AirPrime MiniCard MC73xx/8805

AT Command Reference

SIERRA WIRELESS®

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Revision History

Revision number	Release date	Changes
1	Sep 2013	• Created document
2	Feb 2014	• Added audio commands chapter • Added +CPINR, !GCCLR, !GCDUMP, !GPSCOLDSTART, !GPSONLY, !GVER, !GVERBT, ^MODE, !RMARESET • Added/modified customizations for !CUSTOM (IMSIREFRESH, ISVOICEN, NETWORKNAMEFMT, QMIDETACHEN)
3	Nov 2014	• Added !HOSTDEVINFO, !OSINFO

Revision number	Release date	Changes
4	Jan 2015	• Updated !AVAUDIO

Contents

Proprietary and Confidential

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 22. Once the password is entered, all commands are available and remain available until the modem is reset or powered off and on.

The password assigned to **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!DASBAND** is received too soon after this, the modem returns an error.

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

Escape sequence guard time

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

Result codes

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

References

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

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

Terminology and acronyms

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

Current firmware versions

Version

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

Upgrading

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

Document structure

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

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

Table 1-1: AT password commands

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

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
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!BAND	Select/return frequency band set	26
!BOOTHOLD	Reset modem and wait in bootloader for firmware download	27
!CUSTOM	Set/return customization settings	28
!DARPEN	Enable/disable DARP for SAIC	32
!DTMEN	Enable/disable Dual Transfer Mode stack functionality	33
!EDAEN	Configure protocol stack for EDA	33
!GCFEN	Enable/disable GCF test mode	34
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!DAGGRSSI	Return the RSSI value in dBm (GSM only)	65
!DAGGRSSIRAW	Return raw RSSI value (GSM only)	66
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+VTS	Send DTMF tone	164
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+WANTS	Perform GNSS antenna diagnostic check	166
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+WIOR	Read GPIO value	167
+WIOW	Write GPIO value	168
+WSOS	Enter/exit emergency mode	168

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

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

Command summary

Table 2-1 on page 21 lists the commands described in this chapter.

Table 2-1: AT password commands

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

Command reference

Table 2-2: AT command password details

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

3: Modem Status, Customization, and Reset Commands

Introduction

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

Command summary

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

Table 3-1: Modem status commands

Command	Description	Page
!ANTSEL	Set/query external antenna select configuration	25
!BAND	Select/return frequency band set	26
!BOOTHOLD	Reset modem and wait in bootloader for firmware download	27
!CUSTOM	Set/return customization settings	28
!DARPEN	Enable/disable DARP for SAIC	32
!DTMEN	Enable/disable Dual Transfer Mode stack functionality	33
!EDAEN	Configure protocol stack for EDA	33
!GCFEN	Enable/disable GCF test mode	34
!GCFUIMTYPE	Set/return current SIM type	34
!GETBAND	Return the current active band	35
!GETRAT	Return the current active radio access technology (RAT)	35
!GOBIIMPREF	Query/set Gobi Image Management preferences	36
!GRESET	Reset the modem	37
!GSTATUS	Return operational status	37
!GVER	Return firmware version	37
!GVERBT	Return bootloader version	38
!LTENAS	Configure LTE NAS settings	39
^MODE	Set/report system mode indication state	40
!NASREL	Set/report system mode indication state	40
!NVENCRYPTIMEI	Write unencrypted IMEI to modem	41
!NVNSCODE	Return Network Subset codes	42

Table 3-1: Modem status commands (Continued)

Command	Description	Page
!NVPLMN	Provision PLMN list for Network Personalization locking	43
!NVSPCODE	Provision Network Service Provider code list	43
!PACKAGE	Return package version string	44
!PCINFO	Return power control status information	44
!PCOFFEN	Set/return Power Off Enable state	45
!PCTEMP	Return current temperature information	45
!PCTEMPLIMITS	Set/report temperature state limit values	46
!PCVOLT	Return current power supply voltage information	47
!PCVOLTLIMITS	Set/report power supply voltage state limit values	48
!POWERDOWN	Power down system	49
!PRIID	Set/report module PRI part number and revision	49
!REL	Set/report active protocol/revision	50
!RESET	Reset modem	50
!SELACQ	Select RAT acquisition order	51
!SELMODE	Set/return current service domain	52
!SIMRSTC	Set/report SIM refresh reset notification state	52
!UDINFO	Return information from active USB descriptor	53
!UDPID	Set/report product ID in USB descriptor	54
!UDUSBCOMP	Set/report USB interface configuration	55
&V	Return operating mode AT configuration parameters	56

Command reference

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

Command	Description

!ANTSEL	**Set/query external antenna select configuration**
	
	Configure the device to drive (high or low) up to four GPIOs for specific bands. (If a GPIO is not needed for a specific band, it is identified as not required.)
	
	When the device switches to a configured band, the GPIOs are driven as specified, and the host uses those GPIOs to tune the external antenna appropriately. Note that this feature is independent of the radio technology being used. For example, Band 5 corresponds to any 850-band technology (CDMA, WCDMA, LTE, GSM).
	
	Note: Any changes to GPIO configurations take effect after the modem is reset.
	
	Note: System level testing should be performed to ensure that the antenna switching feature does not introduce any handover issues. The tunable antenna should be designed to ensure that it can retune in < 5 µs (recommended) and < 10 µs (maximum).
	
	Password required: Yes
	Usage:
	• Execution: **AT!ANTSEL=\<band\>, \<gpio1\>, \<gpio2\>, \<gpio3\>[, \<gpio4\>]**
	  Response: OK
	  Purpose: Configure the GPIOs for the specified \<band\>.
	• Query: **AT!ANTSEL?**
	  Response: BAND \<band *a*\>: \<gpio1\>, \<gpio2\>, \<gpio3\>[, \<gpio4\>]
	  BAND \<band *b*\>: \<gpio1\>, \<gpio2\>, \<gpio3\>[, \<gpio4\>]
	  ...
	  OK
	  Purpose: Display the current external antenna select configuration.
	• Query List: **AT!ANTSEL=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	\<band\> (RF band)
	• 3GPP band number. For a full listing of 3GPP band numbers, see Table 13-2 on page 180.
	• Valid range: 0–60. Band support is product specific—see the device's Product Specification or Product Technical Specification document for details.
	
	\<gpio1\>, \<gpio2\>, \<gpio3\>, \<gpio4\> (GPIO configurations. Note: \<gpio4\> availability is device-specific—see the appropriate Product Technical Specification for details.)
	• 0=Logic low
	• 1=Logic high
	• 2=Not used for antenna selection (Default value for \<gpio4\>.)

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

Command	Description

!BAND
 	
Note: The 'Basic' command and response versions are used if you haven't entered the required password. (See Command access *on page 11.)*
	Select/return frequency band set
	Configure the modem to operate on a set of frequency bands, look up available sets, create new sets, or return the current selection.
	Password required: Yes—Execution (Extended) format
	Usage:
	• Execution (Basic):
	               AT!BAND=<Index>
	    Response: OK
	    Purpose: Select an existing set of bands.
	• Execution (Extended):
	               AT!BAND=<Index>,"<Name>",<GWmask>[,<Lmask>,<Lmask2>]
	    Response: OK
	    Purpose: Create a new set of bands.
	• Query: **AT!BAND?**
	    Response: Index, Name[, GW Band Mask [, L Band Mask]]
	                   <Index>, <Name>[, <GWmask> [, <Lmask>]]
	                   OK
	        or *(If the current band mask doesn't match a band set)*
	                 Unknown band mask. Use AT!BAND to set band.
	                 <Index>
	                 OK
	    Purpose: Report the current band selection. (<GWmask> and <Lmask> may only appear in Extended responses.)
	• Query List: **AT!BAND=?**
	    Response: Index, Name[, GW Band Mask [L Band Mask]]
	                   <Index1>, <Name1>[, <GWmask1> [, <Lmask1>]]
	                   ...
	                   <IndexN>, <NameN>[, <GWmaskN> [, <LmaskN>]]
	                 OK
	    Purpose: Display allowed <Index> values and descriptions of the associated band sets.
	
	(Continued on next page)

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

Command	Description

!BAND (continued)	**Select/return frequency band set (continued)**
	
	Parameters:
	<Index> (Index of a band set. Use the Query List command to display all supported sets)
	• Valid range: 0–13 (Hexadecimal. There are 20 possible values.)
	
	<Name> (Name of the band set)
	• ASCII string—Up to 30 characters
	
	<GWmask> (GSM/WCDMA bands included in the set)
	• Format: 32-bit bitmask
	• Valid values:
	  • 0000000000000001—BC0-A
	  • 0000000000000002—BC0-B
	  • 0000000000000003—BC0 (BC0-A and BC0-B)
	  • 0000000000000004—BC1
	  • 0000000000000080—G1800
	  • 0000000000000300—G900 (EGSM/GSM)
	  • 0000000000000400—BC6
	  • 0000000000004000—BC10 (800)
	  • 0000000000080000—G850
	  • 0000000000200000—G1900
	  • 0000000000400000—W2100
	  • 0000000000800000—W1900
	  • 0000000002000000—W1700
	  • 0000000004000000—W850
	  • 0000000008000000—W800
	  • 0000000080000000—BC15
	  • 0002000000000000—W900
	  • 1000000000000000—B19 (850)
	
	<Lmask> (LTE bands included in the set)
	• Format: 32-bit bitmask
	• Valid values:
	  • 0000000000000001—Band 1
	    0000000000000002—Band 2
	
	    ...
	    0000008000000000—Band 40
	    0000010000000000—Band 41

!BOOTHOLD	**Reset modem and wait in bootloader for firmware download**
	Prepare for a firmware download by resetting the modem and waiting in 'boot and hold' mode.
	Password required: No
	Usage:
	• Execution: **AT!BOOTHOLD**
	  Response: OK
	  Purpose: Force the modem to 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
 	
Note: Some customizations may not be available for certain chipsets, firmware revisions, or devices.
	Set/return customization settings
	Set or return several customization values.
	Password required: Yes
	Usage:
	• Execution: **AT!CUSTOM=<customization>, <value>**
	  Response: OK
	  Purpose: Assign <value> to a specific <customization> setting.
	• Query: **AT!CUSTOM?**
	  Response: (list of enabled <customization>s)
	    OK
	  Purpose: Display customizations that are currently enabled.
	• Query list: **AT!CUSTOM=?**
	  Purpose: Return a list of valid <customization> values.
	Parameters:
	<value> (Value being assigned to a specific <customization> setting)
	    • Descriptions are included in each of the customizations described below.
	    • Numeric value. Valid range depends on the <customization> type.
	<customization> (String identifying customization setting. The default value for all customizations is 0.)
	
	Note: Use quotation marks around the customization string. For example, AT!CUSTOM="CSDOFF",0.
	
	    • "AUTONETWORKMODE"—Indicate if UE should revert to Automatic Network mode after 60 seconds of Manual Network mode.
	        <value>:
	        • 0 = Remain in Manual. (Default)
	        • 1 = Revert to Automatic.
	        • 2 = Remain in Manual if UE is attached to the network, otherwise switch to Automatic.
	    • "CFUNPERSISTEN"—Enable/disable persistence (across power cycles) of AT+CFUN setting.
	        <value>:
	        • 0 = Disable (+CFUN setting does not persist across power cycle)
	        • 1 = Enable (+CFUN setting persists across power cycle)
	    • "CMCLIENT"—Assign a default communication manager (CM) client.
	        <value>:
	        • 0 = No CM client specified (default)
	        • 1 = Verizon Access Manager
	        • 2 = Cisco CM
	
	(Continued on next page)

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

Command	Description

!CUSTOM (continued)	**Set—query customization settings (continued)**
	• "CSVOICEREJECT"—Enable/disable ability to ignore incoming voice call pages from the network.
	  <value>:
	   • 0 = Process pages as per device capabilities (default)
	   • 1 = Ignore paging (type 1 and 2) messages
	   • 2 = Reject call setup (voice and circuit-switched VT), returning cause code 88 (Incompatible destination)
	   • 3 = Process voice pages as per device capabilities, and reject call setup (circuit-switched VT), returning cause code 88 (Incompatible destination)
	   • 4 = Reject voice pages, returning cause code 65 (Bearer service not implemented), and reject call setup (circuit-switched VT), returning cause code 88 (Incompatible destination)
	• "FASTENUMEN"—Enable/disable fast enumeration for warm/cold boot.
	  <value>:
	   • 0 = Disable fast enumeration (Default)
	   • 1 = Enable fast enumeration for cold boot and disable for warm boot
	   • 2 = Enable fast enumeration for warm boot and disable for cold boot
	   • 3 = Enable fast enumeration for warm and cold boot
	• "GMMCAUSE7REMAP"—Enable/disable remapping of GMM Cause 7 instances to GMM Cause 14.
	  <value>:
	   • 0 = Do nothing
	   • 1 = Remap all GMM Cause 7 instances to GMM Cause 14.
	• "GOBIIMEN"—Enable/disable Gobi Image Management.
	  <value>:
	   • 0 = Disable (Default)
	   • 1 = Enable
	• "GPIOSARENABLE"—Indicate whether SAR backoff is controlled by GPIOs or by AT commands.
	  <value>:
	   • 0 = Controlled by AT commands (default)
	   • 1 = Controlled by GPIOs
	• "GPSENABLE"—Enable/disable the GPS feature.
	  <value>:
	   • 0 = GPS disabled
	   • 1 = MO & MT enabled regardless of GPS_DISABLE setting
	   • 2 = MO enabled regardless of GPS_DISABLE setting
	   • 3 = MT enabled regardless of GPS_DISABLE setting
	   • 4 = MO & MT enabled but are gated by GPS_DISABLE setting
	   • 5 = MO enabled but is gated by GPS_DISABLE setting
	   • 6 = MT enabled but is gated by GPS_DISABLE setting
	   • <value> + 80 = Disable GLONASS (For example, 84 = MO & MT narrow-band GPS enabled, but gated by GPS_DISABLE setting.)
	(Continued on next page)

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

Command	Description

!CUSTOM (continued)	**Set/query customization settings (continued)**
	• "GPSLPM"—Enable/disable GPS in Low Power Mode.
	    <value>:
	    • 0 = Enable—GPS engine remains enabled when modem enters LPM (Default)
	    • 1 = Disable—GPS engine is disabled when modem enters LPM
	• "GPSREFLOC"—Enable/disable reference GPS location reporting.
	    <value>:
	    • 0 = Enable (Default)
	    • 1 = Disable
	• "GPSSEL"—Select GPS antenna (useful only for devices with both a GPS and a shared GPS/Rx diversity antenna).
	    <value>:
	    • 0 = Use dedicated GPS antenna (Default)
	    • 1 = Use shared GPS/Rx diversity antenna
	• "IMSIREFRESH"—Allow/prohibit IMSI Refresh during active PDP context.
	    <value>:
	    • 0 = Do not allow (Default)
	    • 1 = Allow
	• "ISVOICEN"—Enable/disable voice functionality.
	    <value>:
	    • 0 = Disable voice
	    • 1 = Enable voice
	• "LTEREJDELAY"—Set delay before LTE attach requests are sent after TAU or service request rejection.
	    <value>:
	    • 0–255 = Delay in 10 msec units. (e.g. 10=100 msec)
	    • Actual range is 0–2.55 sec
	    • Delay is cancelled if RRC connection is released early.
	    • Suggested value (if delay is being enabled) is 50 (500 msec). Adjust the value as necessary based on testing.
	• "NETWORKNAMEFMT"—Set MBIM provider name format for vanui (roaming).
	    <value>:
	    • 0 = Display one of: SPN, LongName, or ShortName, by order of priority (Default QCT behavior)
	    • 1 = Display one of: LongName or ShortName
	    • 2 = Display [SPN] - [LongName/ShortName] (Note: May be truncated.)
	    • 3 = Display [LongName/ShortName] - [SPN] (Note: May be truncated.)
	• "NMEAENABLE"—Enable/disable the NMEA port.
	    <value>:
	    • 0 = Disable (default)
	    • 1 = Enable
	• "NOROAM"—Enable/disable roaming indicator display.
	    <value>:
	    • 0 = Enable—Display indicator if roaming
	    • 1 = Disable—Never display indicator
	    • 2 = Disable—Never display when on Home MCC
	(Continued on next page)

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

Command	Description

!CUSTOM (continued)	**Set/query customization settings (continued)**
	• "PCSCDISABLE"—Determine functionality of PCSC, GSM Algorithm and Authenticate commands, and +CIMI command.
	  <value>:
	  • 0–7 (Default value = 0—all functions enabled)
	    • Bit 0: PCSC (0=Enable, 1=Disable)
	    • Bit 1: GSM Algorithm and Authenticate commands (0=Enable, 1=Disable)
	    • Bit 2: AT+CIMI outputs IMSI (0=Enable, 1=Disable)
	• "QMIDETACHEN"—Enable/disable QMI NAS detach.
	  <value>:
	  • 0 = Disable—QMI detach request returns NO_EFFECT response, and no action is taken.
	  • 1 = Enable—QMI detach request is acted on, and appropriate response is returned based on the detach result.
	• "REL8FASTDORMDIS"—Enable/disable the Release 8 fast dormancy feature.
	  <value>:
	  • 0 = Enable (default)
	  • 1 = Disable
	• "RRCREL7CAPDIS"—Configure RRC Release 7 capability
	  <value>:
	  • 0 = Enable CPC, enable EF-DPCH (default)
	  • 1 = Disable CPC, enable EF-DPCH
	  • 2 = Disable CPC, disable EF-DPCH
	• "SIMHOTSWAPDIS"—Configure SIM hotswap feature
	  <value>:
	  • 0 = Enable UIM1 and UIM2 (default)
	  • 1 = Disable UIM1, enable UIM2
	  • 2 = Enable UIM1, disable UIM2
	  • 3 = Disable UIM1 and UIM2
	• "SIMLPM"—Indicate default SIM power state during Low Power Mode.
	  <value>:
	  • 0 = QCT default behavior (same as <value>=2) (Default)
	    Note—The default behavior could change in future revisions. Use <value>=2 if you need to guarantee the described behavior.
	  • 1 = SIM remains powered in LPM
	  • 2 = Power down SIM with AT+CFUN=0; Power up SIM with AT+CFUN=1
	• "SINGLEAPNSWITCH"—Indicate device behavior when changing APN name, username, or password.
	  <value>:
	  • 0 = Do nothing
	  • 1 = Device detaches and re-attaches after changing APN information
	  • 2 = Power-cycle the UE
	• "STKUIEN"—Enable/disable SIM toolkit UI.
	  <value>:
	    • 0 = Enable for QMI interface
	    • 1 = Reserved
	    • 2 = Enable for AT interface
	(Continued on next page)

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

Command	Description

!CUSTOM (continued)	**Set/query customization settings (continued)**
	• "UBISTENABLE"—Enable/disable UBIST support.
	   <value>:
	     • 0 = Disable (Default)
	     • 1 = Enable
	• "USBSERIALENABLE"—Use IMEI as serial number in USB descriptor (USBD).
	   <value>:
	     • 0 = Same as 1 (Default)
	     • 1 = Use IMEI as USB serial number
	     • 2 = Do not use a serial number in the USBD.
	• "WAKEHOSTEN"—Enable/disable host wake-up via SMS or incoming data packet.
	   <value>:
	     • 0 = Disable—Host will not wake when SMS or incoming data packet is received. (Default)
	     • 1 = Wake host when simple SMS is received.
	     • 2 = Wake host when incoming data packet is received.
	     • 3 = Wake host when simple SMS or incoming data packet is received.
	• "WIN7MBOPTIONS"—Configure Windows7 MB options.
	   <mask> (Bitmap):
	     • Bit 0: Hide profile
	       0=Default behavior
	       1=Force OSP to hide all profiles from host
	     • Bit 1: Connect Auth Type Re-map
	       0='NONE' from host maps to CHAP or PAP if UN and/or PWD present
	       1='NONE' from host maps only to PAP if UN and/or PWD present

!DARPEN	**Enable/disable DARP for SAIC**
	Enable or disable Downlink Advanced Receiver Performance (DARP) for Single-Antenna Interference Cancellation (SAIC).
	Password required: Yes—Execution format only
	Usage:
	• Execution: **AT!DARPEN=<enableFlag>**
	   Response: OK
	   Purpose: Enable or disable SAIC-DARP.
	• Query: **AT!DARPEN?**
	   Response: !DARPEN:
	     <enableFlag>
	     OK
	   Purpose: Display the current <enableFlag> setting—this shows whether SAIC-DARP is enabled or disabled. If the command returns ERROR, SAIC-DARP is assumed to be enabled.
	• Query list: **AT!DARPEN=?**
	   Purpose: Display a list of valid <enableFlag> values.
	Parameters:
	<enableFlag> (Enable/disable SAIC-DARP mode)
	   • 0 = Disable SAIC-DARP
	   • 1 = Enable SAIC-DARP (Default) — This value is used for normal operations.

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

Command	Description

!DTMEN	**Enable/disable Dual Transfer Mode stack functionality**
	
	Enable or disable Dual Transfer Mode (DTM) and Enhanced DTM (EDTM) functionality in the stack.
	
	Password required: Yes—Execution format only
	
	Usage:
	• Execution: **AT!DTMEN=<enableDTM, <enableEDTM>**
	  Response: OK
	  Purpose: Enables or disables DTM and EDTM.
	• Query: **AT!DTMEN?**
	  Response: !DTMEN:
	           DTM: 01
	           EDTM: 01
	           OK
	  Purpose: Indicates the current state (disabled/enabled) of DTM and EDTM support. If the command returns ERROR, DTM and EDTM are assumed to be enabled.
	• Query list: **AT!DTMEN=?**
	  Purpose: Returns a list of valid <enableDTM> and <enableEDTM> values.
	
	Parameters:
	
	<enableDTM> (Enable/disable Dual Transfer Mode)
	• 0 = Disable DTM
	• 1 = Enable DTM (Default) — Value used for normal operations.
	
	<enableEDTM> (Enable/disable Enhanced Dual Transfer Mode)
	• 0 = Disable EDTM
	• 1 = Enable EDTM (Default) — Value used for normal operations.

!EDAEN	**Configure protocol stack for EDA**
	
	Enable or disable EDA (Extended Dynamic Allocation) functionality in the stack.
	
	Password required: Yes—Execution format only
	
	Usage:
	• Execution: **AT!EDAEN=<enableFlag>**
	  Response: OK
	  Purpose: Enable or disable EDA.
	• Query: **AT!EDAEN?**
	  Response: !EDAEN:
	           <enableFlag>
	           OK
	  Purpose: Display the current <enableFlag> setting—this shows whether EDA is enabled or disabled. If ERROR is returned, assume that EDA is enabled.
	• Query list: **AT!EDAEN=?**
	  Purpose: Return a list of valid <enableFlag> values.
	
