# AirPrime EM75xx

## AT Command Reference

41111748
Rev. 2

SIERRA WIRELESS®

## 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 MMP Portfolio Licensing.

## Copyright

©2019 Sierra Wireless. All rights reserved.

## Trademarks

Sierra Wireless®, AirPrime®, AirLink®, AirVantage® and the Sierra Wireless logo are registered trademarks of Sierra Wireless, Inc.

Windows® and Windows Vista® are registered trademarks 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 information and technical support, including warranty and returns | Web: sierrawireless.com/company/contact-us/ Global toll-free number: 1-877-687-7795 6:00 am to 5:00 pm PST |
|---|---|
| Corporate and product information | Web: sierrawireless.com |

## Revision History

| Revision number | Release date | Changes |
|---|---|---|
| 1 | February 2018 | Created document |

| Revision number | Release date | Changes |
|---|---|---|
| **2** | January 2019 | Updated Modem Status Commands chapter<br>• Updated !DATALOOPBACK (password required), !IMPREF (<carrier_sub-config>), !PCINFO (response format), !PCTEMP (response format), !PCTEM-PLIMITS (default parameter values), !PCVOLTLIMITS (<hw> replaced <lw>, defaults changed), !USBCOMP (<config type>,<config type desc>)<br>• Updated !CUSTOM customizations—removed AUTONETWORKMODE, CMCLIENT, GMMCAUSE7REMAP, IMSIREFRESH, ISVOICEN, LTEREJ-DELAY, NOROAM, RRCREL7CAPDIS, STKUIN, WIN7MBOPTIONS<br>• Added !LTECA, !TMSTATUS, !USBSPEED<br>Updated Diagnostic Commands chapter<br>• Updated !RXDEN (usage note),<br>• Added !LTERXCONTROL<br>Updated Test Commands chapter<br>• Updated !DAFTMACT (description), !DALGRXAGC (usage requirements), !DALGTXAGC (usage requirements),<br>• Added !DAGFTMRXAGC, !DALTXCONTROL, !DARCONFIG, !DARCON-FIGDROP, !DAWTXCONTROL<br>• Removed unimplemented commands, !DAWINFO,<br>Updated GPS Commands chapter<br>• Updated !GPSNMEASENTENCE (new sentence types)<br>Updated AirVantage Commands chapter<br>• Updated +WDSC <timer_n> parameter details<br>Updated Supported GSM/WCDMA AT Commands chapter<br>• Added +CCHC, +CCHO, +CGLA, +CPINR |

# Contents

# 1: About This Guide

## Introduction

This document describes supported standard and proprietary AT commands available for Sierra Wireless AirPrime® 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 AT!ENTERCND on page 16. Once the password is entered, all commands are available and remain available until the modem is reset or powered off and on.

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

## Command timing

### Interval timing

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

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

### Escape sequence guard time

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

# Result codes

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

# References

This guide covers the command sets used by OEMs, designers and testers of Sierra Wireless 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 | 16 |
| !SETCND | Set AT command password | 17 |

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 | 20 |
| !BAND | Select/return frequency band set | 22 |
| !BOOTHOLD | Reset modem and wait in bootloader for firmware download | 24 |
| !CUSTOM | Set/return customization settings | 25 |
| !DATALOOPBACK | Enable/disable and configure loopback mode | 28 |
| !GCFEN | Enable/disable GCF test mode | 29 |
| !GETBAND | Return the current active band | 29 |
| !GSTATUS | Return operational status | 30 |
| !HWID | Display hardware version | 30 |
| !IMPREF | Query/set Image Management preferences | 31 |
| !LTECA | Enable/disable LTE Carrier Aggregration or Display supported LTE CA pairs | 33 |
| !LTEINFO | Display LTE network information | 35 |
| !NVENCRYPTIMEI | Write unencrypted IMEI to modem | 37 |
| !NVPLMN | Provision/display PLMN list for Network Personalization locking | 38 |
| !PCINFO | Return power control status information | 39 |
| !PCOFFEN | Set/return Power Off Enable state | 40 |
| !PCTEMP | Return current temperature information | 40 |
| !PCTEMPLIMITS | Set/report temperature state limit values | 41 |
| !PCVOLT | Return current power supply voltage information | 42 |
| !PCVOLTLIMITS | Set/report power supply voltage state limit values | 43 |
| !PRIID | Set/report module PRI part number and revision | 44 |
| !RESET | Reset modem | 44 |
| !SCACT | Activate/deactivate data connection | 45 |

**Table 1-2:  Modem status commands (Continued)**

| Command | Description | Page |
|---|---|---|
| **!TMSTATUS** | Report Thermal Mitigation Status | 46 |
| **!USBCOMP** | Set/report USB interface configuration | 47 |
| **!USBINFO** | Return information from active USB descriptor | 48 |
| **!USBPID** | Set/report product ID in USB descriptor | 49 |
| **!USBSPEED** | Set/report USB speed | 50 |
| **&V** | Return operating mode AT configuration parameters | 51 |

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 | 53 |
| **!ERR** | Display diagnostic information | 54 |
| **!GCCLR** | Clear crash dump data | 54 |
| **!GCDUMP** | Display crash dump data | 55 |
| **!LTERXCONTROL** | Enable/disable LTE receive (Rx) diversity during Carrier Aggregation | 56 |
| **!RXDEN** | Enable/disable WCDMA/LTE/TD-SCDMA receive (Rx) diversity | 57 |

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

**Table 1-4:  Test commands**

| Command | Description | Page |
|---|---|---|
| **!DACGPSCTON** | Return GPS CtoN and frequency measurement | 60 |
| **!DACGPSMASKON** | Set CGPS IQ log mask | 60 |
| **!DACGPSSTANDALONE** | Enter/exit StandAlone (SA) RF mode | 61 |
| **!DACGPSTESTMODE** | Start/stop CGPS diagnostic task | 61 |
| **!DAFTMACT** | Put modem into Factory Test Mode | 62 |
| **!DAFTMDEACT** | Put modem into online mode from Factory Test Mode | 62 |
| **!DAGFTMRXAGC** | Get FTM Rx AGC (Primary or Diversity) | 63 |
| **!DALGRXAGC** | Return Rx AGC value (LTE only) | 64 |
| **!DALGTXAGC** | Return Tx AGC value and transmitter parameters (LTE only) | 65 |
| **!DALTXCONTROL** | Configure LTE Tx parameters (LTE only) | 67 |

**Table 1-4: Test commands (Continued)**

| Command | Description | Page |
|---|---|---|
| **!DAOFFLINE** | Place modem offline | 68 |
| **!DARCONFIG** | Set Band and Channel | 69 |
| **!DARCONFIGDROP** | Drop Radio Configurations | 70 |
| **!DAWTXCONTROL** | Configure WCDMA Tx Power (WCDMA only) | 70 |

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

**Table 1-5: Memory management commands**

| Command | Description | Page |
|---|---|---|
| **!NVBACKUP** | Back up device configuration | 72 |
| **!RMARESET** | Back up device configuration | 74 |

GNSS Commands—Supported on GNSS-enabled modems only.

**Table 1-6: GNSS commands**

| Command | Description | Page |
|---|---|---|
| **!GPSAUTOSTART** | Configure GPS auto-start features | 76 |
| **!GPSCLRASSIST** | Clear specific GPS assistance data | 78 |
| **!GPSCOLDSTART** | Clear all GNSS assistance data | 79 |
| **!GPSEND** | End an active session | 79 |
| **!GPSFIX** | Initiate GPS position fix | 80 |
| **!GPSLBSAPN** | Set GPS LBS APNs | 81 |
| **!GPSLOC** | Return last known location of the modem | 83 |
| **!GPSMOMETHOD** | Set/report GPS MO method | 84 |
| **!GPSNMEACONFIG** | Enable and set NMEA data output rate | 85 |
| **!GPSNMEASENTENCE** | Set/report NMEA sentence type | 86 |
| **!GPSPORTID** | Set/report port ID to use over TCP/IP | 87 |
| **!GPSSATINFO** | Request satellite information | 88 |
| **!GPSSTATUS** | Request current status of a position fix session | 89 |
| **!GPSSUPLURL** | Set/report SUPL server URL | 90 |
| **!GPSSUPLVER** | Set/report SUPL server version | 91 |
| **!GPSTRACK** | Initiate local tracking (multiple fix) session | 92 |
| **+WANT** | Enable/disable GNSS antenna power | 93 |

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

**Table 1-7:  SIM commands**

| Command | Description | Page |
|---|---|---|
| **+UIMS** | Select active SIM interface | 97 |

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 | 99 |
| **!IMSTESTMODE** | Enable/disable IMS test mode | 100 |
| **!OSINFO** | Configure host device operating system information | 101 |

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 | 103 |
| **!SARBACKOFF** | Set/report offset from maximum Tx power | 104 |
| **!SARINTGPIOMODE** | Set/report default pull mode for SAR interrupt GPIOs | 105 |
| **!SARSTATE** | Set/report SAR backoff state | 106 |
| **!SARSTATEDFLT** | Set/report default SAR backoff state | 107 |

AirVantage Commands—Commands used to interact with AirVantage.

**Table 1-10:  AirVantage commands**

| Command | Description | Page |
|---|---|---|
| **+WDSC** | Configure AirVantage Management Services | 109 |
| **+WDSE** | Display most recent AirVantage Management Services error | 111 |
| **+WDSG** | Display AirVantage Management Services status information | 112 |
| **+WDSI** | Activate/deactivate AirVantage Management Services unsolicited notifications | 113 |
| **+WDSI (notification)** | AirVantage Management Services events—Unsolicited notification | 114 |
| **+WDSR** | Reply to AirVantage server request | 116 |
| **+WDSS** | Configure/connect AirVantage Management Services session | 117 |

# 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** 

# 2: AT Password Commands

## Introduction

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

## Command summary

Table 2-1 on page 15 lists the commands described in this chapter.

**Table 2-1: AT password commands**

| Command | Description | Page |
|---------|-------------|------|
| **!ENTERCND** | Enable access to password-protected commands | 16 |
| **!SETCND** | Set AT command password | 17 |

# Command reference

**Table 2-2: AT command password details**

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

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

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

# 3: Modem Status, Customization, and Reset Commands

**3**

## 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 | 20 |
| !BAND | Select/return frequency band set | 22 |
| !BOOTHOLD | Reset modem and wait in bootloader for firmware download | 24 |
| !CUSTOM | Set/return customization settings | 25 |
| !DATALOOPBACK | Enable/disable and configure loopback mode | 28 |
| !GCFEN | Enable/disable GCF test mode | 29 |
| !GETBAND | Return the current active band | 29 |
| !GSTATUS | Return operational status | 30 |
| !HWID | Display hardware version | 30 |
| !IMPREF | Query/set Image Management preferences | 31 |
| !LTECA | Enable/disable LTE Carrier Aggregation or Display supported LTE CA pairs | 33 |
| !LTEINFO | Display LTE network information | 35 |
| !NVENCRYPTIMEI | Write unencrypted IMEI to modem | 37 |
| !NVPLMN | Provision/display PLMN list for Network Personalization locking | 38 |
| !PCINFO | Return power control status information | 39 |
| !PCOFFEN | Set/return Power Off Enable state | 40 |
| !PCTEMP | Return current temperature information | 40 |
| !PCTEMPLIMITS | Set/report temperature state limit values | 41 |
| !PCVOLT | Return current power supply voltage information | 42 |
| !PCVOLTLIMITS | Set/report power supply voltage state limit values | 43 |

**Table 3-1: Modem status commands (Continued)**

| Command | Description | Page |
|---|---|---|
| !PRIID | Set/report module PRI part number and revision | 44 |
| !RESET | Reset modem | 44 |
| !SCACT | Activate/deactivate data connection | 45 |
| !TMSTATUS | Report Thermal Mitigation Status | 46 |
| !USBCOMP | Set/report USB interface configuration | 47 |
| !USBINFO | Return information from active USB descriptor | 48 |
| !USBPID | Set/report product ID in USB descriptor | 49 |
| !USBSPEED | Set/report USB speed | 50 |
| &V | Return operating mode AT configuration parameters | 51 |

# Command reference

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

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

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

| Command | Description |
|---|---|
| !ANTSEL (continued) | **Set/query external antenna select configuration (continued)**<br><br>Examples:   BAND 2: 1, 0, 1, 1<br>                 BAND 5: 1, 1, 2, 2<br><br>                 Conflict:<br>                 B2 + B5: 1, C, 1, 1*(<gpio2> has a conflict ('C'))*<br>                 B5 + B2: 1, C, 1, 1<br><br>                 OK<br>Purpose:     Display the current external antenna select configuration.<br>•  Query List:   **AT!ANTSEL=?**<br>   Purpose:     Display valid parameter values and command format.<br><br>Parameters:<br><br><band> (RF band)<br>   •  low- or high-frequency 3GPP band number, as appropriate. (See Table 13-2 on page 129 for a full list of low-, mid-, and high-frequency bands.)<br>   •  Valid range: 0–69. Band support is product specific—see the device's Product Specification or Product Technical Specification document for details.<br><br><gpio1>, <gpio2>, <gpio3>, <gpio4> (GPIO configurations.)<br>   •  0=Logic low<br>   •  1=Logic high<br>   •  2=Not used for antenna selection (Default value for <gpio4> if not specified.)<br>   •  Note: <gpio4> availability is device-specific—see the appropriate Product Technical Specification for details.)<br>   •  gpio1–4 correspond to ANT_CTRL0–3 |

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

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

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

| Command | Description |
|---|---|
| !BAND (continued) | **Select/return frequency band set (continued)**<br><br><Lmask1> (LTE bands included in the set)<br>  • Format: 64-bit bitmask<br>  • Example values (Available bands are device-dependent. Use the extended query command to display the list of bands available for your device.):<br>    • 0000000000000001—Band 1<br>      0000000000000002—Band 2<br>      ...<br>      0000008000000000—Band 40<br>      0000010000000000—Band 41<br>  • Note—The full list of bands in the set is spread across <Lmask1>–<Lmask4>.<br><br><Lmask2> (LTE bands included in the set)<br>  • Format: 64-bit bitmask<br>  • Example values (Available bands are device-dependent. Use the extended query command to display the list of bands available for your device.):<br>    • 0000000000000002—Band 66<br>  • Note—The full list of bands in the set is spread across <Lmask1>–<Lmask4>.<br><br><Lmask3> (Reserved for future use)<br>  • Format: 64-bit bitmask<br>  • Required value: 0000000000000000<br>  • Note—The full list of bands in the set is spread across <Lmask1>–<Lmask4>.<br><br><Lmask4> (LTE bands included in the set)<br>  • Format: 64-bit bitmask<br>  • Example values (Available bands are device-dependent. Use the extended query command to display the list of bands available for your device.):<br>    • 0800000000000000—B252<br>    • 4000000000000000—B255<br>  • Note—The full list of bands in the set is spread across <Lmask1>–<Lmask4>.<br><br><Tdsmask> (TD-SCDMA bands included in the set)<br>  • Format: 64-bit bitmask<br>  • Example values (Available bands are device-dependent. Use the extended query command to display the list of bands available for your device.):<br>    • 0000000000000001—TDS B34<br>      0000000000000002—TDS B35<br>      0000000000000004—TDS B36<br>      0000000000000008—TDS B38<br>      0000000000000010—TDS B40<br>      0000000000000020—TDS B39 |

