EM919x/EM7690

AT Command Reference

SIERRA WIRELESS®

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Document History

Version	Date	Updates
1.0	November 2019	Creation
1.1	January 2020	• Updated !PCTEMP, !PCTEMPLIMITS, !GSTATUS, !PCVOLT, !SARINTGPIOMODE, !SARSTATE, !USBCOMP, !CUSTOM • Updated 3GPP AT commands to mark GSM and voice call related commands to "N/A"
1.2	May 2020	• Added !DAUPDATEPARAM, !DATXCONTROL, !DAMMWACT, !DAMMWDEACT, !VERINFO, !DISABLEDEBUG • Updated !DARCONFIG, !DAGFTMRXAGC, !DACGPSCTON, !DARCONFIGDROP, !GSTATUS, !ERR, !USBCOMP, !GPSTRACK, !GPSLBSAPN, !TMSTATUS, !SETCND • Removed !DALGRXAGC, !DALGTXAGC, !DAWTXCONTROL, !DALTXCONTROL, !DACGPSMASKON, !GPSNMEACONFIG, !GPSNMEASENTENCE, +WANT, !SCACT, !LTERXCONTROL, !RXDEN, !DAOFFLINE • Updated 3GPP and carrier AT commands to only focus on certification requirements
1.3	June 2020	• Added !CMTI, !CMT, !ANTSEL, !LEDTEST, !DASUB6TECHACT, !RFCID • Updated !!IMPREF, !ERR, !GSTATUS, !DARCONFIG, !TMSTATUS
1.4	August 2020	• Added EM9191 and EM7690 information • Added !RATCA, !LTEINFO, !NRINFO, !USBVID, !USBPID, !PCIESSVID, !PCIESSDID, !RFCMBNSCAN, !RXDEN, !LTERXCONTROL • Updated !DATALOOPBACK, !CUSTOM, !SARSTATE, !DAUPDATEPARAM, !DARCONFIG, !DAGFTMRXAGC, !DATXCONTROL, !ENTERCND, !SETCND
1.5	September 2020	• Added !RFDEVSTATUS • Added 5.4 Number of Resource Block • Updated !CUSTOM, !DATXCONTROL, !USBCOMP, !GPSAUTOSTART
1.6	November 2020	• Added !STEFS, !DMSUPPORT • Updated !RATCA
1.7	January 2021	• Updated !GSTATUS (notes) • Updated !RFCID • Updated !TMSTATUS
2	July 2021	• Updated !USBCOMP • Updated !BAND • Updated !TMSTATUS • Updated !LEDTEST • Added !HOSTDEVINFO • Updated !NVBACKUP • Updated !RMARESET • Updated !DARCONFIG • Updated !DATXCONTROL
3	October 2021	• Updated !CUSTOM (GPSENABLE customization) • Added !IMAGE • Added !MMWBYPASSSCAN • Added !SELRAT • Updated !RFDEVSTATUS (<instance> parameter description)

Version	Date	Updates
4	December 2021	- Updated !CUSTOM customizations (added MBIMMODE; updated ICMPINTSRVDIS) - Updated !DAGFTMRXAGC, !DARCONFIG, !DATXCONTROL, !STEFS - Added !IMSIM, !MMWCAL, !TMCONFIG - Removed references to Customer Release Notes (BuildPackage 7.4B1)
5	March 2022	- Updated 1.2 Command Access description of !ENTERCND - Updated !ANTSEL, !DAFTMACT, !GSTATUS, !LTEINFO, !NRINFO, !PCOFFEN, !TMSTATUS - Added !SKU

Contents

List of Tables

1. About This Guide

1.1. Introduction

This document describes supported standard and proprietary AT commands available for Sierra Wireless modules, and provides details where commands vary from the standards. These commands are intended for use by OEMs, and are supplemental to the standard AT commands for WCDMA 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:	*In this document, EM91 refers to the EM91 module series, which includes EM9190, EM9191 and EM7690, unless otherwise specified.*

The commands in this document apply to EM91 modules as follows:

- EM9190 – All commands apply. (EM9190 supports 3G/4G/5G-Sub6/5G-mmW)
- EM9191 – 5G-mmW related commands/parameters do not apply. (EM9191 does not support 5G-mmW)
- EM7690 – 5G-mmW and 5G-Sub6 related commands/parameters do not apply. (EM7690 does not support 5G-mmW or 5G-Sub6)

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.*

1.2. Command Access

Most commands in this reference are password-protected. To use these commands, you must enter the correct password using **AT!ENTERCND**. 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** may be unique to each customer and is configured onto the modem during manufacture. If you do not know your password, contact your Sierra Wireless Account Manager.

1.3. Command Timing

1.3.1. Interval Timing

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

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

1.3.2. Escape Sequence Guard Time

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

1.4.   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.

1.5.   References

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

You may also consult other documents available at www.sierrawireless.com.

[1] AirPrime EM919X-EM7690 Product Technical Specification (Doc# 41113174)

[2] EM91 Series Customer Production Test Guide (Doc# 41113679)

[3] AirPrime EM919x/EM7690 Thermal Mitigation (Doc# 2174267)

[4] EM9190 High Power mmWave RF Customization File Preparation (Doc# 2174282)

[5] EM9190 Low Power mmWave RF Customization File Preparation (Doc# 2174286)

1.6.   Terminology and Acronyms

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

1.7.   Current Firmware Versions

1.7.1.   Version

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

1.7.2.   Upgrading

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

1.8.   Document Structure

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

1) 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
!ENTERCND	Enable access to password-protected commands
!SETCND	Set AT command password

2) 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
!ANTSEL	Set/query external antenna selection configuration
!BAND	Select/return frequency band set
!BOOTHOLD	Reset modem and wait in bootloader for firmware download
!CUSTOM	Set/return customization settings
!DATALOOPBACK	Enable/disable and configure loopback mode
!DISABLEDEBUG	Erase debug policy image
!GCFEN	Enable/disable GCF test mode
!GSTATUS	Return operational status
!HWID	Display hardware version
!IMAGE	Manage firmware images
!IMPREF	Query/set Image Management preferences
!LTEINFO	Display LTE network information
!LTERXCONTROL	Enable/disable LTE receive (Rx) diversity during Carrier Aggregation
!MMWBYPASSSCAN	Bypass the check for mmWave antennas during power ON
!MMWCAL	Report mmW calibration status
!NRINFO	Display NR information
!NVENCRYPTIMEI	Write unencrypted IMEI to modem
!NVPLMN	Provision/display PLMN list for Network Personalization locking
!PCIESSDID	Set/query PCIE subsystem device ID
!PCIESSVID	Set/query PCIE subsystem vendor ID
!PCINFO	Return power control status information
!PCOFFEN	Set/return Power Off Enable state
!PCTEMP	Return current temperature information
!PCTEMPLIMITS	Set/report temperature state limit values
!PCVOLT	Return current power supply voltage information
!PCVOLTLIMITS	Set/report power supply voltage state limit values
!PRIID	Set/report module PRI part number and revision
!RATCA	Enable/disable CA, ENDC and SA capability
!RESET	Reset modem
!RFCID	Set/query RFC related hardware ID and board ID
!RFCMBNSCAN	Display all RFC MBN files
!RFDEVSTATUS	Display all RFFE status
!RXDEN	Enable/disable WCDMA/LTE/5G-Sub6 receive (Rx) diversity
!SELRAT	Set preferred RAT

Command	Description
!SKU	Display module's SKU
!TMCONFIG	Configure Thermal Mitigation Thresholds
!TMSTATUS	Report Thermal Mitigation Status
!USBCOMP	Set/report USB interface configuration
!USBPID	Set/query USB product IDs
!USBVID	Set/query USB vendor ID
!VERINFO	Display image version and security state
&V	Return operating mode AT configuration parameters

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

Table 1-3   Diagnostic Commands

Command	Description
!BCFWUPDATESTATUS	Report status of most recent firmware update attempt
!ERR	Display diagnostic information
!GCCLR	Clear crash dump data
!GCDUMP	Display crash dump data
!IMSTESTMODE	Enable/disable IMS test mode
!LEDTEST	Test to switch on/off LED

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

Table 1-4   Test Commands

Command	Description
!DACGPSCTON	Return GPS CtoN and frequency measurement
!DACGPSSTANDALONE	Enter/exit StandAlone (SA) RF mode
!DACGPSTESTMODE	Start/stop CGPS diagnostic task
!DAFTMACT	Put modem into Factory Test Mode
!DAFTMDEACT	Put modem into online mode from Factory Test Mode
!DAGFTMRXAGC	Get FTM Rx AGC
!DAUPDATEPARAM	Update parameters to prepare for !DARCONFIG
!DARCONFIG	Configure radio
!DARCONFIGDROP	Drop Radio Configurations
!DASUB6TECHACT	Start/stop 5G-Sub6 technology
!DATXCONTROL	Configure Tx Power
!DAMMWACT	Activate 5G-mmW RF debug in FTM mode
!DAMMWDEACT	Deactivate 5G-mmW RF debug in FTM mode

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

Table 1-5   Memory Management Commands

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

6) GNSS Commands — Supported on GNSS-enabled modems only.

Table 1-6   GNSS Commands

Command	Description
!GPSAUTOSTART	Configure GPS auto-start features
!GPSCLRASSIST	Clear specific GPS assistance data
!GPSCOLDSTART	Clear all GNSS assistance data
!GPSEND	End an active session
!GPSFIX	Initiate GPS position fix
!GPSLBSAPN	Set GPS LBS APNs
!GPSLOC	Return last known location of the modem
!GPSMOMETHOD	Set/report GPS MO method
!GPSPORTID	Set/report port ID to use over TCP/IP
!GPSSATINFO	Request satellite information
!GPSSTATUS	Request current status of a position fix session
!GPSSUPLURL	Set/report SUPL server URL
!GPSSUPLVER	Set/report SUPL server version
!GPSTRACK	Initiate local tracking (multiple fix) session

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

Table 1-7   SIM Commands

Command	Description
!UIMS	Select active SIM interface
!IMSIM	Update AUTO-SIM matching list

8) SAR Commands — Commands used to configure SAR options.

Table 1-8   SAR Commands

Command	Description
!SARINTGPIOMODE	Set/report default pull mode for SAR interrupt GPIOs
!SARSTATE	Set/report SAR back-off state
!STEFS	Query ST files

9) DM Commands — Commands used to control different DM sessions and get information of LWM2M objects.

Table 1-9   DM Commands

Command	Description
!DMSESSION	Control different DM sessions
!DMREAD	Get the content of specified LWM2M object
!DMREADALL	Get the content of all LWM2M objects
!DMDEBUG	Enable/disable debug log on AT port
!DMSUPPORT	Enable/disable carrier DM feature

1.9.   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 are 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.

2. AT Passwords Commands

2.1. Introduction

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

2.2. Command Summary

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

Table 2-1   AT Password Commands

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

2.3. Command Reference

Table 2-2   AT Command Password Details

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

Command	Description
	• Password must be entered with quotation marks. (For example, AT!ENTERCND="ExamplePW".) • Password length: 8–64 characters (0–9, A–Z, upper or lower case)
!SETCND	**Set AT command password** Change the password used for the !ENTERCND command. **Password required:** Yes **Usage:** • Execution: **AT!SETCND=<"key">** Response: OK Purpose: Sets <"Key"> as the new password for accessing protected commands. **Parameters:** <"key"> (New password) • Password must be entered with quotation marks (for example, AT!SETCND="NewPW"). • Password length: 8–64 characters (0–9, A–Z, upper or lower case) **Caution:** *Do NOT enter a null password (that is, the <"Key"> cannot be "") — you will NOT be able to use password-protected commands and will have to contact Sierra Wireless for help to reset the password.*

3. Modem Status, Customization, and Reset Commands

3.1. 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.

3.2. Command Summary

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

Table 3-1   Modem Status Commands

Command	Description
!ANTSEL	Set/query external antenna selection configuration
!BAND	Select/return frequency band set
!BOOTHOLD	Reset modem and wait in bootloader for firmware download
!CUSTOM	Set/return customization settings
!DATALOOPBACK	Enable/disable and configure loopback mode
!DISABLEDEBUG	Erase debug policy image
!GCFEN	Enable/disable GCF test mode
!GSTATUS	Return operational status
!HWID	Display hardware version
!IMAGE	Manage firmware images
!IMPREF	Query/set Image Management preferences
!LTEINFO	Display LTE network information
!LTERXCONTROL	Enable/disable LTE receive (Rx) diversity during Carrier Aggregation
!MMWBYPASSSCAN	Bypass the check for mmWave antennas during power ON
!MMWCAL	Report mmW calibration status
!NRINFO	Display NR information
!NVENCRYPTIMEI	Write unencrypted IMEI to modem
!NVPLMN	Provision/display PLMN list for Network Personalization locking
!PCIESSDID	Set/query PCIe subsystem device ID
!PCIESSVID	Set/query PCIe subsystem vendor ID
!PCINFO	Return power control status information
!PCOFFEN	Set/return Power Off Enable state
!PCTEMP	Return current temperature information
!PCTEMPLIMITS	Set/report temperature state limit values
!PCVOLT	Return current power supply voltage information
!PCVOLTLIMITS	Set/report power supply voltage state limit values
!PRIID	Set/report module PRI part number and revision

Command	Description
!RATCA	Enable/disable CA, ENDC and SA capability
!RESET	Reset modem
!RFCID	Set/query RFC related hardware ID and board ID
!RFCMBNSCAN	Display all RFC MBN files
!RFDEVSTATUS	Display all RFFE status
!RXDEN	Enable/disable WCDMA/LTE/5G-Sub6 receive (Rx) diversity
!SELRAT	Set preferred RAT
!SKU	Display module's SKU
!TMCONFIG	Configure Thermal Mitigation Thresholds
!TMSTATUS	Report Thermal Mitigation Status
!USBCOMP	Set/report USB interface configuration
!USBPID	Set/query USB product IDs
!USBVID	Set/query USB vendor ID
!VERINFO	Display image version and security state
&V	Return operating mode AT configuration parameters

3.3.   Command Reference

Table 3-2   Modem Status, Customization, and Reset Commands

Command	Description
!ANTSEL	**Set/query external antenna selection configuration** Configure the modem to use available GPIOs to select external tunable antennas for low frequency bands (< 1000 MHz) that are grouped in predefined signal paths. Any GPIOs that are not used to select external antennas should be configured as not required. When the modem switches to a frequency band in a signal path that has been configured using this command, the GPIOs are driven as specified and the host uses them to tune the external antenna appropriately. This applies whether this is a primary band or the secondary component carrier as part of LTE CA (Carrier Aggregation). If the modem switches to a band that has not been configured, the host uses the default antenna. Signal paths are defined in the following table: {TABLE} When this command is used to set the GPIO configuration (<gpio1>, <gpio2>, <gpio3>, <gpio4>) for a supported 3G, 4G or 5G band, the configuration is used for all bands that share the same signal path. (i.e., if a configuration is set for B18, which is in signal

The signal paths table referenced above:

Signal Path	3G Bands	4G Bands	5G Bands
0	B5, B6, B19	B5, B18, B19, B26	n5
1	B8	B8	
2		B12, B17	
3		B13	
4		B14	
5		B20	
6		B28A	n28A
7		B28B (80)	n28B (90)
8		B29	
9		B71	n71

Command	Description
	path 0, the same configuration is automatically used for **all** signal path 0 3G bands (B5, B6, B19), 4G bands (B5, B18, B19, B26) and 5G bands (n5))
	When designing the system and configuring the device:
	• Perform system testing to ensure that the antenna switching feature does not introduce any handover issues. The tunable antenna should be designed to ensure that it can retune in < 5 μs (recommended) and < 10 μs (maximum).
	• Make sure there are no conflicts between primary (PCell) and secondary (SCell) cells for all supported LTE carrier aggregation (CA) combinations, since a conflict can detune the PCell during LTE CA, resulting in reduced performance. A conflict occurs when the primary band is configured to drive a GPIO one way (high or low), and the secondary is configured to drive the same GPIO the other way (low or high).
	Password required: Yes
	Reset required to apply changes: Yes
	Persistent across power cycles: Yes
	Usage:
	• Execution: **AT!ANTSEL=<tech_num>,<band>,<gpio1>,<gpio2>, <gpio3>,<gpio4>**
	Response: OK
	Purpose: Configure the GPIOs for the specified technology and band.
	• Query: **AT!ANTSEL?<tech_num>**

	Response: <tech_num>G BAND <band a>: <gpio1>, <gpio2>, <gpio3>, <gpio4> <tech_num>G BAND <band b>: <gpio1>, <gpio2>, <gpio3>, <gpio4>
	   ...
	   OK

	• Examples: 3G BAND 5: 0, 1, 1, 0
	   3G BAND 6: 0, 1, 1, 0
	   3G BAND 19: 0, 1, 1, 0
	   OK

	Purpose: Display the current external antenna select configuration.
	• Query List: **AT!ANTSEL=?**
	Purpose: Display valid parameter values and command format.
	Parameters:
	<tech_num> (Radio access technology (RAT) number)
	• 3=WCDMA
	• 4=LTE
	• 5=5G NR
	<band> (RF band)
	• Only support low band (less than 1000MHz). Refer to table "Supported Frequency Bands, by RAT (5G/LTE/3G)" of document *[1] AirPrime EM919X-EM7690 Product Technical Specification* for details.
	• Valid values:
	· 3G: 5, 6, 8, 19
	· 4G: 5, 8, 12, 13, 14, 17, 18, 19, 20, 26, 28 (for B28A), 29, 71, 80 (for B28B)
	· 5G: 5, 28 (for n28A), 71, 90 (for n28B)
	<gpio1>, <gpio2>, <gpio3>, <gpio4> (GPIO configurations)
	• 0=Logic low
	• 1=Logic high
	• 2=Not used for antenna selection
	• gpio1–4 correspond to ANT_CTRL0–3
!BAND *Note: The 'Basic' command and response versions are used if you haven't entered the*	**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.