	Parameters:
	
	<enableFlag> (Enable/disable EDA)
	• 0 = Disable
	• 1 = Enable (Default) — This value is used for normal operations.

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

Command	Description

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

!GCFUIMTYPE	**Set/return current SIM type**
	
	Indicate (for GCF testing) the type of SIM that is installed in the module.
	
	Password required: Yes—Execution format only
	
	Usage:
	• Query: **AT!GCFUIMTYPE?**
	  Response: !GCFUIMTYPE:
	       <simType>
	  Purpose: Return the type of SIM that is installed in the module (the current <simType> value).
	• Query list: **AT!GCFUIMTYPE=?**
	  Purpose: Return a list of supported SIM types.
	• Execution: **AT!GCFUIMTYPE=<simType>**
	  Response: OK
	  Purpose: Indicate the type of SIM that is installed.
	
	Parameters:
	
	<simType> (Installed SIM type)
	  • 0 = 2G SIM
	  • 1 = 3G USIM
	  • 2 = USB UICC (Default) — This value should be used for normal operations.
	  • 3 = USB UICC RST HIGH

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

Command	Description

!GETBAND	**Return the current active band**
	Return the active band currently being used by the modem.
	Password required: No
	Usage:
	• Query: **AT!GETBAND?**
	  Response: !GETBAND: <active band description>
	        OK
	     or Unknown
	        OK
	     or No Service
	        OK
	  Purpose: Return a description of the current active band, or return an error message.
	
	Note: Due to stack implementation requirements, !GETBAND reports W800 for both W800 and W850.

!GETRAT	**Return the current active radio access technology (RAT)**
	Return the RAT currently being used by the modem.
	Password required: No
	Usage:
	• Query: **AT!GETRAT?**
	  Response: !GETRAT: <active RAT description>
	        OK
	     or Unknown
	        OK
	     or No Service
	        OK
	  Purpose: Return a description of the current RAT, or return an error message.

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

Command	Description
!GOBIIMPREF	**Query/set Gobi Image Management preferences** Indicate (set) which firmware image (firmware plus carrier configuration pair) should be downloaded to the module, or list (query) the configuration pairs that are currently downloaded and preferred. Contact your Sierra Wireless representative if you need assistance identifying the correct components of the <pref> parameter. *Note: If Gobi Image Management is disabled, you can use the Execution format to set a new preferred configuration, but the change will not take effect until Gobi Image Management is enabled. Use* **AT!CUSTOM="GOBIIMEN",1** *to enable Gobi Image Management.* **Password required:** Yes **Usage:** • Execution: **AT!GOBIIMPREF=<pref>** Response:OK Purpose:Indicate which firmware plus carrier configuration pair (the preferred pair) should be used. • Query: **AT!GOBIIMPREF?** Response:! GOBIIMPREF: preferred fw version: <firmware_tag> preferred carrier name: <carrier_name> preferred config name: <carrier_configuration_tag> current fw version: <firmware_tag> current carrier name: <carrier_name> current config name: <carrier_configuration>tag> OK Purpose:Query (show) the preferred and current firmware plus carrier carrier configuration pairs. **Parameters:** <pref> (Preferred firmware image) • ASCII string in following format (quotation marks are entered as shown) "<firmware_tag>" or "<firmware_tag>","<carrier_name>","<carrier_configuration_tag>" <firmware_tag> (Unique firmware version number assigned by Sierra Wireless) • ASCII string <carrier_name> (Unique code identifying the carrier that the firmware was designed for) • ASCII string <carrier_configuration_tag> (Unique code identifying the carrier and configuration details) • ASCII string **Example execution:** • AT!GOBIIMPREF="01.02.03.04","ABC","ABC_001.123_000"

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

Command	Description

!GRESET	**Reset the modem**
	Perform a modem reset.
	Password required: No
	Usage:
	• Query: **AT!GRESET**
	  Response: OK
	  Purpose: Instruct system to perform a reset.
	
	Note: This command is identical in function to !RESET.

!GSTATUS	**Return operational status**
	Return specific details about the current operational status of the modem. The response details vary depending on the current RAT. Contact Sierra Wireless for further details if required.
	Password required: No
	Usage:
	• Query: **AT!GSTATUS?**
	  Response (Example shown is for LTE, actual fields may vary)
	
	<pre>!GSTATUS:
	Current Time: <ctime> Temperature: <temp>
	Bootup Time: <btime> Mode: <mode>
	System mode: <smode> PS state: <PSstate>
	LTE band: <lband> LTE bw: <lbw>
	LTE Rx chan: <lrchan> LTE Tx chan: <ltchan>
	GMM (PS) state: <gmmstate> <gmmsubstate>
	MM (CS) state: <mmstate> <mmsubstate>
	
	RSSI (dBm): <rssi> SINR (dB): <sinr>
	RSRP (dBm): <rsrp> TAC: <tac>
	RSRQ (dB): <rsrq> Cell ID: <Cell ID>
	OK</pre>

!GVER	**Return firmware version**
	Return the modem's firmware version.
	Password required: No
	Usage:
	• Query: **AT!GVER?**
	  Response: !GVER: <version>
	              OK
	Parameters:
	<version> (Firmware version information string)
	  • ASCII string
	  • Example: "SWI9X15C_05.05.11.00 r19942 carmd-fwbuild1 2014/01/08 22:36:58"

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

Command	Description
!GVERBT	**Return bootloader version** Return the modem's bootloader version. **Password required:** No **Usage:** • Query: **AT!GVERBT?** Response: !GVERBT: <version> OK **Parameters:** <version> (Bootloader version information string) • ASCII string • Example: "SWI9X15C_05.05.11.00 r19942 carmd-fwbuild1 2014/01/08 22:36:58"

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

Command	Description

!LTENAS	**Configure LTE NAS settings**
	
	Configure LTE NAS-related settings.
	
	Note: To support test equipment that may use the NULL integrity algorithm, turn on (set to '1') <bitmask> Bit0 and Bit3.
	
	Password required: No
	
	Usage:
	• Execution: **AT!LTENAS=<bitmask><FPLMNtime>**
	  Response: <bitmask>
	                   <FPLMNtime>
	  Purpose: Set LTE NAS-related settings.
	• Query: **AT!LTENAS?**
	  Response: LSTI: <lsti>
	                   GERAN Cap: <geran>
	                   Disable GUTI Security check: <guti>
	                   Temp Forbidden PLMN: <FPLMNtime>
	
	                   OK
	  Purpose: Report the current settings.
	• Query List: **AT!LTENAS=?**
	  Purpose: Return the command format and the supported parameter values.
	
	Parameters:
	
	<bitmask> (8-bit mask that identifies LTE NAS-related settings)
	• Displayed/entered as hexadecimal value
	• Bit 0: <lsti>
	• Bit 1: <geran>
	• Bit 2: <guti>
	• Bit 3: <nullIntegrity>
	
	<FPLMNtime> (Temporary Forbidden PLMN backoff time)
	• Displayed/entered as hexadecimal value
	• 0x0=Disable feature (Default)
	• 0x1–0xFFFFFFFE=Backoff time (in ms)
	• 0xFFFFFFFF=Use the user equipment's Timer T3402 time as backoff time
	
	<lsti> (LSTI (LTE/SAE Trial Initiative))
	• 0=Disabled
	• 1=Enabled
	
	<geran> (GERAN Cap)
	• 0=Disabled
	• 1=Enabled
	
	<guti> (Disable GUTI and NAS security check)
	• 0=Disabled (This means the security check is *enabled*.)
	• 1=Enabled (This means the security check is *disabled*.)
	
	<nullIntegrity> (NULL Integrity Algorithm)
	• 0=Disabled
	• 1=Allowed

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

Command	Description
^MODE	**Set/report system mode indication state** Enable or disable system mode indications (unsolicited ^MODE messages). **Password required:** No. **Usage:** • Execution: **AT^MODE=<mode>** Response: OK Purpose: Enable or disable system mode indication support. • Query: **AT^MODE?** Response: !MODE: <mode> OK Purpose: Report current system mode indication support state (enabled/disabled). • Query List: **AT^MODE=?** Purpose: Return the execution command format and the supported parameter values. **Parameters:** <mode> (System mode indication support state) • 0 = Disabled • 1 = Enabled (Default)
!NASREL	**Set/report supported NAS release compliance version** Configure the modem to support a specific NAS (Non-Access Stratum) release compliance version. **Password required:** Yes—Execution format only **Usage:** • Execution: **AT!NASREL=<nasrel>** Response: OK Purpose: Set the desired version (<nasrel>). • Query: **AT!NASREL?** Response: !NASREL: NAS Release: Release 5 *(or Release 99)* OK Purpose: Report the NAS release compliance version currently being used. • Query List: **AT!NASREL=?** Purpose: Return the command format (for !NASREL =) and the supported parameter values. **Parameters:** <nasrel> (NAS release compliance version) • 00 = Release 99 • 01 = Release 5 • 02 = Release 6 (Default) • 03 = Release 7 *Note: If you use !REL, use the default value (1) for that command's <sgsnr> and <mscr> parameters. You must choose the appropriate compliance version using !NASREL.*

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

Command	Description

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

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

Command	Description
!NVENCRYPTIMEI (continued)	**Write unencrypted IMEI to modem (continued)** **Parameters:** <P1> to <P8> (IMEI segments) • <P1> = IMEI[0..1]; <P2> = IMEI[2..3]; ...; <P8> = IMEI[14..15] • <P1> to <P4> represent the TAC • <P5> to <P7> represent the SNR • <P8> represents the CheckDigit plus a padding digit ('0') **Example:** Using the example IMEI shown above: AT!NVENCRYPTIMEI=12,34,56,78,90,12,34,70

!NVNSCODE	**Return Network Subset codes**
	Return the provisioned list of Network Subset codes used for Network Subset Personalization locking.
	
	Password required: Yes
	Usage:
	• Query: **AT!NVNSCODE?**
	  Response: (list of <NSCode> items)
	                  OK
	  Purpose: Return the list of Network Subset codes used for Network Subset Personalization locking.
	• Execution: **AT!NVNSCODE=<NSCode>**
	  Response: OK
	  Purpose: Add a network subset code to the list used for Network Subset Personalization locking.
	Parameters:
	<NSCode> (Network Subset Code)
	• Format: 99—Two digit numeric code

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

Command	Description

!NVPLMN	**Provision PLMN list for Network Personalization locking**
	Provision the list of PLMN (MCC/MNC pairs) used for Network Personalization locking.
	Password required: Yes
	Usage:
	• Query: **AT!NVPLMN?**
	  Response: <MCC> <MNC>
	        ...
	        OK
	  Purpose: Return a list of NV items that can be read or written.
	• Execution: **AT!NVPLMN=<MCC1>, <MNC1>, ..., <MCCn>, <MNCn>**
	  Response: OK
	  Purpose: Add up to six MCC/MNC pairs to the PLMN list
	  Note: Execution can be performed one time only (all MCC/MNC pairs must be set at the same time).
	
	Parameters:
	
	<MCC> (Mobile Country Code)
	  • 3 digits
	
	<MNC> (Mobile Network Code)
	  • 2 digits

!NVSPCODE	**Provision Network Service Provider code list**
	Provisions the list of Network Service Provider codes that are used for Network Service Provider Personalization locking.
	
	Password required: Yes
	Usage:
	• Query: **AT!NVSPCODE?**
	  Response: SP Code:
	        (list of <SP Code> values)
	        OK
	  Purpose: Provision the list of Network Service Provider codes.
	• Execution: **AT!NVSPCODE=<SP Code>**
	  Response: OK
	  Purpose: Add a Network Service Provider code to the list.
	Parameters:
	
	<SP Code> (Service Provider Code)
	  • Format: 1–2 digits

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

Command	Description

!PACKAGE	**Return package version string**
	
	This command returns the FOTA package name loaded in the modem.
	Password required: No
	Usage:
	• Query: **AT!PACKAGE?**
	   Response: !PACKAGE:\<PackageName>
	             OK
	      or Unset
	             OK
	   Purpose: Return the package name string.
	
	Parameters:
	
	\<PackageName>
	• Character string, maximum 126 characters
	• Example: MC7750_01.00.02.03_00_VZW_011.006_000

!PCINFO	**Return power control status information**
	
	Return the modem's power control status information.
	Password required: No
	Usage:
	• Query: **AT!PCINFO?**
	   Response: State: \<state>
	             LPM force flags: W_DISABLE: \<ForceFlag>, User:\<ForceFlag>,
	             Temp:\<ForceFlag>, Volt:\<ForceFlag>, BIOS:\<ForceFlag>,
	             GOBIIM:\<ForceFlag>
	             BIOS: \<description>
	             GOBIIM: \<description>
	             OK
	   Purpose: Return power control information.
	
	Parameters:
	
	\<state> (The modem's power mode)
	• Low Power Mode (LPM)
	• Online
	• Offline
	• Power off (internal)
	• Initialization (internal)
	
	\<ForceFlag> (Conditions that caused modem to enter LPM. 0=did not cause, 1 = caused)
	• W_DISABLE: W_DISABLE is asserted
	• USER: CnS/AT command was issued
	• TEMP: Temperature is outside operational limits
	• VOLT: Voltage is outside operational limits
	
	\<description> (Explanation of associated information)
	• ASCII string

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

Command	Description

!PCOFFEN	**Set/return Power Off Enable state**
	
	The modem can be configured to enter low power mode or power off when W_DISABLE is asserted. (This is called the Power Off Enable feature.)
	
	Use this command to indicate or set the Power Off Enable feature state.
	
	Password required: Yes
	
	Usage:
	• Execution: **AT!PCOFFEN=<state>**
	  Response: OK
	  Purpose: Set the current state.
	• Query: **AT!PCOFFEN?**
	  Response: <state>
	              OK
	  Purpose: Report the current <state>.
	
	Parameters:
	
	<state> (Current state of Power Off Enable)
	    • 0 = Modem will enter LPM (low power mode) when W_DISABLE is asserted.
	    • 2 = Ignore changes on W_DISABLE.

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

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

Command	Description

!PCTEMPLIMITS	**Set/report temperature state limit values**
	
	Certain modem functionality is affected by the modem's temperature state. The possible temperature states are high critical, high warning, high normal, low normal, and low critical.
	
	Use this command to report or set the limits that correspond to these temperature states.
	
	To display the current temperature and temperature state, see !PCTEMP on page 45.
	
	--- 	
	Note: All temperatures are in Celsius.
	--- 	
	
	Password required: Yes
	Usage:
	• Execution: **AT!PCTEMPLIMITS=<hc>,<hw>,<hn>,<ln>,<lc>**
	  Response: OK
	  Purpose: Set the temperature limits for each state (all five values must be specified).
	• Query: **AT!PCTEMPLIMITS?**
	  Response: HI CRIT: <hc>
	              HI WARN: <hw>
	              HI NORM: <hn>
	              LO NORM: <ln>
	              LO CRIT: <lc>
	  Purpose: Return the temperature limits for each state.
	
	Parameters:
	
	<hc> (High Critical)
	• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).
	• Default = 108°C.
	
	<hw> (High Warning)
	• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).
	• Default = 95°C.
	
	<hn>(High Normal)
	• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).
	• Default = 85°C.
	
	<ln> (Low Normal)
	• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).
	• Default = -15°C.
	
	<lc> (Low Critical)
	• Temperature limit varies by device (see device Product Specification Document or Product Technical Specification).
	• Default = -25°C.

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

Command	Description

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

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

Command	Description

!PCVOLTLIMITS	**Set/report power supply voltage state limit values**
	
	Certain modem functionality is affected by the modem's power supply voltage state. The possible voltage states are high critical, high normal, low normal, low warning, and low critical.
	
	Use this command to report or set the limits that correspond to these voltage states.
	
	Password required: Yes
	
	Usage:
	
	• Execution: **AT!PCVOLTLIMITS=<hc>,<hn>,<ln>,<lw>,<lc>**
	  Response: OK
	  Purpose: Set the voltage limits for each state (all five values must be specified).
	
	• Query: **AT!PCVOLTLIMITS?**
	  Response: HI CRIT: <hc>
	                 HI NORM: <hn>
	                 LO NORM: <ln>
	                 LO WARN: <lw>
	                 LO CRIT: <lc>
	  Purpose: Return the voltage limits for each state.
	
	Parameters:
	
	<hc> (High Critical)
	  • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)
	  • Default = 4400 mV
	
	<hw> (High Normal)
	  • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)
	  • Default = 4300 mV
	
	<ln> (Low Normal)
	  • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)
	  • Default = 3300 mV
	
	<lw> (Low Warning)
	  • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)
	  • Default = 3200 mV
	
	<lc> (Low Critical)
	  • Voltage limit varies by device (see device Product Specification Document or Product Technical Specification)
	  • Default = 3100 mV

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

Command	Description

!POWERDOWN	**Power down system**
	
	Power down the system. After using this command, the modem will not communicate with the host until it has been power cycled.
	
	Note: This command initiates an IMSI_DETACH before the power down.
	
	Password required: No
	Usage:
	• Execution: **AT!POWERDOWN**
	  Response: OK
	  Purpose: Power the system down.
	
	Note: This command should only be used when testing using an appropriate testing jig—do not use it when the modem is installed in a computer.

!PRIID	**Set/report module PRI part number and revision**
	
	Report or set the module's customer and carrier PRI part numbers and revisions.
	Password required: Yes—Execution format only
	Usage:
	• Execution: **AT!PRIID=<priPN>,<priRev>**
	  Response: OK
	  Purpose: Set the module's PRI part number (<priPn>) and revision (<priRev>).
	• Query: **AT!PRIID?**
	  Response: PRI Part Number: <priPn>
	    Revision: <priRevDisplay>
	
	    Carrier PRI: None
	    OK
	  Purpose: Return the module's PRI part number (<priPn>) and revision (<priRevDisplay>).
	    (In the example shown above, no Carrier PRI is present. If it were, then the Part Number and Revision would display.)
	
	Parameters:
	
	<priPn> (PRI part number)
	• 7-digit ASCII number
	• Example: 9991234
	
	<priRev> (PRI revision number being written to the module)
	• 4-digit ASCII: XXYY (implied '.' between XX and YY)
	• Example: 0100
	
	<priRevDisplay> (PRI revision number being read from the module)
	• 4-digit ASCII: XX.YY
	• Example: 01.00

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

Command	Description

!REL
 	
Note: The actual parameter values or ranges used in the query (=?) and execution (=) forms of this command may vary slightly from this description depending on the device and firmware revision used.
 	
*Note: Devices should always use the default value (1) for <sgsnr> and <mscr>, and use **AT!NASREL** to choose the NAS Release Compliance version (Release 5, 6, 7, or Release 99).*
	Set/report active protocol/revision
	Configure the modem to use specific protocol, SGSN, and MSC revisions, or indicate the current settings.
	Password required: Yes—Execution format only
	Usage:
	• Execution: **AT!REL=<wcdmarrc> [,<sgsnr>, <mscr>]**
	  Response: OK
	  Purpose: Set the desired protocol (<wcdmarrc>), SGSN revision (<sgsnr>), and MSC revision (<mscr>).
	• Query: **AT!REL?**
	  Response: !REL:
	  Protocol: Release 5 *(from <wcdmarrc>)*
	  SGSN Revision: Dynamic *(from <sgsnr>)*
	  MSC Revision: Dynamic *(from <mscr>)*
	  OK
	  Purpose: Report the current operating protocol, SGSN revision, and MSC revision.
	• Query List: **AT!REL=?**
	  Purpose: Return the command format (for !REL =) and the supported values for each parameter (the supported ranges depend on modem models—see the parameter descriptions for details).
	Parameters:
	<wcdmarrc> (Protocol)
	• Default value is the highest release supported by the device.
	• Two-digit number corresponding to 3GPP release (!REL=? shows valid values)
	• Example: 00 = Release 99
	<sgsnr> (SGSN revision)
	• Two-digit number corresponding to SGSN revision (!REL=? shows valid values)
	• Example: 00 = Release 97
	• nn = Dynamic—Uses the revision broadcast by the network
	<mscr> (MSC revision)
	• Two-digit number corresponding to MSC revision (!REL=? shows valid values)
	• Example: 00 = Release 97
	• nn = Dynamic—Uses the revision broadcast by the network

!RESET	**Reset modem**
	Perform a modem reset.
	Password required: No
	Usage:
	• Execution: **AT!RESET**
	  Response: OK
	  Purpose: Reset the modem.
	
	Note: This command is identical in function to !GRESET.

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

Command	Description

!SELACQ	**Select RAT acquisition order**
	
	Select the acquisition order for RATs (Radio Access Technologies).
	
	Password required: Yes
	
	Usage:
	• Execution: **AT!SELACQ=<mode1>[,<mode2>[,<mode3>[,<mode4>[,<mode5>]]]]**
	  Response: OK
	  Purpose: Indicate the acquisition order for up to five RATs. See <mode> parameter description for details.
	• Query: **AT!SELACQ?**
	  Response: <mode1>
	                 <mode2>
	                 <mode3>
	                 <mode4>
	                 <mode5>
	  Purpose: Show the current acquisition order for the supported RATs.
	• Query list: **AT!SELACQ=?**
	  Purpose: Display valid execution format and parameter values.
	
	Parameters:
	
	<mode*n*> (RAT types)
	  • Valid values (shown in default order):
	    • "CDMA"
	    • "LTE"
	    • "WCDMA"
	    • "HDR"
	    • "GSM"
	  • If the execution format is issued with fewer than five RATs, the missing entries are appended based on the default order shown above.
	  • Example: If the command is issued as **AT!SELACQ=HDR,CDMA,GSM** Then **AT!SELACQ?** will show:
	      HDR
	      CDMA
	      GSM
	      LTE
	      WCDMA
	
	Note: Even if the device does not support a specific RAT (for example, CDMA), the RAT will still appear in the Query response.

