AirPrime EM9190

AT Command Reference

SIERRA WIRELESS®

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

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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 11, 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 15, 2020	• Added !CMTI, !CMT, !ANTSEL, !LEDTEST, !DASUB6TECHACT, !RFCID • Updated !IMPREF, !ERR, !GSTATUS, !DARCONFIG, !TMSTATUS

Contents

List of Tables

1. About This Guide

1.1. Introduction

This document describes supported standard and proprietary AT commands available for Sierra Wireless AirPrime® products, and provides details where commands vary from the standards. These commands are intended for use by OEMs, and are supplemental to the standard AT commands for 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:	*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** is unique to each carrier and is configured onto the modem during manufacture. If you do not know your password, contact your Sierra Wireless Account Manager.

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 AirPrime products, plus general operational use commands.

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

[1] AirPrime EM9190 Product Technical Specification (Doc# 41113174)

[2] AirPrime EM919x Customer Production Test Mode (Doc# 41113679)

[3] EM9190 – BuildPackage - Customer Release Notes (Doc#41113428)

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
!IMPREF	Query/set Image Management preferences
!NVENCRYPTIMEI	Write unencrypted IMEI to modem
!NVPLMN	Provision/display PLMN list for Network Personalization locking
!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
!RESET	Reset modem
!RFCID	Set/query RFC related hardware ID and board ID
!TMSTATUS	Report Thermal Mitigation Status
!USBCOMP	Set/report USB interface configuration
!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

8) SAR Back-off and Thermal Control Commands — Commands used to configure SAR options, and thermal mitigation algorithm parameters and limits.

Table 1-8 SAR Back-off and Thermal Control Commands

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

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

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: 4–10 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: 8–32 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
!IMPREF	Query/set Image Management preferences
!NVENCRYPTIMEI	Write unencrypted IMEI to modem
!NVPLMN	Provision/display PLMN list for Network Personalization locking
!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
!RESET	Reset modem
!RFCID	Set/query RFC related hardware ID and board ID
!TMSTATUS	Report Thermal Mitigation Status
!USBCOMP	Set/report USB interface configuration
!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

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!ANTSEL</td><td>
Set/query external antenna selection configuration
Configure the modem to use available GPIOs to select antenna for each specified frequency band (less than 1000MHz). Any available GPIOs that are not needed for a specific band should be configured as not required.
When the modem switches to a frequency band that has been configured using this command, the GPIOs are driven as specified and the host uses them to tune the external antenna appropriately. This implies 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.
We define 10 signal paths (refer to the table below):
• The GPIO configurations (<gpio1>, <gpio2>, <gpio3>, <gpio4>) for specified signal path (or specified bands) must be the same for different RATs. Otherwise, the GPIO configurations are conflict.
• Once one band is set, all other bands of 3G, 4G and 5G in the same signal path will be automatically configured with the same GPIO configurations.
• The LTE bands in different signal paths cannot take CA.
<table>
<tr><th>Signal Path</th><th>3G Bands</th><th>4G Bands</th><th>5G Bands</th></tr>
<tr><td>0</td><td>B5, B19</td><td>B5, B18, B19, B26</td><td>N5</td></tr>
<tr><td>1</td><td>B8</td><td>B8</td><td></td></tr>
<tr><td>2</td><td></td><td>B12, B17</td><td></td></tr>
<tr><td>3</td><td></td><td>B13</td><td></td></tr>
<tr><td>4</td><td></td><td>B14</td><td></td></tr>
<tr><td>5</td><td></td><td>B20</td><td></td></tr>
<tr><td>6</td><td></td><td>B28A</td><td>N28A</td></tr>
<tr><td>7</td><td></td><td>B28B (80)</td><td>N28B (90)</td></tr>
<tr><td>8</td><td></td><td>B29</td><td></td></tr>
<tr><td>9</td><td></td><td>B71</td><td>N71</td></tr>
</table>
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 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
</td></tr>
</table>

