net/xtra.bin" • URL must be complete, including the "http://" • Maximum string length: 128 characters
!GPSXTRAINITDNL	<p>Initiate gpsOneXTRA data download and inject operation Initiate a gpsOneXTRA data download and inject operation using the data server specified in the !GPSXTRADATAURL command.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSXTRAINITDNL Response: Xtra command sent successfully OK or Error code = <err> OK • Purpose: Initiate the download and inject operation. If the command fails, it returns "Error code = <err>". <p>Parameters:</p> <p><err> (Error code returned if command fails)</p> <ul style="list-style-type: none"> • 3=Bad CRC for XTRA data file • 4=Old XTRA data file • 7=GPS subsystem busy • 8=GPS time reference entered is invalid • 9=Unknown error

Table 7-2: GPS command details (Continued)

Command	Description
!GPSXTRASTATUS	<p>Return current status of gpsOneXTRA</p> <p>Return the status of the most recent time and data injection operations.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • 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. <p>Parameters:</p> <p><timeStatus></p> <ul style="list-style-type: none"> • Returned string does not include quotes (they are used in this description for clarity). • “Unknown”: Default value if time injection operation has not been performed yet, or if operation was incomplete • “Valid”: GPS time injection succeeded • “Invalid”: GPS time injection failed <p><dataStatus></p> <ul style="list-style-type: none"> • Returned string does not include quotes (they are used in this description for clarity). • “Unknown”: Default value if data injection operation has not been performed yet, or if 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” • “error reading xtra.bin file” • “bad TOA in xtra.bin file”: The XTRA data retrieved from the XTRA server is too old (exceeds the Time Of Applicability). <p><timeStamp> (GPS time stamp)</p> <ul style="list-style-type: none"> • 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: GPS command details (Continued)

Command	Description
!GPSXTRATIME	<p>Inject GPS or UTC time into gpsOneXTRA system Inject the GPS or UTC time into the gpsOneXTRA system.</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSXTRATIME=<YYYY>, <MM>, <DD>, <hh>, <mm>, <ss>, <utc>, <force>, <uncrtn> Response: Xtra command sent successfully OK or Error code = <err> OK Purpose: Inject the specified date and time into the gpsOneXTRA system. If the command fails, it returns "Error code = <err>". • Query List: AT!GPSXTRATIME=? Purpose: Return supported parameter values. <p>Parameters:</p> <p><YYYY> (Year)</p> <ul style="list-style-type: none"> • 4 digits required <p><MM> (Month)</p> <ul style="list-style-type: none"> • Valid range: 1–12 <p><DD> (Day)</p> <ul style="list-style-type: none"> • Valid range: 1–31 <p><hh> (Hour)</p> <ul style="list-style-type: none"> • Valid range: 0-23 <p><mm> (Minute)</p> <ul style="list-style-type: none"> • Valid range: 0–59 <p><ss> (Second)</p> <ul style="list-style-type: none"> • Valid range: 0–59 <p><utc> (Flag indicating time type)</p> <ul style="list-style-type: none"> • 0=GPS time • 1=UTC time <p><force> (Force or allow GPS subsystem to decide to accept the time entered)</p> <ul style="list-style-type: none"> • 0=Do not force acceptance • 1=Force acceptance <p><err> (Error code returned if command fails)</p> <ul style="list-style-type: none"> • 3=Bad CRC for XTRA data file • 4=Old XTRA data file • 7=GPS subsystem busy • 8=GPS time reference entered is invalid • 9=Unknown error

Table 7-2: GPS command details (Continued)

Command	Description
!GPSXTRATIMEENABLE	<p>Set/report GPS XTRA time settings</p> <p>Enable or disable gpsOneXTRA time information, and set or report specific gpsOneXTRA time settings.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSXTRATIMEENABLE=<enable> [<thresh>, <delay>] Response: OK or ERROR Purpose: Enable or disable time information. If enabled, sets the uncertainty threshold and delay time to retry with a backup server. • Query: AT!GPSXTRATIMEENABLE? Response: XTRA Time Info Enabled: <enable> XTRA Time Uncertainty Threshold: <thresh> XTRA Time Delay Threshold: <delay> Purpose: Return the current values of GPS XTRA time parameters. • Query List: AT!GPSXTRATIMEENABLE=? Purpose: Return supported execution parameter values. <p>Parameters:</p> <p><enable> (Enable or disable gpsOneXTRA time information)</p> <ul style="list-style-type: none"> • 0=Disable. To fully disable gpsOneXTRA, you must also call !GPSXTRADATAENABLE=0 to disable gpsOneXTRA data information. • 1=Reserved • 2=Enable <p><thresh> (XTRA time uncertainty threshold, in ms)</p> <ul style="list-style-type: none"> • Valid range: 100–30000 <p><delay> (Time to delay before retrying with backup server, in ms)</p> <ul style="list-style-type: none"> • Valid range: 100–10000

Table 7-2: GPS command details (Continued)

Command	Description
!GPSXTRATIMEURL	<p>Set/report GPS XTRA SNTP server URLs</p> <p>Set or report the URLs of up to three GPS XTRA SNTP (Simple Network Time Protocol) servers.</p> <p>Password required: Yes Reset required to apply changes: Yes Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!GPSXTRATIMEURL=<urlIndex>,<url> Response: OK or ERROR Purpose: Set the URL used for the primary, secondary, or tertiary data server. • Query: AT!GPSXTRATIMEURL? Response: XTRA SNTP Primary Server: <url 1> XTRA SNTP Secondary Server: <url 2> XTRA SNTP Tertiary Server: <url 3> Purpose: Return the URLs of the primary, secondary, and tertiary SNTP servers. <p>Parameters:</p> <p><urlIndex> (Server index)</p> <ul style="list-style-type: none"> • 1=Primary server • 2=Secondary server • 3=Tertiary server <p><url> (Server URL)</p> <ul style="list-style-type: none"> • URL string includes quotes • Example: "xtra1.gpsoneextra.net" • Maximum string length=128 characters

Error codes

Table 7-3 describes error codes that can be returned by **!GPSEND** (page 105), **!GPSSTATUS** (page 120), and **!GPSTRACK** (page 123).

Table 7-4 on page 134 describes error codes that can be returned by **!GPSFIX** (page 106)

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

Error code	Description
0	Phone is offline
1	No service
2	No connection with PDE (Position Determining Entity)
3	No data available
4	Session Manager is busy
5	Reserved

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

Error code	Description
6	Phone is GPS-locked
7	Connection failure with PDE
8	Session ended because of error condition
9	User ended the session
10	End key pressed from UI
11	Network session was ended
12	Timeout (for GPS search)
13	Conflicting request for session and level of privacy
14	Could not connect to the network
15	Error in fix
16	Reject from PDE
17	GPS is disabled
18	Ending session due to E911 call
19	Server error
20	Reserved
21	Reserved
22	Unknown system error
23	Unsupported service
24	Subscription violation
25	Desired fix method failed
26	Reserved
27	No fix reported because no Tx confirmation was received
28	Network indicated normal end of session
29	No error specified by the network
30	No resources left on the network
31	Position server not available
32	Network reported an unsupported version of protocol

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](#)
- [Command summary](#)
- [Command reference](#)

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
+CPINR	Display remaining number of SIM unlock retries	136
!ICCID	Return (U)SIM card's ICCID	137

Command reference

Table 8-2: SIM command details

Command	Description
+CPINR	<p>Display remaining number of SIM unlock retries</p> <p>Display the number of remaining SIM unlock retries.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT+CPINR=<CPIN TYPE> Response: +CPINR: <CPIN TYPE>,<remaining> OK • Purpose: Display the number of remaining retries for the specified PIN/PUK type. • Execution: AT+CPINR Response: +CPINR: SIM PIN,<remaining> +CPINR: SIM PUK,<remaining> +CPINR: SIM PIN2,<remaining> +CPINR: SIM PUK2,<remaining> +CPINR: PH-FSIM PIN,<remaining> +CPINR: PH-NET PIN,<remaining> +CPINR: PH-NETSUB PIN,<remaining> +CPINR: PH-SP PIN,<remaining> +CPINR: PH-CORP PIN,<remaining> +CPINR: PH-FSIM PUK,<remaining> +CPINR: PH-NET PUK,<remaining> +CPINR: PH-NETSUB PUK,<remaining> +CPINR: PH-SP PUK,<remaining> +CPINR: PH-CORP PUK,<remaining> OK • Purpose: Display the number of remaining retries for all PIN/PUK types. <p>Parameters:</p> <p><CPIN TYPE> (PIN/PUK type):</p> <ul style="list-style-type: none"> • ASCII string enclosed within quotes. <p>(Continued on next page)</p>

Table 8-2: SIM command details (Continued)

Command	Description
+CPINR (continued)	<p>Display remaining number of SIM unlock retries (continued)</p> <ul style="list-style-type: none"> • Valid values: (Note: If there are any errors in this list, use AT+CPINR to display the full list of available types.) <ul style="list-style-type: none"> • “SIM PIN” • “SIM PUK” • “SIM PIN2” • “SIM PUK2” • “PH-FSIM PIN” • “PH-NET PIN” • “PH-NETSUB PIN” • “PH-SP PIN” • “PH-CORP PIN” • “PH-FSIM PUK” • “PH-NET PUK” • “PH-NETSUB PUK” • “PH-SP PUK” • “PH-CORP PUK” <p><remaining> (Number of retries remaining for specified PIN/PUK type)</p> <ul style="list-style-type: none"> • 0–255 (maximum value is type-dependent)
!ICCID	<p>Return (U)SIM card’s ICCID</p> <p>Return a (U)SIM’s ICCID (Integrated Circuit Card ID).</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Query: AT!ICCID? Response: !ICCID: <iccid> OK Purpose: Display the ICCID. <p>Parameters:</p> <p><iccid> (ICCID of the (U)SIM currently being tested):</p> <ul style="list-style-type: none"> • 20 digit decimal number—This number is often printed on the (U)SIM card.

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
!HOSTDEVINFO	Configure host device details	140
!IDSAUTOFOTA	Configure automatic settings for FOTA updates	141
!IDSAUTOSDM	Configure Subscriber Device Management response to server request	142
!IDSCONFIGACC	Configure DM account authentication mode and XML format	143
!IDSCREATEACC	Enter DM account credentials	144
!IDSDFLTACC	Set DM account to use for device-initiated sessions	145
!IDSPID	Set profile ID for DM data connection types	145
!IDSROAM	Configure DM client roaming support	146
!IDSSUPPORT	Configure DM sessions	147
!IMSTESTMODE	Enable/disable IMS test mode	148
!OSINFO	Configure host device operating system information	149

Command reference

Table 9-2: OMA-DM command details

Command	Description
!HOSTDEVINFO	<p>Configure host device details</p> <p>Configure the host device details that will be reported by OMA DM for AT&T devices, to comply with AT&T <CDR-DVM-4532> requirement.</p> <p>To configure host device operating system information, see !OSINFO on page 149.</p> <hr/> <p><i>Note: In the Execution format, if a parameter is not entered then the value on the device does not change.</i></p> <hr/> <p>Password required: Yes (Execution format only)</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!HOSTDEVINFO="<hostman>","<hostmod>","<hostswv>","<hostplasmaid>"]] <p>Response: OK or ERROR</p> <p>Purpose: Set some or all host device detail parameters.</p> • Query: AT!HOSTDEVINFO? <p>Response: HostMan: <hostman> HostMod: <hostmod> HostSwV: <hostswv> HostPlasmaID: <hostplasmaid> OK</p> <p>Purpose: Display current host device details.</p> • Query List: AT!HOSTDEVINFO=? <p>Purpose: Display the execution command format and parameter values.</p> <p>Parameters:</p> <p><hostman> (Host device manufacturer's name)</p> <ul style="list-style-type: none"> • 256 characters maximum <p><hostmod> (Host device model name)</p> <ul style="list-style-type: none"> • 256 characters maximum <p><hostswv> (Host software version)</p> <ul style="list-style-type: none"> • 256 characters maximum <p><hostplasmaid> (Host Plasma ID)</p> <ul style="list-style-type: none"> • 256 characters maximum <p>Example(s):</p> <ul style="list-style-type: none"> • AT!HOSTDEVINFO="Manufacturer",,"1.0", This sets the <hostman> and <hostswv> values. The values for <hostmod> and <hostplasmaid> do not change. • AT!HOSTDEVINFO="Manufacturer" This sets the <hostman> value. The values for all other parameters do not change.

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

Command	Description
!IDSAUTOFOTA	<p>Configure automatic settings for FOTA updates</p> <p>Configure the automatic download, automatic update, and automatic check flags for over-the-air firmware updates:</p> <ul style="list-style-type: none"> • Automatic check—If enabled, the device initiates a FOTA session on every startup to check if the server has a firmware update available. • Automatic download/Automatic upload—If enabled, the device does not request user permission before proceeding with the download or update. <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIIDSAUTOFOTA=<autodownload>, <autoupdate>, <autocheck> Response: OK or ERROR Purpose: Set 'automatic' options. • Query: ATIIDSAUTOFOTA? Response: !IDSAUTOFOTA:<autodownload>, <autoupdate>, <autocheck> OK Purpose: Display current 'automatic' options. • Query List: ATIIDSAUTOFOTA=? Purpose: Display the execution command format and parameter values. <p>Parameters:</p> <p><autodownload> (Check for user permission before downloading firmware update)</p> <ul style="list-style-type: none"> • 0=Permission required • 1=Permission not required <p><autoupdate> (Check for user permission before updating firmware)</p> <ul style="list-style-type: none"> • 0=Permission required • 1=Permission not required. Auto update when download finishes. • 2=Auto update only on power up. • Note: The device will reboot when the update completes. <p><autocheck> (Check for firmware update on startup)</p> <ul style="list-style-type: none"> • 0=Disabled. Do not check for firmware updates on startup. • 1=Enabled. Check for firmware updates on startup.

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

Command	Description
!IDSAUTOSDM	<p>Configure Subscriber Device Management response to server request</p> <p>Configure the Subscriber Device Management (SDM) response to DM server requests. DM requests can be always accepted, always rejected, or presented to the host (user) application for a decision.</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!IDSAUTOSDM=<autosdm> Response: OK or ERROR Purpose: Set the response behavior. • Query: AT!IDSAUTOSDM? Response: !IDSAUTOSDM:<autosdm> OK Purpose: Display the current response behavior setting. • Query List: AT!IDSAUTOSDM=? Purpose: Display the execution command format and parameter values. <p>Parameters:</p> <p><autosdm> (How to proceed with DM session)</p> <ul style="list-style-type: none"> • 0=Permission required from host application before proceeding with session. (The user must choose whether to accept or reject requests as appropriate.) • 1=Always accept (proceed with) the DM session. Do not notify the host application. (Choose this behavior for standalone devices that do not present a GUI.) • 2=Always reject (do not proceed with) the DM session. Do not notify the host application.