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

Command	Description
!SELMODE	**Set/return current service domain** Configure the modem to use a specific service domain. **Password required:** No **Usage:** • Execution: **AT!SELMODE=<sdInd>** Response: OK Purpose: Set the desired service domain. • Query: **AT!SELMODE?** Response: <sdInd>, Service Domain description OK *or* Unknown service domain mask. Use AT!SELMODE to set service domain. <sdInd> OK Purpose: Return the current service domain index (<sdInd>) and description. If the <sdInd> is undefined, an error message is returned. • Query List: **AT!SELMODE=?** Purpose: Return a list of supported service domain indexes. **Parameters:** <sdInd> (Service domain index): • 00=CS only • 01=PS only • 02=CS and PS
!SIMRSTC	**Set/report SIM refresh reset notification state** Set or report the state of the unsolicited SIM refresh reset notification (!SIMRSTN). **Password required:** Yes **Usage:** • Execution: **AT!SIMRSTC=<n>** Response: OK Purpose: Enable/disable the SIM refresh reset notification. • Query: **AT!SIMRSTC?** Response: !SIMRSTC: <n> Purpose: Show the current state of the SIM refresh reset notification. • Query list: **AT!SIMRSTC=?** Purpose: Display valid execution format and parameter values. **Parameters:** <n> (Notification state) • 0=Disable • 1=Enable

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

Command	Description

!UDINFO	**Return information from active USB descriptor**
	Return information from the active USB descriptor.
	Password required: No
	Usage:
	• Query: **AT!UDINFO?**
	   Response: VID: \<vendor_id>
	                   APP PID: \<app_product_id>
	                   BOOT PID: \<boot_product_id>
	                   Interface: \<interfaceType>
	                   Manufacturer: \<manuString>
	                   Product: \<prodString>
	   Purpose: Display USB descriptor information.
	Parameters:
	\<vendor_id> (Vendor ID):
	• Valid range: 0000–FFFF
	
	\<app_product_id> (Product ID used when modem is in application mode):
	• Valid range: 0000–FFFF
	
	\<boot_product_id> (Product ID used when modem is in boot loader mode):
	• Valid range: 0000–FFFF
	
	\<interfaceType> (USB interface type):
	• ASCII string:
	   • "DIP"—Direct IP interface
	   • "QBI"—QBI interface
	   • "QMI"—QMI interface
	
	\<manuString> (Manufacturer string):
	• ASCII string (32 characters maximum)
	• Example: "Sierra Wireless, Incorporated"
	
	\<prodString> (Product string):
	• ASCII string (64 characters maximum)
	• Example: "Mini Card"

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

Command	Description

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

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

Command	Description

!UDUSBCOMP	**Set/report USB interface configuration**
	
	Use this command with modems that have been configured with multiple USB compositions.
	
	By default, devices are typically configured to use a USB composition that presents a minimal set of interfaces. If the device also supports other compositions, this command is used to choose from any of the supported compositions.
	
	Password required: Yes
	
	Usage:
	• Execution: **AT!UDUSBCOMP=<device_comp>**
	  Response: OK
	  Purpose: Set the current composition. For the change to take effect, you must reset the modem.
	• Query: **AT!UDUSBCOMP?**
	  Response: !UDUSBCOMP: <device_comp>
	         OK
	  Purpose: Report the current interface composition.
	• Query List: **AT!UDUSBCOMP=?**
	  Response: Example response, details may differ:
	
	<pre>0 - HIP DM NMEA AT MDM1 MDM2 MDM3 MS NOT SUPPORTED
	1 - HIP DM NMEA AT MDM1 MS NOT SUPPORTED
	2 - HIP DM NMEA AT NIC1 MS NOT SUPPORTED
	3 - HIP DM NMEA AT MDM1 NIC1 MS NOT SUPPORTED
	4 - HIP DM NMEA AT NIC1 NIC2 NIC3 MS NOT SUPPORTED
	5 - HIP DM NMEA AT ECM1 MS NOT SUPPORTED
	6 - DM NMEA AT QMI SUPPORTED
	7 - DM NMEA AT RMNET1 RMNET2 RMNET3 SUPPORTED
	8 - DM NMEA AT MBIM SUPPORTED
	9 - MBIM SUPPORTED
	10 - NMEA MBIM SUPPORTED
	11 - DM MBIM SUPPORTED
	12 - DM NMEA MBIM SUPPORTED
	OK</pre> Purpose: Report the available interface compositions (<device_comp>)—the device can use any compositions that are listed as "SUPPORTED".
	
	Parameters:
	<device_comp> (USB composition)
	• Integer value, 0 or greater
	• Use **AT!UDUSBCOMP=?** to view the configurations available for the device. Available configurations are identified as "SUPPORTED".

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

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

4: Diagnostic Commands

Introduction

This chapter describes commands used to diagnose modem problems.

Command summary

The table below lists the commands described in this chapter.

Table 4-1: Diagnostic commands

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

Command reference

Table 4-2: Diagnostic command details

Command	Description

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

Table 4-2: Diagnostic command details (Continued)

Command	Description

!ERR	**Display diagnostic information**
	
	This command is used to display diagnostic information (logged error conditions) that Sierra Wireless uses to assist in resolving technical issues.
	
	Password required: No
	
	Usage:
	
	• Execution: **AT!ERR=0**
	  Response: OK
	  Purpose: Clear the logged error conditions. Use this command before running tests to make sure that details displayed using AT!ERR are relevant to the tests being performed.
	
	• Query: **AT!ERR**
	  Response: 00 [F] <count> <file> <line>
	    ...
	    nn [F] <count> <file> <line>
	    OK
	  Purpose: Return all logged error conditions that are stored in NVRAM.
	
	Parameters:
	
	<count> (Number of occurrences)
	  • Valid range: 0x00–0xFF
	
	<file> (Log file name)
	  • Name of log file using ASCII characters
	
	<line> (Line number in log file)
	  • Valid range: 1–99999

!GCCLR	**Clear crash dump data**
	
	Clear crash dump data.
	
	Password required: No
	
	Usage:
	
	• Execution: **AT!GCCLR**
	  Response: Crash data cleared
	    OK
	  Purpose: Clear crash dump data.
	
	Parameters:
	
	None

!GCDUMP	**Display crash dump data**
	
	Display crash dump data.
	
	Password required: No
	
	Usage:
	
	• Execution: **AT!GCDUMP**
	  Response: (crash dump data)
	    OK
	    or No crash data available
	    OK
	  Purpose: Display crash dump data.

Table 4-2: Diagnostic command details (Continued)

Command	Description

!RXDEN	**Enable/disable WCDMA/LTE receive diversity**
	
	Enable or disable WCDMA/LTE receive diversity, or establish receive diversity as the primary path. The new state takes effect the next time the modem is reset.
	
	Note: To change from <state=0> to <state=2> (or from <state=2> to <state=0>, you must issue AT!RXDEN=1, reset the modem, and then make the final state change.
	
	Password required: Yes—Execution format only
	Usage:
	• Execution: **AT!RXDEN=<state>**
	  Response: OK
	  Purpose: Set the current receive diversity state.
	• Query: **AT!RXDEN?**
	  Response: !RXDEN:
	  　　　　　<state>
	  　　　　　OK
	  Purpose: Return the current receive diversity <state>.
	• Query List: **AT!RXDEN=?**
	  Purpose: Return a list of available <state> values to use in this command.
	Parameters:
	<state> (Current/ requested receive diversity state)
	　• 0 = Rx diversity disabled
	　• 1 = Rx diversity enabled
	　• 2 = Rx diversity is primary path

5: Test Commands

Introduction

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

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

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

- !DASBAND—selects the frequency band.

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

  You must execute **AT!DASBAND** to select a WCDMA band to run these commands that test the WCDMA transceiver:
  - !DAWGRXAGC
  - !DAWGAVGAGC
  - !DAWSTXCW
  - !DAWSPARANGE
  - !DASTXOFF
  - !DASTXON
  - !DAWSCONFIGRX

  You must execute **AT!DASBAND** to select a GSM band to run these commands that test the GSM transceiver:
  - !DAGSRXBURST
  - !DAGSRXCONT
  - !DAGGRSSI
  - !DAGGAVGRSSI
  - !DAGGRSSIRAW
  - !DAGSTXFRAME

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

Command summary

The table below lists the commands described in this chapter.

Table 5-1: Test commands

Command	Description	Page
!DAFTMACT	Put modem into Factory Test Mode	64
!DAFTMDEACT	Put modem into online mode from Factory Test Mode	64
!DAGGAVGRSSI	Return averaged RSSI value in dBm (GSM only)	65
!DAGGRSSI	Return the RSSI value in dBm (GSM only)	65
!DAGGRSSIRAW	Return raw RSSI value (GSM only)	66
!DAGINFO	Return GSM mode RF information (GSM only)	67
!DAGSLOCK	Return synthesizer lock state (GSM only)	68
!DAGSRXBURST	Set GSM receiver to burst mode (GSM only)	68
!DAGSRXCONT	Set GSM receiver continuously on (GSM only)	69
!DAGSTXBURST	Set GSM transmitter to burst mode (GSM only)	69
!DAGSTXFRAME	Set GSM Tx frame structure (GSM only)	70
!DALGAVGAGC	Return averaged Rx AGC value (LTE only)	71
!DALGRXAGC	Return Rx AGC value (LTE only)	72
!DALGTXAGC	Return Tx AGC value and transmitter parameters (LTE only)	73
!DALSPARANGE	Set LTE PA range (LTE only)	74
!DALSRXBW	Set LTE Rx bandwidth (LTE only)	75
!DALSTXBW	Set LTE Tx bandwidth (LTE only)	75
!DALSTXINDEX	Set LTE Tx gain index (LTE only)	76
!DALSWAVEFORM	Set LTE TX waveform (LTE only)	76
!DAOFFLINE	Place modem offline	77
!DASBAND	Set frequency band	77
!DASCHAN	Set modem channel (frequency)	78
!DASLNAGAIN	Set LNA gain state	79
!DASPDM	Set PDM value	80
!DASTXOFF	Turn Tx PA off	80
!DASTXON	Turn Tx PA on	81
!DAWGAVGAGC	Return averaged Rx AGC value (WCDMA only)	81
!DAWGRXAGC	Return Rx AGC value (WCDMA only)	82

Table 5-1: Test commands (Continued)

Command	Description	Page
!DAWINFO	Return WCDMA mode RF information (WCDMA only)	83
!DAWSCONFIGRX	Set WCDMA receiver to factory calibration settings (WCDMA only)	84
!DAWSPARANGE	Set PA range state machine (WCDMA only)	85
!DAWSSCHAIN	Enable secondary receive chain (WCDMA only)	85
!DAWSCHAINTCM	Place receive chain in test call mode (WCDMA only)	86
!DAWSTXCW	Set waveform used by the transmitter (WCDMA only)	86
!DAWSTXPWR	Set desired Tx power level (WCDMA mode only)	87

Command reference

Table 5-2: Test command details

Command	Description

!DAFTMACT	**Put modem into Factory Test Mode**
	
	Place the modem in FTM (Factory Test Mode). FTM is a non-signaling mode that allows the radio component to be manually configured to conduct certain types of tests. AT commands that start with "!DA" are only available when the modem is in FTM mode.
	
	Note: When this command executes successfully, the modem responds with the value 290300. Any other response indicates an error.
	
	Password required: Yes
	Usage:
	• Query: **AT!DAFTMACT**
	  Response: 290300 *(Success. Any other response indicates an error.)*
	               OK
	  Purpose: Place modem in FTM mode.

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

Table 5-2: Test command details (Continued)

Command	Description
!DAGGAVGRSSI *Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.*	**Return averaged RSSI value in dBm (GSM only)** Return an averaged RSSI (Received Signal Strength Indicator) value in dBm. *Note: !DASBAND must be used to set the device to a GSM band before you can use !DAGGAVGRSSI.* **Password required:** Yes **Usage:** • Execution: **AT!DAGGAVGRSSI=<channel>, <LNA Index>** Response: OK Purpose: Return the averaged RSSI for the specified channel and LNA offset index. **Parameters:** <channel> (Channel number for the band specified using **!DASBAND**) • Valid values depend on the selected band <LNA Index> (LNA offset index) • 0=R0 (highest gain) • 1=R1 • 2=R2 • 3=R3 (lowest gain)
!DAGGRSSI *Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.*	**Return the RSSI value in dBm (GSM only)** Return the RSSI (Received Signal Strength Indicator) value in dBm using the calibration offsets (valid in GSM burst mode only—the command !DAGSRXBURST puts the modem into burst mode). *Note: !DASBAND and !DASCHAN must be issued before you can use !DAGGRSSI.* **Password required:** Yes **Usage:** • Execution: **AT!DAGGRSSI** Response: Channel:<chan> LNA:<lna> RXPWR:<pwr> dBm OK Purpose: Return the averaged RSSI for the specified channel and LNA offset index. **Parameters:** <chan> (Channel number for the band specified using **!DASBAND**) • Valid values depend on the selected band <lna> (Current LNA state) • Valid range: 0–3 <pwr> (RSSI converted to dBm) • Signed value based on Rx power

Table 5-2: Test command details (Continued)

Command	Description

!DAGGRSSIRAW
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Return raw RSSI value (GSM only)
	Return a 32-bit raw RSSI value (valid in GSM mode only). The value is an average over multiple bursts.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAGGRSSIRAW.
	
	UPassword required: Yes
	sage:
	• Execution: **AT!DAGGRSSIRAW**
	  Response: <rssi>
	  OK
	  Purpose: Return the raw RSSI value.
	Parameters
	<rssi> (RSSI, averaged over multiple bursts)
	• 32-bit value

Table 5-2: Test command details (Continued)

Command	Description

!DAGINFO
 	
Note: The modem must be in online mode (not FTM mode) to use this command.
	Return GSM mode RF information (GSM only)
	Return RF information for GSM mode.
	
	*Note: **!DAWINFO** provides RF information for WCDMA mode.*
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAGINFO**
	  Response: Channel: <channel> RSSI:<rssi> LNA:<lna> RXPWR:<rxPwr> dBm SNR:<snr> DC Offset_I:<iOffset> DC Offset Q:<qOffset> Freq. Offset:<freqOffset> Timing Offset:<timingOffset>
	  OK
	  Purpose: Return the RF information.
	  (If the modem is not in GSM mode, the command returns 'OK' with no information.)
	
	Parameters
	  <channel> (GSM channel)
	  • Valid range: 0–65535
	
	  <rssi> (Receive power)
	  • Valid range: 0x00000000–0xFFFFFFFF
	
	  <lna> (LNA gain state)
	  • Valid range: 0–65535
	
	  <rxPwr> (Rx power in dBm (0.25 units))
	  • Valid range: 0–65535
	
	  <snr> (Signal-to-noise ratio)
	  • Valid range: 0–65535
	
	  <iOffset> (I offset)
	  • Valid range: 0–65535
	
	  <qOffset> (Q offset)
	  • Valid range: 0–65535
	
	  <freqOffset> (Frequency offset)
	  • Valid range: 0–65535
	
	  <timingOffset> (Timing offset)
	  • Valid range: 0–65535

Table 5-2: Test command details (Continued)

Command	Description

!DAGSLOCK
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Return synthesizer lock state (GSM only)
	Return a value indicating the lock state of the RF synthesizers.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAGSLOCK.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAGSLOCK**
	  Response: <sLockState>
	    OK
	  Purpose: Return the synthesizer lock state.
	Parameters
	<sLockState> (Synthesizer lock state)
	• 0=One or more synthesizers are out of lock
	• 1=All synthesizers locked

!DAGSRXBURST
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set GSM receiver to burst mode (GSM only)
	Set the receiver to start or stop sending bursts. The receiver must be in burst mode to read the RSSI. (The command !DAGGRSSI returns the RSSI value.)
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAGSRXBURST.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAGSRXBURST=<function>**
	  Response: <function>
	    OK
	  Purpose: Set the receiver to burst mode
	Parameters:
	<function>
	• 0=Get RSSI (Burst mode)
	• 2=Stop continuous Rx

Table 5-2: Test command details (Continued)

Command	Description

!DAGSRXCONT
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set GSM receiver continuously on (GSM only)
	Set the GSM receiver so that it is continuously on and not bursting.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAGSRXCONT.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAGSRXCONT=<function>**
	  Response: <function>
	              OK
	  Purpose: Set the receiver to continuously on.
	Parameters:
	<function>
	  • 3=Receiver continuously on
	  • 4=Receiver off

!DAGSTXBURST
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set GSM transmitter to burst mode (GSM only)
	Set the transmitter to start or stop sending bursts.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAGSTXBURST.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAGSTXBURST=<source>, <TSCindex>, <burstdur>**
	  Response: <source> <TSCindex> <burstdur>
	              OK
	  Purpose: Set the receiver to start/stop sending bursts.
	Parameters:
	<source>
	  • 0=Random data
	  • 1=Tone
	  • 2=Buffer data
	<TSCindex> (Training sequence index)
	  • Valid range: 0–9
	<burstdur> Burst duration:
	  • 1=Continuous

Table 5-2: Test command details (Continued)

Command	Description

!DAGSTXFRAME
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set GSM Tx frame structure (GSM only)
	This command configures the Tx slots for GSM operation. It must be issued eight times to set all eight slots.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAGSTXFRAME.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAGSTXFRAME=<slotnum>, <onoff>, <pwr>, <mcs>**
	  Response: <slotnum> <onoff> <pwr> <mcs>
	          OK
	  Purpose: Set the Tx frame structure.
	Parameters:
	<slotnum> (Slot number)
	• Valid range: 0–7 (eight available Tx slots)
	
	<onoff> (Enable/disable the specified slot)
	• 0=Off (disable)
	• 1=On (enable)
	
	<pwr> (Slot power level)
	• Measured in dB*100
	• Maximum values:
	  • GMSK Mode
	    850/900 bands: 3200 (32 dBm)
	    1800/1900 bands: 2900 (29 dBm)
	  • 8PSK (EDGE) Mode
	    850/900 bands: 2700 (27 dBm)
	    1800/1900 bands: 2600 (26 dBm)
	
	<mcs> (Modulation code scheme)
	• Valid range: 0–8 (MCS1 to MCS9)

Table 5-2: Test command details (Continued)

Command	Description

!DALGAVGAGC
 	
Note: The modem must be in LTE mode to use this command.
	Return averaged Rx AGC value (LTE only)
	Return the averaged AGC (Automatic Gain Control) readings for a specific uplink channel on the main and diversity paths.
	
	Note: !DASBAND and !DALSRXBW must be issued before you can use !DALGAVGAGC.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DALGAVGAGC=<channel>, <LNA Index>**
	  Response: Paths: <paths>
	                Rx<n>: AGC: <agc> dBm LNA: <lna> Chain: <chain>
	                Rx<n>: AGC: <agc> dBm LNA: <lna> Chain: <chain>
	                OK
	  Purpose: Return the averaged AGC for <channel> on the main and diversity paths.
	
	Parameters:
	<channel> (Uplink channel number (UARFCN) for the band specified using **!DASBAND**)
	    • Valid values depend on the selected band
	
	<LNA Index> (LNA offset index)
	    • 0=R0 (Highest gain)
	    • 1=R1
	    • 2=R2
	    • 3=R3 (Lowest gain)
	
	<paths> (Number of receive paths)
	    • 2
	
	<agc> (AGC value in dBm)
	    • Valid values: Dynamic Rx range
	
	<chain> (Receive paths)
	    • 0=Rx Main
	    • 1=Rx Diversity

Table 5-2: Test command details (Continued)

Command	Description

!DALGRXAGC	**Return Rx AGC value (LTE only)**
	
	Return the Rx AGC (Automatic Gain Control) value and LNA gain states for each RF path.
	
	The AGC value can be converted to RSSI (Received Signal Strength Indicator) in dBm:
	
	if ($<AGC\_value> < 511$)
	
	$<RX\_dBm> = -106 + (\ (\ <AGC\_value> + 512\ )\ /\ 12\ )$
	
	else
	
	$<RX\_dBm> = -106 + (\ (\ (<AGC\_value>-1024) + 512\ )\ /\ 12\ )$
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DALGRXAGC.
	
	Password required: Yes
	
	Usage:
	• Execution: **AT!DALGRXAGC** or **AT!DALGRXAGC?**
	  Response: \<AGC value\>
	                OK
	  Purpose: Return the \<AGC value\> for either the main or diversity path. If no \<path\> is specified, the main path is assumed.
	