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

| Command | Description |
|---------|-------------|
| **!BOOTHOLD** | **Reset modem and wait in bootloader for firmware download**<br><br>Prepare for a firmware download by resetting the modem and waiting in 'boot and hold' mode.<br><br>**Password required:** No<br><br>**Usage:**<br>• Execution:   **AT!BOOTHOLD**<br>  Response:   OK<br>  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 |
|---|---|
| **!CUSTOM**<br><br>*Note: Some customizations may not be available for certain chipsets, firmware revisions, or devices.* | **Set/return customization settings**<br><br>Set or return several customization values.<br><br>Password required: Yes<br><br>Usage:<br>• Execution: **AT!CUSTOM=\<customization\>, \<value\>**<br>  Response: OK<br>  Purpose: Assign \<value\> to a specific \<customization\> setting.<br>• Query: **AT!CUSTOM?**<br>  Response: (list of enabled \<customization\>s)<br>  OK<br>  Purpose: Display customizations that are currently enabled.<br>• Query list: **AT!CUSTOM=?**<br>  Purpose: Return a list of valid \<customization\> values.<br><br>Parameters:<br>\<value\> (Value being assigned to a specific \<customization\> setting)<br>• Descriptions are included in each of the customizations described below.<br>• Numeric value. Valid range depends on the \<customization\> type.<br><br>\<customization\> (String identifying customization setting. The default value for all customizations is 0.)<br><br>*Note: Use quotation marks around the customization string. For example, AT!CUSTOM="CSDOFF",0.*<br><br>• "CFUNPERSISTEN"—Enable/disable persistence (across power cycles) of AT+CFUN setting.<br>  \<value\>:<br>  • 0 = Disable (+CFUN setting does not persist across power cycle)<br>  • 1 = Enable (+CFUN setting persists across power cycle)<br>• "CSVOICEREJECT" (Pending future upgrade)—Enable/disable ability to ignore incoming voice call pages from the network.<br>  \<value\>:<br>  • 0 = Process pages as per device capabilities (default)<br>  • 1 = Ignore paging (type 1 and 2) messages<br>  • 2 = Reject call setup (voice and circuit-switched VT), returning cause code 88 (Incompatible destination)<br>  • 3 = Process voice pages as per device capabilities, and reject call setup (circuit-switched VT), returning cause code 88 (Incompatible destination)<br>  • 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)<br><br>(Continued on next page) |

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

| Command | Description |
|---|---|
| **!CUSTOM** (continued) | **Set—query customization settings (continued)** <br><br> • "FASTENUMEN"—Enable/disable fast enumeration for warm/cold boot. <br>   <value>: <br>    • 0 = Disable fast enumeration (Default) <br>    • 1 = Enable fast enumeration for cold boot and disable for warm boot <br>    • 2 = Enable fast enumeration for warm boot and disable for cold boot <br>    • 3 = Enable fast enumeration for warm and cold boot <br> • "GPIOSARENABLE"—Indicate whether SAR backoff is controlled by GPIOs or by AT commands. <br>   <value>: <br>    • 0 = Controlled by AT commands (default) <br>    • 1 = Controlled by GPIOs <br> • "GPSENABLE"—Enable/disable the GPS feature. <br>   <value>: <br>    • 0 = GPS disabled <br>    • 1 = MO & MT enabled regardless of GPS_DISABLE setting <br>    • 2 = MO enabled regardless of GPS_DISABLE setting <br>    • 3 = MT enabled regardless of GPS_DISABLE setting <br>    • 4 = MO & MT enabled but are gated by GPS_DISABLE setting <br>    • 5 = MO enabled but is gated by GPS_DISABLE setting <br>    • 6 = MT enabled but is gated by GPS_DISABLE setting <br>    • <value> + 80 = Disable GLONASS <br>     (For example, 84 = MO & MT narrow-band GPS enabled, but gated by GPS_DISABLE setting.) <br> • "GPSLPM"—Enable/disable GPS in Low Power Mode. <br>   <value>: <br>    • 0 = Enable—GPS engine remains enabled when modem enters LPM (Default) <br>    • 1 = Disable—GPS engine is disabled when modem enters LPM <br> • "GPSREFLOC"—Enable/disable reference GPS location reporting. <br>   <value>: <br>    • 0 = Enable (Default) <br>    • 1 = Disable <br> • "GPSSEL"—Select GPS antenna (useful only for devices with both a GPS and a shared GPS/Rx diversity antenna). <br>   <value>: <br>    • 0 = Use dedicated GPS antenna (Default) <br>    • 1 = Use shared GPS/Rx diversity antenna <br> • "IPV6ENABLE"—Enable/disable IPV6 support. <br>   <value>: <br>    • 0 = Disable IPV6 <br>    • 1 = Enable IPV6 (Default) <br><br> (Continued on next page) |

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

| Command | Description |
|---|---|
| **!CUSTOM** (continued) | **Set/query customization settings (continued)**<br><br>• "NETWORKNAMEFMT" (Pending future upgrade)—Set MBIM provider name format for vanui (roaming).<br>  \<value>:<br>  • 0 = Display one of: SPN, LongName, or ShortName, by order of priority (Default QCT behavior)<br>  • 1 = Display one of: LongName or ShortName<br>  • 2 = Display [SPN] - [LongName/ShortName] (Note: May be truncated.)<br>  • 3 = Display [LongName/ShortName] - [SPN] (Note: May be truncated.)<br>• "PCSCDISABLE" (Pending future upgrade)—Determine functionality of PCSC, GSM Algorithm and Authenticate commands, and +CIMI command.<br>  \<value>:<br>  • 0–7 (Default value = 0—all functions enabled)<br>    • Bit 0: PCSC (0=Enable, 1=Disable)<br>    • Bit 1: GSM Algorithm and Authenticate commands (0=Enable, 1=Disable)<br>    • Bit 2: AT+CIMI outputs IMSI (0=Enable, 1=Disable)<br>• "QMIDETACHEN" (Pending future upgrade)—Enable/disable QMI NAS detach.<br>  \<value>:<br>  • 0 = Disable—QMI detach request returns NO_EFFECT response, and no action is taken.<br>  • 1 = Enable—QMI detach request is acted on, and appropriate response is returned based on the detach result.<br>• "SIMHOTSWAPDIS"—Configure SIM hotswap feature<br>  \<value>:<br>  • 0 = Enable UIM1 and UIM2 (default)<br>  • 1 = Disable UIM1, enable UIM2<br>  • 2 = Enable UIM1, disable UIM2<br>  • 3 = Disable UIM1 and UIM2<br>• "SIMLPM"—Indicate default SIM power state during Low Power Mode.<br>  \<value>:<br>  • 0 = QCT default behavior (same as \<value>=2) (Default)<br>    Note—The default behavior could change in future revisions. Use \<value>=2 if you need to guarantee the described behavior.<br>  • 1 = SIM remains powered in LPM<br>  • 2 = Power down SIM with AT+CFUN=0; Power up SIM with AT+CFUN=1<br>• "SINGLEAPNSWITCH" (Pending future upgrade)—Indicate device behavior when changing APN name, username, or password.<br>  \<value>:<br>  • 0 = Do nothing<br>  • 1 = Device detaches and re-attaches after changing APN information<br>  • 2 = Power-cycle the UE<br>• "UIM2ENABLE"—Enable/disable UIM2 slot support.<br>  \<value>:<br>  • 0 = Disable<br>  • 1 = Enable (Default)<br><br>(Continued on next page) |

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

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

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

| Command | Description |
|---|---|
| !GCFEN | **Enable/disable GCF test mode**<br><br>Place the modem in GCF testing mode or normal operating mode.<br><br>**Password required:** Yes—Execution format only<br><br>**Usage:**<br>• Execution:    **AT!GCFEN=\<enableFlag\>**<br>  Response:    OK<br>  Purpose:    Place the modem in GCF testing mode or normal operating mode.<br>• Query:    **AT!GCFEN?**<br>  Response:    !GCFEN:<br>        \<enableFlag\><br>        OK<br>  Purpose:    Display the modem's current mode.<br>• Query List:    **AT!GCFEN=?**<br>  Purpose:    Return a list of supported \<enableFlag\> values.<br><br>**Parameters:**<br>\<enableFlag\> (Enable/disable GCF testing)<br>    • 0 = Disable GCF test mode (Default) — This value is used for normal operations.<br>    • 1 = Enable GCF test mode. |
| !GETBAND | **Return the current active band**<br><br>Return the active band currently being used by the modem.<br><br>**Password required:** No<br><br>**Usage:**<br>• Query:    **AT!GETBAND?**<br>  Response:    !GETBAND: \<active band description\><br>        OK<br>    *or*  Unknown<br>        OK<br>    *or*  No Service<br>        OK<br>  Purpose:    Return a description of the current active band, or return an error message.<br><br>*Note: Due to stack implementation requirements, !GETBAND reports W800 for both W800 and W850.* |

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

| Command | Description |
|---|---|
| !GSTATUS | **Return operational status**<br><br>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.<br><br>**Password required:** No<br><br>**Usage:**<br>• Query:    **AT!GSTATUS?**<br>  Response (Example shown is for LTE; fields will vary depending on RAT)<br>    !GSTATUS:<br>    Current Time:    \<ctime>    Temperature:    \<temp><br>    Reset Counter:    \<rcounter>  Mode:    \<mode><br>    System mode:    \<smode>    PS state:    \<PSstate><br>    LTE band:    \<lband>    LTE bw:    \<lbw><br>    LTE Rx chan:    \<lrchan>    LTE Tx chan:    \<ltchan><br>    LTE CA state:    \<CAstate>    LTE Scell band: \<SCband><br>    LTE Scell bw:    \<SCbw>    LTE Scell chan: \<SCchan><br>    EMM state:    \<emmstate> \<emmdesc><br>    RRC state:    \<rrcstate><br>    IMS reg state:    \<imsstate><br><br>    PCC RxM RSSI:    \<PRxMrssi> RSRP (dBm): \<PRxMrsrp><br>    PCC RxD RSSI:    \<PRxDrssi> RSRP (dBm): \<PRxDrsrp><br>    SCC RxM RSSI:    \<SRxMrssi> RSRP (dBm): \<SRxMrsrp><br>    SCC RxD RSSI:    \<SRxDrssi> RSRP (dBm): \<SRxDrsrp><br>    Tx Power:    \<TXpower> TAC: \<tac><br>    RSRQ (dB):    \<rsrq>    Cell ID: \<cellid><br>    SINR (dB):    \<sinr> |
| !HWID | **Display hardware version**<br><br>Display the device's hardware version number.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Query:    **AT!HWID?**<br>  Response:    Revision: \<MajorVer>.\<MinorVer><br>              OK<br>  Purpose:    Display hardware version number.<br>• Query List:    **AT!HWID=?**<br>  Purpose:    Return the query command format.<br><br>**Parameters:**<br>\<MajorVer> (Major versioning number)<br>  • 0–9<br><br>\<MinorVer> (Minor versioning number)<br>  • 0–9 |

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

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

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

| Command | Description |
|---------|-------------|
| **!IMPREF** | **Query/set Image Management preferences (continued)**<br><br><mismatch information> (Message indicating a field mismatch between the current and preferred image settings)<br>• ASCII string (quotation marks do not appear):<br>  • "fw version mismatch"<br>  • "carrier name mismatch"<br>  • "config name mismatch"<br><br><invalid image> (Message indicating an image does not exist)<br>• ASCII string (quotation marks do not appear):<br>  • "preferred image setting does not exist"<br>  • "current image setting does not exist"<br><br>**Example(s):**<br>• AT!IMPREF="ABC"  *(where "ABC" is a carrier name)*<br>• AT!IMPREF="AUTO-SIM"  *(to enable SIM-based switching)* |

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

| Command | Description |
|---|---|
| !LTECA | **Enable/disable LTE Carrier Aggregration or Display supported LTE CA pairs**<br><br>Enable or disable LTE Carrier Aggregation (CA), or (when enabled) display the list of LTE CA pairs supported by the hardware, the permitted combinations due to module band support, and depending on module provisioning, a "prune_ca" list of the actual set of allowed CA combinations (a subset of the combinations that the module supports).<br><br>Password required: No<br><br>Usage:<br>• Execution: **AT!LTECA=\<flag>**<br>  Response: OK<br>  Purpose: Enable or disable LTE CA.<br>• Query: **AT!LTECA?**<br>  Response: Hardware:<br>  \<Bd>\<class>[_\<Bd>\<class>[_\<Bd>\<class>]]:\<Bu>\<class>[,\<Bu>\<class>[,\<Bu>\<class>]]<br>  ...<br>  Permitted Bands:<br>  \<Bd>\<class>[_\<Bd>\<class>[_\<Bd>\<class>]]:\<Bu>\<class>[,\<Bu>\<class>[,\<Bu>\<class>]]<br>  ...<br><br>  *(If Prune_ca_combos does not exist)*<br>  Prune_ca_combos:<br>  Empty<br><br>  *(If Prune_ca_combos exists)*<br>  Prune_ca_combos:<br>  \<Bd>\<class>[-\<Bd>\<class>[-\<Bd>\<class>]]-\<bcs><br><br>  OK<br>  Purpose: Return LTE network measurements.<br>• Query List: **AT!LTECA=?**<br>  Purpose: Return the execution command format and valid parameter values.<br><br>Parameters:<br>\<flag> (Enable/disable LTE CA)<br>• 0—Disable CA<br>• 1—Enable CA<br><br>\<Bd> (LTE downlink band)<br>• Band numbers vary depending on device type, SKU, and PRI configuration. To view the device's supported bands, see !BAND.<br><br>\<Bu> (LTE uplink band)<br>• Band numbers vary depending on device type, SKU, and PRI configuration. To view the device's supported bands, see !BAND.<br><br>\<class> (Aggregated transmission bandwidth configuration)<br>• Valid values: 'A'–'I'<br><br>*(Continued on next page)* |

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

| Command | Description |
|---|---|
| **!LTECA (continued)** | **Enable/disable LTE Carrier Aggregration or Display supported LTE CA pairs (continued)**<br><br>\<bcs\> (Bandwidth Combination Set)<br>  • Integer value, ≥0. See 3GPP specification for details.<br><br>**Example(s):**<br>  • Example where Prune_ca_combos does not exist:<br><br>    AT!LTECA?<br>    Hardware:<br>    12A_30A_66A:12A,30A,66A<br>    13A_66A_66A:13A,66A1<br>    3A_66B:13A,66A<br>    ...<br><br>    Permitted Bands:<br>    12A_30A_66A:12A,30A,66A<br>    13A_66A_66A:13A,66A1<br>    3A_66B:13A,66A<br>    ...<br><br>    Prune_ca_combos:<br>    Empty<br><br>    OK<br>  • Example where Prune_ca_combos exists:<br><br>    AT!LTECA?<br>    Hardware:<br>    12A_30A_66A:12A,30A,66A<br>    13A_66A_66A:13A,66A1<br>    3A_66B:13A,66A<br>    ...<br><br>    Permitted Bands:<br>    12A_30A_66A:12A,30A,66A<br>    13A_66A_66A:13A,66A1<br>    3A_66B:13A,66A<br>    ...<br><br>    Prune_ca_combos:<br>    1A-8A-0<br>    1A-8A-1<br>    1A-8A-2<br>    2C-0<br>    2A-2A-0<br><br>    ...<br><br>    OK |