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

Command	Description
!IDSCONFIGACC	<p>Configure DM account authentication mode and XML format Configure the preferred authentication mode and XML format for a DM account. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!IDSCONFIGACC=<AccountIndex>, <authentication>, <xml_mode> Response: OK or ERROR • Purpose: Set the authentication mode and XML format for a specific DM account. • Query: AT!IDSCONFIGACC? Response: !IDSCONFIGACC:<AccountIndex>, <authentication>, <xml_mode> OK • Purpose: Show the authentication mode and XML format for a specific DM account. • Query List: AT!IDSCONFIGACC=? Purpose: Display the execution command format and parameter values. <p>Parameters:</p> <p><AccountIndex> (DM account number)</p> <ul style="list-style-type: none"> • Valid values: 1–2 <p><authentication> (Account authentication mode)</p> <ul style="list-style-type: none"> • Valid values <ul style="list-style-type: none"> • “NONE”—No authentication • “BASIC”—Basic authentication • “DIGEST”—MD5 authentication • “HMAC”—HMAC authentication <p><xml_mode> (XML format)</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • “XML”—XML format • “WBXML”—WBXML format

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

Command	Description
!IDSCREATEACC	<p>Enter DM account credentials</p> <p>Enter the credentials for a DM account. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIIDSCREATEACC=<AccountIndex>, <ServerAddress>, <ServerID>, <ServerPassword>, <ClientUsername>, <ClientPassword> Response: OK or ERROR • Purpose: Set the account credentials for a specific DM account. • Query: ATIIDSCREATEACC? Response: !IDSCREATEACC:<AccountIndex>, <ServerAddress>, <ServerID>, <ServerPassword>, <ClientUsername>, <ClientPassword> OK • Purpose: Show the account credentials for a specific DM account. • Query List: ATIIDSCREATEACC=? Purpose: Display the execution command format. <p>Parameters:</p> <p><AccountIndex> (DM account number)</p> <ul style="list-style-type: none"> • Valid values: 1–2 <p><ServerAddress> (URL of DM server)</p> <ul style="list-style-type: none"> • Maximum length—121 characters • This parameter configures the following DM tree node: <ul style="list-style-type: none"> • ./DMAcc/AppAddr/1/Addr <p><ServerID> (DM Server ID and Username)</p> <ul style="list-style-type: none"> • Maximum length—32 characters • This parameter configures the following DM tree nodes: <ul style="list-style-type: none"> • ./DMAcc/ServerID • ./DMAcc/AppAuth/Server/AAuthName <p><ServerPassword> (DM Server Password)</p> <ul style="list-style-type: none"> • Maximum length—32 characters • This parameter configures the following DM tree node: <ul style="list-style-type: none"> • ./DMAcc/AppAuth/Server/AAuthSecret <p><ClientUsername> (DM Client Username)</p> <ul style="list-style-type: none"> • Maximum length—32 characters • This parameter configures the following DM tree node: <ul style="list-style-type: none"> • ./DMAcc/AppAuth/Client/AAuthName <p><ClientPassword> (DM Client Password)</p> <ul style="list-style-type: none"> • Maximum length—32 characters • This parameter configures the following DM tree node: <ul style="list-style-type: none"> • ./DMAcc/AppAuth/Client/AAuthSecret

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

Command	Description
!IDSDFLTACC	<p>Set DM account to use for device-initiated sessions Indicate which DM account to use for device-initiated sessions. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!IDSDFLTACC=<AccountIndex> Response: OK or ERROR Purpose: Indicate the DM account to use for device-initiated sessions. • Query: AT!IDSDFLTACC? Response: !IDSDFLTACC:<AccountIndex> OK Purpose: Show which DM account is currently used for device-initiated sessions. • Query List: AT!IDSDFLTACC=? Purpose: Display the execution command format and parameter values. <p>Parameters: <AccountIndex> (DM account number)</p> <ul style="list-style-type: none"> • Valid values: 1–2
!IDSPID	<p>Set profile ID for DM data connection types Set the connection profile ID that OMA-DM will use for its data connection. Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!IDSPID=<lte_profile>,<3GPP_legacy_profile>,<eHRPD profile> Response: OK or ERROR Purpose: Set the profile ID for each data connection type. • Query: AT!IDSPID? Response: !IDSPID:<lte_profile>,<3GPP_legacy_profile>,<eHRPD profile> OK Purpose: Show the current profile IDs used for each data connection type. • Query List: AT!IDSPID=? Purpose: Display the execution command format and parameter values. <p>Parameters:</p> <p><lte_profile> (Profile ID to use for LTE data connections)</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • 0=Use connected or default profile ID. (Default) • 1–16=Profile ID <p><3GPP_legacy_profile> (Profile ID to use for non-LTE 3GPP data connections)</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • 0=Use connected or default profile ID. (Default) • 1–16=Profile ID <p><eHRPD profile> (Profile ID to use for eHRPD data connections)</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • 0=Use connected or default profile ID. (Default) • 101–150=Profile ID

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

Command	Description
!IDSROAM	<p>Configure DM client roaming support Configure the OMA DM client roaming option. Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIIDSROAM=<enable> Response: OK or ERROR Purpose: Enable/disable DM roaming support. • Query: ATIIDSROAM? Response: !IDSROAM:<enable> OK Purpose: Show current DM roaming support state. • Query List: ATIIDSROAM=? Purpose: Display the execution command format and parameter values. <p>Parameters: <enable> (Roaming support state)</p> <ul style="list-style-type: none"> • Valid values: <ul style="list-style-type: none"> • 0=Disabled. The DM client will not attempt to connect to a DM server when roaming. • 1=Enabled. (Default) The DM client will attempt to connect to a DM server when roaming.

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

Command	Description
!IDSSUPPORT	<p>Configure DM sessions Enable/disable client-initiated and network-initiated DM device configuration and FOTA sessions. Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIIDSSUPPORT=<CI Config session>, <NI Config session>, <CI FOTA session>, <NI FOTA session> Response: OK or ERROR Purpose: Enable/disable device configuration sessions and FOTA sessions. • Query: ATIIDSSUPPORT? Response: !IDSSUPPORT:<CI Config session>, <NI Config session>, <CI FOTA session>,<NI FOTA session> OK Purpose: Show current state of device configuration sessions and FOTA sessions. • Query List: ATIIDSSUPPORTI=? Purpose: Display the execution command format and allowed parameter values. <p>Parameters:</p> <p><CI Config session> (Client-initiated DM configuration session state)</p> <ul style="list-style-type: none"> • 0=Disabled (Default) • 1=Enabled <p><NI Config session> (Network-initiated DM configuration session state)</p> <ul style="list-style-type: none"> • 0=Disabled (Default) • 1=Enabled <p><CI FOTA session> (Client-initiated DM FOTA session state)</p> <ul style="list-style-type: none"> • 0=Disabled (Default) • 1=Enabled <p><NI Config session> (Network-initiated DM FOTA session state)</p> <ul style="list-style-type: none"> • 0=Disabled (Default) • 1=Enabled

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

Command	Description
!IMSTESTMODE	<p>Enable/disable IMS test mode</p> <p>Enable/disable IMS (IP Multimedia Subsystem) test mode.</p> <p>If IMS test mode is enabled:</p> <ul style="list-style-type: none"> • IMS registration attempts will not occur • SMS over IMS is not supported <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIIMSTESTMODE=<mode> Response: OK Purpose: Enable/disable IMS test mode. • Query: ATIIMSTESTMODE? Response: IMS Test Mode Enabled or IMS Test Mode Disabled Purpose: Return the current state of IMS Test Mode. <p>Parameters:</p> <p><mode> (IMS Test Mode state)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable

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

Command	Description
!OSINFO	<p>Configure host device operating system information</p> <p>Configure the host device operating system name and version that will be reported by OMA DM for AT&T devices, to comply with AT&T <CDR-DVM-4533> requirement. To configure host device details, see !HOSTDEVINFO on page 140.</p> <hr/> <p><i>Note: In the Execution format, if a parameter is not entered then the value on the device does not change.</i></p> <hr/> <p>Password required: Yes (Execution format only)</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!OSINFO="<osname>["<osversion>"] Response: OK or ERROR Purpose: Set host device operating system information parameters. • Query: AT!OSINFO? Response: OSName: <osname> OSVersion: <osversion> OK Purpose: Display current host device operating system information. • Query List: AT!OSINFO=? Purpose: Display the execution command format and parameter values. <p>Parameters:</p> <p><osname> (Host device operating system name)</p> <ul style="list-style-type: none"> • 256 characters maximum <p><osversion> (Host device operating system version)</p> <ul style="list-style-type: none"> • 256 characters maximum <p>Example(s):</p> <ul style="list-style-type: none"> • AT!OSINFO="An OS Name","1.0" This sets both parameters. • AT!OSINFO=,"1.0" This sets the <osversion> value. The value for the <osname> does not change.

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	152
!SARINTGPIO MODE	Set/report default pull mode for SAR interrupt GPIOs	153

Command reference

Table 10-2: Thermal mitigation command details

Command	Description
!MAXPWR	<p>Set/report maximum Tx power Set or report the maximum Tx power for a specific band.</p> <hr/> <p>Caution: <i>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.</i></p> <hr/> <p><i>Note: Increasing the Tx power affects the module's current consumption and thermal performance.</i></p> <hr/> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution (WCDMA/LTE): AT!MAXPWR=<band>,<tech>,<max_tx_pwr> Response: OK Purpose: Set the maximum Tx power for the specified band/technology combination. Execution (CDMA): AT!MAXPWR=<band>,<tech>,<temperature_bin>,<max_tx_pwr> Response: OK Purpose: Set the maximum Tx power for the specified band/technology/temperature bin 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. <p>Parameters:</p> <p><band> (RF band)</p> <ul style="list-style-type: none"> 3GPP band number. For a full listing of 3GPP band numbers, see Table 13-2 on page 196. Band support is product specific—see the device's Product Specification or Product Technical Specification document for details. Valid range: 0–71 <p>(Continued on next page)</p>

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

Command	Description
!MAXPWR (continued)	<p>Set/report maximum Tx power (continued)</p> <p><tech> (Network technology)</p> <ul style="list-style-type: none"> • 0=WCDMA • 1=CDMA • 2=LTE <p><maxpwr> (Maximum Tx power in dB)</p> <ul style="list-style-type: none"> • Valid range: 20.0–24.5
!SARINTGPIOMODE	<p>Set/report default pull mode for SAR interrupt GPIOs</p> <p>Set or report the default pull mode (high/low) for SAR interrupt GPIOs. This setting applies to all SAR interrupt GPIOs.</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATISARINTGPIOMODE=<mode> Response: OK Purpose: Set the default pull mode for all SAR interrupt GPIOs. • Query: ATISARINTGPIOMODE? Response: <mode> OK Purpose: Indicate the default pull mode. • Query list: ATISARINTGPIOMODE=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><mode> (SAR GPIO interrupt pull mode default setting)</p> <ul style="list-style-type: none"> • 0=Standard mode—Default pull is HIGH/DAL_GPIO_PULL_UP • 1=Inverse mode—Default pull is LOW/DAL_GPIO_PULL_DOWN

11: Audio Commands

Introduction

This chapter describes commands used to configure and manage audio-capable devices, including:

- MC7304
- MC7330
- MC7350
- MC7354
- MC7354B

Note: To enable audio on an audio-capable device, use the "ISVOICEN" customization for AT!CUSTOM (see [page 32](#) for details).

Command summary

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

Table 11-1: Audio commands

Command	Description	Page
!AVAUDIO	Play/record audio file (.wav format)	157
!AVAUDIOLPBK	Start/stop audio loopback	158
!AVCFG	Bind audio profile to device/physical interface	159
!AVDEF	Reset configurable audio parameters to default settings	160
!AVEC	Enable/disable Echo Cancellation mode for audio profile	161
!AVFLTREN	Enable/disable Tx/Rx FIR/IIR functions	162
!AVMUTE	Mute/unmute earpiece/microphone/call waiting tone	163
!AVNS	Enable/disable Noise Suppression mode for audio profile	164
!AVRXAGC	Enable/disable Rx AGC	164
!AVRXAVC	Enable/disable Rx AVC	165
!AVRXG	Query/set audio profile's decoder gain select setting	166
!AVSETPROFILE	Select/configure audio profile for CS call	167
!AVSETVOL	Query/set audio profile's Rx volume level	168
!AVSTG	Query/set/enable/disable audio profile's audio front end sidetone gain	169
!AVTONEPLAY	Play a tone	170
!AVTXAGC	Enable/disable Tx AGC	171
!AVTXG	Query/set audio profile's encoder gain select setting	172

Table 11-1: Audio commands (Continued)

Command	Description	Page
!AVTXVOL	Query/set audio profile's Tx volume gain	173
+CMEP	Preview SMS message	174
*CNTI	Display current, available, or supported network types (technologies)	175
!MADC	Display ADC values	176
!MLDTMFEN	Enable/disable local DTMF	176
+PRLVER	Display current PRL version	177
+VTD	Set DTMF tone duration	177
+VTS	Send DTMF tone	178
+VTSBST	Send burst DTMF tone (CDMA only)	179
+WANTGNSSPWR	Enable/disable GNSS antenna power	180
+WANTS	Perform GNSS antenna diagnostic check	180
+WFSH	Send flash to base station to initiate call holding or three-way calling	181
+WIOR	Read GPIO value	182
+WIOW	Write GPIO value	182
+WSOS	Enter/exit emergency mode	183

Command reference

Table 11-2: Audio command details

Command	Description
!AVAAUDIO Min f/w rev: <ul style="list-style-type: none"> 06.xx.xx.xx or higher <hr/> <i>Note: Audio-capable devices only.</i>	<p>Play/record audio file (.wav format)</p> <p>Play an audio file (locally or for both sides of a voice call), or record to an audio file (from the microphone only, or both sides of a voice call).</p> <p>Each <operation> type is started and stopped independently. For example, to simultaneously play a file for both ends of a voice call and record that call to another file:</p> <ol style="list-style-type: none"> Start recording to a file and start playing an existing audio file for both ends of the call: ATI!AVAAUDIO=4,1,"/usr/recording1.wav" ATI!AVAAUDIO=3,1,"/data/outgoing1.wav" When ready to stop playing the outgoing file and recording the call: ATI!AVAAUDIO=3,0 ATI!AVAAUDIO=4,0 <hr/> <p><i>Note: Only .wav format audio files are supported.</i></p> <hr/> <p>Supporting devices: MC Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: ATI!AVAAUDIO=<operation>, <switch>[, <file_path>] Response: OK Purpose: Start or stop the playback or recording of an audio file. Note: <file_path> is required when <switch> = 1, and optional when <switch> = 0. Query List: ATI!AVAAUDIO=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><operation> (Play or record)</p> <ul style="list-style-type: none"> 1=Audio play. Play the specified .wav file (<filepath>) locally. If a voice call is in progress, the file is not played for the far end of the call. 2=Audio record. Record the local microphone input to the specified .wav file (<filepath>). If a voice call is in progress, the far end of the call is not recorded. 3=WWAN play. Play the specified .wav file (<filepath>) for both ends of a voice call. 4=WWAN record. Record both ends of a voice call to the specified .wav file (<filepath>). <p><switch> (Stop or start playing/recording)</p> <ul style="list-style-type: none"> 0=Stop 1=Start <p><filepath> (Absolute pathname of file to play/record)</p> <ul style="list-style-type: none"> ASCII string Example: /usr/avfile.wav Note: Relative pathnames are not supported. Required when <switch> = 1 (starting to play or record a file), and optional when <switch> = 0.