Command	Description

required password. (See Command access.)	⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯
	Important: *To avoid issues with incompatible RAT/band combinations, if !BAND and !SELRAT are both used, either !BAND must be set to 'All Bands' or !SELRAT must be set to 'Automatic'.*
	⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯
	Password required: Yes — Extended execution and extended response of query
	Usage:
	• Execution (Basic): **AT!BAND=\<Index\>**
	 Response: OK
	 Purpose: Select an existing set of bands.
	• Execution (Extended):
	  (Create or delete GSM/WCDMA/LTE set)
	  AT!BAND=\<Index\>,\<Operation\>[,\<"Name"\>,\<RAT\>,\<GW mask\>, \<Lmask1\>, \<Lmask2\>, \<Lmask3\>, \<Lmask4\>]
	
	  (Create or delete TD-SCDMA set)
	  AT!BAND=\<Index\>,\<Operation\>[,\<"Name"\>,\<RAT\>,\<TDS mask \>]
	
	  (Create or delete NRNSA set)
	  AT!BAND=\<Index\>,\<Operation\>[,\<"Name"\>,\<RAT\>,\<NR NSAmask1\>, \<NRNSAmask2\>, \<NRNSAmask3\>, \<NRNSAmask4\>, \<NRNSAmask5\>]
	
	  (Create or delete NRSA set)
	  AT!BAND=\<Index\>,\<Operation\>[,\<"Name"\>,\<RAT\>,\<NR SAmask1\>, \<NRSAmask2\>, \<NRSAmask3\>, \<NRSAmask4\>, \<NRSAmask5\>]
	 Response: OK
	 Purpose: Create a new set of bands (all parameters are required), or delete an existing set of bands (parameters in "[ ]" are not required).
	• Query: **AT!BAND?[\<index\>]**
	 Response: Index, Name
	   \<Index\>, \<Name\>
	   OK
	  or Index, Name
	   \<Index\>, \<Name\>
	   0 – GW: \<GWmask\>
	   1 – LTE: \<LTEmask1\> \<LTEmask2\> \<LTEmask3\> \<LTEmask4\>
	   2 – TDS: \<TDSmask\>
	   3 – NRNSA: \<NRNSAmask1\> \<NRNSAmask2\> \<NRNSAmask3\> \<NRNSAmask4\> \<NRNSAmask5\>
	   4 – NRSA: \<NRSAmask1\> \<NRSAmask2\> \<NRSAmask3\> \<NRSAmask4\> \<NRSAmask5\>
	   OK
	 Purpose: Report the current band selection. (\<GWmask\>, \<LTEmasks\>, \<TDSmask\>, \<NRNSAmasks\> and \<NRSAmasks\> will appear only in Extended responses.)
	• Query List: **AT!BAND=?**
	 Purpose: Returns supported and available band information.
	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.)
	\<Operation\> (Action to delete or add a ban set)
	• 0 means delete; 1 means add
	\<Name\> (Name of the band set)
	• ASCII string — Up to 30 characters

Command	Description

	<RAT> (Index of supported rate name)
	• Valid range: 0–4 (0: GW,CDMA; 1: LTE; 2: TDSCDMA; 3: 5G NR NSA; 4: 5G NR SA)
	<GWmask> (GSM/WCDMA bands included in the set)
	• Format: 64-bit bitmask
	• Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device.
	    0000000000000001—BC0-A
	    0000000000000002—BC0-B
	    ...
	    0002000000000000—W900
	    1000000000000000—B19 (850)
	<Lmask1> (LTE bands included in the set)
	• Format: 64-bit bitmask
	• Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device.
	    0000000000000001—Band 1
	    0000000000000002—Band 2
	    ...
	    0000010000000000—B41
	    0000200000000000—B46
	    0000800000000000—B48
	<Lmask2> (LTE bands included in the set)
	• Format: 64-bit bitmask
	• Example values shown below – this list is an example only and may not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device.
	    0000000000000002—Band 66
	    0000000000000040—B71
	<Lmask3> (Reserved for future use)
	• Format: 64-bit bitmask
	• Required value: 0000000000000000
	<Lmask3> (Reserved for future use)
	• Format: 64-bit bitmask
	• Required value: 0000000000000000
	<TDSmask> (TD-SCDMA bands included in the set)
	• Format: 64-bit bitmask
	• Example values shown below – this list is an example only and may not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device.
	    0000000000000001—TDS B34
	    0000000000000002—TDS B35
	    0000000000000004—TDS B36
	    0000000000000008—TDS B38
	    0000000000000010—TDS B40
	    0000000000000020—TDS B39
	<NRNSAmask1> (NRNSA bands included in the set)
	• Format: 64-bit bitmask
	• Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device.
	    0000000000000001—n1
	    ……
	    8000000000000000—n64

Command	Description
	<NRNSAmask2> (NRNSA bands included in the set) • Format: 64-bit bitmask • Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device. 0000000000000001—n65 …… 8000000000000000—n128 <NRNSAmask3> (NRNSA bands included in the set) • Format: 64-bit bitmask • Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device. 0000000000000001—n129 …… 8000000000000000—n192 <NRNSAmask4> (NRNSA bands included in the set) • Format: 64-bit bitmask • Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device. 0000000000000001—n193 …… 8000000000000000—n256 <NRNSAmask5> (NRNSA bands included in the set) • Format: 64-bit bitmask • Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device. 0000000000000001—n257 …… 8000000000000000—n320 <NRSAmask1> (NRSA bands included in the set) • Format: 64-bit bitmask • Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device. 0000000000000001—n1 …… 8000000000000000—n64 <NRSAmask2> (NRSA bands included in the set) • Format: 64-bit bitmask • Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device. 0000000000000001—n65 …… 8000000000000000—n128 <NRSAmask3> (NRSA bands included in the set) • Format: 64-bit bitmask • Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device. 0000000000000001—n129 …… 8000000000000000—n192

Command	Description

	<NRSAmask4> (NRSA bands included in the set)
	• Format: 64-bit bitmask
	• Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device.
	   0000000000000001—n193
	   ……
	   8000000000000000—n256
	   <NRSAmask5> (NRSA bands included in the set)
	• Format: 64-bit bitmask
	• Example values shown below – this list is an example only and does not show all possible bands. Available bands are device dependent. Use the extended response of query command to display the list of bands available for your device.
	   0000000000000001—n257
	   ……
	   8000000000000000—n320

!BOOTHOLD	**Reset modem and wait in bootloader for firmware download**
	Prepare for a firmware download by resetting the modem and waiting in "boot and hold" mode.
	Password required: No
	Usage:
	• Execution: **AT!BOOTHOLD**
	   Response: OK
	   Purpose: Force the modem to reset and then wait in boot and hold mode for a firmware download.

!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.)
	Note: Use quotation marks around the customization string. For example, AT!CUSTOM="GPSENABLE",0.
	• "BOOTQUIETDISABLE"— Enable/disable boot quiet feature which determines if kernel log is printed.
	   <value>:
	   · 0 = Enable boot quiet feature which means not to print kernel log (Default)
	   · 1 = Disable boot quiet feature which means to print kernel log
	• "CFUNPERSISTEN"— Enable/disable persistence (across power cycles) of AT+CFUN setting.
	   <value>:
	   · 0 = Disable (+CFUN setting does not persist across power cycle) (Default)
	   · 1 = Enable (+CFUN setting persists across power cycle)

Command	Description

	• "GPIOSARENABLE" — Indicate whether SAR back-off is controlled by GPIOs or AT commands.
	    <value>:
	    · 0 = Controlled by AT commands (Default)
	    · 1 = Controlled by GPIOs
	• "GPSENABLE" — Enable/disable the GNSS feature.
	    <value>:
	    · 0 = GNSS disabled
	    · 1 = MO & MT enabled regardless of GPS_DISABLE pin status (Default)
	    · 2 = MO enabled regardless of GPS_DISABLE pin status
	    · 3 = MT enabled regardless of GPS_DISABLE pin status
	    · 4 = MO & MT enabled when the GPS_DISABLE pin is not asserted
	    · 5 = MO enabled when the GPS_DISABLE pin is not asserted
	    · 6 = MT enabled when the GPS_DISABLE pin is not asserted
	• "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)
	• "ICMPINTSRVDIS" — Enable/disable incoming ping reply.
	    <value>:
	    · 0 = Enable incoming ping reply
	    · 1 = Disable incoming ping reply for IPv4 (Default).
	
	    Note: *When a test SIM is used with the module, this customization is ignored, and the module operates as if option 0 (Enable incoming ping reply) is set. (This occurs when the module transitions to online mode.)*
	
	    Note: *This customization does not disable incoming ping replies for IPv6.*
	
	• "IMCONFIG" — Configure IM (Image Switch) feature.
	    <value>:
	    · 0 = Image switch for boot and modem
	    · 1 = Disable device-based IM feature
	    · 2 = Image switch for all images (Default)
	• "IPCHANNELRATEEN" — Enable/disable IP channel rate feature.
	    <value>:
	    · 0 = Disable (Default)
	    · 1 = Enable
	• "IPV6ENABLE" — Enable/disable IPV6 support.
	    <value>:
	    · 0 = Disable IPV6
	    · 1 = Enable IPV6 (Default)
	• "MBIMMODE" — Enable/disable MBIM mode for data path initialization.
	    <value>:
	    · 0 = Disable (Default)
	    · 1 = Enable
	• "QXDMLOGENABLE"— Enable/disable QXDM log. The setting would take effect immediately without power cycle.
	    <value>:
	    · 0 = Disable QXDM log (Default)
	    · 1 = Enable QXDM log
	• "SIMHOTSWAPDIS" — Configure SIM hotswap feature
	    <value>:
	    · 0 = Enable UIM1 and UIM2 (Default)
	    · 1 = Disable UIM1, enable UIM2
	    · 2 = Enable UIM1, disable UIM2

Command	Description

	• 3 = Disable UIM1 and UIM2
	• "SIMLPA"— Enable/disable LPA (Local Profile Assistant) eSIM feature on host.
	  <value>:
	  · 0 = Disable LPA feature (Default)
	  · 1 = Enable LPA feature
	• "SIMLPM"— Indicate default SIM power state during Low Power Mode.
	  <value>:
	  · 0 = QCT default behavior (same as <value>=2)
	  · 1 = SIM remains powered in LPM (Default)
	  · 2 = Power down SIM with AT+CFUN=0; Power up SIM with AT+CFUN=1
	• "UIM2ENABLE"— Enable/disable UIM2 slot support.
	  <value>:
	  · 0 = Disable (Default)
	  · 1 = Enable
	  · 2 = Enable eSIM on UIM2 slot
	• "WAKEHOSTEN" — Enable/disable host wake-up via SMS or incoming data packet.
	  <value>:
	  · 0 = Disable — Host will not wake when SMS or incoming data packet is received. (Default)
	  · 1 = Wake host when simple SMS is received.
	  · 2 = Wake host when incoming data packet is received.
	  · 3 = Wake host when simple SMS or incoming data packet is received.

!DATALOOPBACK	**Enable/disable and configure loopback mode**
	Enable or disable loopback mode and the loopback multiplier or display the current settings.
	Note: *The data loopback feature might affect 3G/4G/5G registration or other features, please disable it when you don't need it.*
	Password required: Yes
	Reset required to apply changes: Yes
	Persistent across power cycles: Yes
	Usage:
	• Execution: **AT!DATALOOPBACK=<loopback_mode>, <loopback_multiplier>**
	  Response: OK
	  Purpose: Enable/disable loopback mode and set the loopback multiplier.
	• Query: **AT!DATALOOPBACK?**
	  Response: !DATALOOPBACK:
	                  Data Loopback Mode: <loopback_mode>
	                  Replication Count: <loopback_multiplier>
	                  OK
	  Purpose: Display the loopback mode state and loopback multiplier.
	• Query List: **AT!DATALOOPBACK=?**
	  Response: !DATALOOPBACK=<mode>[,<loopback multiplier>]
	                  <mode>
	                    '0' = Disable Data Loopback Mode
	                    '1' = Enable Data Loopback Mode
	                  <loopback multiplier>: Number of downlink bytes to send for each uplink byte
	                  OK
	  Purpose: Return valid parameter values.
	Parameters:
	<loopback_mode> (Loopback mode state)
	  · 0=Disable data loopback mode (Default)
	  · 1=Enable data loopback mode

Command	Description
	<loopback_multiplier> (Replication count - number of downlink bytes sent for each uplink byte) · Decimal value · It is optional when enabling data loopback mode. But it is mandatory to set it to 0 when disabling loopback mode.

!DISABLEDEBUG	**Erase debug policy image**
	Erase debug policy image. It can recover module to secure state **only** after module with secure state is hacked by debug policy.
	Password required: Yes
	Usage:
	• Execution: AT!DISABLEDEBUG=<command>
	  Response: OK
	  Purpose: Erase debug policy image.
	Parameters:
	 <command> (Command ID)
	• 1 – Erase debug policy image

!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.

!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
	Notes:
	• The thermal mitigation level indicated by <mitlvl> is the maximum mitigation level from all sources.
	• Tx power values (PCC Tx Power, SCCx Tx Power, SCCx NR5G Tx Power) are indicated by the <txpwr> parameter, which represents the input power to antennas in dBm.
	  When the response is for LTE/NR5G, the LTE Tx power is reported as PCC Tx Power, and the NR Tx power is reported as SCC1 NR5G Tx Power.
	
	Usage:
	• Query: AT!GSTATUS?
	  Response (Example shown is for LTE/NR5G; fields will vary depending on RAT; SSCx will be displayed only when the SSC is activated)
	    !GSTATUS:
	    Current Time: <ctime> Temperature: <temp>

Command	Description
	Thermal Mitigation Level: <mitlvl> Reset Counter: <rcounter> Mode: <mode> System mode: <smode> PS state: <PSstate> LTE band: <lband> LTE bw: <lbw> LTE Rx chan: <lrchan> LTE Tx chan: <ltchan> LTE SSC1 state: <castate> LTE SSC1 band: <lband> LTE SSC1 bw: <lbw> LTE SSC1 Rx chan: <lrchan> LTE SSC1 UL Configured: <lucon> LTE SSC1 Tx chan: <ltchan> … LTE SSCx state: <castate> LTE SSCx band: <lband> LTE SSCx bw: <lbw> LTE SSCx Rx chan: <lrchan> LTE SSCx UL Configured: <lucon> LTE SSCx Tx chan: <ltchan> EMM state: <emmstate> <emmsubstate> RRC state:<rrcconn> IMS Reg State: <imsstate> IMS mode: <ims mode> IMS Srv State: <imssrvstate> PCC RxM RSSI: <rssi> PCC RxM RSRP: <rsrp> PCC RxD RSSI: <rssi> PCC RxD RSRP: <rsrp> PCC RxM1 RSSI: <rssi> PCC RxM1 RSRP: <rsrp> PCC RxD1 RSSI: <rssi> PCC RxD1 RSRP: <rsrp> SCC1 RxM RSSI: <rssi> SCC1 RxM RSRP: <rsrp> SCC1 RxD RSSI: <rssi> SCC1 RxD RSRP: <rsrp> SCC1 RxM1 RSSI: <rssi> SCC1 RxM1 RSRP: <rsrp> SCC1 RxD1 RSSI: <rssi> SCC1 RxD1 RSRP: <rsrp> … SCCx RxM RSSI: <rssi> SCCx RxM RSRP: <rsrp> SCCx RxD RSSI: <rssi> SCCx RxD RSRP: <rsrp> SCCx RxM1 RSSI: <rssi> SCCx RxM1 RSRP: <rsrp> SCCx RxD1 RSSI: <rssi> SCCx RxD1 RSRP: <rsrp> PCC Tx Power: <txpwr> TAC: <tac> SCC1 Tx Power: <txpwr> … SCCx Tx Power: <txpwr> RSRQ (dB): <rsrq> Cell ID: <Cell ID> SINR (dB): <sinr> SCC1 NR5G band: <nrband> SCC1 NR5G bw: <nrbw> SCC1 NR5G Tx Power: <txpwr> SCC1 NR5G Tx chan: <nrtxchan> SCC1 NR5G Rx chan: <nrrxchan> … SCCx NR5G band: <nrband> SCCx NR5G bw: <nrbw> SCCx NR5G Tx Power: <txpwr> SCCx NR5G Tx chan: <nrtxchan> SCCx NR5G Rx chan: <nrrxchan> NR5G RSRP (dBm): <rsrp> NR5G RSRQ (dB): <rsrq> NR5G SINR (dB): <sinr> OK
!HWID	**Display hardware version** Display the device's hardware version number. **Password required:** Yes **Usage:** • Query: **AT!HWID?** Response: Revision: <MajorVer>

Command	Description
	OK Purpose: Display hardware version number. • Query List: **AT!HWID=?** Purpose: Return the query command format. **Parameters:** <MajorVer> (Major versioning number) • 0–9

!IMAGE	**Manage Firmware Images**
	List or delete stored firmware and configuration (PRI) images.
	
