AT Commands Interface Guide

AirPrime SL9090 and MC9090

SIERRA WIRELESS®

4112834
3.0
August 03, 2015

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

Document History

Version	Date	Updates
1.0	December 18, 2012	Creation
2.0	May 29, 2014	Added MC9090
3.0	August 03, 2015	Manual overhaul

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Introduction

This guide is divided into three sections to describe the Attention (AT) commands supported by the AirPrime SL9090 and MC9090 embedded modules. These three sections are:

- Generic AT commands
- UMTS-specific AT commands
- CDMA-specific AT commands

Unless specified otherwise, the word “modem” applies to either AirPrime SL9090 or MC9090.

To use this document, you should be familiar with the use of AT commands with standard wireline modems. There are two methods of controlling the modem: AT commands and CnS (Control and Status) language. Some features or capabilities of the modem require the use of CnS. This document presumes that the AT interface is the only interface available to you; features requiring CnS are not included in this document.

Note: The SL9090 and MC9090 support a user locking mechanism (similar to a PIN) via the CnS language. The AT command interface does not support access to this feature. If the modem was locked by the user through another application (such as Watcher), the AT command interface is disabled.

Note that some commands are not generally accessible to end users. Access to the commands is unlocked by a setting of the **!ENTERNCD** command.

Commands related to hardware testing may require that normal modem operations be halted to prevent unintended changes in state. To do this, use the **!DAFTMACT** (for UMTS) or **!DIAG** (for CDMA) command to place the modem in diagnostic mode. While in diagnostic mode, the normal automatic operations are suspended.

References

Commands are implemented to be compliant with industry standards, and reference is often made to the following standards:

- IS-131 (Data Transmission Systems and Equipment - Extensions to Serial Asynchronous Dialing and Control)
- EIA/TIA-592 (Asynchronous Facsimile DCE Control Standard, Service Class 2)
- EIA/TIA/IS-134 (Amendments to TIA-592 to Support T.30 - 1993 (Facsimile protocol standard))

Electronic copies of standards can be purchased at the ANSI Electronic Standards Store at: webstore.ansi.org. ANSI Customer Service can be contacted at sales@ansi.org.

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voice:	800-854-7179 or 303-397-7956
fax:	303-397-2740
email:	mailto:global@ihs.com
www:	http://global.ihs.com
post:	Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112

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

Firmware Version

This document is up to date with firmware versions shown in the following table.

Table 1. Supported Firmware Versions

RAT	Firmware Version
UMTS	SWI6600U_02.00.00.03
CDMA	SWI6600V_02.00.00.07
	SWI6600S_02.00.00.06
	SWI6600C_02.00.00.00

To determine your firmware version, enter **AT+GMR**. The modem will respond with the software and firmware version information. Details displayed after the revision number include Sierra Wireless information on the specific build followed by the date and time of the build.

If your modem firmware is an earlier version, you can acquire updated firmware from the Sierra Wireless Source or by contacting your account manager.

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: such as <CR> for Carriage Return and <space> for a blank space character.

Numeric values are decimal unless prefixed as follows:

- Hexadecimal values are shown with a prefix of 0x, i.e. in the form 0x3D.
- Binary values are shown with a prefix of 0b, i.e. in the form 0b00111101.

Command and register syntax is noted using an alternate font: **!DSMS=<i>[,m]**. The "AT" characters are not shown, but must be included before all commands except as noted in the reference tables.

Required parameters are enclosed in angle brackets (**<i>**) while optional parameters are enclosed within square brackets (**[m]**). 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.

Default settings are noted in the command tables. Note that these are factory default settings and not the default parameter value assumed if no parameter is specified. Factory defaults are also noted in a section at the end of each operational mode reference.

Command Access

Most of the commands listed in this document 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.

Result Code

This is a numeric or text code that is returned after all commands (except resets). Only one result code is returned for a command line regardless of the number of individual commands contained on the line. Both basic and extended result codes are supported by the SL9090 and MC9090.

Basic result codes are defined in control serial communications over an asynchronous interface (ITU-T Serial Asynchronous Dialling and Control (Recommendation V.250), available on the International Telecommunication Union web site). Both UMTS and CDMA release of SL9090 and MC9090 support basic result codes.

Table 2. Basic Result Codes

Code	Verbose	Meaning
0	OK	Command executed without errors.
1	CONNECT	Connected at any of the supported speeds.
2	RING	Alerting Signal (Ring) signal received from the network.
3	NO CARRIER	Carrier signal lost or not detected. Unable to activate the service.
4	ERROR	Command not recognized or could not be executed. Illegal command. Error in command line. Command line exceeds buffer size. Parameters out of range.
6	NO DIAL TONE	Dial tone not detected within timeout and subsequent commands not processed.
7	BUSY	Reorder (Busy) signal detected and subsequent commands not processed.
8	NO ANSWER	Five seconds of silence not detected after ring back when “@” (quiet answer) dial modifier is used.

Extended cellular result codes (for CDMA) are extended result codes that may be supported by the IWF. Note that IWF systems may not support some or all of these codes.

Table 3. Extended Cellular Result Codes (CDMA)

Code	Verbose	Meaning
11	RING ASYNC	Indicates an incoming CSC call.
12	RING FAX	Indicates an incoming CSC Fax call.
13	RING PACKET	Indicates an incoming packet data mode call.
21	NO SERVICE	Origination was attempted while the modem was not able to acquire a CDMA Paging Channel.
22	NO ASYNC SERVICE	The base station rejected the async service option request.

Code	Verbose	Meaning
23	NO FAX SERVICE	The base station rejected the fax service option request.
25	BAD REQUEST	An intercept was received after call origination.
26	PAGED	The modem attempted to originate a call after receiving a page.
27	RETRY	Reorder received after call origination.
28	PAGE FAIL	The modem received a page but not an alert.
29	LINK FAIL	The modem has lost the Traffic Channel.
30	RELEASE	The call has been released.

Extended Cellular Result Codes (for UMTS) are extended result codes that are supported by UMTS.

Table 4. Extended Cellular Result Codes (UMTS)

Code	Verbose	Meaning
32	ASYNC	asynchronous transparent
33	SYNC	synchronous transparent
34	REL ASYNC	asynchronous non-transparent
35	REL SYNC	synchronous non-transparent
36	FAX	facsimile
31	VOICE	normal voice
37	VOICE/ASYNC	voice followed by asynchronous transparent data
38	VOICE/SYNC	voice followed by synchronous transparent data
39	VOICE/REL ASYNC	voice followed by asynchronous non-transparent data
40	VOICE/REL SYNC	voice followed by synchronous non-transparent data
41	ALT VOICE/ASYNC	alternating voice/asynchronous transparent data, voice first
42	ALT VOICE/SYNC	alternating voice/synchronous transparent data, voice first
43	ALT VOICE/REL ASYNC	alternating voice/asynchronous non-transparent data, voice first
44	ALT VOICE/REL SYNC	alternating voice/synchronous non-transparent data, voice first
45	ALT ASYNC/VOICE	alternating voice/asynchronous transparent data, data first
46	ALT SYNC/VOICE	alternating voice/synchronous transparent data, data first
47	ALT REL ASYNC/VOICE	alternating voice/asynchronous non-transparent data, data first
48	ALT REL SYNC/VOICE	alternating voice/synchronous non-transparent data, data first
49	ALT VOICE/FAX	alternating voice/fax, voice first
50	ALT FAX/VOICE	alternating voice/fax, fax first
51	GPRS	GPRS network request for PDP context activation

Response

This term indicates a response from the modem that is issued prior to a result code. Reading registers or issuing commands that report information will provide a response followed by a result code unless the command generates an error.

Responses and result codes from the modem, or host system software prompts, are shown in this font: `CONNECT 14400`.

Command Timing

Some commands require time to process before additional commands are entered. When building automated test scripts, ensure that sufficient delays are embedded where necessary to avoid these errors.

Terminology and Acronyms

This document makes wide use of acronyms that are in common use in data communications and cellular technology. Some of these acronyms and terminologies are described in Appendix E: Acronyms and Definitions.

Generic AT Commands

1. AT Password Commands

This chapter describes how to enter or change the password for password-protected commands.

1.1. Command Summary

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

1.2. Command Reference

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!ENTERCND</td><td>
Enable access to password-protected commands.

Before any password-protected AT commands can be used, the password must be entered correctly using this command. The initial password is configured onto the modem during manufacture. The password can be changed using !SETCND. Contact Sierra Wireless if the password is unknown.

Once the password has been entered correctly, the password-protected AT commands are available until the modem is reset or powered off and on.

Usage
Execution AT!ENTERCND=<“key”>
Response OK
Purpose Unlock password-protected commands
Note: The execution operation is not password-protected.

Query AT!ENTERCND?
Response <key> (if unlocked)
Purpose Display the password as a reminder

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><“key”></td><td></td><td>Password stored in non-volatile memory.
Password must be entered with quotation marks. For example, AT!ENTERCND=“ExamplePW”
Password length: 4–10 characters (0–9, A–Z, upper or lower case)
Characters may be entered in ASCII format, or in Hex format. For example: “myPass3” or “ABCDEF01234”.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SETCND</td><td>
Set AT command password

Before the password can be set or changed, access to this command must be enabled using !ENTERCND.

Usage
Execution AT!SETCND=<"key">
Response OK
Purpose Sets <"key"> as the new password for accessing protected commands

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><"key"></td><td></td><td>New password.
Password must be entered with quotation marks. For example, AT!SETCND="NewPW"
Password length: 4–10 characters (0–9, A–Z, upper or lower case)
Characters may be entered in ASCII format, or in Hex format. For example: "myPass3" or "ABCDEF01234".</td></tr>
</table>
Note: Do not enter a null password; that is, <"key"> cannot be "". Doing this will keep you from using password-protected commands.
</td></tr>
</table>

2. Non-Volatile Memory Management Commands

The modem has a non-volatile memory that is used to store:

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

Commands in this chapter allows you to back up and restore data in non-volatile memory.

2.1. Command Summary

Command	Description
!NVDEF	Reset non-volatile memory
!NVBACKUP	Back up select NV items
!NVRESTORE	Restore backup data
!NVENCRYPTIMEI	Write unencrypted IMEI to modem (only applicable for UMTS version)
!NVOEM	Set/report values of non-volatile (NV) memory items
!RTNRESET	Reset device to factory default

2.2. Command Reference

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!NVDEF</td><td>
Reset non-volatile memory

This command removes all calibration data, customizations, etc. and resets the non-volatile memory to default values and restores the modem's FSN. Profiles (PDP contexts) are not restored using AT commands; the host application is responsible for implementing this task.

Note: Use !NVBACKUP to save these settings first. After using this command, use !NVRESTORE to restore those settings.

This command may take 20–30 seconds to complete.

Usage
Execution AT!NVDEF
Response !NVDEF: Wiping NV, restoring defaults for S1614350476E10F
NV Items Defaulted: <defaulted>
OK
(FSN shown is an example)
Purpose Clear and reset non-volatile memory items

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><defaulted></td><td>0–65535</td><td>Number of non-volatile memory items defaulted.
This number varies depending on the firmware version.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!NVBACKUP</td><td>
Back up selected non-volatile memory items

Backs the selected categories in non-volatile memory to EFS files. Backed up data can be retored using AT!NVRESTORE.
This command is not password-protected.

Usage
Execution AT! NVBACKUP=<category>
Response !NVRESTORE:
NV Items Saved: <saved>
NV Items Skipped: <skipped>
NV Items 0 Length: <zerolen>
OK
Purpose Backs the selected non-volatile items up

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><category></td><td></td><td>Item type to be restored</td></tr>
<tr><td></td><td>0</td><td>Factory items (RF calibration data)</td></tr>
<tr><td></td><td>1</td><td>OEM items</td></tr>
<tr><td></td><td>2</td><td>User items</td></tr>
<tr><td><saved></td><td>0–255</td><td>Number of NV items saved</td></tr>
<tr><td><skipped></td><td>0–255</td><td>Number of NV items skipped – this line is not displayed if skipped=0</td></tr>
<tr><td><zerolen></td><td>0–255</td><td>Number of NV items which are zero in length – this line is not displayed if zerolen=0</td></tr>
</table>
</td></tr>
<tr><td>!NVRESTORE</td><td>
Restore backup data

Restore backed up items to non-volatile and return the number of NV items restored.

Usage
Execution AT!NVRESTORE=<category>
Response !NVRESTORE:
NV Items Restored: <restored>
OK
Purpose Clears and resets non-volatile memory items

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><category></td><td></td><td>Item type to be restored</td></tr>
<tr><td></td><td>0</td><td>Factory items (RF calibration data)</td></tr>
<tr><td></td><td>1</td><td>OEM items</td></tr>
<tr><td></td><td>2</td><td>User items</td></tr>
<tr><td><restored></td><td>0–255</td><td>Number of NV items restored</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!NVENCRYPTIMEI</td><td>
Write unencrypted IMEI to modem

This is done if the modem does not have an IMEI yet; this command can only be used once per modem.
The IMEI is a fifteen digit string formed by concatenating the following elements:

TAC code (8 digits)
SN (Serial number) (6 digits)
CheckDigit (1 digit calculated from TAC code and SN)

The CheckDigit is calculated as follows:

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)
Double the value of each odd-labeled digit (D13, D11, ..., D1).
Add the values of each individual digit from the result of Step 2.
Add the even-labeled digits (D14, D12, ..., D2) to the result of Step 3.
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, for TAC (12345678); SN (901234):

Label the digits of the TAC and SN.

<table>
<tr><td>D14</td><td>D13</td><td>D12</td><td>D11</td><td>D10</td><td>D9</td><td>D8</td><td>D7</td><td></td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td></td><td>9</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
</table>
<ol start="2">
Double the odd-labeled values.

<table>
<tr><td>D14</td><td>D13</td><td>D12</td><td>D11</td><td>D10</td><td>D9</td><td>D8</td><td>D7</td><td></td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td></tr>
<tr><td>1</td><td>4</td><td>3</td><td>8</td><td>5</td><td>12</td><td>7</td><td>16</td><td></td><td>9</td><td>0</td><td>1</td><td>4</td><td>3</td><td>8</td></tr>
</table>
<ol start="3">
Add each digit of the odd-labeled values:
4 + 8 + (1 + 2) + (1 + 6) + 0 + 4 + 8 = 34
Add each digit of the even-labeled values to the total from Step 3:
1 + 3 + 5 + 7 + 9 + 1 + 3 +34 = 63
Check last digit of the total from Step 4. CheckDigit = 10 - 3 = 7
Result: IMEI = TAC:SN:CheckDigit = 123456789012347

Usage
<table>
<tr><td>Execution</td><td>AT!NVENCRYPTIMEI=<P1>,<P2>,<P3>,<P4>,<P5>,
<P6>,<P7>,<P8></td></tr>
<tr><td>Response</td><td>OK</td></tr>
<tr><td>Purpose</td><td>Write unencrypted IMEI to the modem</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><P1> to <P8></td><td></td><td>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</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td><P8> represents the CheckDigit plus a padding digit (‘0’)
Example
(Using the sample IMEI shown above)
AT!NVENCRYPTIMEI=12,34,56,78,90,12,34,70</td></tr>
<tr><td>!NVOEM</td><td>Set/report values of non-volatile (NV) memory items

This command reads or writes the values of specific modem operation values held in non-volatile memory.

Usage
Execution — AT!NVOEM=<item>, <value1>, ..., <valuen>
Response — OK
Purpose — Writes the specified configuration <values> (1-byte each) to the NV <item>

Query — AT!NVOEM?<item>
Response — <value1> ... <valuen>
OK
Purpose — Return the current configuration of the specified <item> in 1-byte <value>s (displayed as hexadecimal values)

Note: The query command, !NVOEM?<item>, is not password-protected.

Query List — AT!NVOEM=?
Purpose — Returns a list of non-volatile memoery items that can be read or written

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><item></td><td></td><td>Supported NV item</td></tr><tr><td></td><td>GMSCLASS</td><td>GPRS MS class</td></tr><tr><td></td><td>EMSCLASS</td><td>EDGE MS class</td></tr><tr><td></td><td>FTM_MODE</td><td>FTM enable</td></tr><tr><td></td><td>GERANFP1</td><td>GERAN FP1 enable</td></tr><tr><td></td><td>GSMA5ALG</td><td>A5 encryption support</td></tr><tr><td></td><td>GEAALG</td><td>GEA encryption support</td></tr><tr><td><value></td><td>00-FF</td><td>Single byte of NV configuration item</td></tr></table>
Examples
AT!NVOEM?GMSCLASS
0C
OK

AT!NVOEM=GMSCLASS, 0C
OK</td></tr>
<tr><td>!RTNRESET</td><td>Reset device to factory default

Usage
Execution — AT!RTNRESET
Response — OK</td></tr>
</table>

3. Voice Commands

The AirPrime SL9090 and MC9090 embedded modules have built-in audio support that allows the module to be used as mobile phones.

Both modems support a single analog audio interface that can be used for handset-style applications or headset applications, as well as a PCM digital audio interface. The SL9090 and MC9090 have a wide range of software-controlled audio filtering and amplification stages which minimize the amount of external circuitry required on the host system.

At its most basic configuration, the host audio system could contain either:

- A microphone/speaker combination (handset)
- A headset jack

The audio pass band for the primary and secondary audio paths extends from 300 Hz to 3.4 kHz in both receive and transmit directions.

The following transmit audio features are supported:

- Adjustable gain up to +40 dB
- Several adjustable filtering stages (high-pass and slope filters)
- Noise cancellation
- Configurable echo cancellation for various acoustic environments. (For example, headset, handset, and speakerphone.)
- Adjustable sidetone from mute to unity gain

The following receive audio features are supported:

- Adjustable gain up to +24 dB
- High-pass filter stage
- Output driver stages which can drive speakers directly

The embedded module can serve as an integral component of a more complex audio system, such as a PDA with a separate codec interfacing with the main processor. In this case, the interface between the modem and PDA codec can be as simple as line-level audio with no transducer considerations. Phone-oriented functions such as echo cancellation and FIR filtering are typically left to the module, while path-switching and transducer interfaces are the responsibility of the PDA codec. Functions such as adjustable gain and volume settings, DTMF and ringer tone generation, and mixing can be accomplished in either codec, depending on the architecture of the particular product. The interface between the module and host audio systems is usually the primary audio interface set to linelevel amplitudes, routed as differential pairs for noise immunity.

3.1. Audio Profiles

AT commands allow you to have different audio configurations for different purposes. For example, assume you are embedding the module in a device that has a handset mode and a speakerphone mode. Assume also that you want to use different transmit gain, noise suppression, and echo cancellation settings in each mode. You can store the settings for each mode in separate audio profiles, then activate the appropriate profile as your application switches to handset or speakerphone mode.

The SL9090 and MC9090 support the following audio profiles.

- 0 – Handset
- 1 – Headset
- 2 – Speaker
- 3 – BT(Bluetooth)
- 4 – TTY (TeleType – a device that allows speech and hearing-impaired people to use a phone)
- 5 – HAC (Hearing Aid Compatibility)
- 6 – Reserved
- 7 – Primary external PCM (2 MHz clock)

AT commands used to change audio configuration have a profile parameter; any changes made are applied to the specified profile. The default audio configuration for each profile are shown in the following table.

Table 5. Default Audio Profile Settings

Settings	Profile ID							
	0	1	2	3	4	5	6	7
Automatic Gain Control (Tx) **AT!AVTXAGC**	Off	Off	Off	Off	Off	Off	-	Off
Noise Suppression (Tx) **AT!AVNS**	On	On	Off	Off	On	On	-	Off
AGC, AVC (Rx) **AT!AVRXAGC**	Off	Off	Off	Off	Off	Off	-	Off
Echo Cancellation **AT!AVEC**	ESEC	Headset	AEC	Speaker	Headset	ESEC	-	Headset
Tx Gain **AT!AVTXVOL**	9.5 dB	9.5 dB	9.5 dB	9.5 dB	9.5 dB	0 dB	-	-2.5 dB
Sidetone Gain **AT!AVCODECSTG**	-24.0 dB	-24.0 dB	-24.0 dB	-24.0 dB	-24.0 dB	Mute	-	Mute

3.2. Profile Activation

Profile 0 (handset) is the default profile. Unless you activate a different profile prior to establishing a circuit-switched call, the default profile is used in establishing the call. To use a profile other than Profile 0, use the command **AT!AVSETPROFILE** to activate the profile prior to establishing the call.

3.3. Command Summary

Command	Description
!AVAUDIOLPBK	Enable/disable an audio loopback
!AVCODECSTG	Set/report CODEC sidetone gain
!AVDEF	Set audio settings to default values
!AVDTMFTXG	Set/report the DTMF Tx gain
!AVDTMFVOLDB	Set/report volume for each DTMF volume level in Rx direction

Command	Description
!AVEC	Set/report the echo cancellation setting
!AVEXTPCMCFG	Configure external PCM interface
!AVEXTPCMSTOPCLKOFF	Prevent/allow external PCM interface clock from turning off
!AVINBANDRANGE	Specify Progress Descriptor value range for in-band signaling
!AVNS	Enable/disable noise suppression
!AVRXAGC	Set/report Rx AVC/AGC configuration
!AVRXPCMIIRFLTR	Set/report the Rx PCM IIR filter parameters
!AVRXVOLDB	Set/report volume for each voice volume level in Rx direction
!AVSETPROFILE	Configure and activate profile
!AVSETDEV	Set audio profile Rx and Tx mute states
!AVSETVOL	Set audio profile default volume level
!AVSN	Set/report audio revision number
!AVTONEPLAY	Play DTMF tone
!AVTONESETTINGS	Enable/disable playing of locally-generated DTMF tones
!AVTXAGC	Set Tx AGC
!AVTXPCMIIRFLTR	Set/report the Tx PCM IIR filter parameters
!AVTXVOL	Set Tx volume
!AVADVEC	Advanced echo canceller
!AVPAD	Pad setting
!AVRXAGCLIST	RX AGC control registers
!AVRXAVCLIST	RX AVC control registers
!AVTXAGCLIST	TX AGC control registers
!AVFLUENCE	Fluence speech control registers
!AVEXTI2SCFG	Configure external I^2S interface
!AVCONTROLBLOCKDEF	Set audio control block
!AVINITFROMNV	Re-initialize audio data structures
!AVPATHCONFIGDEF	Set profile configuration to default values
!AVPROPAGATE	Propagate audio parameters
!AVVOLTBLDEF	Set volume table to default values
!AVECRESET	Force echo canceller to reset
!AVTONEDUR	Set DTMF duration time
!AVDTMFK	Send a DTMF character
!AVDTMFB	Set DTMF string or character
!AVCDTMFK	Send continuous DTMF character
!AVTONEMUTE	Read from/write to the audio interface

3.4. Command Reference

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVAUDIOLPBK</td><td>
Enable/disable an audio loopback

The loopback occurs at the vocoder interface and tests the audio front end with the EFR (Enhanced Full Rate) vocoder.

Usage
Execution AT!AVAUDIOLPBK=<enable>
Response OK
Purpose Enable or disable audio loopback

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><enable></td><td></td><td>Enable or disable loopback</td></tr>
<tr><td></td><td>0</td><td>Loopback OFF</td></tr>
<tr><td></td><td>1</td><td>Loopback ON</td></tr>
</table>
</td></tr>
<tr><td>!AVCODECSTG</td><td>
Set/report CODEC sidetone gain

CODEC sidetone gain is the portion of audio from the microphone that gets routed back to the user’s speaker. This prevents the user from speaking too loudly by making them aware of the volume of their own voice.
The gain range is -84dB to +12dB.
This setting is stored in non-volatile memory and persists across power cycles, and takes effect immediately for the specified profile.