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVALAUDIOLPBK</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Start/stop audio loopback</p> <p>Set up (start/stop) an audio loopback at some point in the audio chain.</p> <p>Supporting devices: MC</p> <p>Password required: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVALAUDIOLPBK=<enable> Response: OK Purpose: Start or stop an audio loopback. • Query List: AT!AVALAUDIOLPBK=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><enable> (Start/stop an audio loopback)</p> <ul style="list-style-type: none"> • 0=Stop the loopback • 1=Enable a vocoder loopback • 4=N/A (Execution will return 'OK', but no action is taken.)

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVCFG</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Bind audio profile to device/physical interface</p> <p>Bind an audio profile to a specific ACDB (Audio Calibration Database) device/physical interface combination and, depending on the interface that is chosen, configure the physical interface.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATI!AVCFG=<profile>,<device>,<interface>[,<param1>[,...<paramN>]] Response: OK Purpose: Bind the specified <profile> to a <device>/<interface> combination. If applicable, specify required parameters. • Query: ATI!AVCFG? Response: !AVCFG: <profile0>,<device>,<interface> [<param1> [...<paramN>]] ... <profile5>,<device>,<interface>[<param1>[,...<paramN>]] Purpose: Show current bindings for all audio profiles. • Query List: ATI!AVCFG=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><device> (ACDB device type)</p> <ul style="list-style-type: none"> • 0=Vehicle hands-free device • 1=Handset • 2=TTY device • 3=USB device <p><interface> (Physical interface type)</p> <ul style="list-style-type: none"> • 0=PCM (Use <param> options to configure the interface.) • 1=I2S (No <param> required.) • 2=Analog (No <param> required.) • 3=USB (No <param> required.) <p>(Continued on next page)</p>

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVCFG (continued)</p>	<p>Bind audio profile to device/physical interface (continued)</p> <p><param> (Interface configuration parameters)</p> <ul style="list-style-type: none"> • For <interface>=0 (PCM): <ul style="list-style-type: none"> • <param1> (Mode) <ul style="list-style-type: none"> • 0=Slave • 1=Master • 2=Auxiliary PCM • <param2> (Rate) <ul style="list-style-type: none"> • 0=8K • 1=16K • <param3> (Format) <ul style="list-style-type: none"> • 0=Linear • 1=μ-law • 2=A-law • <param4> (Padding) <ul style="list-style-type: none"> • 0=Disable • 1=Enable • <param5> (Bits per frame (bpf)) <ul style="list-style-type: none"> • 0=8 bpf • 1=16 bpf • 2=32 bpf • 3=64 bpf • 4=128 bpf • 5=256 bpf <p>Example(s):</p> <ul style="list-style-type: none"> • AT!AVCFG=1,1,0,1 (Bind profile 1 to the handset device via PCM, and set PCM as master mode.)
<p>!AVDEF</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Reset configurable audio parameters to default settings</p> <p>Reset all of the configurable audio parameters that are stored in non-volatile (NV) memory to default values.</p> <hr/> <p><i>Note: Some values that affect ACDB (Audio Calibration Database) devices are stored in NV, and some are stored on the device. Values that are stored on the device are not affected by this command.</i></p> <hr/> <p>Supporting devices: MC Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVDEF Response: OK Purpose: Reset parameters to default values. <p>Parameters: None</p>

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVEC Min f/w rev: • 06.xx.xx.xx or higher</p> <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Enable/disable Echo Cancellation mode for audio profile Enable or disable Echo Cancellation (EC) mode for a specific audio profile.</p> <p>Supporting devices: MC Password required: No Reset required to apply changes: No Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATIAVEC=<profile>,<value> Response: OK Purpose: Enable or disable EC mode for the selected profile. • Query: ATIAVEC?<profile> Response: !AVEC: <value> Purpose: Show the current EC mode state (enabled/disabled) for the selected profile. • Query List: ATIAVEC=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><value> (EC mode state)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVFLTREN</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Enable/disable Tx/Rx FIR/IIR functions</p> <p>Enable or disable the Tx or Rx FIR (Finite Impulse Response) filter or IIR (Infinite Impulse Response) filter for a specific audio profile.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVFLTREN=<profile>,<filter>,<state> Response: OK Purpose: Enable or disable the <filter> for the specified <profile>. • Query: AT!AVFLTREN?<profile>,<filter> Response: !AVFLTREN: <state> Purpose: Show the current setting (enabled/disabled) of the selected profile's <filter>. • Query List: AT!AVFLTREN=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><filter> (Filter type)</p> <ul style="list-style-type: none"> • 0=Tx FIR • 1=Rx FIR • 2=Tx IIR • 3=Rx IIR <p><state> (State (enabled/disabled) of <filter>)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVMUTE Min f/w rev: • 06.xx.xx.xx or higher</p> <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Mute/unmute earpiece/microphone/call waiting tone Mute or unmute the earpiece, microphone, and call waiting tone.</p> <p>Supporting devices: MC Password required: No Reset required to apply changes: No Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVMUTE=<profile>,<earmute>,<micmute>[,<cwtmute>] Response: OK Purpose: Set the mute states for the selected profile. • Query: AT!AVMUTE?<profile> Response: !AVMUTE: <earmute>,<micmute>,<cwtmute> Purpose: Show the current mute settings (enabled/disabled) for the selected profile. • Query List: AT!AVMUTE=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><earmute> (Earpiece mute state)</p> <ul style="list-style-type: none"> • 0=Unmuted • 1=Muted <p><micmute> (Microphone mute state)</p> <ul style="list-style-type: none"> • 0=Unmuted • 1=Muted <p><cwtmute> (Call waiting tone mute state)</p> <ul style="list-style-type: none"> • 0=Unmuted • 1=Muted • This parameter is optional.

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVNS</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Enable/disable Noise Suppression mode for audio profile</p> <p>Enable or disable Noise Suppression (NS) mode for a specific audio profile.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVNS=<profile>,<value> Response: OK Purpose: Enable or disable NS mode for the selected profile. • Query: AT!AVNS?<profile> Response: !AVNS: <value> Purpose: Show the current NS mode state (enabled/disabled) for the selected profile. • Query List: AT!AVNS=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><value> (NS mode state)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable
<p>!AVRXAGC</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Enable/disable Rx AGC</p> <p>Enable or disable Rx AGC (Automatic Gain Control) for a specific audio profile.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVRXAGC=<profile>,<value> Response: OK Purpose: Enable or disable Rx AGC for the selected profile. • Query: AT!AVRXAGC?<profile> Response: !AVRXAGC: <value> Purpose: Show the current Rx AGC state (enabled/disabled) for the selected profile. • Query List: AT!AVRXAGC=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><value> (Rx AGC state)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVRXAVC Min f/w rev: • 06.xx.xx.xx or higher</p> <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Enable/disable Rx AVC Enable or disable Rx AVC (Automatic Volume Control) for a specific audio profile.</p> <p>Supporting devices: MC Password required: No Reset required to apply changes: No Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVRXAVC=<profile>,<value> Response: OK Purpose: Enable or disable Rx AVC for the selected profile. • Query: AT!AVRXAVC?<profile> Response: !AVRXAVC: <value> Purpose: Show the current Rx AVC state (enabled/disabled) for the selected profile. • Query List: AT!AVRXAVC=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><value> (Rx AVC state)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVRXG</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Query/set audio profile's decoder gain select setting</p> <p>Set the decoder gain for a specific audio profile. The value entered is mapped to a gain range of -78 dB to +18 dB.</p> <p>Supporting devices: MC</p> <p>Password required: Yes</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVRXG=<profile>,<gain> Response: OK Purpose: Set the decoder gain for the specified profile. • Query: AT!AVRXG?<profile> Response: !AVRXG: <gain> Purpose: Show the decoder gain for the specified profile. • Query List: AT!AVRXG=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><gain> (Decoder gain value)</p> <ul style="list-style-type: none"> • Valid <gain> values: 0–0xFFFF (May be entered as decimal or hexadecimal for Execution format, and returned as hexadecimal in Query response.) <ul style="list-style-type: none"> • Execution examples: Hexadecimal: AT!AVRXG=1,0x3210 Decimal: AT!AVRXG=1,12816 • Query response example: !AVRXG: 0x3210 • Decoder gain is calculated using the following formula: $20 * \text{LOG}(\text{<gain>} / 0x2000)$ • Supported decoder gain range: -78 dB to +18 dB • Recommended gain range: 0 dB to +18 dB

Table 11-2: Audio command details (Continued)

Command	Description
!AVSETPROFILE Min f/w rev: <ul style="list-style-type: none"> 06.xx.xx.xx or higher <hr/> <i>Note: Audio-capable devices only.</i> <hr/>	Select/configure audio profile for CS call Select and configure an audio profile to be used for a circuit-switched call. (To view the current audio profile configurations, use ATIAVCFG?). Supporting devices: MC Password required: No Reset required to apply changes: No Persistent across power cycles: Yes Usage: <ul style="list-style-type: none"> Execution: ATIAVSETPROFILE=<profile>[,<earmute>,<micmute>,<generator>,<volume>[,<cwtmute>]] Response: OK Purpose: Select the profile to use for a circuit switched call and, if needed, configure the mute and volume settings for the profile. Query: ATIAVSETPROFILE?[<generator>] Response: !AVSETPROFILE: <profile>,<earmute>,<micmute>,[<generator>],<volume>,<cwtmute> Purpose: Show the profile that has been selected for circuit switched calls, and its configuration parameters. (The <generator> field does not appear if <generator> is used in the query.) Query List: ATIAVSETPROFILE=? Purpose: Display valid execution format and parameter values. Parameters: <ul style="list-style-type: none"> <profile> (Audio profile used for CS call) <ul style="list-style-type: none"> 0–5=Audio profile number (6 profiles are supported) <earmute> (Earpiece mute state) <ul style="list-style-type: none"> 0=Unmuted 1=Muted <micmute> (Microphone mute state) <ul style="list-style-type: none"> 0=Unmuted 1=Muted <generator> <ul style="list-style-type: none"> 0=Voice synthesizer (Note: This is the only option at this time.) <volume> (Rx volume level) <ul style="list-style-type: none"> Valid range: 0 (quietest) – 5 (loudest) <cwtmute> (Call waiting tone mute state) <ul style="list-style-type: none"> 0=Unmuted 1=Muted

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVSETVOL</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Query/set audio profile's Rx volume level</p> <p>Set the Rx volume level for a specific audio profile.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: ATI!AVSETVOL=<profile>,<generator>,<volume> Response: OK Purpose: Set the Rx volume for the specified audio profile/generator combination. • Query: ATI!AVSETVOL?<profile>,<generator> Response: !AVSETVOL: <volume> Purpose: Show the current volume level for the specified audio profile/generator combination. • Query List: ATI!AVSETVOL=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile used for CS call)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><generator></p> <ul style="list-style-type: none"> • 0=Voice synthesizer (Note: This is the only option at this time.) <p><volume> (Rx volume level)</p> <ul style="list-style-type: none"> • Valid range: 0 (quietest) – 5 (loudest)

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVSTG</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Query/set/enable/disable audio profile's audio front end sidetone gain</p> <p>Set the audio front end (AFE) sidetone gain and enable/disable sidetone for a specific audio profile. The value entered is mapped to a gain range of -78 dB to +18 dB.</p> <hr/> <p><i>Note: To disable sidetone gain, set <gain> = 0.</i></p> <hr/> <p>Supporting devices: MC Password required: Yes Reset required to apply changes: No Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVSTG=<profile>,<gain> Response: OK Purpose: Set AFE sidetone gain value. • Query: AT!AVSTG?<profile> Response: !AVSTG: <gain> Purpose: Show the current sidetone gain value for the specified profile. • Query List: AT!AVSTG=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><gain> (Sidetone gain value)</p> <ul style="list-style-type: none"> • Valid <gain> values: 0–0xFFFF (May be entered as decimal or hexadecimal for Execution format, and returned as hexadecimal in Query response.) <ul style="list-style-type: none"> • Execution examples: Hexadecimal: AT!AVSTG=1,0x3210 Decimal: AT!AVSTG=1,12816 • Query response example: !AVSTG: 0x3210 • Sidetone gain is calculated using the following formula: $20 * \text{LOG}(\text{<gain>} / 0x2000)$ • Supported sidetone gain range: -78 dB to +18 dB • Recommended sidetone gain range: 0 dB to +18 dB

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVTONEPLAY Min f/w rev: • 06.xx.xx.xx or higher</p> <hr/> <p><i>Note: Audio-capable devices only.</i></p>	<p>Play a tone Play a predefined tone.</p> <p>Supporting devices: MC Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT!AVTONEPLAY=<generator>,<tone>[,<duration>] Response: OK Purpose: Play the specified tone, and if required, indicate how long to play it. Query List: AT!AVTONEPLAY=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><generator></p> <ul style="list-style-type: none"> 0=Voice synthesizer (Note: This is the only option at this time.) <p><tone> (Predefined tone to play)</p> <ul style="list-style-type: none"> ASCII. Use tone number shown in table below. <p><duration> (Length of time to play the <tone>)</p> <ul style="list-style-type: none"> 0–65535 (milliseconds) Default duration=1000 ms