	Note: This command is intended for use by advanced users who are familiar with the nuances of firmware and PRI image storage requirements and naming conventions.
	
	Password required: No
	Usage:
	• Execution: **AT!IMAGE=<op>[,<type>[,<slot>[,<build_id>,<unique_id>]]]**
	Response: OK
	Purpose: Delete or list stored FW and/or PRI images.
	• Query: **AT!IMAGE?[<op>[,<type>]]**
	Response: TYPE SLOT STATUS LRU FAILURES UNIQUE_ID BUILD_ID
	    <ty> <slot> <status> <lru> <f1> <f2> <unique_id> <build_id>
	    …
	    Max FW images: <max_fw>
	    Active FW image is at slot <slot>
	
	    TYPE SLOT STATUS LRU FAILURES UNIQUE_ID BUILD_ID
	    <ty> <slot> <status> <lru> <f1> <f2> <unique_id> <build_id>
	    …
	    Max PRI images: <max_pri>
	
	    OK
	Purpose: Display lists of stored firmware and/or PRI images, or the quantity of stored firmware or PRI images. (In the format shown above, the <TY> value in the first group of responses will be 'FW', and the value in the second group will be 'PRI'.)
	Note: If the active firmware image has been deleted from storage, the "Active FW image is at slot <slot>" line will show "slot 255".
	Parameters:
	<op> (Operation)
	    • 0 – Delete. (Note: Valid only for Execution format.)
	    • 1 – List stored FW and/or PRI images, depending on <type>
	    • 2 – List Max FW images or Max PRI images, depending on <type>
	<type> (Image type)
	    • 0 – FW (firmware)
	    • 1 – PRI (configuration)
	<slot> (Firmware image slot ID)
	    • Valid range: 0–FF
	    • Field is ignored for PRI images
	<build_id> (Build ID)
	    • ASCII string, including double-quotes (e.g. "01.00.04.00_ATT")
	<unique_id> (Unique ID)
	    • ASCII string, including double-quotes (e.g. "001.000_000")
	<TY> (Image type)
	    • FW
	    • PRI

Command	Description
	<status> (Image status) • EMPTY • GOOD <lru> (Least Recently Used count) • Indicates how recently the image has been used. • Used automatically during slot selection process to determine which image to remove if a new image is being loaded and there are no empty slots. <f1> (Programming failure count) • 0–255 <f2> (Switching failure count) • 0–255 <max_fw> (Maximum number of firmware images that can be stored) • Device-dependent <max_pri> (Maximum number of PRI images that can be stored) • Device-dependent **Example(s):** • Delete all stored FW and PRI images: AT!IMAGE=0 • Delete all stored FW images: AT!IMAGE=0,0 • Delete FW at slot 2 AT!IMAGE=0,0,2 • Delete a particular PRI by build/unique ID: AT!IMAGE=0,1,,"01.00.01.00_SWISSCOM","000.001_000"

!IMPREF	**Query/set Image Management preferences**
	Indicate which firmware image (firmware plus carrier configuration) should be selected. Use the query format to list the configuration pairs that are currently downloaded and preferred.
	Password required: No
	Usage:
	• Execution: **AT!IMPREF=<preference>**
	 Response: OK
	 Purpose: Indicate which image should be used (the preferred image).
	• Query: **AT!IMPREF?**
	 Response: !IMPREF:
	  preferred fw version: <firmware-ver>
	  preferred carrier name: <carrier-name>
	  preferred config name: <carrier-config>
	  preferred subpri index: <carrier-sub-config>
	  current fw version: <firmware-ver>
	  current carrier name: <carrier-name>
	  current config name: <carrier-config>
	  current subpri index: <carrier-sub-config>
	  [<mismatch information>]
	  OK
	   or
	  !IMPREF
	  <invalid image>
	  OK
	 Purpose: Query (show) the preferred and current images (firmware plus carrier configuration pairs), or if an image setting does not exist, a message will be displayed, as shown.
	Parameters:

Command	Description
	<preference> (The preferred carrier) • Valid values: "<carrier-name>" — Module will search for a matching carrier PRI and the firmware required for that PRI. If found, the new image preference is set. <carrier-name> (Unique code identifying the carrier that the firmware was designed for) • ASCII string <firmware-ver> (Unique firmware version number assigned by Sierra Wireless) • ASCII string <carrier-config> (Unique code identifying the carrier and configuration details) • ASCII string <carrier-sub-config> (Sub-configuration for carrier PRI for custom ICCID/IMSI ranges) • ASCII string <mismatch information> (Message indicating a field mismatch between the current and preferred image settings) • ASCII string (quotation marks do not appear): • "fw version mismatch" • "carrier name mismatch" • "config name mismatch" <invalid image> (Message indicating an image does not exist) • ASCII string (quotation marks do not appear): • "preferred image setting does not exist" • "current image setting does not exist" **Example(s):** • AT!IMPREF="ABC" *(where "ABC" is a carrier name)*
!LTEINFO	**Display LTE network information** Display LTE network information. **Password required:** No **Usage:** • Query: **AT!LTEINFO?** Response: !LTEINFO: Serving: EARFCN MCC MNC TAC CID Bd D U SNR PCI RSRQ RSRP RSSI RXLV <earfcn> <mcc> <mnc> <tac> <cid> <bd> <d> <u> <snr> <pci> <rsrq> <rsrp> <rssi> <rxlv> IntraFreq: PCI RSRQ RSRP RSSI RXLV <pci> <rsrq> <rsrp> <rssi> <rxlv> InterFreq: EARFCN ThresholdLow ThresholdHi Priority PCI RSRQ RSRP RSSI RXLV <earfcn> <thresholdlow> <thresholdhi> <priority> <pci> <rsrq> <rsrp> <rssi> <rxlv> CA SCell: EARFCN SCID Bd ST D U Mdl Mul PCI RSRP RSSI SINR <earfcn> <scid> <bd> <st> <d> <u> <mdl> <mul> <pci> <rsrp> <rssi> <sinr> GSM: ThreshL ThreshH Prio NCC ARFCN 1900 valid BSIC RSSI RXLV <threshl> <threshh> <prio> <ncc> <arfcn> <1900> <valid> <bsic> <rssi> <rxlv> WCDMA: UARFCN ThreshL ThreshH Prio PSC RSCP ECN0 RXLV <uarfcn> <threshl> <threshh> <prio> <psc> <rscp> <ecn0> <rxlv> Or !LTEINFO: Not Available

Command	Description
	OK

Purpose: Display LTE network information.

Parameters:

<earfcn> (LTE RF channel number)
- 0–65535

<mcc> (Mobile country code)
- 0–999

<mnc> (Mobile network code)
- 0–999

<tac> (Tracking area code)
- 0–65535

<cid> (Serving cell ID)
- 0–503

<Bd> (Operating band)
- 1–64

<d> (DL bandwidth)
- 0 = 1.4 MHz
- 1 = 3 MHz
- 2 = 5 MHz
- 3 = 10 MHz
- 4 = 15 MHz
- 5 = 20 MHz

<d> (UL bandwidth)
- 0 = 1.4 MHz
- 1 = 3 MHz
- 2 = 5 MHz
- 3 = 10 MHz
- 4 = 15 MHz
- 5 = 20 MHz

<snr> (Average reference signal signal-to-noise ratio)
- -10 to 30

<pci> (Physical Cell ID)
- 0–503

<rsrq> (Reference signal receive quality in dB)
- -3 to -19.5

<rsrp> (Reference signal receive power in dBm)
- -144 to -40

<rssi> (Reference signal strength indicator in dBm)
- Total received wide-band power

<rxlv> (Suitable receive level)

<thresholdlow> (Lower receive level threshold for reselection)

<thresholdhi> (Higher receive level threshold for reselection)

<priority> (Cell reselection priority)

<scid> (SCC ID of the secondary cell for LTE)

<st> (State of the secondary cell)
- 0 = Init
- 1 = Configured
- 2 = Active

Command	Description
	<mdl> (Number of downlink MIMO layers) <mul> (Number of uplink MIMO layers) <sinr> (Signal to interference plus noise ratio) <uarfcn> (WCDMA RF channel number) • 3GPP channel number <threshl> (Reselection threshold for low priority layers) <threshh> (Reselection threshold for high priority layers) <prio> (Cell reselection priority) <psc> (Primary scrambling code) <rscp> (Absolute power level of the common pilot channel as received) <ecn0> (Energy per chip over the noise) <prio> (Cell reselection priority)

!LTERXCONTROL	**Enable/disable LTE receive (Rx) diversity during Carrier Aggregation**
	Enable or disable LTE receive diversity for individual component carriers (PCC or SCC) during Carrier Aggregation (CA).
	Note: *It is overlapped setting for LTE between !LTERXCONTROL and !RXDEN. The setting is overwritten by the later issued command.*
	           Due to firmware design, LTE open-loop Tx power should be set to 20 dBm when measuring SISO sensitivity with Rx diversity as the primary path.
	Password required: Yes
	Reset required to apply changes: Yes
	Persistent across power cycles: Yes
	Usage:
	• Execution: **AT!LTERXCONTROL=<cc_id>,<selection>**
	     Response: OK
	     Purpose: Enable or disable LTE Rx diversity for specific component carrier.
	• Query List: **AT!LTERXCONTROL=?**
	     Response: !LTERXCONTROL: <cc_id>,<selection>
	                 <cc_id>: 0-3
	                  0 – PCC,
	                  1 – SCC1,
	                  2 - SCC2,
	                  3 - SCC3
	                 <selection>: 1-5
	                  1 - Enable Primary Rx only
	                  2 - Enable Diversity Rx1 only
	                  3 - Enable Diversity Rx2 only
	                  4 - Enable Diversity Rx3 only
	                  5 - Enable both PRx and DRx
	                  OK
	     Purpose: Return valid parameter values.
	Parameters:
	<cc_id> (Component carrier ID)
	  • 0 – PCC (Default)

Command	Description
	• 1 – SCC1 • 2 – SCC2 • 3 – SCC3 \<selection\> (Select Rx path) • 1 – Enable Primary Rx only (means primary Rx path only) • 2 – Enable Diversity Rx1 only (means MIMO1 Rx path only) • 3 – Enable Diversity Rx2 only (means MIMO2 Rx path only) • 4 – Enable Diversity Rx3 only (means aux Rx path only) • 5 – Enable both PRx and DRx (means all 4 Rx paths. It is default)

!MMWBYPASSSCAN	**Bypass the check for mmWave antennas during power ON**
	 By default, during the module power-on sequence, the module's mmWave antenna modules are scanned to ensure they are functioning properly. If any modules are scanned and found to be missing, damaged, etc., mmWave functionality is disabled.
	 However, mmWave functionality can be maintained by using this command to bypass known missing or damaged modules during the scan.
	 Password required: Yes
	 Persistent across power cycles: Yes
	 Usage:
	 • Execution: **AT!MMWBYPASSSCAN=\<device\>,\<enable\>**
	   Response: OK
	   Purpose: Explicitly exclude or include the mmWave \<device\> during the module's power-on sequence.
	 • Query: **AT!MMWBYPASSSCAN?**
	   Response: DEVICE \< device\>: \<enable\>
	   …
	   DEVICE \< device\>: \<enable\>
	   OK
	   Purpose: Display the scan setting (enabled or disabled) of all devices that have been configured. (i.e. only devices that have been explicitly enabled or disabled will be listed)
	 • Query List: **AT!MMWBYPASSSCAN=?**
	   Response: !MMWBYPASSSCAN: (1-16),(0-1)
	   Purpose: Return the valid values for execution mode parameters.
	 Parameters:
	 \<device\> (mmW device to configure):
	 • Valid values:
	   • Low power design: 1-8
	   • High power design: 1-16
	 \<enable\> (Include or exclude (bypass) the \<device\> in the power-on scan):
	 • 0 – Include device in scan (i.e., The device will not be bypassed in the power-on scan.)
	 • 1 – Exclude device from scan (i.e., mmW will not be disabled even if the device is missing or damaged.)

!MMWCAL	**Report mmW calibration status** (EM9190 only) Use this command to indicate if mmW calibration has been performed since the module was originally factory-tested at Sierra Wireless. Note – mmW calibration is done by users using the processes described in *[4] EM9190 High Power mmWave RF Customization File Preparation* or *[5] AirPrime EM9190 Low Power mmWave RF Customization File Preparation*. After performing mmW calibration, users are advised to use AT!NVBACKUP with option 2 to back up the mmW calibration. **Password required:** Yes **Usage:** • Query: AT!MMWCAL?

Command	Description
	Response: \<cal_state\> OK Purpose: Indicate whether or not the module has been calibrated by the user using version 3 (or higher) of the .xtt tool indicated in the documents mentioned above. **Usage restrictions:** • This command requires that calibration be performed using version 3 (or higher) of the .xtt tool indicated in the documents mentioned above. Modules calibrated using earlier versions will always return 0. **Parameters:** \<cal_state\> (mmW calibration state): • 0 – Factory-tested, uncalibrated (default mmW calibration date (20180321) detected) 1 – User-calibrated (mmW calibration present and different calibration stamp detected)

!NRINFO	**Display NR information**
	Display the NR (5G-Sub6 or 5G-mmW) information of the device. It is available only when device supports 5G.
	Password required: No
	Usage:
	• Query (no 5G): **AT!NRINFO?**
	     Response: !NRINFO:
	          Connectivity Mode: ---
	
	          Connectivity Mode: ---
	
	          NR5G Cell ID: ---
	          NR5G band: --- NR5G Carrier ID: ---
	          NR5G dl bw: --- NR5G ul bw: ---
	          NR5G Tx Power: --- NR5G Tx chan: ---
	          NR5G Rx chan:
	          NR5G dl MIMO: --- NR5G ul MIMO: ---
	          NR5G(sub6) RxM RSSI (dBm): --- NR5G(sub6) RxD RSSI (dBm): ---
	          NR5G(sub6) RxM1 RSSI (dBm): --- NR5G(sub6) RxD1 RSSI (dBm): ---
	          NR5G(mmw) Rx0 RSSI (dBm): --- NR5G(mmw) Rx1 RSSI (dBm): ---
	
	          NR5G RSRP (dBm): --- NR5G RSRQ (dB): ---
	          NR5G SINR (dB): ---
	          OK
	     Purpose: Display information in case there's no available 5G.
	• Query (5G-Sub6): **AT!NRINFO?**
	     Response: !NRINFO:
	          Connectivity Mode: \<mode\>
	
	          NR5G Cell ID: \<cell id\>
	          NR5G band: \<band\> NR5G Carrier ID: \<cid\>
	          NR5G dl bw: \<dl_bw\> NR5G ul bw: \<ul_bw\>
	          NR5G Tx Power: \<TxPower\> NR5G Tx chan: \<TxChan\>
	          NR5G Rx chan: \<RxChan\> NR5G Tx chan: \<TxChan\>
	          NR5G dl MIMO: \<dlMaxMimo\> NR5G ul MIMO: \<ulMaxMimo\>
	          NR5G(sub6) RxM RSSI (dBm): \<rssi\> NR5G(sub6)

Command	Description
	RxD RSSI (dBm): <rssi>
	NR5G(sub6) RxM1 RSSI (dBm): <rssi> NR5G(sub6) RxD1 RSSI (dBm): <rssi>
	… // repeats for additional NR5G Cells
	NR5G RSRP (dBm): <rsrp> NR5G RSRQ (dB): <rsrq> NR5G SINR (dB): <sinr> OK
	Purpose: Display 5G-Sub6 information.
	• Query (5G-mmW): **AT!NRINFO?**
	Response: !NRINFO: Connectivity Mode: <mode>
	NR5G Cell ID: <cell id> NR5G band: <band> NR5G Carrier ID: <cid> NR5G dl bw: <dl_bw> NR5G ul bw: <ul_bw> NR5G Tx Power: <TxPower> NR5G Tx chan: <TxChan> NR5G Rx chan: <RxChan> NR5G dl MIMO: <dlMaxMimo> NR5G ul MIMO: <ulMaxMimo> NR5G(mmw) Rx1 RSSI (dBm): <rssi> NR5G(mmw) Rx2 RSSI (dBm): <rssi>
	… // repeats for additional NR5G Cells
	NR5G RSRP (dBm): <rsrp> NR5G RSRQ (dB): <rsrq> NR5G SINR (dB): <sinr> OK
	Purpose: Display 5G-mmW information.
	Example(s):

	• 5G-Sub6, SA connectivity mode:
	
	`AT!NRINFO?`
	`!NRINFO:`
	`Connectivity Mode: SA`
	
	`Connectivity Mode: SA`
	
	`NR5G Cell ID:  500`
	`NR5G band:    n77       NR5G Carrier ID: 0`
	`NR5G dl bw:    20 MHz    NR5G ul bw: 20 MHz`
	`NR5G Tx Power: -22       NR5G Tx chan: 620644`
	`NR5G Rx chan:  620644`
	`NR5G dl MIMO: 0          NR5G ul MIMO: 1`
	`NR5G(sub6) RxM RSSI (dBm): -31.8   NR5G(sub6) RxD RSSI`
	`(dBm): -5.6`
	`NR5G(sub6) RxM1 RSSI (dBm): -37.9   NR5G(sub6) RxD1 RSSI`
	`(dBm): -4.4`
	