Usage
Execution AT!AVCODECSTG=<profile>, <value>
Response OK
Purpose Sets the CODEC sidetone gain for the specified <profile>

Query AT!AVCODECSTG?<profile>
Response <value>
Purpose Returns the current CODEC sidetone gain for the specified <profile>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><value></td><td>0x0000 (mute) – 0xFFFF</td><td>Gain value for selected <profile>
The value is entered/returned in hexadecimal format.
To calculate the gain in dB, convert <value> to decimal (<decvalue>) and use the following formula:
Gain = 20 log10 (<decvalue> / 16384)
Mute = 0x0000
Unity gain = 0x4000</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVDEF</td><td>
Set audio settings to default values

Set all the configurable audio parameters to default values. Default values are also loaded into non-volatile memory.
Change takes effect immediately for the specified profile.

Usage
Execution AT!AVDEF
Response OK
Purpose Set audio settings to default values
</td></tr>
<tr><td>!AVDTMFTXG</td><td>
Set/report the DTMF Tx gain

The DTMF Tx gain determines the gain, from -84dB to +12dB, for the DTMF tone that is transmitted over the air.
This setting is stored in non-volatile memory and persists across power cycles. Changes to the audio system take effect when a phone call is made or received.
This command is not password-protected.

Usage
Execution AT!AVDTMFTXG=<profile>, <value>
Response OK
Purpose Set the DTMF Tx gain for the specified <profile>

Query AT!AVDTMFTXG?<profile>
Response <value>
OK
Purpose Return the current DTMF Tx gain for the specified <profile>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><value></td><td>0x0000 (mute) – 0x4B0</td><td>Gain value for the selected <profile>
To calculate the gain in dB, convert <value> to decimal (<decvalue>) and use the following formula:</td></tr>
<tr><td></td><td>0xEC78 – 0xFFFF</td><td>Gain = 20 log10 (<decvalue> / 16384)
Unity gain = 0x4000</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVDTMFVOLDB</td><td>
Set/report volume for each DTMF volume level in Rx direction

The setting is stored in non-volatile memory and persists across power cycles. Changes to the audio system takes effect immediately if the specified path is active and all the volumes have been initialized.

Usage
Execution AT!AVDTMFVOLDB=<profile>, <generator>, <level>, <value>
Response OK
Purpose Set the audio and DTMF volumes for the specified <profile>

Query AT!AVDTMFVOLDB?<profile>, <generator>, <level>
Response <value>
Purpose Return the current volume for the specified <profile><generator><level> combination

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><generator></td><td></td><td>Audio type</td></tr>
<tr><td></td><td>0</td><td>Voice</td></tr>
<tr><td><level></td><td>0-7</td><td>Volume level</td></tr>
<tr><td><value></td><td>0x0000 – 0x04B0 (positive gains)
0xFFFF – 0xEC78 (negative gains)</td><td>Volume for the specified <level>
The volume in dB is equal to <value>/100.</td></tr>
</table>
</td></tr>
<tr><td>!AVEC</td><td>
Set/report the echo cancellation setting

The echo canceller detects and removes audio that echoes back from the far end of the voice conversation.
Several settings are available:

Handset mode for mild echo with short delay
Headset mode for moderate echo with short delay
Car kit for loud echo with long delay
Speakerphone mode for loud echo with extreme acoustic distortion

This setting is stored in non-volatile memory and persists across power cycles. Change take effect immediately for the specified profile.
This command is not password protected.

Usage
Execution AT!AVEC=<profile>, <value>
Response OK
Purpose Set the echo cancellation mode for the specified <profile>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Query AT!AVEC?<profile>
Response <value>
Purpose Return the echo cancellation mode (<value>) for the specified <profile>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><value></td><td></td><td>Echo cancellation mode</td></tr>
<tr><td></td><td>0</td><td>EC Off</td></tr>
<tr><td></td><td>1</td><td>EC ESEC (Handset)</td></tr>
<tr><td></td><td>2</td><td>EC Headset</td></tr>
<tr><td></td><td>3</td><td>EC AEC (Car Kit)</td></tr>
<tr><td></td><td>4</td><td>EC Speaker</td></tr>
</table>
</td></tr>
<tr><td>!AVEXTPCMCFG</td><td>
Configure external PCM interface

Configure the external PCM interface by specifying the clock speed, the format, and enabling/disabling padding.
These settings are stored in non-volatile memory and persist across power cycles; changes takes effect immediately for the specified profile.

Usage
Execution AT!AVEXTPCMCFG=<clock>, <format>, <padding>
Response OK
Purpose Configure the external PCM interface

Query AT!AVEXTPCMCFG?
Response <clock> <format> <padding>
Purpose Display current PCM interface configuration settings

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><clock></td><td></td><td>PCM clock speed</td></tr>
<tr><td></td><td>0</td><td>2.048 MHz (short sync)</td></tr>
<tr><td><format></td><td></td><td>PCM format type</td></tr>
<tr><td></td><td>0</td><td>8-bit μ-law</td></tr>
<tr><td></td><td>1</td><td>8-bit a-law</td></tr>
<tr><td></td><td>2</td><td>16-bit linear</td></tr>
<tr><td><padding></td><td></td><td>Enable/disable padding
Note that padding is typically disabled (padding bits are used to control the volume level for some external codecs).</td></tr>
<tr><td></td><td>0</td><td>Disable</td></tr>
<tr><td></td><td>1</td><td>Enable</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVEXTPCMSTOPCLKOFF</td><td>
Prevent/allow external PCM interface clock from turning off

The external PCM interface for the current audio profile must be enabled before using this command.
Changes take effect immediately.

Usage
Execution AT!AVEXTPCMSTOPCLKOFF=<value>
Response OK
Purpose Enable or disable (<value>) the ability to turn off the external PCM interface clock

Query AT!AVEXTPCMSTOPCLKOFF?
Response <value>
Purpose Return the current status of this option

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><value></td><td></td><td>Ability to prevent the PCM clock from being turned off</td></tr>
<tr><td></td><td>0</td><td>Disable</td></tr>
<tr><td></td><td>1</td><td>Enable</td></tr>
</table>
At startup, if the default audio profile 0 uses the external PCM interface, the modem enables the clock. If the default audio profile 0 does not use the external PCM interface, the user must switch to a different profile that uses the external PCM interface to enable the clock.
If the user switches from a profile that uses the external PCM interface to one that does not, the PCM clock is lost.
Depending on the external CODEC configuration, OEMs using this command might prevent the audio from being muted, so the device could be more prone to noise from the RF subsystem.
</td></tr>
<tr><td>!AVINBANDRANGE</td><td>
Specify Progress Descriptor value range for in-band signaling

During call establishment, several OTA messages may include a Progress Indicator information element that indicates whether the network uses in-band DTMF signaling.
3GPP TS24.008 (section 5.5.1 and section 10.5.4.21) indicates the valid range of Progress Descriptor values. This command can be used to specify one of two possible ranges to accommodate differing interpretations of the specification.
This setting takes immediate effect (does not require a restart), and persists cross power cycles.

Usage
Execution AT!AVINBANDRANGE=<range>
Response OK
or
ERROR
Purpose Specify the range of possible Progress Descriptor values

Query AT!AVINBANDRANGE?
Response <range>
Purpose Return the range of possible Progress Descriptor values
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><range></td><td></td><td>Progress Descriptor value range</td></tr>
<tr><td></td><td>0</td><td>Default (1, 2, 3, 6, .., 20)</td></tr>
<tr><td></td><td>1</td><td>Alternate (1, 2, 3, 6, .., 0x20)</td></tr>
</table>
</td></tr>
<tr><td>!AVNS</td><td>
Enable/disable noise suppression

Set the noise suppression mode for a specified profile. The noise suppressor reduces or eliminates continuous background noise, providing a clearer Rx audio signal.
This setting is stored in non-volatile memory and persists across power cycles. Changes take effect immediately for the specified profile.
This command is not password-protected.

Usage
Execution AT!AVNS=<profile>, <value>
Response OK
Purpose Set the noise suppression mode for the specified <profile>

Query AT!AVNS?<profile>
Response <value>
Purpose Return the noise suppression mode for the specified <profile>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><value></td><td></td><td>Noise suppression mode</td></tr>
<tr><td></td><td>0</td><td>Noise suppression mode is off</td></tr>
<tr><td></td><td>1</td><td>Noise supporession mode is on</td></tr>
</table>
</td></tr>
<tr><td>!AVRXAGC</td><td>
Set/report Rx AVC/AGC configuration

The Rx AGC compensates for variations in audio gains from the land line side, while the Rx AVC tracks the ambient audio noise on the mobile side and compensates accordingly. Both controls allow for a constant audio level in the Rx direction.
The setting is stored in non-volatile memory and persists across power cycles. Changes take effect immediately for the specified profile.

Usage
Execution AT!AVRXAGC=<profile>, <value>
Response OK
Purpose Set the Rx AVC/AGC configuration for the specified <profile>

Execution AT!AVRXAGC?<profile>
Response <value>
Purpose Return the current Rx AVC/AGC configuration for the specified <profile>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><value></td><td></td><td>AVC/AGC configuration</td></tr>
<tr><td></td><td>0</td><td>AGC off, AVC off</td></tr>
<tr><td></td><td>1</td><td>AGC on, AVC on</td></tr>
<tr><td></td><td>2</td><td>AGC on, AVC off</td></tr>
</table>
</td></tr>
<tr><td>!AVRXPCMIIRFLTR</td><td>
Set/report the Rx PCM IIR filter parameters

The modem has a multi-stage PCM (Pulse Code Modulation) IIR (Infinite Impulse Response) filter. Use this command to set parameters for each stage of the specified profile.
Note: This command is only useful when embedding the modem in a handset.
Mobile phones, PDAs or other handheld transmitters and receivers that incorporate a GSM module are required to comply with the GSM 11.10 3GPP TS51.010 or 3GPP TS26.132 standard, or with national standards or government regulations. To conform to the relevant standard you may need to tune certain audio characteristics.
This command lets you tune the receive PCM filter to alter audio characteristics. Settings are stored in non-volatile memory and persist across power cycles.
Changes take effect immediately for the specified profile.

To enable the PCM IIR filter, set the number of stages > 0.
To disable the PCM IIR filter, set the number of states = 0.

To tune the receive or transmit audio characteristics, follow a procedure similar to the following:
1. Disable the PCM IIR and FIR filters.
2. Use test equipment to obtain the initial Tx/Rx frequency response (uncorrected).
3. Make sure your filter design tool is configured to generate filter coefficients in signed Q30 format.
4. Identify frequency bands that must be corrected (boosted or attenuated) to bring the overall response within the bounds specified in the test case, considering the following points:
▪ Fit the conformance mask (3GPP specification)
▪ Minimize overall gain introduced by the PCM filter
▪ Modify the filter if necessary to improve quality (higher frequencies are more legible; lower frequencies will sound muffled)
5. Use !AVRXPCMIIRFLTR with an appropriate number of stages for the speech codec being used:
▪ Wideband codecs (e.g. AMR-WB)—Five stages required
▪ Narrowband codecs (e.g. AMR-NB)—Fewer stages required (for example, 3)
6. Repeat steps 4–5 until the specifications are met.

Usage
Execution AT!AVRXPCMIIRFLTR=<profile>, <param>, <stages>
or
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Response: AT!AVRXPCMIIRFLTR=<profile>, <param>, <a1>, <a2>, <b0>, <b1>, <b2>
OK
Purpose: Set the number of stages for the filter, or set the parameters for a specific stage

Query: AT!AVRXPCMIIRFLTR?<profile>, <param>
Response: <stages>
OK
or
<a1>,<a2>,<b0>,<b1>,<b2>
OK
Purpose: Return the number of IIR filter stages, or the parameters for a specific stage

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><param></td><td></td><td>Stage number</td></tr>
<tr><td></td><td>0</td><td>Configure the number of <stages></td></tr>
<tr><td></td><td>1-5</td><td></td></tr>
<tr><td><stages></td><td>0-5</td><td>Number of stages</td></tr>
<tr><td><a1>, <a2></td><td>0x00000000 – 0xFFFFFFFF</td><td>IIR filter design parameter
Signed hexadecimal</td></tr>
<tr><td><b0>, <b1>, <b2></td><td>0x00000000 – 0xFFFFFFFF</td><td>IIR filter design parameter</td></tr>
</table>
</td></tr>
<tr><td>!AVRXVOLDB</td><td>
Set/report volume for each voice volume level in Rx direction

Volumes range from -50 dB to 12 dB and are applied to PCM voice packets after they have been decoded by the vocoder.
The setting is stored in non-volatile memory and persists across power cycles.
Change take effect immediately for the specified profile.

Usage
Execution: AT!RXVOLDB=<profile>, <generator>, <level>, <value>
Response: OK
Purpose: Set the Rx volume (in dB) for the specified <profile>

Query: AT!RXVOLDB?<profile>,<generator>,<level>
Response: <value>
Purpose: Return the Rx volume (in dB) for the specified <profile>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
</table>
</td></tr>
</table>

Command	Description
	<generator> Audio type 0 Voice <level 0-7 Volume level <value> Rx volume (signed) in dB = value/100); 0x0000–0x04B0, FFFF–EC78
!AVSETPROFILE	**Configure and activate profile** This command allows you to select a profile with which to establish a circuit-switched call, as well as enables or disables muting on the earpiece and microphone and sets the volume level. The profile you select remains active until the modem is reset or powered down and up again. Following a reset or power up, Profile 0 (default profile) is active. If desired, you can run the command **!AVRXVOLDB** to assign specific volume levels to each of the predefined volume levels, 1 through 7. This command is not password-protected. **Usage** Execution **AT!SETPROFILE=<profile>, <earmute>, <micmute>, <generator>, <volume>[, <cwtmute>]** Response **OK** Purpose Set the audio characteristics for the specified <profile> Query **AT!AVSETPROFILE?<generator>** Response **<profile>, <earmute>, <micmute>, <volume>** **OK** Purpose Return the audio profile characteristics for the specified audio type **Parameters** **Parameter / Value / Description** <profile> Audio profile number. Refer to section 3.1 Audio Profiles for parameter values <earmute> Enable/disable earpiece muting 0 Unmuted 1 Muted <micmute> Enable/disable microphone muting 0 Unmuted 1 Muted <generator> Audio type 0 Voice <level> 0-7 Volume level <cwtmute> Enable/disable call waiting tone muting 0 Unmuted (default) 1 Muted

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVSETDEV</td><td>
Set audio profile Rx and Tx mute states

Mute or unmute a profile’s Rx and Tx audio paths (earphone/microphone).

Usage
Execution AT!AVSETDEV=<profile>,<earmute>,<micmute>
Response OK
Purpose Set the audio codec’s register bit width

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><earmute></td><td></td><td>Enable/disable earpiece muting</td></tr>
<tr><td></td><td>0</td><td>Unmuted</td></tr>
<tr><td></td><td>1</td><td>Muted</td></tr>
<tr><td><micmute></td><td></td><td>Enable/disable microphone muting</td></tr>
<tr><td></td><td>0</td><td>Unmuted</td></tr>
<tr><td></td><td>1</td><td>Muted</td></tr>
</table>
</td></tr>
<tr><td>!AVSETVOL</td><td>
Set audio profile default volume level

This setting is stored in non-volatile memory and persists across power cycles. Use this command with !AVSETDEV to set the default values for each voice audio profile.

Usage
Execution AT!AVSETVOL=<profile>,<generator>,<value>
Response OK
Purpose Set the audio profile’s default volume level

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><generator></td><td></td><td>Audio generator</td></tr>
<tr><td></td><td>0</td><td>Voice</td></tr>
<tr><td></td><td>1</td><td>Key beep</td></tr>
<tr><td></td><td>2</td><td>MIDI</td></tr>
<tr><td><value></td><td>0-7</td><td>Voice volume level</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVSN</td><td>
Set/report audio revision number

The modem does NOT associate this number with any settings and this command does not provide a means of restoring a particular configuration; it only provides a means of storing and retrieving a number.
This command is not password-protected.

Usage
Execution AT!AVSN=<value>
Response OK
Purpose Set the audio configuration revision number

Query AT!AVSN?
Response <value>
OK
Purpose Return the current audio configuration revision number

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><value></td><td>0x00000000 – 0xFFFFFFFF</td><td>Revision number</td></tr>
</table>
</td></tr>
<tr><td>!AVTONEPLAY</td><td>
Play DTMF tone

Play a specified DTMF tone with the current active audio profile. This is intended for testing purposes and not for normal operation use.

Usage
Execution AT!AVTONEPLAY=<generator>, <value> [, <duration>]
Response OK
Purpose Play a specific tone

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><generator></td><td></td><td>Audio type</td></tr>
<tr><td></td><td>0</td><td>Voice</td></tr>
<tr><td><value></td><td>0x00 – 0x39</td><td>Tone value
Refer to Table 6 Tone Values for AT!AVTONEPLAY for details</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVTONESETTINGS</td><td>
Enable/disable playing of locally-generated DTMF tones

Block locally-generated DTMF tones from playing, while leaving voice unaffected.
The setting is stored in non-volatile memory and persists across power cycles.
This does not block in-band DTMF tones.

Usage
Execution AT!AVTONESETTINGS=<group>,<setting>
[,<group>, <setting>][,...]
Response <group 1> TONES: <Off | On>
...
<group N> TONES: <Off | On>
OK
or
ERROR
Purpose Enable or disable local playing of specific tone groups

Query AT!AVTONESETTINGS?
Response <group 1> TONES: <Off | On>
...
<group N> TONES: <Off | On>
OK
Purpose Return the current state for each supported tone group

Query List AT!AVTONESETTINGS=?
Purpose Return the command format, and supported <group> and <setting> values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><group></td><td>“ALL”</td><td>Affected tone group
ASCII string</td></tr>
<tr><td><setting></td><td></td><td>Enable/disable specific tone group</td></tr>
<tr><td></td><td>0</td><td>Disable</td></tr>
<tr><td></td><td>1</td><td>Enable</td></tr>
</table>
</td></tr>
<tr><td>!AVTXAGC</td><td>
Set Tx AGC

Set the Tx AGC (Automatic Gain Control) for the specified profile. The Tx AGC compensates for variations in audio gains from the mobile side to allow for a constant audio level in the Tx direction.
The setting is stored in non-volatile memory and persists across power cycles.
Change take effect immediately for the specified profile.

Usage
Execution AT!AVTXAGC=<profile>, <value>
Response OK
Purpose Set the Tx AGC for the specified profile

Query AT!AVTXAGC?<profile>
Response <value>
OK
Purpose Return the current Tx AGC (<value>) for the specified profile
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><value></td><td></td><td>Enable/Disable Tx AGC</td></tr>
<tr><td></td><td>0</td><td>AGC off</td></tr>
<tr><td></td><td>1</td><td>AGC on</td></tr>
</table>
</td></tr>
<tr><td>!AVTXPCMIIRFLTR</td><td>
Set/report the Tx PCM IIR filter parameters

The modem has a multi-stage PCM (Pulse Code Modulation) IIR (Infinite Impulse Response) filter. Use this command to set parameters for each stage of the specified profile. See !AVRXPCMIIRFLTR for a description of using the filters.
Changes take effect immediately for the specified profile.

Usage
<table>
<tr><td>Execution</td><td>AT!AVTXPCMIIRFLTR=<profile>, <param>, <stages>
or
AT!AVTXPCMIIRFLTR=<profile>, <param>, <a1>, <a2>, <b0>, <b1>, <b2></td></tr>
<tr><td>Response</td><td>OK</td></tr>
<tr><td>Purpose</td><td>Set the number of stages for the filter, or set the parameters for a specific stage</td></tr>
<tr><td>Query</td><td>AT!AVTXPCMIIRFLTR?<profile>, <param></td></tr>
<tr><td>Response</td><td><stages>
OK
or
<a1>,<a2>,<b0>,<b1>,<b2>
OK</td></tr>
<tr><td>Purpose</td><td>Return the number of IIR filter stages, or the parameters for a specific stage</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><param></td><td></td><td>Stage number</td></tr>
<tr><td></td><td>0</td><td>Configure the number of <stages></td></tr>
<tr><td></td><td>1-5</td><td></td></tr>
<tr><td><stages></td><td>0-5</td><td>Number of stages</td></tr>
<tr><td><a1>, <a2>, <b01>, <b1>, <b2></td><td>0x00000000 – 0xFFFFFFFF</td><td>IIR filter design parameter
Signed hexadecimal</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVTXVOL</td><td>
Set Tx volume

The Tx volume gain determines the gain, from -84 dB to +12 dB, for the voice that is transmitted over the air. This gain is applied to the PCM voice packets prior to feeding them into the vocoder, which encodes the PCM packets into a more efficient format for over the air transmission.
This setting is stored in non-volatile memory and persists across power cycles.
Changes take effect immediately for the specified profile.

Usage
Execution AT!AVTXVOL=<profile>, <value>
Response OK
Purpose Set the Tx volume gain for the specified <profile>

Execution AT!AVTXVOL?<profile>
Response <value>
OK
Purpose Display the Tx volume gain for the specified <profile>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td></td><td>Audio profile number
Refer to section 3.1 Audio Profiles for parameter values</td></tr>
<tr><td><value></td><td>0x0000 (mute) – 0xFFFF</td><td>Tx volume gain
The value is entered/returned in hexadecimal format.
To calculate the gain in dB, convert <value> to decimal (<decvalue>) and use the following formula:
Gain = 20 log10 (<decvalue> / 16384)
Unity gain value is 0x4000</td></tr>
</table>
</td></tr>
<tr><td>!AVADVEC</td><td>
Sets/queries the Advanced EC (Echo Canceller) control registers for the specified EC mode

The registers are used to tune the Advanced EC state machine. Settings are stored in non-volatile memory and persists across power cycles. For releases which support “instant update” of audio calibration parameters, the change impacts the specified profile immediately.

Usage
Execution AT!AVECLIST=<mode>,<type>,<value>
Response OK

Query AT!AVADVEC?<profile>,<mode>,<type>
Response <value>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td>0 – 7</td><td>Audio profile
The SL9090 supports profile 0 – 5 for I^{2}S, and profile 7 for PCM
The MC9090 only supports profile 7 for PCM</td></tr>
</table>
</td></tr>
</table>

Command	Description		
	<mode>		EC mode
		0	EC ESEC (handset)
		1	EC Headset
		2	EC AEC (car kit)
		3	EC Speaker
	<type>	0	NLPP limit
		1	NLPP gain
		2	NLMS limit
		3	Mode
		4	Tuning mode
		5	Echo path delay
		6	Output gain
		7	Input gain
		8	NLMS TwoAlpha
		9	NLMS ERL
		10	NLMS taps
		11	NLMS preset coefs
		12	NLMS offset
		13	NLMS ERL BG
		14	NLMS taps BG
		15	PCD Threshold
		16	Minimum ERL
		17	ERL Step
		18	Max noise floor
		19	DET threshold
		20	SPDET far
		21	SPDET mic
		22	SPDET xclip
		23	DENS tail alpha
		24	DENS tail portion
		25	DENS gamma e alpha
		26	DENS gamma e dt
		27	DENS gamma e low
		28	DENS gamma e rescue
		29	DENS gamma e high
		30	DENS spdet near
		31	DENS spdet act
		32	DENS gamma n
		33	DENS NFE blocksize
		34	DENS limit NS
		35	DENS NL Atten
		36	DENS CNI level
		37	WB echo ratio
	<value>	0000 – FFFF	Value for <type>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVPAD</td><td>
Sets/queries pad settings for the specified profile’s generator’s volume level

Usage
Execution AT!AVPAD=<profile>,<method>,<level>,<value>
Response OK

Query AT!AVPAD?<profile>,<method>,<level>
Response <value>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td>0 – 7</td><td>Audio profile
The SL9090 supports profile 0 – 5 for I²S, and profile 7 for PCM
The MC9090 only supports profile 7 for PCM</td></tr>
<tr><td><method></td><td></td><td>Audio method/generator</td></tr>
<tr><td></td><td>0</td><td>Voice</td></tr>
<tr><td></td><td>1</td><td>Key beep</td></tr>
<tr><td></td><td>2</td><td>MIDI</td></tr>
<tr><td><level</td><td>0 – 7</td><td>Audio volume level</td></tr>
<tr><td><value></td><td>00 – FF</td><td>Pad parameter</td></tr>
</table>
</td></tr>
<tr><td>!AVRXAGCLIST</td><td>
Sets/queries the RX AGC (Automatic Gain Control) control registers

The RX AGC compensates for variations in audio gains from the landline side. The registers are used to tune the RX AGC operation.
This setting is stored in non-volatile memory and persists across power cycles. For releases which support “instant update” of audio calibration parameters, the change impacts the specified profile immediately.