#	Description	#	Description	#	Description	#	Description	#	Description
0	DTMF (0 key)	13	TONE_ERR	26	TONE_RING_AS5	39	TONE_RING_F6	4C	TONE_LOW_PITCH_A
1	DTMF (1 key)	14	TONE_TIME	27	TONE_RING_B5	3A	TONE_RING_FS6	4D	TONE_LOW_PITCH_B
2	DTMF (2 key)	15	TONE_RING_A	28	TONE_RING_C5	3B	TONE_RING_G6	4E	TONE_TEST_ON
3	DTMF (3 key)	16	TONE_RING_B	29	TONE_RING_CS5	3C	TONE_RING_GS6	4F	TONE_MSG_WAITING
4	DTMF (4 key)	17	TONE_RING_C	2A	TONE_RING_D5	3D	TONE_RING_A7	50	TONE_PIP_TONE_TONE
5	DTMF (5 key)	18	TONE_RING_D	2B	TONE_RING_DS5	3E	TONE_RBACK	51	TONE_SPC_DT_INDIA
6	DTMF (6 key)	19	TONE_RING_A4	2C	TONE_RING_E5	3F	TONE_BUSY	52	TONE_SIGNAL_INDIA
7	DTMF (7 key)	1A	TONE_RING_AS4	2D	TONE_RING_F5	40	TONE_INTERCEPT_A	53	TONE_DT_TONE_INDIA
8	DTMF (8 key)	1B	TONE_RING_B4	2E	TONE_RING_FS5	41	TONE_INTERCEPT_B	54	TONE_DT_TONE_BRAZIL
9	DTMF (9 key)	1C	TONE_RING_C4	2F	TONE_RING_G5	42	TONE_REORDER_TONE	55	TONE_DT_DTACO_TONE
A	DTMF (A key)	1D	TONE_RING_CS4	30	TONE_RING_GS5	43	TONE_PWRUP	56	TONE_HFK_TONE1
B	DTMF (B key)	1E	TONE_RING_D4	31	TONE_RING_A6	44	TONE_OFF_HOOK_TONE	57	TONE_HFK_TONE2
C	DTMF (C key)	1F	TONE_RING_DS4	32	TONE_RING_AS6	45	TONE_CALL_WT_TONE		
D	DTMF (D key)	20	TONE_RING_E4	33	TONE_RING_B6	46	TONE_DIAL_TONE_TONE		
E	DTMF (# key)	21	TONE_RING_F4	34	TONE_RING_C6	47	TONE_ANSWER_TONE		
F	DTMF (* key)	22	TONE_RING_FS4	35	TONE_RING_CS6	48	TONE_HIGH_PITCH_A		
10	TONE CTRL	23	TONE_RING_G4	36	TONE_RING_D6	49	TONE_HIGH_PITCH_B		
11	TONE 2ND	24	TONE_RING_GS4	37	TONE_RING_DS6	4A	TONE_MED_PITCH_A		
12	TONE WARN	25	TONE_RING_A5	38	TONE_RING_E6	4B	TONE_MED_PITCH_B		

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVTXAGC</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Enable/disable Tx AGC</p> <p>Enable or disable Tx AGC (Automatic Gain Control) for a specific audio profile.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVTXAGC=<profile>,<value> Response: OK Purpose: Enable or disable Tx AGC for the selected profile. • Query: AT!AVTXAGC?<profile> Response: !AVTXAGC: <value> Purpose: Show the current Tx AGC state (enabled/disabled) for the selected profile. • Query List: AT!AVTXAGC=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><value> (Tx AGC state)</p> <ul style="list-style-type: none"> • 0=Disable • 1=Enable

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVTXG</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Query/set audio profile’s encoder gain select setting</p> <p>Set the encoder gain for a specific audio profile. The value entered is mapped to a gain range of -78 dB to +18 dB.</p> <p>Supporting devices: MC Password required: Yes Reset required to apply changes: No Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVTXG=<profile>,<gain> Response: OK Purpose: Set the encoder gain for the specified profile. • Query: AT!AVTXG?<profile> Response: !AVTXG: <gain> Purpose: Show the encoder gain for the specified profile. • Query List: AT!AVTXG=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><gain> (Encoder gain value)</p> <ul style="list-style-type: none"> • Valid <gain> values: 0–0xFFFF (May be entered as decimal or hexadecimal for Execution format, and returned as hexadecimal in Query response.) <ul style="list-style-type: none"> • Execution examples: Hexadecimal: AT!AVTXG=1,0x3210 Decimal: AT!AVTXG=1,12816 • Query response example: !AVTXG: 0x3210 • Encoder gain is calculated using the following formula: $20 * \text{LOG}(\text{<gain>} / 0x2000)$ • Supported encoder gain range: -78 dB to +18 dB • Recommended encoder gain range: 0 dB to +18 dB

Table 11-2: Audio command details (Continued)

Command	Description
<p>!AVTXVOL</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Query/set audio profile's Tx volume gain</p> <p>Set the Tx volume gain for a specific audio profile. The value entered is mapped to a gain range of -78 dB to +18 dB.</p> <p>Gain is applied to PCM voice packets before they are fed into the vocoder, which encodes the PCM packets for more efficient over the air transmission.</p> <p>Supporting devices: MC</p> <p>Password required: Yes</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT!AVTXVOL=<profile>,<gain> Response: OK Purpose: Set the Tx volume gain for the specified profile. • Query: AT!AVTXVOL?<profile> Response: !AVTXVOL: <gain> Purpose: Show the Tx volume gain for the specified profile. • Query List: AT!AVTXVOL=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><profile> (Audio profile)</p> <ul style="list-style-type: none"> • 0–5=Audio profile number (6 profiles are supported) <p><gain> (Encoder gain value)</p> <ul style="list-style-type: none"> • Valid <gain> values: 0–0xFFFF (May be entered as decimal or hexadecimal for Execution format, and returned as hexadecimal in Query response.) <ul style="list-style-type: none"> • Execution examples: Hexadecimal: AT!AVTXG=1,0x3210 Decimal: AT!AVTXG=1,12816 • Query response example: !AVTXG: 0x3210 • Volume gain is calculated using the following formula: $20 * \text{LOG}(\text{<gain>} / 0x2000)$ • Supported volume gain range: -78 dB to +18 dB • Recommended volume gain range: 0 dB to +18 dB

Table 11-2: Audio command details (Continued)

Command	Description
<p>+CMGP</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Preview SMS message</p> <p>Read an SMS message without changing its 'read' status. (If the SMS message is marked as 'unread', it will remain 'unread'.) (To read an SMS message and have its status changed to 'read', use +CMGR.)</p> <p>Supporting devices: MC Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT+CMGP=<index> Response: <ul style="list-style-type: none"> If text mode (+CMGF=1), SMS-DELIVER, and command successful: +CMGP: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcsc>,<sca>,<tosca>,<length>] <data> If text mode (+CMGF=1), SMS-SUBMIT, and command successful: +CMGP: <stat>,<da>,[<alpha>] [,<toda>,<fo>,<pid>,<dcsc>,<vp>],<sca>,<tosca>,<length>] <data> If text mode (+CMGF=1), SMS-REPORT, and command successful: +CMGP: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> If text mode (+CMGF=1), SMS-COMMAND, and command successful: +CMGP: <stat>,<fa>,<ct>[,<pid>,<mn>],[<da>],[<toda>],<length>] <data> If text mode (+CMGF=1), CBM storage, and command successful: +CMGP: <stat>,<sn>,<mid>,<dcsc>,<page>,<pages> <data> If PDU mode (+CMGF=0), and command successful: +CMGP: <stat>,[<alpha>],<length>] <pdu> Otherwise: +CMS ERROR: <err> <p>Purpose: Read SMS message at specified index position.</p> <p>Parameters:</p> <p><index> (SMS storage location)</p> <ul style="list-style-type: none"> Index range is service provider-dependent. <p><stat> (Message status)</p> <ul style="list-style-type: none"> Type: Integer (if in PDU mode) or string (if in text mode) 0 or "REC UNREAD"=Message is unread (new) 1 or "REC READ"=Message has been read 2 or "STO UNSENT"=Message is stored and has not been sent (applies to SMS only) 3 or "STO SENT"=Message is stored and has been sent (applies to SMS only) 4 or "ALL"=All messages (applies to +CMGL command only) <p>All other parameters</p> <ul style="list-style-type: none"> Refer to 3GPP specification TS 27.005

Table 11-2: Audio command details (Continued)

Command	Description
<p>*CNTI</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Display current, available, or supported network types (technologies)</p> <p>Display the currently connected network type (technology), the types available on the current network, or all types supported by the device.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT*<i>CNTI</i>=<option> • Response: *<i>CNTI</i>=<option>,<tech>[,<tech>[...]] • Purpose: Specify <option> to display the current network type, available network types, or device-supported network types. • Query List: AT*<i>CNTI</i>=? • Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><option> (Desired response type)</p> <ul style="list-style-type: none"> • 0=Currently connected network type • 1=Technologies available on the current network • 2=Technologies supported by the device <p><tech> (Network technology)</p> <ul style="list-style-type: none"> • ASCII string: <ul style="list-style-type: none"> • "GSM" • "GPRS" • "EDGE" • "UMTS" • "HSDPA" • "HSUPA" • "HSDPA/HSUPA" • "HSPA+" • "DC-HSPA+" • "LTE" • "Unknown"

Table 11-2: Audio command details (Continued)

Command	Description
<p>!MADC</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Display ADC values</p> <p>Read one of the available ADCs (Analog to Digital Converters).</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Query: AT!MADC?<adc> Response: !MADC: <value> Purpose: Show the value being reported by the specified ADC. Query List: AT!MADC=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><adc> (Analog to Digital Converters)</p> <ul style="list-style-type: none"> 0=VBATT (Battery voltage) 1=VCOIN (Charging voltage of RTC coin battery. Note: This voltage can be configured using AT!MVCOIN) 2=PA_THERM (Power Amplifier Thermistor) 3=PMIC_THERM (Power Management Integrated Circuit Thermistor) 4=XO_THERM (Crystal Oscillator Thermistor) <p><value> (Value returned from ADC)</p> <ul style="list-style-type: none"> ASCII string, contents depend on ADC being polled.
<p>!MLDTMFEN</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Enable/disable local DTMF</p> <p>Enable or disable local DTMF.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT!MLDTMFEN=<enable> Response: OK Purpose: Enable or disable local DTMF. Query: AT!MLDTMFEN? Response: !MLDTMFEN: <enable> Purpose: Show the current state of local DTMF. Query List: AT!MLDTMFEN=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><enable> (Enable/disable local DTMF)</p> <ul style="list-style-type: none"> 0=Disable 1=Enable

Table 11-2: Audio command details (Continued)

Command	Description
<p>!PRLVER Min f/w rev: • 06.xx.xx.xx or higher</p> <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Display current PRL version Display the device's current PRL (Preferred Roaming List) version.</p> <p>Supporting devices: MC Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Query: AT!PRLVER? Response: PRL VER: <n> Purpose: Display the PRL version. <p>Parameters: <n> (PRL version number)</p> <ul style="list-style-type: none"> Integer
<p>+VTD Min f/w rev: • 06.xx.xx.xx or higher</p> <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Set DTMF tone duration Set the duration for DTMF tones (for UMTS and CDMA networks)</p> <p>Supporting devices: MC Password required: No Reset required to apply changes: No Persistent across power cycles: No (After a power cycle, default tone duration is used.)</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT+VTD=<duration> Response: OK Purpose: Set the duration for DTMF tones. Query: AT+VTD? Response: +VTD: <duration> Purpose: Display the current DTMF tone duration. Query List: AT+VTD=? Purpose: Display valid execution format and parameter values. <p>Parameters: <duration> (Length of DTMF tone)</p> <ul style="list-style-type: none"> Unit value: 100 msec Valid values: <ul style="list-style-type: none"> 0=20 msec (default) 1–255=100–25500 msec

Table 11-2: Audio command details (Continued)

Command	Description
<p>+VTS</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Send DTMF tone</p> <p>Send continuous in-band DTMF tones (for UMTS and CDMA networks) while on an active call.</p> <p>Use AT+VTD to set the tone duration.</p> <p>Supporting devices: MC Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT+VTS=<tone> Response: OK Purpose: Send the specified DTMF tone. • Query List: AT+VTS=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><tone> (DTMF tone)</p> <ul style="list-style-type: none"> • UMTS networks: 0–9, A–D, *, # • CDMA networks: 0–9, *, # • Examples: <ul style="list-style-type: none"> • AT+VTS=1 (Send the DTMF tone for '1'.) • AT+VTS=# (Send the DTMF tone for '#'.)

Table 11-2: Audio command details (Continued)

Command	Description
<p>+VTSBST Min f/w rev: • 06.xx.xx.xx or higher</p> <hr/> <p><i>Note: Audio-capable devices only.</i></p>	<p>Send burst DTMF tone (CDMA only) Send a burst DTMF tone sequence (on CDMA networks only) while on an active call.</p> <hr/> <p><i>Note: To set the tone duration, use AT+VTD.</i></p> <hr/> <p>Supporting devices: MC Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT+VTSBST= <tones>[,<onlen>,<offlen>] Response: OK Purpose: Start or stop an audio loopback. • Query List: AT+VTSBST=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><tones> (DTMF tone sequence)</p> <ul style="list-style-type: none"> • One or more tones can be sent together. • Valid values: 0–9, *, # <p><onlen> (Tone pulse width)</p> <ul style="list-style-type: none"> • 0=95 ms • 1=150 ms • 2=200 ms • 3=250 ms • 4=300 ms • 5=350 ms • Default: 5 (350 ms) <p><offlen> (Minimum interdigit interval)</p> <ul style="list-style-type: none"> • 0=6 ms • 1=100 ms • 2=150 ms • 3=200 ms • Default: 3 (200 ms) <p>Example(s):</p> <ul style="list-style-type: none"> • AT+VTSBST=1 (Send the DTMF tone for '1' using the default <onlen> and <offlen>.) • AT+VTSBST=1,3,2 (Send the DTMF tone for '1' using <onlen>=3 and <offlen>=2.) • AT+VTSBST=18677653342# (Send the DTMF tone sequence "18677653342#" using the default <onlen> and <offlen>.) • AT+VTSBST=18677653342#,3,2 (Send the DTMF tone sequence "18677653342#" using the <onlen>=3 and <offlen>=2.)