	`NR5G RSRP (dBm): —       NR5G RSRQ (dB): —`
	`NR5G SINR (dB):  —`
	
	`OK`
	• 5G-Sub6, NSA connectivity mode:

Command	Description

	<pre>AT!NRINFO?
	!NRINFO:
	
	Connectivity Mode: NSA
	NR5G Cell ID: 500
	NR5G band: n78 NR5G Carrier ID: 0
	NR5G dl bw: 100 MHz NR5G ul bw: 100 MHz
	NR5G Tx Power: 19 NR5G Tx chan: 636666
	NR5G Rx chan: 636666
	NR5G dl MIMO: 0 NR5G ul MIMO: 1
	NR5G(sub6) RxM RSSI (dBm): -66.9 NR5G(sub6) RxD RSSI
	(dBm): -66.3
	NR5G(sub6) RxM1 RSSI (dBm): --- NR5G(sub6) RxD1 RSSI
	(dBm): ---
	
	NR5G RSRP (dBm): -102 NR5G RSRQ (dB): -11
	NR5G SINR (dB): 22.0
	OK</pre> 5G-mmW: <pre>AT!NRINFO?
	!NRINFO:
	Connectivity Mode: NSA
	
	NR5G Cell ID: 0
	NR5G band: n261 NR5G Carrier ID: 0
	NR5G dl bw: 100 MHz NR5G ul bw: 100 MHz
	NR5G Tx Power: -5 NR5G Tx chan: 2072459
	NR5G Rx chan: 2072459
	NR5G dl MIMO: 0 NR5G ul MIMO: 1
	NR5G(mmw) Rx1 RSSI (dBm): -39.3 NR5G(mmw) Rx2 RSSI (dBm):
	-36.0
	NR5G Cell ID: 1
	NR5G band: n261 NR5G Carrier ID: 1
	NR5G dl bw: 100 MHz NR5G ul bw: Unknown
	NR5G Tx Power: --- NR5G Tx chan: 0
	NR5G Rx chan: 2074125
	NR5G dl MIMO: 0 NR5G ul MIMO: 0
	NR5G(mmw) Rx1 RSSI (dBm): -40.1 NR5G(mmw) Rx2 RSSI (dBm):
	-37.0
	NR5G Cell ID: 2
	NR5G band: n261 NR5G Carrier ID: 2
	NR5G dl bw: 100 MHz NR5G ul bw: Unknown
	NR5G Tx Power: --- NR5G Tx chan: 0
	NR5G Rx chan: 2075791
	NR5G dl MIMO: 0 NR5G ul MIMO: 0
	NR5G(mmw) Rx1 RSSI (dBm): -40.1 NR5G(mmw) Rx2 RSSI (dBm):
	-37.0
	NR5G Cell ID: 3
	NR5G band: n261 NR5G Carrier ID: 3
	NR5G dl bw: 100 MHz NR5G ul bw: Unknown
	NR5G Tx Power: --- NR5G Tx chan: 0
	NR5G Rx chan: 2077457
	NR5G dl MIMO: 0 NR5G ul MIMO: 0
	NR5G(mmw) Rx1 RSSI (dBm): -40.1 NR5G(mmw) Rx2 RSSI (dBm):
	-37.0
	NR5G Cell ID: 4</pre>

Command	Description
	NR5G band: n261 NR5G Carrier ID: 4 NR5G dl bw: 100 MHz NR5G ul bw: Unknown NR5G Tx Power: --- NR5G Tx chan: 0 NR5G Rx chan: 2079123 NR5G dl MIMO: 0 NR5G ul MIMO: 0 NR5G(mmw) Rx1 RSSI (dBm): -40.1 NR5G(mmw) Rx2 RSSI (dBm): -37.0 NR5G Cell ID: 5 NR5G band: n261 NR5G Carrier ID: 5 NR5G dl bw: 100 MHz NR5G ul bw: Unknown NR5G Tx Power: --- NR5G Tx chan: 0 NR5G Rx chan: 2080789 NR5G dl MIMO: 0 NR5G ul MIMO: 0 NR5G(mmw) Rx1 RSSI (dBm): -40.1 NR5G(mmw) Rx2 RSSI (dBm): -37.0 NR5G Cell ID: 6 NR5G band: n261 NR5G Carrier ID: 6 NR5G dl bw: 100 MHz NR5G ul bw: Unknown NR5G Tx Power: --- NR5G Tx chan: 0 NR5G Rx chan: 2082455 NR5G dl MIMO: 0 NR5G ul MIMO: 0 NR5G(mmw) Rx1 RSSI (dBm): -40.1 NR5G(mmw) Rx2 RSSI (dBm): -37.0 NR5G Cell ID: 7 NR5G band: n261 NR5G Carrier ID: 7 NR5G dl bw: 100 MHz NR5G ul bw: Unknown NR5G Tx Power: --- NR5G Tx chan: 0 NR5G Rx chan: 2084121 NR5G dl MIMO: 0 NR5G ul MIMO: 0 NR5G(mmw) Rx1 RSSI (dBm): -40.1 NR5G(mmw) Rx2 RSSI (dBm): -37.0 NR5G RSRP (dBm): -72 NR5G RSRQ (dB): -11 NR5G SINR (dB): 25.0 OK

!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.

Command	Description

	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.
	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(s):
	Using the example IMEI shown above: AT!NVENCRYPTIMEI=12,34,56,78,90,12,34,70

!NVPLMN	**Provision/display PLMN list for Network Personalization locking**
	Provision or display the list of PLMN (MCC/MNC pairs) used for Network Personalization locking.
	Use the execution format to provision the list ONE TIME ONLY. After the list is provisioned, it can only be displayed, not updated.
	Password required: Yes
	Usage:
	• Execution: AT!NVPLMN=<MCC1>, <MNC1>,…, <MCCn>, <MNCn>
	  Response: OK
	  Purpose: Add up to 50 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).
	• Query: AT!NVPLMN?
	  Response: <MCC> <MNC>
	                ..
	                .
	                OK
	  Purpose: Return a list of up to fifty NV items that can be read or written.
	Parameters:
	  <MCC> (Mobile Country Code)
	  • 3 digits
	  <MNC> (Mobile Network Code)

Command	Description
	• 2 digits

!PCIESSDID	**Set/query PCIe subsystem device ID**
	Set or query PCIe subsystem device ID. The PCIe host driver will check this ID to match the driver.
	Password required: Yes
	Usage:
	• Execution: **AT!PCIESSDID=<subsystem_device_id>**
	  Response: OK
	  Purpose: Set PCIe subsystem device ID.
	• Query: **AT! PCIESSDID?**
	  Response: <subsystem_device_id>
	          OK
	  Purpose: Query PCIe subsystem device ID.
	Parameters:
	<subsystem_device_id>
	  • Hex ASCII number
	  • Valid range: 0000 – FFFF

!PCIESSVID	**Set/query PCIE subsystem vendor ID**
	Set or query PCIE subsystem vendor ID. The PCIe host driver will check this ID to match the driver.
	Password required: Yes
	Usage:
	• Execution: **AT!PCIESSVID=<subsystem_vendor_id>**
	  Response: OK
	  Purpose: Set PCIE subsystem vendor ID.
	• Query: **AT! PCIESSVID?**
	  Response: <subsystem_vendor_id>
	          OK
	  Purpose: Query PCIe subsystem vendor ID.
	Parameters:
	<subsystem_vendor_id>
	  • Hex ASCII number
	  • Valid range: 0000 – FFFF

!PCINFO	**Return power control status information**
	Return the modem's power control status information.
	Password required: No
	Usage:
	• Query: **AT!PCINFO?**
	  Response: State: <state>
	          LPM voters - Temp:<vote>, Volt:<vote>, User:<vote>, W_DISABLE:<vote>, IMSWITCH:<vote>, BIOS:<vote>, LWM2M:<vote>,OMADM:<vote>, FOTA:<vote>, RFCAL:<vote>
	          LPM persistence -<userlpm>
	          OK
	  Purpose: Return power control information.
	Parameters:
	<state> (The modem's power mode)
	  • "Low Power Mode"
	  • "Online"
	  • "Offline"
	<vote> (LPM requested flag)
	  • 0 — LPM requested

Command	Description

	• 1 — LPM not requested
	<userlpm> (Current state of user-initiated Low Power Mode)
	   • 0 — Host GUI has not requested LPM
	   • 1 — Host GUI has requested LPM

!PCOFFEN	**Enable/return Low Power Mode control via W_DISABLE feature**
	The modem can be configured to enter low power mode when W_DISABLE is asserted. Use this command to indicate or set this feature's 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 Low Power Mode control)
	   • 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 Warning"
	   • "Low Critical"
	 <temperature> (Current temperature):
	 • Current temperature in degrees Celsius.
	 • Decimal ASCII

!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.
	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

Command	Description

	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)
	 • High critical temperature setting
	 • Default = 118°C
	 \<hw\> (High Warning)
	 • High warning temperature setting
	 • Default = 100°C
	 \<hn\>(High Normal)
	 • High normal temperature setting
	 • Default = 70°C
	 \<ln\> (Low Normal)
	 • Low normal temperature setting
	 • Default = -30°C
	 \<lc\> (Low Critical)
	 • Low critical temperature setting
	 • Default = -45°C

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

!PCVOLTLIMITS	**Set/report power supply voltage state limit values** Certain modem functionality is affected by the modem's power supply voltage state. The possible voltage states are high critical, high warning, high normal, low normal, and low critical. Use this command to report or set the limits that correspond to these voltage states. **Password required:** Yes

Command	Description

	Usage:
	• Execution: **AT!PCVOLTLIMITS=\<hc\>,\<hw\>,\<hn\>,\<ln\>,\<lc\>**
	  Response: OK
	  Purpose: Set the voltage limits for each state (all five values must be specified).
	• Query: **AT!PCVOLTLIMITS?**
	  Response: HI CRIT:\<hc\>
	  HI WARN:\<hw\>
	  HI NORM:\<hn\>
	  LO NORM:\<ln\>
	  LO CRIT:\<lc\>
	  Purpose: Return the voltage limits for each state.
	Parameters:
	\<hc\> (High Critical)
	• High critical voltage setting
	• Default = 4600 mV
	\<hw\> (High Warning)
	• High warning voltage setting
	• Default = 4400 mV
	\<hn\> (High Normal)
	• High normal voltage setting
	• Default = 3300 mV
	\<ln\> (Low Normal)
	• Low normal voltage setting
	• Default = 3135 mV
	\<lc\> (Low Critical)
	• Low critical voltage setting
	• Default = 2900 mV

!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\>","\<pri_cust\>"**
	  Response: OK
	  Purpose: Set the module's PRI part number (\<priPn\>), revision (\<priRev\>), and customer name (\<pri_cust\>).
	• Query: **AT!PRIID?**
	  Response: PRI Part Number: \<priPn\>
	  Revision: \<priRevDisplay\>
	  Customer: \<pri_cust\>
	  Carrier PRI: \<bcVersion\>
	  OK
	  Purpose: Return the module's PRI information.
	Parameters:
	\<priPn\> (PRI part number)
	• 7-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)

Command	Description

	• 4-digit [ASCII]: XX.YY
	• Example: 01.00
	<pri_cust> (PRI customer name)
	    • [ASCII] string
	    • Example: "Generic Operator"
	<bcVersion> (BC version)
	    • [ASCII] string

!RATCA	**Enable/disable CA, ENDC and SA capability**
	Enable or disable CA (Carrier Aggregation), ENDC (EUTRA-NR Dual Connectivity) and SA (Stand-Alone) NR (5G-Sub6 or 5G-mmW) capability.
	Password required: No
	Usage:
	• Execution: **AT!RATCA=<ca>,<endc>,<sa>**
	   Response: OK
	   Purpose: Enable or disable CA (Carrier Aggregation), ENDC (EUTRA-NR Dual Connectivity) and SA (Stand-Alone) capability.
	• Query: **AT!RATCA?**
	   Response: !RATCA:
	                 CA:<ca>
	                 ENDC:<endc>
	                 SA:<sa>
	                 OK
	   Purpose: Query current CA, ENDC and SA capability settings.
	• Query List: **AT!RATCA=?**
	   Response: !RATCA: (0-1),(0-1),(0-1)
	                 0 - Disable Capability
	                 1 - Enable Capability
	                 OK
	   Purpose: Return valid parameter values.
	Parameters:
	<ca> (Carrier Aggregation capability)
	    • 0 – CA disabled
	    • 1 – CA enabled (Default)
	    • The setting is persistent across power cycles.
	<endc> (ENDC capability)
	    • 0 – ENDC disabled
	    • 1 – ENDC enabled (Default)
	    • The setting is NOT persistent across power cycles.
	<sa> (Stand-Alone capability)
	    • 0 – SA disabled
	    • 1 – SA enabled (Default)
	    • The setting is NOT persistent across power cycles.

!RESET	**Reset modem**
	Perform a modem reset.
	Password required: No
	Usage:
	• Execution: **AT!RESET**
	   Response: OK
	   Purpose: Reset the modem.

!RFCID	**Set/query RFC related hardware ID and board ID** Set or query RFC (Radio Frequency Card) related hardware ID and board ID. **Password required:** Yes (Execution format only) **Usage:**

Command	Description
	• Execution: **AT!RFCID=<cmw_hardware_id>,<cmw_board_id>[,<mmw_hardware_id>,<mmw_board_id>]** Response: OK Purpose: Set RFC related hardware ID and board ID. Note: All RFC IDs (set by this command) must be supported in modem RFC configuration files. Otherwise, RFC cannot work. • Query: **AT!RFCID?** Response: !RFCID: CMW_HWID: <cmw_hardware_id> CMW_BID: <cmw_board_id> MMW_HWID: <mmw_hardware_id> MMW_BID: <mmw_board_id> OK Purpose: Query current RFC related hardware ID and board ID. **Parameters:** <cmw_hardware_id> (Centimeter wave hardware ID) • Decimal ASCII number • Range: 0 – 4095 • It is applicable for WCDMA, LTE and 5G-Sub6 <cmw_board_id> (Centimeter wave board ID) • Decimal ASCII number • Range: 0 – 15 • It is applicable for WCDMA, LTE and 5G-Sub6 <mmw_hardware_id> (5G-mmW hardware ID) • Decimal ASCII number • Range: 0 – 4095 • It is applicable for 5G-mmW <mmw_board_id> (5G-mmW board ID) • Decimal ASCII number • Range: 0 – 15 • It is applicable for 5G-mmW
!RFCMBNSCAN	**Display all RFC MBN files** Display all RFC bin files(.mbn) in the device. **Password required:** No **Usage:** • Query: **AT!RFCMBNSCAN?** Response: <RFC name:> <FW tag> <build server name> <build time> <RFC tag> <RFC version> OK Example: AT!RFCMBNSCAN? 1003_0_0.mbn: SWIX55C_00.00.00.00 000000 CNSHZ-ED-SVR107 2020/08/04 09:57:32 rfctag:005 rfcver:66 1004_0_0.mbn: SWIX55C_00.00.00.00 000000 CNSHZ-ED-SVR107 2020/08/04 09:57:32 rfctag:005 rfcver:63 1005_0_0.mbn: SWIX55C_00.00.00.00 000000 CNSHZ-ED-SVR107 2020/08/04 09:57:32 rfctag:005 rfcver:61 OK Purpose: Display all RFC MBN files.
!RFDEVSTATUS	**Display all RFFE status** Display all RFFE (Radio Frequency Front End) status. **Password required:** No

Command	Description
	Usage:
	• Query: **AT!RFDEVSTATUS?**
	Response: RFC init failure
	OK
	or
	instance, manufacture id, product id, present
	\<instance\>, \<manufacture id\>, \<product id\>, \<device status\>
	……
	\<instance\>, \<manufacture id\>, \<product id\>, \<device status\>
	OK
	Example:
	AT!RFDEVSTATUS?
	instance, manufacture id, product id, present
	0 ,0x217 ,0xfed ,TRUE
	1 ,0x217 ,0x35 ,TRUE
	2 ,0x217 ,0x1c3 ,TRUE
	……
	37 ,0x134 ,0x15 , TRUE
	0 ,0xff ,0x526 ,TRUE
	1 ,0x0 ,0x0 ,FALSE
	2 ,0x0 ,0x0 ,FALSE
	……
	OK
	• Purpose: Display all RFFE status.
	Parameters:
	\<instance\>
	• Each instance indicates one RFFE device.
	• The first part of the response is for WCDMA, LTE and 5G-Sub6 (i.e., 0..37). The second part of the response is for 5G-mmW (i.e., 0..8 for low power QTM antenna modules, or 0..16 for high power QTM antenna modules).
	\<manufacture id\>
	• RFFE device manufacture ID.
	\<product id\>
	• RFFE device product ID.
	\<present\>
	• TRUE – RFFE device can work well.
	• FALSE – RFFE device cannot work.
!RXDEN	**Enable/disable WCDMA/LTE/5G-Sub6 receive (Rx) diversity**
	Enable or disable WCDMA/LTE/5G-Sub6 receive diversity.
	Note: *It is overlapped setting for LTE between !LTERXCONTROL and !RXDEN. The setting is overwritten by the later issued command.*
	During LTE CA, this command works only on the Primary component carrier (PCC). Please use AT!LTERXCONTROL for controlling SCC Rx chains
	Due to firmware design, LTE open-loop Tx power should be set to 20 dBm when measuring SISO sensitivity with Rx diversity as the primary path.
	Password required: Yes
	Reset required to apply changes: Yes
	Persistent across power cycles: Yes
	Usage:
	• Execution: **AT!RXDEN=\<WCDMA/LTE/NR5G flag\>[,\<RX CHAIN SELECT\>]**

Command	Description
	Response: OK
	Purpose: Enable or disable Rx diversity.
	• Query: **AT!RXDEN?**
	Response: !RXDEN: <WCDMA/LTE/NR5G flag>[,RX CHAIN SELECT]
	Purpose: Query current parameter settings.
	• Query List: **AT!RXDEN=?**

	Response: !RXDEN: <WCDMA/LTE/NR5G flag>,[RX CHAIN SELECT]
	     0 - Disable Rx diversity
	     1 - Enable Rx diversity
	     2 - Rx diversity as primary path (Not applicable for TDSCDMA, both paths are enabled)
	     [RX CHAIN SELECT]:
	     0 - Rx1 diversity as primary path,
	     1 - Rx2 diversity as primary path,
	     2 - Rx3 diversity as primary path
	     OK

	Purpose: Return valid parameter values.