Usage
Execution AT!AVRXAGCLIST=<profile>,<value₁>,<value₂>,<value₃>,<value₄>,<value₅>,<value₆>
Response OK

Query AT!AVRXAGCLIST?<profile>
Response <value₁>,<value₂>,<value₃>,<value₄>,<value₅>,<value₆>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td>0 – 7</td><td>Audio profile
The SL9090 supports profile 0 – 5 for I²S, and profile 7 for PCM
The MC9090 only supports profile 7 for PCM</td></tr>
<tr><td><value₁></td><td>2000 – FFFF</td><td>RX precompressor static gain
Gain in dB = 20LOG(value₁/8192)</td></tr>
<tr><td><value₂></td><td></td><td>RX precompressor gain selection flag</td></tr>
<tr><td></td><td>0000</td><td>Enable static gain</td></tr>
<tr><td></td><td>FFFF</td><td>Enable adaptive gain</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><value3></td><td>0000 – 2580</td><td>RX expansion threshold
Gain in dB = (value3/128 – 75)</td></tr>
<tr><td><value4></td><td>0000 – FFFF</td><td>RX expansion slope
Equals to 256 * {-0.04...-0.996}, where {} = limited range</td></tr>
<tr><td><value5></td><td>0000 – 2580</td><td>RX compression threshold
Gain in dB = (value5/128 – 75)</td></tr>
<tr><td><value6></td><td>0000 – FFFF</td><td>RX compression slope
Equals to 65536 * {-0.50001..-0.99999} where {} = limited range</td></tr>
</table>
</td></tr>
<tr><td>!AVRXAVCLIST</td><td>
Sets/queries the RX AVC (Automatic Colume Control) control registers

The RX AVC tracks the ambient audio noise on the mobile side and compensates accordingly. The registers are used to tune the RX AVC operation.
This setting is stored in non-volatile memory and persists across power cycles. For releases which support “instant update” of audio calibration parameters, the change impacts the specified profile immediately.

Usage
Execution AT!AVRXAVCLIST=<profile>,<value1>,<value2>
Response OK

Query AT!AVRXAVCLIST?<profile>
Response <value1>,<value2>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td>0 – 7</td><td>Audio profile
The SL9090 supports profile 0 – 5 for I2S, and profile 7 for PCM
The MC9090 only supports profile 7 for PCM</td></tr>
<tr><td><value1></td><td>0000 – FFFF</td><td>AVC variation from nominal sensitivity
Equals to 256 * {-75..75 dB}</td></tr>
<tr><td><value2></td><td>0000 – 4600</td><td>AVC headroom
Gain in dB = value2/256</td></tr>
</table>
</td></tr>
<tr><td>!AVTXAGCLIST</td><td>
Sets/queries the TX AGC (Automatic Gain Control) control registers

The TX AGC compensates for variations in audio gains from the mobile side to allow for a constant level in the TX direction. The registers are used to tune the TX AGC operation.
This setting is stored in non-volatile memory and persists across power cycles. For releases which support “instant update” of audio calibration parameters, the change impacts the specified profile immediately.

Usage
Execution AT!AVTXAGCLIST=<profile>,<value1>,<value2>,<value3>,<value4>,<value5>,<value6>
Response OK
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Query AT!AVTXAGCLIST?<profile>
Response <value1>,<value2>,<value3>,<value4>,<value5>,<value6>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><profile></td><td>0 – 7</td><td>Audio profile
The SL9090 supports profile 0 – 5 for I²S, and profile 7 for PCM
The MC9090 only supports profile 7 for PCM</td></tr>
<tr><td><value1></td><td>2000 – FFFF</td><td>TX precompressor static gain
Gain in dB = 20LOG(value1/8192)</td></tr>
<tr><td><value2></td><td></td><td>TX precompressor gain selection flag</td></tr>
<tr><td></td><td>0000</td><td>Enable static gain</td></tr>
<tr><td></td><td>FFFF</td><td>Enable adaptive gain</td></tr>
<tr><td><value3></td><td>0000 – 2580</td><td>TX expansion threshold
Gain in dB = (value3/128 – 75)</td></tr>
<tr><td><value4></td><td>0000 – FFFF</td><td>TX expansion slope
Equals to 256 * {-0.04...-0.996}, where
{} = limited range</td></tr>
<tr><td><value5></td><td>0000 – 2580</td><td>TX compression threshold
Gain in dB = (value5/128 – 75)</td></tr>
<tr><td><value6></td><td>0000 – FFFF</td><td>TX compression slope
Equals to 65536 * {-0.50001..-0.99999} where {} = limited range</td></tr>
</table>
</td></tr>
<tr><td>!AVFLUENCE</td><td>
Sets/queries the fluence speech control registers

The registers are used to tune the dual-mic noise suppression and echo cancellation.
This setting is stored in non-volatile memory and persists across power cycles. For releases which support “instant update” of audio calibration parameters, the change impacts the specified profile immediately.

Usage
Execution AT!AVFLUENCE=<item>,<index>,<value>
Response OK

Query AT!AVFLUENCE?<item>,<index>
Response <value>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><item></td><td>00</td><td>uint16 CSMode</td></tr>
<tr><td></td><td>01</td><td>uint16 CS_TuningMode</td></tr>
<tr><td></td><td>02</td><td>uint16 CS_echo_path_delay</td></tr>
<tr><td></td><td>03</td><td>uint16 AF1_twoalpha</td></tr>
<tr><td></td><td>04</td><td>uint16 AF1_erl</td></tr>
<tr><td></td><td>05</td><td>uint16 AF1_taps</td></tr>
<tr><td></td><td>06</td><td>uint16 AF1_preset_coefs</td></tr>
</table>
</td></tr>
</table>

Command	Description	
	07	uint16 AF1_offset
	08	uint16 AF2_twoalpha
	09	uint16 AF2_erl
	10	uint16 AF2_taps
	11	uint16 AF2_preset_coefs
	12	uint16 AF2_offset
	13	uint16 PCD_twoalpha
	14	uint16 PCD_offset
	15	uint16 CSPCD_threshold
	16	uint16 WgThreshold
	17	uint16 MpThreshold
	18	uint16 SF_init_table0[8]
	19	uint16 SF_init_table1[8]
	20	uint16 SF_taps
	21	uint16 SF_twoalpha
	22	uint16 DNNS_EchoAlphaRev
	23	uint16 DNNS_EchoYcomp
	24	uint16 DNNS_WbThreshold
	25	uint16 DNNS_EchoGammaHi
	26	uint16 DNNS_EchoGammaLo
	27	uint16 DNNS_NoiseGammaS
	28	uint16 DNNS_NoiseGammaN
	29	uint16 DNNS_NoiseGainMinS
	30	uint16 DNNS_NoiseGainMinN
	31	uint16 DNNS_NoiseBiasComp
	32	uint16 DNNS_AcThreshold
	33	uint16 WB_echo_ratio_2mic
	34	uint16 WB_Gamma_E
	35	uint16 WB_Gamma_NN
	36	uint16 WB_Gamma_SN
	37	uint16 vcodec_delay0
	38	uint16 vcodec_delay1
	39	uint16 vcodec_len0
	40	uint16 vcodec_len1
	41	uint16 vcodec_thr0
	42	uint16 vcodec_thr1
	43	uint16 FixCalFactorLeft
	44	uint16 FixCalFactorRight
	45	uint32 vcodec_coeff0[15]
	46	uint32 vcodec_coeff1[15]
	47	uint16 CS_OutputGain
	48	uint16 Enhance_MeuFilter1
	49	uint16 Enhance_MeuFilter2
	50	uint16 Fix_OverEstimation
	51	uint16 dmNLPPlimit
	52	uint16 dmNLPPgain

Command	Description		
		53	uint16 windNoiseCfgNoiseThresh
		54	uint16 windNoiseSensitivity
		55	uint16 windNoiseHangOver
		56	uint16 windPowerSmAlpha
		57	uint16 lpEnergySmAlpha
		58	uint16 windNoiseEnergyOffset
		59	uint16 windNoiseRatioSmAlpha
		60	uint16 numCoeflirTdf2Lpf[6]
		61	uint16 denCoeflirTdf2Lpf[4]
		62	uint16 numCoeflirTdf2Hpf[6]
		63	uint16 denCoeflirTdf2Hpf[4]
		64	uint16 lvnv_SPDET_far
		65	uint16 lvnv_SPDET_mic
		66	uint16 lvnv_SPDET_xclip
		67	uint16 DNNS_NL_atten
		68	uint16 DNNS_CNI_level
		69	uint16 DNNS_EchoGammaAlpha
		70	uint16 DNNS_EchoGammaRescue
		71	uint16 DNNS_EchoGammaDt
		72	uint16 MF_NoiseGammaFac
		73	uint16 E_NoiseGammaFac
		74	uint16 DNNS_NoiseGammaInit
		75	uint16 SM_NoiseGammaS
		76	uint16 WND_NoiseGammaN
		77	uint16 AF_taps_bg_spkr
		78	uint16 AF_erl_bg_spkr
		79	uint16 Minimum_Erl_bg
		80	uint16 Erl_Step_bg
		81	uint16 uPPriSecAlpha
		82	uint16 uPPriSecThresh
		83	uint16 uPPriWindBias
		84	uint16 E_PCD_threshold
		85	uint16 NV_maxVadCount
		86	uint16 VCountParam
		87	uint16 uPFloorCntMax
		88	uint16 uPNSfac
		89	uint16 uPWndTh0
		90	uint16 uPWndTh1
		91	uint16 uPwindscoreSmAlphaInc
		92	uint16 uPwindScoreSmAlphaDec
		93	uint16 uPfreqC
		94	uint16 uPdfcMax
	<index>	0 – 14	Array index
	<value>	00000000 – FFFFFFFF	

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVEXTI2SCFG</td><td>
Configures the external I²S interface

This setting is stored in non-volatile memory and persists across power cycles.

Usage
Execution AT!AVEXTPCMCFG=<fs>,<codec_init>
Response OK

Query AT!AVEXTI2SCFG?
Response <fs>,<codec_init>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><fs></td><td></td><td>FS sample rate</td></tr>
<tr><td></td><td>0</td><td>8 kHz</td></tr>
<tr><td></td><td>1</td><td>16 kHz</td></tr>
<tr><td></td><td>2</td><td>32 kHz</td></tr>
<tr><td></td><td>3</td><td>44.1 kHz</td></tr>
<tr><td></td><td>4</td><td>48 kHz</td></tr>
<tr><td><format></td><td></td><td>PCm format type</td></tr>
<tr><td></td><td>0</td><td>Do not initialize external codec</td></tr>
<tr><td></td><td>1</td><td>Inititalize external codec</td></tr>
</table>
</td></tr>
<tr><td>!AVCONTROLBLOCKDEF</td><td>
Set audio control block

The audio control block contains EC settings and the serial number. This command sets the audio control block NV items to default values.

Usage
Execution AT!AVCONTROLBLOCKDEF
Response OK
</td></tr>
<tr><td>!AVINITFROMNV</td><td>
Re-initialize audio data structures

Re-initialize audio data structures from NV RAM. Note that this command is for testing purposes only.
AT!AVPROPAGATE will need to be called for the values to take effect in the audio subsystem after calling AT!AVINITFROMNV.

Usage
Execution AT!AVINITFROMNV
Response OK
</td></tr>
<tr><td>!AVPATHCONFIGDEF</td><td>
Set profile configuration to default values

Usage
Execution AT!AVPATHCONFIGDEF
Response OK
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVPROPAGATE</td><td>
Propagate audio parameters

Propagate audio parameters in the audio data structure to the audio subsystems. This command is for testing purposes only.

Usage
Execution AT!AVPROPAGATE
Response OK
</td></tr>
<tr><td>!AVVOLTBLDEF</td><td>
Set volume table to default values

Usage
Execution AT!AVVOLTBLDEF
Response OK
</td></tr>
<tr><td>!AVECRESET</td><td>
Force echo canceller to reset

Force echo canceller to reset when its registers are updated with AVECLIST.

Usage
Execution AT!AVECRESET=<value>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><value></td><td></td><td>Force EC reset</td></tr>
<tr><td></td><td>0</td><td>Off</td></tr>
<tr><td></td><td>1</td><td>On</td></tr>
</table>
</td></tr>
<tr><td>!AVTONEDUR</td><td>
Set DTMF duration time

This command is not password-protected.
Note: Only applicable in CDMA mode.

Usage
Execution AT!AVTONEDUR = <DUR>,<ON>,<OFF>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><DUR></td><td></td><td>DTMF duration time</td></tr>
<tr><td><ON></td><td></td><td>Burst on</td></tr>
<tr><td><OFF></td><td></td><td>Burst off</td></tr>
</table>
</td></tr>
</table>

Command	Description
!AVDTMFK	**Send a DTMF character** This command is not password-protected. *Note: Only applicable in CDMA mode.* **Usage** Execution **AT!AVDTMFK = <CHAR>** Response **OK** **Parameters** **Parameter** / **Value** / **Description** <CHAR> / 0 – 9, *, # / DTMF character
!AVDTMFB	**Set DTMF string or character** This command is not password-protected. *Note: Only applicable in CDMA mode.* **Usage** Execution **AT!AVDTMFB = <STRING>** Response **OK** **Parameters** **Parameter** / **Value** / **Description** <STRING> / 0 – 9, *, # / DTMF string containing a maximum of 32 characters
!AVCDTMFK	**Send continuous DTMF character** The time length of the continuous DTMF is controlled by the first parameter <DUR> of **AT!AVTONEDUR**. This command is not password-protected. *Note: Only applicable in CDMA mode.* **Usage** Execution **AT!AVCDTMFK = <CHAR>** Response **OK** **Parameters** **Parameter** / **Value** / **Description** <CHAR> / 0 – 9, *, # / DTMF character

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AVTONEMUTE</td><td>
Read from/write to the audio interface

This command is not password-protected.

Usage
Execution AT!AVTONEMUTE=<mute>
Response OK

Query AT!AVTONEMUTE?
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mute></td><td>0</td><td>Mute off</td></tr>
<tr><td></td><td>1</td><td>Mute on</td></tr>
</table>
</td></tr>
</table>

Table 6. Tone Values for AT!AVTONEPLAY

<Value> Parameter Setting	Tone	Description
0x00	SND_0	DTMF for 0 key
0x01	SND_1	DTMF for 1 key
0x02	SND_2	DTMF for 2 key
0x03	SND_3	DTMF for 3 key
0x04	SND_4	DTMF for 4 key
0x05	SND_5	DTMF for 5 key
0x06	SND_6	DTMF for 6 key
0x07	SND_7	DTMF for 7 key
0x08	SND_8	DTMF for 8 key
0x09	SND_9	DTMF for 9 key
0x0A	SND_A	DTMF for A key
0x0B	SND_B	DTMF for B key
0x0C	SND_C	DTMF for C key
0x0D	SND_D	DTMF for D key
0x0E	SND_POUND	DTMF for # key
0x0F	SND_STAR	DTMF for * key
0x10	SND_CTRL	Tone for a control key
0x11	SND_2ND	Tone for secondary function on a key
0x12	SND_WARN	Warning tone (e.g. overwriting user phone# slot)
0x13	SND_ERR	Tone to indicate an error
0x14	SND_TIME	Time marker tone
0x15	SND_RING_A	1st Ringer tone
0x16	SND_RING_B	2nd Ringer tone
0x17	SND_RING_C	3rd Ringer tone
0x18	SND_RING_D	4th Ringer tone

<Value> Parameter Setting	Tone	Description
0x19	SND_RING_A4	440.0 Hz (Piano Notes)
0x1A	SND_RING_AS4	466.1 Hz
0x1B	SND_RING_B4	493.8 Hz
0x1C	SND_RING_C4	523.2 Hz
0x1D	SND_RING_CS4	554.3 Hz
0x1E	SND_RING_D4	587.3 Hz
0x1F	SND_RING_DS4	622.2 Hz
0x20	SND_RING_E4	659.2 Hz
0x21	SND_RING_F4	698.5 Hz
0x22	SND_RING_FS4	739.9 Hz
0x23	SND_RING_G4	784.0 Hz
0x24	SND_RING_GS4	830.6 Hz
0x25	SND_RING_A5	880.0 Hz
0x26	SND_RING_AS5	932.2 Hz
0x27	SND_RING_B5	987.7 Hz
0x28	SND_RING_C5	1046.5 Hz
0x29	SND_RING_CS5	1108.7 Hz
0x2A	SND_RING_D5	1174.6 Hz
0x2B	SND_RING_DS5	1244.3 Hz
0x2C	SND_RING_E5	1318.5 Hz
0x2D	SND_RING_F5	1397.0 Hz
0x2E	SND_RING_FS5	1479.9 Hz
0x2F	SND_RING_G5	1568.0 Hz
0x30	SND_RING_GS5	1661.2 Hz
0x31	SND_RING_A6	1760.0 Hz
0x32	SND_RING_AS6	1864.7 Hz
0x33	SND_RING_B6	1975.5 Hz
0x34	SND_RING_C6	2093.1 Hz
0x35	SND_RING_CS6	2217.4 Hz
0x36	SND_RING_D6	2349.3 Hz
0x37	SND_RING_DS6	2489.1 Hz
0x38	SND_RING_E6	2637.0 Hz
0x39	SND_RING_F6	2793.7 Hz
0x3A	SND_RING_FS6	2959.9 Hz
0x3B	SND_RING_G6	3135.9 Hz
0x3C	SND_RING_GS6	3322.4 Hz
0x3D	SND_RING_A7	3520.0 Hz
0x3E	SND_RBACK	Ring back (audible ring)
0x3F	SND_BUSY	Busy tone
0x40	SND_INTERCEPT_A	First tone of an intercept
0x41	SND_INTERCEPT_B	Second tone of an intercept
0x42	SND_REORDER_TONE	Reorder
0x43	SND_PWRUP	Power-up tone
0x44	SND_OFF_HOOK_TONE	Off-hook tone, IS-95 (CAI 7.7.5.5)

<Value> Parameter Setting	Tone	Description
0x45	SND_CALL_WT_TONE	Call-waiting tone
0x46	SND_DIAL_TONE_TONE	Dial tone
0x47	SND_ANSWER_TONE	Answer tone
0x48	SND_HIGH_PITCH_A	1st High pitch for IS-54B alerting
0x49	SND_HIGH_PITCH_B	2nd High pitch for IS-54B alerting
0x4A	SND_MED_PITCH_A	1st Medium pitch for IS-54B alerting
0x4B	SND_MED_PITCH_B	2nd Medium pitch for IS-54B alerting
0x4C	SND_LOW_PITCH_A	1st Low pitch for IS-54B alerting
0x4D	SND_LOW_PITCH_B	2nd Low pitch for IS-54B alerting
0x4E	SND_TEST_ON	Test tone on
0x4F	SND_MSG_WAITING	Message Waiting Tone
0x50	SND_PIP_TONE_TONE	Used for Pip-Pip-Pip-Pip (Vocoder) Tone
0x51	SND_SPC_DT_INDIA	Used for India's Special Dial Tone
0x52	SND_SIGNAL_INDIA	Used in Various India Signalling Tones
0x53	SND_DT_TONE_INDIA	Used for India's Normal Dial Tone (and others)
0x54	SND_DT_TONE_BRAZIL	Used for Brazil's Dial Tone
0x55	SND_DT_DTACO_TONE	Used for DTACO's single tone (350 Hz,350 Hz)
0x56	SND_HFK_TONE1	These two tones are used for Voice Activation and Incoming Call Answer in phone VR-HFK
0x57	SND_HFK_TONE2	

4. GPS Commands

This chapter describes commands used to access GPS functionality in the AirPrime SL9090 and MC9090. When using these commands, the following considerations apply:

- GPS is typically enabled by default; however, it may be disabled by default for some SKUs. If so, enable GPS using **AT!CUSTOM="GPSENABLE",01**
- If supported by the modem, gpsOneXTRA is enabled (over the NDIS interface) by default when GPS is enabled, and it generates data traffic.

4.1. Command Summary

Command	Description
!GPS3RDPARTYXFER	Initiate Location Service (LCS) third party transfer location request
!GPSAUTOSTART	Configure GPS auto-start features
!GPSCLRASSIST	Clear specific GPS assistance data
!GPSCOLDSTART	Clear all GPS assistance data
!GPSEND	End an active position location session
!GPSFIX	Initiate GPS position fix
!GPSIPADDR	Queries or sets the IP address used when TCP/IP is the transport mechanism for Location Processing
!GPSKEEPWARM	Configure Keep Warm functionality
!GPSLBSAPN	Set GPS LBS APNs
!GPSLBSSETTINGS	Set default GPS location fix options
!GPSLOC	Return last known location of the modem
!GPSLOCK	Query or set the GPS lock for location processing
!GPSMTLRSETTINGS	Set/report MT location request settings
!GPSNIQOSTIME	Set/report GPS QoS timeout period for network-initialized fixes
!GPSNMEACONFIG	Enable and set NMEA data output rate
!GPSNMEASENTENCE	Set/report NMEA sentence type
!GPSPORTID	Set/report port ID to use over TCP/IP
!GPSPOSMODE	Configure support for GPS positioning modes
!GPSPROTOSEL	Control GPS protocol selection
!GPSSATINFO	Request satellite information
!GPSSTATUS	Request current status of a position fix session
!GPSSUPLPID	Set/report supplementary channel connection profile ID
!GPSSUPLURL	Set/report SUPL server URL
!GPSSUPLVER	Set/report SUPL server version
!GPSTRACK	Initiate local tracking (multiple fix) session
!GPSTRANSSEC	Control GPS transport security
!GPSXTRAAPN	Set GPS XTRA APNs
!GPSXTRADATAENABLE	Set/report GPS XTRA settings
!GPSXTRADATAURL	Set/report GPS XTRA data server URLs
!GPSXTRAINITDNLD	Initiate gpsOneXTRA data download and inject operation

Command	Description
!GPSXTRASTATUS	Return current status of gpsOneXTRA
!GPSXTRATIME	Inject GPS or UTC time into gpsOneXTRA system
!GPSXTRATIMEENABLE	Set/report GPS XTRA time settings
!GPSXTRATIMEURL	Set/report GPS XTRA SNTP server URLs

4.2. Command Reference

Command: **!GPS3RDPARTYXFER**

Description:

Initiate Location Service (LCS) third party transfer location request

Initiate a location fix, directing the location information to a third party at a specified ISDN address.
This command is not password-protected.

Usage

Execution	**AT!GPS3RDPARTYXFER=<External Client ID - ISDN address>[, <MLC number - ISDN address>]**
Response	**OK** or **ERROR**
Purpose	Initiate a location fix and send the information to the specified address
Query List	**AT!GPS3RDPARTYXFER=?**
Purpose	Return the expected command format

Parameters

Parameter	Value	Description
<External Client ID>		ISDN address to which fix information is to be sent in the format: <Extension flag>,<Nature of address>, <Numbering plan>,<Number string>
<MLC number>		ISDN address of the Mobile Location Centre in the format: <Extension flag>,<Nature of address>, <Numbering plan>,<Number string>
<Extension flag>		
	0	Extension
	1	No extension
<Nature of address>	0–7	See AddressString definition in 3GPP TS 29.002
<Numbering plan>	0–15	See AddressString definition in 3GPP TS 29.002
<Number string>	‘0’–‘9’, ‘*’, ‘#’, ‘a’, ‘b’, ‘c’	ISDN address – see AddressString definition in 3GPP TS 29.002 Maximum length: 20 characters

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GPSAUTOSTART</td><td>
Configure GPS auto-start features

Configure the auto-start features of the GPS. Any changes take effect the next time the modem is reset.
If auto-start is enabled, another GPS session cannot be started.
This command is not password-protected.