Command	Description
	• Examples: 3G BAND 5: 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 EM9190 Product Technical Specification* for details. • Valid range for 3G: 5, 8, 19 • Valid range for 4G: 5, 18, 19, 26, 8, 12,17, 13, 14, 20, 28 (for B28A), 80 (for band B28B), 29, 71 • Valid range for 5G: 5, 28 (for N28A), 90 (for N28B), 71 <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 required password. (See Command access.)*	**Select/return frequency band set** Configure the modem to operate on a set of frequency bands, look up available sets, create new sets, or return the current selection. **Password required:** Yes — Extended execution and extended response of query **Usage:** • Execution (Basic): **AT!BAND=<Index>** Response: OK Purpose: Select an existing set of bands. • Execution (Extended): **AT!BAND=<Index>,<Operation>[,<“Name”>,<RAT>,<GW mask | Lmask1 | Lmask2 | Lmask3 | Lmask4 | TDSmask | NRNSAmask1 | NRNSAmask2 | NRNSAmask3 | NRNSAmask4 | NRNSAmask5 | NRSAmask1 | NRSAmask2 | NRSAmask3 | NRSAmask4 | NRSAmask5>]** Response: OK Purpose: Create a new set of bands or delete an existing set of bands (in this case, 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

Command	Description
	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 <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 (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 (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 <Lmask2> (LTE bands included in the set) • Format: 64-bit bitmask • Example values (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 (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

Command	Description
	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 (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 <NRNSAmask2> (NRNSA bands included in the set) • Format: 64-bit bitmask • Example values (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 (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 (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 (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> (NRNSA bands included in the set) • Format: 64-bit bitmask • Example values (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> (NRNSA bands included in the set) • Format: 64-bit bitmask

Command	Description
	• Example values (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> (NRNSA bands included in the set) • Format: 64-bit bitmask • Example values (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 <NRSAmask4> (NRNSA bands included in the set) • Format: 64-bit bitmask • Example values (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> (NRNSA bands included in the set) • Format: 64-bit bitmask • Example values (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)

Command	Description
	• 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.* • "CFUNPERSISTEN"—Enable/disable persistence (across power cycles) of AT+CFUN setting. <value>: · 0 = Disable (+CFUN setting does not persist across power cycle) · 1 = Enable (+CFUN setting persists across power cycle) • "GPIOSARENABLE" — Indicate whether SAR back-off is controlled by GPIOs or by AT commands. <value>: · 0 = Controlled by AT commands (default) · 1 = Controlled by GPIOs • "GPSENABLE" — Enable/disable the GPS feature. <value>: · 0 = GPS disabled · 1 = GPS enabled • "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 • "IPV6ENABLE" — Enable/disable IPV6 support. <value>: · 0 = Disable IPV6 · 1 = Enable IPV6 (Default) • "SIMHOTSWAPDIS" — Configure SIM hotswap feature <value>: · 0 = Enable UIM1 and UIM2 (default) · 1 = Disable UIM1, enable UIM2 · 2 = Enable UIM1, disable UIM2 · 3 = Disable UIM1 and UIM2 • "SIMLPM"—Indicate default SIM power state during Low Power Mode. <value>: · 0 = QCT default behavior (same as <value>=2) (Default) · 1 = SIM remains powered in LPM · 2 = Power down SIM with AT+CFUN=0; Power up SIM with AT+CFUN=1 • "UIM2ENABLE"—Enable/disable UIM2 slot support. <value>: · 0 = Disable · 1 = Enable (Default) · 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.