	Parameters:
	
	\<path\> (For modules supporting diversity)
	• 0=Main path
	• 1=Diversity path
	
	\<AGC value\> (Rx AGC value for specified path)
	• Valid range: -512 to +511

Table 5-2: Test command details (Continued)

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

Table 5-2: Test command details (Continued)

Command	Description

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

!DALSPARANGE	**Set LTE PA range (LTE only)**
	Set the LTE PA (Power Amplifier) range.
	Requirements:
	   • Device must be in FTM mode
	   • **!DASBAND**, **!DASCHAN**, and **!DALSTXBW** must be issued before you can use this command.
	Password required: Yes
	Usage:
	   • Execution: **AT!DALSPARANGE=<pa_range>**
	     Response: OK
	     Purpose: Set the LTE PA range.
	Parameters:
	<pa_range> (PA range)
	   • 0
	   • 1
	   • 2
	   • 3

Table 5-2: Test command details (Continued)

Command	Description

!DALSRXBW	**Set LTE Rx bandwidth (LTE only)**
	Set the LTE Rx bandwidth.
	Requirements:
	• **!DASBAND** must be issued before you can use this command.
	• This command must be issued before you can use **!DALGAVGAGC**.
	Password required: Yes
	Usage:
	• Execution: **AT!DALSRXBW=<bw>**
	  Response: OK
	  Purpose: Set the LTE Rx bandwidth.
	Parameters:
	<bw> (LTE bandwidth)
	• 0=1.4 MHz
	• 1=3 MHz
	• 2=5 MHz
	• 3=10 MHz
	• 4=15 MHz
	• 5=20 MHz

!DALSTXBW	**Set LTE Tx bandwidth (LTE only)**
	Set the LTE Tx bandwidth.
	Requirements:
	• **!DASBAND** must be issued before you can use this command.
	Password required: Yes
	Usage:
	• Execution: **AT!DALSTXBW=<bw>**
	  Response: OK
	  Purpose: Set the LTE Tx bandwidth.
	Parameters:
	<bw> (LTE bandwidth)
	• 0=1.4 MHz
	• 1=3 MHz
	• 2=5 MHz
	• 3=10 MHz
	• 4=15 MHz
	• 5=20 MHz

Table 5-2: Test command details (Continued)

Command	Description
!DALSTXINDEX	**Set LTE Tx gain index (LTE only)** Set the LTE Tx gain index. Requirements: - Device must be in FTM mode **!DASBAND**, **!DASCHAN**, and **!DALSTXBW** must be issued before you can use this command. **Password required:** Yes **Usage:** - Execution: **AT!DALSTXINDEX=<tx_index>** Response: OK Purpose: Set the LTE Tx gain index. **Parameters:** <tx_index> (LTE Tx gain index) - Valid range: 0–127
!DALSWAVEFORM	**Set LTE TX waveform (LTE only)** Set the LTE Tx waveform characteristics. Requirements: - Device must be in FTM mode **!DASBAND**, **!DASCHAN**, and **!DALSTXBW** must be issued before you can use this command. **Password required:** Yes **Usage:** - Execution: **AT!DALSWAVEFORM=<waveform>[,<PUSCH_RBs>, <PUCCH_RBs>,<PUSCH_start_RB_index>]** Response: OK Purpose: Set the LTE Tx waveform characteristics. **Parameters:** <waveform> (Tx waveform) 0=1 MHz offset CW 1=LTE PUSCH (Physical Uplink Shared Channel) 2=LTE PUCCH (Physical Uplink Control Channel) 3=LTE PRACH (Physical Random Access Channel) 4=LTE SRS 5=UpPTS (Uplink Pilot Time Slot <PUSCH_RBs> (Number of PUSCH resource blocks - Valid rnage: 0–100 <PUCCH_RBs> (Number of PUCCH resource blocks) - Valid range: 0–12 <PUSCH_start_RB_index> (PUSCH starting resource block index - Valid range: 0–255

Table 5-2: Test command details (Continued)

Command	Description

!DAOFFLINE	**Place modem offline**
	Put the modem offline.
	Password required: Yes
	Usage:
	• Execution: **AT!DAOFFLINE**
	  Response: OK
	  Purpose: Put the modem offline.
	Parameters:
	  None

!DASBAND
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set frequency band
	Set the modem to use a particular frequency band. You must use this command to select an appropriate band before running LTE, WCDMA, or GSM commands. See page 61.
	Password required: Yes
	Usage:
	• Execution: **AT!DASBAND=<rfband>**
	  Response: <rfband>
	       OK
	  Purpose: Set frequency band.
	Parameters:
	<rfband> (Unique value corresponding to an RF band and technology.)
	  • This is a unique value that maps to an RF band and technology. It is not an actual 3GPP band number. For example, '18' is GSM 850, which corresponds to 3GPP band 5 (on a GSM network).
	  • Band support is product specific—see the device's Product Specification or Product Technical Specification document for details.
	  • Examples (for a full listing, see Table 13-1 on page 179):
	    • GSM
	      • 10=GSM 900
	      • 11=GSM 1800
	      • 12=GSM 1900
	      • 18=GSM 850
	    • WCDMA
	      • 9=WCDMA 2100
	      • 16=WCDMA 1900B
	      • 22=WCDMA 850
	      • 29=WCDMA 900 (BC8)
	    • LTE
	      • 34=LTE B1
	      • 35=LTE B7
	      • 36=LTE B13
	      • 37=LTE B17
	      • 42=LTE B4
	      • 44=LTE B3
	      • 47=LTE B8
	      • 56=LTE B20

Table 5-2: Test command details (Continued)

Command	Description
!DASCHAN *Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.*	**Set modem channel (frequency)** Set the modem to operate on a particular frequency channel. Before using this command, use the command !DASBAND (described on page 77) to set the band. Once a channel is set, the modem continues to use that channel until the modem is reset or powered off and on. *Note: !DASBAND must be issued before you can use !DASCHAN..* *In LTE mode, you must also issue !DALSRXBW and !DALSTXBW before you can use !DASCHAN..* **Password required:** Yes **Usage:** • Execution: **AT!DASCHAN=\<rfchannel\>** Response: \<rfchannel\> OK Purpose: Set modem channel (frequency). **Parameters:** \<rfchannel\> (Uplink channel number (ARFCN)—depends on frequency band being used) • 128–251: GSM 850 MHz • 1–24: GSM 900 MHz • 975–1023: GSM 900 MHz • 512–885: GSM 1800 MHz • 512–810: GSM 1900 MHz • 9612–9888: WCDMA 2100 • 9262–9538: WCDMA 1900 • 4132–4233: WCDMA 850 • 2712–2863: WCDMA 900 • 18000–18599: LTE B1 • 19200–19949: LTE B3 • 19950–20399 LTE B4 • 20750–21449: LTE B7 • 21450–21799: LTE B8 • 23180–23279: LTE B13 • 23730–23849: LTE B17 • 24150–24449: LTE B20

Table 5-2: Test command details (Continued)

Command	Description
!DASLNAGAIN	**Set LNA gain state** Set the LNA (Low Noise Amplifier) range for the main or diversity path (if applicable), in either WCDMA or GSM mode. *Note: !DASBAND and !DASCHAN must be issued before you can use !DASLNAGAIN.* **Password required:** Yes **Usage:** • Execution: AT!LNAGAIN=\<gain index>[, \<path>] Response: \<gain index> OK Purpose: Set the LNA gain state for either the main or diversity paths. **Parameters:** \<gain index> • 0=R0 (highest gain) Approximate switch from low to high gain: WCDMA (< -72 dBm); GSM (< -73 dBm) • 1=R1 Approximate switch from low to high gain: WCDMA (< -72 up to -46 dBm); GSM (< -73 up to -58 dBm) • 2=R2 Approximate switch from low to high gain: WCDMA (< -46 up to -36 dBm); GSM (< -58 up to -41 dBm) • 3=R3 (lowest gain) Approximate switch from low to high gain: WCDMA (> -36 dBm); GSM (< -41 dBm) *Note: The LNA gain state is set based on the expected receive power level. The gain state values listed above are provided as a guideline. The values are approximations and subject to change over time. The values are different than those from high to low gain.* \<path> (For modules supporting diversity) • 0=Main path • 1=Secondary (diversity) path

Table 5-2: Test command details (Continued)

Command	Description

!DASPDM
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set PDM value
	
	Adjust the PDM (Pulse Duration Modulation), allowing you to apply frequency offset to the LO (Local Oscillator) or Tx AGC.
	
	When you adjust the Tx AGC (<PDM ID> = 2), the modem does not use a calibrated result but uses the raw AGC value. The resulting change in Tx power will vary from modem to modem, so it is usually necessary to tune this value by executing the command repeatedly with different settings for the <PDMvalue> until you obtain the desired Tx power.
	
	When adjusting the tracking LO, you also need to execute the command repeatedly with different settings for the <PDMvalue> until you obtain the desired frequency offset.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DASPDM.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DASPDM=<PDM ID>, <PDMvalue>**
	  Response: <PDM ID> <PDMvalue>
	  OK
	  Purpose: Set the tracking LO and Tx AGC PDM.
	Parameters:
	<PDM ID> (LO (Local Oscillator) or Tx AGC (Automatic Gain Control) to adjust)
	• 0=Tracking LO adjust (GSM only)
	• 2=Tx AGC adjust (WCDMA only)
	• 4=Tracking LO adjust (WCDMA only)
	
	<PDMvalue> (Frequency offset value)
	• If <PDM ID>=0: 0–511
	• If <PDM ID>=2: 0–511
	• If <PDM ID>=5: 0–65536

!DASTXOFF
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Turn Tx PA off
	
	Turn the transceiver PA off, after it has been turned on with !DASTXON.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DASTXOFF.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DASTXOFF**
	  Response: OK
	  Purpose: Turn the Tx PA off.
	Parameters:
	None

Table 5-2: Test command details (Continued)

Command	Description
!DASTXON --- *Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.*	**Turn Tx PA on** Turn on the transceiver PA (either the WCDMA PA or the GSM PA, depending on the mode set with !DASBAND). The PA then remains on until you turn it off using the !DASTXOFF command, or until you reset or power the modem down and up. --- *Note: !DASBAND and !DASCHAN must be issued before you can use !DASTXON.* --- **Password required:** Yes **Usage:** • Execution: **AT!DASTXON** Response: OK Purpose: Turn the Tx PA on. **Parameters:** None
!DAWGAVGAGC	**Return averaged Rx AGC value (WCDMA only)** Return the averaged AGC (Automatic Gain Control) reading for a specific band for either the main path or diversity path (if applicable). --- *Note: !DASBAND must be issued before you can use !DAWGAVGAGC.* --- **Password required:** Yes **Usage:** • Execution: **AT!DAWGAVGAGC=<channel>, <LNA Index>[, <path>]** Response: <agc> OK Purpose: Return the averaged AGC for <channel> on the main path or diversity path. **Parameters:** <channel> (Uplink channel number (UARFCN) for the band specified using **!DASBAND**) • Valid values depend on the selected band <LNA Index> (LNA offset index) • 0=R0 (Highest gain) • 1=R1 • 2=R2 • 3=R3 (Lowest gain) <path> (For modules supporting diversity) • 0=Main path • 1=Diversity path <agc> (Averaged Rx AGC in dBm) • Example: -78.9

Table 5-2: Test command details (Continued)

Command	Description

!DAWGRXAGC	**Return Rx AGC value (WCDMA only)**
	
	Return the Rx AGC (Automatic Gain Control) value of the main path or diversity path (if applicable).
	
	This value can be converted to RSSI (Received Signal Strength Indicator) in dBm:
	
	if (<AGC_value> < 511)
	$<RX\_dBm> = -106 + (\ (\ <AGC\_value> + 512\ )\ /\ 12\ )$
	else
	$<RX\_dBm> = -106 + (\ (\ (<AGC\_value>-1024) + 512\ )\ /\ 12\ )$
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAWGRXAGC.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAWGRXAGC?[<path>]**
	  Response: <AGC value>
	          OK
	  Purpose: Return the <AGC value> for either the main or diversity paths. If no <path> is specified, the main path is assumed.
	Parameters:
	<path> (For modules supporting diversity)
	• 0=Main path
	• 1=Diversity path
	<AGC value> (Rx AGC value for specified path)
	• Valid range: -512 to +511

Table 5-2: Test command details (Continued)

Command	Description
!DAWINFO *Note: The modem must be in online mode (not FTM mode) to use this command.*	**Return WCDMA mode RF information (WCDMA only)** Return RF information for WCDMA mode when the modem is in CELL_DCH (Designated Channel) state. *Note: !DAGINFO provides RF information for GSM mode.* **Password required:** Yes **Usage:** • Execution: **AT!DAWINFO** Response: RXAGC:<rxAGC> TXAGC:<txAGC> TXADJ:<txAdj> TXLIM:<txLim> LNA:<lnaRange> PA ON:<paOn> TX ON:<txOn> PA Range:<paRange> RxD RXAGC:<RXDrxAGC> RxD LNA:<RXDlnaRange> HDET:<hdet> OK Purpose: Return the RF information. **Parameters:** <rxAGC> (Rx AGC value) • Valid range: 0–65535 <txAGC> (Tx AGC value) • Valid range: 0–65535 <txAdj> (Tx AGC value after linearization (adjustment)) • Valid range: 0–65535 <txLim> (Tx AGC limit) • Valid range: 0–65535 <lnaRange> (State of the LNA) • Valid range: 0–65535 <paOn> (State of PA_ON0) • Valid range: 0–65535 <txOn> (State of TX_ON) • Valid range: 0–65535 <paRange> (State of PA_R1: PA_R0) • Valid range: 0–65535 <RXDrxAGC> (RxD Rx AGC value) • Valid range: 0–65535 <RXDlnaRange> (State of the RxD LNA) • Valid range: 0–65535 <hdet> (Raw HDET (High Power Detector) data) • Valid range: 0–255

Table 5-2: Test command details (Continued)

Command	Description

!DAWSCONFIGRX
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set WCDMA receiver to factory calibration settings (WCDMA only)
	Configure the WCDMA receiver according to factory calibration settings stored in the modem's NV (Non-Volatile memory). This allows for accurate measurement of Rx AGC levels.
	The command performs these steps:
	1. Sets the channel.
	2. Selects and sets LNA range (or LNA gain).
	3. Sets the VGA gain offset based on the channel.
	4. Sets the LNA range offset.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAWSCONFIGRX.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAWSCONFIGRX=<channel>,<Rx_Level_dBm>**
	  Response: <LNA Index>, <LNA Value>
	  OK
	  Purpose: Configure the receiver.
	Parameters (Input):
	<channel> (Uplink channel number (ARFCN))
	• Value based on the selected band
	<Rx_Level_dBm> (Approximate signal level (in dBm) being applied to the modem receiver)
	• Valid range: -113 to 20
	Parameters (Output):
	<LNA Index> (LNA offset index)
	• 0=R0 (highest gain)
	• 1=R1
	• 2=R2
	• 3=R3 (lowest gain)
	<LNA Value>
	• Internal use only

Table 5-2: Test command details (Continued)

Command	Description

!DAWSPARANGE
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set PA range state machine (WCDMA only)
	Set the PA range state machine in WCDMA operation.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAWSPARANGE.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAWSPARANGE=<PA range>**
	  Response: <PA range>
	         OK
	  Purpose: Set the PA range state machine.
	Parameters:
	<PA range>
	• 0=Low gain state of the PA — Limited to about 16 dBm output power (R0=0, R1=0)
	• 3=High gain state of the PA — Up to the maximum output power of the modem (R0=1, R1=1)

!DAWSSCHAIN	**Enable secondary receive chain (WCDMA only)**
	Enable or disable the secondary receive chain.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAWSSCHAIN.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAWSSCHAIN=<state>**
	  Response: OK
	  Purpose: Enable or disable the secondary receive chain.
	Parameters:
	<state> (Requested state for secondary receive chain)
	• 0=Off (Disable)
	• 1=On (Enable)

Table 5-2: Test command details (Continued)

Command	Description

!DAWSCHAINTCM	**Place receive chain in test call mode (WCDMA only)**
	
	Place one or both of the primary and secondary receive chains in test call mode.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAWSCHAINTCM.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAWSCHAINTCM=<chain>**
	  Response: OK
	  Purpose: Place requested receive chain(s) in test call mode.
	Parameters:
	<chain> (Receive chain to place in test call mode)
	  • 0=Main
	  • 1=Secondary
	  • 2=Both

!DAWSTXCW
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set waveform used by the transmitter (WCDMA only)
	
	Set the waveform used by the transmitter—the modem can transmit either in carrier wave or WCDMA modulated.
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAWSTXCW.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAWSTXCW=<waveform>**
	  Response: OK
	  Purpose: Set the transmitter waveform.
	Parameters:
	<waveform> (Waveform used by the transmitter)
	  • 0=WCDMA
	  • 1=Carrier wave (no modulating signal applied)

Table 5-2: Test command details (Continued)

Command	Description

!DAWSTXPWR
 	
--- 	
 	
Note: The modem must be in FTM mode to use this command—use !DAFTMACT to enter FTM mode.
	Set desired Tx power level (WCDMA mode only)
	
	Set the desired Tx power level in dBm. When this occurs, the PA range and PDM are automatically updated as well. (When this command is used, you do not need to use **!DAWSPARANGE** and **!DASPDM**.)
	
	--- 	
	
	Note: !DASBAND and !DASCHAN must be issued before you can use !DAWSTXPWR.
	
	--- 	
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAWSTXPWR=<dBm>[,<use_temp_comp>]**
	  Response: <pa_range>, <pdm>
	  OK
	  Purpose: Set the Tx power level to the requested <dBm> level, and automatically set the PA range and PDM.
	Parameters:
	<dBm> (Desired Tx power in dBm)
	• Valid range: -57 to 28
	<use_temp_comp> (Apply temperature compensation to set desired Tx power.)
	• Frequency compensation is always applied.
	• 0=No (default)
	• 1=Yes
	<pa_range> (PA range set as a result of the command)
	• Valid range: 0–3
	<pdm> (PDM set as a result of the command)
	• Valid range: 0–255

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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
!RMARESET	Restore device to original settings	90

Command reference

Table 6-2: Memory management command details

Command	Description

!RMARESET	**Restore device to original settings**
	
	Restore the device to the original provisioned (OEM default) state.
	
	Password required: Yes
	
	Usage:
	• Execution: **AT!RMARESET=<category>**
	   Response: !RMARESET:
	                    <category> RESET
	                    OK
	   Purpose: Restore device to original provisioned (OEM default) state.
	
	Parameters:
	
	<category> (Type of restoration)
	     • OEM=Default OEM provisioned state
	     • RTN=OEM provisioned state plus activation and Sprint-related settings

7: GPS Commands

Introduction

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

When using these commands, the following considerations apply:

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

Command summary

The table below lists the commands described in this chapter.

Table 7-1: GPS commands

Command	Description	Page
!GPSAUTOSTART	Configure GPS auto-start features	93
!GPSCLRASSIST	Clear specific GPS assistance data	94
!GPSCOLDSTART	Clear all GNSS assistance data	95
!GPSEND	End an active session	95
!GPSFIX	Initiate GPS position fix	96
!GPSKEEPWARM	Configure Keep Warm functionality	97
!GPSLBSAPN	Set GPS LBS APNs	98
!GPSLOC	Return last known location of the modem	100
!GPSMOMETHOD	Set/report GPS MO method	101
!GPSMTLRSETTINGS	Set/report MT location request settings	102
!GPSNIQOSTIME	Set/report GPS QoS timeout period for network-initialized fixes	102
!GPSNMEA	Enable/disable GPS session autostart when NMEA opens	103
!GPSNMEACONFIG	Enable and set NMEA data output rate	103
!GPSNMEASENTENCE	Set/report NMEA sentence type	104
!GPSONLY	Configure GNSS for GPS only, or GPS and GLONASS	105
!GPSPORTID	Set/report port ID to use over TCP/IP	105

Table 7-1: GPS commands (Continued)

Command	Description	Page
!GPSPOSMODE	Configure support for GPS positioning modes	106
!GPSSATINFO	Request satellite information	107
!GPSSTATUS	Request current status of a position fix session	108
!GPSSUPLURL	Set/report SUPL server URL	109
!GPSSUPLVER	Set/report SUPL server version	109
!GPSTRACK	Initiate local tracking (multiple fix) session	110
!GPSTRANSSEC	Control GPS transport security	111
!GPSXTRAAPN	Set GPS XTRA APNs	112
!GPSXTRADATAENABLE	Set/report GPS XTRA settings	113
!GPSXTRADATAURL	Set/report GPS XTRA data server URLs	114
!GPSXTRAINITDNLD	Initiate gpsOneXTRA data download and inject operation	114
!GPSXTRASTATUS	Return current status of gpsOneXTRA	115
!GPSXTRATIME	Inject GPS or UTC time into gpsOneXTRA system	116
!GPSXTRATIMEENABLE	Set/report GPS XTRA time settings	117
!GPSXTRATIMEURL	Set/report GPS XTRA SNTP server URLs	118

 4114486

Command reference

Table 7-2: GPS command details

Command	Description

!GPSAUTOSTART
 	
• Min f/w rev: 4.0
	Configure GPS auto-start features
	
	Configure the GPS auto-start features. Any changes take effect the next time the modem is reset.
	
	Note: If auto-start is enabled, another GPS session cannot be started.
	
	Password required: No
	Usage:
	
	• Execution: AT!GPSAUTOSTART=<enable>[, <fixtype>, <maxtime>, <maxdist>, <fixrate>]
	    Response: OK
	        or ERROR
	    Purpose: Assign start values for various GPS settings
	• Query: AT!GPSAUTOSTART?
	    Response: !GPSAUTOSTART
	        enable: <enable>
	        fixtype: <fixtype>
	        maxtime: <maxtime> seconds
	        maxdist: <maxdist> meters
	        fixrate: <fixrate> seconds
	        OK
	    Purpose: Display the current values for auto-start features
	• Query List: AT!GPSAUTOSTART=?
	    Purpose: Return the expected command format.
	
	Parameters:
	
	<enable> (Enable/disable the feature)
	  • 0=Disabled
	  • 1=Enabled (GPS tracking session starts automatically when modem is reset)
	
	<fixtype> (Type of fix to establish)
	  • 1=Standalone (not supported by a mobile station)
	  • 2=MS-based only
	  • 3=MS-assisted only
	
	<maxtime> (Maximum time to wait for a position fix)
	  • Valid range: 0–255—Number of seconds to wait
	
	<maxdist> (Requested accuracy of fix)
	  • Entered in decimal format
	  • Valid range:
	    • 0–4294967279 meters
	    • 4294967280=No preference
	
	<fixrate> (Time to wait between fixes)
	  • Valid range: 1–65535 seconds

Table 7-2: GPS command details (Continued)

Command	Description
!GPSCLRASSIST • Min f/w rev: 4.0	**Clear specific GPS assistance data** Clear one or more types of assistance data from the modem. This forces a cold start for GPS acquisition the next time a session starts. The command is only available when there is no active GPS session—the GPS receiver is off and no position fix is being calculated. This command is equivalent to **!GPSCOLDSTART** when all four parameters are set to '1'. **Password required:** Yes **Usage:** • Execution: **AT!GPSCLRASSIST=<eph>, <alm>, <pos>, <time>, <iono>** Response: OK _or_ Command ignored OK Purpose: Clear each assistance data type that is flagged as '1'. • Query List: **AT!GPSCLRASSIST=?** Purpose: Return the expected command format and supported values. **Parameters:** <eph> (Ephemeris assistance data) • 0=Ignore (Do not clear the ephemeris assistance data) • 1=Clear this assistance data type—Clears GPS, GLONASS, and SBAS ephemeris assistance data. <alm> (Almanac assistance data) • 0=Ignore (Do not clear the almanac assistance data) • 1=Clear this assistance data type—Clears GPS, GLONASS, and SBAS almanac assistance data. <pos> (Position assistance data) • 0=Ignore (Do not clear the position assistance data) • 1=Clear this assistance data type <time> (Time reference) • 0=Ignore (Do not clear the time reference) • 1=Clear the time reference <iono> (Ionosphere assistance data) • 0=Ignore (Do not clear the ionosphere assistance data) • 1=Clear this assistance data type

Table 7-2: GPS command details (Continued)

Command	Description
!GPSCOLDSTART	**Clear all GNSS assistance data**
	Clear all GNSS assistance details from the modem and put the modem into a coldstart state. Data cleared includes Almanac, Ephemeris, Previous Position, Ionosphere, and GPS time. This forces a cold start for GPS acquisition the next time a session starts.
	The command is only available when there is no active GPS session—the GPS receiver is off and no position fix is being calculated.
	Password required: Yes
	Usage:
	• Execution: **AT!GPSCOLDSTART**
	Response: OK
	Purpose: Clear the modem's GPS details
	Parameters:
	None
!GPSEND • Min f/w rev: 4.0	**End an active session**
	End an active position fix session.
	Password required: No
	Usage:
	• Execution: **AT!GPSEND=<sessType>**
	Response: ERRCODE = <value>
	OK
	or OK
	Purpose: End the current session.
	Parameters:
	<sessType> (Type of session to end)
	• 0=Position fix session
	<value> (Error code returned when command fails for any reason)
	• See Table 7-3 on page 118 for a list of possible error codes.