Table 11-2: Audio command details (Continued)

Command	Description
<p>+WANTGNSSPWR</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> 05.02.03.00 or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Enable/disable GNSS antenna power</p> <p>Enable or disable GNSS antenna power (3.3V).</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: Yes</p> <p>Usage:</p> <ul style="list-style-type: none"> Execution: AT+WANTGNSSPWR=<enable> Response: OK Purpose: Enable or disable the GNSS antenna power (3.3V). Query List: AT+WANTGNSSPWR=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><enable> (Enable/disable GNSS antenna power)</p> <ul style="list-style-type: none"> 0=Disable 1=Enable
<p>+WANTS</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Perform GNSS antenna diagnostic check</p> <p>Check the status of the GNSS antenna.</p> <p>A short is reported if the ADC (Analog to Digital Converter) value for the GNSS antenna is higher than the short limit.</p> <p>An open is reported if the ADC value is lower than the open limit.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> Query: AT+WANTS Response: +WANTS: <gnssAntStatus> Purpose: Display the status of the GNSS antenna. Query List: AT+WANTS=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><gnssAntStatus> (GNSS antenna status)</p> <ul style="list-style-type: none"> 0=Shorted (ADC > short limit) 1=Normal (short limit >= ADC >= open limit) 2=Open (ADC < open limit) 3=Over current (antenna is shorted and the current HW protection circuitry has tripped)

Table 11-2: Audio command details (Continued)

Command	Description
<p>+WFSH</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Send flash to base station to initiate call holding or three-way calling</p> <p>Send flash to the base station to initiate call holding or three-way calling.</p> <p>For call waiting:</p> <ol style="list-style-type: none"> 1. When a call is in progress and a second call is received, send a flash (AT+WFSH) to toggle between the two calls. <p>For 3-way calling:</p> <ol style="list-style-type: none"> 1. Use ATD to initiate a call with party #1. 2. Send a flash (AT+WFSH=<number>) to place party #1 on hold and initiate a call with party #2. 3. When the second call is connected, send a flash (AT+WFSH) to connect all three parties. 4. When ready to disconnect one or both calls: <ul style="list-style-type: none"> • Send a flash (AT+WFSH) to disconnect party #2, or • Use ATH to end the call for all parties. (3GPP2 only) <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution format 1: AT+WFSH Response: OK Purpose: Send a flash to the base station. • Execution format 2: AT+WFSH=<number> Response: OK Purpose: Send a flash and the call number to the base station. <p>Parameters:</p> <p><number> (Telephone number)</p> <ul style="list-style-type: none"> • ASCII string • Valid characters: '0'-'9', '*', '#'

Table 11-2: Audio command details (Continued)

Command	Description
<p>+WIOR</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Read GPIO value</p> <p>Read a GPIO (General Purpose I/O port) pin value.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: No (At power-on, all GPIOs are configured for input.)</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT+WIOR=<gpio> Response: <value> OK • Purpose: Read the specified GPIO's pin value. • Query List: AT+WIOR=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><gpio> (External GPIO number)</p> <ul style="list-style-type: none"> • 1–4 <p><value> (GPIO pin value)</p> <ul style="list-style-type: none"> • 0–1
<p>+WIOW</p> <p>Min f/w rev:</p> <ul style="list-style-type: none"> • 06.xx.xx.xx or higher <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Write GPIO value</p> <p>Write a GPIO (General Purpose I/O port) pin value.</p> <p>Supporting devices: MC</p> <p>Password required: No</p> <p>Reset required to apply changes: No</p> <p>Persistent across power cycles: No (At power-on, all GPIOs are configured for input.)</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT+WIOW=<gpio>,<value> Response: OK • Purpose: Write the specified GPIO's pin value. • Query List: AT+WIOW=? Purpose: Display valid execution format and parameter values. <p>Parameters:</p> <p><gpio> (External GPIO number)</p> <ul style="list-style-type: none"> • 1–4 <p><value> (GPIO pin value)</p> <ul style="list-style-type: none"> • 0–1

Table 11-2: Audio command details (Continued)

Command	Description
<p>+WSOS Min f/w rev: • 06.xx.xx.xx or higher</p> <hr/> <p><i>Note: Audio-capable devices only.</i></p> <hr/>	<p>Enter/exit emergency mode Set the modem into or out of emergency mode (for an E911 session).</p> <p>Supporting devices: MC Password required: No Reset required to apply changes: No Persistent across power cycles: No</p> <p>Usage:</p> <ul style="list-style-type: none"> • Execution: AT+WSOS=<emergency> Response: OK Purpose: Enter or exit emergency mode. • Query: AT+WSOS? Response: +WSOS: <emergency> Purpose: Indicate whether modem is in emergency mode. <p>Parameters: <emergency> (Emergency mode status)</p> <ul style="list-style-type: none"> • 0=Modem not in emergency mode • 1=Modem in emergency mode

12: Supported GSM/WCDMA AT Commands

This chapter identifies standard AT commands that are supported by most Sierra WirelessAirPrime devices. 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 12-1](#) 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 12-2](#) on page 187.
- Control devices operating on GSM/WCDMA networks (*3GPP TS 27.007*, available on the 3GPP web site, www.3gpp.org)
See [Table 12-3](#) on page 188.

The tables below identify whether each command is supported on Sierra Wireless UMTS devices. 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 12-1](#) on page 185).

Table 12-1: Supported ITU-T Recommendation V.250 AT commands

Command	Description	Supported ✓=Yes; ✗=No
&C	Set Data Carrier Detected (Received line signal detector) function mode	✗
&D	Set Data Terminal Ready function mode	✓
&F	Set all current parameters to manufacturer's defaults	✓
&S	Set DSR signal	✓
&T	Auto tests	✗
&V	Return operating mode AT configuration parameters	✓
&W	Store current parameter to user-defined profile	✓
+DR	V42bis data compression report	✓
+DS	V42bis data compression	✓
+GCAP	Request complete TA capabilities list	✓
+GMI	Request manufacturer identification	✓

Table 12-1: Supported ITU-T Recommendation V.250 AT commands (Continued)

Command	Description	Supported ✓=Yes; ✗=No
+GMM	Request TA model identification	✓
+GMR	Request TA revision identification	✓
+GOI	Request global object identification	✗
+GSN	Request TA serial number identification	✓
+ICF	Set TE-TA control character framing	✓
+IFC	Set TE-TA local data flow control	✓
+ILRR	Set TE-TA local rate reporting mode	✗
+IPR	Set fixed local rate	✓
A	Answer incoming call	✓
A/	Re-issues last AT command given	✓
D	Dial	✓
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	✓
H	Disconnect existing connections	✓
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	✗
Q	Set Result code presentation mode	✓
S0	Set number of rings before automatically answering the call	✓
S10	Set disconnect delay after indicating the absence of data carrier	✓
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	✓

Table 12-1: Supported ITU-T Recommendation V.250 AT commands (Continued)

Command	Description	Supported ✓=Yes; ✗=No
S8	Set number of seconds to wait when comma dial modifier used	✓
T	Select tone dialing	✓
V	Set result code format mode	✓
X	Set connect result code format and call monitoring	✓
Z	Set all current parameters to user-defined profile	✓

Table 12-2: 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	✓
+CMGF	Message format	✓
+CMGL	List messages	✓
+CMGR	Read message	✓
+CMGS	Send message	✓
+CMGW	Write message to memory	✓
+CMMS	More messages to send	✓
+CMNA	New message acknowledgement to ME/TA	✓
+CMS ERROR: <err>	SMS error (mobile or network error)	✓
+CMSS	Send message from storage	✓
+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	✓
+CPMS	Preferred message storage	✓
+CRES	Restore settings	✗

Table 12-2: Supported 27.005 AT commands (Continued)

Command	Description	Supported ✓=Yes; ✗=No
+CSAS	Save settings	✗
+CSCA	Service center address	✓
+CSCB	Select cell broadcast message types	✓
+CSDH	Show text mode parameters	✓
+CSMP	Set text mode parameters	✓
+CSMS	Select message service	✓

Table 12-3: Supported 27.007 AT commands

Command	Description	Supported ✓=Yes; ✗=No
C	ITU T V.24 circuit 109 carrier detect signal behavior command Format <ul style="list-style-type: none"> C<value> Limitations <ul style="list-style-type: none"> Default <value> = 2 <value> = 2 causes the AT/Data carrier detect pin to 'wink' (briefly switch off and on) when data calls end. <value> = 0 or 1 performs as defined in the standard 	Partial
+CACM	Accumulated call meter	✗
+CACSP	Voice Group or Voice Broadcast Call State Attribute Presentation	N/A
+CAEMLPP	eMLPP Priority Registration and Interrogation	✗
+CAHLD	Leave an ongoing Voice Group or Voice Broadcast Call	N/A
+CAJOIN	Accept an incoming Voice Group or Voice Broadcast Call	N/A
+CALA	Alarm	N/A
+CALCC	List current Voice Group and Voice Broadcast Calls	N/A
+CALD	Delete alarm	N/A
+CALM	Alert sound mode	✗
+CAMP	Accumulated call meter maximum	✗
+CANCHEV	NCH Support Indication	✗
+CAOC	Advice of Charge	✗
+CAPD	Postpone or dismiss an alarm	N/A
+CAPTT	Talker Access for Voice Group Call	N/A
+CAREJ	Reject an incoming Voice Group or Voice Broadcast Call	N/A
+CAULEV	Voice Group Call Uplink Status Presentation	N/A

Table 12-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✓=Yes; ✗=No
+CBC	Battery charge	✓
+CBST	Select bearer service type	✓
+CCCM	Current call meter value	✗
+CCFC	Call forwarding number and conditions	✓
+CCLK	Clock	N/A
+CCUG	Closed user group	✓
+CCWA	Call waiting	✓
+CCWE	Call Meter maximum event	✗
+CDIP	Called line identification presentation	✗
+CDIS	Display control	✗
+CEER	Extended error report	✗
+CFUN	Set phone functionality Format <ul style="list-style-type: none"> +CFUN = [<fun> [, <rst>]] Limitations <ul style="list-style-type: none"> Valid <fun> values: <ul style="list-style-type: none"> 0 (minimum functionality, low power draw) 1 (full functionality, high power draw) 	Partial
+CGACT	PDP context activate or deactivate	✓
+CGANS	Manual response to a network request for PDP context activation	✗
+CGATT	PS attach or detach	✓
+CGAUTO	Automatic response to a network request for PDP context activation	✗
+CGCLASS	GPRS mobile station class	✓
+CGCLOSP	Configure local octet stream PAD parameters	✗
+CGCMOD	PDP Context Modify	✗
+CGDATA	Enter data state	✓
+CGDCONT	Define PDP Context	✓
+CGDSCONT	Define Secondary PDP Context	✓
+CGEQMIN	3G Quality of Service Profile (Minimum acceptable)	✓
+CGEQNEG	3G Quality of Service Profile (Negotiated)	✓
+CGEQREQ	3G Quality of Service Profile (Requested)	✓
+CGEREP	Packet Domain event reporting	✓

Table 12-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✓=Yes; ✗=No
+CGEV	GPRS network event indication	✓
+CGMI	Request manufacturer identification	✓
+CGMM	Request model identification	✓
+CGMR	Request revision identification	✓
+CGPADDR	Show PDP address	✓
+CGQMIN	Quality of Service Profile (Minimum acceptable)	✓
+CGQREQ	Quality of Service Profile (Requested)	✓
+CGREG	GPRS network registration status	✓
+CGSMS	Select service for MO SMS messages	✓
+CGSN	Request product serial number identification	✓
+CGTFT	Traffic Flow Template	✓
+CHLD	Call related supplementary services	✓
+CHSA	HSCSD non-transparent asymmetry configuration	N/A
+CHSC	HSCSD current call parameters	N/A
+CHSD	HSCSD device parameters	N/A
+CHSR	HSCSD parameters report	N/A
+CHST	HSCSD transparent call configuration	N/A
+CHSU	HSCSD automatic user initiated upgrading	N/A
+CHUP	Hangup call	✓
+CIEV	Indicator event	✓
+CIMI	Request international mobile subscriber identity	✓
+CIND	Indicator control	✓
+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	✓
+CLIP	Calling line identification presentation	✓

Table 12-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✓=Yes; ✗=No
+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	✓
+CMER	Mobile Termination event reporting	✓
+CMOD	Call mode	✓
+CMUT	Enable/disable uplink voice muting	✓
+CMUX	Multiplexing mode	✓ (When MUX mode configured on USB interface.)
+CNUM	Subscriber number	✓
+COLP	Connected line identification presentation	✓
+COPN	Read operator names	✓
+COPS	Operator selection	✓
+CPAS	Phone activity status	✓
+CPBF	Find phonebook entries	✓
+CPBR	Read phonebook entries	✓
+CPBS	Select phonebook memory storage	✓
+CPBW	Write phonebook entry	✓
+CPIN	Enter PIN	✓
+CPLS	Preferred PLMN list selection	✓
+CPOL	Preferred operator list	✓
+CPROT	Enter protocol mode	✗
+CPUC	Price per unit and currency table	✓
+CPWC	Power class	✗
+CPWD	Change password	✓
+CR	Service reporting control	✓
+CRC	Cellular result codes	✓

Table 12-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✓=Yes; ✗=No
+CREG	Network registration	✓
+CRING	Incoming call type	✓
+CRLP	Radio link protocol	✓
+CRMP	Ring Melody Playback	N/A
+CRSL	Ringer sound level	N/A
+CRSM	Restricted SIM access	✓
+CSCC	Secure control command	✗
+CSCS	Select TE character set	✓
+CSDF	Settings date format	N/A
+CSGT	Set Greeting Text	N/A
+CSIL	Silence Command	N/A
+CSIM	Generic SIM access	✓
+CSNS	Single numbering scheme	✗
+CSQ	Signal quality	✓
+CSSN	Supplementary service notifications	✓
+CSTA	Select type of address	✓
+CSTF	Settings time format	✓
+CSVM	Set Voice Mail Number	✗
+CTFR	Call deflection	✓
+CTZR	Time Zone Reporting	N/A
+CTZU	Automatic Time Zone Update	✗
+CUSD	Unstructured supplementary service data	✓
+CV120	V.120 rate adaptation protocol	✗
+CVHU	Voice Hangup Control	✗
+CVIB	Vibrator mode	N/A
D	ITU T V.25ter [14] 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	✓

Table 12-3: Supported 27.007 AT commands (Continued)

Command	Description	Supported ✓=Yes; ✗=No
+VTS	DTMF and arbitrary tone generation	✓
+WS46	PCCA STD 101 [17] select wireless network	✗

13: 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 13-1](#))
- A 3GPP band number ([Table 13-2](#) on page 196)

Note: Band support is product-specific—see the device's Product Specification Document or Product Technical Specification for details.