Usage
Execution AT!GPSAUTOSTART=<enable>[, <fixtype>, <maxtime>, <maxdist>, <fixrate>]
Response OK
or
ERROR
Purpose Assign start values for various GPS settings

Query AT!GPSAUTOSTART?
Response !GPSAUTOSTART
enable: <enable>
fixtype: <fixtype>
maxtime: <maxtime> seconds
maxdist: <maxdist> meters
fixrate: <fixrate> seconds
OK
Purpose Display the current values for auto-start features

Query List AT!GPSAUTOSTART=?
Purpose Return the expected command format

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><enable></td><td></td><td>Enable/disable the feature</td></tr>
<tr><td></td><td>0</td><td>Disabled</td></tr>
<tr><td></td><td>1</td><td>Enabled (GPS tracking session starts automatically when the modem is reset)</td></tr>
<tr><td><fixtype></td><td></td><td>Type of fix to establish</td></tr>
<tr><td></td><td>1</td><td>Standalone (not supported by a mobile station)</td></tr>
<tr><td></td><td>2</td><td>MS-based only</td></tr>
<tr><td></td><td>3</td><td>MS-assisted only</td></tr>
<tr><td><maxtime></td><td>0 – 255</td><td>Maximum time, in seconds, to wait for a position fix</td></tr>
<tr><td><maxdist></td><td>0 – 4294967279</td><td>Requested accuracy of fix in meters. Value is entered in decimal format.</td></tr>
<tr><td></td><td>4294967280</td><td>No preference</td></tr>
<tr><td><fixrate></td><td>1 – 65535</td><td>Time, in seconds, to wait between fixes</td></tr>
</table>
</td></tr>
</table>

Command	Description
!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 four parameters are set to "1". **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** **Parameter / Value / Description** <eph> — Ephemeris assistance data 0 — Ignore (do not clear ephemeris assistance data) 1 — Clear this assistance data type <alm> — Almanac assistance data 0 — Ignore (do not clear almanac assistance data) 1 — Clear this assistance data type <pos> — Position assistance data 0 — Ignore (do not clear position assistance data) 1 — Clear this assistance data type <time> — Time reference 0 — Ignore (do not clear time reference) 1 — Clear time reference <iono> — Ionosphere assistance data 0 — Ignore (do not clear ionosphere assistance data) 1 — Clear this assistance data type

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GPSCOLDSTART</td><td>
Clear all GPS assistance data

Clears all GPS assistance details from the modem and puts the modem into a coldstart state. Data cleared includes Almanac, Ephemeris, Previous Position, Ionosphere, and GPS time. This forces a cold start for GPS acquisition the next time a session starts.
The command is only available when there is no active GPS session – the GPS receiver is off and no position fix is being calculated.
This command is equivalent to !GPSCLRASSIST when all four of that command's parameters are set to "1".

Usage
Execution AT!GPSCOLDSTART
Response OK
Purpose Clear the modem's GPS details
</td></tr>
<tr><td>!GPSEND</td><td>
End an active position location session

This command is not password-protected.

Usage
Execution AT!GPSEND=<sessType>
Response ERRCODE = <value>
OK
or
OK
Purpose End the current session

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><sessType></td><td></td><td>Type of session to end</td></tr>
<tr><td></td><td>0</td><td>Position fix session</td></tr>
<tr><td><value></td><td></td><td>Error code returned when command fails for any reason
See Table 8 Error Codes for !GPSEND, !GPSFIX and !GPSTRACK for details.</td></tr>
</table>
</td></tr>
<tr><td>!GPSFIX</td><td>
Initiate GPS position fix

This command is not password-protected.

Usage
Execution AT!GPSFIX=<fixType>, <maxTime>, <maxDist>
Response Fix initiated
OK
or
ERROR CODE = <value>
OK
Purpose Initiate a time-limited position fix with a specified accuracy

Query List AT!GPSFIX=?
Purpose Return supported <fixType>, <maxTime>, and <maxDist> values
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><fixType></td><td></td><td>Type of fix to establish</td></tr>
<tr><td></td><td>1</td><td>Standalone (not supported by a mobile station)</td></tr>
<tr><td></td><td>2</td><td>MS-based only</td></tr>
<tr><td></td><td>3</td><td>MS-assisted only</td></tr>
<tr><td><maxTime></td><td>0 – 255</td><td>Maximum time, in seconds, to wait for a position fix</td></tr>
<tr><td><maxDist></td><td>0 – 4294967280</td><td>Requested accuracy, in meters, of fix. Value is entered in decimal format.</td></tr>
<tr><td><value></td><td></td><td>Error code returned when command fails for any reason
See Table 8 Error Codes for !GPSEND, !GPSFIX and !GPSTRACK for details.</td></tr>
</table>
Example
AT!GPSFIX=1, 15, 10 requests a standalone position fix to 10 meters accuracy.
The request will fail (timeout) if the modem cannot determine a position fix within 15 seconds.

Related commands

!GPSSTATUS – Use this command while the tracking session is in progress.
!GPSLOC – Use this command after the session completes to obtain the result.

</td></tr>
<tr><td>!GPSIPADDR</td><td>Deprecated. Use !GPSSUPLURL instead.</td></tr>
<tr><td>!GPSKEEPWARM</td><td>
Configure Keep Warm functionality

Set, clear, or report the modem’s “keep warm” functionality. This functionality downloads GPS assistance data from the GPS server.

Usage
<table>
<tr><td>Execution</td><td>AT!GPSKEEPWARM=<enableFlag></td></tr>
<tr><td>Response</td><td>OK</td></tr>
<tr><td>Purpose</td><td>Enable/disable the keep warm functionality</td></tr>
<tr><td>Query</td><td>AT!GPSKEEPWARM?</td></tr>
<tr><td>Response</td><td>KeepWarm Enabled: <enableFlag>
Warm Status: <warmStatus></td></tr>
<tr><td>Purpose</td><td>Display the current status (<enableFlag>) of the keep warm functionality and indicate if GPS is in “warm” state (<warmStatus>)</td></tr>
<tr><td>Query List</td><td>AT!GPSKEEPWARM=?</td></tr>
<tr><td>Purpose</td><td>Display valid <enableFlag> options</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><enable Flag></td><td></td><td>Enable/disable keep warm functionality</td></tr>
<tr><td></td><td>0</td><td>Disable</td></tr>
<tr><td></td><td>1</td><td>Enable</td></tr>
<tr><td><warm Status></td><td></td><td>GPS is in warm state</td></tr>
<tr><td></td><td>0</td><td>No</td></tr>
<tr><td></td><td>1</td><td>Yes</td></tr>
</table>
Example
AT!GPSKEEPWARM?
KeepWarm Enabled: 1
Warm Status: 1
In this example, “keep warm” is enabled and GPS is in Warm state.
</td></tr>
<tr><td>!GPSLBSAPN</td><td>
Set GPS LBS APNs

Set the GPS LBS APNs to be used for various RATs (Radio Access Technologies).

Usage
<table>
<tr><td>Execution (add)</td><td>AT!GPSLBSAPN=<operation>,<ratmask>,<IPtype>, <APN></td></tr>
<tr><td>Execution (delete one)</td><td>AT!GPSLBSAPN=<operation>,<ratmask></td></tr>
<tr><td>Execution (delete all)</td><td>AT!GPSLBSAPN=<operation></td></tr>
<tr><td>Response</td><td>OK
or
ERROR</td></tr>
<tr><td>Purpose</td><td>Set the APN to be used for the specified <ratmask>, or delete the APN for a single <ratmask> or all RATs</td></tr>
<tr><td>Query</td><td>AT!GPSLBSAPN?</td></tr>
<tr><td>Response</td><td>operation>, <ratmask>, <IPType>, <APN>
<operation>, <ratmask>, <IPType>, <APN>
...
OK
or
OK (if no ID has been set)</td></tr>
<tr><td>Purpose</td><td>Display the APNs currently assigned for each RAT</td></tr>
<tr><td>Query List</td><td>AT!GPSLBSAPN=?</td></tr>
<tr><td>Purpose</td><td>Display valid parameter options</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><operation></td><td></td><td>Add or delete APNs</td></tr>
<tr><td></td><td>1</td><td>Add an APN for a specific <ratmask> and <IPtype>.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
When this option is selected, specifying a <ratmask> and <IPtype> is required.
To change an APN that has already been set for a RAT,the current APN must first be deleted and a new, updated APN added.
2 — Delete the APN for a specific <ratmask>.
When this option is selected, specifying a <ratmask> is required.
3 — Delete all APNs
<ratmask> — Radio access technology. Values are specified in hexadecimal format.
01 — CDMA
02 — HDR
04 — GSM
08 — WCDMA
10 — LTE
<IPtype> — Internet protocol version. This is a character string and entered without quotataion marks
IPV4
IPV6
IPV4V6
<APN> — Access point name. This is a character string and entered with quotation marks. For example, “mycompany.mnc987.mcc123.gprs”, “ourinternet”
</td></tr>
<tr><td>!GPSLBSSETTINGS</td><td>
Set default GPS location fix options

Set default GPS LBS (location based service) values.
This command is not password-protected.

Usage
Execution — AT!GPSLBSSETTINGS=<fixType>,<maxTime>,<maxDist>,<fixCount>,<fixRate>
Response — OK
Purpose — Set specific LBS default values

Query — AT!GPSLBSSETTINGS?
Response — FIX TYPE: <fixType>
MAX TIME: <maxTime>
MAX DIST: <maxDist>
FIX COUNT: <fixCount>
FIX RATE: <fixRate>
Purpose — Displays the current GPS location fix default values

Query List — AT!GPSLBSSETTINGS=?
Purpose — Display valid parameter options
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><fixType></td><td></td><td>Type of fix to establish</td></tr>
<tr><td></td><td>1</td><td>Standalone (not supported by a mobile station)</td></tr>
<tr><td></td><td>2</td><td>MS-based only</td></tr>
<tr><td></td><td>3</td><td>MS-assisted only</td></tr>
<tr><td><maxTime></td><td>0 – 255</td><td>Maximum time, in seconds, to wait for a position fix</td></tr>
<tr><td><maxDist></td><td>0 – 4294967279</td><td>Requested accuracy, in meters, of fix. Value is entered in decimal format.</td></tr>
<tr><td></td><td>4294967280</td><td>No preference</td></tr>
<tr><td><fixCount></td><td>1 – 1000</td><td>Number of position fixes to take.
1000 = continuous series of position fixes</td></tr>
<tr><td><fixrate></td><td>1 – 65535</td><td>Time to wait, in seconds, between fixes</td></tr>
</table>
</td></tr>
<tr><td>!GPSLOC</td><td>
Return last known location of the modem

Returns details obtained during the most recent position location session, if available.
This command is not password-protected.

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
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><latitude></td><td></td><td>Latitude at last position fix
Example: “49 Deg 10 Min 21.49 Sec N (0x008BDE6C)”</td></tr>
<tr><td><longitude></td><td></td><td>Longitude at last position fix
Example: “123 Deg 4 Min 14.76 Sec W (0xFEA1EE9A)”</td></tr>
<tr><td><time></td><td></td><td>Time at which last position fix was taken
Example: “2009 01 30 4 20:27:18 (GPS)”</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><luAngle></td><td>Location uncertainty angle of returned position
Example: “11.2 deg”</td></tr>
<tr><td><luA></td><td>Standard deviation of axis along <luAngle>
Example: “6.0 m”</td></tr>
<tr><td><luP></td><td>Standard deviation of axis perpendicular to <luAngle>
Example: “6.0 m”</td></tr>
<tr><td><hepe></td><td>Horizontal Estimated Positional Error
Example: “8.485 m”</td></tr>
<tr><td><fixType></td><td>2D or 3D fix
Example: “2D Fix” or “3D Fix”</td></tr>
<tr><td><altitude></td><td>Altitude in meters at which last position fix was taken. Only present if <fixType> is 3D.
Example: “-1 m”</td></tr>
<tr><td><luV></td><td>Vertical uncertainty in meters. Only present if <fixType> is 3D.
Example: “3.0 m”</td></tr>
<tr><td><heading></td><td>Direction of MS
Example: “0.0 deg”</td></tr>
<tr><td><vH></td><td>Horizontal velocity
Example: “0.0 m/s”</td></tr>
<tr><td><vV></td><td>Vertical velocity
Example: “0.0 m/s”</td></tr>
</table>
</td></tr>
<tr><td>!GPSLOCK</td><td>
Queries or sets the GPS lock for location processing
Note: This command is supported in the following Firmware versions or higher:
SWI6600U_02.01.00.02
SWI6600S_02.01.00.02
SWI6600V_02.01.00.01
SWI6600C_02.01.00.02

Usage
Execution AT!GPSLOCK= <lock>
Response OK
Purpose Set GPS mode
Note A successful execute operation does not guarantee that the value has been updated in NV. It indicates that the request to update the value is syntactically correct, and the request is being placed in the queue. The application that has requested the change in value should verify that the value has actually changed (in NV), by issuing a query operation of this command.

Query AT!GPSLOCK?
Response GPS lock mode
Purpose Returns current GPS mode setting
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><lock></td><td></td><td>GPS working mode</td></tr>
<tr><td></td><td>0</td><td>No GPS lock is active</td></tr>
<tr><td></td><td>1</td><td>Mobile inititated sessions locked</td></tr>
<tr><td></td><td>2</td><td>Mobile terminated sessions locked</td></tr>
<tr><td></td><td>3</td><td>All GPS sessions are locked (except 911)</td></tr>
</table>
Example
AT!GPSLOCK=2
OK
</td></tr>
<tr><td>!GPSMTLRSETTINGS</td><td>
Set/report MT location request settings

Set or report the current MT (mobile-terminated) Location Request settings.
!RESET must be issued after this command is used.

Usage
<table>
<tr><td>Execution</td><td>AT!GPSMTLRSETTINGS=<notifyResp></td></tr>
<tr><td>Response</td><td>OK
or
ERROR</td></tr>
<tr><td>Purpose</td><td>Indicates how MT location request will be handled</td></tr>
<tr><td>Query</td><td>AT!GPSMTLRSETTINGS?</td></tr>
<tr><td>Response</td><td>Notification Response Setting: <notifResp>
OK</td></tr>
<tr><td>Purpose</td><td>Return the current <notifResp> setting</td></tr>
<tr><td>Query List</td><td>AT!GPSMTLRSETTINGS=?</td></tr>
<tr><td>Response</td><td>OK</td></tr>
<tr><td>Purpose</td><td>Return valid <notifResp> values</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><notifResp></td><td></td><td>Notification response setting</td></tr>
<tr><td></td><td>0</td><td>Default setting as defined in 3GPP specification 29.00 ‘NotificationToMSUser’ enumeration</td></tr>
<tr><td></td><td>1</td><td>Accept all MT location requests</td></tr>
<tr><td></td><td>2</td><td>Reject all MT location requests</td></tr>
<tr><td></td><td>3</td><td>Verify all – the user will be asked to accept or reject every MT location request</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GPSNIQOSTIME</td><td>
Set/report GPS QoS timeout period for network-initialized fixes

!RESET must be issued after this command is used.

Usage
Execution AT!GPSNIQOSTIME=<timeout>
Response OK
or
ERROR
Purpose Sets new timeout period

Query AT!GPSNIQOSTIME?
Response QoS time: <timeout>
OK
Purpose Returns current <timeout> period

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><timeout></td><td></td><td>GPS QoS timeout period in seconds</td></tr>
</table>
</td></tr>
<tr><td>!GPSNMEACONFIG</td><td>
Enable and set NMEA data output rate

Enable or disable NMEA data output, and set the output rate for use with !GPSTRACK.

Usage
Execution AT!GPSNMEACONFIG=<enable>[,<outputRate>]
Response OK
or
ERROR
Purpose Enable or disable NMEA output and set rate

Query AT!GPSNMEACONFIG?
Response Enabled: 0
Output Rate: <outputRate>
OK
or
Enabled
Output Rate: <outputRate>
OK
Purpose Return the current <timeout> period

Query List AT!GPSNMEACONFIG=?
Purpose Return valid parameter values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><enable></td><td></td><td>Enable/disable NMEA data output.
<outputRate> is ignored regardless of setting</td></tr>
<tr><td></td><td>0</td><td>Disable</td></tr>
<tr><td></td><td>1</td><td>Enable</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td><outputRate> 1 – 255 NMEA data output rate – time between outputs in seconds</td></tr>
<tr><td>!GPSNMEASENTENCE</td><td>
Set/report NMEA sentence type

Usage
Execution AT!GPSNMEASENTENCE=<nmea type>
Response OK
or
ERROR
Purpose Enable or disable NMEA sentence types

Query AT!GPSNMEASENTENCE?
Response !GPSNMEASENTENCE: <nmea type>
OK
Purpose Indicate the currently enabled GPS NMEA sentence types

Query List AT!GPSNMEASENTENCE=?
Purpose Return valid parameter values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><nmea type></td><td></td><td>NMEA sentence type in 2-byte hexadecimal format mask. Note that the “0x” should not be included before the mask value in the execution command.
0 = Disabled and 1 = Enabled in each bit.
Bit 0 GGA (Fix information)
Bit 1 RMC (Recommended minimum data for GPS)
Bit 2 GSV (Detailed satellite data)
Bit 3 GSA (Overall satellite data)
Bit 4 VTG (Vector track and speed over the ground)
Bit 5 PQXFI (Proprietary Qualcomm eXtended Fix Information)
Bit 6 GLGSV (GLONASS GSV)
Bit 7 GNGSA (GLONASS GSA)
Bit 8 GNGNS (Time, position, and fixed related data for GLONASS receiver)
Bit 13 PSTIS (GPS session start indication)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GPSPORTID</td><td>
Set/report port ID to use over TCP/IP

Set or report the port ID of the SUPL server to use when using TCP/IP as the transport mechanism for SUPL. The command can also be used when the FQDN is auto-generated from the IMSI.

Usage
Execution AT!GPSPORTID=<portid>
Response OK
or
ERROR
Purpose Queue the request to set the port ID

Query AT!GPSPORTID?
Response <portid>
OK
Purpose Return the port ID currently being used

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><portID></td><td>0 – 65535</td><td>Port ID to use over TCP/IP</td></tr>
</table>
Related commands
!GPSSUPLURL – Set/report SUPL server URL
</td></tr>
<tr><td>!GPSPOSMODE</td><td>
Configure support for GPS positioning modes

!RESET must be issued after this command is used.

Usage
Execution AT!GPSPOSMODE=<mask>
Response OK
or
ERROR
Purpose Use a single byte hexadecimal format mask to indicate which GPS positioning modes are to be supported

Execution AT!GPSPOSMODE?
Response MASK: <mask>
OK
Purpose Return a <mask> value indicating which GPS positioning modes are currently supported

Query List AT!GPSPOSMODE=?
Purpose Return supported <mask> values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mask></td><td></td><td>Bitmap value representing supported GPS positioning modes in 1-byte hexadecimal format. Note that “0x” should not be included before the mask value.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Bits set as “1” identify modes that are supported.
Bit 0 Standalone
Bit 1 UP MS-based
Bit 2 UP MS-assisted
Bit 3 CP MS-based (2G)
Bit 4 CP MS-assisted (2G)
Bit 5 CP UE-based (3G)
Bit 6 CP UE-assisted (3G)
Bit 7 Unused

Example
AT!GPSPOSMODE=2a enables support for Bit 5 (CP UE-based), Bit 3 (CP MSbased), and Bit 1 (UP MS-based)</td></tr>
<tr><td>!GPSPROTOSEL</td><td>Control GPS protocol selection

Set or report the current GPS protocol selection method for User Plane GPS. !RESET must be issued after this command is used.

Usage
Execution AT!GPSPROTOSEL=<protocol>
Response OK
or
ERROR
Purpose Indicate the protocol selection method to use

Query AT!GPSPROTOSEL?
Response Protocol selection: <protocol>
OK
Purpose Return the current <protocol> selection method

Query List AT!GPSPROTOSEL=?
Purpose Return supported <protocol> values

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><protocol></td><td></td><td>Protocol selection method</td></tr><tr><td></td><td>0</td><td>None</td></tr><tr><td></td><td>1</td><td>PreSUPL</td></tr><tr><td></td><td>2</td><td>X1</td></tr><tr><td></td><td>3</td><td>SUPL (Secure User Plane Location)</td></tr></table></td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GPSSATINFO</td><td>
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.
This command is not password-protected.

Usage
Query AT!GPSSATINFO?
Response
NO SAT INFO
OK
or
Satellites in view: <numSats>
* SV: <SV 1> ELEV:<ELEV 1> AZI:<AZI 1> SNR:<SNR 1>
...
* SV: <SV n> ELEV:<ELEV n> AZI:<AZI n> SNR:<SNR n>
OK
Purpose: Return the number of satellites in view (including those used in the latest position fix) and details for each satellite (or return an error message)
Notes: An asterisk (*) at the beginning of a line indicates that the satellite was used in the fix location calculation.

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><numSats></td><td>1 – 12</td><td>Number of satellites in view</td></tr>
<tr><td><SV n></td><td>1 – 32</td><td>Satellite vehicle number for the nth satellite in the list</td></tr>
<tr><td><ELEV n></td><td>0 – 90</td><td>Satellite elevation, in degress, relative to modem location</td></tr>
<tr><td><AZI n></td><td>0 – 360</td><td>Satellite azimuth, in degrees, relative to modem location</td></tr>
<tr><td><SNR n></td><td>0 – 99</td><td>Signal to noise ratio; in dB</td></tr>
</table>
</td></tr>
<tr><td>!GPSSTATUS</td><td>
Request/return current status of a position fix session

This command is not password-protected.

Usage
Query AT!GPSSTATUS?
Response
<year> <month> <day> <day of week> <time of day> Last Fix Status = <status>
<year> <month> <day> <day of week> <time of day> Fix Session Status = <status>
Purpose: Return timestamps and status of a position fix session

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><year></td><td></td><td>Year (4-digits)</td></tr>
<tr><td><month></td><td>01 – 12</td><td>Month</td></tr>
<tr><td><day></td><td>01 – 31</td><td>Day</td></tr>
</table>
</td></tr>
</table>

Command	Description
	<day of week> 0 – 6 Day of the week where 0 = Monday, 6 = Sunday <time of day> Time of day in 24-hour clock format Example: “13:25:48” <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 Error Codes for !GPSSTATUS for details. **Example** **AT!GPSSTATUS?** **2007 01 06 6 00:25:01 Last Fix Status = SUCCESS** **2007 01 06 6 00:25:02 Fix Session Status = ACTIVE**
!GPSSUPLPID	**Set/report supplementary channel connection profile ID** Set or return the connection profile ID that GPS uses for its supplementary channel. This command is not password-protected. **Usage** Execution **AT!GPSSUPLPID=<pid>** Response **OK** or **ERROR** Purpose Set the PID used for the GPS supplementary channel Query **AT!GPSSUPLPID?** Response **!GPSSUPLPID: <pid>** **OK** Purpose Return the PID used for the GPS supplementary channel Query List **AT!GPSSUPLPID=?** Purpose Return a list of valid <pid> values **Parameters** Parameter / Value / Description <pid> / 1 – 16 / Profile ID 0 / Use connected or default profile ID

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GPSSUPLURL</td><td>
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.
Note: This command should be used in place of !GPSIPADDR.