Table 7-2: GPS command details (Continued)

Command	Description

!GPSFIX
• Min f/w rev: 4.0
	Initiate GPS position fix
	Initiate a GPS position fix.
	Password required: No
	Usage:
	• Execution: **AT!GPSFIX=<fixType>, <maxTime>, <maxDist>**
	  Response: Fix initiated
	          OK
	       or ERROR CODE = <value>
	          OK
	  Purpose: Initiate a time-limited position fix with a specified accuracy.
	• Query List: **AT!GPSFIX=?**
	  Purpose: Return supported <fixType>, <maxTime>, and <maxDist> values.
	Parameters:
	
	<fixType> (Type of fix to establish)
	  • 1=Standalone (not supported by a mobile station)
	  • 2=MS-based only
	  • 3=MS-assisted only
	
	<maxTime> (Maximum time to wait for a position fix)
	  • Valid range: 0–255 seconds
	
	<maxDist> (Requested accuracy of fix)
	  • Entered in decimal format
	  • Valid range:
	    • 0–4294967279 meters
	    • 4294967280=No preference
	
	<value> (Error code returned when command fails for any reason)
	  • See Table 7-3 on page 118 for a list of possible error codes.
	Example:
	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.
	Related commands:
	• **!GPSSTATUS** (page 108)—Use this command while the tracking session is in progress.
	• **!GPSLOC** (page 100)—Use this command after the session completes to obtain the result.

Table 7-2: GPS command details (Continued)

Command	Description

!GPSKEEPWARM
• Min f/w rev: 4.0
	Configure Keep Warm functionality
	Set, clear, or report the modem's 'keep warm' functionality. This functionality downloads GPS assistance data from the GPS server.
	Password required: Yes
	Usage:
	• Execution: **AT!GPSKEEPWARM=<enableFlag>**
	  Response: OK
	  Purpose: Enable/disable the keep warm functionality.
	• Query: **AT!GPSKEEPWARM?**
	  Response: KeepWarm Enabled: <enableFlag>
	              Warm Status: <warmStatus>
	  Purpose: Display the current status (<enableFlag>) of the keep warm functionality and indicate if GPS is in 'warm' state (<warmStatus>).
	• Query List: **AT!GPSKEEPWARM=?**
	  Purpose: Display valid <enableFlag> options.
	Parameters:
	<enableFlag> (Enable/disable keep warm functionality)
	• 0=Disable
	• 1=Enable
	<warmStatus> (GPS is in Warm state)
	• 0=No
	• 1=Yes
	Example:
	AT!GPSKEEPWARM? returns:
	KeepWarm Enabled: 1
	Warm Status: 1
	In this example, KeepWarm is enabled, and GPS is in Warm state.

Table 7-2: GPS command details (Continued)

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

Table 7-2: GPS command details (Continued)

Command	Description

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

Table 7-2: GPS command details (Continued)

Command	Description

!GPSLOC
• Min f/w rev: 4.0
	Return last known location of the modem
	Return the details obtained during the most recent position location session, if available.
	Password required: No
	Usage:
	• Query: **AT!GPSLOC?**
	  Response: Unknown *(No information is available)*
	                OK
	       or Not Available *(No information is available)*
	                OK
	       or Lat: <latitude>
	                Lon: <longitude>
	                Time: <time>
	                LocUncAngle: <luAngle> LocUncA: <luA> LocUncP: <luP> HEPE: <hepe>
	                <fixType>
	                Altitude: <altitude> LocUncVe: <luV>
	                Heading: <heading> VelHoriz: <vH> VelVert: <vV>
	                OK *(Altitude and heading only appear if data was collected as part of the most recent fix.)*
	  Purpose: Return last position location details.
	Parameters:
	<latitude> (Latitude at last position fix)
	  • Example: "49 Deg 10 Min 21.49 Sec N (0x008BDE6C)"
	<longitude> (Longitude at last position fix)
	  • Example: "123 Deg 4 Min 14.76 Sec W (0xFEA1EE9A)"
	<time> (Time at which last position fix was taken)
	  • Example: "2009 01 30 4 20:27:18 (GPS)"
	<luAngle> (Location uncertainty angle of returned position)
	  • Example: "11.2 deg"
	<luA> (Standard deviation of axis along <luAngle>)
	  • Example: "6.0 m"
	<luP> (Standard deviation of axis perpendicular to <luAngle>)
	  • Example: "6.0 m"
	<hepe> (Horizontal Estimated Positional Error)
	  • Example: "8.485 m"
	<fixType> (2D or 3D fix)
	  • Example: "2D Fix" or "3D Fix"
	<altitude> (Altitude in meters at which last position fix was taken)
	  • Only present if <fixType> is 3D
	  • Example: "-1 m"
	<luV> (Vertical uncertainty in meters)
	  • Only present if <fixType> is 3D
	  • Example: "3.0 m"
	(Continued on next page)

Table 7-2: GPS command details (Continued)

Command	Description
!GPSLOC (continued)	**Return last known location of the modem (continued)** <heading> (Direction of MS) • Example: "0.0 deg" <vH> (Horizontal velocity) • Example: "0.0 m/s" <vV> (Vertical velocity) • Example: "0.0 m/s"

!GPSMOMETHOD
• Min f/w rev: 4.0
	Set/report GPS MO method
	Set or report the GPS MO method.
	
	Note: !RESET must be issued after this command is used.
	
	Password required: Yes
	Usage:
	• Execution: **AT!GPSMOMETHOD=<MO_method>**
	  Response: OK
	     or ERROR
	  Purpose: Indicate the MO method to use.
	• Query: **AT!GPSMOMETHOD?**
	  Response: <MO_method>
	        OK
	  Purpose: Return the current <MO_method> setting.
	Parameters:
	<MO_method> (MO method)
	• 0=CP (Control Plane)
	• 1=UP (User Plane)

Table 7-2: GPS command details (Continued)

Command	Description
!GPSMTLRSETTINGS	**Set/report MT location request settings** Set or report the current MT (mobile-terminated) Location Request settings, which control how the UE responds to network-initiated notifications. *Note: !RESET must be issued after this command is used.* **Password required:** Yes **Usage:** • Execution: **AT!GPSMTLRSETTINGS=<notifyResp>** Response: OK *or* ERROR Purpose: Indicate how MT location request will be handled. • Query: **AT!GPSMTLRSETTINGS?** Response: Notification Response Setting: <notifResp> OK Purpose: Return the current <notifResp> setting. • Query List: **AT!GPSMTLRSETTINGS=?** Purpose: Return valid <notifResp> values. **Parameters:** <notifResp> (Notification response setting) • 0=Default setting as defined in *3GPP specification 29.002*, 'NotificationToM-SUser' enumeration. • 1=Accept all MT location requests. • 2=Reject all MT location requests. • 3=Verify all—User will be asked to accept or reject every MT location request.
!GPSNIQOSTIME • Min f/w rev: 4.0	**Set/report GPS QoS timeout period for network-initialized fixes** Set or report the current GPS QoS timeout period for network-initiated fixes. *Note: !RESET must be issued after this command is used.* **Password required:** Yes **Usage:** • Execution: **AT!GPSNIQOSTIME=<timeout>** Response: OK *or* ERROR Purpose: Set the new timeout period. • Query: **AT!GPSNIQOSTIME?** Response: QoS time: <timeout> OK Purpose: Return the current <timeout> period. **Parameters:** <timeout> (GPS QoS timeout period) • Timeout period (in seconds)

Table 7-2: GPS command details (Continued)

Command	Description
!GPSNMEA	**Enable/disable GPS session autostart when NMEA opens** Enable or disable the automatic start of a GPS session when NMEA opens. **Password required:** No **Usage:** • Execution: **AT!GPSNMEA=<enable>** Response: OK Purpose: Enable or disable automatic start of GPS session when NMEA opens. • Query: **AT!GPSNMEA?** Response: Enabled: <enable> OK Purpose: Return the enable/disable state. **Parameters:** <enable> (Enable/disable GPS autostart) • 0=Disable • 1=Enable (Default)
!GPSNMEACONFIG • Min f/w rev: 4.0	**Enable and set NMEA data output rate** Enable or disable NMEA data output, and set the output rate for use with !GPSTRACK. **Password required:** Yes *Note: NMEA streaming must be enabled using !GPSNMEA before this command will work.* **Usage:** • Execution: **AT!GPSNMEACONFIG=<enable>[,<outputRate>]** Response: OK *or* ERROR Purpose: Enable or disable NMEA output and set rate. • Query: **AT!GPSNMEACONFIG?** Response: Enabled: 0 Output Rate: <outputRate> *or* Enabled Output Rate: <outputRate> OK Purpose: Return the current <timeout> period. • Query List: **AT!GPSNMEACONFIG=?** Purpose: Return valid parameter values. **Parameters:** <enable> (Enable/disable NMEA data output) • 0=Disable. (Note: <outputRate> is ignored) • 1=Enable. (Note: <outputRate> is required) <outputRate> (NMEA data output rate—time between outputs) • Valid range: 1–255 seconds

Table 7-2: GPS command details (Continued)

Command	Description

!GPSNMEASENTENCE
• Min f/w rev: 4.0
	Set/report NMEA sentence type
	Set or report the current GPS NMEA sentence types.
	
	Password required: Yes
	
	--- 	
	Note: NMEA streaming must be enabled using **!GPSNMEA** *before this command will work.*
	
	--- 	
	Usage:
	• Execution: **AT!GPSNMEASENTENCE=<nmea type>**
	   Response: OK
	     or ERROR
	   Purpose: Enable or disable NMEA sentence types.
	• Query: **AT!GPSNMEASENTENCE?**
	   Response: !GPSNMEASENTENCE: <nmea type>
	          OK
	   Purpose: Indicate the currently enabled GPS NMEA sentence types.
	• Query List: **AT!GPSNMEASENTENCE=?**
	   Purpose: Return valid parameter values.
	Parameters:
	<nmea type> (NMEA sentence types)
	  • 2-byte hex format mask (Note: In the execution format, do not include '0x' before the mask value)
	  • Each bit: 0=Disabled; 1=Enabled
	  • Bit 0: GGA (Fix information)
	  • Bit 1: RMC (Recommended minimum data for GPS)
	  • Bit 2: GSV (Detailed satellite data)
	  • Bit 3: GSA (Overall satellite data)
	  • Bit 4: VTG (Vector track and speed over the ground)
	  • Bit 5: PQXFI (Proprietary Qualcomm eXtended Fix Information)
	  • Bit 6: GLGSV (GLONASS GSV)
	  • Bit 7: GNGSA (GLONASS GSA)
	  • Bit 8: GNGNS (Time, position, and fixed related data for GLONASS receiver)
	  • Bit 13: PSTIS (GPS session start indication)

Table 7-2: GPS command details (Continued)

Command	Description

!GPSONLY
• Min f/w rev: 4.0
	Configure GNSS for GPS only, or GPS and GLONASS
	Configure GNSS engine mode to support GPS only, or GPS and GLONASS.
	Password required: No
	Usage:
	• Execution: **AT!GPSONLY=<enable>**
	  Response: OK
	  Purpose: Enable or disable GLONASS support.
	• Query: **AT!GPSONLY?**
	  Response: !GPSONLY: <enable>
	           OK
	  Purpose: Display the current GNSS mode.
	• Query List: **AT!GPSONLY=?**
	  Purpose: Return the expected command format.
	Parameters:
	<enable> (GNSS mode—GPS only, or GPS and GLONASS)
	  • 0=Disabled (GPS + GLONASS)
	  • 1=Enabled (GPS only)

!GPSPORTID
• Min f/w rev: 4.0
	Set/report port ID to use over TCP/IP
	Set or report the port ID of the SUPL server to use when using TCP/IP as the transport mechanism for SUPL. The command can also be used when the FQDN is auto-generated from the IMSI.
	Password required: Yes
	Usage:
	• Execution: **AT!GPSPORTID=<portid>**
	  Response: OK
	      or ERROR
	  Purpose: Queue the request to set the port ID.
	• Query: **AT!GPSPORTID?**
	  Response: <portid>
	           OK
	  Purpose: Return the port ID currently being used
	Parameters:
	<port ID> (Port ID to use over TCP/IP)
	  • Valid range: 0–65535
	Related commands
	  • !GPSSUPLURL (p.109)—Set/return SUPL server URL used for TCP/IP

Table 7-2: GPS command details (Continued)

Command	Description

!GPSPOSMODE
• Min f/w rev: 4.0
	Configure support for GPS positioning modes
	Enable or disable support for several GPS positioning modes.
	
	--- 	
	Note: !RESET must be issued after this command is used.
	--- 	
	
	Password required: Yes
	Usage:
	• Execution: **AT!GPSPOSMODE=<mask>**
	   Response: OK
	       or ERROR
	   Purpose: Use a single byte hexadecimal format mask to indicate which GPS positioning modes are to be supported.
	• Query: **AT!GPSPOSMODE?**
	   Response: MASK: <mask>
	          OK
	   Purpose: Return a <mask> value indicating which GPS positioning modes are currently supported.
	• Query List: **AT!GPSPOSMODE=?**
	   Purpose: Return supported <mask> values.
	Parameters:
	<mask> (Bitmap value representing supported GPS positioning modes)
	• 1-byte hex format mask (do not include '0x' before the mask value)
	• 'On' bits identify modes that are supported
	• Bit 0: Standalone
	• Bit 1: UP MS-based
	• Bit 2: UP MS-assisted
	• Bit 3: CP MS-based (2G)
	• Bit 4: CP MS-assisted (2G)
	• Bit 5: CP UE-based (3G)
	• Bit 6: CP UE-assisted (3G)
	• Bit 7: Unused
	Example:
	AT!GPSPOSMODE=2a enables support for Bit 5 (CP UE-based), Bit 3 (CP MS-based), and Bit 1 (UP MS-based)

Table 7-2: GPS command details (Continued)

Command	Description

!GPSSATINFO
• Min f/w rev: 4.0
	Request satellite information
	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).
	The information returned is valid regardless of the current fix mode or whether the PDE or the modem performs the fix calculations.
	Password required: No
	Usage:
	• Query: **AT!GPSSATINFO?**
	  Response: NO SAT INFO
	        OK
	    or Satellites in view: \<numSats>
	        * SV: \<SV 1> ELEV:\<ELEV 1> AZI:\<AZI 1> SNR:\<SNR 1>
	        ...
	        * SV: \<SV n> ELEV:\<ELEV n> AZI:\<AZI n> SNR:\<SNR n>
	        OK
	  Purpose: Return the number of satellites in view (including those used in the latest position fix) and details for each satellite (or return an error message).
	
	Note: An asterisk (*) at the beginning of a line indicates the satellite was used in the fix location calculation.
	
	Parameters:
	\<numSats> (Number of satellites in view)
	• Valid range: 1–12
	\<SV n> (Satellite vehicle number for the nth satellite in the list)
	• Valid range: 1–32
	\<ELEV n> (Satellite elevation relative to modem location, in degrees)
	• Valid range: 0–90
	\<AZI n> (Satellite azimuth relative to modem location, in degrees)
	• Valid range: 0–360
	\<SNR n> (Signal to noise ratio, in dB)
	• Valid range: 0–99

Table 7-2: GPS command details (Continued)

Command	Description

!GPSSTATUS
• Min f/w rev: 4.0
	Request current status of a position fix session
	Return the current status of a position fix session.
	Password required: No
	Usage:
	• Query: **AT!GPSSTATUS?**
	  Response: <year> <month> <day> <day of week> <time of day> Last Fix Status = <status>
	          <year> <month> <day> <day of week> <time of day> Fix Session Status = <status>
	  Purpose: Return timestamps and status of a position fix session.
	Timestamp parameters:
	<year>
	• Example: "2007"
	<month>
	• 01–12 (Jan–Dec)
	<day>
	• 01–31
	<day of week>
	• 0–6 (0=Monday)
	<time of day>
	• 24-hour clock format
	• Example: "13:25:48"
	Status parameters:
	<status> (Session status)
	• "NONE": No session of this type has occurred since the modem powered up.
	  • The timestamp is the current time.
	• "ACTIVE": A session of this type is currently active.
	  • The timestamp is the time when the session entered this state.
	• "SUCCESS": The most recent session of this type succeeded.
	  • The timestamp is the time when the previous session completed successfully.
	• "FAIL": The most recent session of this type failed.
	  • The timestamp is the time when the previous session failed.
	  • An error code is displayed with the "FAIL" string. See Table 7-3 on page 118 for a list of error codes.
	Example:
	AT!GPSSTATUS? returns:
	2007 01 06 6 00:25:01 Last Fix Status = SUCCESS
	2007 01 06 6 00:25:02 Fix Session Status = ACTIVE

Table 7-2: GPS command details (Continued)

Command	Description
!GPSSUPLURL • Min f/w rev: 4.0	**Set/report SUPL server URL** Set or return the URL of the SUPL server to be used when TCP/IP is used as the transport mechanism for location processing. Use !GPSPORTID to set the port ID. **Password required:** Yes **Usage:** • Execution: **AT!GPSSUPLURL="<suplURL>"** 　Response: OK 　　　or ERROR 　Purpose: Identify the SUPL server URL. • Query: **AT!GPSSUPLURL?** 　Response: <suplURL> 　　　OK 　Purpose: Return the SUPL server's URL.. • Query List: **AT!GPSSUPLURL=?** 　Purpose: Return the execution command format. **Parameters:** <suplURL> (SUPL server URL) • Must be a fully qualified domain name (FQDN) or address • Examples: "supl.url.net", "123.123.123.123" • The <suplURL> is not checked for correctness—if the string is invalid, the modem will not be able to perform MS-assisted GPS fixes. **Examples:** AT!GPSSUPLURL="supl.url.net" AT!GPSSUPLURL="123.123.123.123"
!GPSSUPLVER • Min f/w rev: 4.0	**Set/report SUPL server version** Set or return the version of the SUPL server. **Password required:** Yes **Usage:** • Execution: **AT!GPSSUPLURL=<supl ver>"** 　Response: OK 　　　or ERROR 　Purpose: Identify the SUPL server version. • Query: **AT!GPSSUPLVER?** 　Response: <supl ver> 　　　OK 　Purpose: Return the SUPL server's version. • Query List: **AT!GPSSUPLVER=?** 　Purpose: Return the execution command format. **Parameters:** <supl ver> (SUPL server version) • 1—SUPL version 1 • 2—SUPL version 2

Table 7-2: GPS command details (Continued)

Command	Description

!GPSTRACK
• Min f/w rev: 4.0
	Initiate local tracking (multiple fix) session
	Initiate a local tracking session comprising a specific number of position fixes taken at regular time intervals.
	Password required: No
	Usage:
	• Execution: **AT!GPSTRACK = <fixType>, <maxTime>, <maxDist>, <fixCount>, <fixRate>**
	  Response: Fix initiated
	                OK
	         or ERROR CODE = <value>
	                OK
	  Purpose: Initiate a series of time-limited position fixes.
	• Query List: **AT!GPSTRACK=?**
	  Purpose: Return supported <fixType>, <maxTime>, <maxDist>, <fixCount>, and <fixRate> values.
	Parameters:
	\<fixType\> (Type of fix to establish)
	  • 1=Standalone (not supported by a mobile station)
	  • 2=MS-based only
	  • 3=MS-assisted only
	\<maxTime\> (Maximum time to wait for satellite information)
	  • Valid range: 0–255 seconds
	\<maxDist\> (Requested accuracy of fix)
	  • Entered in decimal format
	  • Valid range:
	    • 0–4294967279 meters
	    • 4294967280=No preference
	\<fixCount\> (Number of position fixes requested)
	  • Valid range: 1–1000 (1000—Take a continuous series of position fixes)
	\<fixrate\> (Amount of time to wait between fix attempts)
	  • Valid range: 0–1799999 seconds
	Failure conditions:
	The request fails if the tracking session fails to initiate.
	If the request fails, the message ERROR CODE = <value> is returned. See Table 7-3 on page 118 for a list of error codes.
	
	Note: The 'time to first fix' may require more time than subsequent fixes, if almanac, ephemeris, or location data needs to be updated. (Almanac data is valid for 3–4 days, ephemeris for 30–120 minutes, and location data for 4 minutes). To avoid a timeout error (time spent > <maxtime>), your application could precede the !GPSTRACK call with a single position fix (AGPSFIX) with a greater <maxTime> value.
	
	(Continued on next page)

Table 7-2: GPS command details (Continued)

Command	Description
!GPSTRACK (continued)	**Initiate local tracking (multiple fix) session (continued)** **Example:** AT!GPSTRACK=1, 15, 10, 20, 60 requests a series of 20 standalone position fixes to 10 meters accuracy—fixes are taken every 60 seconds. One of the following responses will be received: "OK" if the request is successful, or "ERROR CODE = <value>" if the request fails for any reason. See Table 7-3 on page 118 for a list of error codes. **Related commands:** **!GPSSTATUS**—Use this command while the tracking session is in progress. **!GPSLOC**—Use this command after the session completes to obtain the result.
!GPSTRANSSEC • Min f/w rev: 4.0	**Control GPS transport security** Enable or disable GPS transport security for SUPL GPS fixes. *Note: !RESET must be issued after this command is used.* **Password required:** Yes **Usage:** • Execution: **AT!GPSTRANSSEC=<security>** Response: OK *or* ERROR Purpose: Indicate if transport security is used. • Query: **AT!GPSTRANSSEC?** Response: Transport security: <security> OK Purpose: Return the current <security> setting.

Table 7-2: GPS command details (Continued)

Command	Description
!GPSXTRAAPN • Min f/w rev: 4.0	**Set GPS XTRA APNs** Set the GPS XTRA APNs to be used for various RATs (Radio Access Technologies). **Password required:** Yes **Usage:** • Execution (Add): 　　　　**AT!GPSXTRAAPN=\<operation>,\<ratmask>,\<IPtype>,\<APN>** 　Execution (Delete one): 　　　　**AT!GPSXTRAAPN=\<operation>,\<ratmask>** 　Execution (Delete all): 　　　　**AT!GPSXTRAAPN=\<operation>** 　Response:　　OK 　　　*or*　　ERROR 　Purpose:　　Set the APN to be used for the specified \<ratmask>, or delete the APN for a single \<ratmask> or all RATs. • Query:　　　**AT!GPSXTRAAPN?** 　Response:　　\<operation>, \<ratmask>, \<IPType>, \<APN> 　　　　　　　\<operation>, \<ratmask>, \<IPType>, \<APN> 　　　　　　　... 　　　　　　　OK 　　　*or*　　OK *(if no ID has been set)* 　Purpose:　　Display the APNs currently assigned for each RAT. • Query List:　**AT!GPSXTRAAPN=?** 　Purpose:　　Display valid parameter options. **Parameters:** \<operation> (Add or delete APNs) 　• 1=Add an APN for a specific \<ratmask> and \<IPtype> 　　Note: All paramters are required. *Note: To change an APN that has been set for a RAT, you must first delete the current APN, then add the new APN.* 　• 2=Delete the APN for a specific \<ratmask> 　　Note: Only \<ratmask> is required. 　• 3=Delete all APNs 　　Note: No other parameters are required. \<ratmask> (Radio access technology) 　• Valid values (hexadecimal format): 　　• 01=CDMA 　　• 02=HDR 　　• 04=GSM 　　• 08=WCDMA 　　• 10=LTE \<IPtype> (Internet Protocol version) 　• Character string, entered without quotation marks 　• Valid values: 　　• IPV4 　　• IPV6 　　• IPV4V6 (Continued on next page)

Table 7-2: GPS command details (Continued)

Command	Description

!GPSXTRAAPN (continued)	**Set GPS XTRA APNs (continued)**
	
	<APN> (Access Point Name)
	  • Character string, entered with quotation marks
	  • Examples: "mycompany.mnc987.mcc123.gprs", "ourinternet"

!GPSXTRADATAENABLE
  • Min f/w rev: 4.0
	Set/report GPS XTRA settings
	
	Enable or disable GPS XTRA data and set or report GPS XTRA data configuration settings.
	