Command	Description
	Password required: Yes **Reset required to apply changes:** Yes **Persistent across power cycles:** Yes **Usage:** • Query: **AT!DATALOOPBACK?** Response: !DATALOOPBACK: Data Loopback Mode; <loopback_mode> Replication Count: <loopback_multiplier> OK Purpose: Display the loopback mode state, and loopback multiplier. Execution: **AT!DATALOOPBACK=<loopback_mode>, <loopback_multiplier>** Response: OK Purpose: Enable/disable loopback mode and set the loopback multiplier. • Query List: **AT!DATALOOPBACK=?** Purpose: Returns a list of valid parameter values. **Parameters:** <loopback_mode> (Loopback mode state) · 0=Disable data loopback mode · 1=Enable data loopback mode <loopback_multiplier> (Number of downlink bytes sent for each uplink byte (replication count)) · Decimal value · Maximum=6
!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.

Command	Description
!GSTATUS	**Return operational status** Return specific details about the current operational status of the modem. The response details vary depending on the current RAT. Contact Sierra Wireless for further details if required. **Password required:** No **Usage:** • Query: **AT!GSTATUS?** Response (Example shown is for LTE/NR5G; fields will vary depending on RAT; SSCx will be displayed only when the SSC is activated) !GSTATUS: Current Time: <ctime> Temperature: <temp> Modem Mitigation Level:<mml> ModemProc Mitigation Level:<mpml> 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 SSCx state: <castate> LTE SSCx band: <lband> LTE SSCx bw: <lbw> LTE SSCx 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> 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> Tx Power: <txpwr> TAC: <tac> RSRQ (dB): <rsrq> Cell ID: <Cell ID> SINR (dB): <sinr> 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> OK Purpose: Display hardware version number. • Query List: **AT!HWID=?** Purpose: Return the query command format. **Parameters:** <MajorVer> (Major versioning number) • 0–9
!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:**

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
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:
<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)
</td></tr>
<tr><td>!NVENCRYPTIMEI</td><td>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.</td></tr>
</table>

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

Command	Description
	Usage: • Query: **AT!NVPLMN?** Response: <MCC> <MNC> .. . o K Purpose: Return a list of up to fifty NV items that can be read or written. • Execution: **AT!NVPLMN=<MCC1>, <MNC1>,...., <MCCn>, <MNCn>** Response: OK Purpose: Add up to 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). **Parameters:** <MCC> (Mobile Country Code) • 3 digits <MNC> (Mobile Network Code) • 2 digits
!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 • 1 — LPM not requested <userlpm> (Current state of user-initiated Low Power Mode) • 0 — Host GUI has not requested LPM • 1 — Host GUI has requested LPM
!PCOFFEN	**Set/return Power Off Enable state** The modem can be configured to enter low power mode or power off when W_DISABLE is asserted. (This is called the Power Off Enable feature.) Use this command to indicate or set the Power Off Enable feature state. **Password required:** Yes **Usage:** • Execution: **AT!PCOFFEN=<state>** Response: OK Purpose: Set the current state. • Query: **AT!PCOFFEN?** Response: <state>

Command	Description
	OK Purpose: Report the current <state>. **Parameters:** <state> (Current state of Power Off Enable) • 0 — Modem will enter LPM (low power mode) when W_DISABLE is asserted. • 1 — Power off modem • 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 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)

Command	Description
	• 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 **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>

Command	Description
	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) • 4-digit ASCII: XX.YY • Example: 01.00 <pri_cust> (PRI customer name) • ASCII string • Example: "Generic Operator" <bcVersion> (BC version) • ASCII string
!RESET	**Reset modem** Perform a modem reset. **Password required:** No **Usage:** • Execution: **AT!RESET**