Usage
Execution AT!GPSSUPLURL="<suplURL>"
Response OK
or
ERROR
Purpose Identify the SUPL server URL

Query AT!GPSSUPLURL?
Response <suplURL>
OK
Purpose Return the SUPL server's URL

Query List AT!GPSSUPLURL=?
Purpose Return the execution command format

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><suplURL></td><td></td><td>SUPL server URL
This must be a fully qualified domain name (FQDN) or address.
Example: "supl.url.net", "123.123.123.123"
This parameter is not checked for correctness – if the string is invalid, the modem will not be able to perform MS-assisted GPS fixes</td></tr>
</table>
Examples
AT!GPSSUPLURL="supl.url.net"
AT!GPSSUPLURL="123.123.123.123"
</td></tr>
<tr><td>!GPSSUPLVER</td><td>
Set/report SUPL server version

Usage
Execution AT!GPSSUPLURL="<supl ver>"
Response OK
or
ERROR
Purpose Identify the SUPL server version

Query AT!GPSSUPLVER?
Response <supl ver>
OK
Purpose Return the SUPL server's version

Query List AT!GPSSUPLVER=?
Purpose Return the execution command format
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><supl ver></td><td></td><td>SUPL server version</td></tr>
<tr><td></td><td>1</td><td>SUPL version 1</td></tr>
<tr><td></td><td>2</td><td>SUPL version 2</td></tr>
</table>
</td></tr>
<tr><td>!GPSTRACK</td><td>
Initiate local tracking (multiple fix) session

Initiate a local tracking session comprising a specific number of position fixes taken at regular time intervals.
This command is not password-protected.

Usage
<table>
<tr><td>Execution</td><td>AT!GPSTRACK = <fixType>, <maxTime>, <maxDist>, <fixCount>, <fixRate></td></tr>
<tr><td>Response</td><td>Fix initiated
OK
or
ERROR CODE = <value>
OK</td></tr>
<tr><td>Purpose</td><td>Initiate a series of time-limited position fixes</td></tr>
<tr><td>Query List</td><td>AT!GPSTRACK=?</td></tr>
<tr><td>Purpose</td><td>Return supported <fixType>, <maxTime>, <maxDist>, <fixCount>, and <fixRate> values</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><fixType></td><td></td><td>Type of fix to establish</td></tr>
<tr><td></td><td>1</td><td>Standalone (not supported by a mobile station)</td></tr>
<tr><td></td><td>2</td><td>MS-based only</td></tr>
<tr><td></td><td>3</td><td>MS-assisted only</td></tr>
<tr><td><maxTime></td><td>0 – 255</td><td>Maximum time, in seconds, to wait for satellite information</td></tr>
<tr><td><maxDist></td><td>0 – 4294967279</td><td>Requested accuracy, in meters, of fix. Value should be entered in decimal format.</td></tr>
<tr><td></td><td>4294967280</td><td>No preference</td></tr>
<tr><td><fixCount></td><td>1 – 1000</td><td>Number of requested position fixes.
1000 = continuous series of position fixes</td></tr>
<tr><td><fixrate></td><td>1 – 1799999</td><td>Time to wait, in seconds, between fixes</td></tr>
</table>
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 8 Error Codes for !GPSEND, !GPSFIX and !GPSTRACK for details.
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>), the application could precede the !GPSTRACK call with a single position fix (AGPSFIX) with a greater <maxTime> value.
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Example
AT!GPSTRACK=1, 15, 10, 20, 60 requests a series of 20 standalone position fixes to 10 meters accuracy – fixes are taken every 60 seconds.
One of the following responses will be received:
“OK” if the request is successful, or
“ERROR CODE = <value>” if the request fails for any reason. See Table 8 Error Codes for !GPSEND, !GPSFIX and !GPSTRACK for details.

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.

</td></tr>
<tr><td>!GPSTRANSSEC</td><td>
Control GPS transport security

Enable or disable GPS transport security for SUPL GPS fixes.
!RESET must be issued after this command is used.

Usage
<table>
<tr><td>Execution</td><td>AT!GPSTRANSSEC=<security></td></tr>
<tr><td>Response</td><td>OK
or
ERROR</td></tr>
<tr><td>Purpose</td><td>Indicate if transport security is used</td></tr>
<tr><td>Query</td><td>AT!GPSTRANSSEC?</td></tr>
<tr><td>Response</td><td>Transport security: <security>
OK</td></tr>
<tr><td>Purpose</td><td>Return the current <security> setting</td></tr>
<tr><td>Query List</td><td>AT!GPSTRANSSEC=?</td></tr>
<tr><td>Purpose</td><td>Display valid values for <security> parameter</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><security></td><td></td><td>Transport security state</td></tr>
<tr><td></td><td>0</td><td>Disable (secure TCP/IP is not used)</td></tr>
<tr><td></td><td>1</td><td>Enable (secure TCP/IP is used)</td></tr>
</table>
</td></tr>
<tr><td>!GPSXTRAAPN</td><td>
Set GPS XTRA APNs

Set the GPS XTRA APNs to be used for various RATs (Radio Access Technologies).

Usage
<table>
<tr><td>Execution (add)</td><td>AT!GPSXTRAAPN=<operation>,<ratmask>,<IPtype>,<APN></td></tr>
<tr><td>Execution (delete)</td><td>AT!GPSXTRAAPN=<operation>,<ratmask></td></tr>
<tr><td>Execution (delete all)</td><td>AT!GPSXTRAAPN=<operation></td></tr>
</table>
</td></tr>
</table>

Command	Description
	Response: **OK** or **ERROR** Purpose: Set the APN to be used for the specified <ratmask>, or delete the APN for a single <ratmask> or all RATs Query: **AT!GPSXTRAAPN?** Response: **<operation>, <ratmask>, <IPType>, <APN>** **<operation>, <ratmask>, <IPType>, <APN>** ... **OK** or **OK** (if no ID has been set) Purpose: Display the APNs currently assigned for each RAT Query List: **AT!GPSXTRAAPN=?** Purpose: Display valid parameter options

Parameters

Parameter	Value	Description
<operation>		Add or delete APNs
	1	Add an APN for a specific <ratmask> and <IPtype>. When this option is selected, specifying a <ratmask> and <IPtype> is required. To change an APN that has already been set for a RAT,the current APN must first be deleted and a new, updated APN added.
	2	Delete the APN for a specific <ratmask>. When this option is selected, specifying a <ratmask> is required.
	3	Delete all APNs
<ratmask>		Radio access technology. Values are specified in hexadecimal format.
	01	CDMA
	02	HDR
	04	GSM
	08	WCDMA
	10	LTE
<IPtype>		Internet protocol version. This is a character string and entered without quotataion marks
	IPV4	
	IPV6	
	IPV4V6	
<APN>		Access point name. This is a character string and entered with quotation marks. For example, “mycompany.mnc987.mcc123.gprs”, “ourinternet”

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

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GPSXTRADATAURL</td><td>
Set/report GPS XTRA data server URLs

Set or report the URLs of up to three GPS XTRA data servers.

Usage
Execution AT!GPSXTRADATAURL=<urlIndex>,<url>
Response OK
or
ERROR
Purpose Set the URL used for the primary, secondary, or tertiary data server

Query AT!GPSXTRADATAURL?
Response XTRA Primary Server: <url1>
XTRA Secondary Server: <url2>
XTRA Tertiary Server: <url3>
OK
Purpose Return the URLs of the primary, secondary, and tertiary data servers

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><urlIndex></td><td></td><td>Server index</td></tr>
<tr><td></td><td>1</td><td>Primary server</td></tr>
<tr><td></td><td>2</td><td>Secondary server</td></tr>
<tr><td></td><td>3</td><td>Tertiary server</td></tr>
<tr><td><url></td><td></td><td>Server URL
The URL string includes quotation marks and must be complete, including the “http://”
Maximum string length: 128 characters
Example: “http://xtra1.gpsoneextra.net/xtra.bin”</td></tr>
</table>
</td></tr>
<tr><td>!GPSXTRAINITDNLD</td><td>
Initiate gpsOneXTRA data download and inject operation

Initiate a gpsOneXTRA data download and inject operation using the data server specified in the !GPSXTRADATAURL command.
This command is not password-protected.

Usage
Execution AT!GPSXTRAINITDNLD
Response Xtra command sent successfully
OK
or
Error code = <err>
OK
Purpose Initiate the download and inject operation. If the command fails, it returns “Error code = <err>”
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><err></td><td></td><td>Error code returned if the command fails</td></tr>
<tr><td></td><td>3</td><td>Bad CRC for XTRA data file</td></tr>
<tr><td></td><td>4</td><td>Old XTRA data file</td></tr>
<tr><td></td><td>7</td><td>GPS subsystem busy</td></tr>
<tr><td></td><td>8</td><td>GPS time reference entered is invalid</td></tr>
<tr><td></td><td>9</td><td>Unknown error</td></tr>
</table>
</td></tr>
<tr><td>!GPSXTRASTATUS</td><td>
Return current status of gpsOneXTRA

Return the status of the most recent time and data injection operations.
This command is not password-protected.

Usage
Query AT!GPSXTRASTATUS?
Response Xtra Time status = <timeStatus>
Xtra Data status = <dataStatus>
Validity Start = <timeStamp>
Validity End = <timeStamp>
OK
Purpose Return the status of the most recent time and data injection operations

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><timeStatus></td><td></td><td></td></tr>
<tr><td></td><td>Unknown</td><td>Default value if time injection operation has not been performed yet, or if operation was incomplete</td></tr>
<tr><td></td><td>Valid</td><td>GPS time injection succeeded</td></tr>
<tr><td></td><td>Invalid</td><td>GPS time injection failed</td></tr>
<tr><td><dataStatus></td><td>Unknown</td><td>Default value if data injection operation has not been performed yet, or if operation was incomplete</td></tr>
<tr><td></td><td>Valid</td><td>GPS data injection succeeded</td></tr>
<tr><td></td><td>Invalid</td><td>GPS data injection failed</td></tr>
<tr><td></td><td>xtra.bin file has bad crc</td><td></td></tr>
<tr><td></td><td>GPS Busy, end current session first</td><td></td></tr>
<tr><td></td><td>error reading xtra.bin file</td><td></td></tr>
<tr><td></td><td>bad TOA in xtra.bin file</td><td>The XTRA data retrieved from the XTRA server is too old (exceeds Time Of Applicability)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><timeStamp></td><td></td><td>GPS time stamp with format:
<year> <month> <day> <dayOfWeek> <time>
Example: 2008 02 28 5 13:15:45 represents Thursday 28 Feb 2008 at 1:15:45 PM</td></tr>
<tr><td><year></td><td></td><td>4-digit year</td></tr>
<tr><td><month></td><td>01 – 12</td><td>Month</td></tr>
<tr><td><day></td><td>01 – 31</td><td>Day</td></tr>
<tr><td><dayOfWeek></td><td>0 – 6</td><td>Day of the week where 0 = Monday and 6 = Sunday</td></tr>
<tr><td><time></td><td></td><td>Time of day
Example: 13:15:45</td></tr>
</table>
</td></tr>
<tr><td>!GPSXTRATIME</td><td>
Inject GPS or UTC time into gpsOneXTRA system

Usage
Execution AT!GPSXTRATIME=<YYYY>, <MM>, <DD>, <hh>, <mm>, <ss>, <utc>, <force>, <uncrtn>
Response Xtra command sent successfully
OK
or
Error code = <err>
OK
Purpose Inject the specfied date and time into the gpsOneXTRA system. If the command fails, it returns “Error code = <err>”

Query List AT!GPSXTRATIME=?
Purpose Return supported parameter values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><YYYY></td><td></td><td>4-digit year</td></tr>
<tr><td><MM></td><td>1 – 12</td><td>Month</td></tr>
<tr><td><DD></td><td>1 – 31</td><td>Day</td></tr>
<tr><td><hh></td><td>0 – 23</td><td>Hour</td></tr>
<tr><td><mm></td><td>0 – 59</td><td>Minute</td></tr>
<tr><td><ss></td><td>0 – 59</td><td>Seconds</td></tr>
<tr><td><utc></td><td></td><td>Flag indicating time type</td></tr>
<tr><td></td><td>0</td><td>GPS time</td></tr>
<tr><td></td><td>1</td><td>UTC time</td></tr>
<tr><td><force></td><td></td><td>Indicates whether to force or allow GPS subsystem to decide to accept the time entered</td></tr>
<tr><td></td><td>0</td><td>Do not force acceptance</td></tr>
<tr><td></td><td>1</td><td>Force acceptance</td></tr>
<tr><td><err></td><td></td><td>Error code returned if the command fails</td></tr>
<tr><td></td><td>3</td><td>Bad CRC for XTRA data file</td></tr>
<tr><td></td><td>4</td><td>Old XTRA data file</td></tr>
<tr><td></td><td>7</td><td>GPS subsystem busy</td></tr>
<tr><td></td><td>8</td><td>GPS time reference entered is invalid</td></tr>
<tr><td></td><td>9</td><td>Unknown error</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GPSXTRATIMEENABLE</td><td>
Set/report GPS XTRA time settings

Enable or disable GPS XTRA time information, and set or report specific GPS XTRA time settings.
!RESET must be issued after this command is used.

Usage
Execution — AT!GPSXTRATIMEENABLE=<enable> [,<thresh>, <delay>]
Response — OK or ERROR
Purpose — Enable or disable time information. If enabled, sets the uncertainty threshold and delay time to retry with a backup server

Query — AT!GPSXTRATIMEENABLE?
Response — XTRA Time Info Enabled: <enable>
XTRA Time Uncertainty Threshold: <thresh>
XTRA Time Delay Threshold: <delay>
Purpose — Return the current values of GPS XTRA time parameters

Query List — AT!GPSXTRATIMEENABLE=?
Purpose — Return supported execution parameter values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><enable></td><td></td><td>Enable or disable time information</td></tr>
<tr><td></td><td>0</td><td>Disable
To fully disable gpsOneXTRA, !GPSXTRADATAENABLE=0 must also be called to disable gpsOneXTRA data functionality.</td></tr>
<tr><td></td><td>1</td><td>Enable</td></tr>
<tr><td><thresh></td><td>100 – 30000</td><td>XTRA time uncertainty threshold, in ms</td></tr>
<tr><td><delay></td><td>100 – 10000</td><td>Time to delay, in ms, before retrying with backup server</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GPSXTRATIMEURL</td><td>
Set/report GPS XTRA SNTP server URLs

Set or report the URLs of up to three GPS XTRA SNTP (Simple Network Time Protocol) servers.
!RESET must be issued after this command is used.

Usage
Execution AT!GPSXTRATIMEURL=<urlIndex>,<url>
Response OK
or
ERROR
Purpose Set the URL used for the primary, secondary, or tertiary data server

Query AT!GPSXTRATIMEURL?
Response XTRA SNTP Primary Server: <url 1>
XTRA SNTP Secondary Server: <url 2>
XTRA SNTP Tertiary Server: <url 3>
Purpose Return the URLs of the primary, secondary, and tertiary SNTP servers

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><urlIndex></td><td></td><td>Server index</td></tr>
<tr><td></td><td>1</td><td>Primary server</td></tr>
<tr><td></td><td>2</td><td>Secondary server</td></tr>
<tr><td></td><td>3</td><td>Tertiary server</td></tr>
<tr><td><url></td><td></td><td>Server URL
The URL string includes quotation marks; with maximum string length=128 characters
Example: “xtra1.gpsoneextra.net”</td></tr>
</table>
</td></tr>
</table>

4.3. Error Codes

The following table describes error codes that can be returned by **!GPSSTATUS**.

Table 7. Error Codes for !GPSSTATUS

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

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

The following table describes error codes that can be returned by **!GPSEND**, **!GPSFIX** and **!GPSTRACK**.

Table 8. Error Codes for !GPSEND, !GPSFIX and !GPSTRACK

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

Error Code	Description
12	No active session to terminate
13	Session is active
14	Session is busy
15	Phone is offline
16	Phone is CDMA locked
17	GPS is locked
18	Command is invalid in current state
19	Connection failure with PDE
20	PDSM command buffer unavailable to queue command
21	Search communication problem
22	Temporary problem reporting position determination results
23	Error mode not supported
24	Periodic NI in progress
25	Unknown error
26	Unknown error

5. PAD Commands

This chapter describes commands used to configure, initiate, and disconnect single- and multi-PAD (Packet Assembler/Disassembler) client and server connections. For detailed descriptions of PAD functionality, see EMConnect Guide (document reference: 2131177).

5.1. Managing PAD Sessions

- Before initiating a PAD session, use **!PADCONF**, **!PADSETUP**, and **!PADFILTER** to configure PAD profile settings.
- To initiate a PAD session, use **!PADCONN** (for a client connection) or **!PADLISTEN** (for a server connection).
- To switch between active PAD sessions, use **!PADSWITCH**.
- To disconnect a PAD session, use **!PADDISCONN**.
- To stop a PAD server, use **!PADENDLISTEN**.

5.2. Command Summary

Command	Description
!PADCONF	Configure profile options
!PADCONN	Initiate PAD client connection
!PADDISCONN	Disconnects an active PAD session
!PADENDLISTEN	Disable PAD server
!PADFILTER	Set IP address filters for TCP PAD server
!PADLISTEN	Initiate PAD server connection
!PADSETUP	Set/query PAD (Packet Assembler/Disassembler) profile connection parameters
!PADDNSLOOKUP	Query the IP for a desired domain
!PADSWITCH	Switch active PAD session
!PADPADDR	Query the IP address of the PAD socket call

5.3. Command Reference

Command	Description
!PADCONF	**Configure profile options** Configure the PAD (Packet Assembler/Disassembler) session options and trigger conditions for packetization on the transmit side. *Note: Multiple triggers can be active simultaneously. If any trigger condition is met, packetization occurs.* For PAD server profiles, this configuration applies to all PAD sessions connected to the server. Settings are stored in non-volatile memory. This command is not password-protected.

Command	Description

Usage

Execution	**AT!PADCONF=<PADprofile>, <idle>, <interchar>, <pktlen>, <fwdopt>, <fwdchar>**
Response	**OK** or **ERROR**
Purpose	Configure trigger conditions for the specified <PADprofile>
Query	**AT!PADCONF?<PADprofile>**
Response	**AT!PADCONF:<PADprofile>, <idle>, <interchar>, <pktlen>, <fwdopt>,<fwdchar>** **OK**
Purpose	Return the current timer conditions for the specified <PADprofile>

Parameters

Parameter	Value	Description
<PADprofile>	1 – 10	PAD profile ID number
<idle>	0 – 65535	Idle disconnect timeout, in seconds. The session disconnects if there is no data activity within this period of time.
<interchar>	0 – 65535	Inter-character timeout, in ms. Packetization begins if the time interval between successive characters is greater than this period of time
<pktlen>	0 – 1460	Packet length trigger, in bytes. Packetization begins when this many bytes have been collected. 0 = Trigger is disabled
<fwdopt>		Forwarding character trigger. Packetization begins when the <fwdchar> character appears in the data stream
	0	Trigger disabled
	1	Trigger enabled; character is included in the message
	2	Trigger enabled; character is not included in the message
<fwdchar>	0 – 255	ASCII value of the character that forces packetization to occur. Used in combination with <fwdopt>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!PADCONN</td><td>
Initiate PAD client connection

Initiate a PAD (Packet Assembler/Disassembler) client connection for a specific profile ID.
Note: The modem must have a data connection on the network with an open TCP or UDP socket on the remote agent, and at least one trigger condition must be defined for the specified profile ID. See !PADCONF.
This command is not password-protected.

Usage
Execution: AT!PADCONN=<PADprofile>AT!NVRESTORE=<category>
Response: OK
CONNECT PAD: <PADprofile>,<connectionState>
or
ERROR
Purpose: Initiate a connection for the specified profile. For multipad, the“CONNECT PAD” response indicates the start of the PAD connection

Query: AT!PADCONN?<PADprofile>
Response: AT!PADCONN:<PADprofile>,<connectionState>
OK
Purpose: Display the current connection state of the specified profile

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><PADprofile></td><td>1 – 10</td><td>PAD profile ID number</td></tr>
<tr><td><connectionState></td><td></td><td>Current connection state of the <PADprofile> session</td></tr>
<tr><td></td><td>0</td><td>Disconnected</td></tr>
<tr><td></td><td>1</td><td>Connected</td></tr>
</table>
</td></tr>
<tr><td>!PADDISCONN</td><td>
Disconnects an active PAD session

Note: This command is equivalent to using ATH.
This command is not password-protected.

Usage
Execution: AT!PADDISCONN [=<PADprofile>,<session>]
Response: If PAD session has been disconnected (DCD line is deasserted as per AT&C setting):
OK
DISCONNECT PAD: <PADprofile>,<connectionState>
If data connection is already disconnected:
OK
Purpose: Disconnect the currently active profile. The “DISCONNECT PAD” response appears after the session disconnects
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><PADprofile></td><td>1 – 10</td><td>PAD profile ID number</td></tr><tr><td><session></td><td>0 – 3</td><td>Session index</td></tr></table></td></tr>
<tr><td>!PADENDLISTEN</td><td>Disable PAD server

Disable a PAD server (and disconnect all PAD sessions related to the PAD server).
If remote clients were connected, the following notification will be received after the OK response: DISCONNECT PAD: <padprofile>, <session>
This command is not password-protected.

Usage
Execution AT!PADENDLISTEN=<PADprofile>
Response OK
or
ERROR
Purpose Disable the indicated PAD server

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><PADprofile></td><td>1 – 10</td><td>PAD profile ID number</td></tr><tr><td><session></td><td>0 – 3</td><td>Session index</td></tr></table></td></tr>
<tr><td>!PADFILTER</td><td>Set IP address filters for TCP PAD server

This command sets up to two IP address filters for a specific PAD (Packet Assembler/Disassembler) profile when configured as a TCP server.
When a remote PAD client attempts to connect to the server, the server compares the client’s IP addresses to the filter(s). If the address is in one of the ranges, the server accepts the client’s connection.
Filter setup:
• Low and High IP addresses specified – Defines a range of allowed IP addresses.
• One address (Low or High) specified – Defines a single allowed IP address.
• No addresses specified for either filter – Filtering is disabled, all IP addresses are allowed.
• If Low and High IP addresses are specified for a filter, the High address must be greater than the Low address or the execution command returns ERROR.

These settings are ignored if the specified profile is configured as a client.
This command is not password-protected.

Usage
Execution AT!PADFILTER=<PADprofile>[, <ip1Low>[, <ip1High>[, <ip2Low>[, <ip2High>]]]]
Response OK
or
ERROR
Purpose Set up to two ranges of PAD client IP addresses that the TCP PAD server will accept</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Query AT!PADFILTER?<PADprofile>
Response AT!PADFILTER: <PADprofile>, <ip1Low>, <ip1High>, <ip2Low>, <ip2High>
OK
Purpose Show up to two ranges of PAD client IP addresses that the TCP PAD server will accept

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><PADprofile></td><td>1 – 10</td><td>PAD profile ID number</td></tr>
<tr><td><ip1Low></td><td></td><td>Starting value of the first IP range
Example: 63.162.134.132</td></tr>
<tr><td><ip1High></td><td></td><td>Ending value of the first IP range
Example: 63.162.134.150</td></tr>
<tr><td><ip2Low></td><td></td><td>Starting value of the second IP range
Example: 63.162.178.110</td></tr>
<tr><td><ip2High></td><td></td><td>Ending value of the second IP range
Example: 63.162.178.130</td></tr>
</table>
</td></tr>
<tr><td>!PADLISTEN</td><td>
Initiate PAD server connection

This command initiates a TCP PAD (Packet Assembler/Disassembler) server connection for a specific profile ID.

Note: At least one trigger condition must be defined for the specified profile ID. See !PADCONF.

This command is not password-protected.

Usage
Execution AT!PADLISTEN=<PADprofile>[,<manual>]
Response OK
(Connected, waiting for remote TCP client to connect. Serial port remains in AT command mode.)
CONNECT
(PAD connection established over TCP socket. Modem in PAD mode, and DCD line is asserted.)
CLIENT-UP
(Remote TCP client is connected. Modem is in AT command mode, and DCD line remains deasserted.)
NO CARRIER
(Connection failed. DCD line is deasserted.)
ERROR
(Error activating session, or all triggers are disabled.)
Purpose Initiate a server connection for the specified profile

Query AT!PADLISTEN?<PADprofile>
Response AT!PADLISTEN:<PADprofile>,<connectionstate>
OK
Purpose Display the current connection state of the specified profile

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><PADprofile></td><td>1 – 10</td><td>PAD profile ID number</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><manual></td><td>0</td><td>Modem sends CONNECT to the host and switches port to PAD mode</td></tr>
<tr><td></td><td>1</td><td>Modem sends CLIENT-UP to the host, then waits for an ATO command before sending CONNECT to the host ans switching port to PAD mode</td></tr>
<tr><td><connectionstate></td><td></td><td>Current connection state of the <PADprofile> PAD session</td></tr>
<tr><td></td><td>0</td><td>Disconnected</td></tr>
<tr><td></td><td>1</td><td>Listening</td></tr>
</table>
</td></tr>
<tr><td>!PADSETUP</td><td>
Set/query PAD (Packet Assembler/Disassembler) profile connection parameters

Set the connection parameters for a specific PAD profile, including its IP address and connection type, TCP/UDP port numbers, and auto-start configuration.
This command is not password-protected.