	Note: These settings are persistent across power cycles.
	
	Note: !RESET must be issued after this command is used.
	
	Password required: Yes
	Usage:
	  • Execution: **AT!GPSXTRADATAENABLE=
	        <enable>[,<retries>,<retryInt>[,<dload>,<dloadInt>]]**
	    Response: OK
	       or ERROR
	    Purpose: Enable or disable GPS XTRA data. You can only set the retry parameters if <enable> = 1, and you can only set the download parameters if the retry parameters are set.
	  • Query: **AT!GPSXTRADATAENABLE?**
	    Response: XTRA Data Enabled: <enable>
	        XTRA Data Retry Number: <retries>
	        XTRA Data Retry Interval: <retryInt>
	        XTRA Data Autodownload Enabled: <dload>
	        XTRA Data Autodownload Interval: <dloadInt>
	    Purpose: Return the current GPS XTRA data settings.
	  • Query List: **AT!GPSXTRADATAENABLE=?**
	    Purpose: Return supported <enable>, <retries>, <retryInt>, <dload>, and <dloadInt> values.
	
	Parameters:
	<enable> (Enable or disable gpsOneXTRA functionality)
	  • 0=Disable. To fully disable gpsOneXTRA, you must also call **!GPSXTRATIMEENABLE=0** to disable gpsOneXTRA time functionality.
	  • 1=Enable
	
	<retries> (Number of download retries)
	  • Valid range: 0–10
	
	<retryInt> (Interval between download retries, in minutes)
	  • Valid range: 1–120
	
	<dload> (Enable or disable automatic downloads)
	  • 0=Disable
	  • 1=Enable
	
	<dloadInt> (Interval between automatic downloads, in hours)
	  • Valid range: 1–168

Table 7-2: GPS command details (Continued)

Command	Description

!GPSXTRADATAURL
• Min f/w rev: 4.0
	Set/report GPS XTRA data server URLs
	Set or report the URLs of up to three GPS XTRA data servers.
	Password required: Yes
	Usage:
	• Execution: **AT!GPSXTRADATAURL=<urlIndex>,<url>**
	   Response: OK
	        or ERROR
	   Purpose: Set the URL used for the primary, secondary, or tertiary data server.
	• Query: **AT!GPSXTRADATAURL?**
	   Response: XTRA Primary Server: <url1>
	          XTRA Secondary Server: <url2>
	          XTRA Tertiary Server: <url3>
	          OK
	   Purpose: Return the URLs of the primary, secondary, and tertiary data servers.
	Parameters:
	<urlIndex> (Server index)
	• 1=Primary server
	• 2=Secondary server
	• 3=Tertiary server
	<url> (Server URL)
	• URL string includes quotes
	• Example: "http://xtra1.gpsoneextra.net/xtra.bin"
	• URL must be complete, including the "http://"
	• Maximum string length: 128 characters

!GPSXTRAINITDNLD
• Min f/w rev: 4.0
	Initiate gpsOneXTRA data download and inject operation
	Initiate a gpsOneXTRA data download and inject operation using the data server specified in the **!GPSXTRADATAURL** command.
	Password required: No
	Usage:
	• Execution: **AT!GPSXTRAINITDNLD**
	   Response: Xtra command sent successfully
	          OK
	        or Error code = <err>
	          OK
	   Purpose: Initiate the download and inject operation. If the command fails, it returns "Error code = <err>".
	Parameters:
	<err> (Error code returned if command fails)
	• 3=Bad CRC for XTRA data file
	• 4=Old XTRA data file
	• 7=GPS subsystem busy
	• 8=GPS time reference entered is invalid
	• 9=Unknown error

Table 7-2: GPS command details (Continued)

Command	Description
!GPSXTRASTATUS • Min f/w rev: 4.0	**Return current status of gpsOneXTRA** Return the status of the most recent time and data injection operations. **Password required:** No **Usage:** • Query: **AT!GPSXTRASTATUS?** Response: Xtra Time status = <timeStatus> Xtra Data status = <dataStatus> Validity Start = <timeStamp> Validity End = <timeStamp> OK Purpose: Return the status of the most recent time and data injection operations. **Parameters:** <timeStatus> • Returned string does not include quotes (they are used in this description for clarity). • "Unknown": Default value if time injection operation has not been performed yet, or if operation was incomplete • "Valid": GPS time injection succeeded • "Invalid": GPS time injection failed <dataStatus> • Returned string does not include quotes (they are used in this description for clarity). • "Unknown": Default value if data injection operation has not been performed yet, or if operation was incomplete • "Valid": GPS data injection succeeded • "Invalid": GPS data injection failed • "xtra.bin file has bad crc" • "GPS Busy, end current session first" • "error reading xtra.bin file" • "bad TOA in xtra.bin file": The XTRA data retrieved from the XTRA server is too old (exceeds the Time Of Applicability). <timeStamp> (GPS time stamp) • Format: <year> <month> <day> <dayOfWeek> <time> • <year>: 4 digits (Example: 2008) • <month>: 2 digits (01–12) • <day>: 2 digits (01–31) • <dayOfWeek>: 1 digit (0–6) where 0=Monday • <time>: time of day (Example: 13:15:45) • Example: 2008 02 28 5 13:15:45 represents Thursday 28 Feb 2008 at 1:15:45 PM

Table 7-2: GPS command details (Continued)

Command	Description

!GPSXTRATIME
• Min f/w rev: 4.0
	Inject GPS or UTC time into gpsOneXTRA system
	Inject the GPS or UTC time into the gpsOneXTRA system.
	Password required: Yes
	Usage:
	• Execution: **AT!GPSXTRATIME=<YYYY>, <MM>, <DD>, <hh>, <mm>, <ss>, <utc>, <force>, <uncrtn>**
	Response: Xtra command sent successfully
	            OK
	     or Error code = <err>
	            OK
	Purpose: Inject the specfied date and time into the gpsOneXTRA system. If the command fails, it returns "Error code = <err>".
	• Query List: **AT!GPSXTRATIME=?**
	Purpose: Return supported parameter values.
	Parameters:
	<YYYY> (Year)
	  • 4 digits required
	<MM> (Month)
	  • Valid range: 1–12
	<DD> (Day)
	  • Valid range: 1–31
	<hh> (Hour)
	  • Valid range: 0-23
	<mm> (Minute)
	  • Valid range: 0–59
	<ss> (Second)
	  • Valid range: 0–59
	<utc> (Flag indicating time type)
	  • 0=GPS time
	  • 1=UTC time
	<force> (Force or allow GPS subsystem to decide to accept the time entered)
	  • 0=Do not force acceptance
	  • 1=Force acceptance
	<err> (Error code returned if command fails)
	  • 3=Bad CRC for XTRA data file
	  • 4=Old XTRA data file
	  • 7=GPS subsystem busy
	  • 8=GPS time reference entered is invalid
	  • 9=Unknown error

Table 7-2: GPS command details (Continued)

Command	Description

!GPSXTRATIMEENABLE
• Min f/w rev: 4.0
	Set/report GPS XTRA time settings
	Enable or disable GPS XTRA time information, and set or report specific GPS XTRA time settings.
	
	Note: *!RESET* *must be issued after this command is used.*
	
	Password required: Yes
	Usage:
	• Execution: **AT!GPSXTRATIMEENABLE=<enable> [,<thresh>, <delay>]**
	  Response: OK
	       or ERROR
	  Purpose: Enable or disable time information. If enabled, sets the uncertainty threshold and delay time to retry with a backup server.
	• Query: **AT!GPSXTRATIMEENABLE?**
	  Response: XTRA Time Info Enabled: <enable>
	       XTRA Time Uncertainty Threshold: <thresh>
	       XTRA Time Delay Threshold: <delay>
	  Purpose: Return the current values of GPS XTRA time parameters.
	• Query List: **AT!GPSXTRATIMEENABLE=?**
	  Purpose: Return supported execution parameter values.
	Parameters:
	<enable> (Enable or disable time information)
	  • 0=Disable. To fully disable gpsOneXTRA, you must also call **!GPSXTRADATAENABLE=0** to disable gpsOneXTRA data functionality.
	  • 1=Enable
	<thresh> (XTRA time uncertainty threshold, in ms)
	  • Valid range: 100–30000
	<delay> (Time to delay before retrying with backup server, in ms)
	  • Valid range: 100–10000

Table 7-2: GPS command details (Continued)

Command	Description

!GPSXTRATIMEURL
• Min f/w rev: 4.0
	Set/report GPS XTRA SNTP server URLs
	Set or report the URLs of up to three GPS XTRA SNTP (Simple Network Time Protocol) servers.
	
	Note: !RESET must be issued after this command is used.
	
	Password required: Yes
	Usage:
	• Execution: **AT!GPSXTRATIMEURL=<urlIndex>,<url>**
	  Response: OK
	    or ERROR
	  Purpose: Set the URL used for the primary, secondary, or tertiary data server.
	• Query: **AT!GPSXTRATIMEURL?**
	  Response: XTRA SNTP Primary Server: <url 1>
	    XTRA SNTP Secondary Server: <url 2>
	    XTRA SNTP Tertiary Server: <url 3>
	  Purpose: Return the URLs of the primary, secondary, and tertiary SNTP servers.
	
	Parameters:
	
	<urlIndex> (Server index)
	• 1=Primary server
	• 2=Secondary server
	• 3=Tertiary server
	
	<url> (Server URL)
	• URL string includes quotes
	• Example: "xtra1.gpsoneextra.net"
	• Maximum string length=128 characters

Error codes

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

describes error codes that can be returned by **!GPSFIX** ()

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

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

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

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

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

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

8

8: SIM Commands

- Introduction
- Command summary
- Command reference

Introduction

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

Command summary

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

Table 8-1: SIM command passwords

Command	Description	Page
+CPINR	Display remaining number of SIM unlock retries	122
!ICCID	Return (U)SIM card's ICCID	123

Command reference

Table 8-2: SIM command details

Command	Description

+CPINR	**Display remaining number of SIM unlock retries**
	Display the number of remaining SIM unlock retries.
	Password required: No
	Usage:
	• Execution: **AT+CPINR=<CPIN TYPE>**
	  Response: +CPINR: <CPIN TYPE>,<remaining>
	              OK
	  Purpose: Display the number of remaining retries for the specified PIN/PUK type.
	• Execution: **AT+CPINR**
	  Response: +CPINR: SIM PIN,<remaining>
	              +CPINR: SIM PUK,<remaining>
	              +CPINR: SIM PIN2,<remaining>
	              +CPINR: SIM PUK2,<remaining>
	              +CPINR: PH-FSIM PIN,<remaining>
	              +CPINR: PH-NET PIN,<remaining>
	              +CPINR: PH-NETSUB PIN,<remaining>
	              +CPINR: PH-SP PIN,<remaining>
	              +CPINR: PH-CORP PIN,<remaining>
	              +CPINR: PH-FSIM PUK,<remaining>
	              +CPINR: PH-NET PUK,<remaining>
	              +CPINR: PH-NETSUB PUK,<remaining>
	              +CPINR: PH-SP PUK,<remaining>
	              +CPINR: PH-CORP PUK,<remaining>
	              OK
	  Purpose: Display the number of remaining retries for all PIN/PUK types.
	Parameters:
	<CPIN TYPE> (PIN/PUK type):
	• ASCII string enclosed within quotes.
	
	(Continued on next page)

Table 8-2: SIM command details (Continued)

Command	Description

+CPINR (continued)	**Display remaining number of SIM unlock retries (continued)**
	• Valid values: (Note: If there are any errors in this list, use AT+CPINR to display the full list of available types.)
	  • "SIM PIN"
	  • "SIM PUK"
	  • "SIM PIN2"
	  • "SIM PUK2"
	  • "PH-FSIM PIN"
	  • "PH-NET PIN"
	  • "PH-NETSUB PIN"
	  • "PH-SP PIN"
	  • "PH-CORP PIN"
	  • "PH-FSIM PUK"
	  • "PH-NET PUK"
	  • "PH-NETSUB PUK"
	  • "PH-SP PUK"
	  • "PH-CORP PUK"
	
	<remaining> (Number of retries remaining for specified PIN/PUK type)
	• 0–255 (maximum value is type-dependent)

!ICCID	**Return (U)SIM card's ICCID**
	Return a (U)SIM's ICCID (Integrated Circuit Card ID).
	Password required: Yes
	Usage:
	• Query: **AT!ICCID?**
	  Response: !ICCID: <iccid>
	                  OK
	  Purpose: Display the ICCID.
	Parameters:
	<iccid> (ICCID of the (U)SIM currently being tested):
	• 20 digit decimal number—This number is often printed on the (U)SIM card.

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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	126
!IDSAUTOFOTA	Configure automatic settings for FOTA updates	127
!IDSAUTOSDM	Configure Subscriber Device Management response to server request	128
!IDSCONFIGACC	Configure DM account authentication mode and XML format	129
!IDSCREATEACC	Enter DM account credentials	130
!IDSDFLTACC	Set DM account to use for device-initiated sessions	131
!IDSPID	Set profile ID for DM data connection types	131
!IDSROAM	Configure DM client roaming support	132
!IDSSUPPORT	Configure DM sessions	133
!IMSTESTMODE	Enable/disable IMS test mode	134
!OSINFO	Configure host device operating system information	135

Command reference

Table 9-2: OMA-DM command details

Command	Description

!HOSTDEVINFO	**Configure host device details**
	
	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.
	
	To configure host device operating system information, see !OSINFO on page 135.
	
	--- 	
	
	Note: In the Execution format, if a parameter is not entered then the value on the device does not change.
	
	--- 	
	
	Password required: Yes (Execution format only)
	Usage:
	• Execution: AT!HOSTDEVINFO="<hostman>"[, "<hostmod>"[, "<hostswv>"[, "<hostplasmaid>"]]]
	  Response: OK
	    or ERROR
	  Purpose: Set some or all host device detail parameters.
	• Query: **AT!HOSTDEVINFO?**
	  Response: HostMan: <hostman>
	    HostMod: <hostmod>
	    HostSwV: <hostswv>
	    HostPlasmaID: <hostplasmaid>
	    OK
	  Purpose: Display current host device details.
	• Query List: **AT!HOSTDEVINFO=?**
	  Purpose: Display the execution command format and parameter values.
	Parameters:
	<hostman> (Host device manufacturer's name)
	• 256 characters maximum
	<hostmod> (Host device model name)
	• 256 characters maximum
	<hostswv> (Host software version)
	• 256 characters maximum
	<hostplasmaid> (Host Plasma ID)
	• 256 characters maximum
	Examples:
	• AT!HOSTDEVINFO="Manufacturer",,"1.0",
	  This sets the <hostman> and <hostswv> values. The values for <hostmod> and <hostplasmaid> do not change.
	• AT!HOSTDEVINFO="Manufacturer"
	  This sets the <hostman> value. The values for all other parameters do not change.

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

Command	Description

!IDSAUTOFOTA	**Configure automatic settings for FOTA updates**
	
	Configure the automatic download, automatic update, and automatic check flags for over-the-air firmware updates:
	• Automatic check—If enabled, the device initiates a FOTA session on every startup to check if the server has a firmware update available.
	• Automatic download/Automatic upload—If enabled, the device does not request user permission before proceeding with the download or update.
	
	Password required: No
	Usage:
	• Execution: **AT!IDSAUTOFOTA=<autodownload>, <autoupdate>, <autocheck>**
	  Response: OK
	  or ERROR
	  Purpose: Set 'automatic' options.
	• Query: **AT!IDSAUTOFOTA?**
	  Response: !IDSAUTOFOTA:<autodownload>, <autoupdate>, <autocheck>
	  OK
	  Purpose: Display current 'automatic' options.
	• Query List: **AT!IDSAUTOFOTA=?**
	  Purpose: Display the execution command format and parameter values.
	
	Parameters:
	<autodownload> (Check for user permission before downloading firmware update)
	  • 0=Permission required
	  • 1=Permission not required
	<autoupdate> (Check for user permission before updating firmware)
	  • 0=Permission required
	  • 1=Permission not required. Auto update when download finishes.
	  • 2=Auto update only on power up.
	  • Note: The device will reboot when the update completes.
	<autocheck> (Check for firmware update on startup)
	  • 0=Disabled. Do not check for firmware updates on startup.
	  • 1=Enabled. Check for firmware updates on startup.

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

Command	Description

!IDSAUTOSDM	**Configure Subscriber Device Management response to server request**
	
	Configure the Subscriber Device Management (SDM) response to DM server requests. DM requests can be always accepted, always rejected, or presented to the host (user) application for a decision.
	
	Password required: No
	
	Usage:
	• Execution: **AT!IDSAUTOSDM=<autosdm>**
	  Response: OK
	       or ERROR
	  Purpose: Set the response behavior.
	• Query: **AT!IDSAUTOSDM?**
	  Response: !IDSAUTOSDM:<autosdm>
	            OK
	  Purpose: Display the current response behavior setting.
	• Query List: **AT!IDSAUTOSDM=?**
	  Purpose: Display the execution command format and parameter values.
	
	Parameters:
	<autosdm> (How to proceed with DM session)
	• 0=Permission required from host application before proceeding with session. (The user must choose whether to accept or reject requests as appropriate.)
	• 1=Always accept (proceed with) the DM session. Do not notify the host application. (Choose this behavior for standalone devices that do not present a GUI.)
	• 2=Always reject (do not proceed with) the DM session. Do not notify the host application.

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

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

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

Command	Description
!IDSCREATEACC	**Enter DM account credentials** Enter the credentials for a DM account. **Password required:** No **Usage:** • Execution: **AT!IDSCREATEACC=<AccountIndex>, <ServerAddress>, <ServerID>, <ServerPassword>, <ClientUsername>, <ClientPassword>** Response: OK *or* ERROR Purpose: Set the account credentials for a specific DM account. • Query: **AT!IDSCREATEACC?** Response: !IDSCREATEACC:<AccountIndex>, <ServerAddress>, <ServerID>,<ServerPassword>, <ClientUsername>, <Client-Password> OK Purpose: Show the account credentials for a specific DM account. • Query List: **AT!IDSCREATEACC=?** Purpose: Display the execution command format. **Parameters:** <AccountIndex> (DM account number) • Valid values: 1–2 <ServerAddress> (URL of DM server) • Maximum length—121 characters • This parameter configures the following DM tree node: • ./DMAcc/AppAddr/1/Addr <ServerID> (DM Server ID and Username) • Maximum length—32 characters • This parameter configures the following DM tree nodes: • ./DMAcc/ServerID • ./DMAcc/AppAuth/Server/AAuthName <ServerPassword> (DM Server Password) • Maximum length—32 characters • This parameter configures the following DM tree node: • ./DMAcc/AppAuth/Server/AAuthSecret <ClientUsername> (DM Client Username) • Maximum length—32 characters • This parameter configures the following DM tree node: • ./DMAcc/AppAuth/Client/AAuthName <ClientPassword> (DM Client Password) • Maximum length—32 characters • This parameter configures the following DM tree node: • ./DMAcc/AppAuth/Client/AAuthSecret

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

Command	Description
!IDSDFLTACC	**Set DM account to use for device-initiated sessions** Indicate which DM account to use for device-initiated sessions. **Password required:** No **Usage:** • Execution: **AT!IDSDFLTACC=<AccountIndex>** Response: OK *or* ERROR Purpose: Indicate the DM account to use for device-initiated sessions. • Query: **AT!IDSDFLTACC?** Response: !IDSDFLTACC:<AccountIndex> OK Purpose: Show which DM account is currently used for device-initiated sessions. • Query List: **AT!IDSDFLTACC=?** Purpose: Display the execution command format and parameter values. **Parameters:** <AccountIndex> (DM account number) • Valid values: 1–2
!IDSPID	**Set profile ID for DM data connection types** Set the connection profile ID that OMA-DM will use for its data connection. **Password required:** No **Usage:** • Execution: **AT!IDSPID=<lte_profile>,<3GPP_legacy_profile>,<eHRPD profile>** Response: OK *or* ERROR Purpose: Set the profile ID for each data connection type. • Query: **AT!IDSPID?** Response: !IDSPID:<lte_profile>, <3GPP_legacy_profile>, <eHRPD profile> OK Purpose: Show the current profile IDs used for each data connection type. • Query List: **AT!IDSPID=?** Purpose: Display the execution command format and parameter values. **Parameters:** <lte_profile> (Profile ID to use for LTE data connections) • Valid values: • 0=Use connected or default profile ID. (Default) • 1–16=Profile ID <3GPP_legacy_profile> (Profile ID to use for non-LTE 3GPP data connections) • Valid values: • 0=Use connected or default profile ID. (Default) • 1–16=Profile ID <eHRPD profile> (Profile ID to use for eHRPD data connections) • Valid values: • 0=Use connected or default profile ID. (Default) • 101–150=Profile ID

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

Command	Description

!IDSROAM	**Configure DM client roaming support**
	Configure the OMA DM client roaming option.
	Password required: Yes
	Usage:
	• Execution: **AT!IDSROAM=\<enable>**
	  Response: OK
	      or ERROR
	  Purpose: Enable/disable DM roaming support.
	• Query: **AT!IDSROAM?**
	  Response: !IDSROAM:\<enable>
	      OK
	  Purpose: Show current DM roaming support state.
	• Query List: **AT!IDSROAM=?**
	  Purpose: Display the execution command format and parameter values.
	Parameters:
	\<enable> (Roaming support state)
	• Valid values:
	  • 0=Disabled. The DM client will not attempt to connect to a DM server when roaming.
	  • 1=Enabled. (Default)
	    The DM client will attempt to connect to a DM server when roaming.