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

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

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

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

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

| Command | Description |
|---|---|
| !NVENCRYPTIMEI | **Write unencrypted IMEI to modem**<br><br>Write an unencrypted IMEI to a modem *if* the modem does not already have an IMEI—the command can only be used once per modem.<br>The IMEI is a fifteen digit string formed by concatenating the following elements:<br>    TAC code (8 digits)<br>    SN (Serial number) (6 digits)<br>    CheckDigit (1 digit calculated from TAC code and SN)<br>The CheckDigit is calculated as follows:<br><br>1. Label the fourteen digits in the TAC and SN as:<br>    TAC:   $D14..D7$<br>    SN:    $D6..D1$<br>    For example:<br>    TAC = 12345678 ('1' is D14, '8' is D7)<br>    SN = 901234 ('9' is D6, '4' is D1)<br><br>2. Double the value of each odd-labeled digit (D13, D11, ..., D1).<br><br>3. Add the values of each individual digit from the result of Step 2.<br><br>4. Add the even-labeled digits (D14, D12, ..., D2) to the result of Step 3.<br><br>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.<br><br>For example:<br>    TAC (12345678)        SN (901234)<br><br>    Step 1: Label the digits of the TAC and SN.<br><br>| D14 | D13 | D12 | D11 | D10 | D9 | D8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 |<br>|---|---|---|---|---|---|---|---|---|---|---|---|---|---|<br>| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 |<br><br>    Step 2: Double the odd-labeled values:<br><br>| D14 | **D13** | D12 | **D11** | D10 | **D9** | D8 | **D7** | D6 | **D5** | D4 | **D3** | D2 | **D1** |<br>|---|---|---|---|---|---|---|---|---|---|---|---|---|---|<br>| 1 | **4** | 3 | **8** | 5 | **12** | 7 | **16** | 9 | **0** | 1 | **4** | 3 | **8** |<br><br>    Step 3: Add *each* digit of the odd-labeled values:<br>        4 + 8 + (1 + 2) + (1 + 6) + 0 + 4 + 8 = 34<br><br>    Step 4: Add each digit of the even-labeled values to the Step 3 total:<br>        1 + 3 + 5 + 7 + 9 + 1 + 3 +34 = 63<br><br>    Step 5: Check last digit of Step 4 total.<br>        CheckDigit = 10 - 3 = 7<br><br>    Result:  IMEI = TAC:SN:CheckDigit<br>                = 123456789012347<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution:    **AT!NVENCRYPTIMEI=\<P1\>, \<P2\>, \<P3\>, \<P4\>, \<P5\>, \<P6\>, \<P7\>, \<P8\>**<br>  Response:    OK<br>  Purpose:    Write the unencrypted IMEI to the modem.<br><br>(Continued on next page) |

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

| Command | Description |
|---|---|
| **!NVENCRYPTIMEI (continued)** | **Write unencrypted IMEI to modem (continued)**<br><br>Parameters:<br><br><P1> to <P8> (IMEI segments)<br> • <P1> = IMEI[0..1]; <P2> = IMEI[2..3]; ...; <P8> = IMEI[14..15]<br> • <P1> to <P4> represent the TAC<br> • <P5> to <P7> represent the SNR<br> • <P8> represents the CheckDigit plus a padding digit ('0')<br><br>Example(s):<br>Using the example IMEI shown above:<br>    AT!NVENCRYPTIMEI=12,34,56,78,90,12,34,70 |
| **!NVPLMN** | **Provision/display PLMN list for Network Personalization locking**<br><br>Provision or display the list of PLMN (MCC/MNC pairs) used for Network Personalization locking.<br>Use the execution format to provision the list ONE TIME ONLY. After the list is provisioned, it can only be displayed, not updated.<br><br>Password required: Yes<br><br>Usage:<br> • Query: **AT!NVPLMN?**<br>   Response: <MCC> <MNC><br>          ...<br>          OK<br>   Purpose: Return a list of up to fifty NV items that can be read or written.<br> • Execution: **AT!NVPLMN=<MCC1>, <MNC1>, ..., <MCCn>, <MNCn>**<br>   Response: OK<br>   Purpose: Add up to six MCC/MNC pairs to the PLMN list<br>   Note: Execution can be performed one time only (all MCC/MNC pairs must be set at the same time).<br><br>Parameters:<br><br><MCC> (Mobile Country Code)<br> • 3 digits<br><br><MNC> (Mobile Network Code)<br> • 2 digits |

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

| Command | Description |
|---|---|
| **!PCINFO** | **Return power control status information**<br><br>Return the modem's power control status information.<br><br>**Password required:** No<br><br>**Usage:**<br>• Query:     **AT!PCINFO?**<br>  Response:   State: \<state\><br>  LPM voters - Temp:\<vote\>, Volt:\<vote\>, User:\<vote\>, W_DISABLE:<br>  \<vote\>, IMSWITCH:\<vote\>, BIOS:\<vote\>,<br>  LWM2M:\<vote\>,OMADM:\<vote\>, FOTA:\<vote\>, RFCAL:\<vote\><br><br>  LPM persistence - \<userlpm\><br><br>  OK<br>  Purpose:    Return power control information.<br><br>**Parameters:**<br>\<state\> (The modem's power mode)<br>• "Low Power Mode"<br>• "Online"<br>• "Offline"<br><br>\<vote\> (LPM requested flag)<br>• 0—LPM requested<br>• 1—LPM not requested<br><br>\<userlpm\> (Current state of user-initiated Low Power Mode)<br>• 0—Host GUI has not requested LPM<br>• 1—Host GUI has requested LPM |

Proprietary and Confidential

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

| Command | Description |
|---|---|
| **!PCOFFEN** | **Set/return Power Off Enable state**<br><br>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.)<br>Use this command to indicate or set the Power Off Enable feature state.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution: **AT!PCOFFEN=\<state\>**<br>  Response: OK<br>  Purpose: Set the current state.<br>• Query: **AT!PCOFFEN?**<br>  Response: \<state\><br>           OK<br>  Purpose: Report the current \<state\>.<br><br>**Parameters:**<br><br>\<state\> (Current state of Power Off Enable)<br>  • 0—Modem will enter LPM (low power mode) when W_DISABLE is asserted.<br>  • 1—Power off modem<br>  • 2—Ignore changes on W_DISABLE. |
| **!PCTEMP** | **Return current temperature information**<br><br>Return the module's temperature state and actual temperature.<br><br>**Password required:** No<br><br>**Usage:**<br>• Query: **AT!PCTEMP?**<br>  Response: Temp state: \<state\><br>           Temperature: \<temperature\> C<br>           OK<br>  Purpose: Return the module's temperature information.<br><br>**Parameters:**<br><br>\<state\> (Temperature state):<br>• Valid values:<br>  • "Normal"<br>  • "High Warning"<br>  • "High Critical"<br>  • "Low Critical"<br><br>\<temperature\> (Current temperature):<br>• Current temperature in degrees Celsius. This is the temperature reported by a thermistor positioned near the power amplifiers.<br>• Decimal ASCII |

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

| Command | Description |
|---|---|
| !PCTEMPLIMITS | **Set/report temperature state limit values**<br><br>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.<br>Use this command to report or set the limits that correspond to these temperature states.<br>To display the current temperature and temperature state, see !PCTEMP on page 40.<br><br>*Note: All temperatures are in Celsius.*<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution:   **AT!PCTEMPLIMITS=\<hc\>,\<hw\>,\<hn\>,\<ln\>,\<lc\>**<br>  Response:   OK<br>  Purpose:   Set the temperature limits for each state (all five values must be specified).<br>• Query:   **AT!PCTEMPLIMITS?**<br>  Response:   HI CRIT: \<hc\><br>          HI WARN: \<hw\><br>          HI NORM: \<hn\><br>          LO NORM: \<ln\><br>          LO CRIT: \<lc\><br>  Purpose:   Return the temperature limits for each state.<br><br>**Parameters:**<br>\<hc\> (High Critical)<br>• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).<br>• Default = 105°C<br><br>\<hw\> (High Warning)<br>• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).<br>• Default = 85°C<br><br>\<hn\>(High Normal)<br>• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).<br>• Default = 70°C<br><br>\<ln\> (Low Normal)<br>• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).<br>• Default = -30°C<br><br>\<lc\> (Low Critical)<br>• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).<br>• Default = -45°C |

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

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

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

| Command | Description |
|---|---|
| **!PCVOLTLIMITS** | **Set/report power supply voltage state limit values**<br><br>Certain modem functionality is affected by the modem's power supply voltage state. The possible voltage states are high critical, high warning, high normal, low normal, and low critical.<br><br>Use this command to report or set the limits that correspond to these voltage states.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution:  **AT!PCVOLTLIMITS=\<hc\>,\<hw\>,\<hn\>,\<ln\>,\<lc\>**<br>  Response:  OK<br>  Purpose:  Set the voltage limits for each state (all five values must be specified).<br>• Query:  **AT!PCVOLTLIMITS?**<br>  Response:  HI CRIT: \<hc\><br>                HI WARN: \<hw\><br>                HI NORM: \<hn\><br>                LO NORM: \<ln\><br>                LO CRIT: \<lc\><br>  Purpose:  Return the voltage limits for each state.<br><br>**Parameters:**<br><br>\<hc\> (High Critical)<br>• Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)<br>• Default = 4600 mV<br><br>\<hw\> (High Warning)<br>• Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)<br>• Default = 4400 mV<br><br>\<hn\> (High Normal)<br>• Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)<br>• Default = 3300 mV<br><br>\<ln\> (Low Normal)<br>• Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)<br>• Default = 3135 mV<br><br>\<lc\> (Low Critical)<br>• Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)<br>• Default = 2900 mV |

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

| Command | Description |
|---------|-------------|
| **!PRIID** | **Set/report module PRI part number and revision**<br><br>Report or set the module's customer and carrier PRI part numbers and revisions.<br><br>**Password required:** Yes—Execution format only<br><br>**Usage:**<ul><li>Execution: **AT!PRIID="<priPN>","<priRev>","<pri_cust>"**<br>Response: OK<br>Purpose: Set the module's PRI part number (<priPn>), revision (<priRev>), and customer name (<pri_cust>).</li><li>Query: **AT!PRIID?**<br>Response: PRI Part Number: <priPn><br>Revision: <priRevDisplay><br>Customer: <pri_cust><br><br>Carrier PRI: <bcVersion><br>OK<br>Purpose: Return the module's PRI information.</li></ul>**Parameters:**<br><priPn> (PRI part number)<ul><li>7-digit ASCII number</li><li>Example: 9991234</li></ul><priRev> (PRI revision number being written to the module)<ul><li>4-digit ASCII: XXYY (implied '.' between XX and YY)</li><li>Example: 0100</li></ul><priRevDisplay> (PRI revision number being read from the module)<ul><li>4-digit ASCII: XX.YY</li><li>Example: 01.00</li></ul><pri_cust> (PRI customer name)<ul><li>ASCII string</li><li>Example: "Generic Operator"</li></ul><bcVersion> (BC version)<ul><li>ASCII string</li></ul> |
| **!RESET** | **Reset modem**<br><br>Perform a modem reset.<br><br>**Password required:** No<br><br>**Usage:**<ul><li>Execution: **AT!RESET**<br>Response: OK<br>Purpose: Reset the modem.</li></ul> |

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

| Command | Description |
|---|---|
| !SCACT | **Activate/deactivate data connection**<br><br>Activate or deactivate a specific data connection between the host and network.<br><br>*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.*<br><br>**Password required:** No<br><br>**Usage:**<br>• Query:         **AT!SCACT?[<pid>]**<br>  Response:   !SCACT: <pid>,<state><br>               ...      *(additional <pid>/<state> combinations)*<br>               OK<br>  Purpose:    Display a list of all defined connections and their current state, or display a specified connection and its state.<br>• Execution:   **AT!SCACT=<state>,<pid>**<br>  Response:   OK<br>  Purpose:    Activate or deactivate a specific data connection.<br><br>**Parameters:**<br><br><pid> (PDN connection ID)<br>    • Valid values:<br>        • UMTS:<br>            • 1–16<br>            • Default: 1 (all networks except Verizon), 3 (Verizon)<br>        • CDMA:<br>            • 101–107<br>             • Default: 101 (all networks except Verizon), 3 (Verizon)<br><br><state> (Current state of specified <pid>)<br>    • 0= Deactivated<br>    • 1=Activated<br>    • Any other value causes command execution to return ERROR. |

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

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

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

| Command | Description |
|---|---|
| !USBCOMP | **Set/report USB interface configuration**<br><br>Set or display the device's USB interface configuration.<br><br>By default, devices are typically configured to use a USB composition that presents a minimal set of interfaces from a list of available interfaces. This command is used to add or remove interfaces from the configuration.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution:    **AT!USBCOMP=<Config Index>,<Config Type>,<Interface bitmask>**<br>     Response:    OK<br>     Purpose:     Set the current composition. For the change to take effect, you must reset the modem.<br>• Query:         **AT!USBCOMP?**<br>     Response:    Config Index: <Config Index><br>                  Config Type: <Config Type> <Config Type Desc><br>                  Interface bitmask: <Interface bitmask> <Bitmask Desc><br>                  OK<br>     Purpose:     Report the current interface composition.<br>• Query List:    **AT!USBCOMP=?**<br>     Purpose:     Display valid execution format and parameter values, and examples.<br><br>**Parameters:**<br><Config Index> (USB composition)<br>    • Valid value: 1<br>    • Use **AT!USBCOMP=?** to view the configurations available for the device. Available configurations are identified as "SUPPORTED".<br><br><Config Type> (USB composition)<br>    • 1—Generic. This option is used for all customized VID/PID.<br>    • 2—USBIF-MBIM. This option is used only for Sierra PIDs 68B1 and 9068.<br>    • 3—RNDIS. This option is used only for Sierra PIDs 68B1 and 9068.<br><br><Config Type Desc> (Configuration description)<br>    • "(Generic)"—Description of <Config Type> = 1.<br>    • "(USBIF-MBIM)"—Description of <Config Type> = 1.<br>    • "(RNDIS)"—Description of <Config Type> = 1.<br><br><Interface bitmask> (USB composition)<br>    • Bitmask representing all enabled interfaces<br>    • Format: 32-bit bitmask<br>    • Valid values (available interfaces are device-dependent):<br>        • 0x00000001—DIAG<br>        • 0x00000004—NMEA<br>        • 0x00000008—MODEM<br>        • 0x00000100—RMNET0<br>        • 0x00000400—RMNET1<br>        • 0x00001000—MBIM<br>        • 0x00010000—AUDIO<br><br><Bitmask Desc> (Interface bitmask description)<br>    • List of interface descriptions corresponding to <Interface bitmask> components<br>    • Example: "(diag, nmea, modem, mbim)" |

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

| Command | Description |
|---|---|
| !USBINFO | **Return information from active USB descriptor**<br><br>Return information from the active USB descriptor.<br><br>**Password required:** No<br><br>**Usage:**<br>• Query: **AT!USBINFO?**<br>   Response:   VID:              &lt;vendor_id&gt;<br>                     APP PID:     &lt;app_product_id&gt;<br>                     BOOT PID:  &lt;boot_product_id&gt;<br>                     Manufacturer: &lt;product_manufacturer&gt;<br>                     Product: &lt;product_name&gt;<br>   Purpose:     Display USB descriptor information.<br><br>**Parameters:**<br>&lt;vendor_id&gt; (Vendor ID):<br>• Valid range: 0000–FFFF<br><br>&lt;app_product_id&gt; (Product ID used when modem is in application mode):<br>• Valid range: 0000–FFFF<br><br>&lt;boot_product_id&gt; (Product ID used when modem is in boot loader mode):<br>• Valid range: 0000–FFFF<br><br>&lt;product_manufacturer&gt; (Manufacturer string):<br>• ASCII string (32 characters maximum)<br>• Example: "Sierra Wireless, Incorporated"<br><br>&lt;product_name&gt; (Product string):<br>• ASCII string (64 characters maximum)<br>• Example: "EM7565" |

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

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

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

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

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

| Command | Description |
|---|---|
| &V | **Return operating mode AT configuration parameters**<br><br>Return the status of all AT command parameters that apply to the current operating mode.<br><br>**Password required:** No<br><br>**Usage:**<br><ul><li>Execution: **AT&V**<br>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;<br>S3: 13; S4: 10; S5: 8; S6: 2; S7: 50; S8: 2; S9: 6; S10: 14; S11: 95;<br>+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<br>OK<br>*Note: this is an example only. The supported commands may vary by device/SKU.*</li></ul>Purpose: Display command parameters. |

# 4: Diagnostic Commands

## Introduction

This chapter describes commands used to diagnose modem problems.