Command	Description
	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:** No **Usage:** • 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, refer to document *[3] EM9190 – BuildPackagexx - Customer Release Notes* to get available list. 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-mmWave hardware ID) • Decimal ASCII number • Range: 0 – 4095 • It is applicable for 5G-mmWave <mmw_board_id> (5G-mmWave board ID) • Decimal ASCII number • Range: 0 – 15 • It is applicable for 5G-mmWave
!TMSTATUS	**Report Thermal Mitigation Status** Report the thermal mitigation status of available cooling devices in the module. **Password required:** No **Usage:** • Query: **AT!TMSTATUS?** Response: Device Level pa <status> … OK Purpose: Return the thermal mitigation status. **Parameters:** <status> (Thermal mitigation level) • Valid range: 0 – 3
!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. **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 • 2 – USBIF-MBIM • 3 – RNDIS • 4 – USBIF GNSS V2 • 5 - USBIF RMNET • Config type 1/2/3 is the place holder and not supported currently • Use config type 4 if USB PID is 90D3. It supports to configure MBIM/NEMA/MODEM interfaces. • Use config type 5 if USB PID is 90D9. It supports to configure RMNET/MODEM interfaces. <interface_bitmask> (USB interface bitmask) • DIAG – 0x00000001 • ADB – 0x00000002 • NMEA – 0x00000004 • MODEM – 0x00000008 (mandatory) • RMNET – 0x00000100 • MBIM – 0x00001000
!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:** • Query: **AT!VERINFO** Response: SBL: <version> TZ: <version> AOP: <version> UEFI: <version> Mpss: <version> OS: <version> Yocto: <version> RootFS: <version> Security: <secure_info> [(debug policy:

Command	Description
	<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) • 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:** • Query: **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** Simply test to switch on/off LED connected with WWAN_LED pin (refer to *document [1] AirPrime EM9190 Product Technical Specification* for details). It requires to reset to exit LED test state. **Password required:** No **Usage:** • Execution: **AT!LEDTEST=<led no>,<state>** Response: OK Purpose: Switch on/off LED. • Query: **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 index number connected with 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:** • Query: **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. **Password required:** Yes **Usage:** • Query: **AT!DAFTMACT** Response: 290300 *(Success. Any other response indicates an error.)* OK Purpose: Place modem in FTM mode.
!DAFTMDEACT	**Put modem into online mode from Factory Test Mode** This command takes the modem out of FTM and puts the modem back into online mode. (The command !DAFTMACT puts the modem into FTM.) *Note: When this command executes successfully, the modem responds with the value 290400. Any other response indicates an error.* **Password required:** Yes **Usage:** • Query: **AT!DAFTMDEACT** Response: 290400 *(Success. Any other response indicates an error.)* OK Purpose: Place modem in online mode (from FTM mode).
!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 • 3 — Diversity Rx • 4 — mmW IF Rx <beam_ID> (5G-mmW beam ID)

Command	Description
	• It is applicable for 5G-mmW • Valid range: 0 — 3 if it is IFV port, or 128 — 131 if it is IFH port • 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>** 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 EM9190 Product Technical Specification*. • e.g. ‘1’ is maybe WCDMA B1 or LTE B1 or 5G-Sub6 N1
!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>]]]** Response: OK Purpose: Set the selected RAT’s band and channel, bandwidth, etc. **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 <band> (Band number) • Valid range: refer to section “Supported RF Bands” of document *[1] AirPrime EM9190 Product Technical Specification*.

Command	Description
	• 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 *[2] AirPrime EM919x Customer Production Test Mode* for details. <rx_channel> (Downlink channel number for selected <band>) • It is applicable for 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) • It is applicable for LTE, 5G-Sub6 • 0 — Not support • 1 — Support <beam_ID> (5G-mmW beam ID) • It is applicable for 5G-mmW • Valid range: 0 — 3 if it is IFV port, or 128 — 131 if it is IFH port • 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.
!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:**

Command	Description
	• 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. **Password required:** Yes **Usage:** • Execution: **AT!DATXCONTROL=<carrier>,<technology>,<enable>,<power_dBm10>[,<waveform>,<mod>,<ns_value>,<start_RB>,<num_RB>[,<beam_ID>]]** 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