Table 13-1: Band/technology enumerations^a

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

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

Table 13-2: 3GPP bands

Band	Frequency bands (MHz)		Band	Frequency bands (MHz)	
	Rx	Tx		Rx	Tx
1	1920–1980	2110–2170	20	832–862	791–821
2	1850–1910	1930–1990	21	1447.9–1462.9	1495.9–1510.9
3	1710–1785	1805–1880	22	Reserved	Reserved
4	1710–1755	2110–2155	23	2000–2020	2180–2200
5	824–849	869–894	24	1626.5–1660.5	1525–1559
6	830–840	875–885	25	1850–1915	1930–1995
7	2500–2570	2620–2690	26–32	Reserved	Reserved
8	880–915	925–960	33	1900–1920	1900–1920
9	1749.9–1784.9	1844.9–1879.9	34	2010–2025	2010–2025
10	1710–1770	2110–2170	35	1850–1910	1850–1910
11	1427.9–1447.9	1475.9–1495.9	36	1930–1990	1930–1990
12	699–716	729–746	37	1910–1930	1910–1930
13	777–787	746–756	38	2570–2620	2570–2620
14	788–798	758–768	39	1880–1920	1880–1920
15	Reserved	Reserved	40	2300–2400	2300–2400
16	Reserved	Reserved	41	2496–2690	2496–2690
17	704–716	734–746	42	3400–3600	3400–3600
18	815–830	860–875	43	3600–3800	3600–3800
19	830–845	875–890	44–60	Reserved	Reserved

14: ASCII Table

Table 14-1: 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	64
ENQ	5	05	%	37	25	E	69	45	e	101	65
ACK	6	06	&	38	26	F	70	46	f	102	66
BEL	7	07	'	39	27	G	71	47	g	103	67
BS	8	08	(	40	28	H	72	48	h	104	68
HT	9	09	)	41	29	I	73	49	i	105	69
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
US	31	1F	?	63	3F	_	95	5F	DEL	127	7F

Index (AT commands)

A

A, answer incoming call, [186](#)
A/, re-issue last AT command, [186](#)
!ANTSEL, set/query external antenna select configuration, [27](#)
!AUAUDIO, play/record audio file, [157](#)
!AUAUDIOLPBK, start/stop audio loopback, [158](#)
!AVCFG, bind audio profile to device+physical interface, [159](#)
!AVDEF, reset audio parameters in NV to default values, [160](#)
!AVEC, enable/disable Echo Cancellation mode for audio profile, [161](#)
!AVFLTREN, enable/disable an audio profile's Rx or Tx FIR or IIR filter, [162](#)
!AVMUTE, mute/unmute earpiece/microphone/call waiting tone, [163](#)
!AVNS, enable/disable Noise Suppression mode for audio profile, [164](#)
!AVRXAGC, enable/disable Rx AGC, [164](#)
!AVRXAVC, enable/disable Rx AVC, [165](#)
!AVRXG, set decoder gain, [166](#)
!AVSETPROFILE, select audio profile for CS calls, [167](#)
!AVSETVOL, set Rx volume level, [168](#)
!AVSTG, set audio front end sidetone gain, [169](#)
!AVTONEPLAY, play predefined tone, [170](#)
!AVTXAGC, enable/Tx AGC, [171](#)
!AVTXG, set encoder gain, [172](#)
!AVTXVOL, set Tx volume gain, [173](#)

B

!BAND, set/query frequency bands, [28](#)
!BCFWUPDATESTATUS, report status of last firmware update attempt, [68](#)
!BOOTHOLD, reset modem and wait for f/w download, [29](#)

C

&C, set data carrier detected, [185](#)
C, ITU T v.24 circuit 109 carrier detect signal behavior command, [188](#)
+CACM, accumulated call meter, [188](#)
+CACSP, voice group or voice broadcast call state attribute presentation, [188](#)
+CAEMLPP, eMLPP priority registration and interrogation, [188](#)
+CAHLD, leave an ongoing voice group or voice broadcast call, [188](#)
+CAJOIN, accept incoming voice group or voice broadcast call, [188](#)
+CALA, alarm, [188](#)
+CALCC, list current voice group and voice broadcast call, [188](#)

+CALD, delete alarm, [188](#)
+CALM, alert sound mode, [188](#)
+CAMM, accumulated call meter maximum, [188](#)
+CANCHEV, NCH support indication, [188](#)
+CAOC, advice of charge, [188](#)
+CAPD, postpone or dismiss an alarm, [188](#)
+CAPTT, talker access for voice group call, [188](#)
+CAREJ, reject incoming voice group or voice broadcast call, [188](#)
+CAULEV, voice group call uplink status presentation, [188](#)
+CBC, battery charge, [189](#)
+CBM, cell broadcast message directly displayed, [187](#)
+CBMI, cell broadcast message stored in memory at specified location, [187](#)
+CBST, select bearer service type, [189](#)
+CCCM, current call meter value, [189](#)
+CCFC, call forwarding number and conditions, [189](#)
+CCLK, clock, [189](#)
+CCUG, closed user group, [189](#)
+CCWA, call waiting, [189](#)
+CCWE, call meter maximum event, [189](#)
+CDIP, called line identification presentation, [189](#)
+CDIS, display control, [189](#)
+CDS, SMS status report after sending a SMS, [187](#)
+CDSI, incoming SMS status report, [187](#)
+CEER, extended error report, [189](#)
+CFUN, set phone functionality, [189](#)
+CGACT, PDP context activate or deactivate, [189](#)
+CGANS, manual response to network request for PDP context activation, [189](#)
+CGATT, PS attach or detach, [189](#)
+CGAUTO, automatic response to network request for PDP context activation, [189](#)
+CGCLASS, GPRS mobile station class, [189](#)
+CGCLOSP, configure local octet stream PAD parameters, [189](#)
+CGCMOD, PDP context modify, [189](#)
+CGDATA, enter data state, [189](#)
+CGDCONT, define PDP context, [189](#)
+CGDSCONT, define secondary PDP context, [189](#)
+CGEQMIN, 3G QoS profile (minimum acceptable), [189](#)
+CGEQNEG, 3G QoS profile (negotiated), [189](#)
+CGEQREQ, 3G QoS profile (requested), [189](#)
+CGEREP, packet domain event reporting, [189](#)
+CGEV, GPRS network event indication, [190](#)
+CGIEV, indicator event, [190](#)
+CGMI, request manufacturer identification, [190](#)
+CGMM, request model identification, [190](#)
+CGMR, request revision identification, [190](#)
+CGPADDR, show PDP address, [190](#)
+CGQMIN, QoS profile (minimum acceptable), [190](#)
+CGQREQ, QoS profile (requested), [190](#)
+CGREG, GPRS network registration status, [190](#)
+CGSMS, select service for MO SMS messages, [190](#)
+CGSN, request product serial number identification, [190](#)

- +CGTFT, traffic flow template, [190](#)
- +CGXCONT, 3GPP2 profiles, update/display, [30](#)
- +CHLD, call-related supplementary services, [190](#)
- +CHSA, HSCSD non-transparent asymmetry configuration, [190](#)
- +CHSC, HSCSD current call parameters, [190](#)
- +CHSD, HSCSD device parameters, [190](#)
- +CHSR, HSCSD parameters report, [190](#)
- +CHST, HSCSD transparent call configuration, [190](#)
- +CHSU, HSCSD automatic user initiated upgrading, [190](#)
- +CHUP, hangup call, [190](#)
- +CIMI, request international mobile subscriber identity, [190](#)
- +CIND, indicator control, [190](#)
- +CKEV, key press or release event, [190](#)
- +CKPD, keypad control, [190](#)
- +CLAC, list all available AT commands, [190](#)
- +CLAE, language event, [190](#)
- +CLAN, set language, [190](#)
- +CLCC, list current calls, [190](#)
- +CLCK, facility lock, [190](#)
- +CLIP, calling line identification presentation, [190](#)
- +CLIR, calling line identification restriction, [191](#)
- +CLVL, sets/returns internal loudspeaker volume, [191](#)
- +CMAR, master reset, [191](#)
- +CME ERROR, mobile termination error result code, [191](#)
- +CMEC, mobile termination control mode, [191](#)
- +CMEE, report mobile termination error, [191](#)
- +CMER, mobile termination event reporting, [191](#)
- +CMGC, send command, [187](#)
- +CMGD, delete message, [187](#)
- +CMGF, message format, [187](#)
- +CMGL, list messages, [187](#)
- +CMGP, preview SMS message, [174](#)
- +CMGR, read message, [187](#)
- +CMGS, send message, [187](#)
- +CMGW, write message to memory, [187](#)
- +CMMS, more messages to send, [187](#)
- +CMNA, new message acknowledgement to ME/TA, [187](#)
- +CMOD, call mode, [191](#)
- +CMS ERROR, SMS error (mobile or network error), [187](#)
- +CMSS, send message from storage, [187](#)
- +CMT, incoming message directly displayed, [187](#)
- +CMTI, incoming message stored at specific memory location, [187](#)
- +CMUT, enables/disables uplink voice muting, [191](#)
- +CMUX, multiplexing mode, [191](#)
- +CNMA, new message acknowledgement to ME, [187](#)
- +CNMI, new message indications to TE, [187](#)
- *CNTI, display network type (current, available, supported), [175](#)
- +CNUM, subscriber number, [191](#)
- +COLP, connected line identification presentation, [191](#)
- +COPN, read operator names, [191](#)
- +COPS, operator selection, [191](#)
- +CPAS, phone activity status, [191](#)
- +CPBR, read phonebook entries, [191](#)
- +CPBS, select phonebook memory storage, [191](#)
- +CPBW, write phonebook entry, [191](#)
- +CPFB, find phonebook entries, [191](#)
- +CPIN, enter PIN, [191](#)
- +CPINR, display remaining number of SIM unlock retries, [136](#)
- +CPLS, Preferred PLMN list selection, [191](#)
- +CPMS, preferred message storage, [187](#)
- +CPOL, preferred operator list, [191](#)
- +CPROT, enter protocol mode, [191](#)
- +CPUC, price per unit and currency table, [191](#)
- +CPWC, power class, [191](#)
- +CPWD, change password, [191](#)
- +CR, service reporting control, [191](#)
- +CRC, cellular result code, [191](#)
- +CREG, network registration, [192](#)
- +CRES, restore settings, [187](#)
- +CRING, incoming call type, [192](#)
- +CRLP, radio link protocol, [192](#)
- +CRMP, ring melody playback, [192](#)
- +CRSL, ringer sound level, [192](#)
- +CRSM, restricted SIM access, [192](#)
- +CSAS, save settings, [188](#)
- +CSCA, service center address, [188](#)
- +CSCB, select cell broadcast message type, [188](#)
- +CSCC, secure control command, [192](#)
- +CSCS, select TE character set, [192](#)
- +CSDF, settings date format, [192](#)
- +CSDH, show text mode parameters, [188](#)
- +CSGT, set greeting text, [192](#)
- +CSIL, silence command, [192](#)
- +CSIM, generic SIM access, [192](#)
- +CSMP, set text mode parameters, [188](#)
- +CSMS, select message service, [188](#)
- +CSNS, single numbering scheme, [192](#)
- +CSQ, signal quality, [192](#)
- +CSSN, supplementary service notifications, [192](#)
- +CSTA, select type of address, [192](#)
- +CSTF, settings time format, [192](#)
- +CSVM, set voice mail number, [192](#)
- +CTFR, call deflection, [192](#)
- +CTZR, time zone reporting, [192](#)
- +CTZU, automatic time zone update, [192](#)
- +CUSD, unstructured supplementary service data, [192](#)
- !CUSTOM, customization settings, [32](#)
 - AUTONETWORKMODE, revert to automatic mode?, [32](#)
 - CFUNPERSISTEN, AT+CFUN setting persists across power cycle?, [32](#)
 - CMCLIENT, Assign default communication manager, [32](#)
 - CSVOICEREJECT, enable incoming voice call pages ignore, [33](#)
 - FASTENUMEN, Enable/disable fast enumeration, [33](#)
 - FLOWNOTIDISABLE, Enable/disable QMI notification events, [33](#)
 - GMMCAUSE7REMAP, Enable/disable remapping of GMM Cause 7 instances to GMM Cause 14, [33](#)
 - GOBIIMEN, Enable/disable Gobi Image Management, [33](#)
 - GPIOARENABLE, Control SAR backoff by GPIOs or by AT commands, [33](#)
 - GPSENABLE, enable GPS, [34](#)
 - GPSLPM, enable GPS in low power mode, [34](#)
 - GPSREFLOC, enable GPS location reporting, [34](#)
 - GPSSEL, select GPS antenna type, [34](#)
 - IMSIREFRESH, allow/prohibit IMSI Reresh during active PDP context, [34](#)