## Command summary

The table below lists the commands described in this chapter.

**Table 4-1: Diagnostic commands**

| Command | Description | Page |
|---------|-------------|------|
| **!BCFWUPDATESTATUS** | Report status of most recent firmware update attempt | 53 |
| **!ERR** | Display diagnostic information | 54 |
| **!GCCLR** | Clear crash dump data | 54 |
| **!GCDUMP** | Display crash dump data | 55 |
| **!LTERXCONTROL** | Enable/disable LTE receive (Rx) diversity during Carrier Aggregation | 56 |
| **!RXDEN** | Enable/disable WCDMA/LTE/TD-SCDMA receive (Rx) diversity | 57 |

# Command reference

**Table 4-2: Diagnostic command details**

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

**Table 4-2: Diagnostic command details (Continued)**

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

**Table 4-2: Diagnostic command details (Continued)**

| Command | Description |
|---------|-------------|
| !GCDUMP | **Display crash dump data**<br><br>Display crash dump data.<br><br>**Password required:** No<br><br>**Usage:**<br>• Execution: **AT!GCDUMP**<br>  Response: \<crash dump data\><br>  OK<br>  or No crash data available<br>  OK<br>  Purpose: Display crash dump data. |

**Table 4-2: Diagnostic command details (Continued)**

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

**Table 4-2: Diagnostic command details (Continued)**

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

# >> | 5: Test Commands

## Introduction

---

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

---

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

# Command summary

The table below lists the commands described in this chapter.

**Table 5-1: Test commands**

| Command | Description | Page |
|---|---|---|
| !DACGPSCTON | Return GPS CtoN and frequency measurement | 60 |
| !DACGPSMASKON | Set CGPS IQ log mask | 60 |
| !DACGPSSTANDALONE | Enter/exit StandAlone (SA) RF mode | 61 |
| !DACGPSTESTMODE | Start/stop CGPS diagnostic task | 61 |
| !DAFTMACT | Put modem into Factory Test Mode | 62 |
| !DAFTMDEACT | Put modem into online mode from Factory Test Mode | 62 |
| !DAGFTMRXAGC | Get FTM Rx AGC (Primary or Diversity) | 63 |
| !DALGRXAGC | Return Rx AGC value (LTE only) | 64 |
| !DALGTXAGC | Return Tx AGC value and transmitter parameters (LTE only) | 65 |
| !DALTXCONTROL | Configure LTE Tx parameters (LTE only) | 67 |
| !DAOFFLINE | Place modem offline | 68 |
| !DARCONFIG | Set Band and Channel | 69 |
| !DARCONFIGDROP | Drop Radio Configurations | 70 |
| !DAWTXCONTROL | Configure WCDMA Tx Power (WCDMA only) | 70 |

# Command reference

**Table 5-2: Test command details**

| Command | Description |
|---|---|
| **!DACGPSCTON** | **Return GPS CtoN and frequency measurement**<br><br>Return the GPS CtoN and frequency measurement.<br><br>**Requirements:**<br>1. AT!DACGPSTESTMODE=1 *(to start CGPS diagnostic task)*<br>2. AT!DACGPSSTANDALONE=1 *(to enter SA RF mode)*<br>3. AT!DACGPSMASKON *(to enable log mask)*<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution: **AT!DACGPSCTON**<br>  Response: CtoN=<CtoN>, Freq=<freq><br>           OK<br>  Purpose: Return CtoN and frequency measurements.<br><br>**Parameters:**<br><CtoN> (Signal strength calculated in dBHz as part of WBIQ test)<br>  • Uint32<br><br><freq> (Frequency in Hz calculated as part of WBIQ test)<br>  • Int32 |
| **!DACGPSMASKON** | **Set CGPS IQ log mask**<br><br>Set CGPS IQ (0x138a) log mask.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution: **AT!DACGPSMASKON**<br>  Response: 730000000300000000000000001000000DC03<br>         0000000000000000000000000000000000000<br>         0000000000000000000000000000000000000<br>         0000000000000000000000000000000000000<br>         0000000000000000000000000000000000000<br>         0000000000000000000000000000000000000<br>         0000000000000000000000000000000000000<br>         00000000000000040000000000000000000000<br><br>         OK<br>  Purpose: Set log mask. |

**Table 5-2: Test command details (Continued)**

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

**Table 5-2:  Test command details (Continued)**

| Command | Description |
|---------|-------------|
| !DAFTMACT | **Put modem into Factory Test Mode**<br><br>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.<br><br>*Note:  When this command executes successfully, the modem responds with the value 290300. Any other response indicates an error.*<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Query:      **AT!DAFTMACT**<br>  Response:    290300 *(Success. Any other response indicates an error.)*<br>                 OK<br>  Purpose:     Place modem in FTM mode. |
| !DAFTMDEACT | **Put modem into online mode from Factory Test Mode**<br><br>This command takes the modem out of FTM and puts the modem back into online mode. (The command !DAFTMACT puts the modem into FTM.)<br><br>*Note:  When this command executes successfully, the modem responds with the value 290400. Any other response indicates an error.*<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Query:      **AT!DAFTMDEACT**<br>  Response:    290400 *(Success. Any other response indicates an error.)*<br>                 OK<br>  Purpose:     Place modem in online mode (from FTM mode). |

**Table 5-2: Test command details (Continued)**

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

**Table 5-2: Test command details (Continued)**

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

**Table 5-2: Test command details (Continued)**

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

**Table 5-2: Test command details (Continued)**

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

**Table 5-2: Test command details (Continued)**

| Command | Description |
|---|---|
| !DALTXCONTROL | **Configure LTE Tx parameters (LTE only)**<br><br>Configure LTE Tx parameters, including Tx power, waveform, modulation, net signal values, number of resource blocks, and start resource block.<br><br>**Requirements:**<br>Before using this command:<br>&bull; **!DAFTMACT** must be issued to put the modem into FTM.<br>&bull; **!DARCONFIG** must be issued to set the technology, band, and channel.<br><br>**Password required:** Yes<br><br>**Usage:**<br>&bull; Execution:    AT!DALTXCONTROL=<carrier><enable>,[<tx_pwr>,<waveform>, <mod>,<ns_val>,<num_RB>,<start_RB>]<br>   Response:    OK<br>   Purpose:    Set the LTE Tx parameters.<br><br>**Parameters:**<br><carrier> (Carrier ID)<br>&bull; 0—PCC<br><br><enable> (Enable/disable Tx power output)<br>&bull; 0—Disable<br>&bull; 1—Enable<br><br><tx_pwr> (Desired Tx power in dBm)<br>&bull; Valid range: -57 to 23<br>&bull; Value is ignored if <enable>=0.<br><br><waveform> (Tx waveform)<br>&bull; 0=1 MHz offset CW (Continuous Wave)<br>&bull; 1=LTE PUSCH (Physical Uplink Shared Channel)<br>&bull; 2=LTE PUCCH (Physical Uplink Control Channel)<br>   Note: LTE PUCCH is not supported by EM75xx modules.<br>&bull; 3=LTE PRACH (Physical Random Access Channel)<br>&bull; 4=LTE SRS (Sounding Reference Signal)<br>&bull; 5=UpPTS (Uplink Pilot Time Slot)<br><br><mod> (Tx modulation)<br>&bull; 0—QPSK<br>&bull; 1—16 QAM<br>&bull; 2—64 QAM<br><br><ns_val> (LTE NS (Net Sig))<br>&bull; Valid range: 1–32<br>&bull; This value affects maximum output power.<br><br><num_RB> (Number of resource blocks<br>&bull; Valid range: 0–100<br><br><start_RB> (PUSCH starting resource block index)<br>&bull; Valid range: 0–255 |

**Table 5-2: Test command details (Continued)**

| Command | Description |
|---------|-------------|
| **!DAOFFLINE** | **Place modem offline**<br><br>Put the modem offline.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution: **AT!DAOFFLINE**<br>  Response: OK<br>  Purpose: Put the modem offline.<br><br>**Parameters:**<br>  None |

**Table 5-2: Test command details (Continued)**

| Command | Description |
|---|---|
| **!DARCONFIG** | **Set Band and Channel**<br><br>Configure and tune the module's radio to a specific RAT, band, and channel.<br><br>**Requirements:**<br>Before using this command:<br>• **!DAFTMACT** must be issued to put the modem into FTM.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution:      **AT!DARCONFIG=\<carrier>,\<technology>,\<band>,\<channel>[,<br>             \<lte_bw>]**<br>  Response:      OK<br>  Purpose:        Set the selected RAT's band and channel (and bandwidth, for LTE).<br><br>**Parameters:**<br>\<carrier> (Carrier ID)<br>• 0—PCC<br><br>\<technology> (Radio access technology (RAT))<br>• RAT support is device-dependent<br>• 0—CDMA<br>• 1—WCDMA<br>• 2—GSM<br>• 3—LTE<br><br>\<band> (Band number)<br>• Valid range: 1–66<br>• e.g. '1' is LTE B1 or WCDMA B1<br><br>\<channel> (Uplink channel number for selected \<band>)<br>• Integer value<br>• \<band>-dependent<br><br>\<lte_bw> (LTE bandwidth)<br>• 0—1.4 MHz<br>• 1—3 MHz<br>• 2—5 MHz<br>• 3—10 MHz<br>• 4—15 MHz<br>• 5—20 MHz |

**Table 5-2:  Test command details (Continued)**

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

# 6: Memory Management Commands

**6**

## 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 |
|---------|-------------|------|
| **!NVBACKUP** | Back up device configuration | 72 |
| **!RMARESET** | Restore device to saved restore point | 74 |

# Command reference

**Table 6-2: Memory management command details**

| Command | Description |
|---|---|
| **!NVBACKUP** | **Back up device configuration**<br><br>Save the device's current configuration as a 'restore point'. The restore point can then be restored at a later time if necessary, using !RMARESET on page 74.<br><br>**Password required:** No<br><br>**Usage:**<br>• Execution:  **AT!NVBACKUP=<restore point>[,<name>]**<br>  Response:  !NVBACKUP:<br>  Items Saved:  <saved><br>  Items Skipped:  <skipped><br>  OK<br>  Purpose:  Save the current device configuration to the indicated <restore point>.<br>  Note: The restore point replaces the existing same-numbered restore point (if present), and deletes higher-numbered restore points.<br>• Query:  **AT!NVBACKUP?**<br>  Response:  !NVBACKUP:<br>  <restore point> <name><br>  ...<br>  OK<br>  Purpose:  Display all available restore points.<br><br>**Usage notes:**<br>• When saving a restore point:<br>  • The existing <restore point> is replaced (if present).<br>  • Higher-numbered restore points are deleted.<br>• If a <name> is not specified, the file is saved as "unnamed" or "Latest", depending on the <restore point>.<br><br>**Parameters:**<br><restore point> (Type of saved restore point)<br>  • Valid range: 0–3<br>  • 0=Factory-calibrated configuration (Cannot be replaced)<br>  • 1=Sierra-provided SKU configuration (Cannot be replaced)<br>  • 2=Save the current configuration using a specified file <name>. If no <name> is specified, save as "unnamed".<br>  • 3=Save the current configuration as the 'Latest' restore point.<br>    Note: The category 3 restore point is also generated automatically after a successful reconfiguration (e.g. after an image switch or firmware update).<br><br>(Continued on next page) |

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

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

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

| Command | Description |
|---|---|
| !RMARESET | **Restore device to saved restore point**<br><br>Restore the device to a previously saved restore point.<br>(To save a restore point, see !NVBACKUP on page 72.)<br><br>**Password required:** Yes<br>**Reset required to apply changes:** Yes<br><br>**Usage:**<br>• Execution:   **AT!RMARESET=<restore point>**<br>   Response:   !RMARESET: DEVICE REBOOT REQUIRED<br>                    Items Restored:    <restored count><br>                    Items Deleted:    <deleted count><br>                    Items Defaulted:   <defaulted count><br>                    Items Skipped:     <skipped count><br>                    OK<br>   Purpose:   Restore device to the specified <restore point> (configuration). A reboot is required to take effect.<br>• Query:      **AT!RMARESET?**<br>   Response:   !RMARESET:<br>                    <restore point> <name><br>                    ...<br>                    OK<br>   Purpose:   Display all available restore points.<br><br>**Parameters:**<br><restore_point> (Saved restore point)<br>• 0=Factory-calibrated configuration (Note: For information only, cannot be restored.)<br>• 1=Sierra-provided SKU configuration<br>• 2=Restore to the restore point that was saved earlier using !NVBACKUP on page 72.<br>• 3=Restore to the latest saved restore point (saved earlier using !NVBACKUP or automatically when the device was successfully reconfigured, e.g. after an image switch or firmware update)<br><br><name> (Descriptive name of <restore_point>)<br>• ASCII string, varies by <restore point>:<br>  • <restore point> = 0—"Factory" (Factory-calibrated configuration, pre-SKU)<br>  • <restore point> = 1—"Provision" (Sierra-provisioned SKU configuration)<br>  • <restore point> = 2—User-defined name provided when using !NVBACKUP to save a configuration, or "unnamed" if no name was provided<br>  • <restore point> = 3—User-defined name provided when using !NVBACKUP to save a configuration, or "Latest" (Latest saved configuration) |

# 7: GNSS Commands

## Introduction

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

When using these commands, the following considerations apply:

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

## Command summary

The table below lists the commands described in this chapter.