	Parameters:
	 <WCDMA/LTE/NR5G flag> (Component carrier ID)
	   • It is applicable for 3G/4G/5G-Sub6
	   • 0 – Disable Rx diversity (means primary Rx path only)
	   • 1 – Enable Rx diversity (means all 4 Rx paths. It is default)
	   • 2 – Rx diversity as primary path (which depends on parameter <RX CHAIN SELECT>)
	 <RX CHAIN SELECT> (Select Rx path)
	   • It is optional parameter which is used only when <WCDMA/LTE/NR5G flag>=2
	   • 0 – Rx1 diversity as primary path (means MIMO1 Rx path only)
	   • 1 – Rx2 diversity as primary path (means MIMO2 Rx path only)
	   • 2 – Rx3 diversity as primary path (means aux Rx path only)

!SELRAT	**Set preferred RAT**
	Set the preferred RAT mode(s) for acquisition.
	If the module's current band setting is not compatible with the selected RAT, either an appropriate band will be selected automatically and set on the modem, or an ERROR may be returned.
	
	Important: To avoid issues with incompatible RAT/band combinations, if !BAND and !SELRAT are both used, either !BAND must be set to 'All Bands' or !SELRAT must be set to 'Automatic'.
	
	Password required: No
	Reset required to apply changes: No
	Persistent across power cycles: Yes
	Usage:
	• Execution: **AT!SELRAT=<ratInd>**
	     Response: OK
	     Purpose: Set the desired RAT.
	• Query: **AT!SETRAT?**
	     Response: <ratInd>, RAT configuration description
	             OK
	     or Unknown RAT mode. Use AT!SELRAT to set mode.
	             <ratInd>
	             OK
	     Purpose: Return the current RAT (<ratInd>) and description. If the <ratInd> is undefined, an error message is returned.

Command	Description

	• Query List: **AT!SELRAT=?**
	    Purpose: Return a list of supported RAT index values and their descriptions.
	Parameters:
	<ratInd> (RAT index):
	  • 00 – Automatic
	  • 01 – UMTS 3G only
	  • 04 – LTE only
	  • 05 – 5G only
	  • 0E – UMTS and LTE only
	  • 0F – LTE and NR5G only
	  • 10 – WCDMA and NR5G only

!SKU	**Display module's SKU**
	Display the module's production SKU number.
	Password required: Yes
	Usage:
	• Query: **AT!SKU?**
	   Response: !SKU:<SKU>
	              OK
	   Purpose: Display the module's SKU number.
	• Query List: **AT!SKU=?**
	   Purpose: Return the query command format.
	Parameters:
	<SKU> (Module's SKU number)
	  • 7-digit integer
	  • Example: 1101234

!TMCONFIG	**Configure thermal mitigation thresholds**
	EM91 series modules are pre-configured with thermal mitigation thresholds for several sensors. This command can be used to display and modify the configured thresholds.
	
	Password required: Yes (Execution format)
	Reset required: Yes. Changes will appear in the query response as soon as they are made, but the module must be reset for the changes to take effect.
	Usage:
	• Execution:
	   AT!TMCONFIG=<tm_device>,<t1>,<t2>,[<t3>],<t1_clr>,<t2_clr>,[<t3_clr>]
	   Response: OK
	   Purpose: Set the thresholds for initiating thermal mitigation steps, and for ending the mitigations.
	• Query: **AT!TMCONFIG?**
	   Response: [<tm_device>] ← *i.e. "[pa]", "[pa_fr1]", "qfe_mmw2", etc.*
	               thermal_zone <tm_zone>
	               sampling <sample> <sample> <sample> <sample>
	               thresholds <t1> <t2> <t3> 528
	               thresholds_clr -273 <t1_clr> <t2_clr> <t3_clr>
	               actions <action> <action> <action> <action>
	               action_info <act_info> <act_info> <act_info> <act_info>
	
	               […] ← *repeats for each <tm_device>*
	
	               OK
	   Purpose: Display the configuration of a specified carrier's SIM, or of all SIMs

Command	Description

	(do not include <carrier_name>).
	• Query List: **AT!IMCONFIG=?**
	  Purpose: Return the command format and the supported parameter values.
	Usage notes:
	• Before changing any threshold values, make sure to use AT!TMCONFIG? and record the default values. When finished testing, use the execution format to reset the threshold values appropriately.
	Parameters:
	<tm_device> (Device sensor):
	• 0 – pa (4G/3G/2G only)
	• 1 – pa_1 (4G/3G/2G only)
	• 2 – pa_fr1 (5G only)
	• 3 – pa_1_fr1 (5G only)
	• 4 – modem_tsens
	• 5 – modem_tsens1
	• 6 – mmw0
	• 7 – mmw1
	• 8 – mmw2
	• 9 – mmw3
	<tm_zone> (Thermal zone that monitors the <tm_device>s in a thermal region and triggers mitigation):
	• ASCII string
	• Valid values:
	  • pa
	  • pa_fr1
	  • modem
	  • mmw0
	  • mmw1
	  • mmw2
	  • mmw3
	<sample> (Number of samples taken):
	• Numeric. This is a fixed value; the number of samples cannot be changed.
	<t1>,<t2>,<t3> (Thermal threshold values in °C):
	• Mitigation begins when the detected temperature is ≥ this value.
	• Valid range: 0–527
	• The thermal threshold value for <act_info>=3 is 528 and cannot be changed since there are no further mitigations possible.
	<t1_clr>,<t2_clr>,<t3_clr> (Thermal threshold clear values in °C):
	• Mitigation ends when the detected temperature is less than the corresponding <t#> threshold. (e.g. <t1_clr> < <t1>)
	• Valid range: 0–527
	• The thermal threshold clear value for <act_info>=0 is -273 and cannot be changed since there are no further mitigations to clear.
	<action> (Action associated with the thermal threshold and threshold clear values):
	• "mitigate" – Thermal mitigation
	• No other values are supported.
	<act_info> (Thermal mitigation level):
	• Mitigation level
	• Valid values:
	  • 0 – No mitigation
	  • 1 – Level 1 mitigation.
	  • 2 – Level 2 mitigation.
	  • 3 – Level 3 mitigation.
	Examples:
	Change thresholds for device 4 (modem_tsens):
	AT!TMCONFIG=4,35,40,45,33,38,42
	OK

Command	Description

!TMSTATUS	**Report Thermal Mitigation Status**
	
	Report the thermal mitigation status of available thermal mitigation devices (TMD) in the module. Also, during an active mmW ENDC call, report the current temperatures of the mmW antenna modules.
	For additional information, refer to *[3] AirPrime EM919x/EM7690 Thermal Mitigation*.
	Password required: No
	Usage:
	
	• Query: AT!TMSTATUS?
	
	Response: Device Level Temperature(C)
	            <device> <status> [<temp>]
	            …
	            OK
	Purpose: Return the thermal mitigation status.
	
	Parameters:
	<device> (Thermal mitigation (cooling) device)
	• "cpuv_restriction_cold" – CPU voltage mitigation
	• "mmw0" – "mmw3" – Cooling devices for mmWave antenna modules QFE_MMW0 to QFE_MMW3, respectively. (Note – Antenna module designations cannot be changed.)
	
	Note – As of this document's publication date, only mmw0 is reported. A future firmware update will enable reporting of mmw1–mmw3.
	• "modem" – Cooling device for MODEM_TSENS/MODEM_TSENS1 sensors.
	• "pa" – Cooling device for PA/PA1 sensors; applies to WCDMA and LTE thermal mitigation actions.
	• "pa_fr1" – Cooling device for PA/PA1 sensors; applies to 5G NR Sub6 thermal mitigation actions.
	<status> (Device thermal mitigation level)
	• Valid values are <device>-dependent:
	• For device "cpuv_restriction_cold":
	    • 0 – No mitigation
	    • 1 – Restricts the voltage
	• For device "mmw0" – "mmw3":
	    • 0 – No mitigation
	    • 1 – Reduce number of antenna elements (4 / 4-2 / 2-1 / 1)
	    • 2 – Reduce number of antenna elements (1 / 1-0 / 0)
	    • 3 – No data calls
	• For device "modem":
	    • 0 – No mitigation
	    • 1 – DL data rate throttling
	    • 3 – No data calls
	• For device "pa" or "pa_fr1":
	    • 0 – No mitigation
	    • 1 – UL data rate throttling
	    • 2 – UL rate throttling and Tx power limiting
	    • 3 – No data calls
	<temp> (Device temperature, in °C)
	• Always reported for mmWave antenna modules. (Temperature display for other antenna modules to be supported in a future firmware update.)
	• Actual mmWave antenna module temperature is reported only during an active mmW ENDC call. Otherwise, the temperature is reported as -273 °C.
	• Note – As of this document's publication date, only mmw0 is reported. A future firmware update will enable reporting of mmw1–mmw3.

!USBCOMP	**Set/report USB interface configuration**

Command	Description

	Set or display the device's USB interface configuration.
	
	By default, devices are typically configured to use a USB composition that presents a minimal set of interfaces from a list of available interfaces. This command is used to add or remove interfaces from the configuration.
	
	Note that the RmNet and MODEM interfaces are mutually exclusive – they cannot both be enabled at the same time.
	
	Password required: Yes
	Usage:
	• Execution: **AT!USBCOMP=\<config_index\>,\<config_type\>,\<interface_bitmask\>**
	  Response: OK
	  Purpose: Set the device's USB interface configuration.
	• Query: **AT!USBCOMP?**
	  Response: Config Index: \<config_index\>
	      Config Type:
	      \<config_type\>
	      Interface bitmask:
	      \<interface_bitmask\>
	      OK
	  Purpose: Return the device's USB interface configuration.
	Parameters:
	\<config_index\> (Configuration index)
	• 1
	\<config_type\> (Configuration type)
	• 1 – Generic (Note: Reserved for future use, not currently supported)
	• 2 – USBIF MBIM (Note: Reserved for future use, not currently supported)
	• 3 – RNDIS (Note: Reserved for future use, not currently supported)
	• 4 – USBIF MBIM V2
	\<interface_bitmask\> (USB interface bitmask)
	• DIAG – 0x00000001
	• ADB – 0x00000002
	• MODEM – 0x00000008 (mandatory)
	• RmNet – 0x00000100 (Note: If RmNet is enabled, MBIM must be disabled.)
	• MBIM – 0x00001000 (Note: If MBIM is enabled, RmNet must be disabled.)

!USBPID	**Set/query USB product IDs**
	Set or query product IDs in USB descriptor.
	Password required: Yes
	Usage:
	• Execution: **AT!USBPID=\<app_product_id\>[,\<boot_product_id\>]**
	  Response: OK
	  Purpose: Set the device's USB product IDs.
	• Query: **AT!USBPID?**
	  Response: !USBPID:
	      APP: \<app_product_id\>
	      BOOT: \<boot_product_id\>
	      OK
	  Purpose: Return the device's USB product IDs.
	• Query List: **AT!USBPID=?**
	  Response: APP BOOT
	      \<app product_id\>, \<boot_product_id\>
	      OK
	  Purpose: Return available default app PIDs and their relevant boot PIDs.
	Parameters:
	\<app_product_id\> (APP product ID)

Command	Description
	• Hex ASCII number • Range: 0000 – FFFF <boot_product_id> (BOOT product ID) • Hex ASCII number • Range: 0000 – FFFF

!USBVID	**Set/query USB vendor ID**
	Set or query vendor ID in USB descriptor.
	Password required: Yes
	Usage:
	• Execution: **AT!USBVID=<vendor_id>**
	  Response: OK
	  Purpose: Set the device's USB vendor ID.
	• Query: **AT!USBVID?**
	  Response: !USBVID:
	          <vendor_id>
	          OK
	  Purpose: Return the device's USB vendor ID.
	Parameters:
	<vendor_id>
	• Hex ASCII number
	• Range: 0000 – FFFF

!VERINFO	**Display image version and security state**
	Display SBL, TZ, AOP, UEFI, Mpss, OS, Yocto, RootFS version and security state information which indicates the module is in secure or unsecure state.
	Password required: No
	Usage:
	• Execution: **AT!VERINFO**
	  Response: SBL: <version>
	          TZ: <version>
	          AOP: <version>
	          UEFI: <version>
	          Mpss: <version>
	          OS: <version>
	          Yocto: <version>
	          RootFS: <version>
	          Security: <secure_info>
	          [(debug policy:
	          <debug_policy_bitmask>]
	          OK
	  Purpose: Display image version and security state.
	Parameters:
	<version> (Image version information)
	• ASCII string
	• Example: SWIX55C_00.04.06.00 488291 jenkins 2019/09/30 03:56:48
	<secure_info> (security state)
	• ASCII string
	• secure – if secure boot enabled and secure debug disabled, and debug policy bitmask are 0
	• unsecure – if secure boot not enabled, or secure boot enabled but secure debug not disabled
	• unsecure (debug policy: 0xXXXXXXXXXXXXXXXX) – if secure boot enabled and debug policy bitmask > 0
	<debug_policy_bitmask> (Indicate different debug policy functions)

Command	Description
	• bit 0 = 1 – Enable crash dumps before boot • bit 1 = 1 – Enable crash dumps during boot • bit 2 = 1 – Enable JTAG • bit 3 = 1 – Enable QTEE/QSEE logging • bit 4 ~ bit 8 – MSS debug related • bit 9 ~ bit 23 – Reserved • bit 24 = 1 – Enable crash dumps of memory other than QTEE/QSEE secure regions • bit 25 ~ bit 31 – Encrypted mini dumps related • bit 32 ~ bit 47 – Reserved • bit 48 = 1 – Enable Sierra assistant debug tools • bit 49 ~ bit 63 – Reserved
&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

4.1. Introduction

This chapter describes commands used to diagnose modem problems.

4.2. Command Summary

Table 4-1 lists the commands described in this chapter.

Table 4-1   Diagnostic Commands

Command	Description
!BCFWUPDATESTATUS	Report status of most recent firmware update attempt
!ERR	Display diagnostic information
!GCCLR	Clear crash dump data
!GCDUMP	Display crash dump data
!IMSTESTMODE	Enable/disable IMS test mode
!LEDTEST	Test to switch on/off LED

4.3. 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 is successful.
	  • "FAILED" — Last update is failed.

Command	Description

	<type> (Firmware image type that failed to update)
	   • ASCII string
	   • Note: Parameter appears only if <result> is FAILED
	<data> (Reference data for failed image)
	   • Location of the reference data as an offset in the CWE image
	   • Valid range: 0–(2^{32}-1)
	   • Note: Parameter appears only if <result> is FAILED
	<part> (Partition associated with the failed image)
	   • ASCII string
	   • Applies only to configuration updates
	   • Note: Parameter appears only if <result> is FAILED

!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**
	    Response: MODEM APPS
	                  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.

!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

Command	Description
	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
!LEDTEST	**Test to switch on/off LED**
	Switch on or off the LED that is connected to the WWAN_LED pin.
	Password required: No
	Usage:
	• Execution: **AT!LEDTEST=\<led no>,\<state>**
	Response: OK
	Purpose: Switch on/off LED.
	• Query List: **AT!LEDTEST=?**
	Response: !LEDTEST: \<led no>,\<state>
	Turn an LED on or off
	\<led no>: led index, zero-based
	\<state>: value (1:On, 0:Off)
	Parameters:
	\<led no> (LED index number)
	• 0 – LED connected to WWAN_LED pin
	\<state> (LED state)
	• 0 – Off
	• 1 – On

5. Test Commands

5.1. Introduction

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

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

5.2. Command Summary

Table 5-1 lists the commands described in this chapter.