Usage
<table>
<tr><td>Execution</td><td>AT!PADSETUP=<PADprofile>, <conntype>, <addrtype>, <ipaddr>, <localport>, <remoteport>, <autostart>[, <connprofile>]</td></tr>
<tr><td>Response</td><td>OK
or
ERROR</td></tr>
<tr><td>Purpose</td><td>Configure the connection parameters for the specified <PADprofile>. The command returns ERROR if <autostart> is enabled on more than one PAD profile</td></tr>
<tr><td>Query</td><td>AT!PADSETUP?<PADprofile></td></tr>
<tr><td>Response</td><td>AT!PADSETUP:<PADprofile>, <conntype>, <addrtype>, <ipaddr>, <localport>, <remoteport>, <autostart>, <connprofile>
OK</td></tr>
<tr><td>Purpose</td><td>Return the current connection setup parameters for the specified <PADprofile></td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><PADprofile></td><td>1 – 10</td><td>PAD profile ID number</td></tr>
<tr><td><conntype></td><td></td><td>IP connection type</td></tr>
<tr><td></td><td>0</td><td>PAD profile disabled</td></tr>
<tr><td></td><td>1</td><td>UDP client</td></tr>
<tr><td></td><td>2</td><td>TCP client</td></tr>
<tr><td></td><td>3</td><td>TCP server</td></tr>
<tr><td><addrtype></td><td></td><td>IP address type</td></tr>
<tr><td></td><td>0</td><td>IPv4 address</td></tr>
<tr><td></td><td>1</td><td>IPv6 address</td></tr>
<tr><td><ipaddr></td><td></td><td>Destination IP address in standard IP address format.
Example:
IPv4: 63.162.134.132.
IPv6: 1234:5678:9012:3456:7890:1234:5678:9012</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td></td><td>This parameter is used in client mode only; when used in server mode, the value is ignored.</td></tr>
<tr><td><localport></td><td></td><td>Modem port number</td></tr>
<tr><td></td><td>0</td><td>Port number is assigned by the modem (in client mode only). In serial mode, this must not be zero.</td></tr>
<tr><td></td><td>1 – 65535</td><td>Port number used by the modem</td></tr>
<tr><td><remoteport></td><td>1 – 65535</td><td>Port number of the remote client. This parameter is used in client mode only; when used in server mode, the value is ignored.</td></tr>
<tr><td><autostart></td><td></td><td>State of auto-start feature</td></tr>
<tr><td></td><td>0</td><td>Disabled. Default value</td></tr>
<tr><td></td><td>1</td><td>Enabled</td></tr>
<tr><td><connprofile></td><td>1 – 16</td><td>Connection profile ID. Default value is 1 if not specified.</td></tr>
</table>
</td></tr>
<tr><td>!PADDNSLOOKUP</td><td>
Return IP address of desired domain

There must not be any active PAD connection for this command to run properly.
This command is not password-protected.

Usage
Query AT!PADDNSLOOKUP?<domain>
Response <ip address>
OK
or
+CME: 129
ERROR
Purpose Show the DNS address for the specific domain

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><ip address></td><td></td><td>IP address</td></tr>
</table>
</td></tr>
<tr><td>!PADSWITCH</td><td>
Switch active PAD session

Switch the active PAD session to another session (uniquely identified by the combination of <PADprofile> and <session>).
After switching sessions, ATO can be used to enter PAD mode and then send and receive data for the active session, or to query available PAD sessions.
This command is not password-protected.

Usage
Execution AT!PADSWITCH=<PADprofile>,<session>
Response OK
or
ERROR
Purpose Switch the active PAD session to the PAD session uniquely identified by <PADprofile> and <session>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Query AT!PADSWITCH?<qualifier>
Response !PADSWITCH: Active session: <PADprofile>, <session>
!PADSWITCH:
<padprofile>,<session>,<dst_ip>,<dst_port>,<unread>
[...] (repeats for each available PAD session]tra command sent successfully
OK
Purpose Show the active session (1st line of response) and all other available sessions (lines 2–n)

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><PADprofile></td><td>1 – 10</td><td>PAD profile ID number</td></tr>
<tr><td><session></td><td>0 – 3</td><td>Session index</td></tr>
<tr><td><dst_ip></td><td></td><td>Destination port address in standard IP address format. For example:
IPv4: 63.162.134.132
IPv6: 1234:5678:9012:3456:7890:1234:5678:9012</td></tr>
<tr><td><dst_port></td><td>0 – 65535</td><td>Destination port</td></tr>
<tr><td><unread></td><td>0</td><td>No unread data</td></tr>
<tr><td></td><td>1</td><td>Unread data exists</td></tr>
</table>
</td></tr>
<tr><td>!PADPADDR</td><td>
Query the IP address of the PAD socket call

This command is not password-protected.

Usage
Query AT!PADPADDR?
Response !PADPADDR: “1.2.3.4”
OK
or
ERROR
</td></tr>
</table>

6. EFS Commands

EFS commands support the following file operations:

- List the available space, used space and erased space in EFS
- List the file contents (in /SWIR directory, top directory, or a specified directory)
- List the directories in the modem's top directory

6.1. Command Summary

Command	Description
!EFS	Check EFS space
!FML	Lists file contents of the modem's /SWIR directory.
!FMGENL	Lists file contents of a specified directory.
!FMGENDIRL	Lists the directories in the modem's top directory.
!OSDSM	Display memory usage for DSM buffer pools

6.2. Command Reference

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.

Table 9. EFS Command Details

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!EFS?</td><td>Returns the available space, used space, and erased space in EFS.</td></tr>
<tr><td>!FML</td><td>Lists the filename and size of each file in the modem's /SWIR directory.
If the /SWIR directory is empty, OK is returned.
If the /SWIR directory doesn't exist, an ERROR is returned.</td></tr>
<tr><td>!FMGENL?

!FMGENL=<dir></td><td>Lists the filename and size of each file in a specified directory. If the directory is not specified, then the modem's top directory is used.

<table><tr><th>Parameter</th><th>Meaning</th></tr><tr><td>dir</td><td>Name of directory</td></tr></table>
If the directory doesn't exist, an error is returned.
Note: All filenames and directory names are case sensitive. If the directory is empty, OK is returned.
Example 1:
AT!FMGENL?
/$SYS.FACTORY 000000CE
/.DIAGCFG 00000005
/.DIAGIN 0000018B
/CLK_DB 00000040
OK</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Example 2:
AT!FMGENL=mydir
/myfile1 00000020
/myfile2 000000A1
OK</td></tr>
<tr><td>!FMGENDIRL?</td><td>Lists the directories in the modem’s top directory.
Note: All filenames and directory names are case sensitive.</td></tr>
<tr><td>!OSDSM?</td><td>This command is used to display the memory usage for the various Qualcomm DSM buffer pools. Such a command is useful when searching for memory leaks.
AT!OSDSM?
Pool 0 Size <size> Free <free/max> Min <min free>
Pool 1 Size <size> Free <free/max> Min <min free>
…
Pool n Size <size> Free <free/max> Min <min free>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><Size></td><td>0000 – FFFF</td><td>Size of each item in the pool</td></tr>
<tr><td><Free></td><td>0000 – FFFF</td><td>Number of items currently available in the pool</td></tr>
<tr><td><Max></td><td>0000 – FFFF</td><td>Total number of items in the pool</td></tr>
<tr><td><Min Free></td><td>0000 – FFFF</td><td>Lowest number of free items since power on</td></tr>
</table></td></tr>
</table>

7. SAR Backoff Commands

This chapter describes SAR-related commands (Specific Absorption Rate) – SAR commands are used to meet regulatory requirements for the OEM host device by managing the modem's SAR backoff state. OEMs should carefully evaluate their use of these commands and their impact on device operation.

Note: Operators may require OEMs to disclose SAR settings and theory of operation for applicable certifications.

7.1. Command Summary

Command	Description
!MAXPWR	Set/report maximum Tx power
!SARBACKOFF	Set/report maximum Tx power limit
!SARSTATE	Set/report SAR backoff state
!SARSTATEDFLT	Set/report default SAR backoff state

7.2. Command Reference

Command	Description
!MAXPWR	**Set/report maximum Tx power** **Caution:** *Any adjustments of Tx power may impact regulatory certification of the module in the host platform. The OEM is responsible for ensuring that the final module configuration in the host platform meets all regulatory requirements.* Increasing the Tx power affects the module's current consumption and thermal performance. **Usage** Execution: `AT!MAXPWR=<band>,<tech>,<maxpwr>` Response: `OK` Purpose: Set the maximum Tx power for the specified band/technology combination Query: `AT!MAXPWR?<band>,<tech>` Response: `<maxpwr> dBm` `OK` Purpose: Indicate the maximum Tx power for the specified band/technology combination Query List: `AT!MAXPWR=?` Purpose: Display valid execution format and parameter values

Command	Description
	Parameters **Parameter** / **Value** / **Description** <band> / 0 – 43 / RF band. Refer to Table 35 3GPP Bands for the completelist of bands. Note that band support is specific. Refer to the product specification of the SL9090 or MC9090 for details. <tech> / / Network technology / 0 / WCDMA / 1 / CDMA (not supported) / 2 / LTE (not supported) <maxpwr> / / Maximum Tx power in dBm. Integer value in ASCII format
!SARBACKOFF	**Set/report maximum Tx power limit** Set or report the maximum Tx power limit for a specific band/technology/state combination. **Usage** Execution (for WCDMA, CDMA and LTE): **AT!SARBACKOFF=<tech>,<band>,<state>,<offset>** Execution (for GSM): **AT!SARBACKOFF=<tech>,<band>,<slot>,<state>,<modulation>,<offset>** Response: **OK** Purpose: Set the SAR backoff values for a specific band/technology combination Query: **AT!SARBACKOFF?<tech>,<band>,<state>** Response: **<backoff> dBm** **OK** Purpose: Indicate the maximum Tx power limit for the specified band/technology/state combination Query List: **AT!SARBACKOFF=?<tech>** Purpose: Display the execution and query formats with valid parameter values for the requested technology **Parameters** **Parameter** / **Value** / **Description** <tech> / / Network technology / 0 / WCDMA / 1 / CDMA (not supported) / 2 / LTE (not supported) / 3 / GSM <band> / 0 – 40 / RF band. Refer to Table 35 3GPP Bands for the completelist of bands. Note that band support is specific. Refer to the product specification of the SL9090 or MC9090 for details.

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><state></td><td></td><td>SAR backoff state setting</td></tr>
<tr><td></td><td>0</td><td>No backoff</td></tr>
<tr><td></td><td>1 – 8</td><td>Backoff state 1 to 8</td></tr>
<tr><td><offset></td><td>0 – 8 (GSM)
0 – 81 (WCDMA)</td><td>Offset from maximum Tx power, in dBm
Range is technology-dependent.</td></tr>
<tr><td><slot></td><td>1 – 4</td><td>Tx slot for GPRS/EDGE (for GSM only)</td></tr>
<tr><td><modulation></td><td></td><td>Modulation method (for GSM only)</td></tr>
<tr><td></td><td>0</td><td>GMSK (GPRS)</td></tr>
<tr><td></td><td>1</td><td>8PSK (EDGE)</td></tr>
</table>
</td></tr>
<tr><td>!SARSTATE</td><td>
Set/report SAR backoff state

Set or report the current SAR (Specific Absorption Rate) backoff state.
This is a non-persistent setting. Use !SARSTATEDFLT to change the default backoff state.
This command is not password-protected

Usage
<table>
<tr><td>Execution</td><td>AT!SARSTATE=<state></td></tr>
<tr><td>Response</td><td>OK</td></tr>
<tr><td>Purpose</td><td>Set the SAR backoff state</td></tr>
<tr><td>Query</td><td>AT!SARSTATE?</td></tr>
<tr><td>Response</td><td>!SARSTATE: <state>
OK</td></tr>
<tr><td>Purpose</td><td>Indicate the current <state> setting</td></tr>
<tr><td>Query List</td><td>AT!SARSTATE=?</td></tr>
<tr><td>Purpose</td><td>Display valid execution format and parameter values</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td></td><td>SAR backoff state setting</td></tr>
<tr><td></td><td>0</td><td>No backoff</td></tr>
<tr><td></td><td>1 – 8</td><td>Backoff state 1 to 8</td></tr>
</table>
</td></tr>
</table>

Command	Description
!SARSTATEDFLT	**Set/report default SAR backoff state** Set or report the default SAR (Specific Absorption Rate) backoff state used when the device powers up. By choosing an appropriate default backoff state, the device is made to start in a low-exposure state, which is important if there is any delay in the host proximity or position detection measurement and control algorithms. To temporarily change the SAR backoff state, use **!SARSTATE**. The change will last until the command is repeated or the modem resets. **Usage** Execution **AT!SARSTATEDFLT=<state>** Response **OK** Purpose Set the default SAR backoff state Query **AT!SARSTATEDFLT?** Response **<state>** **OK** or **ERROR** Purpose Indicate the default state Query List **AT!SARSTATEDFLT=?** Purpose Display valid execution format and parameter values **Parameters** **Parameter** / **Value** / **Description** <state> / / Default SAR backoff state setting / 0 / No backoff / 1 – 8 / Backoff state 1 to 8

8. Modem Management Commands

This chapter describes modem management AT commands, including firmware information inquiry and hardware information inquiry.

8.1. Command Summary

Command	Description
!IMSETPREF	AMSS image query and selction
!IMGETCOMB	Lists all valid combinations of carrier, slot and UQCN in the modem
!BCINF	Return CWE headers, including bootloader version
!BOOTHOLD	Reset modem and wait in bootloader for firmware download
!ERR	Display diagnostic information
!GCCLR	Clear crash dump data
!GCDUMP	Display crash dump data
^HVER	Return the modem hardware version
!PRIID	Set/report module PRI part number and revision
!SKU	Read modem's SKU
!PACKAGE	Return package version string
!BSHWID	Return modem's hardware ID
!BSMCCHECK	Return modem hardware version
!CARRIERID	Carrier ID
!PRIREV	PRI revision
+ATINIT	AT Initialization
+ATINITSTATE	AT Initialization State
!MDMVER	Current current firmware version
!SUBNETMASK	Read or write the subnet mask

8.2. Command Reference

Command	Description
!IMSETPREF	**AMSS image query and selection** The SL9090 and MC9090 support multiple AMSS images on a chip to support multi-carrier for different operators. This command provides a way to query and selection images. **Usage** Execution **AT!IMSETPREF=<amss_index>, <uqcn_index>** or **AT!IMSETPREF=<amss_build_id>,<amss_image_id>,<uqcn_build_id>,<uqcn_image_id>**

Command	Description
	Notes: The modem automatically resets after executing this command Query: **AT!IMSETPREF?** Response: **Available Images** **Index Build ID Image ID** **<amss_index_0> <amss_build_id_0> <amss_image_id_0>** **[<amss_index_1> <amss_build_id_1> <amss_image_id_0>** **[…** **[<amss_index_n> <amss_build_id_n> <amss_image_id_n>]…]** **Available UQCN** **Index Build ID Image ID** **<uqcn_index_0> <uqcn_build_id_0> <uqcn_image_id_0>** **[<uqcn_index_1> <uqcn_build_id_1> <uqcn_image_id_0>** **[…** **[<uqcn_index_n> <uqcn_build_id_n> <uqcn_image_id_n>]…]** **OK** **Parameters** **Parameter / Value / Description** <amss_index> / 0 – 5 / AMSS index <uqcn_index> / 0 – 50 / UQCN index <amss_build_id> / / Firmware name of the AMSS image ACSII string no larger than 32 bytes <uqcn_build_id> / / UQCN name ASCII string no larger than 32 bytes <amss_image_id> / / Firmware ID of the AMSS image ASCII string no larger than 40 bytes <uqcn_image_id> / / UQCN ID ASCII string no larger than 40 bytes
!IMGETCOMB	**Lists all valid combinations of carrier, slot and UQCN in the modem** This command is available for the following Firmware versions or higher: • SWI6600X_02.04.02.00 • SWI6600H_02.04.03.00 • SWI6600U_02.04.03.00 **Usage** Query: **AT!IMGETCOMB** Response: **Carrier ID: <Carrier_ID>** **Carrier Name: <Carrier_Name>** **Slot: <Slot>** **Active: <Active_flag>** **AMSS Build ID: <AMSS_Build_ID>** **AMSS Image ID: <AMSS_Image_ID>** **UQCN Build ID: <UQCN_Build_ID>** **UQCN Image ID: <UQCN_Image_ID>** … **OK**

Command	Description
	Parameters **Parameter** / **Value** / **Description** <Carrier_ID> / 0 – 255 / Carrier index <Carrier_Name> / / Name of carrier <Slot> / 1 – 5 / Slot/partition index <Active_flag> / 0 / Inactive / 1 / Active <AMSS_Build_ID> / / AMSS build ID <AMSS_Image_ID> / / AMSS image/unique ID <UQCN_Build_ID> / / UQCN build ID <UQCN_Image_ID> / / UQCN image/unique ID
!BCINF	**Return CWE headers** Return the module's CWE headers, including the bootloader version and application headers. **Usage** Execution: **AT!BCINF** Response: **OSBL** **Address: <address>** **Version: <version>** **Date: <date>** **Size: <size>** **AMSS** **Address: <address>** **Version: <version>** **Date: <date>** **Size: <size>** Purpose: List the CWE headers in the devices flash memory. The bootloader version is in the BOOT section **Parameters** **Parameter** / **Value** / **Description** <address> / 0x00000000 – 0xFFFFFFFF / Start address <version> / / Bootloader version ASCII string with maximum length = 84 characters Example: Ver: SWI6600X_00.00.01.06BT R1941 CNSZXD00000132 2012/06/02 08:09:25 <date> / / Date string 8-byte ASCII string <size> / 0x00000000 – 0xFFFFFFFF / Image size

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!BOOTHOLD</td><td>
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.
This command is not applicable in DIP mode.

Usage
Execution AT!BOOTHOLD
Response OK
Purpose Force the modem to backup user NV options, reset, and then wait in boot and hold mode for a firmware download
</td></tr>
<tr><td>!ERR</td><td>
Display diagnostic information

Display diagnostic information that Sierra Wireless uses to assist in resolving technical issues.

Usage
Execution AT!ERR
Response 00 [F] <count> <file> <line>
...
n [F] <count> <file> <line>
OK
Purpose Display diagnostics

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><count></td><td>0x00 – 0xFF</td><td>Number of occurences</td></tr>
<tr><td><file></td><td></td><td>Source code file name as an ASCII string</td></tr>
<tr><td><line></td><td>1 – 99999</td><td>Line number in source file</td></tr>
</table>
</td></tr>
<tr><td>!GCCLR</td><td>
Clear crash dump data

Clear the crash dump and assert data.

Usage
Execution AT!GCCLR
Response Crash data cleared
OK
Purpose Clear crash dump and assert data
</td></tr>
<tr><td>!GCDUMP</td><td>
Display crash dump data

Usage
Execution AT!GCDUMP
Response (crash dump data)
OK
or
No crash data available
OK
Purpose Display crash dump data
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>^HVER</td><td>
Return the modem hardware version

Return the modem’s hardware version number based on the FSN.
The version number is returned as a short string representing the actual version.

Usage
Execution AT^HVER
Response <versionString>
OK
Purpose Return the hardware version number

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><versionString></td><td></td><td>Hardware version number
Examples:
“E2” – Eng2 device
“1.0” – Production v1.0
“1.1” – Production v1.1</td></tr>
</table>
</td></tr>
<tr><td>!PRIID</td><td>
Set/report module PRI part number and revision

Usage
Query AT!PRIID=<priPN>,<priRev>
Response OK
Purpose Set the module’s PRI part number and revision

Query AT!PRIID?
Response PRI Part Number: <priPn>
Revision: <priRevDisplay>
OK
Purpose Return the module’s PRI part number and revision
Notes The query command is not password-protected

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><priPn></td><td></td><td>PRI part number as a 7-digit ASCII number
Example: 9991234</td></tr>
<tr><td><priRev></td><td></td><td>PRI revision number being written to the module
4-digit ASCII number with an implied “.” In the middle
Example: 0100</td></tr>
<tr><td><priRevDisplay></td><td></td><td>PRI revision number being read from the module
4-digit ASCII number with a decimal point in the middle
Example: 01.00</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SKU</td><td>
Read modem’s SKU

This command returns the modem’s Sierra Wireless SKU identification.

Usage
Query AT!SKU?
Response SKU: <sku>
OK
Purpose Read SKU from the modem

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><sku></td><td></td><td>SKU number as a numeric string
Example: “1584083”</td></tr>
<tr><td></td><td>“Unset”</td><td>No SKU has been set</td></tr>
</table>
</td></tr>
<tr><td>!PACKAGE</td><td>
Return package version string

This command returns the package version loaded in the modem.
This command is not password-protected.

Usage
Query AT!PACKAGE?
Response !PACKAGE:<versionString>
OK
Purpose Return package version string

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><versionString></td><td></td><td>Character string
Example:
MC7750_01.00.02.03_00_VZW_011.006
_000</td></tr>
</table>
</td></tr>
<tr><td>!BSHWID</td><td>
Return modem’s hardware ID

This command is not password-protected.

Usage
Query AT!BSHWID?
Response <HW ID value>
OK
Purpose Return the modem’s hardware ID

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><HW ID value></td><td>0 – 63</td><td>Modem’s hardware ID</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!BSMCCHECK</td><td>
Return modem hardware version

Return the modem’s hardware (board) version number based on the hardware resistor. A similar command, ^HVER, returns the version number based on the FSN.
This command is not password-protected.

Usage
Query AT!BSMCCHECK?
Response <hwRev>
OK
Purpose Return the modem’s hardware version

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><hwRev></td><td></td><td>Modem’s hardware version</td></tr>
<tr><td></td><td>DV0</td><td>DV 0 board</td></tr>
<tr><td></td><td>DV1</td><td>DV 1 board</td></tr>
<tr><td></td><td>DV2</td><td>DV 2 board</td></tr>
<tr><td></td><td>PV</td><td>PV board</td></tr>
</table>
</td></tr>
<tr><td>!CARRIERID?</td><td>
Queries the carrier ID

<table>
<tr><th>Value</th><th>Carrier</th></tr>
<tr><td>1</td><td>Generic</td></tr>
<tr><td>2</td><td>Sprint</td></tr>
<tr><td>3</td><td>Bell Mobility</td></tr>
<tr><td>4</td><td>Telus</td></tr>
<tr><td>5</td><td>Verizon</td></tr>
<tr><td>6</td><td>Western Wireless</td></tr>
<tr><td>7</td><td>Smartcom</td></tr>
<tr><td>8</td><td>Alltel</td></tr>
<tr><td>9</td><td>US Cellular</td></tr>
<tr><td>10 – 13</td><td>Obsolete</td></tr>
<tr><td>14</td><td>China Unicom</td></tr>
<tr><td>15</td><td>Hutchison Thailand</td></tr>
<tr><td>16</td><td>Movinet</td></tr>
<tr><td>17</td><td>Tarjetas-Lusacell Mexico</td></tr>
<tr><td>18</td><td>Telecom New Zealand</td></tr>
<tr><td>19</td><td>Reliance</td></tr>
<tr><td>20</td><td>Telstra</td></tr>
<tr><td>21</td><td>Mobility Canada</td></tr>
<tr><td>22</td><td>VZW Puerto Rico</td></tr>
<tr><td>23</td><td>Pelephone</td></tr>
<tr><td>24</td><td>Bell Canada</td></tr>
<tr><td>25</td><td>Indosol Indonesia</td></tr>
<tr><td>26</td><td>Midwest Wireless</td></tr>
<tr><td>27</td><td>Bell South Chile</td></tr>
<tr><td>28</td><td>Bell South Panama</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
29 Tata India
30 Alaska Communication Systems
31 Sprint Private Label Services
32 Starcomm Nigeria
33 Telecsa Ecuador
</td></tr>
<tr><td>!PRIREV?</td><td>Get PRI revision

Reports the PRI revision (major and minor revision number).</td></tr>
<tr><td>+ATINIT=<cmd>[,C|T[,s[,c]]]

+ATINIT?</td><td>
AT Initialization

This command is used to store an AT command string into the module, or query the module for the current initialization string. If the initialization string is not empty, the AT commands in this string are executed when the module is powered on or reset. If the initialization string is empty, no AT commands are executed upon module startup.
The AT+ATINITSTATE command is used to enable or disable the execution of the command stored by +ATINIT upon module startup. This allows you to temporarily disable the execution of the initialization string without losing the setting of the stored string.
Based on the optional mode parameter (C or T), the command string (cmd) is either stored or executed as a test.