**Table 7-1: GNSS commands**

| Command | Description | Page |
|---|---|---|
| **!GPSAUTOSTART** | Configure GPS auto-start features | 76 |
| **!GPSCLRASSIST** | Clear specific GPS assistance data | 78 |
| **!GPSCOLDSTART** | Clear all GNSS assistance data | 79 |
| **!GPSEND** | End an active session | 79 |
| **!GPSFIX** | Initiate GPS position fix | 80 |
| **!GPSLBSAPN** | Set GPS LBS APNs | 81 |
| **!GPSLOC** | Return last known location of the modem | 83 |
| **!GPSMOMETHOD** | Set/report GPS MO method | 84 |
| **!GPSNMEACONFIG** | Enable and set NMEA data output rate | 85 |
| **!GPSNMEASENTENCE** | Set/report NMEA sentence type | 86 |
| **!GPSPORTID** | Set/report port ID to use over TCP/IP | 87 |
| **!GPSSATINFO** | Request satellite information | 88 |
| **!GPSSTATUS** | Request current status of a position fix session | 89 |
| **!GPSSUPLURL** | Set/report SUPL server URL | 90 |
| **!GPSSUPLVER** | Set/report SUPL server version | 91 |

**Table 7-1: GNSS commands (Continued)**

| Command | Description | Page |
|---|---|---|
| **!GPSTRACK** | Initiate local tracking (multiple fix) session | 92 |
| **+WANT** | Enable/disable GNSS antenna power | 93 |

# Command reference

**Table 7-2: GNSS command details**

| Command | Description |
|---|---|
| **!GPSAUTOSTART** | **Configure GPS auto-start features**<br><br>Configure the GPS auto-start features. Any changes take effect the next time the modem is reset.<br><br>*Note: If auto-start is enabled, another GPS session cannot be started.*<br><br>**Password required:** No<br><br>**Usage:**<br>• Execution: **AT!GPSAUTOSTART=<function>[, <fixtype>, <maxtime>, <maxdist>, <fixrate>]**<br>  Response: OK<br>    *or* ERROR<br>  Purpose: Assign start values for various GPS settings<br>• Query: **AT!GPSAUTOSTART?**<br>  Response: !GPSAUTOSTART<br>    function: <function><br>    fixtype: <fixtype><br>    maxtime: <maxtime> seconds<br>    maxdist: <maxdist> meters<br>    fixrate: <fixrate> seconds<br>    OK<br>  Purpose: Display the current values for auto-start features<br>• Query List: **AT!GPSAUTOSTART=?**<br>  Purpose: Return the expected command format.<br><br>(Continued on next page) |

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---|---|
| !GPSAUTOSTART | **Configure GPS auto-start features (continued)**<br><br>Parameters:<br><br><function> (Enable/disable the feature)<br>  • 0=Disabled<br>  • 1=Enabled at boot (GPS tracking session starts automatically when modem is reset)<br>  • 2=Enabled when NMEA port is opened<br><br><fixtype> (Type of fix to establish)<br>  • 1=Standalone (not supported by a mobile station)<br>  • 2=MS-based only<br>  • 3=MS-assisted only<br><br><maxtime> (Maximum time to wait for a position fix)<br>  • Valid range: 0–255—Number of seconds to wait<br><br><maxdist> (Requested accuracy of fix)<br>  • Entered in decimal format<br>  • Valid range:<br>    • 0–4294967279 meters<br>    • 4294967280=No preference<br><br><fixrate> (Time to wait between fixes)<br>  • Valid range: 1–65535 seconds |

**Table 7-2: GNSS command details (Continued)**

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

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---|---|
| !GPSCOLDSTART | **Clear all GNSS assistance data**<br><br>Clear GNSS assistance details from the modem and put the modem into a coldstart state. Data cleared includes Ephemeris, Previous Position, Ionosphere, and GPS time—almanac data is not cleared. This forces a cold start for GPS acquisition the next time a session starts.<br><br>The command is only available when there is no active GPS session—the GPS receiver is off and no position fix is being calculated.<br><br>**Requirements:**<br>• Before using this command, end all active GNSS sessions using **AT!GPSEND=0,255**<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution:    **AT!GPSCOLDSTART**<br>  Response:    OK<br>  Purpose:      Clear the modem's GPS details<br><br>**Parameters:**<br>  None |
| !GPSEND | **End an active session**<br><br>End an active position fix session.<br><br>**Password required:** No<br><br>**Usage:**<br>• Execution:    **AT!GPSEND=<sessType>[, <sessionID>]**<br>  Response:    ERRCODE = <value><br>                      OK<br>          *or*    OK<br>  Purpose:      End the current session.<br><br>**Parameters:**<br><sessType> (Type of session to end)<br>• 0=Position fix session<br><br><sessionID> (ID of the session to end)<br>• 255=End all sessions<br>• 0–254=Reserved<br><br><value> (Error code returned when command fails for any reason)<br>• See Table 7-3 on page 93 for a list of possible error codes.<br>• N/A=Not available |

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---------|-------------|
| **!GPSFIX** | **Initiate GPS position fix**<br><br>Initiate a GPS position fix.<br><br>**Password required:** No<br><br>**Usage:**<br>• Execution: **AT!GPSFIX=<fixType>, <maxTime>, <maxDist>**<br>　Response: Fix initiated<br>　　　　　　OK<br>　　　*or*　ERROR CODE = <value><br>　　　　　　OK<br>　Purpose: Initiate a time-limited position fix with a specified accuracy.<br>• Query List: **AT!GPSFIX=?**<br>　Purpose: Return supported <fixType>, <maxTime>, and <maxDist> values.<br><br>**Parameters:**<br><br><fixType> (Type of fix to establish)<br>• 1=Standalone (not supported by a mobile station)<br>• 2=MS-based only<br>• 3=MS-assisted only<br><br><maxTime> (Maximum time to wait for a position fix)<br>• Valid range: 0–255 seconds<br><br><maxDist> (Requested accuracy of fix)<br>• Entered in decimal format<br>• Valid range:<br>　• 0–4294967279 meters<br>　• 4294967280=No preference<br><br><value> (Error code returned when command fails for any reason)<br>• See Table 7-3 on page 93 for a list of possible error codes.<br>• N/A—Not available<br><br>**Example(s):**<br>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.<br><br>**Related commands:**<br>• **!GPSSTATUS** (page 89)—Use this command while the tracking session is in progress.<br>• **!GPSLOC** (page 83)—Use this command after the session completes to obtain the result. |

**Table 7-2: GNSS command details (Continued)**

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

**Table 7-2: GNSS command details (Continued)**

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

**Table 7-2:  GNSS command details (Continued)**

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

**Table 7-2: GNSS command details (Continued)**

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

**Table 7-2: GNSS command details (Continued)**

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

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---|---|
| !GPSNMEASENTENCE | **Set/report NMEA sentence type**<br><br>Set or report the current GPS NMEA sentence types.<br><br>**Requirements:**<br>• NMEA streaming must be enabled using **!GPSNMEA** before this command will work.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution:     **AT!GPSNMEASENTENCE=\<nmea type\>**<br>  Response:    OK<br>      *or*      ERROR<br>  Purpose:     Enable or disable NMEA sentence types.<br>• Query:        **AT!GPSNMEASENTENCE?**<br>  Response:    !GPSNMEASENTENCE: \<nmea type\><br>                OK<br>  Purpose:     Indicate the currently enabled GPS NMEA sentence types.<br>• Query List:    **AT!GPSNMEASENTENCE=?**<br>  Response:    !GPSNMEASENTENCE: (00-1FFFFF)<br>                OK<br>  Purpose:     Indicates Execution format. See parameter description below for details of supported values.<br><br>**Parameters:**<br>\<nmea type\> (NMEA sentence types)<br>• 2-byte hex format mask (Note: In the execution format, do not include '0x' before the mask value)<br>• Each bit: 0=Disabled; 1=Enabled<br>• Bit 0: GPGGA (GPS fix data)<br>• Bit 1: GPRMC (GPS recommended minimum data)<br>• Bit 2: GPGSV (GPS satellites in view)<br>• Bit 3: GPGSA (GPS overall satellite data)<br>• Bit 4: GPVTG (GPS vector track and speed over the ground)<br>• Bit 5: Reserved<br>• Bit 6: GLGSV (GLONASS satellites in view)<br>• Bit 7: GNGSA (GLONASS overall satellite data)<br>• Bit 8: GNGNS (Time, position, and fix related data for GLONASS receiver)<br>• Bit 9: GARMC (Galileo recommended minimum data)<br>• Bit 10: GAGSV (Galileo satellites in view)<br>• Bit 11: GAGSA (Galileo overall satellite data)<br>• Bit 12: GAVTG (Galileo Vector track and speed over the ground)<br>• Bit 13: PSTIS (GPS session start indication)<br>• Bit 14: ExGSV (Extended GSV). This option modifies the output format of the GPGSV sentence to display azimuth and elevation as float values. If this bit is not set, the values appear in decimal format.<br>• Bit 15: GAGGA (Galileo time, position, and fix related data)<br>• Bit 16: PQGSA (QZSS GSA)<br><br>(Continued on next page) |

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---------|-------------|
| **!GPSNMEASENTENCE (continued)** | **Set/report NMEA sentence type (continued)**<br><br>• Bit 17: PQGSV (QZSS GSV)<br>• Bit 18: GAGNS (Galileo fix data)<br>• Bit 19: GPDTM (GPS datum reference information)<br>• Bit 20: Proprietary sentences for debugging |
| **!GPSPORTID** | **Set/report port ID to use over TCP/IP**<br><br>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.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution:   **AT!GPSPORTID=\<portid>**<br>  Response:   OK<br>      *or*   ERROR<br>  Purpose:   Queue the request to set the port ID.<br>• Query:   **AT!GPSPORTID?**<br>  Response:   \<portid><br>          OK<br>  Purpose:   Return the port ID currently being used<br><br>**Parameters:**<br>\<port ID> (Port ID to use over TCP/IP)<br>• Valid range: 0–65535<br><br>**Related commands**<br>• !GPSSUPLURL (p.90)—Set/return SUPL server URL used for TCP/IP |

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---------|-------------|
| **!GPSSATINFO** | **Request satellite information**<br><br>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).<br><br>The information returned is valid regardless of the current fix mode or whether the PDE or the modem performs the fix calculations.<br><br>**Password required:** No<br><br>**Usage:**<br>• Query:      AT!GPSSATINFO?<br>  Response:  NO SAT INFO<br>             OK<br>      *or*    Satellites in view: &lt;numSats&gt;  (Timestamp of sat. info)<br>              * SV: &lt;SV 1&gt;  ELEV:&lt;ELEV 1&gt;  AZI:&lt;AZI 1&gt;  SNR:&lt;SNR 1&gt;<br>              ...<br>              * SV: &lt;SV n&gt;  ELEV:&lt;ELEV n&gt;  AZI:&lt;AZI n&gt;  SNR:&lt;SNR n&gt;<br>              OK<br>  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).<br><br>*Note: An asterisk (*) at the beginning of a line indicates the satellite was used in the fix location calculation.*<br><br>**Parameters:**<br>&lt;numSats&gt; (Number of satellites in view)<br>• Valid range: 1–12<br><br>&lt;SV n&gt; (Satellite vehicle number for the nth satellite in the list)<br>• Valid ranges:<br>  • 1–32 (GPS)<br>  • 65–96 (GLONASS)<br>  • 193–197 (QZS)<br>  • 201–237 (Beidou)<br>  • 301–336 (Galileo)<br><br>&lt;ELEV n&gt; (Satellite elevation relative to modem location, in degrees)<br>• Valid range: 0–90<br><br>&lt;AZI n&gt; (Satellite azimuth relative to modem location, in degrees)<br>• Valid range: 0–360<br><br>&lt;SNR n&gt; (Signal to noise ratio, in dB)<br>• Valid range: 0–99 |

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---|---|
| !GPSSTATUS | **Request current status of a position fix session**<br><br>Return the current status of a position fix session.<br><br>**Password required:** No<br><br>**Usage:**<br>• Query:     AT!GPSSTATUS?<br>  Response:     \<year\> \<month\> \<day\> \<day of week\> \<time of day\> Last Fix Status = \<status\><br>                  \<year\> \<month\> \<day\> \<day of week\> \<time of day\> Fix Session Status = \<status\><br>  Purpose:     Return timestamps and status of a position fix session.<br><br>**Parameters (Timestamp):**<br>\<year\><br>• Example: "2007"<br><br>\<month\><br>• 01–12 (Jan–Dec)<br><br>\<day\><br>• 01–31<br><br>\<day of week\><br>• 0–6 (0=Monday)<br><br>\<time of day\><br>• 24-hour clock format<br>• Example: "13:25:48"<br><br>**Parameters (Status):**<br>\<status\> (Session status)<br>• "NONE": No session of this type has occurred since the modem powered up.<br>  • The timestamp is the current time.<br>• "ACTIVE": A session of this type is currently active.<br>  • The timestamp is the time when the session entered this state.<br>• "SUCCESS": The most recent session of this type succeeded.<br>  • The timestamp is the time when the previous session completed successfully.<br>• "FAIL": The most recent session of this type failed.<br>  • The timestamp is the time when the previous session failed.<br>  • An error code is displayed with the "FAIL" string. See Table 7-3 on page 93 for a list of error codes.<br><br>**Example(s):**<br>AT!GPSSTATUS? returns:<br>2007 01 06 6 00:25:01 Last Fix Status = SUCCESS<br>2007 01 06 6 00:25:02 Fix Session Status = ACTIVE |

**Table 7-2:  GNSS command details (Continued)**

| Command | Description |
|---------|-------------|
| !GPSSUPLURL | **Set/report SUPL server URL**<br><br>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.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution: **AT!GPSSUPLURL=”<suplURL>”**<br>  Response: OK<br>       or   ERROR<br>  Purpose: Identify the SUPL server URL.<br>• Query: **AT!GPSSUPLURL?**<br>  Response: <suplURL><br>           OK<br>  Purpose: Return the SUPL server's URL..<br>• Query List: **AT!GPSSUPLURL=?**<br>  Purpose: Return the execution command format.<br><br>**Parameters:**<br><suplURL> (SUPL server URL)<br>  • Must be a fully qualified domain name (FQDN) or address<br>  • Examples: "supl.url.net", "123.123.123.123"<br>  • The <suplURL> is not checked for correctness—if the string is invalid, the modem will not be able to perform MS-assisted GPS fixes.<br><br>**Example(s):**<br>AT!GPSSUPLURL="supl.url.net"<br>AT!GPSSUPLURL="123.123.123.123" |

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---|---|
| !GPSSUPLVER | **Set/report SUPL server version**<br><br>Set or return the version of the SUPL server.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution:    **AT!GPSSUPLURL=<supl ver>"**<br>  Response:   OK<br>         or    ERROR<br>  Purpose:    Identify the SUPL server version.<br>• Query:       **AT!GPSSUPLVER?**<br>  Response:   <supl ver><br>             OK<br>  Purpose:    Return the SUPL server's version.<br>• Query List:  **AT!GPSSUPLVER=?**<br>  Purpose:    Return the execution command format.<br><br>**Parameters:**<br><supl ver> (SUPL server version)<br>   • 1—SUPL version 1<br>   • 2—SUPL version 2 |

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---|---|
| !GPSTRACK | **Initiate local tracking (multiple fix) session**<br><br>Initiate a local tracking session comprising a specific number of position fixes taken at regular time intervals.<br><br>**Password required:** No<br><br>**Usage:**<br>• Execution: AT!GPSTRACK = <fixType>, <maxTime>, <maxDist>, <fixCount>, <fixRate><br>  Response: Fix initiated<br>        OK<br>    *or* ERROR CODE = <value><br>        OK<br>  Purpose: Initiate a series of time-limited position fixes.<br>• Query List: AT!GPSTRACK=?<br>  Purpose: Return supported <fixType>, <maxTime>, <maxDist>, <fixCount>, and <fixRate> values.<br><br>**Parameters:**<br><fixType> (Type of fix to establish)<br>• 1=Standalone (not supported by a mobile station)<br>• 2=MS-based only<br>• 3=MS-assisted only<br><br><maxTime> (Maximum time to wait for satellite information)<br>• Valid range: 0–255 seconds<br><br><maxDist> (Requested accuracy of fix)<br>• Entered in decimal format<br>• Valid range:<br>  • 0–4294967279 meters<br>  • 4294967280=No preference<br><br><fixCount> (Number of position fixes requested)<br>• Valid range: 1–1000 (1000—Take a continuous series of position fixes)<br><br><fixrate> (Amount of time to wait between fix attempts)<br>• Valid range: 0–1799999 seconds<br><br>**Failure conditions:**<br>The request fails if the tracking session fails to initiate.<br>If the request fails, the message ERROR CODE = <value> is returned. See Table 7-3 on page 93 for a list of error codes.<br><br>---<br><br>*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.*<br><br>---<br><br>(Continued on next page) |

**Table 7-2: GNSS command details (Continued)**

| Command | Description |
|---|---|
| !GPSTRACK (continued) | **Initiate local tracking (multiple fix) session (continued)**<br><br>**Example(s):**<br>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.<br>One of the following responses will be received:<br>• "OK" if the request is successful, or<br>• "ERROR CODE = <value>" if the request fails for any reason. See Table 7-3 on page 93 for a list of error codes.<br><br>**Related commands:**<br>• !GPSSTATUS—Use this command while the tracking session is in progress.<br>• !GPSLOC—Use this command after the session completes to obtain the result. |
| +WANT | **Enable/disable GNSS antenna power**<br><br>Enable or disable GNSS antenna power (3.3V).<br><br>**Password required:** No<br>**Persistent across power cycles:** Yes<br><br>**Usage:**<br>• Execution: **AT+WANT=<enable>**<br>  Response: OK<br>  Purpose: Enable or disable the GNSS antenna power (3.3V).<br>• Query List: **AT+WANT=?**<br>  Purpose: Display valid execution format and parameter values.<br><br>**Parameters:**<br><enable> (Enable/disable GNSS antenna power)<br>• 0=Disable<br>• 1=Enable |

## Error codes

Table 7-3 describes error codes that can be returned by !GPSEND (page 79), !GPSSTATUS (page 89), and !GPSTRACK (page 92).