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

Command	Description

!IDSSUPPORT	**Configure DM sessions**
	Enable/disable client-initiated and network-initiated DM device configuration and FOTA sessions.
	Password required: Yes
	Usage:
	• Execution: **AT!IDSSUPPORT=<CI Config session>, <NI Config session>, <CI FOTA session>, <NI FOTA session>**
	  Response: OK
	  or ERROR
	  Purpose: Enable/disable device configuration sessions and FOTA sessions.
	• Query: **AT!IDSSUPPORT?**
	  Response: !IDSSUPPORT:<CI Config session>, <NI Config session>, <CI FOTA session>,<NI FOTA session>"
	  OK
	  Purpose: Show current state of device configuration sessions and FOTA sessions.
	• Query List: **AT!IDSSUPPORTI=?**
	  Purpose: Display the execution command format and allowed parameter values.
	Parameters:
	<CI Config session> (Client-initiated DM configuration session state)
	• 0=Disabled (Default)
	• 1=Enabled
	<NI Config session> (Network-initiated DM configuration session state)
	• 0=Disabled (Default)
	• 1=Enabled
	<CI FOTA session> (Client-initiated DM FOTA session state)
	• 0=Disabled (Default)
	• 1=Enabled
	<NI Config session> (Network-initiated DM FOTA session state)
	• 0=Disabled (Default)
	• 1=Enabled

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

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

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

Command	Description
!OSINFO	**Configure host device operating system information** Configure the host device operating system name and version that will be reported by OMA DM for AT&T devices, to comply with AT&T <CDR-DVM-4533> requirement. To configure host device details, see !HOSTDEVINFO on page 126. --- *Note: In the Execution format, if a parameter is not entered then the value on the device does not change.* --- **Password required:** Yes (Execution format only) **Usage:** • Execution: **AT!OSINFO="<osname>"[, "<osversion>"]** Response: OK *or* ERROR Purpose: Set host device operating system information parameters. • Query: **AT!OSINFO?** Response: OSName: <osname> OSVersion: <osversion> OK Purpose: Display current host device operating system information. • Query List: **AT!OSINFO=?** Purpose: Display the execution command format and parameter values. **Parameters:** <osname> (Host device operating system name) • 256 characters maximum <osversion> (Host device operating system version) • 256 characters maximum **Examples:** • AT!OSINFO="An OS Name","1.0" This sets both parameters. • AT!OSINFO=,"1.0" This sets the <osversion> value. The value for the <osname> does not change.

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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	138
!SARINTGPIOMODE	Set/report default pull mode for SAR interrupt GPIOs	139

Command reference

Table 10-2: Thermal mitigation command details

Command	Description
!MAXPWR	**Set/report maximum Tx power** Set or report the maximum Tx power for a specific band. **Caution:** *Any adjustments of Tx power may impact regulatory certification of the module in the host platform. The OEM is responsible for ensuring that the final module configuration in the host platform meets all regulatory requirements.* *Note: Increasing the Tx power affects the module's current consumption and thermal performance.* **Password required:** Yes **Usage:** • Execution (WCDMA/LTE): **AT!MAXPWR=\<band\>,\<tech\>,\<max_tx_pwr\>** Response: OK Purpose: Set the maximum Tx power for the specified band/technology combination. • Execution (CDMA): **AT!MAXPWR=\<band\>,\<tech\>,\<temperature_bin\>,\<max_tx_pwr\>** Response: OK Purpose: Set the maximum Tx power for the specified band/technology/temperature bin combination. • Query: **AT!MAXPWR?\<band\>,\<tech\>** Response: \<maxpwr\> dBm OK Purpose: Indicate the maximum Tx power for the specified band/technology combination. • Query list: **AT!MAXPWR=?** Purpose: Display valid execution format and parameter values. **Parameters:** \<band\> (RF band) • 3GPP band number. For a full listing of 3GPP band numbers, see Table 13-2 on page 180. • Band support is product specific—see the device's Product Specification or Product Technical Specification document for details. • Valid range: 0–71 \<tech\> (Network technology) • 0=WCDMA • 1=CDMA • 2=LTE \<maxpwr\> (Maximum Tx power in dB) • Valid range: 20.0–24.5

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

Command	Description

!SARINTGPIOMODE	**Set/report default pull mode for SAR interrupt GPIOs**
	
	Set or report the default pull mode (high/low) for SAR interrupt GPIOs. This setting applies to all SAR interrupt GPIOs.
	
	Password required: Yes
	
	Usage:
	
	• Execution: **AT!SARINTGPIOMODE=\<mode\>**
	  Response: OK
	  Purpose: Set the default pull mode for all SAR interrupt GPIOs.
	• Query: **AT!SARINTGPIOMODE?**
	  Response: \<mode\>
	              OK
	  Purpose: Indicate the default pull mode.
	• Query list: **AT!SARINTGPIOMODE=?**
	  Purpose: Display valid execution format and parameter values.
	
	Parameters:
	
	\<mode\> (SAR GPIO interrupt pull mode default setting)
	    • 0=Standard mode—Default pull is HIGH/DAL_GPIO_PULL_UP
	    • 1=Inverse mode—Default pull is LOW/DAL_GPIO_PULL_DOWN

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11: Audio Commands

Introduction

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

- MC7304
- MC7330
- MC7350
- MC7354

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

Command summary

lists the commands described in this chapter.

Table 11-1: Audio commands

Command	Description	Page
!AVAUDIO	Play/record audio file (.wav format)	143
!AVAUDIOLPBK	Start/stop audio loopback	144
!AVCFG	Bind audio profile to device/physical interface	145
!AVDEF	Reset configurable audio parameters to default settings	146
!AVEC	Enable/disable Echo Cancellation mode for audio profile	147
!AVFLTREN	Enable/disable Tx/Rx FIR/IIR functions	148
!AVMUTE	Mute/unmute earpiece/microphone/call waiting tone	149
!AVNS	Enable/disable Noise Suppression mode for audio profile	150
!AVRXAGC	Enable/disable Rx AGC	150
!AVRXAVC	Enable/disable Rx AVC	151
!AVRXG	Query/set audio profile's decoder gain select setting	152
!AVSETPROFILE	Select/configure audio profile for CS call	153
!AVSETVOL	Query/set audio profile's Rx volume level	154
!AVSTG	Query/set/enable/disable audio profile's audio front end sidetone gain	155
!AVTONEPLAY	Play a tone	156
!AVTXAGC	Enable/disable Tx AGC	157
!AVTXG	Query/set audio profile's encoder gain select setting	158

Table 11-1: Audio commands (Continued)

Command	Description	Page
!AVTXVOL	Query/set audio profile's Tx volume gain	159
!MADC	Display ADC values	160
!MLDTMFEN	Enable/disable local DTMF	160
*CNTI	Display current, available, or supported network types (technologies)	161
+CMEP	Preview SMS message	162
+PRLVER	Display current PRL version	163
+VTD	Set DTMF tone duration	163
+VTS	Send DTMF tone	164
+VTSBST	Send burst DTMF tone (CDMA only)	165
+WANTGNSSPWR	Enable/disable GNSS antenna power	166
+WANTS	Perform GNSS antenna diagnostic check	166
+WFSH	Send flash to base station to initiate call holding or three-way calling	167
+WIOR	Read GPIO value	167
+WIOW	Write GPIO value	168
+WSOS	Enter/exit emergency mode	168

Command reference

Table 11-2: Modem status, customization, and reset commands

Command	Description

!AVAUDIO
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Play/record audio file (.wav format)
	Play an audio file (locally or for both sides of a voice call), or record to an audio file (from the microphone only, or both sides of a voice call).
	Each <operation> type is started and stopped independently. For example, to simultaneously play a file for both ends of a voice call and record that call to another file:
	1. Start recording to a file and start playing an existing audio file for both ends of the call:
	AT!AVAUDIO=4,1,"/usr/recording1.wav"
	AT!AVAUDIO=3,1,"/data/outgoing1.wav"
	2. When ready to stop playing the outgoing file and recording the call:
	AT!AVAUDIO=3,0
	AT!AVAUDIO=4,0
	
	Note: Only .wav format audio files are supported.
	
	Password required: No
	Usage:
	• Execution: **AT!AVAUDIO=<operation>, <switch>[, <file_path>]**
	  Response: OK
	  Purpose: Start or stop the playback or recording of an audio file.
	  Note: <file_path> is required when <switch> = 1, and optional when <switch> = 0.
	• Query List: **AT!AVAUDIO=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<operation> (Play or record)
	• 1=Audio play. Play the specified .wav file (<filepath>) locally. If a voice call is in progress, the file is not played for the far end of the call.
	• 2=Audio record. Record the local microphone input to the specified .wav file (<filepath>). If a voice call is in progress, the far end of the call is not recorded.
	• 3=WWAN play. Play the specified .wav file (<filepath>) for both ends of a voice call.
	• 4=WWAN record. Record both ends of a voice call to the specified .wav file (<filepath>).
	<switch> (Stop or start playing/recording)
	• 0=Stop
	• 1=Start
	<filepath> (Absolute pathname of file to play/record)
	• ASCII string
	• Example: /usr/avfile.wav
	  Note: Relative pathnames are not supported.
	• Required when <switch> = 1 (starting to play or record a file), and optional when <switch> = 0.

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVAUDIOLPBK
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Start/stop audio loopback
	Set up (start/stop) an audio loopback at some point in the audio chain.
	Password required: Yes
	Usage:
	• Execution: **AT!AVAUDIOLPBK=<enable>**
	  Response: OK
	  Purpose: Start or stop an audio loopback.
	• Query List: **AT!AVAUDIOLPBK=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<enable> (Start/stop an audio loopback)
	  • 0=Stop the loopback
	  • 1=Enable a vocoder loopback
	  • 4=N/A (Execution will return 'OK', but no action is taken.)

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVCFG
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Bind audio profile to device/physical interface
	Bind an audio profile to a specific ACDB (Audio Calibration Database) device/physical interface combination and, depending on the interface that is chosen, configure the physical interface.
	
	Note: These bindings are persistent (persist across power cycles).
	
	Password required: No
	Usage:
	• Execution: **AT!AVCFG=<profile>,<device>, <interface>[,<param1>[,...<paramN>]]**
	  Response: OK
	  Purpose: Bind the specified <profile> to a <device>/<interface> combination. If applicable, specify required parameters.
	• Query: **AT!AVCFG?**
	  Response: !AVCFG:
	    <profile0>,<device>,<interface> [<param1> [,...<paramN>]]
	    ...
	    <profile5>,<device>,<interface>[<param1>[,...<paramN>]]
	  Purpose: Show current bindings for all audio profiles.
	• Query List: **AT!AVCFG=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	• 0–5=Audio profile number (6 profiles are supported)
	<device> (ACDB device type)
	• 0=Vehicle hands-free device
	• 1=Handset
	• 2=TTY device
	• 3=USB device
	<interface> (Physical interface type)
	• 0=PCM (Use <param> options to configure the interface.)
	• 1=I2S (No <param> required.)
	• 2=Analog (No <param> required.)
	• 3=USB (No <param> required.)
	(Continued on next page)

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description
!AVCFG (continued)	**Bind audio profile to device/physical interface (continued)**

	<param> (Interface configuration parameters)
	• For <interface>=0 (PCM):
	    • <param1> (Mode)
	        • 0=Slave
	        • 1=Master
	        • 2=Auxiliary PCM
	    • <param2> (Rate)
	        • 0=8K
	        • 1=16K
	    • <param3> (Format)
	        • 0=Linear
	        • 1=µ-law
	        • 2=A-law
	    • <param4> (Padding)
	        • 0=Disable
	        • 1=Enable
	    • <param5> (Bits per frame (bpf))
	        • 0=8 bpf
	        • 1=16 bpf
	        • 2=32 bpf
	        • 3=64 bpf
	        • 4=128 bpf
	        • 5=256 bpf
	
	Example:
	• AT!AVCFG=1,1,0,1 (Bind profile 1 to the handset device via PCM, and set PCM as master mode.)

!AVDEF
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Reset configurable audio parameters to default settings
	Reset all of the configurable audio parameters that are stored in non-volatile (NV) memory to default values.
	
	Note: Some values that affect ACDB (Audio Calibrartion Database) devices are stored in NV, and some are stored on the device. Values that are stored on the device are not affected by this command.
	
	Password required: No
	Usage:
	• Execution: **AT!AVDEF**
	  Response: OK
	  Purpose: Reset parameters to default values.
	Parameters:
	None

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVEC
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Enable/disable Echo Cancellation mode for audio profile
	Enable or disable Echo Cancellation (EC) mode for a specific audio profile.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: No
	Usage:
	• Execution: **AT!AVEC=<profile>,<value>**
	  Response: OK
	  Purpose: Enable or disable EC mode for the selected profile.
	• Query: **AT!AVEC?<profile>**
	  Response: !AVEC: <value>
	  Purpose: Show the current EC mode state (enabled/disabled) for the selected profile.
	• Query List: **AT!AVEC=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	  • 0–5=Audio profile number (6 profiles are supported)
	<value> (EC mode state)
	  • 0=Disable
	  • 1=Enable

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVFLTREN
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Enable/disable Tx/Rx FIR/IIR functions
	Enable or disable the Tx or Rx FIR (Finite Impulse Response) filter or IIR (Infinite Impulse Response) filter for a specific audio profile.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: No
	Usage:
	• Execution: **AT!AVFLTREN=<profile>,<filter>,<state>**
	  Response: OK
	  Purpose: Enable or disable the <filter> for the specified <profile>.
	• Query: **AT!AVFLTREN?<profile>,<filter>**
	  Response: !AVFLTREN: <state>
	  Purpose: Show the current setting (enabled/disabled) of the selected profile's <filter>.
	• Query List: **AT!AVFLTREN=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	  • 0–5=Audio profile number (6 profiles are supported)
	<filter> (Filter type)
	  • 0=Tx FIR
	  • 1=Rx FIR
	  • 2=Tx IIR
	  • 3=Rx IIR
	<state> (State (enabled/disabled) of <filter>)
	  • 0=Disable
	  • 1=Enable

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVMUTE
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Mute/unmute earpiece/microphone/call waiting tone
	Mute or unmute the earpiece, microphone, and call waiting tone.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: No
	Usage:
	• Execution: **AT!AVMUTE=<profile>,<earmute>,<micmute>[,<cwtmute>]**
	  Response: OK
	  Purpose: Set the mute states for the selected profile.
	• Query: **AT!AVMUTE?<profile>**
	  Response: !AVMUTE: <earmute>,<micmute>,<cwtmute>
	  Purpose: Show the current mute settings (enabled/disabled) for the selected profile.
	• Query List: **AT!AVMUTE=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	  • 0–5=Audio profile number (6 profiles are supported)
	<earmute> (Earpiece mute state)
	  • 0=Unmuted
	  • 1=Muted
	<micmute> (Microphone mute state)
	  • 0=Unmuted
	  • 1=Muted
	<cwtmute> (Call waiting tone mute state)
	  • 0=Unmuted
	  • 1=Muted
	  • This parameter is optional.

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVNS
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Enable/disable Noise Suppression mode for audio profile
	Enable or disable Noise Suppression (NS) mode for a specific audio profile.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: No
	Usage:
	• Execution: **AT!AVNS=<profile>,<value>**
	  Response: OK
	  Purpose: Enable or disable NS mode for the selected profile.
	• Query: **AT!AVNS?<profile>**
	  Response: !AVNS: <value>
	  Purpose: Show the current NS mode state (enabled/disabled) for the selected profile.
	• Query List: **AT!AVNS=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	• 0–5=Audio profile number (6 profiles are supported)
	
	<value> (NS mode state)
	• 0=Disable
	• 1=Enable

!AVRXAGC
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Enable/disable Rx AGC
	Enable or disable Rx AGC (Automatic Gain Control) for a specific audio profile.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: No
	Usage:
	• Execution: **AT!AVRXAGC=<profile>,<value>**
	  Response: OK
	  Purpose: Enable or disable Rx AGC for the selected profile.
	• Query: **AT!AVRXAGC?<profile>**
	  Response: !AVRXAGC: <value>
	  Purpose: Show the current Rx AGC state (enabled/disabled) for the selected profile.
	• Query List: **AT!AVRXAGC=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	• 0–5=Audio profile number (6 profiles are supported)
	
	<value> (Rx AGC state)
	• 0=Disable
	• 1=Enable

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVRXAVC
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Enable/disable Rx AVC
	Enable or disable Rx AVC (Automatic Volume Control) for a specific audio profile.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: No
	Usage:
	• Execution: **AT!AVRXAVC=<profile>,<value>**
	  Response: OK
	  Purpose: Enable or disable Rx AVC for the selected profile.
	• Query: **AT!AVRXAVC?<profile>**
	  Response: !AVRXAVC: <value>
	  Purpose: Show the current Rx AVC state (enabled/disabled) for the selected profile.
	• Query List: **AT!AVRXAVC=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	  • 0–5=Audio profile number (6 profiles are supported)
	<value> (Rx AVC state)
	  • 0=Disable
	  • 1=Enable

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVRXG
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Query/set audio profile's decoder gain select setting
	Set the decoder gain for a specific audio profile. The value entered is mapped to a gain range of -78 dB to +18 dB.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: Yes
	Usage:
	• Execution: **AT!AVRXG=<profile>,<gain>**
	  Response: OK
	  Purpose: Set the decoder gain for the specified profile.
	• Query: **AT!AVRXG?<profile>**
	  Response: !AVRXG: <gain>
	  Purpose: Show the decoder gain for the specified profile.
	• Query List: **AT!AVRXG=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	  • 0–5=Audio profile number (6 profiles are supported)
	
	<gain> (Decoder gain value)
	  • Valid <gain> values: 0–0xFFFF (May be entered as decimal or hexadecimal for Execution format, and returned as hexadecimal in Query response.)
	    • Execution examples:
	      Hexadecimal: AT!AVRXG=1,0x3210
	      Decimal: AT!AVRXG=1,12816
	    • Query response example:
	      !AVRXG: 0x3210
	  • Decoder gain is calculated using the following formula:
	    $20 * LOG(<gain> / 0x2000)$
	  • Supported decoder gain range: -78 dB to +18 dB
	  • Recommended gain range: 0 dB to +18 dB

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVSETPROFILE
 	
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Select/configure audio profile for CS call
	
	Select and configure an audio profile to be used for a circuit-switched call. (To view the current audio profile configurations, use **AT!AVCFG?**).
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: No
	
	Usage:
	• Execution: **AT!AVSETPROFILE=<profile>[,<earmute>,<micmute>, <generator>,<volume>[,<cwtmute>]]**
	  Response: OK
	  Purpose: Select the profile to use for a circuit switched call and, if needed, configure the mute and volume settings for the profile.
	• Query: **AT!AVSETPROFILE?[<generator>]**
	  Response: !AVSETPROFILE: <profile>,<earmute>,<micmute>, [<generator>,]<volume>,<cwtmute>
	  Purpose: Show the profile that has been selected for circuit switched calls, and its configuration parameters. (The <generator> field does not appear if <generator> is used in the query.)
	• Query List: **AT!AVSETPROFILE=?**
	  Purpose: Display valid execution format and parameter values.
	
	Parameters:
	
	<profile> (Audio profile used for CS call)
	• 0–5=Audio profile number (6 profiles are supported)
	
	<earmute> (Earpiece mute state)
	• 0=Unmuted
	• 1=Muted
	
	<micmute> (Microphone mute state)
	• 0=Unmuted
	• 1=Muted
	
	<generator>
	• 0=Voice synthesizer (Note: This is the only option at this time.)
	
	<volume> (Rx volume level)
	• Valid range: 0 (quietest) – 5 (loudest)
	
	<cwtmute> (Call waiting tone mute state)
	• 0=Unmuted
	• 1=Muted

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description
!AVSETVOL Min f/w rev: • 06.xx.xx.xx or higher *Note: Audio-capable devices only.*	**Query/set audio profile's Rx volume level** Set the Rx volume level for a specific audio profile. *Note: This setting is persistent (persists across power cycles).* **Password required:** No **Usage:** • Execution: **AT!AVSETVOL=<profile>,<generator>,<volume>** Response: OK Purpose: Set the Rx volume for the specified audio profile/generator combination. • Query: **AT!AVSETVOL?<profile>,<generator>** Response: !AVSETVOL: <volume> Purpose: Show the current volume level for the specified audio profile/generator combination. • Query List: **AT!AVSETVOL=?** Purpose: Display valid execution format and parameter values. **Parameters:** <profile> (Audio profile used for CS call) • 0–5=Audio profile number (6 profiles are supported) <generator> • 0=Voice synthesizer (Note: This is the only option at this time.) <volume> (Rx volume level) • Valid range: 0 (quietest) – 5 (loudest)

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVSTG
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Query/set/enable/disable audio profile's audio front end sidetone gain
	Set the audio front end (AFE) sidetone gain and enable/disable sidetone for a specific audio profile. The value entered is mapped to a gain range of -78 dB to +18 dB.
	
	Note: To disable sidetone gain, set <gain> = 0.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: Yes
	Usage:
	• Execution: **AT!AVSTG=<profile>,<gain>**
	   Response: OK
	   Purpose: Set AFE sidetone gain value.
	• Query: **AT!AVSTG?<profile>**
	   Response: !AVSTG: <gain>
	   Purpose: Show the current sidetone gain value for the specified profile.
	• Query List: **AT!AVSTG=?**
	   Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	• 0–5=Audio profile number (6 profiles are supported)
	
	<gain> (Sidetone gain value)
	• Valid <gain> values: 0–0xFFFF (May be entered as decimal or hexadecimal for Execution format, and returned as hexadecimal in Query response.)
	   • Execution examples:
	     Hexadecimal: AT!AVSTG=1,0x3210
	     Decimal: AT!AVSTG=1,12816
	   • Query response example:
	     !AVSTG: 0x3210
	• Sidetone gain is calculated using the following formula:
	   20 * LOG(<gain> / 0x2000)
	• Supported sidetone gain range: -78 dB to +18 dB
	• Recommended sidetone gain range: 0 dB to +18 dB

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVTONEPLAY
 	
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Play a tone
	
	Play a predefined tone.
	Password required: No
	Usage:
	• Execution: **AT!AVTONEPLAY=<generator>,<tone>[,<duration>]**
	  Response: OK
	  Purpose: Play the specified tone, and if required, indicate how long to play the tone.
	• Query List: **AT!AVTONEPLAY=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<generator>
	• 0=Voice synthesizer (Note: This is the only option at this time.)
	
	<tone> (Predefined tone to play)
	• ASCII. Use tone number shown in table below.
	