<table>
<tr><th>Parameter</th><th>Meaning</th></tr>
<tr><td>cmd</td><td>The character string that is executed upon module power-up or reset. This parameter has a maximum length of 40 characters.
To avoid parsing errors, semi-colons and commas in the initialization string must be replaced as noted by the s and c parameters below.</td></tr>
<tr><td>C|T</td><td>Mode: determines whether the command string parameter is to be stored (C) or executed immediately as a test (T). If this parameter is omitted, T is assumed. Test commands are not stored.</td></tr>
<tr><td>s</td><td>Semi-colon replacement character. The command string may require the use of semi-colon delimiters that would be trapped by the AT command handler when intended to be stored as part of the initialization string. To prevent parsing errors, semi- colons in the initialization command must be replaced. This parameter specifies the replacement character. This parameter can be omitted if there are no semi-colon characters in the command string. See the samples below.</td></tr>
<tr><td>c</td><td>Comma replacement character. Similar to the semi-colon, any commas in the initialization string must be replaced to prevent parsing errors. This parameter can be omitted if there are no comma characters in the initialization command string.</td></tr>
</table>

If the string is accepted without errors, it is echoed to the serial terminal with the semicolon and comma characters replaced. If only the string is given, then it is assumed that the T command is desired.

Example 1:
AT+ATINIT=+GMR,c

Stores the single command +GMR to report the revision of the firmware.
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Example 2:
AT+ATINIT=+GMR\+CMUX=2/2,c,\,/

Stores the command string +GMR;+CMUX=2,2. Note the substitution characters for semi-colon (\) and comma (/).
To delete the stored string, set +ATINIT= ,c</td></tr>
<tr><td>+ATINITSTATE= <n>

+ATINITSTATE?</td><td>AT Initialization State

This command is used to enable or disable the automatic execution of the startup initialization string set using AT+ATINIT. This allows you to temporarily disable the execution of the initialization string without losing the setting of the stored string.

<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>0</td><td>Disables the execution of the initialization string on startup. (Default)</td></tr><tr><td>1</td><td>Enables the automatic execution of the initialization string on module startup.</td></tr></table></td></tr>
<tr><td>!MDMVER</td><td>Returns the current firmware version of the modem

This command is not password-protected.

Usage
Query AT!MDMVER?
Response Firmware version information</td></tr>
<tr><td>!SUBNETMASK</td><td>Read or write the subnet mask

This command is not password-protected.

Usage
Execution AT!SUBNETMASK=<subnetmask>
Response OK

Query AT!SUBNETMASK?
Response OK

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><subnetmask></td><td></td><td>Subnet mask</td></tr></table></td></tr>
</table>

9. Power Control Commands

9.1. Command Summary

Command	Description
!PCTEMP	Return current temperature information
!PCVOLT	Return current power supply voltage information
!POWERDOWN	Power down system
!RESET	Reset modem
!PCINFO	Return power control status information
!PCOFFEN	Set/return Power Off Enable state
!PCTEMPLIMITS	Set/report temperature state limit values
!PCVOLTLIMITS	Set/report power supply voltage state limit values

9.2. Command Reference

Command	Description
!PCTEMP	**Return current temperature information** Return the module's temperature state and actual temperature. **Usage** Query: **AT!PCTEMP?** Response: **Temp state: <state>** **Temperature: <temperature> degC** **OK** Purpose: Return the module's temperature information **Parameters** **Parameter / Value / Description** <state> — Temperature state "Normal" — Normal "High Warning" — High warning "High Critical" — High critical "Low Critical" — Low critical <temperature> — Current temperature, in degrees Celsius This is the highest temperature reported by the two thermistors (one measures the PA (Power Amplifier) used by the WCDMA transceiver, the other measures the temperature of the PA used by the GSM transceiver).

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!PCVOLT</td><td>
Return current power supply voltage information

Return the module’s power supply state and actual voltage.

Usage
Query AT!PCVOLT?
Response Volt state: Normal
Power supply voltage: <voltage> mV (<raw> cnt)
OK
Purpose Return the module’s voltage information

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td></td><td>Power supply state</td></tr>
<tr><td></td><td>“Normal”</td><td>Normal</td></tr>
<tr><td></td><td>“High Critical”</td><td>High critical</td></tr>
<tr><td></td><td>“Low Warning”</td><td>Low warning</td></tr>
<tr><td></td><td>“Low Critical”</td><td>Low critical</td></tr>
<tr><td><voltage></td><td></td><td>Current voltage reading in mV</td></tr>
<tr><td><raw></td><td></td><td>Analog/digital converter reading</td></tr>
</table>
</td></tr>
<tr><td>!POWERDOWN</td><td>
Power down system

Power down the system. After using this command, the modem will not communicate with the host until it has been power cycled.
This command should only be used when testing using an appropriate testing jig – do not use it when the modem is installed in a computer.

Usage
Execution AT!POWERDOWN
Response OK
Purpose Power the system down
</td></tr>
<tr><td>!RESET</td><td>
Reset modem

This command is identical in function to !GRESET.

Usage
Execution AT!RESET
Response OK
Purpose Reset the modem
</td></tr>
</table>

Command	Description
!PCINFO	**Return power control status information** This command is not password-protected. **Usage** Query: **AT!OCINFO?** Response: **State: <state>** **LPM force flags: W_DISABLE: <0|1>, User:<0|1>, Temp:<0|1>,** **Volt:<0|1> (0=Did not cause, 1=Caused)** **W_DISABLE: <w_disable>** **Poweroff mode: <pwroff>** **User initiated LPM: <userlpm>** **OK** Purpose: Return power control information **Parameters**

Parameter	Value	Description
<state>		Modem's power mode
	0	Low power mode (LPM)
	1	Online
	2	Offline
	3	Power off (internal)
	4	Initialization (internal)
<LPM force flags>		Conditions that caused the modem to enter LPM (0=did not cause, 1=caused)
	W_DISABLE	W_DISABLE is asserted
	USER	CnS/AT command was issued
	TEMP	Temperature is outside operational limits
	VOLT	Voltage is outside operational limits
<w_disable>		Current state of W_DISABLE
	0	De-asserted
	1	Asserted
<pwroff>		State of power off enable feature (preset by device manufacturer) for Firmware revisions D0_0_4_1ap and earlier
	0	Disabled
	1	Enabled
		Current power off mode (preset by device manufacturer) for firmware revisions D0_0_4_2ap and later
	0	Enter LPM when W_DISABLE is asserted
	1	Power down modem when W_DISABLE is asserted
	2	Ignore changes on W_DISABLE
<userlpm>		State of user-initiated low power mode
	0	Disabled (normal power mode)
	1	Enabled (low power mode)

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!PCOFFEN</td><td>
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.

Usage
Execution AT!PCOFFEN=<state>
Response OK
Purpose Set the current state

Query AT!PCOFFEN?
Response <state>
OK
Purpose Report the current Power Off Enable state

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td></td><td>Current state of Power Off Enable</td></tr>
<tr><td></td><td>0</td><td>Modem will enter LPM (low power mode) when W_DISABLE is asserted</td></tr>
<tr><td></td><td>1</td><td>Modem will power off when W_DISABLE is asserted (for the MC9090 only).
Default value for both SL9090 and MC9090.</td></tr>
<tr><td></td><td>2</td><td>Ignore changes on W_DISABLE</td></tr>
</table>
</td></tr>
<tr><td>!PCTEMPLIMITS</td><td>
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.

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
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><hc></td><td></td><td>High critical temperature limit</td></tr>
<tr><td><hw></td><td></td><td>High warning temperature limit</td></tr>
<tr><td><hn></td><td></td><td>High normal temperature limit</td></tr>
<tr><td><ln></td><td></td><td>Low normal temperature limit</td></tr>
<tr><td><lc></td><td></td><td>Low critical temperature limit</td></tr>
</table>
</td></tr>
<tr><td>!PCVOLTLIMITS</td><td>
Set/report power supply voltage state limit values

Certain modem functionality is affected by the modem’s power supply voltage state. The possible voltage states are high critical, high normal, low normal, low warning, and low critical.
Use this command to report or set the limits that correspond to these voltage states.

Usage
Execution AT!PCVOLTLIMITS=<hc>,<hn>,<ln>,<lw>,<lc>
Response OK
Purpose Set the voltage limits for each state (all five values must be specified)

Query AT!PCVOLTLIMITS?
Response HI CRIT: <hc>
HI NORM: <hn>
LO NORM: <ln>
LO WARN: <lw>
LO CRIT: <lc>
Purpose Return the voltage limits for each state

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><hc></td><td></td><td>High critical voltage limit</td></tr>
<tr><td><hw></td><td></td><td>High warning voltage limit</td></tr>
<tr><td><ln></td><td></td><td>Low normal voltage limit</td></tr>
<tr><td><lw></td><td></td><td>Low warning voltage limit</td></tr>
<tr><td><lc></td><td></td><td>Low critical temperature limit</td></tr>
</table>
</td></tr>
</table>

10. USB Descriptor Commands

10.1. Command Summary

Command	Description
!UDINFO	Return information from active USB descriptor
!UDPID	Set/report product ID in USB descriptor
!UDUSBCOMP	Set/report USB interface configuration

10.2. Command Reference

Command	Description

!UDINFO	**Return information from active USB descriptor**
	
	Usage
	Query: `AT!UDINFO?`
	Response:
	`VID: <vendor_id>`
	`PID: <product_id>`
	`Interface: <interfaceType>`
	`Manufacturer: <manuString>`
	`Product: <prodString>`
	Purpose: Display USB descriptor information
	
	Parameters
	Parameter / Value / Description:
	<vid> / 0000 – FFFF / Vendor ID
	<pid> / 0000 – FFFF / Product ID
	<interfaceType> / / USB interface type
	/ "DIP" / Direct IP interface
	/ "QMI" / QMI interface
	<manuString> / / Manufacturer string as an ASCII string with a maximum of 29 characters. Example: "Sierra Wireless, Incorporated"
	<prodString> / / Product string as an ASCII string with a maximum of 64 characters. Example: "Mini Card"

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!UDPID</td><td>
Set/report product ID in USB descriptor

Use this command to set the device's product ID in the USB descriptor. (The SL9090 and MC9090 devices support more than one product ID.)

Usage
Execution AT!UDPID=<product_id>
Response OK
Purpose Set the product ID in the USB descriptor

Query AT!UDUSBCOMP?
Response <product_id>
OK
Purpose Report the product ID that is stored in the USB descriptor

Query List AT!UDPID=?
Purpose Display a list of available product IDs for the device

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><product_id></td><td>0000 – FFFF</td><td>Product ID in hexadecimal ASCII value</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!UDUSBCOMP</td><td>
Set/report USB interface configuration

Use this command with modems that have been configured with multiple USB compositions.
By default, devices are typically configured to use a USB composition that presents a minimal set of interfaces. If the device also supports other compositions, this command is used to choose from any of the supported compositions.

Usage
Execution AT!UDUSBCOMP=<device_comp>
Response OK
Purpose Set the current composition. For the change to take effect, you must reset the modem

Query AT!UDUSBCOMP?
Response !UDUSBCOMP: <device_comp>
OK
Purpose Report the current interface composition

Query List AT!UDUSBCOMP=?
Response
Traditional interface:
0 – HIP DM NMEA AT MDM1 MDM2 MDM3 MS SUPPORTED
1 – HIP DM NMEA AT MDM1 MS NOT SUPPORTED
2 – HIP DM NMEA AT NIC1 MS NOT SUPPORTED
3 – HIP DM NMEA AT MDM1 NIC1 MS NOT SUPPORTED
4 – HIP DM NMEA AT NIC1 NIC2 NIC3 MS NOT SUPPORTED
5 – HIP DM NMEA AT ECM1 MS NOT SUPPORTED
OK
Direct IP interface:
0 – HIP DM NMEA AT MDM1 MDM2 MDM3 MS NOT SUPPORTED
1 – HIP DM NMEA AT MDM1 MS NOT SUPPORTED
2 – HIP DM NMEA AT NIC1 MS SUPPORTED
3 – HIP DM NMEA AT MDM1 NIC1 MS SUPPORTED
4 – HIP DM NMEA AT NIC1 NIC2 NIC3 MS SUPPORTED
5 – HIP DM NMEA AT ECM1 MS SUPPORTED
6 – DM NMEA AT QMI NOT SUPPORTED
OK
Purpose Report the available interface compositions (<device_comp>) – the device can use any of the compositions that are listed as “SUPPORTED”

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><device_comp></td><td></td><td>USB composition
Integer value; 0 or greater</td></tr>
</table>
</td></tr>
</table>

11. Hardware Related Commands

11.1. Command Summary

Command	Description
+WHCNF	Activate/deactivate modem hardware features
!BZBUZZ	Generate frequency on buzzer pin
!BZBUZZPLAY	Generate melody on buzzer pin
!DIO	Read/write from/to Digital I/O (DIO) channel
!DIOCFG	Configure DIO channels
!LEDCTRL	Set/query LED flash pattern

11.2. Command Reference

Command	Description
+WHCNF	**Activate/deactivate modem hardware features** Activate, deactivate, or return the current operating state of hardware features (LED, SIM, and UART). **Usage** Execution: **AT+WHCNF=<type>, <mode>[, <uartgroup>[, <uartlinedcd>[, <uartlinedtr>[, <uartlinedsr>[, <uartsleep>]]]]]** Response: **OK** Purpose: Activate/deactivate the specified hardware <type> Query: **AT+WHCNF?** Response: **+WHCNF: <type>,<status>[,<resetFlag>]** or **+WHCNF: <type>,<status>,<resetFlag>, <uartgroup>,<uartlinedcd>,<uartlinedtr>, <uartlinedsr>,<uartsleep>]** **...** **OK** Purpose: Display the current activation state and settings for each hardware feature Query List: **AT+WHCNF=?** Purpose: Display valid execution formats and parameter values **Parameters** **Parameter** / **Value** / **Description** <type> / / Hardware functionality / 1 / LED / 6 / UART

Command	Description
	<mode> Requested operation 0 Deactivate 1 Activate 2 Interrogate status Note that the execution response returns the current operating state of the <type> - deactivated or activated. The Query command can be used to return the same information for all of the hardware types at one time. <uartgroup> Pin type duplexed for extended UART signals (DCD, DSR and DTR) 0 Extended UART disabled (4-wire enabled) 1 GPIO 2 PCM 3 SPI <uartlinedcd> DCD line 0 Disabled 1 Enabled <uartlinedtr> DTR line 0 Disabled 1 Enabled <uartlinedsr> DSR line 0 Disabled 1 Enabled <uartsleep> UART sleep flag Sleep flag is only referenced if the DTR line is disabled 0 Sleep enabled 1 Sleep disabled Parameter behavior summary: • <uartgroup = 1|2|3> && <uartlinedtr = 1>: UART goes to sleep when DTR is deasserted and wakes when DTR is asserted. • <uartgroup = 0> && <uartsleep = 0>: UART goes to sleep 15 seconds after bootup (if no activity), and after 4 seconds of normal inactivity. UART wakes when activity is detected on Rx line; the port may be used after short delay (~1 second). • <uartgroup = 0> && <uartsleep = 1>: UART never sleeps.
!BZBUZZ	**Generate frequency on buzzer pin** Generate a pre-defined frequency on the module's BUZZER_EN pin using the modem's internal PWM (pulse wave modulation) generator. If BUZZER_EN is configured as a PWM output, use this command to generate a specific frequency, or use **!BZBUZZPLAY** to generate a predefined melody. **Usage** When BUZZER_EN is configured as PWM output: Execution **AT!BZBUZZ=<status>, <freq>** Response **OK** Purpose Play (or stop playing) the frequency on the PWM output

Command	Description

When BUZZER_EN is configured as GPO (general purpose output):

Execution	**AT!BZBUZZ=<status>**
Response	**OK**
Purpose	Set the BUZZER_EN pin to high or low
Query	**AT!BZBUZZ?**
Response	**!BZBUZZ: <status>[, <freq>]** **OK**
Purpose	Display current buzzer output state
Query List	**AT!BZBUZZ=?**
Purpose	Display valid values for <status> and <freq> parameters

Parameters

Parameter	Value	Description
<status>		BUZZER_EN pin output state
	0	Off (low voltage)
	1	On (high voltage)
<freq>		Predefined frequency in Hz This parameter can be omitted when <status>=0
	0	
	32	
	64	
	85	
	128	
	171	
	195	
	256	
	293	
	391	
	512	
	586	
	781	
	1172	
	1563	
	2344	
	3125	
	4688	

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!BZBUZZPLAY</td><td>
Generate melody on buzzer pin

Generate a pre-defined melody on the module's BUZZER_EN pin using the modem's internal PWM (pulse wave modulation) generator.
BUZZER_EN must be configured as a PWM output. To generate a frequency instead of a melody, use !BZBUZZ.

Usage
Execute AT!BZBUZZPLAY=<melody>
Response OK
Purpose Play the selected melody using the module's buzzer

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><melody></td><td>1 – 7</td><td>Predefined melody</td></tr>
</table>
</td></tr>
<tr><td>!DIO</td><td>
Read/write from/to Digital I/O (DIO) channel

Read from or write to a DIO channel that has been configured and enabled using !DIOCFG.
This command is not password-protected.

Usage
Execution AT!DIO=<channel>, <output value>]
Response OK
Purpose Output (write) a logic low or logic high to the specified DIO channel

Query AT!DIO?<channel>
Response !DIO: <channel>,<input value>
OK
Purpose Read the logic level at the specified DIO channel (the last value written to the DIO channel)

Query List AT!DIO=?
Purpose Display the 'write' command format and allowed parameter values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><channel></td><td>1 – [number of channels available]</td><td>Digital I/O channels
See !DIOCFG for channel details</td></tr>
<tr><td><input value></td><td></td><td>Logic level on specified channel</td></tr>
<tr><td></td><td>0</td><td>Logic low</td></tr>
<tr><td></td><td>1</td><td>Logic high</td></tr>
<tr><td><output value></td><td></td><td>Logic level output to specified channel</td></tr>
<tr><td></td><td>0</td><td>Output logic low</td></tr>
<tr><td></td><td>1</td><td>Output logic high</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DIOCFG</td><td>
Configure DIO channels

Configure specific GPIOs for DIO (digital I/O) operation.
If a DIO channel is disabled, the GPIO maintains its default functionality.
After a channel is configured and enabled, it can be used for input or output (as appropriate) using !DIO. See the table below for channel configuration details.
Input DIO channels – choice to register level change notifications associated with the corresponding DIO channels is specified as part of the configuration.
Output DIO channels – initial value to write to the DIO channel is specified as part of the configuration.

DIO and GPIO map table:
<table>
<tr><th>DIO CH</th><th>HOST INTERFACE CONNECTOR PIN</th><th>SL9090 and MC9090 GPIO</th></tr>
<tr><td>1</td><td>GPIO_0</td><td>87</td></tr>
<tr><td>2</td><td>GPIO_1</td><td>77</td></tr>
<tr><td>3</td><td>GPIO_2</td><td>76</td></tr>
<tr><td>4</td><td>GPIO_3</td><td>75</td></tr>
</table>
Cannot program as input or output if Tx burst indication has been enabled by +WTBI.
This command is not password-protected.

Usage
Execution (first use) AT!DIOCFG=<channel>, <enable>, <type>, <initval/notify>
Execution (second use) AT!DIOCFG=<channel>, <enable>
Response Xtra command sent successfully
OK
or
ERROR
Purpose Configure the specified <channel> (all parameters required), or enable/disable the already configured <channel> (only <channel> and <enable> are required).
Notes An ERROR is returned if the specified DIO channel is not configured

Query AT!DIOCFG?<channel>
Response !DIOCFG: <channel>,<enable>,<type>,<initval/notify>
or
ERROR (unconfigured channel or channel out of range)
Purpose Display the current configuration for the specified <channel>

Query List AT!DIOCFG=?
Purpose Display the execution command format and allowed parameter values
</td></tr>
</table>

Command	Description
	Parameters **Parameter** / **Value** / **Description** <channel> / 1 – [number of channels available] / DIO channel <enable> / / Enable/disable DIO channel flag / 0 / Disable / 1 / Enable <type> / / DIO channel input/output type / 0 / Output / 1 / Input with pull-up resistor / 2 / Input with pull-down resistor <initval/notify> / / Initial output value, or input change notification option Input / 0 / Disable input level change notifications / 1 / Enable input level change notifications Ouptut / 0 / Set output to logic low at power-up / / Set output to logic high at power-up
!LEDCTRL	**Set/query LED flash pattern** Set/query LED flash pattern stored in non-volatile memory. The modem must be reset for the new settings to become effective. **Usage** Execution: **AT!LEDCTRL=<index>,<period>,<ontime>, <invert>** Response: **OK** Query: **AT!LEDCTRL?** Response: **<index1>:<period>,<ontime>,<invert>** **<index2>:<period>,<ontime>,<invert>** **: : : :** **<indexn>:<period>,<ontime>,<invert>** **OK** **Parameters** **Parameter** / **Value** / **Description** <index> / 0 / OFF pattern / 1 / Out of service / 2 / In service / 3 / Call active / 4 / Offline / 5 / Data active <period> / / LED period in 100ms units 16-bit decimal ASCII <ontime> / / LED ON duration in 100ms units 16-bit decimal ASCII <invert> / 0 / LED on duration is as specified / 1 / LED ON duration is <period> - <ontime> (i.e. ON duration is swapped with OFF duration)

12. Service Mapping Commands

12.1. Command Summary

Command	Description
!MAPCSD	Map CSD service to port
!MAPUART	Map UART interface to a service
!MAPMTPDP	Configure MT PDP port mapping
!MXPORTMAP	Set/report MUX mode port mappings

12.2. Command Reference

Command	Description
!MAPCSD	**Map CSD service to port** Map the CSD (Circuit Switched Data) service to a specific port. The modem must be reset before the service is mapped to the specified port. **Usage** Execution: **AT!MAPCSD=<service>** Response: **OK** or **ERROR** (unsupported service) Purpose: Map CSD to the specified <service> Query: **AT!MAPCSD?** Response: **!MAPCSD: <service>** **OK** Purpose: Display the current CSD port mapping Query List: **AT!MAPCSD=?** Purpose: Display valid <service> values **Parameters** **Parameter** / **Value** / **Description** <service> / / Service port to use for CSD / 1 / At command / 2 – 4 / Reserved / 5 / PDP1 / 6 / PDP2 / 7 / PDP3

Command	Description
!MAPUART	**Map UART interface to a service** Map the UART interface to a service (in MUX or non-MUX mode). Any change to the service mapping takes effect after the modem is reset. Once the UART interface is mapped, an application can access the functions offered by the service over the UART interface. **Usage** Execution: **AT!MAPUART=<service>** Response: **OK** or **ERROR** (unsupported service) Purpose: Map a supported service to the UART interface Query: **AT!MAPUART?** Response: **!MAPUART: <service>** **OK** Purpose: Report which service is currently mapped to the UART interface Query List: **AT!MAPUART=?** Purpose: Return the command format and the supported <service> values **Parameters** **Parameter** / **Value** / **Description** <service> / / Supported services / 0 / No service mapped; UART disabled / 1 / AT command processor/data service (MUX/non-MUX) / 2 / Diagnostic Message (DM) service (MUX/non-MUX) / 3 / Reserved / 4 / NMEA (GPS) service (non-MUX) / 5 / PDP1 service (non-MUX) / 6 / PDP2 service (non-MUX) / 7 / PDP3 service (non-MUX) / Default value

Command	Description
!MAPMTPDP	**Configure MT PDP port mapping** Configure the SIO port mapping for the mobile terminated (MT) PDP context. MT PDP can be mapped over: • AT command port – the modem alerts the host by sending a RING. The number of rings is set using the !S0 command. The host must respond with ATA within 5 seconds, otherwise the modem will reject the MT PDP call. • NDIS – the modem alerts the NDIS driver of the MT PDP call. This command is not password-protected. **Usage** Execution: **AT!MAPMTPDP=<service>** Response: **OK** Purpose: Map the MT PDP context to the specified service. This takes effect after the modem is reset Query: **AT!MAPMTPDP?** Response: **!MAPMTPDP: <service>** **OK** Purpose: Reports the current service mapping Query List: **AT!MAPMTPDP=?** Purpose: Return the command format and the supported <service> values **Parameters** **Parameter / Value / Description** <service> / / Supported services / 0 / MT PDP disabled / 1 / AT command / 2 / Reserved / 3 / NDIS Default value / 4 / Reserved / 5 / PDP1 service (not supported) / 6 / PDP2 service (not supported) / 7 / PDP3 service (not supported)

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!MXPORTMAP</td><td>
Set/report MUX mode port mappings

Set the modem’s MUX-mode DLCI port mappings for AT and PDP2.