Table 7-4 on page 95 describes error codes that can be returned by !GPSFIX (page 80)

**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 |

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

| Error code | Description |
|---|---|
| 4 | Session Manager is busy |
| 5 | Reserved |
| 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

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 |
|---------|-------------|------|
| **!UIMS** | Select active SIM interface | 97 |

# Command reference

**Table 8-2: SIM command details**

| Command | Description |
|---|---|
| **!UIMS** | **Select active SIM interface**<br>On a module that supports multiple SIM interfaces, select the active SIM interface.<br>To enable/disable UIM2 slot support, use AT!CUSTOM="UIM2ENABLE". See page 27 for option values.<br>**Password required:** No<br><br>**Usage:**<br>• Execution: **AT!UIMS=\<uim_slot\>**<br>  Response: OK<br>  Purpose: Configure the module to use the selected SIM interface.<br>• Query: **AT!UIMS?**<br>  Response: !UIMS: \<uim_slot\><br>  OK<br>  Purpose: Display the currently selected interface.<br>• Query List: **AT!UIMS=?**<br>  Purpose: Return the command format and the supported parameter values.<br>**Parameters:**<br>\<uim\> (SIM interface):<br>• 0=UICC1—External UIM interface #1<br>• 1=UICC2—External UIM interface #2 |

# 9: OMA-DM Commands

## Introduction

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

## Command summary

The table below lists the commands described in this chapter.

**Table 9-1: OMA-DM commands**

| Command | Description | Page |
|---------|-------------|------|
| !HOSTDEVINFO | Configure host device details | 99 |
| !IMSTESTMODE | Enable/disable IMS test mode | 100 |
| !OSINFO | Configure host device operating system information | 101 |

# Command reference

**Table 9-2: OMA-DM command details**

| Command | Description |
|---|---|
| !HOSTDEVINFO | **Configure host device details**<br><br>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.<br>To configure host device operating system information, see !OSINFO on page 101.<br><br>*Note: In the Execution format, if a parameter is not entered then the value on the device does not change.*<br><br>**Password required:** Yes—Execution formation only<br><br>**Usage:**<br>• Execution: AT!HOSTDEVINFO="<hostman>"[, "<hostmod>"[, "<hostswv>"[, "<hostplasmaid>"]]]<br>    Response: OK<br>    *or* ERROR<br>    Purpose: Set some or all host device detail parameters.<br>• Query: AT!HOSTDEVINFO?<br>    Response: HostMan:     <hostman><br>                 HostMod:     <hostmod><br>                 HostSwV:     <hostswv><br>                 HostPlasmaID:   <hostplasmaid><br>                 OK<br>    Purpose: Display current host device details.<br>• Query List: AT!HOSTDEVINFO=?<br>    Purpose: Display the execution command format and parameter values.<br><br>**Parameters:**<br><hostman> (Host device manufacturer's name)<br>• 256 characters maximum<br><hostmod> (Host device model name)<br>• 256 characters maximum<br><hostswv> (Host software version)<br>• 256 characters maximum<br><hostplasmaid> (Host Plasma ID)<br>• 256 characters maximum<br><br>**Example(s):**<br>• AT!HOSTDEVINFO="Manufacturer",,"1.0",<br>    This sets the <hostman> and <hostswv> values. The values for <hostmod> and <hostplasmaid> do not change.<br>• AT!HOSTDEVINFO="Manufacturer"<br>    This sets the <hostman> value. The values for all other parameters do not change. |

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

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

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

| Command | Description |
|---|---|
| !OSINFO | **Configure host device operating system information**<br><br>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.<br>To configure host device details, see !HOSTDEVINFO on page 99.<br><br>*Note:  In the Execution format, if a parameter is not entered then the value on the device does not change.*<br><br>**Password required:** Yes—Execution format only<br><br>**Usage:**<br>• Execution:  **AT!OSINFO="\<osname\>"[, "\<osversion\>"]**<br>  Response:  OK<br>      *or*    ERROR<br>  Purpose:  Set host device operating system information parameters.<br>• Query:  **AT!OSINFO?**<br>  Response:  OSName:        \<osname\><br>          OSVersion:      \<osversion\><br>          OK<br>  Purpose:  Display current host device operating system information.<br>• Query List:  **AT!OSINFO=?**<br>  Purpose:  Display the execution command format and parameter values.<br><br>**Parameters:**<br>\<osname\> (Host device operating system name)<br>  • 256 characters maximum<br>\<osversion\> (Host device operating system version)<br>  • 256 characters maximum<br><br>**Example(s):**<br>• AT!OSINFO="An OS Name","1.0"<br>  This sets both parameters.<br>• AT!OSINFO=,"1.0"<br>  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 evalute 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 | 103 |
| **!SARBACKOFF** | Set/report offset from maximum Tx power | 104 |
| **!SARINTGPIOMODE** | Set/report default pull mode for SAR interrupt GPIOs | 105 |
| **!SARSTATE** | Set/report SAR backoff state | 106 |
| **!SARSTATEDFLT** | Set/report default SAR backoff state | 107 |

# Command reference

**Table 10-2: Thermal mitigation command details**

| Command | Description |
|---------|-------------|
| **!MAXPWR** | **Set/report maximum Tx power**<br><br>Set or report the maximum Tx power for a specific band.<br><br>**Caution:** *Any adjustments of Tx power may impact regulatory certification of the module in the host platform. The OEM is responsible for ensuring that the final module configuration in the host platform meets all regulatory requirements.*<br><br>*Note: Increasing the Tx power affects the module's current consumption and thermal performance.*<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution (WCDMA/LTE):<br>    **AT!MAXPWR=\<band>,\<tech>,\<max_tx_pwr>**<br>  Response: OK<br>  Purpose: Set the maximum Tx power for the specified band/technology combination.<br>• Query: **AT!MAXPWR?\<band>,\<tech>**<br>  Response: \<maxpwr> dBm<br>    OK<br>  Purpose: Indicate the maximum Tx power for the specified band/technology combination.<br>• Query list: **AT!MAXPWR=?**<br>  Purpose: Display valid execution format and parameter values.<br><br>**Parameters:**<br>\<band> (RF band)<br>• 3GPP band number. For a full listing of 3GPP band numbers, see Table 13-2 on page 129.<br>• Band support is product specific—see the device's Product Specification or Product Technical Specification document for details.<br>• Valid range: 0–71<br><br>\<tech> (Network technology)<br>• 0=WCDMA<br>• 2=LTE<br><br>\<maxpwr> (Maximum Tx power in dB)<br>• Valid range: 20.0–24.5 |

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

| Command | Description |
|---|---|
| !SARBACKOFF | **Set/report offset from maximum Tx power**<br><br>Set or report the offset from maximum Tx power limit for a specific band/technology/backoff state combination.<br>Changes take place after the next modem reset.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution (WCDMA, LTE):<br>        **AT!SARBACKOFF=\<tech\>,\<band\>,\<state\>,\<Backoff offset\>**<br>  Response:    OK<br>  Purpose:     Set the maximum Tx power for the tech/band/state combination.<br>• Execution (GSM):<br>        **AT!SARBACKOFF=\<tech\>,\<band\>,\<slot\>,\<state\>,\<modulation\>, \<offset\>**<br>  Response:    OK<br>  Purpose:     Set the maximum Tx power for the tech/band/state combination.<br>• Query (WCDMA, LTE):<br>        **AT!SARBACKOFF?\<tech\>,\<band\>,\<state\>**<br>  Response:    \<offset\> dBm<br>       *or*<br>       NV Not Set<br><br>       OK<br>  Purpose:     Display the offset from maximum Tx power for the tech/band/state combination.<br>• Query (GSM):<br>        **AT!SARBACKOFF?\<tech\>,\<band\>,\<slot\>,\<state\>,\<modulation\>**<br>  Response:    \<offset\> dBm<br>       *or*<br>       NV Not Set<br><br>       OK<br>  Purpose:     Display the offset from maximum Tx power for the tech/band/state combination.<br>• Query list:    **AT!SARBACKOFF=?**<br>  Purpose:     Display valid execution format and parameter values for LTE/WCDMA/CDMA and GSM queries.<br><br>**Parameters:**<br>\<tech\> (Network technology)<br>  • 0=WCDMA<br>  • 2=LTE<br>  • 3=GSM<br>  • 4=TD-SCDMA<br><br>\<band\> (RF band)<br>  • 0–41<br>  • Band support is device-dependent. See the device's Product Technical Specification for details.<br>(Continued on next page) |

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

| Command | Description |
|---|---|
| **!SARBACKOFF** (continued) | **Set/report offset from maximum Tx power (continued)**<br><br>\<slot\> (Tx slot. GSM only)<br>• 1–5<br><br>\<state\> (SAR backoff state)<br>• 0=No backoff<br>• 1–8=Backoff state 1 to 8<br><br>\<modulation\> (Modulation method. GSM only.)<br>• 0=GMSK (GPRS)<br>• 1=8PSK (EDGE)<br><br>\<Backoff offset\> (Offset from max Tx power, in dBm)<br>• Valid values: use the Query List command to display valid values.<br>• Value may be integer or decimal. (For example, 4 or 6.8) |
| **!SARINTGPIOMODE** | **Set/report default pull mode for SAR interrupt GPIOs**<br><br>Set or report the default pull mode (high/low) for SAR interrupt GPIOs. This setting applies to all SAR interrupt GPIOs.<br><br>**Password required:** Yes<br><br>**Usage:**<br>• Execution: **AT!SARINTGPIOMODE=\<mode\>**<br>  Response: OK<br>  Purpose: Set the default pull mode for all SAR interrupt GPIOs.<br>• Query: **AT!SARINTGPIOMODE?**<br>  Response: \<mode\><br>         OK<br>  Purpose: Indicate the default pull mode.<br>• Query list: **AT!SARINTGPIOMODE=?**<br>  Purpose: Display valid execution format and parameter values.<br><br>**Parameters:**<br><br>\<mode\> (SAR GPIO interrupt pull mode default setting)<br>• 0=Standard mode—Default pull is HIGH/DAL_GPIO_PULL_UP<br>• 1=Inverse mode—Default pull is LOW/DAL_GPIO_PULL_DOWN |

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

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

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

| Command | Description |
|---|---|
| !SARSTATEDFLT | **Set/report default SAR backoff state**<br><br>Set or report the default (persistent) SAR (Specific Absorption Rate) backoff state.<br><br>*Note: This setting is persistent. To temporarily change the backoff state, use !SARSTATE.*<br><br>**Password required:** No<br>**Persistent across power cycles:** Yes<br><br>**Usage:**<br><ul><li>Execution: **AT!SARSTATEDFLT=<state>**<br>Response: OK<br>Purpose: Set the default SAR backoff state.</li><li>Query: **AT!SARSTATEDFLT?**<br>Response: !SARSTATEDFLT: <state><br>OK<br>Purpose: Indicate the default SAR backoff state.</li><li>Query list: **AT!SARSTATEDFLT=?**<br>Purpose: Display valid execution format and parameter values.</li></ul><br>**Parameters:**<br><state> (SAR backoff state)<ul><li>0=No backoff</li><li>1–8=Backoff state 1 to 8</li></ul> |

# 11: AirVantage Commands

## Introduction

This chapter describes AirVantage (AV) related commands.

## Command summary

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

**Table 11-1: AirVantage commands**

| Command | Description | Page |
|---------|-------------|------|
| **+WDSC** | Configure AirVantage Management Services | 109 |
| **+WDSE** | Display most recent AirVantage Management Services error | 111 |
| **+WDSG** | Display AirVantage Management Services status information | 112 |
| **+WDSI** | Activate/deactivate AirVantage Management Services unsolicited notifications | 113 |
| **+WDSI (notification)** | AirVantage Management Services events—Unsolicited notification | 114 |
| **+WDSR** | Reply to AirVantage server request | 116 |
| **+WDSS** | Configure/connect AirVantage Management Services session | 117 |

# Command reference

**Table 11-2: AirVantage Device Services command details**

| Command | Description |
|---|---|
| **+WDSC** | **Configure AirVantage Management Services**<br><br>Configure the following AirVantage Management Services parameters:<br>• User agreement for connection, package download and package install<br>• Polling mode to make a connection to the AirVantage server<br>• Retry mode to attempt a new connection to the AirVantage server when the WWAN DATA service is temporarily out of order or when an http/coap error occurs<br><br>**SIM card requirement:** Not required<br>**Password required:** No<br>**Persistent across power cycles:** Yes (<State>, <Timer_1>, <Timer_n>)<br><br>**Usage:**<br>• Execution (<Mode> = 0, 1, 2, 3, 5):<br>       **AT+WDSC=<Mode>,<State>**<br>   Response:  OK<br>   Purpose:  Enable or disable the selected <Mode>.<br>• Execution (<Mode> = 4):<br>       **AT+WDSC=<Mode>,<Timer_1>[[,<Timer_2>]...[,<Timer_n>]]**<br>   Response:  OK<br>   Purpose:  Set interval timers for successive connection attempts.<br>• Query:  **AT!WDSC?**<br>   Response:  +WDSC: 0,<State><br>           +WDSC: 1,<State><br>           +WDSC: 2,<State><br>           +WDSC: 3,<State><br>           +WDSC: 4,<Timer_1>[[,<Timer_2>]...[,<Timer_n>]]<br>           +WDSC: 5,<State><br>           OK<br>   Purpose:  Show the current <Mode> configurations.<br>• Query List:  **AT!WDSC=?**<br>   Purpose:  Display valid execution format and parameter values.<br><br>(Continued on next page) |