Table 5-1   Test Commands

Command	Description
!DACGPSCTON	Return GPS CtoN and frequency measurement
!DACGPSSTANDALONE	Enter/exit StandAlone (SA) RF mode
!DACGPSTESTMODE	Start/stop CGPS diagnostic task
!DAFTMACT	Put modem into Factory Test Mode
!DAFTMDEACT	Put modem into online mode from Factory Test Mode
!DAGFTMRXAGC	Get FTM Rx AGC
!DAUPDATEPARAM	Update parameters to prepare for !DARCONFIG
!DARCONFIG	Configure radio
!DARCONFIGDROP	Drop Radio Configurations
!DASUB6TECHACT	Start/stop 5G-Sub6 technology
!DATXCONTROL	Configure Tx Power
!DAMMWACT	Activate 5G-mmW RF debug in FTM mode
!DAMMWDEACT	Deactivate 5G-mmW RF debug in FTM mode

5.3. Command References

Table 5-2   Test Command Details

Command	Description
!DACGPSCTON	**Return GPS CtoN and frequency measurement** Return the GPS CtoN and frequency measurement. **Requirements:** 1. AT!DACGPSTESTMODE=1 *(to start CGPS diagnostic task)* 2. AT!DACGPSSTANDALONE=1 *(to enter SA RF mode)* **Password required:** Yes **Usage:** • Execution: AT!DACGPSCTON=<GNSS_path>

Command	Description
	Response: CtoN=<CtoN>, Freq=<freq> OK Purpose: Return CtoN and frequency measurements. **Parameters:** <GNSS_path> (GNSS signal path) • 1 — GNSS L1 signal path • 5 — GNSS L5 signal path <CtoN> (Signal strength calculated in dBHz as part of WBIQ test) • Uint32 <freq> (Frequency in Hz calculated as part of WBIQ test) • Int32
!DACGPSSTANDALONE	**Enter/exit StandAlone (SA) RF mode** Enter/exit SA RF mode. **Requirements:** AT!DACGPSTESTMODE=1 *(to start CGPS diagnostic task)* **Password required:** Yes **Usage:** • Execution: **AT!DACGPSSTANDALONE=<state>** Response: 4B0D 65001 400 OK or Error Purpose: Enter/exit SA RF mode **Parameters:** <state> (SA RF mode state) • 0=Exit SA RF mode • 1=Enter SA RF mode
!DACGPSTESTMODE	**Start/stop CGPS diagnostic task** Start/stop the CGPS diagnostic task. **Password required:** Yes **Usage:** • Execution: **AT!DACGPSTESTMODE=<mode>** Response: *(for start):* 4B0D0800 OK (for stop): 4B0D0C00 OK or Error Purpose: Start or stop the CGPS diagnostic test. **Parameters:** <mode> (CGPS diagnostic task mode) • 0=Stop • 1=Start
!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.

Command	Description

	Note: When this command executes successfully, the modem responds with the value 290300. Any other response indicates an error.
	
	Requirement: The device must be in full functionality mode (AT+CFUN=1) to use this command.
	
	Password required: Yes
	Usage:
	• Execution: **AT!DAFTMACT**
	  Response: 290300 *(Success. Any other response indicates an error.)*
	     OK
	  Purpose: Place modem in FTM mode (from online 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:
	• Execution: **AT!DAFTMDEACT**
	  Response: 290400 *(Success. Any other response indicates an error.)*
	     OK
	  Purpose: Place modem in online mode (from FTM mode).

!DAGFTMRXAGC	**Get FTM Rx AGC**
	Get the FTM Rx AGC on the primary, diversity path, MIMO or mmW IF paths.
	Requirements:
	Before using this command:
	• **!DAFTMACT** must be issued to put the modem into FTM.
	• **!DAUPDATEPARAM** must be issued to update/get parameters except for 5G-mmW.
	• **!DARCONFIG** must be issued to set the technology, band, and channel.
	Password required: Yes
	Usage:
	• Execution: **AT!DAGFTMRXAGC=<carrier>, <technology>, <expected_AGC>, <path> [,<beam_ID>]**
	  Response: <rssi>
	     OK
	  Purpose: Return the FTM Rx AGC value.
	Parameters:
	 <carrier> (Carrier ID)
	    • 0 — PCC
	 <technology> (Radio access technology (RAT))
	    • RAT support is device dependent.
	    • 1 — WCDMA
	    • 3 — LTE
	    • 6 — 5G-Sub6 or 5G-mmW
	 <expected_AGC> (Expected AGC value)
	    • Valid range: -550 to 230
	    • It is 10 times expected AG
	    • e.g. '-505' means -50.5 dBm power
	<path> (Rx path)
	    • 0 — Primary Rx
	    • 1 — MIMO1
	    • 2 — MIMO2

Command	Description
	• 3 — Diversity Rx • 4 — mmW IF Rx <beam_ID> (5G-mmW beam ID) • It is applicable for 5G-mmW • Valid ranges: • IFV port: 0–127 • IFH port: 128–255 • It selects which mmW IF port for testing • Refer to document *[2] AirPrime EM919x Customer Production Test Mode* for the mapping between beam ID and mmW IF port <rssi> (RSSI, in dBm) • Dynamic Rx AGC
!DAUPDATEPARAM	**Update parameters to prepare for !DARCONFIG** Update/get signal path, RFM (Radio Frequency Module) device, etc. according to specific band. **Requirements:** Before using this command: • **!DAFTMACT** must be issued to put the modem into FTM. **Password required:** Yes **Usage:** Execution: **AT!DAUPDATEPARAM=<technology_family>,<band>[,<subband_type>]** Response: OK Purpose: Update/get signal path, RFM (Radio Frequency Module) device, etc. according to specific band. **Parameters:** <technology_family> (Radio access technology (RAT) family type) • 1 — WCDMA • 10 — LTE • 18 — 5G-Sub6 <band> (Band number) • Valid range: refer to section "Supported RF Bands" of document *[1] AirPrime EM919X-EM7690 Product Technical Specification*. • e.g. '1' is maybe WCDMA B1 or LTE B1 or 5G-Sub6 N1 <subband_type> (Sub-band type) • 1 — Sub-band B • It is only for sub-band B. For example, use AT!DAUPDATEPARAM=10,28,1 to update parameters for LTE B28**B**.
!DARCONFIG	**Configure radio** Configure the module's radio to a specific RAT, band, channel, bandwidth, etc. **Requirements:** Before using this command: • **!DAFTMACT** must be issued to put the modem into FTM. • **!DAUPDATEPARAM** must be issued to update/get parameters except for 5G-mmW. **Password required:** Yes **Usage:** Execution: **AT!DARCONFIG=<carrier>,<technology>,<band>,<tx_channel>[,<bw>,<rx_channel>[,<mimo_mode>[,<beam_ID>[,<continuous_mode>]]]]** Response: OK Purpose: Set the selected RAT's band and channel, bandwidth, etc. **Parameters:**

Command	Description
	<carrier> (Carrier ID) • 0 — PCC **<technology>** (Radio access technology (RAT)) • RAT support is device-dependent • 1 — WCDMA • 3 — LTE • 6 — 5G Sub6 or 5G-mmW **<band>** (Band number) • Valid range: refer to section "Supported RF Bands" of document *[1] AirPrime EM919X-EM7690 Product Technical Specification*. • e.g. '1' is maybe WCDMA B1 or LTE B1 or 5G-Sub6 N1 **<tx_channel>** (Uplink channel number for selected <band>) • Integer value • <band>-dependent, refer to tables "Test Settings — xxx Transmission Path" of document *[2] AirPrime EM919x Customer Production Test Mode*. **<bw>** (Bandwidth) • Valid range for LTE: 0 — 5 • Valid range for 5G-Sub6: 2 — 13 • Valid range for 5G-mmW: 9, 13 • 0 — 1.4 MHz • 1 — 3 MHz • 2 — 5 MHz • 3 — 10 MHz • 4 — 15 MHz • 5 — 20 MHz • 6 – 25MHz • 7 – 30MHz • 8 – 40MHz • 9 – 50MHz • 10 – 60MHz • 11 – 80MHz • 12 – 90MHz • 13 – 100MHz • <band>-dependent, refer to table "LTE Bandwidth Support" and "NR Bandwidth Support" of document *[1] AirPrime EM919X-EM7690 Product Technical Specification*. **<rx_channel>** (Downlink channel number for selected <band>) • Applies to LTE, 5G-Sub6 and 5G-mmW • 1 – for LTE • <band>-dependent, refer to tables "Test Settings — 5G xx Transmission Path" of document *[2] AirPrime EM919x Customer Production Test Mode* for 5G. **<mimo_mode>** (MIMO mode) • Applies to LTE and 5G-Sub6 • 0 — Not supported (Default) • 1 — Support **<beam_ID>** (5G-mmW beam ID) • Applies to 5G-mmW only. If <continuous_mode> is used for LTE or 5G-Sub6, leave this parameter blank. • Valid ranges: • IFV port: 0–127

Command	Description
	• IFH port: 128–255 • It selects which mmW IF port for testing • Refer to document *[2] AirPrime EM919x Customer Production Test Mode* for the mapping between beam ID and mmW IF port. <continuous_mode> (Burst or Continuous mode) • Applies to LTE, 5G-Sub6 and 5G-mmW • 0 — Burst mode • 1 — Continuous mode (Default)
!DARCONFIGDROP	**Drop Radio Configurations** Drop the radio configurations that were previously set using !DARCONFIG. This command must be used when switching between technologies (RATs). **Requirements:** Before using this command: • **!DAFTMACT** must be issued to put the modem into FTM. **Password required:** Yes **Usage:** • Execution: **AT!DARCONFIGDROP=<technology>** Response: OK Purpose: Drop the current configurations for the selected RAT (<technology>). **Parameters:** <technology> (Radio access technology (RAT)) • RAT support is device-dependent • 1 — WCDMA • 3 — LTE • 6 — 5G-Sub6 or 5G-mmW
!DASUB6TECHACT	**Start/stop 5G-Sub6 technology** Start 5G-Sub6 technology before 5G-Sub6 radio configuration with !DARCONFIG or stop 5G-Sub6 technology after dropping 5G-Sub6 radio configuration with !DARCONFIGDROP. **Requirements:** Before using this command: • **!DAFTMACT** must be issued to put the modem into FTM. **Password required:** Yes **Usage:** • Execution: **AT! DASUB6TECHACT=<enable>** Response: OK Purpose: Start/stop 5G-Sub6 technology. **Parameters:** <enable> • 1 — Start 5G-Sub6 technology • 0 — Stop 5G-Sub6 technology
!DATXCONTROL	**Configure Tx Power** Configure Tx Power for WCDMA, LTE, 5G-Sub6 and 5G-mmW. **Requirements:** Before using this command: • **!DAFTMACT** must be issued to put the modem into FTM. • **!DAUPDATEPARAM** must be issued to update/get parameters except for 5G-mmW. • **!DARCONFIG** must be issued to set the technology, band, channel, etc.

Command	Description
	Password required: Yes
	Usage:
	• Execution: **AT!DATXCONTROL=<carrier>,<technology>,<enable>,<power_dBm10>[,<waveform>,<mod>,<ns_value>,<start_RB>,<num_RB>[,<beam_ID>[,<duty_cycle>]]]** Response: OK Purpose: Set the Tx parameters for WCDMA, LTE, 5G-Sub6 and 5G-mmW.

	Parameters:
	<carrier> (Carrier ID)
	  • 0 — PCC
	<technology> (Radio access technology (RAT))
	  • RAT support is device-dependent
	  • 1 — WCDMA
	  • 3 — LTE
	  • 6 — 5G-Sub6 or 5G-mmW
	<enable> (Enable/disable Tx power output)
	  • 0 — Disable
	  • 1 — Enable
	<power_dBm10> (Desired Tx power in dBm)
	  • Valid range: -550 to 230
	  • It is 10 times desired Tx power
	  • e.g. -505 means -50.5 dBm Tx power
	  • Value is ignored if <enable>=0.
	<waveform> (Waveform for LTE, 5G-Sub6 or 5G-mmW)
	  LTE waveform
	  • 0 — 1MHz offset CW
	  • 1 — LTE PUSCH
	  • 2 — LTE PUCCH
	  • 3 — LTE PRACH
	  • 4 — LTE SRS
	  • 5 — UpPTS
	  5G-Sub6 or 5G-mmW waveform
	  • 1 — CW
	  • 2 — Offset CW
	  • 9 — Reserved
	  • 10 — PUSCH
	  • 11 — PUSCH DFT-S
	<mod> (Tx modulation)
	  • Applies to LTE, 5G-Sub6 and 5G-mmW
	  • 0 — QPSK
	  • 1 — 16 QAM
	  • 2 — 64 QAM
	  • 3 — 256 QAM
	  • 4 — BPSK (5G-Sub6 and 5G-mmW only)
	<ns_value> (Network signal value)
	  • Applies to LTE, 5G-Sub6 and 5G-mmW
	  • Valid range: 1 — 32
	  • It affects max output power
	<start_RB> (Start resource block index)

Command	Description
	- Applies to LTE, 5G-Sub6 and 5G-mmW - Valid range: 0 — 273 - It can start from any number but should not exceed maximum resource block value which varies according to different band, bandwidth and SCS configuration (refer to Table 5-3 for details). **<num_RB> (Number of resource blocks)** - Applies to LTE, 5G-Sub6 and 5G-mmW - Valid range: 0 — 273 - The maximum resource block value varies according to different band, bandwidth and SCS configuration (refer to Table 5-3 for details). **<beam_ID> (5G-mmW beam ID)** - Applies to 5G-mmW only. If <duty_cycle> is used for LTE or 5G-Sub6, leave this parameter blank. - Valid ranges: - IFV port: 0–127 - IFH port: 128–255 - It selects which mmW IF port for testing - Refer to document [2] AirPrime EM919x Customer Production Test Mode for the mapping between beam ID and mmW IF port. **<duty_cycle> (Transmission duty cycle)** - Applies to LTE, 5G-Sub6 and 5G-mmW radio configurations in burst mode. If the radio is in continuous mode, <duty_cycle> will be ignored. - LTE: 1 – 10% duty cycle 2 – 20% duty cycle 3 – 30% duty cycle 4 – 40% duty cycle 5 – 50% duty cycle 6 – 60% duty cycle 7 – 70% duty cycle 8 – 80% duty cycle 9 – 90% duty cycle 10 – 100% duty cycle (Default) 5G Sub6, 5G-mmW: 0 – 20% duty cycle 1 – 25% duty cycle 2 – 40% duty cycle 3 – 50% duty cycle (Default)
!DAMMWACT	**Activate 5G-mmW RF debug in FTM mode** Activate 5G-mmW RF debug in FTM mode. **Requirements:** Before using this command: **!DAFTMACT** must be issued to put the modem into FTM. **Password required:** Yes **Usage:** Execution: **AT!DAMMWACT** Response: OK Purpose: Activate 5G-mmW RF debug in FTM mode.
!DAMMWDEACT	**Deactivate 5G-mmW RF debug in FTM mode** Deactivate 5G-mmW RF debug in FTM mode. **Requirements:** Before using this command:

Command	Description
	• **!DAFTMACT** must be issued to put the modem into FTM. **Password required:** Yes **Usage:** Execution: **AT!DAMMWDEACT** Response: OK Purpose: Deactivate 5G-mmW RF debug in FTM mode.

5.4.   Number of Resource Block

Table 5-3   Maximum Transmission Bandwidth Configuration NRB

SCS (kHz)	N_{RB}											
	5 MHz	10 MHz	15 MHz	20 MHz	25 MHz	30 MHz	40 MHz	50 MHz	60 MHz	80 MHz	90 MHz	100 MHz
15 (FDD)	25	52	79	106	133	160	216	270	N/A	N/A	N/A	N/A
30 (TDD)	11	24	38	51	65	78	106	133	162	217	245	273
60 (N/A)	N/A	11	18	24	31	38	51	65	79	107	121	135

Note: This table is from 3GPP TS 38.521-1 V15.3.0. FDD bands only support 15KHz, SCS and TDD bands only support 30KHz SCS.

6. Memory Management Commands

6.1. 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.

6.2. Command Summary

Table 6-1 lists the commands described in this chapter:

Table 6-1 Memory Management Commands

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

6.3. Command Reference

Table 6-2 Memory Management Command Details

Command	Description
!NVBACKUP	**Back up device configuration** Save the device's current configuration as a "restore point". The restore point can then be restored later if necessary, using !RMARESET. **Password required:** No **Usage:** • Execution: **AT!NVBACKUP[=<restore point>[,<name>]]** Response: !NVBACKUP: Items Saved: <saved> Items Skipped: <skipped> OK Purpose: Save the current device configuration to the indicated <restore point>. Note: The restore point replaces the existing same-numbered restore point (if present) and deletes higher-numbered restore points. (i.e. saving to <restore point>=2 replaces any existing configuration in that restore point, and deletes the configuration in <restore point>=3) • Query: **AT!NVBACKUP?** Response: !NVBACKUP: <restore point> <name> ... OK Purpose: Display all saved restore points.