Command	Description
	• 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) • It is applicable for LTE, 5G-Sub6 and 5G-mmW • 0 — QPSK • 1 — 16 QAM • 2 — 64 QAM • 3 — 256 QAM <ns_value> (Network signal value) • It is applicable for LTE, 5G-Sub6 and 5G-mmW • Valid range: 1 — 32 • It affects max output power <start_RB> (Start resource block index) • It is applicable for LTE, 5G-Sub6 and 5G-mmW • Valid range: 0 — 255 <num_RB> (Number of resource blocks) • It is applicable for LTE, 5G-Sub6 and 5G-mmW • Valid range: 0 — 255 <beam_ID> (5G-mmW beam ID) • It is applicable for 5G-mmW • Valid range: 0 — 3 if it is IFV port, or 128 — 131 if it is IFH port • 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.
!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

Command	Description
	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: • **!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.

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. • Query: **AT!NVBACKUP?** Response: !NVBACKUP: <restore point> <name> ... OK Purpose: Display all available restore points. **Usage notes:** • When saving a restore point: • The existing <restore point> is replaced (if present).

Command	Description
	• Higher numbered restore points are deleted. • If a <name> is not specified, the file is saved as “unnamed” or “Latest”, depending on the <restore point>. **Parameters:** <restore point> (Type of saved restore point) • Valid range: 0–3 • 0=Factory-calibrated configuration (Cannot be replaced) • 1=Sierra-provided SKU configuration (Cannot be replaced) • 2=Save the current configuration using a specified file <name>. If no <name> is specified, save as “unnamed”. • 3=Save the current configuration as the ‘Latest’ restore point. Note: The category 3 restore point is also generated automatically after a successful reconfiguration (e.g. after an image switch or firmware update). <name> (Name used to store the restore point) • 0–32 ASCII characters • <restore point> = 0 — “Factory” (Factory-calibrated configuration, pre-SKU) • <restore point> = 1 — “Provision” (Sierra-provisioned SKU configuration) • <restore point> = 2 — User-defined name provided when restore point was saved, or “unnamed” if no name was provided • <restore point> = 3 — “Latest” (Latest saved configuration) <saved> (Number of saved items) • 0–(2^{32} - 1) <skipped> (Number of skipped items) • 0–(2^{32} - 1) • Note: Does not display if 0
!RMARESET	**Restore device to saved restore point** Restore the device to a previously saved restore point. (To save a restore point, see !NVBACKUP.) **Password required:** Yes **Reset required to apply changes:** Yes **Usage:** • Execution: **AT!RMARESET=<restore point>** Response: !RMARESET: DEVICE REBOOT REQUIRED Items Restored: <restored count> Items Deleted: <deleted count> Items Defaulted: <defaulted count> Items Skipped: <skipped count> OK Purpose: Restore device to the specified <restore point> (configuration). A reboot is required to take effect. • Query: **AT!RMARESET?** Response: !RMARESET: <restore point> <name> ... OK Purpose: Display all available restore points. **Parameters:** <restore_point> (Saved restore point) • 0=Factory-calibrated configuration (Note: For information only, cannot be restored.) • 1=Sierra-provided SKU configuration • 2=Restore to the restore point that was saved earlier using !NVBACKUP. • 3=Restore to the latest saved restore point (saved earlier using !NVBACKUP or automatically when the device was successfully reconfigured, e.g. after an

Command	Description
	image switch or firmware update) <name> (Descriptive name of <restore_point>) • ASCII string, varies by <restore point>: • <restore point> = 0 — “Factory” (Factory-calibrated configuration, pre-SKU) • <restore point> = 1 — “Provision” (Sierra-provisioned SKU configuration) • <restore point> = 2 — User-defined name provided when using !NVBACKUP to save a configuration, or “unnamed” if no name was provided • <restore point> = 3 — User-defined name provided when using !NVBACKUP to save a configuration, or “Latest” (Latest saved configuration)

7. GNSS Commands

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) • 2=Enabled when NMEA port is opened <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)