**Table 11-2: AirVantage Device Services command details (Continued)**

| Command | Description |
|---------|-------------|
| **+WDSC** | **Configure AirVantage Management Services (continued)**<br><br>Parameters:<br><br><Mode> (Mode being configured)<br>  • 0=Reserved for future use<br>  • 1=User agreement for package download. When enabled, the module returns an unsolicited notification to request an agreement before downloading any package. See +WDSI on page 113 for details.<br>  • 2=User agreement for package install. When enabled, the module returns an unsolicited notification to request an agreement before installing any package. See +WDSI on page 113 for details.<br>  • 3=Polling mode. When enabled (<State> > 0), the module waits for the number of minutes specifed in <State>, then will initiate a connection to the AirVantage server based if the device is registered on the network.<br>  • 4=Retry mode. If an error occurs during a connection to the AirVantage server (e.g. WWAN DATA establishment failed, http error code received), the module will initiate a new connection according to the defined timers. (Note: This is a persistent setting.)<br>  • 5=User agreement for device reboot. When enabled, the module returns an unsolicited notification to request an agreement before rebooting the device.<br><br><State> (For <Mode> = 0, 1, 2, 5: Activation state of <Mode>)<br>  • 0=Disabled (Default value)<br>  • 1=Enabled<br><br><State> (For <Mode> = 3: Activation state/timer of <Mode>)<br>  • 0=Disabled (Default value)<br>  • 1–525600=Polling timer (in minutes)<br><br><Timer_1>..<Timer_n> (Connection attempt interval timers)<br>  • The number of minutes to wait after connection attempt (n-1) before making connection attempt (n). (Note: There is a maximum of 8 connection attempts.)<br>  • <Timer_1>—Timer between the first failed connection and the next attempt.<br>    • Valid range: 0–20160 (0—Retry mode is deactivated)<br>    • Default value: 15<br>  • $<Timer\_n>$—Timer between the $n^{th}$ failed connection attempt and the $(n+1)^{th}$ connection (n≤8).<br>    • Valid range: 1–20160<br>    • Default value: 15<br>      • <Timer_2>=60 (Time to wait after second failed connection attempt.)<br>      • <Timer_3>=240 (Time to wait after third failed connection attempt.)<br>      • <Timer_4>=960 (Time to wait after fourth failed connection attempt.)<br>      • <Timer_5>=2880 (Time to wait after fifth failed connection attempt.)<br>      • <Timer_6>=10080 (Time to wait after sixth failed connection attempt.)<br>      • <Timer_7>=10080 (Time to wait after seventh failed connection attempt.)<br>      • <Timer_8> not used<br><br>*Note: The <State>, <Timer_1>, and <Timer_n> parameters are stored in NV without sending the &W command. The &F command does not affect these values.* |

**Table 11-2: AirVantage Device Services command details (Continued)**

| Command | Description |
|---------|-------------|
| +WDSE | **Display most recent AirVantage Management Services error** <br><br> Display the most recent HTTP(S) response received by the device for the package download. <br><br> **Requirements:** <br> • AirVantage Management Services must be activated (See +WDSG on page 112 for details). <br> • Session must be initiated using AT+WDSS=1,1. (See +WDSS on page 117 for details). <br><br> **SIM card requirement:** Not required <br> **Password required:** No <br><br> **Usage:** <br> • Execution: **AT+WDSE** <br>   Response: [+WDSE: <HTTP_Status>] <br>   OK <br>   *or* <br>   +CME ERROR: 3 <br>   *(If AirVantage Management services are not in the Activated state.)* <br>   Purpose: Display most recent response. (If HTTP/HTTPS is not yet used, return only OK.) <br><br> **Parameters:** <br> <HTTP_Status> (Standard HTTP status code) <br> • none—No response shown if HTTP/HTTPS has not yet been used. <br> • Supported statuses: <br>   • 1xx Informational: <br>     100 (Continue)   101 (Switching protocols) <br>   • 2xx Success: <br>     200 (OK)   201 (Created) <br>     202 (Accepted)   203 (Non-authoritative information) <br>     204 (No content)   205 (Reset content) <br>     206 (Partial content) <br>   • 3xx Redirection: <br>     300 (Multiple choices)   301 (Moved permanently) <br>     302 (Found)   303 (See other) <br>     304 (Not modified)   305 (Use proxy) <br>     307 (Temporary redirect) <br>   • 4xx Client Error: <br>     400 (Bad request)   401 (Unauthorized) <br>     402 (Payment required)   403 (Forbidden) <br>     404 (Not found)   405 (Method not allowed) <br>     406 (Not acceptable)   407 (Proxy authentication required) <br>     408 (Request time-out)   409 (Conflict) <br>     410 (Gone)   411 (Length required) <br>     412 (Precondition failed)   413 (Request entity too large) <br>     414 (Request URI too large)   415 (Unsupported media type) <br>     416 (Requested range not satisfiable)   417 (Expectation failed) <br>   • 5xx Server Error: <br>     500 (Internal server error)   501 (Not implemented) <br>     502 (Bad gateway)   503 (Service unavailable) <br>     504 (Gateway time-out)   505 (HTTP version not supported) |

**Table 11-2: AirVantage Device Services command details (Continued)**

| Command | Description |
|---------|-------------|
| **+WDSG** | **Display AirVantage Management Services status information**<br><br>Display general AirVantage Management Services status details.<br>**SIM card requirement:** Not required<br>**Password required:** No<br><br>**Usage:**<br>• Execution:   **AT+WDSG**<br>   Response:   +WDSG: <Status>, <Value><br>                 +WDSG: <Status>, <Value><br>                 OK<br>   Purpose:   Returns the current <Value>s for <Status>=1 and <Status>=2.<br><br>**Parameters:**<br><Status> (Information type to display)<br>  • 0—AirVantage Management Services activation state<br>    • For <Value>=2 and <Value>=3, connection parameters are automatically provisioned and no actions are required by the user.<br>    • Device is activated (<Value>=3) when a dedicated APN (Access Point Name) is set manually or automatically in the first session. See +WDSS on page 117 for details.<br>  • 1—Session and package indication<br><br><Value> (Detail for the <Status>)<br>  • For <Status>=0:<br>    • 0—AirVantage Management Services prohibited. Management Services will never be activated.<br>    • 1—AirVantage Management Services deactivated. Connection parameters to an AirVantage server must be provisioned.<br>      This is the default state when a device has never been activated (first use of device services on this device).<br>    • 2—AirVantage Management Services must be provisioned. A bootstrap session is required.<br>    • 3—AirVantage Management Services are activated.<br>  • For <Status>=1:<br>    • 0—No session or package.<br>    • 1—A session is under treatment.<br>    • 2—A package is available on the server.<br>    • 3—A package was downloaded and ready to install.<br>    • Note: If a package is downloaded unsuccessfully, the <Value> is set to 0. If it downloads successfully, the <Value> is set to 3. |

**Table 11-2: AirVantage Device Services command details (Continued)**

| Command | Description |
|---------|-------------|
| **+WDSI** | **Activate/deactivate AirVantage Management Services unsolicited notifications**<br><br>Activate/deactivate specific AirVantage Management Services unsolicited notifications.<br><br>Requirements:<br>• To receive unsolicited notifications, AirVantage Management Services must be activated (see +WDSG on page 112 for details).<br>SIM card requirement: Not required<br>Password required: No<br>Reset required to apply changes: No<br>Persistent across power cycles: Yes<br><br>Usage:<br>• Execution: **AT+WDSI=<Level>**<br> Response: OK<br> Purpose: Activate/deactivate identifications as specified by <Level>.<br>• Query: **AT+WDSI?**<br> Response: +WDSI: <Level>]<br> OK<br> Purpose: Indicate current state (activated/deactivated) of indications using the <Level> bitmask parameter.<br>• Query List: **AT+WDSI=?**<br> Purpose: Display valid execution format and parameter values.<br><br>Parameters:<br><Level> (Unsolicited AirVantage Management Services notifications bit mask)<br>• Bit mask indicating which notifications to enable/disable entered as integer value<br>• Default: 0= No indications activated<br>• Bit value:<br> • 0=Indication deactivated<br> • 1=Indication activated<br>• Range: 0–8191. Add the values of each bit listed below. (See +WDSI on page 114 for <Event> details.)<br> • 1 (Bit 0)—Initialization end indication (<Event> = 0)<br> • 2 (Bit 1)—Server request for user agreement indication (<Event> = 1, 2, 3, 24)<br> • 4 (Bit 2)—Authentication indications (<Event> = 4, 5)<br> • 8 (Bit 3)—Session indication (<Event> = 6, 7, 8)<br> • 16 (Bit 4)—Package download indications (<Event> = 9, 10, 11)<br> • 32 (Bit 5)—Certified downloaded package indication (<Event> = 12, 13)<br> • 64 (Bit 6)—Update indications (<Event> = 14, 15, 16)<br> • 128 (Bit 7)—Fallback indication (<Event> = 17)<br> • 256 (Bit 8)—Download progress indication (<Event> = 18)<br> • 512 (Bit 9)—Memory preemption indication (<Event> = 19)<br> • 1024 (Bit 10)—User PIN request indication for bootstrap (<Event> = 20)<br> • 2048 (Bit 11)—Reserved<br> • 4096 (Bit 12)—Bootstrap event indication (<Event> = 23)<br><br>*Note: <Level> is stored in NV without sending the &W command. Default value can be restored using &F.* |

**Table 11-2: AirVantage Device Services command details (Continued)**

| Command | Description |
|---------|-------------|
| +WDSI (notification) | **AirVantage Management Services events—Unsolicited notification**<br><br>Unsolicited notification received for various AirVantage Management Services events.<br><br>**Requirements:**<br>• To receive unsolicited notifications, AirVantage Management Services must be activated (see +WDSG on page 112 for details).<br><br>**Notification format:**<br>+WDSI: <Event>[,<Data>]<br><br>---<br>*Note: <Event> parameter descriptions below indicate when a <Data> parameter is included in the response.*<br>---<br><br>**Examples:**<br>• +WDSI: 9,1000<br>*Package will be downloaded, size is 1000 bytes*<br>• +WDSI: 18,1<br>*1% of package has been downloaded*<br>• +WDSI: 18, 100<br>*Entire package (100%) has been downloaded*<br>• +WDSI: 11,2<br>*Package download failue due to HTTP(S) error (see +WDSE on page 111 for error values)*<br><br>**Parameters:**<br><Event> (AirVantage Management Services event)<br>• 0—AirVantage Management Services are initialized and can be used. (Note: Management Services are initialized when the SIM PIN code is entered and a dedicated NAP is configured. See +WDSS on page 117 for details.)<br>• 1—AirVantage server requests that the device make a connection. The device requests a user agreement to allow the module to make the connection. The response can be sent using +WDSR (see +WDSR on page 116) and this indication can be returned by the device if the user has activated the user agreement for connection (see +WDSC on page 110 for details).<br>• 2—AirVantage server requests that the device make a package download. The device requests a user agreement to allow the module to make the download. The response can be sent using +WDSR (see +WDSR on page 116) and this indication can be returned by the device if the user has activated the user agreement for download (see +WDSC on page 110 for details).<br>• 3—Device has downloaded a package. The device requests a user agreement to install the downloaded package. The response can be sent using +WDSR (see +WDSR on page 116) and this indication can be returned by the device if the user has activated the user agreement for install (see +WDSC on page 110 for details).<br>• 4—Module starts authentication with the server.<br>• 5—Authentication with the server failed.<br>• 6—Authentication has succeeded and session with the server has started.<br>• 7—Session with the server failed.<br><br>(Continued on next page) |

**Table 11-2: AirVantage Device Services command details (Continued)**

| Command | Description |
|---------|-------------|
| +WDSI (notification) | **AirVantage Management Services events—Unsolicited notification (continued)**<br><br>• 8—Session with the server is finished.<br>• 9—Package is available on the server and can be downloaded by the module. A <Data> parameter is returned indicating the package size in kB.<br><br>• 10—Package was successfully downloaded and stored in flash.<br>• 11—One of the following issues happened during the package download:<br>  • If the download did not start (a +WDSI <Event>=9 indication has not been received), there is not enough space in the device to download the package.<br>  • If the download started (a +WDSI <Event>=9 indication has been received), a flash problem implies that the package has not been saved in the device.<br>• 12—Downloaded package is certified to be sent by the AirVantage server.<br>• 13—Downloaded package is not certified to be sent by the AirVantage server.<br>• 14—Update will be launched.<br>• 15—OTA update client has finished unsuccessfully.<br>• 16—OTA update client has finished successfully.<br>• 17—Reserved<br>• 18—Download progress:<br>  • No <Data> parameter—Download start<br>  • <Data> parameter—Percentage progress<br>• 19–22—Reserved<br>• 23—Session type (only in LWM2M protocol)<br>• 24—AirVantage server requests that the device make a reboot. The device requests a user agreement to allow the module to reboot. The response can be sent using +WDSR (see +WDSR on page 116) and this indication can be returned by the device if the user has activated the user agreement for connection (see +WDSC on page 110 for details).<br><br><Data> (Additional data for specific <Event>s)<br>• (<Event>=5) To be defined<br>• (<Event>=9) Package size:<br>  • Package size in bytes, which will be downloaded<br>  • Preempted DOTA area size needed to download an update package<br>  • If preemption is not made, this parameter is not returned for this event.<br>  • If a reverse package is not downloaded and stored, the preempted area will be released after the installation.<br>• (<Event>=11) Download failure reason:<br>  • 0=Insufficient memory in device to save firmware update package. Package was not downloaded.<br>  • 1=HTTP/HTTPS error occurred. See +WDSE on page 111 for possible error values.<br>  • 2=Corrupted firmware update package, did not store correctly. Reasons include (or example), mismatched CRCs between actual and expected, or signature check error.<br>• (<Event>=18) Download progress:<br>  • Integer value (% complete)<br>• (<Event>=23) Session event type:<br>  • 0=Bootstrap session<br>  • 1=Device management session |

**Table 11-2: AirVantage Device Services command details (Continued)**

| Command | Description |
|---|---|
| **+WDSR** | **Reply to AirVantage server request**<br><br>Reply to a user agreement request (see +WDSI on page 114 for details) from the module.<br>**SIM card requirement:** Required, and PIN 1/CHV 1 code must be entered.<br>**Password required:** No<br><br>**Usage:**<br>• Execution: **AT+WDSR=<Reply>[,<Timer>]**<br>  Response: OK<br>  Purpose: Send <Reply> to a user agreement request from the module. For specific <Reply> types, include a <Timer> to have the module send a new user agreement request after the specified delay.<br>• Query List: **AT+WDSR=?**<br>  Purpose: Display valid execution format and parameter values.<br><br>**Parameters:**<br><Reply> (Reply type)<br>• 0—Reserved for future use<br>• 1—Reserved for future use<br>• 2—Delay or refuse to download. New user agreement request to be sent by module after <Timer> minutes:<br>  • Delay—<Timer> must be > 0, or blank (Default 30). New user agreement request to be sent by module after <Timer> minutes.<br>  • Refuse—<Timer>=0. Usage restrictions include:<br>    • Option available only if OMA DM protocol is used.<br>    • Not supported for install request (AT+WDSR=5,0). Returns +CME ERROR: 3<br>    • Not supported for device reboot request (AT+WDSR=7,0). Returns +CME_ERROR: 3<br>• 3—Accept the download (download it now)<br>• 4—Accept the install (install it now)<br>• 5—Delay the install. New user agreement request to be sent by module after <Timer> minutes.<br>• 6—Accept the device reboot (reboot now)<br>• 7—Delay the device reboot. New user agreement request to be sent by module after <Timer> minutes.<br>• Note: If the module is powered down before a delay (install, download, or reboot) finishes, the new user agreement request will be returned during the next start up.<br><br><Timer> (Interval before new user agreement request to be sent by module)<br>• Applies to <Reply> types 2, 5, 7<br>• Valid values:<br>  • Valid range: 0–1440 (minutes)<br>  • 0—If <Reply>=2 and OMA DM protocol is used, refuse the user agreement request.<br>  • Default (if not specified): 30 (minutes) |