	<duration> (Length of time to play the <tone>)
	• 0–65535 (milliseconds)
	• Default duration=1000 ms

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

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVTXAGC
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Enable/disable Tx AGC
	Enable or disable Tx AGC (Automatic Gain Control) for a specific audio profile.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: No
	Usage:
	• Execution: **AT!AVTXAGC=\<profile\>,\<value\>**
	  Response: OK
	  Purpose: Enable or disable Tx AGC for the selected profile.
	• Query: **AT!AVTXAGC?\<profile\>**
	  Response: !AVTXAGC: \<value\>
	  Purpose: Show the current Tx AGC state (enabled/disabled) for the selected profile.
	• Query List: **AT!AVTXAGC=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	\<profile\> (Audio profile)
	  • 0–5=Audio profile number (6 profiles are supported)
	\<value\> (Tx AGC state)
	  • 0=Disable
	  • 1=Enable

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVTXG
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Query/set audio profile's encoder gain select setting
	Set the encoder gain for a specific audio profile. The value entered is mapped to a gain range of -78 dB to +18 dB.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: Yes
	Usage:
	• Execution: **AT!AVTXG=<profile>,<gain>**
	  Response: OK
	  Purpose: Set the encoder gain for the specified profile.
	• Query: **AT!AVTXG?<profile>**
	  Response: !AVTXG: <gain>
	  Purpose: Show the encoder gain for the specified profile.
	• Query List: **AT!AVTXG=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<profile> (Audio profile)
	• 0–5=Audio profile number (6 profiles are supported)
	
	<gain> (Encoder gain value)
	• Valid <gain> values: 0–0xFFFF (May be entered as decimal or hexadecimal for Execution format, and returned as hexadecimal in Query response.)
	  • Execution examples:
	    Hexadecimal: AT!AVTXG=1,0x3210
	    Decimal: AT!AVTXG=1,12816
	  • Query response example:
	    !AVTXG: 0x3210
	• Encoder gain is calculated using the following formula:
	  20 * LOG(<gain> / 0x2000)
	• Supported encoder gain range: -78 dB to +18 dB
	• Recommended encoder gain range: 0 dB to +18 dB

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!AVTXVOL
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Query/set audio profile's Tx volume gain
	Set the Tx volume gain for a specific audio profile. The value entered is mapped to a gain range of -78 dB to +18 dB.
	Gain is applied to PCM voice packets before they are fed into the vocoder, which encodes the PCM packets for more efficient over the air transmission.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: Yes
	Usage:
	• Execution: **AT!AVTXVOL=\<profile>,\<gain>**
	  Response: OK
	  Purpose: Set the Tx volume gain for the specified profile.
	• Query: **AT!AVTXVOL?\<profile>**
	  Response: !AVTXVOL: \<gain>
	  Purpose: Show the Tx volume gain for the specified profile.
	• Query List: **AT!AVTXVOL=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	\<profile> (Audio profile)
	  • 0–5=Audio profile number (6 profiles are supported)
	
	\<gain> (Encoder gain value)
	  • Valid \<gain> values: 0–0xFFFF (May be entered as decimal or hexadecimal for Execution format, and returned as hexadecimal in Query response.)
	    • Execution examples:
	      Hexadecimal: AT!AVTXG=1,0x3210
	      Decimal: AT!AVTXG=1,12816
	    • Query response example:
	      !AVTXG: 0x3210
	  • Volume gain is calculated using the following formula:
	    20 * LOG(\<gain> / 0x2000)
	  • Supported volume gain range: -78 dB to +18 dB
	  • Recommended volume gain range: 0 dB to +18 dB

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!MADC
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Display ADC values
	Read one of the available ADCs (Analog to Digital Converters).
	Password required: No
	Usage:
	• Query: **AT!MADC?<adc>**
	  Response: !MADC: <value>
	  Purpose: Show the value being reported by the specified ADC.
	• Query List: **AT!MADC=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<adc> (Analog to Digital Converters)
	• 0=VBATT (Battery voltage)
	• 1=VCOIN (Charging voltage of RTC coin battery. Note: This voltage can be configured using AT!MVCOIN)
	• 2=PA_THERM (Power Amplifier Thermistor)
	• 3=PMIC_THERM (Power Management Integrated Circuit Thermistor)
	• 4=XO_THERM (Crystal Oscillator Thermistor)
	
	<value> (Value returned from ADC)
	• ASCII string, contents depend on ADC being polled.

!MLDTMFEN
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Enable/disable local DTMF
	Enable or disable local DTMF.
	
	Note: This setting is persistent (persists across power cycles).
	
	Password required: No
	Usage:
	• Execution: **AT!MLDTMFEN=<enable>**
	  Response: OK
	  Purpose: Enable or disable local DTMF.
	• Query: **AT!MLDTMFEN?**
	  Response: !MLDTMFEN: <enable>
	  Purpose: Show the current state of local DTMF.
	• Query List: **AT!MLDTMFEN=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<enable> (Enable/disable local DTMF)
	• 0=Disable
	• 1=Enable

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

*CNTI
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Display current, available, or supported network types (technologies)
	Display the currently connected network type (technology), the types available on the current network, or all types supported by the device.
	Password required: No
	Usage:
	• Execution: **AT*CNTI=<option>**
	  Response: *CNTI=<option>,<tech>[,<tech>[...]]
	  Purpose: Specify <option> to display the current network type, available network types, or device-supported network types.
	• Query List: **AT*CNTI=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<option> (Desired response type)
	  • 0=Currently connected network type
	  • 1=Technologies available on the current network
	  • 2=Technologies supported by the device
	
	<tech> (Network technology)
	  • ASCII string:
	    • "GSM"
	    • "GPRS"
	    • "EDGE"
	    • "UMTS"
	    • "HSDPA"
	    • "HSUPA"
	    • "HSDPA/HSUPA"
	    • "HSPA+"
	    • "DC-HSPA+"
	    • "LTE"
	    • "Unknown"

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

+CMGP
 	
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Preview SMS message
	
	Read an SMS message without changing its 'read' status. (If the SMS message is marked as 'unread', it will remain 'unread'.)
	
	(To read an SMS message and have its status changed to 'read', use **+CMGR**.)
	
	Password required: No
	
	Usage:
	• Execution: **AT+CMGP=<index>**
	  Response: If text mode (+CMGF=1), SMS-DELIVER, and command successful:
	  +CMGP: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,
	  <sca>,<tosca>,<length>]
	  <data>
	
	  If text mode (+CMGF=1), SMS-SUBMIT, and command successful:
	  +CMGP: <stat>,<da>,[<alpha>] [,<toda>,<fo>,<pid>,<dcs>,[<vp>],
	  <sca>,<tosca>,<length>]
	  <data>
	
	  If text mode (+CMGF=1), SMS-REPORT, and command successful:
	  +CMGP: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>
	
	  If text mode (+CMGF=1), SMS-COMMAND, and command successful:
	  +CMGP: <stat>,<fa>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length>]
	  <data>
	
	  If text mode (+CMGF=1), CBM storage, and command successful::
	  +CMGP: <stat>,<sn>,<mid>,<dcs>,<page>,<pages>
	  <data>
	
	  If PDU mode (+CMGF=0), and command successful:
	  +CMGP: <stat>,[<alpha>],<length>]
	  <pdu>
	
	  Otherwise:
	  +CMS ERROR: <err>
	  Purpose: Read SMS message at specified index position.
	
	Parameters:
	
	<index> (SMS storage location)
	• Index range is service provider-dependent.
	
	<stat> (Message status)
	• Type: Integer (if in PDU mode) or string (if in text mode)
	• 0 or "REC UNREAD"=Message is unread (new)
	• 1 or "REC READ"=Message has been read
	• 2 or "STO UNSENT"=Message is stored and has not been sent (applies to SMs only)
	• 3 or "STO SENT"=Message is stored and has been sent (applies to SMs only)
	• 4 or "ALL"=All messages (applies to +CMGL command only)
	
	All other parameters
	• Refer to 3GPP specification TS 27.005

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

!PRLVER
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Display current PRL version
	Display the device's current PRL (Preferred Roaming List) version.
	Password required: No
	Usage:
	• Query: **AT!PRLVER?**
	  Response: PRL VER: \<n>
	  Purpose: Display the PRL version.
	Parameters:
	\<n> (PRL version number)
	• Integer

+VTD
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Set DTMF tone duration
	Set the duration for DTMF tones (for UMTS and CDMA networks)
	(Note: This is not a persistent setting. After a power cycle, the default tone duration is used.)
	Password required: No
	Usage:
	• Execution: **AT+VTD=\<duration>**
	  Response: OK
	  Purpose: Set the duration for DTMF tones.
	• Query: **AT+VTD?**
	  Response: +VTD: \<duration>
	  Purpose: Display the current DTMF tone duration.
	• Query List: **AT+VTD=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	\<duration> (Length of DTMF tone)
	• Unit value: 100 msec
	• Valid values:
	  • 0=20 msec (default)
	  • 1–255=100–25500 msec

...

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

+VTS
 	
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Send DTMF tone
	Send continuous in-band DTMF tones (for UMTS and CDMA networks) while on an active call.
	Use **AT+VTD** to set the tone duration.
	Password required: No
	Usage:
	• Execution: **AT+VTS=<tone>**
	  Response: OK
	  Purpose: Send the specified DTMF tone.
	• Query List: **AT+VTS=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	<tone> (DTMF tone)
	  • UMTS networks: 0–9, A–D, *, #
	  • CDMA networks: 0–9, *, #
	  • Examples:
	    • AT+VTS=1 (Send the DTMF tone for '1'.)
	    • AT+VTS=# (Send the DTMF tone for '#'.)

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

+VTSBST
 	
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Send burst DTMF tone (CDMA only)
	Send a burst DTMF tone sequence (on CDMA networks only) while on an active call.
	
	Note: To set the tone duration, use AT+VTD.
	
	Password required: No
	Usage:
	• Execution: **AT+VTSBST= <tones>[,<onlen>,<offlen>]**
	  Response: OK
	  Purpose: Start or stop an audio loopback.
	• Query List: **AT+VTSBST=?**
	  Purpose: Display valid execution format and parameter values.
	
	Parameters:
	
	<tones> (DTMF tone sequence)
	  • One or more tones can be sent together.
	  • Valid values: 0–9, *, #
	
	<onlen> (Tone pulse width)
	  • 0=95 ms
	  • 1=150 ms
	  • 2=200 ms
	  • 3=250 ms
	  • 4=300 ms
	  • 5=350 ms
	  • Default: 5 (350 ms)
	
	<offlen> (Minimum interdigit interval)
	  • 0=6 ms
	  • 1=100 ms
	  • 2=150 ms
	  • 3=200 ms
	  • Default: 3 (200 ms)
	
	Examples:
	  • AT+VTSBST=1 (Send the DTMF tone for '1' using the default <onlen> and <offlen>.)
	  • AT+VTSBST=1,3,2 (Send the DTMF tone for '1' using <onlen>=3 and <offlen>=2.)
	  • AT+VTSBST=18677653342# (Send the DTMF tone sequence "18677653342#" using the default <onlen> and <offlen>.)
	  • AT+VTSBST=18677653342#,3,2 (Send the DTMF tone sequence "18677653342#" using the <onlen>=3 and <offlen>=2.)

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description
+WANTGNSSPWR Min f/w rev: • 06.xx.xx.xx or higher *Note: Audio-capable devices only.*	**Enable/disable GNSS antenna power** Enable or disable GNSS antenna power (3.3V). *Note: This setting is persistent (persists across power cycles).* **Password required:** No **Usage:** • Execution: **AT+WANTGNSSPWR=<enable>** Response: OK Purpose: Enable or disable the GNSS antenna power (3.3V). • Query List: **AT+WANTGNSSPWR=?** Purpose: Display valid execution format and parameter values. **Parameters:** <enable> (Enable/disable GNSS antenna power) • 0=Disable • 1=Enable
+WANTS Min f/w rev: • 06.xx.xx.xx or higher *Note: Audio-capable devices only.*	**Perform GNSS antenna diagnostic check** Check the status of the GNSS antenna. A short is reported if the ADC (Analog to Digital Converter) value for the GNSS antenna is higher than the short limit. An open is reported if the ADC value is lower than the open limit. **Password required:** No **Usage:** • Query: **AT+WANTS** Response: +WANTS: <gnssAntStatus> Purpose: Display the status of the GNSS antenna. • Query List: **AT+WANTS=?** Purpose: Display valid execution format and parameter values. **Parameters:** <gnssAntStatus> (GNSS antenna status) • 0=Shorted (ADC > short limit) • 1=Normal (short limit >= ADC >= open limit) • 2=Open (ADC < open limit) • 3=Over current (antenna is shorted and the current HW protection circuitry has tripped)

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

+WFSH
 	
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Send flash to base station to initiate call holding or three-way calling
	
	Send flash to the base station to initiate call holding or three-way calling.
	
	For call waiting:
	1. When a call is in progress and a second call is received, send a flash (AT+WFSH) to toggle between the two calls.
	
	For 3-way calling:
	1. Use ATD to initiate a call with party #1.
	
	2. Send a flash (AT+WFSH=\<number>) to place party #1 on hold and initiate a call with party #2.
	
	3. When the second call is connected, send a flash (AT+WFSH) to connect all three parties.
	
	4. When ready to disconnect one or both calls:
	   • Send a flash (AT+WFSH) to disconnect party #2, or
	   • Use ATH to end the call for all parties. (3GPP2 only)
	
	Password required: No
	Usage:
	• Execution format 1: **AT+WFSH**
	  Response: OK
	  Purpose: Send a flash to the base station.
	• Execution format 2: **AT+WFSH=\<number>**
	  Response: OK
	  Purpose: Send a flash and the call number to the base station.
	Parameters:
	\<number> (Telephone number)
	   • ASCII string
	   • Valid characters: '0'–'9', '*', '#'

+WIOR
 	
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Read GPIO value
	
	Read a GPIO (General Purpose I/O port) pin value.
	
	Note: This is not a persistent setting. At power-on, all GPIOs are configured for input.
	
	Password required: No
	Usage:
	• Execution: **AT+WIOR=\<gpio>**
	  Response: \<value>
	               OK
	  Purpose: Read the specified GPIO's pin value.
	• Query List: **AT+WIOR=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	\<gpio> (External GPIO number)
	   • 1–4
	
	\<value> (GPIO pin value)
	   • 0–1

Table 11-2: Modem status, customization, and reset commands (Continued)

Command	Description

+WIOW
 	
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Write GPIO value
	Write a GPIO (General Purpose I/O port) pin value.
	
	Note: This is not a persistent setting. At power-on, all GPIOs are configured for input.
	
	Password required: No
	Usage:
	• Execution: **AT+WIOW=\<gpio>,\<value>**
	  Response: OK
	  Purpose: Write the specified GPIO's pin value.
	• Query List: **AT+WIOW=?**
	  Purpose: Display valid execution format and parameter values.
	Parameters:
	\<gpio> (External GPIO number)
	  • 1–4
	\<value> (GPIO pin value)
	  • 0–1

+WSOS
 	
Min f/w rev:
• 06.xx.xx.xx or higher
 	
Note: Audio-capable devices only.
	Enter/exit emergency mode
	Set the modem into or out of emergency mode (for an E911 session).
	Password required: No
	Usage:
	• Execution: **AT+WSOS=\<emergency>**
	  Response: OK
	  Purpose: Enter or exit emergency mode.
	• Query: **AT+WSOS?**
	  Response: +WSOS: \<emergency>
	  Purpose: Indicate whether modem is in emergency mode.
	Parameters:
	\<emergency> (Emergency mode status)
	  • 0=Modem not in emergency mode
	  • 1=Modem in emergency mode

12: Supported GSM/WCDMA AT Commands

This chapter identifies standard AT commands that are supported by most Sierra 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 171.

- 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 172.

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 169).

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

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

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

Command	Description	Supported ✔=Yes; ✘=No
+GMM	Request TA model identification	✔
+GMR	Request TA revision identification	✔
+GOI	Request global object identification	✘
+GSN	Request TA serial number identification	✔
+ICF	Set TE-TA control character framing	✔
+IFC	Set TE-TA local data flow control	✔
+ILRR	Set TE-TA local rate reporting mode	✘
+IPR	Set fixed local rate	✔
A	Answer incoming call	✔
A/	Re-issues last AT command given	✔
D	Dial	✔
D><MEM><N>	Originate call to phone number in memory <MEM>	✘
D><N>	Originate call to phone number in current memory	✔
D><STR>	Originate call to phone number in memory which corresponds to alphanumeric field <STR>	✘
DL	Redial last telephone number used	✘
E	Set command echo mode	✔
H	Disconnect existing connections	✔
I	Display product identification information	✔
L	Set monitor speaker loudness	✘
M	Set monitor speaker mode	✘
O	Switch from command mode to data mode	✔
P	Select pulse dialing	✘
Q	Set Result code presentation mode	✔
S0	Set number of rings before automatically answering the call	✔
S10	Set disconnect delay after indicating the absence of data carrier	✔
S3	Set command line termination character	✔
S4	Set response formatting character	✔
S5	Set command line editing character	✔
S6	Set pause before blind dialing	✔
S7	Set number of seconds to wait for connection completion	✔

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

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

Table 12-2: Supported 27.005 AT commands

Command	Description	Supported ✔=Yes; ✗=No
+CBM	Cell broadcast message directly displayed	✔
+CBMI	Cell broadcast message stored in memory at specified <index> location	✗
+CDS	SMS status report after sending a SMS	✔
+CDSI	Incoming SMS status report	✔
+CMGC	Send command	✔
+CMGD	Delete message	✔
+CMGF	Message format	✔
+CMGL	List messages	✔
+CMGR	Read message	✔
+CMGS	Send message	✔
+CMGW	Write message to memory	✔
+CMMS	More messages to send	✔
+CMNA	New message acknowledgement to ME/TA	✔
+CMS ERROR: <err>	SMS error (mobile or network error)	✔
+CMSS	Send message from storage	✔
+CMT	Incoming message directly displayed	✔
+CMTI	Incoming message stored in <mem> ("SM" - (U)SIM message storage) at location <index>	✔
+CNMA	New message acknowledgement to mobile equipment	✔
+CNMI	New message indications to TE	✔
+CPMS	Preferred message storage	✔

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

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

Table 12-3: Supported 27.007 AT commands

Command	Description	Supported ✔=Yes; ✗=No
C	ITU T V.24 circuit 109 carrier detect signal behavior command Format • C<value> Limitations • Default <value> = 2 • <value> = 2 causes the AT/Data carrier detect pin to 'wink' (briefly switch off and on) when data calls end. • <value> = 0 or 1 performs as defined in the standard	Partial
+CACM	Accumulated call meter	✗
+CACSP	Voice Group or Voice Broadcast Call State Attribute Presentation	N/A
+CAEMLPP	eMLPP Priority Registration and Interrogation	✗
+CAHLD	Leave an ongoing Voice Group or Voice Broadcast Call	N/A
+CAJOIN	Accept an incoming Voice Group or Voice Broadcast Call	N/A
+CALA	Alarm	N/A
+CALCC	List current Voice Group and Voice Broadcast Calls	N/A
+CALD	Delete alarm	N/A
+CALM	Alert sound mode	✗
+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

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

Command	Description	Supported ✔=Yes; ✗=No
+CAULEV	Voice Group Call Uplink Status Presentation	N/A
+CBC	Battery charge	✔
+CBST	Select bearer service type	✔
+CCCM	Current call meter value	✗
+CCFC	Call forwarding number and conditions	✔
+CCLK	Clock	N/A
+CCUG	Closed user group	✔
+CCWA	Call waiting	✔
+CCWE	Call Meter maximum event	✗
+CDIP	Called line identification presentation	✗
+CDIS	Display control	✗
+CEER	Extended error report	✗
+CFUN	Set phone functionality Format • +CFUN = [<fun> [, <rst>]] Limitations • Valid <fun> values: · 0 (minimum functionality, low power draw) · 1 (full functionality, high power draw)	Partial
+CGACT	PDP context activate or deactivate	✔
+CGANS	Manual response to a network request for PDP context activation	✗
+CGATT	PS attach or detach	✔
+CGAUTO	Automatic response to a network request for PDP context activation	✗
+CGCLASS	GPRS mobile station class	✔
+CGCLOSP	Configure local octet stream PAD parameters	✗
+CGCMOD	PDP Context Modify	✗
+CGDATA	Enter data state	✔
+CGDCONT	Define PDP Context	✔
+CGDSCONT	Define Secondary PDP Context	✔
+CGEQMIN	3G Quality of Service Profile (Minimum acceptable)	✔
+CGEQNEG	3G Quality of Service Profile (Negotiated)	✔

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	✔
+CGMI	Request manufacturer identification	✔
+CGMM	Request model identification	✔
+CGMR	Request revision identification	✔
+CGPADDR	Show PDP address	✔
+CGQMIN	Quality of Service Profile (Minimum acceptable)	✔
+CGQREQ	Quality of Service Profile (Requested)	✔
+CGREG	GPRS network registration status	✔
+CGSMS	Select service for MO SMS messages	✔
+CGSN	Request product serial number identification	✔
+CGTFT	Traffic Flow Template	✔
+CHLD	Call related supplementary services	✔
+CHSA	HSCSD non-transparent asymmetry configuration	N/A
+CHSC	HSCSD current call parameters	N/A
+CHSD	HSCSD device parameters	N/A
+CHSR	HSCSD parameters report	N/A
+CHST	HSCSD transparent call configuration	N/A
+CHSU	HSCSD automatic user initiated upgrading	N/A
+CHUP	Hangup call	✔
+CIEV	Indicator event	✔
+CIMI	Request international mobile subscriber identity	✔
+CIND	Indicator control	✔
+CKEV	Key press or release event	✘
+CKPD	Keypad control	✘
+CLAC	List all available AT commands	✘
+CLAE	Language Event	✘
+CLAN	Set Language	✘
+CLCC	List current calls	✔

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

Command	Description	Supported ✔=Yes; ✘=No
+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	✔
+CPLS	Preferred PLMN list selection	✔
+CPOL	Preferred operator list	✔
+CPROT	Enter protocol mode	✘
+CPUC	Price per unit and currency table	✔
+CPWC	Power class	✘
+CPWD	Change password	✔

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

Command	Description	Supported ✔=Yes; ✗=No
+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	✔
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)	✔

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

Command	Description	Supported ✔=Yes; ✗=No
+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 180)

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

Table 13-1: Band/technology enumerations[a]

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

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

Table 13-2: 3GPP bands

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

14: ASCII Table

Table 14-1: ASCII values

Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
NUL	0	00	SP	32	20	@	64	40	'	96	60
SOH	1	01	!	33	21	A	65	41	a	97	61
STX	2	02	"	34	22	B	66	42	b	98	62
ETX	3	03	#	35	23	C	67	43	c	99	63
EOT	4	04	$	36	24	D	68	44	d	100	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

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