Command	Description
	Usage notes: • When saving a restore point: • If no parameters are entered (i.e. "AT!NVBACKUP"), the next available restore point is used (i.e. \<restore point\>=2 will be used if it is empty, otherwise \<restore point\>=3 will be used). • The existing \<restore point\> is replaced (if present). • Higher-numbered restore points are deleted. • If a \<name\> is not specified, the file is saved as "unnamed" or "Latest", depending on the \<restore point\>. **Parameters:** \<restore point\> (Type of saved restore point) • Valid range: 0–3 • 0=Sierra factory-calibrated configuration (Reserved for internal use) • 1=Sierra-provided SKU configuration (Reserved for internal use) • 2=Save the current configuration using a user-defined \<name\>. If no \<name\> is specified, save as "unnamed". • 3=Save the current configuration as the 'Latest' restore point. Note: The category 3 restore point is also generated automatically after a successful reconfiguration (e.g. after an image switch or firmware update). \<name\> (Name used to store the restore point) • 0–32 ASCII characters • \<restore point\> = 0 — "Factory" (Sierra factory-calibrated configuration, pre-SKU) • \<restore point\> = 1 — "Provision" (Sierra-provisioned SKU configuration) • \<restore point\> = 2 — User-defined name provided when restore point was saved, or "unnamed" if no name was provided • \<restore point\> = 3 — User-defined name provided when restore point was saved, or "Latest" (Latest saved configuration) if no name was provided \<saved\> (Number of saved items) • 0–(2^{32} - 1) \<skipped\> (Number of skipped items) • 0–(2^{32} - 1) • Note: Does not display if 0
!RMARESET	**Restore device to saved restore point** Restore the device to a previously saved restore point. Important – Using this command may erase any settings performed by the user. Sierra Wireless recommends creating a backup (using the !NVBACKUP command) in restore point 2 after making configuration changes (e.g. after downloading mmWave or Smart Transmit settings). **Password required:** Yes **Reset required to apply changes:** Yes **Usage:** • Execution: **AT!RMARESET=\<restore point\>** Response: !RMARESET: DEVICE REBOOT REQUIRED Items Restored: \<restored count\> Items Deleted: \<deleted count\> Items Defaulted: \<defaulted count\> Items Skipped: \<skipped count\> OK Purpose: Restore device to the specified \<restore point\> (configuration). A reboot is required to take effect. • Query: **AT!RMARESET?** Response: !RMARESET: \<restore point\> \<name\>

Command	Description
	... OK Purpose: Display all available restore points. **Parameters:** <restore_point> (Saved restore point) 0=Sierra factory-calibrated configuration (Note: For information only, cannot be restored.) 1=Sierra-provided SKU configuration 2=Restore to the restore point that was saved earlier using !NVBACKUP. 3=Restore to the latest saved restore point (saved earlier using !NVBACKUP or automatically when the device was successfully reconfigured, e.g. after an image switch or firmware update) <name> (Descriptive name of <restore_point>) - ASCII string, varies by <restore point>: <restore point> = 0 — "Factory" (Sierra factory-calibrated configuration, pre-SKU) <restore point> = 1 — "Provision" (Sierra-provisioned SKU configuration) <restore point> = 2 — User-defined name provided when using !NVBACKUP to save a configuration, or "unnamed" if no name was provided <restore point> = 3 — User-defined name provided when using !NVBACKUP to save a configuration, or "Latest" (Latest saved configuration)

7. GNSS Commands

7.1. Introduction

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

When using these commands, the following considerations apply:

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

7.2. Command Summary

Table 7-1 lists the commands described in this chapter:

Table 7-1   GNSS Commands

Command	Description
!GPSAUTOSTART	Configure GPS auto-start features
!GPSCLRASSIST	Clear specific GPS assistance data
!GPSCOLDSTART	Clear all GNSS assistance data
!GPSEND	End an active session
!GPSFIX	Initiate GPS position fix
!GPSLBSAPN	Set GPS LBS APNs
!GPSLOC	Return last known location of the modem
!GPSMOMETHOD	Set/report GPS MO method
!GPSPORTID	Set/report port ID to use over TCP/IP
!GPSSATINFO	Request satellite information
!GPSSTATUS	Request current status of a position fix session
!GPSSUPLURL	Set/report SUPL server URL
!GPSSUPLVER	Set/report SUPL server version
!GPSTRACK	Initiate local tracking (multiple fix) session

7.3. Command Reference

Table 7-2   GNSS Command Details

Command	Description
!GPSAUTOSTART	**Configure GPS auto-start features** Configure the GPS auto-start features. Any changes take effect the next time the modem is reset. *Note: If auto-start is enabled, another GPS session cannot be started.* **Password required:** No

Command	Description

	Usage:
	• Execution: **AT!GPSAUTOSTART=\<function>[, \<fixtype>, \<maxtime>, \<maxdist>, \<fixrate>]**
	    Response: OK
	       or ERROR
	    Purpose: Assign start values for various GPS settings
	• Query: **AT!GPSAUTOSTART?**
	    Response: !GPSAUTOSTART
	        function: \<function>
	        fixtype: \<fixtype>
	        maxtime:\<maxtime>seconds
	        maxdist: \<maxdist> meters
	        fixrate: \<fixrate> seconds
	        OK
	    Purpose: Display the current values for auto-start features
	• Query List: **AT!GPSAUTOSTART=?**
	    Purpose: Return the expected command format.
	Parameters:
	\<function> (Enable/disable the feature)
	   • 0=Disabled
	   • 1=Enabled at boot (GPS tracking session starts automatically when modem is reset)
	\<fixtype> (Type of fix to establish)
	   • 1=Standalone
	   • 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

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

Command	Description
	• 1=Clear this assistance data <alm> (Almanac assistance data) • 0=Ignore (Do not clear the almanac assistance data) • 1=Clear this assistance data <pos> (Position assistance data) • 0=Ignore (Do not clear the position assistance data) • 1=Clear this assistance data <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
!GPSCOLDSTART	**Clear all GNSS assistance data** Clear GNSS assistance details from the modem and put the modem into a coldstart state. Data cleared includes Ephemeris, Previous Position, Ionosphere, and GPS time — almanac data is not cleared. This forces a cold start for GPS acquisition the next time a session starts. The command is only available when there is no active GPS session — the GPS receiver is off, and no position fix is being calculated. **Requirements:** • Before using this command, end all active GNSS sessions using **AT!GPSEND=0,255** **Password required:** Yes **Usage:** • Execution: **AT!GPSCOLDSTART** Response: OK Purpose: Clear the modem's GPS details **Parameters:** None
!GPSEND	**End an active session** End an active position fix session. **Password required:** No **Usage:** • Execution: **AT!GPSEND=<sessType>[, <sessionID>]** Response: ERRCODE = <value> OK *or* OK Purpose: End the current session. **Parameters:** <sessType> (Type of session to end) • 0=Position fix session <sessionID> (ID of the session to end) • 255=End all sessions • 0–254=Reserved <value> (Error code returned when command fails for any reason) • See Table 7-3 for a list of possible error codes. • N/A=Not available
!GPSFIX	**Initiate GPS position fix** Initiate a GPS position fix. **Password required:** No **Usage:** • Execution: **AT!GPSFIX=<fixType>, <maxTime>, <maxDist>**

Command	Description

	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
	   • 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 for a list of possible error codes.
	   • N/A — Not available
	Example(s):
	AT!GPSFIX=1, 15, 10 requests a standalone position fix to 10 meters accuracy. The request will fail (timeout) if the modem cannot determine a position fix within 15 seconds.
	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.

!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.

Command	Description

	• Query List: **AT!GPSLBSAPN=?**
	    Purpose: Display valid parameter options.
	Parameters:
	<operation> (Add or delete APNs)
	    • 1=Add an APN for a specific <ratmask> and <IPtype>.
	      Note: All parameters are required.
	    • 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):
	      • 08=WCDMA
	      • 10=LTE
	      • Note – 5G is not supported
	<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"

!GPSLOC	**Return last known location of the modem**
	Return the details obtained during the most recent position location session, if available.
	Password required: No
	Usage:
	    • Query: **AT!GPSLOC?**
	      Response: Unknown *(No information is available)*
	               OK
	      or Not Available *(No information is available)*
	               OK
	      or Lat:
	               <latitude>
	               Lon:
	               <longitude>
	               Time:
	               <time>
	               LocUncAngle: <luAngle> LocUncA: <luA> LocUncP: <luP>
	               HEPE:
	               <hepe>
	               <fixType>
	               Altitude: <altitude> LocUncVe: <luV>
	               Heading: <heading> VelHoriz: <vH> VelVert: <vV>
	               OK *(Altitude and heading only appear if data was collected as part of the most recent fix.)*
	      Purpose: Return last position location details.
	Parameters:
	<latitude> (Latitude at last position fix)
	    • Example: "49 Deg 10 Min 21.49 Sec N (0x008BDE6C)"

Command	Description
	<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" <heading> (Direction of MS) • Example: "0.0 deg" <vH> (Horizontal velocity) • Example: "0.0 m/s" <vV> (Vertical velocity) • Example: "0.0 m/s"
!GPSMOMETHOD	**Set/report GPS MO method** Set or report the GPS MO method (session type) that a mobile-originated GPS session should use (Control plane or User plane). **Password required:** No **Reset required to apply changes:** Yes **Usage:** • Execution: **AT!GPSMOMETHOD=<MO_method>** Response: OK *or* ERROR Purpose: Indicate the MO method to use. • Query: **AT!GPSMOMETHOD?** Response: <MO_method> OK Purpose: Return the current <MO_method> setting. **Parameters:** <MO_method> (MO method) • 0=CP (Control Plane) • 1=UP (User Plane)
!GPSPORTID	**Set/report port ID to use over TCP/IP** Set or report the port ID of the SUPL server to use when using TCP/IP as the transport mechanism for SUPL. **Password required:** Yes **Usage:** • Execution: **AT!GPSPORTID=<portid>** Response: OK *or* ERROR

Command	Description
	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 — Set/return SUPL server URL used for TCP/IP
!GPSSATINFO	**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> (Timestamp of sat. info) * 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 ranges: • 1–32 (GPS) • 65–96 (GLONASS) • 193–197 (QZS) • 201–237 (BeiDou) • 301–336 (Galileo) \<ELEV n> (Satellite elevation relative to modem location, in degrees) • Valid range: 0–90 \<AZI n> (Satellite azimuth relative to modem location, in degrees) • Valid range: 0–360 \<SNR n> (Signal to noise ratio, in dB) • Valid range: 0–99
!GPSSTATUS	**Request current status of a position fix session** Return the current status of a position fix session. **Password required:** No **Usage:** • Query: **AT!GPSSTATUS?** Response: \<year> \<month> \<day> \<day of week> \<time of day> Last Fix Status = \<status>

Command	Description
	<year> <month> <day> <day of week> <time of day> Fix Session Status = <status>
	Purpose: Return timestamps and status of a position fix session.

	Parameters (Timestamp):
	\<year>
	• Example: "2007"
	\<month>
	• 01–12 (Jan–Dec)
	\<day>
	• 01–31
	\<day of week>
	• 0–6 (0=Monday)
	\<time of day>
	• 24-hour clock format
	• Example: "13:25:48"
	Parameters (Status):
	\<status> (Session status)
	• "NONE": No session of this type has occurred since the modem powered up.
	   • The timestamp is the current time.
	• "ACTIVE": A session of this type is currently active.
	   • The timestamp is the time when the session entered this state.
	• "SUCCESS": The most recent session of this type succeeded.
	   • The timestamp is the time when the previous session completed successfully.
	• "FAIL": The most recent session of this type failed.
	   • The timestamp is the time when the previous session failed.
	   • An error code is displayed with the "FAIL" string. See Table 7-3 for a list of error codes.
	Example(s):
	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

!GPSSUPLURL	**Set/report SUPL server URL**
	Set or return the URL of the SUPL server to be used when TCP/IP is used as the transport mechanism for location processing. Use !GPSPORTID to set the port ID.
	Password required: Yes
	Usage:
	• Execution: AT!GPSSUPLURL="\<suplURL>"
	    Response: OK
	      or ERROR
	    Purpose: Set 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"

Command	Description
	• The <suplURL> is not checked for correctness—if the string is invalid, the modem will not be able to perform MS-assisted GPS fixes. **Example(s):** AT!GPSSUPLURL="supl.url.net" AT!GPSSUPLURL="123.123.123.123"
!GPSSUPLVER	**Set/report SUPL server version** Set or return the version of the SUPL server. **Password required:** Yes **Usage:** • Execution:　　**AT!GPSSUPLURL=<supl ver>"** 　Response:　　OK 　　or　　　　　ERROR 　Purpose:　　　Set 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
!GPSTRACK	**Initiate local tracking (multiple fix) session** Initiate a local tracking session comprising a specific number of position fixes taken at regular time intervals. **Password required:** No **Usage:** • Execution: 　**AT!GPSTRACK=<fixType>,<maxTime>,<maxDist>,<fixCount>,<fixRate>** 　Response:　　Fix initiated 　　　　　　　　OK 　　　or　　　　ERROR CODE = 　　　　　　　　<value> OK 　Purpose:　　　Initiate a series of time-limited position fixes. • Query List:　**AT!GPSTRACK=?** 　Purpose:　　　Return supported <fixType>, <maxTime>, <maxDist>, <fixCount>, and <fixRate> values. **Parameters:** <fixType> (Type of fix to establish) • 1=Standalone • 2=MS-based only • 3=MS-assisted only <maxTime> (Maximum time to wait for satellite information) • Valid range: 1–255 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)

Command	Description
	<fixrate> (Amount of time to wait between fix attempts) • Valid range: 0–65535 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 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 (**!GPSFIX**) with a greater <maxTime> value.* **Example(s):** AT!GPSTRACK=1, 15, 10, 20, 60 requests a series of 20 standalone position fixes to 10 meters accuracy — fixes are taken every 60 seconds. One of the following responses will be received: • "OK" if the request is successful, or • "ERROR CODE = <value>" if the request fails for any reason. See Table 7-3 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.

7.4. Error Codes

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

Table 7-4 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
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

Error Code	Description
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   Command Error Code (!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

Error Code	Description
22	Temporary problem reporting position determination results
23	Error mode not supported
24	Periodic NI in progress
25	Unknown error
26	Unknown error

8. SIM Commands

8.1. Introduction

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

8.2. Command Summary

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

Table 8-1   SIM Command Passwords

Command	Description
!UIMS	Select active SIM interface
!IMSIM	Update AUTO-SIM matching list

8.3. Command Reference

Table 8-2   SIM Command Details

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

!IMSIM	**Update AUTO-SIM matching list**
	Update the module's image switching AUTO-SIM matching list, which the module uses to select the correct carrier PRI and firmware to use with the detected SIM.
	The module is pre-loaded with a SKU-specific matching list of carrier configurations. This command can be used to
	• Add SIM entries for any of the carrier configurations in the pre-loaded matching list
	• Reset carrier configurations (i.e., remove user-entered SIM entries) to their pre-loaded settings
	Password required: Yes (Execution format)
	Usage:
	• Execution: **AT!IMSIM=\<carrier_name\>[,\<type\>,\<key\>,\<rank\>,\<subpri\>]**
	Response: OK
	Purpose: Either add a new SIM for the specified carrier (all parameters are required), or reset the specified carrier configuration to its pre-loaded version.
	• Query: **AT!IMSIM?[\<carrier_name\>]**
	Response: !IMSIM:
	configuration: \<\>, Firmware: \<\>, count: \<\>
	\<type\> \<key\> \<rank\> \<subpri\> \<source\>
	[…]
	OK
	Purpose: Display the SIM entries associated with each carrier configuration in the matching list (do not include \<carrier_name\>), or the entries for a single specified carrier (\<carrier_name\>).
	• Query List: **AT!IMSIM=?**
	Purpose: Return the command format and the supported parameter values.
	Usage notes:
	• Each pre-loaded carrier configuration includes one or more SIM entries. Users can add up to 50 additional SIM entries per carrier configuration.
	Parameters:
	\<carrier_name\> (Carrier identifier):
	• ASCII string
	• e.g., ATT = AT&T, GENERIC = Generic, etc.
	• The list of supported carriers is SKU-dependent.
	\<configuration\> (Carrier PRI ID):
	• e.g., GENERIC_002.023_000
	\<Firmware\> (Firmware version to use for the carrier's SIMs that are included in the carrier's configuration)
	• e.g., 01.11.00.00
	\<count\> (Number of SIM entries in the carrier's configuration):
	• Minimum: 1. See Usage notes above.
	\<type\> (Entry type):
	• 0 – IIN (i.e., the first 7 digits of the SIM's ICCID)
	• 1 – MCC/MNC (i.e., the SIM's PLMN)
	• The numeric value (0–1) is used in the Execution format, and the string equivalent is displayed by the Query format.
	\<key\> (Entry value):
	• Valid formats:
	• 7-digit IIN value (e.g., 8901410)
	• MCC/MNC value – The MCC and MNC must be separated by ':', the MCC must be 3 digits, and the MNC must be 2 or 3 digits. (e.g., 313:100, 432:65, etc.)
	\<rank\> (Image switch ranking):
	• Used to choose between applicable PRIs when switching images. e.g., if two PRIs are suitable, the PRI with the highest rank is used.
	• Valid values:
	• 0–127
	• 255 (-1) – Lowest rank (indicates the PRI should be used only if no better choice is available). Note – 255 is used in the Execution format and appears as -1 in the Query output format.

Command	Description
	<subpri> (SubPri index): • Index used to identify the carrier sub-PRI to use for custom ICCID/IMSI ranges. (A carrier PRI may contain multiple sub-PRIs.) • Min. value: 1 ------ <Source> (Entry origin): • Indicates the source of the SIM entry (i.e., how it was added to the list) • Valid values: • PRI – Included in the pre-loaded list. The entry cannot be deleted. CUST – Added by the customer using !IMSIM. The entry can be deleted.

9. SAR Commands

9.1. 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 back-off 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.*

9.2. Command Summary

Table 9-1 lists the commands described in this chapter.