**Table 11-2: AirVantage Device Services command details (Continued)**

| Command | Description |
|---------|-------------|
| +WDSS | **Configure/connect AirVantage Management Services session**<br><br>Configure a dedicated access point name (APN), and initiate a connection to the AirVantage server. Also used to activate an automatic registration to the AirVantage server.<br><br>Activating dedicated PDP context:<br>• If a dedicated NAP has not been defined using this command, and a session is requested (via AT command, or via an SMS notification (SMS only in the OMA DM protocol use case), the module uses an APN that has been defined using AT+CGDCONT to activate the dedicated PDP context. This APN will be recorded to configure the AirVantage server's APN and it will be used to activate the dedicated PDP context for the next sessions.<br>• If the PDP context cannot be activated because the AirVantage server's APN is miscon-figured, the module uses an APN defined using AT+CGDCONT command to activate the dedicated PDP context. However, the initial APN configuration is not erased.<br><br>**SIM card requirement:** Required, and PIN 1/CHV 1 code must be entered.<br>**Password required:** No<br>**Persistent across power cycles:** Yes (<Apn> only)<br><br>**Usage:**<br>• Execution (<Mode> = 0):<br>      **AT+WDSS=<Mode>,<Apn>[,<User>[,<Pwd>]]**<br>  Response:   OK<br>  Purpose:    Configure the AirVantage server connection.<br>• Execution (<Mode> = 1):<br>      **AT+WDSS=<Mode>,<Action>**<br>  Response:   OK<br>  Purpose:    Connect to/disconnect from the AirVantage server<br>• Query:      **AT+WDSS?**<br>  Response:   [+WDSS: 0,<Apn>[,<User>]<br>            +WDSS: 1,<Action>]<br>            OK<br>  Purpose:    Return the current AirVantage server configuration details. If no APN has been defined, return only OK.<br>• Query List:  **AT+WDSS=?**<br>  Purpose:    Display valid execution format and parameter values.<br><br>**Parameters:**<br><Mode> (Connection method)<br>• 0—PDP context configuration for AirVantage server<br>• 1—User-initiated connection to the AirVantage server<br><br><Apn> (AirVantage server access point name)<br>• ASCII string<br>• Max length: 50 characters<br>• Note: Stored in NV.<br><br>(Continued on next page) |

**Table 11-2: AirVantage Device Services command details (Continued)**

| Command | Description |
|---|---|
| **+WDSS (continued)** | **Configure/connect AirVantage Management Services session (continued)**<br><br><User> (AirVantage server APN login)<br>• ASCII string<br>• Max length: 30 characters<br>• Note: Stored in flash without using &W. &F does not affect this parameter.<br><br><Pwd> (AirVantage server APN password)<br>• ASCII string<br>• Max length: 30 characters<br>• Note: Stored in flash without using &W. &F does not affect this parameter.<br><br><Action> (Connect to/disconnect from AirVantage server)<br>• 0—Release connection (Default)<br>• 1—Establish connection<br><br>*Note: <User> and <Pwd> are stored in flash without sending the &W command. &F does not affect these values. <Apn> is stored in NV.* |

# 12: Supported GSM/WCDMA AT Commands

This chapter identifies standard AT commands that are supported by most Sierra Wireless AirPrime 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 121.

- 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 122.

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 119).

**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 | ✔ |

| 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<br>Format<br>• C<value><br>Limitations<br>• Default <value> = 2<br>• <value> = 2 causes the AT/Data carrier detect pin to 'wink' (briefly switch off and on) when data calls end.<br>• <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 | ✗ |
| **+CAMM** | 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 | ✔ |
| **+CCHC** | Close logical channel | ✔ |
| **+CCHO** | Open logical channel | ✔ |
| **+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<br>Format<br>• +CFUN = [ <fun> [, <rst>] ]<br>Limitations<br>• Valid <fun> values:<br>  · 0 (minimum functionality, low power draw)<br>  · 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) | ✔ |

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

| Command | Description | Supported ✔=Yes; ✘=No |
|---------|-------------|-----------------------|
| **+CGEQREQ** | 3G Quality of Service Profile (Requested) | ✔ |
| **+CGEREP** | Packet Domain event reporting | ✔ |
| **+CGEV** | GPRS network event indication | ✔ |
| **+CGLA** | Generic UICC logical channel access | ✔ |
| **+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 | ✘ |

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

| Command | Description | Supported ✔=Yes; ✗=No |
|---|---|---|
| **+CLCC** | List current calls | ✔ |
| **+CLCK** | Facility lock | ✔ |
| **+CLIP** | Calling line identification presentation | ✔ |
| **+CLIR** | Calling line identification restriction | ✔ |
| **+CLVL** | Set/return internal loudspeaker volume | ✔ |
| **+CMAR** | Master Reset | ✗ |
| **+CME ERROR: <err>** | Mobile Termination error result code | ✔ |
| **+CMEC** | Mobile Termination control mode | ✗ |
| **+CMEE** | Report Mobile Termination error | ✔ |
| **+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 | ✔ |
| **+CPINR** | Remaining PIN retries | ✔ |
| **+CPLS** | Preferred PLMN list selection | ✔ |
| **+CPOL** | Preferred operator list | ✔ |
| **+CPROT** | Enter protocol mode | ✗ |
| **+CPUC** | Price per unit and currency table | ✔ |

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

| Command | Description | Supported ✔=Yes; ✘=No |
|---------|-------------|------------------------|
| +CPWC | Power class | ✘ |
| +CPWD | Change password | ✔ |
| +CR | Service reporting control | ✔ |
| +CRC | Cellular result codes | ✔ |
| +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 | ✔ |

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

| Command | Description | Supported ✔=Yes; ✗=No |
|---|---|---|
| **D*99#** | Sets up a packet data call (PDP context) based on profile ID #1 | ✔ |
| **D*99***<n>#** | Sets up a packet data call (PDP context) based on profile ID #<n> (<n> is the <cid> in the +CGDCONT command) | ✔ |
| **+VTD** | Tone duration | ✔ |
| **+VTS** | DTMF and arbitrary tone generation | ✔ |
| **+WS46** | PCCA STD 101 [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 129)

*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 | Type | Frequency bands (MHz) | | Band | Type | Frequency bands (MHz) | |
|---|---|---|---|---|---|---|---|
| | | Rx | Tx | | | Rx | Tx |
| 1 | Mid | 1920–1980 | 2110–2170 | 24 | Mid | 1626.5–1660.5 | 1525–1559 |
| 2 | Mid | 1850–1910 | 1930–1990 | 25 | Mid | 1850–1915 | 1930–1995 |
| 3 | Mid | 1710–1785 | 1805–1880 | 26 | Low | 859–894 | 814–849 |
| 4 | Mid | 1710–1755 | 2110–2155 | 27 | - | Reserved | Reserved |
| 5 | Low | 824–849 | 869–894 | 28 | Low | 758–803 | 703–748 |
| 6 | Low | 830–840 | 875–885 | 29 | - | Reserved | Reserved |
| 7 | High | 2500–2570 | 2620–2690 | 30 | High | 2350–2360 | 2305–2315 |
| 8 | Low | 880–915 | 925–960 | 31–32 | - | Reserved | Reserved |
| 9 | Mid | 1749.9–1784.9 | 1844.9–1879.9 | 33 | Mid | 1900–1920 | 1900–1920 |
| 10 | Mid | 1710–1770 | 2110–2170 | 34 | Mid | 2010–2025 | 2010–2025 |
| 11 | Mid | 1427.9–1447.9 | 1475.9–1495.9 | 35 | Mid | 1850–1910 | 1850–1910 |
| 12 | Low | 699–716 | 729–746 | 36 | Mid | 1930–1990 | 1930–1990 |
| 13 | Low | 777–787 | 746–756 | 37 | Mid | 1910–1930 | 1910–1930 |
| 14 | Low | 788–798 | 758–768 | 38 | High | 2570–2620 | 2570–2620 |
| 15 | - | Reserved | Reserved | 39 | Mid | 1880–1920 | 1880–1920 |
| 16 | - | Reserved | Reserved | 40 | High | 2300–2400 | 2300–2400 |
| 17 | Low | 704–716 | 734–746 | 41 | High | 2496–2690 | 2496–2690 |
| 18 | Low | 815–830 | 860–875 | 42 | High | 3400–3600 | 3400–3600 |
| 19 | Low | 830–845 | 875–890 | 43 | High | 3600–3800 | 3600–3800 |
| 20 | Low | 832–862 | 791–821 | 44–45 | - | Reserved | Reserved |
| 21 | Mid | 1447.9–1462.9 | 1495.9–1510.9 | 46 | High | 5150–5925 | 5150–5925 |
| 22 | - | Reserved | Reserved | 47–65 | - | Reserved | Reserved |
| 23 | Mid | 2000–2020 | 2180–2200 | 66 | Mid | 2110–2200 | 1710–1780 |

**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 | 94 |
| ENQ | 5 | 05 | % | 37 | 25 | E | 69 | 45 | e | 101 | 95 |
| ACK | 6 | 06 | & | 38 | 26 | F | 70 | 46 | f | 102 | 96 |
| BEL | 7 | 07 | ' | 39 | 27 | G | 71 | 47 | g | 103 | 97 |
| BS | 8 | 08 | ( | 40 | 28 | H | 72 | 48 | h | 104 | 98 |
| HT | 9 | 09 | ) | 41 | 29 | I | 73 | 49 | i | 105 | 99 |
| LF | 10 | 0A | * | 42 | 2A | J | 74 | 4A | j | 106 | 6A |
| VT | 11 | 0B | + | 43 | 2B | K | 75 | 4B | k | 107 | 6B |
| FF | 12 | 0C | , | 44 | 2C | L | 76 | 4C | l | 108 | 6C |
| CR | 13 | 0D | - | 45 | 2D | M | 77 | 4D | m | 109 | 6D |
| SO | 14 | 0E | . | 46 | 2E | N | 78 | 4E | n | 110 | 6E |
| SI | 15 | 0F | / | 47 | 2F | O | 79 | 4F | o | 111 | 6F |
| DLE | 16 | 10 | 0 | 48 | 30 | P | 80 | 50 | p | 112 | 70 |
| XON | 17 | 11 | 1 | 49 | 31 | Q | 81 | 51 | q | 113 | 71 |
| DC2 | 18 | 12 | 2 | 50 | 32 | R | 82 | 52 | r | 114 | 72 |
| XOFF | 19 | 13 | 3 | 51 | 33 | S | 83 | 53 | s | 115 | 73 |
| DC4 | 20 | 14 | 4 | 52 | 34 | T | 84 | 54 | t | 116 | 74 |
| NAK | 21 | 15 | 5 | 53 | 35 | U | 85 | 55 | u | 117 | 75 |
| SYN | 22 | 16 | 6 | 54 | 36 | V | 86 | 56 | v | 118 | 76 |
| ETB | 23 | 17 | 7 | 55 | 37 | W | 87 | 57 | w | 119 | 77 |
| CAN | 24 | 18 | 8 | 56 | 38 | X | 88 | 58 | x | 120 | 78 |
| EM | 25 | 19 | 9 | 57 | 39 | Y | 89 | 59 | y | 121 | 79 |
| SUB | 26 | 1A | : | 58 | 3A | Z | 90 | 5A | z | 122 | 7A |
| ESC | 27 | 1B | ; | 59 | 3B | [ | 91 | 5B | { | 123 | 7B |
| FS | 28 | 1C | < | 60 | 3C | \ | 92 | 5C | \| | 124 | 7C |
| GS | 29 | 1D | = | 61 | 3D | ] | 93 | 5D | } | 125 | 7D |
| RS | 30 | 1E | > | 62 | 3E | ^ | 94 | 5E | ~ | 126 | 7E |
| US | 31 | 1F | ? | 63 | 3F | _ | 95 | 5F | DEL | 127 | 7F |

# Index (AT commands)

# D

41111748

# Index

## Symbols

## Numerics

## A

## B

## C

## D

## E

## F

frequency bands. See bands.
FTM
  activate FTM modem mode,  62
  deactivate FTM modem mode,  62,  63

# G

GCF testing
  test mode, enable/disable,  29
Global Certification Forum testing. See GCF testing.
GMM state, return,  30
GNSS
  antenna power, enable,  93
Gobi Image Management
  preferences, set,  31
GPIO
  SAR interrupt, pull mode (default),  105
GPS
  accuracy, configure,  76
  almanac data, clear,  78
  altitude, last fix,  83
  assistance data
    clear all,  79
    clear specific,  78
  AT command error codes,  93,  95
  auto-start features, configure,  76
  command list,  12,  13,  75
  enter/exit StandAlone (SA) RF mode,  61
  ephemeris data, clear,  78
  fix period, configure,  76
  fix session
    end,  79
    initiate,  80
    status, report,  89
  fix type
    configure,  76
    last fix,  83
  fix wait time, configure,  76
  heading, last fix,  83
  horizontal estimated positional error, last fix,  83
  ionosphere data, clear,  78
  latitude, last fix,  83
  LBS APNs, set,  81
  location details, most recent,  83
  location uncertainty angle, last fix,  83
  longitude, last fix,  83
  low power mode, customization,  26
  low power mode, enable/disable,  26
  MO method, query/set,  84
  multiple fix (tracking) session, initiate,  92
  port ID over TCP/IP, query/set,  87
  position data, clear,  78
  reference location reporting, enable/disable,  26
  return CtoN and frequency measurement,  60
  satellite information, request,  88
  select antenna,  26
  set CGPS IQ log mask,  60
  start/stop CGPS diagnostic task,  61
  SUPL server URL, query/set,  90

  SUPL server version, query/set,  91
  support, customization,  26
  time reference, clear,  78
  time, last fix,  83
  tracking (multiple fix) session, initiate,  92
  uncertainty, last fix,  83
  velocity, last fix,  83
GSM
  Algorithm and Authenticate, enable/disable,  27
guard time, AT escape sequence,  9

# H

hardware version, display,  30
high speed USB, set,  50
Host wake-up method, enable/disable,  28

# I

IMEI
  using as serial number,  28
  write to modem, unencrypted,  37
IPV6 support, enable/disable,  26
ITU-T V.250 commands, list,  119

# L

loopback mode, enable/disable and configure,  28
low power mode customization, GPS,  26
LPM
  SIM, default state,  27
LPM. See Low Power Mode
LTE
  CA pairs supported, display,  33
  CA, enable/disable,  33
  network information, display,  35
  receive diversity during CA, enable/disable,  56
  receive diversity, enable/disable,  57
LTE bandwidth
  set,  69

# M

memory management
  command list,  71
MM
  state and substate, return,  30
mode acquired by modem, return,  30
modem
  customizations,  25
  FTM mode
    activate,  62
    deactivate,  62,  63
  IMEI, write unencrypted,  37
  mode, return,  30
  online mode, activate,  62,  63
  operational status, return,  30

## W