Command	Description
	• 0=Ignore (Do not clear the ephemeris assistance data) • 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:**

Command	Description

	• Execution: **AT!GPSFIX=<fixType>, <maxTime>, <maxDist>**
	Response: Fix initiated
	OK
	or ERROR CODE =
	<value> OK
	Purpose: Initiate a time-limited position fix with a specified accuracy.
	• Query List: **AT!GPSFIX=?**
	Purpose: Return supported <fixType>, <maxTime>, and <maxDist> values.
	Parameters:
	<fixType> (Type of fix to establish)
	• 1=Standalone
	• 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

Command	Description
	or OK *(if no ID has been set)* Purpose: Display the APNs currently assigned for each RAT. • Query List: **AT!GPSLBSAPN=?** Purpose: Display valid parameter options. **Parameters:** <operation> (Add or delete APNs) • 1=Add an APN for a specific <ratmask> and <IPtype>. Note: All parameters are required. • 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 • Not support 5G <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)

Command	Description
	• Example: “49 Deg 10 Min 21.49 Sec N (0x008BDE6C)” <longitude> (Longitude at last position fix) • Example: “123 Deg 4 Min 14.76 Sec W (0xFEA1EE9A)” <time> (Time at which last position fix was taken) • Example: “2009 01 30 4 20:27:18 (GPS)” <luAngle> (Location uncertainty angle of returned position) • Example: “11.2 deg” <luA> (Standard deviation of axis along <luAngle>) • Example: “6.0 m” <luP> (Standard deviation of axis perpendicular to <luAngle>) • Example: “6.0 m” <hepe> (Horizontal Estimated Positional Error) • Example: “8.485 m” <fixType> (2D or 3D fix) • Example: “2D Fix” or “3D Fix” <altitude> (Altitude in meters at which last position fix was taken) • Only present if <fixType> is 3D • Example: “-1 m” <luV> (Vertical uncertainty in meters) • Only present if <fixType> is 3D • Example: “3.0 m” <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_met hod> 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

Command	Description
	or ERROR Purpose: Queue the request to set the port ID. • Query: **AT!GPSPORTID?** Response: <portid> OK Purpose: Return the port ID currently being used **Parameters:** <port ID> (Port ID to use over TCP/IP) • Valid range: 0–65535 **Related commands** • !GPSSUPLURL — 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 n^{th} 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>

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

Command	Description
	• Examples: “supl.url.net”, “123.123.123.123” • The <suplURL> is not checked for correctness—if the string is invalid, the modem will not be able to perform MS-assisted GPS fixes. **Example(s):** 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)

Command	Description
	• Valid range: 1–1000 (1000 — Take a continuous series of position fixes) <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

Error Code	Description
14	Could not connect to the network
15	Error in fix
16	Reject from PDE
17	GPS is disabled
18	Ending session due to E911 call
19	Server error
20	Reserved
21	Reserved
22	Unknown system error
23	Unsupported service
24	Subscription violation
25	Desired fix method failed
26	Reserved
27	No fix reported because no Tx confirmation was received
28	Network indicated normal end of session
29	No error specified by the network
30	No resources left on the network
31	Position server not available
32	Network reported an unsupported version of protocol

Table 7-4 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

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

8. SIM Commands

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

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

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

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. **Parameters:** <mode> (SAR GPIO interrupt pull mode default setting)

Command	Description
	• 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. *Note: This setting is not persistent.* **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=?** Purpose: Display valid execution format and parameter values. **Parameters:** <state> (SAR back-off state) • 00=No back-off • 01–14=Back-off state 0x01 to 0x14

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

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: **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
!DMREAD	**Get the content of specified LWM2M object**

Command	Description
	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: **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: **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: **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

11. Supported 3GPP and Carrier AT Commands

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

- Control serial communications over an asynchronous interface (ITU-T Serial Asynchronous 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 EM9190 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

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