- ISVOICEN, enable voice functionality, [34](#)
 LTEREJDELAY, Set delay before LTE attach requests are sent, [34](#)
 NETWORKNAMEFMT, set MBIM provider name format for vanui (roaming), [35](#)
 NMEAENABLE, Enable/disable NMEA port, [35](#)
 NOROAM, enable roaming indicator display, [35](#)
 PCSCDISABLE, set PCSC functionality, [35](#)
 QMIDETACHEN, Enable/disable QMI NAS, [35](#)
 REL8FASTDORMDIS, Release 8 fast dormancy, enable/disable, [35](#)
 RRCREL7CAPDIS, RRC Release 7 capability, configure, [35](#)
 SIMHOTSWAPDIS, Configure SIM hotswap feature, [35](#)
 SIMLPM, set default low power mode SIM power state, [36](#)
 SINGLEAPNSWITCH, device behaviour when APN details change, customize, [36](#)
 SKUID, set device SKU ID, [36](#)
 STKUIEN, enable SIM toolkit UI, [36](#)
 UBISTENABLE, Enable/disable UBIST support, [36](#)
 USBSERIALENABLE, use IMEI as USB serial number, [36](#)
 WAKEHOSTEN, Host wake-up method, enable/disable, [36](#)
 WIN7MBOPTIONS, Windows 7 Mobile Broadband options, configure, [36](#)
 !CUSTOM, customization settings, set/query, [101](#)
 +CV120, v.120 rate adaption protocol, [192](#)
 +CVHU, voice hangup control, [192](#)
 +CVIB, vibrator mode, [192](#)
- ## D
- &D, set DTR function mode, [185](#)
 D, dial, [186](#)
 D, ITU T V.25ter dial command, [192](#)
 D'99"><n>#, set up packet data call based on profile ID #<n>, [192](#)
 D'99#, set up packet call based on profile ID #1, [192](#)
 D>>MEM><N>, originate call to phone number in memory, [186](#)
 D>>N>, originate call to phone number in current memory, [186](#)
 D>>STR>, originate call to phone number corresponding to a/n field, [186](#)
 !DAFTMACT, put modem into FTM mode, [11](#), [71](#), [74](#)
 !DAFTMDEACT, put modem into online mode, [74](#)
 !DALGAVGAGC, return averaged AGC in LTE mode, [81](#)
 !DAGGAVGRSSI, return averaged RSSI, [75](#)
 !DAGGRSSI, return RSSI, [75](#)
 !DAGGRSSIRAW, return raw RSSI, [76](#)
 !DAGINFO, return GSM RF information, [77](#)
 !DAGSLOCK, return synthesizer lock state, [78](#)
 !DAGSRXBURST, set GSM receiver to burst mode, [78](#)
 !DAGSRXCONT, set GSM receiver continuously on, [79](#)
 !DAGSTXBURST, set GSM transmitter to burst mode, [79](#)
 !DAGSTXFRAME, set GSM Tx frame structure, [80](#)
 !DALGRXAGC, return Rx AGC (LTE mode), [82](#)
 !DALGTXAGC, return Tx AGC (LTE mode), [83](#)
 !DALSPARANGE, set PA range (LTE mode), [84](#)
 !DALSRXBW, set Rx bandwidth (LTE mode), [85](#)
 !DALSTXBW, set Tx bandwidth (LTE mode), [85](#)
 !DALSTXINDEX, set Tx gain index(LTE mode), [86](#)
 !DALSWAVEFORM, set Tx waveform (LTE mode), [86](#)
 !DAOFFLINE, place modem offline, [87](#)
 !DARPEN, DARP for SAIC, enable/disable, [37](#)
 !DASBAND, set frequency band, [11](#), [71](#), [88](#)
 !DASCHAN, set modem channel (frequency), [89](#)
 !DASLNAGAIN, set LNA gain state, [90](#)
 !DASPDM, set PDM value, [91](#)
 !DASTXOFF, turn Tx PA off, [91](#)
 !DASTXON, turn Tx PA on, [92](#)
 !DAWGAVGAGC, return averaged Rx AGC (WCDMA), [92](#)
 !DAWGRXAGC, return Rx AGC, [93](#)
 !DAWINFO, return WCDMA RF information, [94](#)
 !DAWSCHAINTCM, place WCDMA receive chain in test call mode, [97](#)
 !DAWSCONFIGRX, set WCDMA receiver to factory settings, [95](#)
 !DAWSPARANGE, set PA range state machine, [96](#)
 !DAWSSCHAIN, enable secondary receive chain, [96](#)
 !DAWSTXCW, select transmitter waveform, [97](#)
 !DAWSTXPWR, set Tx power level, [98](#)
 !\$DIAG, DIAG service, enable/disable, [37](#)
 DL, redial last phone number used, [186](#)
 +DR, V42bis compression report, [185](#)
 +DS, V42bis data compress, [185](#)
 !DTMEN, enable/disable DTM and ETM, [38](#)
- ## E
- E, set command echo mode, [186](#)
 !EDAEN, enable/disable EDA, [38](#)
 !ENTERCND, enable protected command access, [11](#), [22](#), [23](#)
 !ERR, display diagnostic information, [69](#)
- ## F
- &F, set current parameters to defaults, [185](#)
- ## G
- +GCAP, Request complete TA capabilities list, [185](#)
 !GCCLR, clear crash dump data, [69](#)
 !GCDUMP, display crash dump data, [69](#)
 !GCFEN, enable/disable GCF test mode, [39](#)
 !GCFUIMTYPE, query/set SIM type, [39](#)
 !GETBAND, return current active band, [40](#)
 !GETRAT, return current active RAT, [40](#)
 +GMI, request manufacturer identification, [185](#)
 +GMM, request TA model identification, [186](#)
 +GMR, request TA revision identification, [12](#), [186](#)
 !GOBIIMPREF, query/set Gobi Image management preferences, [41](#)
 +GOI, request global object identification, [186](#)
 !GPSAUTOSTART, configure GPS auto-start features, [103](#)

!GPSCLRASSIST, clear selected GPS assistance data, [104](#)
!GPSOLDSTART, clear all GPS assistance data, [104](#), [105](#)
!GPSEND, end active position fix session, [105](#), [132](#)
!GPSFIX, initiate GPS position fix, [106](#), [123](#), [132](#), [134](#)
!GPSKEEPWARM, query/set/clear Keep Warm, [107](#)
!GPSLBSAPN, set GPS LBS APNs, [108](#)
!GPSLOC, return last known modem location, [106](#), [110](#), [124](#)
!GPSMOMETHOD, query/set GPS MO method, [111](#)
!GPSMTLRSSETTINGS, query/set MT location request settings, [112](#)
!GPSNIQOSTIME, query/set GPS QoS timeout period, [112](#)
!GPSNMEA, enable/disable GPS session autostart when NMEA opens, [113](#)
!GPSNMEACONFIG, enable/set NMEA data output rate, [114](#)
!GPSNMEASENTENCE, set/get NMEA sentence type, [115](#), [116](#)
!GPSONLY, configure GNSS mode, [117](#)
!GPSPORTID, query/set TCP/IP port ID, [117](#)
!GPSPOSMODE, configure GPS positioning mode support, [118](#)
!GPSSATINFO, request satellite information, [119](#)
!GPSSTATUS, request position fix session status, [106](#), [120](#), [124](#), [132](#)
!GPSUPLURL, query/set SUPL server URL, [121](#)
!GPSUPLVER, query/set SUPL server version, [122](#)
!GPSTRACK, initiate multiple-fix tracking session, [123](#), [132](#)
!GPSTRANSSEC, control GPS transport security, [124](#)
!GPSXTRAAPN, set GPS XTRA APNs, [125](#)
!GPSXTRADATAENABLE, query/set GPS XTRA settings, [127](#)
!GPSXTRADATAURL, query/set GPS XTRA data server URL, [128](#)
!GPSXTRAINITDNLD, initiate gpsOneXTRA download and inject operation, [128](#)
!GPSXTRASTATUS, current gpsOneXTRA status, [129](#)
!GPSXTRATIME, inject GPS or UTC time information to gpsOneXTRA, [130](#)
!GPSXTRATIMEENABLE, query/set GPS XTRA time settings, [131](#)
!GPSXTRATIMEURL, query/set GPS XTRA SNTP server URL, [132](#)
!GRESET, reset the modem, [42](#)
+GSN, request TA serial number identification, [186](#)
!GSTATUS, return operational status, [42](#)
!GVER, return firmware version, [42](#)
!GVERBT, return bootloader version, [43](#)

H

H, disconnect existing connections, [186](#)
!HOSTDEVINFO, set/report host device details, [140](#)
!HWID, display hardware version, [43](#)

I

I, display product identification information, [186](#)
!ICCID, return SIM card's ICCID, [137](#)
+ICF, set TE-TA control character framing, [186](#)
!IDSAUTOFOTA, configure automatic settings for FOTA updates, [141](#)

!IDSAUTOSDM, configure SDM response to server request, [142](#)
!IDSCONFIGACC, configure DM account authentication mode and XML format, [143](#)
!IDSCREATEACC, enter DM account credentials, [144](#)
!IDSDFLTACC, set DM account for device-initiated sessions, [145](#)
!IDSPID, set profile ID for DM data connection types, [145](#)
!IDSR0AM, configure DM client roaming support, [146](#)
!IDSSUPPORT, configure DM sessions, [147](#)
+IFC, set TE-TA local data flow control, [186](#)
+ILRR, set TE-TA local rate reporting mode, [186](#)
!IMSTESTMODE, enable/disable IMS test mode, [148](#)
+IPR, set fixed local rate, [186](#)

L

L, set monitor speaker loudness, [186](#)
!LTEINFO, display LTE network information, [44](#)
!LTENAS, configure LTE NAS settings, [46](#)

M

M, set monitor speaker mode, [186](#)
!MADC, display ADC values, [176](#)
!MAXPWR, query/set maximum Tx power for specific band, [152](#)
!MLDTMFEN, enable/disable DTMF, [176](#)
^MODE, query/set system mode indication state, [47](#)

N

!NASREL, query/set NAS release compliance version, [47](#), [58](#)
!NVENCRYPTIMEI, write IMEI to modem, [48](#)
!NVNSCODE, return Network Subset codes, [49](#)
!NVPLMN, provision PLMN list for Network Personalization, [50](#)
!NVSPCODE, return service provider code list, [50](#)

O

O, switch from command mode to data mode, [186](#)
!OSINFO, set/report host device operating system information, [149](#)

P

P, select pulse dialing, [186](#)
!PACKAGE, return package version string, [51](#)
!PATEMP, return current PA temperature information, [51](#)
!PCINFO, return power control status information, [52](#)
!PCOFFEN, query/set Power Off Enable state, [52](#)
!PCTEMP, return current temperature information, [53](#)
!PCTEMPLIMITS, query/set temperature state limits, [54](#)
!PCVOLT, return current power supply voltage information, [55](#)
!PCVOLTLIMITS, query/set power supply voltage state limits, [56](#)
!POWERDOWN, power down the system, [57](#)
!PRIID, query/set PRI part number and revision, [57](#)

+PRLVER, display PRL version, [177](#)

Q

Q, set result code presentation mode, [186](#)

R

IREL, query/set active protocol/revision, [47](#), [58](#)
 IRESET, reset the modem, [58](#)
 IRMARESET, restore device to original settings, [100](#)
 IRXDEN, enable/disable WCDMA Rx diversity, [70](#)

S

&S, set DSR signal, [185](#)
 S0, set number of rings before auto-answer, [186](#)
 S10, set disconnect delay after indicating absence of data carrier, [186](#)
 S3, set command line termination character, [186](#)
 S4, set response formatting character, [186](#)
 S5, set command line editing character, [186](#)
 S6, set pause before blind dialing, [186](#)
 S7, set number of seconds to wait for connection completion, [186](#)
 S8, set number of seconds to wait when comma dial modifier used, [187](#)
 ISARINTGPIOMODE, query/set default pull mode for SAR GPIOs, [153](#)
 ISCACT, activate/deactivate data connection, [59](#)
 ISELACQ, select RAT acquisition order, [60](#)
 ISELMODE, query/set current service domain, [61](#)
 ISETCND, set AT command password, [23](#)
 ISIMRSTC, enable/disable SIM refresh reset notification, [61](#)

T

&T, auto tests, [185](#)

T, select tone dialing, [187](#)

U

!UDINFO, return information from active USB descriptor, [62](#)
 !UDPID, query/set USB descriptor product ID, [63](#)
 !UDUSBCOMP, query/set USB interface configuration, [64](#)

V

&V, return AT configuration parameters, [65](#), [185](#)
 V, set result code format mode, [187](#)
 +VTD, set DTMF tone duration, [177](#)
 +VTD, tone duration, [192](#)
 +VTS, DTMF and arbitrary tone generation, [193](#)
 +VTS, send DTMF tone, [178](#)
 +VTSBST, send burst DTMF tone, [179](#)

W

&W, Store parameter to user-defined profile, [185](#)
 +WANTGNSSPWR, enable GNSS power, [180](#)
 +WANTS, check GNSS antenna, [180](#)
 +WFSH, send flash to base station, [181](#)
 +WIOR, read GPIO value, [182](#)
 +WIOW, write GPIO value, [182](#)
 +WS46, PCCA STD 101 select wireless network, [193](#)
 +WSOS, enter/exit emergency mode, [183](#)

X

X, set connect result code format and call monitoring, [187](#)

Z

Z, set all current parameters to user-defined profile, [187](#)

Index

Symbols

+++ , 12

Numerics

3GPP
27.005 commands, list, 187
27.007 commands, list, 188
3GPP2 profiles, update/status display, 30

A

ADC values, display, 176
AGC
averaged Rx value (LTE mode), return, 81
averaged Rx value (WCDMA), return, 92
read Rx AGC in dBm for CDMA and WCDMA modes, 148
Rx
value, WCDMA mode, 94
Rx value (LTE), return, 82
Tx
value, WCDMA mode, 94
Tx value (LTE), return, 83
AGC, Rx
enable/disable, 164, 171
airplane mode. See Low Power Mode
antenna
select configuration, external, 27
ASCII table, 197
AT command parameters, display, 65
AT commands
3GPP 27.005 commands, list, 187
3GPP 27.007 commands, list, 188
access, password, 11
GPS command error codes, 132, 134
guard timing, escape sequence, 12
ITU-T V.250 commands, list, 185
password commands, 18, 21, 25, 155
password protected, access, 22
password, changing, 23
timing, entry, 11
audio file
play/record, 157
audio loopback
set up Vocoder/Audio/PCM/Internal codec, 158
audio parameters
reset (in NV) to default values, 160
audio profile
bind to device+physical interface, 159
CS calls, select, 167
filter enable/disable, FIR/IIR, 162
Rx volume level, set, 168
automatic network mode, customization, 32
AVC, Rx

enable/disable, 165

B

band
current active band, return, 40
current GSM, return, 42
current WCDMA, return, 42
set, 88
bands
available, 28
current, 28
set, 28
bandwidth
LTE, set Rx, 85
LTE, set Tx, 85
boot and hold. See bootloader.
bootloader
version, return, 43
wait for firmware update, 29
bootup time, return, 42
burst mode
GSM receiver enable/disable, 78
GSM transmitter enable/disable, 79

C

call holding, send flash to initiate, 181
call waiting tone
mute/unmute, 163
+CFUN persistence, customization, 32
channel
set, 89
channel number
current GSM, return, 42
current WCDMA, return, 42
codec, internal
audio loopback setup, 158
command access password, 11
communication manager client, assign default, 32
control plane, GPS MO method, 111
crash data
display, 69
crash dump data, clear, 69
CS calls
select audio profile, 167
customization
modem functions, 32

D

DARP, enable/disable for SAIC, 37
data connection, activate/deactivate, 59
decoder gain, set, 166
device behaviour when APN details change, customize, 36

DIAG service, enable/disable, [37](#)
 diagnostic
 commands, list, [67](#)
 information, display, [69](#)
 diversity, receive, enable/disable, [70](#)
 DM
 account authentication mode, [143](#)
 account credentials, [144](#)
 account, set, [145](#)
 client roaming option, [146](#)
 FOTA configuration, [141](#)
 host device details, [140](#)
 host device operating system information, [149](#)
 profile IDs for data connections, [145](#)
 SDM response option, [142](#)
 session types, support for, [147](#)
 XML format, [143](#)
 document
 format conventions, [19](#)
 Downlink Advanced Receiver Performance, enable/disable for SAIC, [37](#)
 DTM
 enable/disable, [38](#)
 DTMF tone
 burst, send, [179](#)
 duration, set, [177](#)
 send, [178](#)
 DTMF, enable/disable, [176](#)
 Dual Transfer Mode. See DTM.