Table 9-1   SAR Commands

Command	Description
!SARINTGPIOMODE	Set/report default pull mode for SAR interrupt GPIOs
!SARSTATE	Set/report SAR back-off state
!STEFS	Query ST files

9.3. Command Reference

Table 9-2   SAR Command Details

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. *Note: It is necessary to reset the module in order to make it effect after modifying pull mode.* • Query: AT!SARINTGPIOMODE? Response: <mode> OK Purpose: Indicate the default pull mode. • Query List: AT!SARINTGPIOMODE=? Purpose: Display valid execution format and parameter values.

Command	Description
	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

!SARSTATE	**Set/report SAR back-off state**
	Set or report the current SAR (Specific Absorption Rate) back-off state.
	Password required: No
	Persistent across power cycles: No
	Usage:
	• Execution: **AT!SARSTATE=<state>**
	  Response: OK
	  Purpose: Temporarily set the SAR back-off state.
	• Query: **AT!SARSTATE?**
	  Response: !SARSTATE: <state>
	       OK
	  Purpose: Indicate the current SAR back-off state.
	• Query List: **AT!SARSTATE=?**
	  Response: !SARSTATE: <0-20>
	  Purpose: Display valid parameter values.
	Parameters:
	<state> (SAR back-off state)
	• 0–20=Back-off state 0 to 20

!STEFS	**Query ST files**
	Check if ST (Smart Transmit) files are present and print their SHA-256 hash values.
	Password required: No
	Usage:
	• Query: **AT!STEFS?**
	  Response: rtsar_config_fcc <sha256_hash_ID>
	       rtsar_config_row <sha256_hash_ID>
	       OK
	      or
	       File missing
	       Existing files:
	          // No files will be listed
	       OK
	  Purpose: Show all ST EFS files or indicate if the files are missing.
	Parameters:
	<sha256_hash_ID> (SHA-256 hash values of ST EFS files)
	• e.g., 709c4b46da06ef70057d25d16f09e3c6cc6f829a5ca0b66576839b6d49f7202f
	Examples:
	• Both files present:
	  AT!STEFS?
	  rtsar_config_fcc
	  709c4b46da06ef70057d25d16f09e3c6cc6f829a5ca0b66576839b6d49f7202f
	  rtsar_config_row
	  76f7e702113a0d2a276bdf73b47f8988651d634370a0c7bef1828972f8cd6c79
	  OK
	• Files missing:
	  AT!STEFS?

Command	Description
	File missing
	Existing files:
	OK

10. DM Commands

10.1. Introduction

This chapter describes Data Management (DM) related commands based on LWM2M (Light Weight Machine to Machine) protocol.

10.2. Command Summary

Table 10-1 lists the commands described in this chapter.

Table 10-1   DM Commands

Command	Description
!DMSESSION	Control different DM sessions
!DMREAD	Get the content of specified LWM2M object
!DMREADALL	Get the content of all LWM2M objects
!DMDEBUG	Enable/disable DM related debug log on AT port
!DMSUPPORT	Enable/disable carrier DM feature

10.3. Command Reference

Table 10-2   DM Command Details

Command	Description
!DMSESSION	**Control different DM sessions** Control the following DM sessions: • Start DM session • Update DM session • Stop DM session • Start bootstrap session only **SIM card requirement:** Required **Password required:** No **Usage:** • Execution: **AT!DMSESSION=\<Action\>** Response: OK *or* ERROR Purpose: Implement different DM sessions according to the selected \<Action\>. • Query List: **AT!DMSESSION=?** Purpose: Show the supported actions. **Parameters:** \<Action\> (Action to DM session) • 0=Stop DM session • 1=Start DM session • 2=Update DM session • 3=Start bootstrap session only

Command	Description

!DMREAD	**Get the content of specified LWM2M object**
	Get the content of specified LWM2M object (for example, object "0").
	Password required: Yes
	Usage:
	• Execution: **AT!DMREAD=\<Object ID\>**
	  Response: OK
	              /x/x/x: \<content\>
	              ……
	        or ERROR
	  Purpose: Read out all content of specified LWM2M object ID.
	• Query List: **AT!DMREAD=?**
	  Purpose: Show the command format.
	Parameters:
	\<Object ID\> (LWM2M object ID, for example, "0")

!DMREADALL	**Get the content of all LWM2M objects**
	Get the content of all LWM2M objects which currently are configured.
	Password required: Yes
	Usage:
	• Execution: **AT!DMREADALL**
	  Response: OK
	              /x/x/x: \<content\>
	              ……
	        or ERROR
	  Purpose: Read out all content of all LWM2M object IDs.
	• Query List: **AT!DMREADALL=?**
	  Purpose: Show the command format.
	Parameters:
	None

!DMDEBUG	**Enable/disable DM related debug log on AT port**
	Enable/disable DM related debug log on AT port according to selected actions.
	Password required: No
	Usage:
	• Execution: **AT!DMDEBUG=\<Action\>**
	  Response: OK
	        or ERROR
	  Purpose: Enable/disable DM related debug log on AT port according to the selected \<Action\>.
	• Query List: **AT!DMDEBUG=?**
	  Purpose: Show the supported actions.
	Parameters:
	\<Action\> (Action to enable or disable debug log)
	• 0=Disable debug log on AT port
	• 1=Enable debug log on AT port

!DMSUPPORT	**Enable/disable carrier DM feature**
	Enable/disable carrier DM feature.
	Password required: Yes
	Reset required to apply changes: Yes
	Persistent across power cycles: Yes
	Usage:
	• Execution: **AT!DMSUPPORT=\<Carrier LWM2M\>**
	  Response: OK
	        or ERROR

Command	Description
	Purpose: Enable/disable carrier DM feature according to selected <Carrier LWM2M>. Note: The command shall be used for debug purpose. Users shall be careful to use this command unless they are fully aware of its consequence. • Query List: **AT!DMSUPPORT=?** Purpose: Show the supported settings. **Parameters:** <Carrier LWM2M> (Settings to enable or disable carrier DM feature) • 0=Disable carrier DM feature • 1=Enable carrier DM feature
!HOSTDEVINFO	**Configure host device details** Configure the host device details that will be reported by DM to the LWM2M server for AT&T devices, to comply with AT&T <CDR-DVM-4543> requirement. Note: In the Execution format, at least one of the <hostman>, <hostmod>, <hostswv>, and <hostid> parameters must be entered. Also, if a parameter is not entered, the value on the device does not change. **Password required:** Yes (Execution format only) **Reset required to apply changes:** No **Persistent across power cycles:** Yes **Usage:** • Execution: **AT!HOSTDEVINFO=[<instance>],["<hostman>"[,"<hostmod>"[,"<hostswv>"[,"<hostid>"]]]]** Response: OK *or* ERROR Purpose: Configure some or all of the host device details for the specified host device instance. If no <instance> is entered, configure interface 0. • Query: **AT!HOSTDEVINFO?[<instance>]** Response: HostMan: <hostman> HostMod: <hostmod> HostSwV: <hostswv> HostId: <hostid> OK Purpose: Display the device details for the specified host device instance. If no <instance> is entered, display for instance 0. • Query List: **AT!HOSTDEVINFO=?** Purpose: Show the supported settings. **Parameters:** <instance> (Host device instance) • 0–1 – Device instance (For example, instance 0 could be the main host (e.g. Octave), which is connected to another host (a 'bigger' host) which could be instance 1.) • Default value: 0 <hostman> (Host device manufacturer's name) • 256 characters maximum <hostmod> (Host device model name) • 256 characters maximum <hostswv> (Host software version) • 256 characters maximum <hostid> (Host ID – AT&T Onboarding ID) • 256 characters maximum

Command	Description
	Examples:
	• AT!HOSTDEVINFO=1,"Manufacturer name",,"1.0"
	This sets the <hostman> and <hostswv> values for device instance 1. The values for <hostmod> and <hostid> do not change.
	• AT!HOSTDEVINFO=0,"Manufacturer"
	This sets the <hostman> value for device instance 0. The values for all other parameters do not change.
	• AT!HOSTDEVINFO=, "Our Model Name",,"1.0"
	This sets the <hostmod> value for device instance 0. The values for all other parameters do not change.

11. Supported 3GPP and Carrier AT Commands

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

- Control serial communications over an asynchronous interface (ITU-T Serial Asynchronous Dialing and Control (Recommendation V.250), available on the International Telecommunication Union website www.itu.int).
  See Table 11-1.
- Control SMS functions for devices (3GPP TS 27.005, available on the 3GPP website www.3gpp.org)
  See Table 11-2.
- Control devices operating (3GPP TS 27.007, available on the 3GPP website www.3gpp.org)
  See Table 11-3.

The tables below identify whether each command is supported on Sierra Wireless devices. An "N/A" in the Supported column of the table indicates that the command is related to a feature (such as voice, GSM) that is not available on the modems.

Commands that are partially supported include descriptions identifying any limitations on command usage (for example, +CFUN in Table 11-3).

Table 11-1   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	✔
+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	N/A
A/	Re-issues last AT command given	✘
D	Dial	N/A

Command	Description	Supported ✓=Yes; ✗=No
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	N/A
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	✗
S8	Set number of seconds to wait when comma dial modifier used	✗
T	Select tone dialing	✗
V	Set result code format mode	✗
V1	Provides more verbose error codes that aid debugging	✓
X	Set connect result code format and call monitoring	✗
X4	Not to wait for dial tone before dialing	N/A
Z	Set all current parameters to user-defined profile	✗

Table 11-2   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 an SMS	✗
+CDSI	Incoming SMS status report	✗
+CESP	Enter SMS block mode protocol	✗
+CMGC	Send command	✓
+CMGD	Delete message	✓
+CMGF	Message format	✓
+CMGL	List messages	✓
+CMGR	Read message	✓

Command	Description	Supported ✔=Yes;✘=No
+CMGS	Send message	✔
+CMGW	Write message to memory	✔
+CMMS	More messages to send	✔
+CMNA	New message acknowledgement to ME/TA	✘
+CMS ERROR: <err>	SMS error (mobile or network error)	✘
+CMSS	Send message from storage	✔
+CMT	Incoming message directly displayed	✔
+CMTI	Incoming message stored in <mem> ("SM" - (U)SIM message storage) at location <index>	✔
+CNMA	New message acknowledgement to mobile equipment	✔
+CNMI	New message indications to TE	✔
+CPMS	Preferred message storage	✔
+CRES	Restore settings	✔
+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 11-3   Supported 27.007 AT Commands

Command	Description	Supported ✔=Yes;✘=No
C	ITU T V.24 circuit 109 carrier detect signal behavior command	✘
+CACM	Accumulated call meter	✘
+CACSP	Voice Group or Voice Broadcast Call State Attribute Presentation	✘
+CAEMLPP	eMLPP Priority Registration and Interrogation	✘
+CAHLD	Leave an ongoing Voice Group or Voice Broadcast Call	✘
+CAJOIN	Accept an incoming Voice Group or Voice Broadcast Call	✘
+CALA	Alarm	✘
+CALCC	List current Voice Group and Voice Broadcast Calls	✘
+CALD	Delete alarm	✘
+CALM	Alert sound mode	✘
+CAMM	Accumulated call meter maximum	✘
+CANCHEV	NCH Support Indication	✘
+CAOC	Advice of Charge	✘
+CAPD	Postpone or dismiss an alarm	✘
+CAPTT	Talker Access for Voice Group Call	✘
+CAREJ	Reject an incoming Voice Group or Voice Broadcast Call	✘
+CAULEV	Voice Group Call Uplink Status Presentation	✘
+CBC	Battery charge	N/A

Command	Description	Supported ✓=Yes; ✘=No
+CBKLT	Backlight (handset only)	✘
+CBST	Select bearer service type	✓
+CCCM	Current call meter value	✘
+CCFC	Call forwarding number and conditions	✘
+CCHC	Close logical channel	✘
+CCHO	Open logical channel	✘
+CCLK	Clock	✓
+CCUG	Closed user group	✘
+CCWA	Call waiting	N/A
+CCWE	Call Meter maximum event	✘
+CDIP	Called line identification presentation	✘
+CDIS	Display control	✘
+CEER	Extended error report	✓
+CEREG	Read network register status	✓
+CESQ	Extended signal quality	✘
+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	✓
+CGCONTRDP	PDP context read dynamic parameters	✘
+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)	✘
+CGEQOSRDP	EPS quality of service read dynamic parameters	✘
+CGEQREQ	3G Quality of Service Profile (Requested)	✓
+CGEREP	Packet Domain event reporting	✘
+CGEV	GPRS network event indication	✘
+CGLA	Generic UICC logical channel access	✘
+CGMI	Request manufacturer identification	✓
+CGMM	Request model identification	✓

Command	Description	Supported ✓=Yes; ✗=No
+CGMR	Request revision identification	✓
+CGPADDR	Show PDP address	✓
+CGPIAF	Printing IP address format	✓
+CGQMIN	Quality of Service Profile (Minimum acceptable)	✗
+CGQREQ	Quality of Service Profile (Requested)	✗
+CGREG	GPRS network registration status	✗
+CGSCONTRDP	Secondary PDP context read dynamic parameters	✗
+CGSMS	Select service for MO SMS messages	✓
+CGSN	Request product serial number identification	✓
+CGTFT	Traffic flow template	✓
+CGTFTRDP	Traffic flow template read dynamic parameters	✗
+CHLD	Call related supplementary services	N/A
+CHSA	HSCSD non-transparent asymmetry configuration	✗
+CHSC	HSCSD current call parameters	✗
+CHSD	HSCSD device parameters	✗
+CHSR	HSCSD parameters report	✗
+CHST	HSCSD transparent call configuration	✗
+CHSU	HSCSD automatic user-initiated upgrading	✗
+CHUP	Hang up call	N/A
+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	N/A
+CLCK	Facility lock	✓
+CLIP	Calling line identification presentation	N/A
+CLIR	Calling line identification restriction	N/A
+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	N/A
+CMUT	Enable/disable uplink voice muting	✗
+CMUX	Multiplexing mode	✗
+CNUM	Subscriber number	✓
+COLP	Connected line identification presentation	✗

Command	Description	Supported ✓=Yes;✗=No
+COPN	Read operator names	✓
+COPS	Operator selection	✓
+CPAS	Phone activity status	✓
+CPBF	Find phonebook entries	✗
+CPBR	Read phonebook entries	✗
+CPBS	Select phonebook memory storage	✗
+CPBW	Write phonebook entry	✗
+CPIN	Enter PIN	✓
+CPINR	Remaining PIN retries	✗
+CPLS	Preferred PLMN list selection	✗
+CPOL	Preferred operator list	✓
+CPROT	Enter protocol mode	✗
+CPUC	Price per unit and currency table	✗
+CPWC	Power class	✗
+CPWD	Change password	✓
+CR	Service reporting control	✗
+CRC	Cellular result codes	✗
+CREG	Network registration	✓
+CRING	Incoming call type	✗
+CRLP	Radio link protocol	✗
+CRMP	Ring Melody Playback	✗
+CRSL	Ringer sound level	✗
+CRSM	Restricted SIM access	✓
+CSCC	Secure control command	✗
+CSCS	Select TE character set	✓
+CSDF	Settings date format	✗
+CSGT	Set Greeting Text	✗
+CSIL	Silence Command	✗
+CSIM	Generic SIM access	✓
+CSNS	Single numbering scheme	✗
+CSQ	Signal quality	✓
+CSSN	Supplementary service notifications	✗
+CSTA	Select type of address	✗
+CSTF	Settings time format	✗
+CSUS	Set card slot	✗
+CSVM	Set Voice Mail Number	✗
+CTFR	Call deflection	✗
+CTSA	Command touch screen action (handset with touch screen only)	✗
+CTZR	Time Zone Reporting	✗
+CTZU	Automatic Time Zone Update	✗
+CUSD	Unstructured supplementary service data	✓
+CV120	V.120 rate adaptation protocol	✗

Command	Description	Supported ✓=Yes; ✗=No
+CVHU	Voice Hang-up Control	N/A
+CVIB	Vibrator mode	✗
D	ITU T V.25ter [14] dial command	N/A
D*99#	Sets up a packet data call (PDP context) based on profile ID #1	✗
D*99*<n>#**	Sets up a packet data call (PDP context) based on profile ID #<n> (<n> is the <cid> in the +CGDCONT command)	✗
+VTD	Tone duration	✗
+VTS	DTMF and arbitrary tone generation	N/A
+WS46	PCCA STD 101 [17] select wireless network	✓

Table 11-4   Supported Carrier AT Commands

Command	Description	Supported ✓=Yes; ✗=No
+VZWAPNE	Verizon proprietary command	✓
+VZWRSRP	Verizon proprietary command	✓
+VZWRSRQ	Verizon proprietary command	✓
$CCLK	AT&T proprietary command	✗
$CREG	AT&T proprietary command	✗
$CSQ	AT&T proprietary command	✗
*CNTI	AT&T proprietary command	✗
+CEINFO	AT&T proprietary command	✗
+ECNO	AT&T proprietary command	✗
+NCELL	AT&T proprietary command	✗
+PACSP	AT&T proprietary command	✗
+SCELL	AT&T proprietary command	✗
+RSCP	AT&T proprietary command	✓
+RSRP	AT&T proprietary command	✗
+RSRQ	AT&T proprietary command	✗

12. Band Definitions

Some commands described in this document include input and/or output 'band' parameters which are defined in section "Supported Frequencies" of document *[1] AirPrime EM919X-EM7690 Product Technical Specification*.

13. ASCII Table

Table 13-1   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

14. Index