E

earpiece
 mute/unmute, [163](#)
 Echo Cancellation mode, enable/disable, [161](#)
 EDA, enable/disable, [38](#)
 emergency mode, enter/exit, [183](#)
 encoder gain, set, [172](#)
 error conditions, display log, [69](#)
 escape sequence guard time, [12](#)
 Extended Dynamic Allocation, enable/disable, [38](#)

F

factory settings, reset WCDMA receiver, [95](#)
 factory test mode. See FTM.
 fast enumeration, enable/disable, [33](#)
 FIR filter, enable/disable, [162](#)
 firmware
 update, wait in bootloader mode, [29](#)
 version, return, [42](#)
 firmware update, status of last attempt, [68](#)
 firmware, upgrading, [12](#)
 flash, send to base station, [181](#)
 flight mode. See Low Power Mode
 format
 documentation conventions, [19](#)
 frequency

 band, set, [88](#)
 channel, set, [89](#)
 offset, display, GSM, [77](#)
 frequency bands. See bands.
 FTM
 activate FTM modem mode, [74](#)
 deactivate FTM modem mode, [74](#)

G

gain
 sidetone, set, [169](#)
 gain, decoder
 set, [166](#)
 gain, encoder
 set, [172](#)
 GCF testing
 SIM type, return, [39](#)
 test mode, enable/disable, [39](#)
 Global Certification Forum testing. See GCF testing.
 GLONASS, enable/disable, [117](#)
 GMM Cause 7 to 14 remapping, enable/disable, [33](#)
 GMM state, return, [42](#)
 GNSS
 antenna, check, [180](#)
 power, enable, [180](#)
 set mode (GPS or GPS+GLONASS), [117](#)
 Gobi Image Management
 preferences, set, [41](#)
 Gobi Image Management, enable/disable, [33](#)
 GPIO
 SAR interrupt, pull mode (default), [153](#)
 GPIO, read value, [182](#)
 GPIO, write value, [182](#)
 GPS
 accuracy, configure, [103](#)
 almanac data, clear, [104](#)
 altitude, last fix, [110](#)
 assistance data
 clear all, [105](#)
 clear specific, [104](#)
 AT command error codes, [132](#), [134](#)
 auto-start features, configure, [103](#)
 command list, [16](#), [17](#), [101](#)
 ephemeris data, clear, [104](#)
 fix period, configure, [103](#)
 fix session
 end, [105](#)
 initiate, [106](#)
 status, report, [120](#)
 fix type
 configure, [103](#)
 last fix, [110](#)
 fix wait time, configure, [103](#)
 gpsOneXTRA. See GPS, XTRA.
 heading, last fix, [110](#)
 horizontal estimated positional error, last fix, [110](#)
 ionosphere data, clear, [104](#)
 keep warm functionality, set/clear/query, [107](#)

- latitude, last fix, [110](#)
 - LBS APNs, set, [108](#)
 - location details, most recent, [110](#)
 - location request settings, query/set, [112](#)
 - location uncertainty angle, last fix, [110](#)
 - longitude, last fix, [110](#)
 - low power mode, enable/disable, [34](#)
 - MO method, query/set, [111](#)
 - multiple fix (tracking) session, initiate, [123](#)
 - port ID over TCP/IP, query/set, [117](#)
 - position data, clear, [104](#)
 - positioning mode support, enable/disable, [118](#)
 - QoS timeout period, query/set, [112](#)
 - reference location reporting, enable/disable, [34](#)
 - satellite information, request, [119](#)
 - select antenna, [34](#)
 - session autostart when NMEA opens, [113](#)
 - SUPL server URL, query/set, [121](#)
 - SUPL server version, query/set, [122](#)
 - support, customization, [34](#)
 - time reference, clear, [104](#)
 - time, last fix, [110](#)
 - tracking (multiple fix) session, initiate, [123](#)
 - transport security, enable/disable, [124](#)
 - uncertainty, last fix, [110](#)
 - velocity, last fix, [110](#)
 - XTRA
 - data configuration settings, query/set, [127](#)
 - data download and inject, initiate, [128](#)
 - data injection status, report, [129](#)
 - data server URLs, query/set, [128](#)
 - data, enable/disable, [127](#)
 - SNTP server URLs, query/set, [132](#)
 - time information, query/set, [131](#)
 - time injection operation, [130](#)
 - time injection status, report, [129](#)
- GSM
- Algorithm and Authenticate, enable/disable, [35](#)
 - channel, display, [77](#)
 - receiver burst mode, enable/disable, [78](#)
 - receiver continuous on, enable/disable, [79](#)
 - RF information, display, [77](#)
 - transmitter burst mode, enable/disable, [79](#)
 - Tx slots, configure, [80](#)
- guard time, AT escape sequence, [12](#)
- H**
- hardware version, display, [43](#)
 - Host wake-up method, enable/disable, [36](#)
- I**
- I offset
 - display, GSM, [77](#)
 - ICCID, display, [137](#)
 - IIR filter, enable/disable, [162](#)
- IMEI
- using as serial number, [36](#)
 - write to modem, unencrypted, [48](#)
- IMSI refresh, allow/prohibit during active PDP context, [34](#)
- indicator
- roaming, enable/disable, [35](#)
- ITU-T V.250 commands, list, [185](#)
- K**
- keep warm, GPS, set/clear/query, [107](#)
- L**
- LNA gain state
- display, GSM, [77](#)
 - display, WCDMA, [94](#)
 - set, [90](#)
- Low Noise Amplifier. See LNA.
- LPM
- SIM, default state, [36](#)
- LPM. See Low Power Mode
- LTE
- averaged AGC, return, [81](#)
 - bandwidth, set Rx, [85](#)
 - bandwidth, set Tx, [85](#)
 - network information, display, [44](#)
 - PA range, set, [84](#)
 - Tx gain index, set, [86](#)
 - Tx waveform, set, [86](#)
- LTE attach request delay, set, [34](#)
- M**
- manual network mode, customization, [32](#)
 - memory management
 - command list, [99](#)
 - microphone
 - mute/unmute, [163](#)
 - MM
 - state and substate, return, [42](#)
 - mode acquired by modem, return, [42](#)
 - mode, configure for testing, [71](#)
 - modem
 - channel, set, [89](#)
 - customizations, [32](#)
 - frequency band, set, [88](#)
 - FTM mode
 - activate, [74](#)
 - deactivate, [74](#)
 - IMEI, write unencrypted, [48](#)
 - mode, return, [42](#)
 - MSC revision, query/set, [58](#)
 - online mode, activate, [74](#)
 - operational status, return, [42](#)
 - place offline, [87](#)
 - PRI part number and revision, query/set, [57](#)
 - protocol, WCDMA, query/set, [58](#)

reset, [42](#), [58](#)
 reset, wait for firmware update, [29](#)
 SGSN revision, query/set, [58](#)
 SKU ID, assign, [36](#)
 temperature
 limits, query/set, [54](#)
 voltage limits, query/set, [56](#)
 MSC revision, query/set, [58](#)
 mute, enable/disable, [163](#)

N

NAS, release compliance version, query/set, [47](#)
 network
 mode, automatic or manual, customization, [32](#)
 personalization
 PLMN list provisioning, [50](#)
 Network Subset codes, return, [49](#)
 Network Subset Personalization locking, subset codes for, [49](#)
 network type, display, [175](#)
 NMEA data output rate, enable/set, [114](#)
 NMEA port, enable/disable, [35](#)
 NMEA sentence type, get/set, [115](#), [116](#)
 NMEA streaming, GPS session autostart, [113](#)
 Noise Suppression mode, enable/disable, [164](#)
 Non-Access Stratum. See NAS.

O

offline, place modem, [87](#)
 OMA-DM
 command list, [139](#), [151](#)

P

PA
 range state machine, WCDMA, [96](#)
 state, WCDMA, [94](#)
 PA range, set, [84](#)
 PA temperature
 current, return, [51](#)
 state, return, [51](#)
 package, return string from modem, [51](#)
 packet data protocol. See PDP.
 PAD
 command list, [18](#)
 password
 changing, [23](#)
 commands, list, [18](#), [21](#), [25](#), [155](#)
 protected commands, access, [22](#)
 requirements, [11](#)
 PCM
 audio loopback setup, [158](#)
 PCSC, enable/disable, [35](#)
 PDM, adjust, [91](#)
 PDP
 context, configure SIO port mapping, [46](#)
 PLMN

 network personalization, provisioning, [50](#)
 power
 control status details, return, [52](#)
 power off, W_Disable, [52](#)
 Tx (max), set/query, [152](#)
 power amplifier
 Tx, turn off, [91](#)
 Tx, turn on, [92](#)
 power down system, [57](#)
 PRI, part number and revision, query/set, [57](#)
 PRL version, display, [177](#)
 product ID, set in USB descriptor, [63](#)
 PS state, return, [42](#)

Q

Q offset, display, GSM, [77](#)
 QMI notification events, enable/disable, [33](#)

R

radio access technology. See RAT.
 radio frequency. See RF.
 RAT
 current, display description, [40](#)
 RAT acquisition order, select, [60](#)
 receive chain (WCDMA)
 secondary, enable/disable, [96](#)
 test call mode, [97](#)
 receive diversity, enable/disable, [70](#)
 reference documents, location, [12](#)
 Release 5
 active protocol, query/set, [58](#)
 MSC revision, query/set, [58](#)
 NAS release compliance version query/set, [47](#)
 SGSN revision, query/set, [58](#)
 Release 6
 active protocol, query/set, [58](#)
 Release 7
 active protocol, query/set, [58](#)
 Release 8 fast dormancy, enable/disable, [35](#)
 Release 97
 MSC revision, query/set, [58](#)
 SGSN revision, query/set, [58](#)
 Release 99
 active protocol, query/set, [58](#)
 MSC revision, query/set, [58](#)
 NAS release compliance version query/set, [47](#)
 SGSN revision, query/set, [58](#)
 release compliance version, NAS, query/set, [47](#)
 reset
 WCDMA receiver, [95](#)
 reset modem, [29](#), [42](#), [58](#)
 restore device to original settings, [100](#)
 result codes, displaying in document, [12](#)
 RF
 GSM information, display, [77](#)
 WCDMA information, display, [94](#)

roaming indicator, enable/disable, [35](#)
 RRC Release 7 capability, configure, [35](#)
 RSSI
 display, [77](#)
 GSM receiver burst mode, enable/disable, [78](#)
 value
 display averaged value, [75](#)
 display raw value, [76](#)
 display value using calibration offset, [75](#)
 Rx
 AGC reading (LTE), return, [82](#)
 AGC reading, return, [93](#)
 averaged AGC reading (LTE mode), return, [81](#)
 averaged AGC reading (WCDMA), return, [92](#)
 value, return, [93](#)

S

SAIC,enable/disable DARP, [37](#)
 SAR backoff control method, [33](#)
 scripts
 testing, command timing, [11](#)
 serial number, using IMEI as, [36](#)
 service
 domain, query/set, [61](#)
 service provider codes list, return, [50](#)
 SGSN revision, query/set, [58](#)
 sidetone gain
 set, [169](#)
 SIM
 default state in low power mode, [36](#)
 enable/disable SIM refresh reset notification, [61](#)
 ICCID, display, [137](#)
 unlock retries remaining, [136](#)
 SIM hotswap, configure, [35](#)
 SIM Toolkit. See STK.
 SIM
 return SIM type, GCF testing, [39](#)
 Single Antenna Interference Cancellation
 enable/disable DARP, [37](#)
 SIO port mapping, configure PDP context, [46](#)
 SKU ID, assign, [36](#)
 slots, Tx, configure for GSM, [80](#)
 SMS
 preview message, [174](#)
 SNR
 display, GSM, [77](#)
 stack
 DTM, enable/disable, [38](#)
 STK
 UI, enable/disable, [36](#)
 synthesizer lock state, display, [78](#)
 system
 power down, [57](#)
 system mode indication, enable/disable, [47](#)

T

temperature
 current, return, [53](#)
 limits, query/set, [54](#)
 return, [42](#)
 state, return, [53](#)
 temperature, PA
 state, return, [51](#)
 temperature,PA
 current, return, [51](#)
 test
 scripts, command timing, [11](#)
 testing
 command list, [72](#)
 configure modem mode, [71](#)
 three-way calling, send flash to initiate, [181](#)
 timing
 AT command entry, [11](#)
 AT guard time, [12](#)
 offset, display, GSM, [77](#)
 test script commands, [11](#)
 tone, play, [170](#)
 transmitter waveform type, selection, [97](#)
 Tx
 AGC reading (LTE), return, [83](#)
 power amplifier
 turn off, [91](#)
 turn on, [92](#)
 power level, set, [98](#)
 slots, configure for GSM, [80](#)
 state, WCDMA, [94](#)
 Tx gain index
 LTE, set, [86](#)
 Tx waveform, set, [86](#)

U

UBIST support, enable/disable, [36](#)
 unlock protected commands, [22](#)
 USB
 descriptor—product ID, query/set, [63](#)
 interface configuration, query/set, [64](#)
 USB descriptor information, display, [62](#)
 user plane, GPS MO method, [111](#)

V

vanui
 MBIM provider name format, roaming, [35](#)
 version
 hardware, display, [43](#)
 vocoder
 audio loopback setup, [158](#)
 voice
 call pages, enable/disable 'ignore' capability, [33](#)
 functionality, customization, [34](#)
 voltage

- actual, return, [55](#)
- raw reading, return, [55](#)
- state, return, [55](#)
- voltage limits, query/set, [56](#)
- volume
 - Rx, set, [168](#)
- volume gain
 - Tx, set, [173](#)

W

- W_Disable, power off enable, [52](#)

- waveform type selection, transmitter, [97](#)

WCDMA

- PA range state machine, set, [96](#)
- protocol, query/set, [58](#)
- receive chain, secondary, enable/disable, [96](#)
- receive chain, test call mode, [97](#)
- receive diversity, enable/disable, [70](#)
- receiver, reset to factory calibration settings, [95](#)
- RF information, display, [94](#)
- Windows 7 Mobile Broadband options, configure, [36](#)
- WWAN Disable. See Low Power Mode



SIERRA
WIRELESS®