Usage
Execution AT!MUXMODE=<mode>
Response OK
Purpose Select the new port mapping

Query AT!MXPORTMAP?
Response <mode>
OK
Purpose Report the current port mapping

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mode></td><td></td><td>Port map used in UX mode</td></tr>
<tr><td></td><td>00</td><td>AT uses DLCI port 2
PDP2 uses DLCI port 6
Default value</td></tr>
<tr><td></td><td>01</td><td>Carrier-specific
AT uses DLCI port 6
PDP2 uses DLCI port 2</td></tr>
</table>
</td></tr>
</table>

13. Generic Setting Commands

13.1. Command Summary

Command	Description
!TIME	Set/return current time of day
!UTCTIME	Set/return UTC time of day
!CUSTOM	Set/return customization settings
!SLEEP	Set/report Sleep Enable state
!WWKUP	Enable/disable wake-up signals
+WGETWK	Return wake-up event type
!DTEMP	Return temperature reading

13.2. Command Reference

Command	Description
!TIME	**Set/return current time of day** Set or retrieve the current time of day – the time of day can be set using this command, or could be set by the network. If the time has not been set, the command returns **ERROR**. **Usage** Execution: **AT!TIME= <YYYY>,<MM>,<DD>,<hh>,<mm>,<ss> [, <TZ>, <DST>]** Response: **OK** Purpose: Set the current time using UTC format Query: **AT!TIME?** Response: **!TIME:** **<YYYY>/<MM>/<DD>** **<hh>:<mm>:<ss> (local)** **<YYYY>/<MM>/<DD>** **<hh>:<mm>:<ss> (UTC)** **OK** Purpose: Display current local and UTC time Query List: **AT!TIME=?** Purpose: Display execution command format **Parameters** **Parameter** / **Value** / **Description** <YYYY> / / 4-digit year <MM> / 01 – 12 / Month

Command	Description
	<DD> 01 – 31 Day <hh> 00 – 23 Hour <mm> 00 – 59 Minute <ss> 00 – 59 Second <TZ> -48 to 48 Timezone offset from UTC in 15-minute increments. This parameter must be used if <DST> is used <DST> 0 – 2 Daylight savings time offset in 1-hour increments. This parameter must be used if <TZ> is used
!UTCTIME	**Set/return UTC time of day** **Usage** Execution: **AT!UTCTIME=<yyyy>, <mm>, <dd>, <hh>, <mm>, <ss>[, <tz>, <dst>]** Response: **OK** Purpose: Manually set the UTC time of day Query: **AT!UTCTIME?** Response: **!UTCTIME:** **<yyyy>/<mm>/<dd>** **<hh>:<mm>:<ss>** **TZ:<tz>** **DST:<dst>** **OK** Purpose: Display the current UTC time of day (previously set manually or by the network) Query List: **AT+UTCTIME=?** Purpose: Display valid parameter values **Parameters** **Parameter / Value / Description** <YYYY> — 4-digit year <MM> 01 – 12 Month <DD> 01 – 31 Day <hh> 00 – 23 Hour <mm> 00 – 59 Minute <ss> 00 – 59 Second <TZ> -48 to 48 Timezone offset from UTC in 15-minute increments. This parameter must be used if <DST> is used <DST> 0 – 2 Daylight savings time offset in 1-hour increments. This parameter must be used if <TZ> is used

Command	Description
!CUSTOM	**Set/return customization settings** **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**

Parameter	Value	Description
<value>		Value being assigned to a specific <customization> setting
<customization>		String identifying customization setting. Default value = 0 String must be enclosed in quotation marks
“AUTONETWORKMODE”		Indicate if UE should revert to Automatic Network mode after 60 seconds of Manual Network mode
	0	Remain in manual
	1	Revert to automatic
	2	Remain in manual if UE is attached to the network, otherwise switch to automatic
“CFUNPERSISTEN”		Enable/disable persistence (across power cycles) of AT+CFUN setting
	0	Disable (+CFUN setting does not persist across power cycle)
	1	Enable (+CFUN setting persists across power cycle)
“CPASCWRINGIND”		Set incoming (RINGING) vs. in-progress call priority for +CPAS command.
	0	Incoming call does not take priority over a call already in progress Default value
	1	Incoming call takes priority over a call already in progress
“CSDOFF”		Enable/disable ability of UE to initiate CS calls
	0	Enable
	1	Disable

Command	Description		
	“CSVOICEREJECT”		Enable/disable ability to ignore incoming voice call pages on 3G channels
		0	Process pages as per 3GPP TS 24.008 specification Default value
		1	Ignore paging (type 1 and 2) messages
		2	Reject call setup (voice and circuit-switched VT), returning cause code 88 (Incompatible destination
	“DISFDNPDPCHK”		Enable/disable FDN check for PS data calls
		0	Allow FDN checking
		1	Disable FDN when checking PDP activation number
		2	Disable FDN when checking SMSC address
		3	Disable FDN when checking PDP activation number and when checking SMSC address
	“DISSTACK”		Enable/disable Adaptive Multi-Rate (AMR) codec
		00000000	Enable AMR, including AMR-WB Default value
		00001000	Disable AMR, including AMR-WB
		00010000	Disable AMR-WB only
	“GPSENABLE”		Enable the MO and/or MT GPS feature (and present the NMEA port to the host)
		0	Disable
		1	MT and MO enabled
		2	MO enabled only
		3	MT enabled only
		4	NMEA port enaled; MT and MO enabled (unless GPS_DISABLE pin is asserted)
	“GPSLPM”		Enable/disable GPS in Low Power Mode
		0	Enable Default value
		1	Disable
	“GPSREFLOC”		Enable/disable reference GPS location reporting
		0	Enable Default value
		1	Disable

Command	Description		
	“GPSSEL”		Select GPS antenna (useful only for devices with both a GPS and a shared GPS/Rx diversity antenna)
		0	Use dedicated GPS antenna Default value
		1	Use shared GPS/Rx diversity antenna
		2	Use dedicated GPS antenna, with bias voltage disabled
	“GPSSUPLSETID”		NOT USED
	“HPPLMNSCDIS”		Set HPLMN scan constraints
		0	Include foreign MCC
		1	Reject foreign MCC
	“HSDPATEST”		Enable/disable HSDPA test channel interface
		0	Disabled
		1	Enabled
	“HSICON”		Control HSPA icon behavior
		0	Maintain HSPA icon if the bearer is revoked but remains on the same cell
		1	Revert to the UMTS icon if the bearer is revoked
	“HWCFGLOCK”		Prevent UART reconfiguration
		0	Disable (UART cannot be reconfigured)
		1	Enable (UART can be reconfigured)
	“ISVOICEN”		Enable/disable voice functionality Note that voice functionalities are available on the AT interface when <value> = 0 or 1
		0	Disable voice-related CnS objects
		1	Enable voice-related CnS objects
		2	Disable voice on both CnS and AT interfaces
	“MEPCODE”		Enable/disable prompt for MEP code when incorrect SIM is inserted
		0	Disable
		1	Enable
	“MEPLOCK”		Set MEP locking status 0, 2, 4, 6, 8, 10, 12, 14, where <value> is represented by Bits 0 – 7: Bit 0 Reserved, always 0 Bit 1 Network personalization: 0 = Not permanent 1 = Permanent

Command	Description		
			Bit 2 Network subset personalization: 0 = Not permanent 1 = Permanent Bit 3 Service provider personalization: 0 = Not permanent 1 = Permanent Bits 4 – 7 Reserved, always 0 Example: If <value> = 0, locking can be removed by the host using **+CPIN** or **+CLCK** with the correct unlock code. If <value> = 2 (permanent network personalization), locking cannot be removed.
	"MUXMODE"		NOT USED
	"NOGPRS"		Enable/disable indicator display (GPRS, EDGE, WCDMA, etc.)
		0	Enable
		1	Disable
	"NOROAM"		Enable/disable roaming indicator display
		0	Enable
		1	Disable
	"PCSCDISABLE"	0 – 7	Determine functionality of PCSC, GSM Algorithm and authenticate commands, and **+CIMI** command Default value = 0 (all functions disabled) Bit 0 PCSC (0=Enable, 1=Disable) Bit 1 GSM Algorithm and Authenticate commands (0=Enable, 1=Disable) Bit 2 AT+CIMI outputs IMSI (0=Enable, 1=Disable)
	"PPPPROFAUTH"		Indicate source of authorization information (username, password) for PPP session
		0	Use profile 1, and obtain username/password from host Default value
		1	Obtain username/password from default profile
		2	Obtain username/password from profile 1
	"PRLREGION"		Region-specific scanning algorithm
		0	Default (internal)
		1	Europe/rest of the world
		2	North America
		3	Australia
		4	Japan
		5 or greater	Reserved

Command	Description		
	“PUKPRMPT”		Indicate if host will prompt for PUK code if maximum number of PIN unlock retries is exceeded
		0	Don’t prompt
		1	Prompt
	“RADIORESET”		Indicate if modem should reset when coming out of Low Power Mode (that is, if **+CFUN=1**)
		0	No reset Default value
		1	No reset
		2	Reset
	“SCANPROF”		Enable/disable profile scan (try all profiles configured on card until successful connection is found; the activated context becomes the new default)
		0	Disable
		1	Enable
	“SIMLPM”		Indicate default SIM power state during Low Power Mode
		0	Default (device-dependent)
		1	Do not power down SIM in LPM
		2	Power down SIM in LPM
	“SKUID”		No longer used Use **!PRIID** instead of this customization
	“STARTLPM”		Enable/disable LPM (Low Power Mode) as the startup mode for the user equipment
		0	Disabled
		1	Enabled (start UE in LPM)
	“STKUIEN”		Enable/disable SIM toolkit UI
		0, 1	Enable for QMI interface
		2	Enable for AT interface
	“TRUFLOWDISABLE”		Enable/disable TRU-Flow
		0	TRU-Flow is enabled Default value
		1	TRU-Flow is disabled
	“USBDMDISABLE”		Enable/disable the USB DM port
		0	Enable Default value
		1	Disable
	“USBSERIALENABLE”		Use IMEI as USB serial number
		0	Do not use IMEI as USB serial number Default value
		1	Use IMEI as USB serial number

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
“WAKEHOSTEN” — Enable/disable host wake-up via SMS or incoming data packet
0 — Disable (Host will not wake when SMS or incoming data packet is received)
1 — Wake host when simple SMS is received
2 — Wake host when incoming data packet is received
“WAPPUSHDATA” — Enable/disable processing of WAP Push data
0 — Disable
1 — Enable
</td></tr>
<tr><td>!SLEEP</td><td>
Set/report Sleep Enable state

The modem supports a low-power sleep state that occurs when the feature is enabled and specific operating conditions are met (for example, there is no data traffic over USB, no OTA traffic, etc.).
Use this command to indicate the current state of the Sleep Enable feature, and to set the state of the feature.

Usage
Execution: AT!SLEEP=<state>
Response: OK
Purpose: Set the current state

Query: AT!SLEEP?
Response: <state>
OK
Purpose: Report the current <state>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td></td><td>Sleep state</td></tr>
<tr><td></td><td>0</td><td>Disabled – the modem cannot enter sleep state under any condition
Default value</td></tr>
<tr><td></td><td>1</td><td>Enabled – the modem can enter sleep state when all conditions are met</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>+WWKUP</td><td>
Enable/disable wake-up signals

Enable (or disable) the output of wake-up signals from the modem to the host device in response to specific wake-up event types. These settings are persistent (remain unchanged over a modem power cycle).
WAKE_N pin is used as RI to output the wake-up signal to the host. Functionality is available even when the UART interface is disabled.
UART must be enabled using !MAPUART=1 for the RI signal to be output.
Signal timing:
• Ring received event – assert RI for 5.9 seconds, then deassert for 0.1 seconds. Repeat for number of ring cycles (network dependent).
• Radio coverage restored/SMS received events – assert RI for 5.9 seconds, then deassert.

Any wake-up events that occur while RI is being asserted (a wake-up signal is already being output) are ignored until RI is deasserted.
To identify the event that generated the wake-up signal, see +WGETWK.

Usage
Execution AT+WWKUP=<bitmask>
Response OK
or
ERROR
Purpose Enable or disable reporting of wake-up events

Query AT+WWKUP?
Response +WWKUP: <bitmask>
Purpose Display the current state of wake-up event reporting

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><bitmask></td><td>00 – 07</td><td>Wake-up event reporting states
Bit values (1=Enable, 0=Disable)
Bit 0 Ring received (Default = 1). The RING indication on the AT command port is not affected by this setting – it is still issued even if RI is deasserted.
Bit 1 Radio coverage restored (Default = 0)
Bit 2 SMS received (Default = 1)
Bit 3 – 7 Reserved (All must be 0)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>+WGETWK</td><td>
Return wake-up event type

When a wake-up signal is received from the modem, use this command to identify the event type that caused it to be sent. (If any other wake-up events occurred while the wake-up signal was being sent, they are ignored.)
When this command is executed, the last wake-up event is identified and then cleared from memory.

Usage
Execution AT+WGETWK
Response +WGETWK: <event>
Purpose Report the wake-up event type that caused the modem to send a wake-up signal to the host device

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><event></td><td></td><td>Wake up event type</td></tr>
<tr><td></td><td>0</td><td>No event occurred</td></tr>
<tr><td></td><td>1</td><td>Ring received</td></tr>
<tr><td></td><td>2</td><td>Radio coverage restored</td></tr>
<tr><td></td><td>3</td><td>SMS received</td></tr>
</table>
</td></tr>
<tr><td>!DTEMP</td><td>
Return temperature reading

Return temperature reading (in degrees Celsius) from within the system.
This command is not password-protected.

Usage
Execution AT!DTEMP?<thermistornum>
Response <tempDegC>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><thermistornum></td><td>0</td><td>RTR temperature</td></tr>
<tr><td></td><td>1</td><td>PA temperature</td></tr>
<tr><td></td><td>2</td><td>PMIC temperature</td></tr>
<tr><td><tempDegC></td><td></td><td>Temperature in degrees celsius</td></tr>
</table>
</td></tr>
</table>

14. Non-Singaling Test Commands

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

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

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

AT!DASBAND must be executed to select a WCDMA band to run these commands that test the WCDMA transceiver:

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

AT!DASBAND must be executed to select a GSM band to run these commands that test the GSM transceiver:

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

14.1. Command Summary

Command	Description
!ALLUP	Turn transmitter on/off and simulate 'All UPs'
!DAFTMACT	Put modem into Factory Test Mode
!DAFTMDEACT	Put modem into online mode from Factory Test Mode
!DAGGAVGRSSI	Return averaged RSSI value in dBm (GSM only)
!DAGGRSSI	Return the RSSI value in dBm (GSM only)
!DAGGRSSIRAW	Return raw RSSI value

Command	Description
!DAGINFO	Return GSM mode RF information (GSM only)
!DAGSLOCK	Return synthesizer lock state
!DAGSRXBURST	Set GSM receiver to burst mode
!DAGSRXCONT	Set GSM receiver continuously on
!DAGSTXBURST	Set GSM transmitter to burst mode
!DAGSTXFRAME	Set GSM Tx frame structure
!DAOFFLINE	Place modem offline
!DASBAND	Set frequency band
!DASCHAN	Set modem channel (frequency)
!DASLNAGAIN	Set LNA gain state
!DASPDM	Set PDM value
!DASTXOFF	Turn Tx PA off
!DASTXON	Turn Tx PA on
!DAWGAVGAGC	Return averaged Rx AGC value (WCDMA only)
!DAWGRXAGC	Return Rx AGC value (WCDMA only)
!DAWINFO	Return WCDMA mode RF information (WCDMA only)
!DAWSCONFIGRX	Set WCDMA receiver to factory calibration settings
!DAWSCONFIGRXDIV	Set WCDMA diversity path receiver to factory calibration settings
!DAWSPARANGE	Set PA range state machine
!DAWSSCHAIN	Enable secondary receive chain (WCDMA only)
!DAWSCHAINTCM	Place receive chain in test call mode (WCDMA only)
!DAWSTXCW	Set waveform used by the transmitter
!DAWSTXPWR	Set desired Tx power level (WCDMA mode only)

14.2. Command Reference

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!ALLUP</td><td>
Turn transmitter on/off and simulate “All UP”s

This command turns the transmitter on/off and simulates an ‘All UPs’ Tx condition. The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.

Usage
Execution AT!ALLUP=<value>
Response OK
Purpose Turn transmitter on/off and simulate All UPs Tx condition

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><value></td><td></td><td>State of ALL UPs simulation</td></tr>
<tr><td></td><td>0</td><td>All UPs off</td></tr>
<tr><td></td><td>1</td><td>ALL UPs on</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DAFTMACT</td><td>
Put modem into Factory Test Mode

Place the modem in FTM (Factory Test Mode). FTM is a non-signaling mode that allows the radio component to be manually configured to conduct certain types of tests. AT commands that start with "!DA" are only available when the modem is in FTM mode.
When this command executes successfully, the modem responds with the value 290300. Any other response indicates an error.

Usage
Execution AT!DAFTMACT
Response 290300
OK
Purpose Place modem in FTM mode
</td></tr>
<tr><td>!DAFTMDEACT</td><td>
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 !DAFTMACT command puts the modem into FTM.
When this command executes successfully, the modem responds with the value 290400. Any other response indicates an error.

Usage
Execution AT!DAFTMDEACT
Response 290400
OK
Purpose Place modem in online mode (from FTM mode)
</td></tr>
<tr><td>!DAGGAVGRSSI</td><td>
Return averaged RSSI value in dBm (GSM only)

Return an averaged RSSI (Received Signal Strength Indicator) value in dBm.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND must be issued before this command can be used.

Usage
Execution AT!DAGGAVGRSSI=<channel>, <LNA Index>
Response OK
Purpose Return the averaged RSSI for the specified channel and LNA offset index

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><channel></td><td></td><td>Channel number for the band specified using !DASBAND</td></tr>
<tr><td><LNA Index></td><td></td><td>LNA offset index</td></tr>
<tr><td></td><td>0</td><td>R0 (highest gain)</td></tr>
<tr><td></td><td>1</td><td>R1</td></tr>
<tr><td></td><td>2</td><td>R2</td></tr>
<tr><td></td><td>3</td><td>R3 (lowest gain)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DAGGRSSI</td><td>
Return the RSSI value in dBm (GSM only)

Return the RSSI (Received Signal Strength Indicator) value in dBm using the calibration offsets (valid in GSM burst mode only – the !DAGSRXBURST command puts the modem into burst mode).
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAGGRSSI
Response Channel:<chan> LNA:<lna> RXPWR:<pwr> dBm
OK
Purpose Return the averaged RSSI for the specified channel and LNA offset index

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><chan></td><td></td><td>Channel number for the band specified using !DASBAND</td></tr>
<tr><td><lna></td><td>0 – 3</td><td>Current LNA state</td></tr>
<tr><td><pwr></td><td></td><td>Signed RSSI value converted to dB, based on Rx power</td></tr>
</table>
</td></tr>
<tr><td>!DAGGRSSIRAW</td><td>
Return raw RSSI value

Return a 32-bit raw RSSI value (valid in GSM mode only). The value is an average over multiple bursts.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAGGRSSIRAW
Response <rssi>
OK
Purpose Return the raw RSSI value

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><rssi></td><td></td><td>32-bit RSSI value
Averaged over multiple bursts</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DAGINFO</td><td>
Return RF information for GSM mode

The modem must be in online mode to use this command.
!DAWINFO provides RF information for WCDMA mode.

Usage
Execution AT!DAGINFO
Response Channel: <channel> RSSI:<rssi> LNA:<lna> RXPWR:<rxPwr> dBm SNR:<snr> DC Offset_I:<iOffset> DC Offset Q:<qOffset> Freq. Offset:<freqOffset> Timing Offset:<timingOffset>
OK
Purpose Return RF information

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><channel></td><td>0 – 65535</td><td>GSM channel</td></tr>
<tr><td><rssi></td><td>0x00000000 – 0xFFFFFFFF</td><td>Receive power</td></tr>
<tr><td><lna></td><td>0 – 65535</td><td>LNA gain state</td></tr>
<tr><td><rxPwr></td><td>0 – 65535</td><td>Rx power in dBm (0.25 units)</td></tr>
<tr><td><snr></td><td>0 – 65535</td><td>Signal to noise ratio</td></tr>
<tr><td><iOffset></td><td>0 – 65535</td><td>I offset</td></tr>
<tr><td><qOffset></td><td>0 – 65535</td><td>Q offset</td></tr>
<tr><td><freqOffset></td><td>0 – 65535</td><td>Frequency offset</td></tr>
<tr><td><timingOffset></td><td>0 – 65535</td><td>Timing offset</td></tr>
</table>
</td></tr>
<tr><td>!DAGSLOCK</td><td>
Return synthesizer lock state

Return a value indicating the lock state of the RF synthesizers.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAGSLOCK
Response <sLockState>
OK
Purpose Return the synthesizer lock state

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><sLockState></td><td></td><td>Synthesizer lock state</td></tr>
<tr><td></td><td>0</td><td>One or more synthesizers are out of lock</td></tr>
<tr><td></td><td>1</td><td>All synthesizers locked</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DAGSRXBURST</td><td>
Set GSM receiver to burst mode

Set the receiver to start or stop sending bursts. The receiver must be in burst mode to read the RSSI. (Command !DAGGRSSI returns the RSSI value.)
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAGSRXBURST=<function>
Response <function>
OK
Purpose Set the receiver to burst mode

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><function></td><td>0</td><td>Get RSSI (burst mode)</td></tr>
<tr><td></td><td>2</td><td>Stop continuous Rx</td></tr>
</table>
</td></tr>
<tr><td>!DAGSRXCONT</td><td>
Set GSM receiver continuously on

Set the GSM receiver so that it is continuously on and not bursting.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAGSRXCONT=<function>
Response <function>
OK
Purpose Set the receiver to continuously on

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><function></td><td>3</td><td>Receiver is continuously on</td></tr>
<tr><td></td><td>4</td><td>Receiver is off</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DAGSTXBURST</td><td>
Set GSM transmitter to burst mode

Set the transmitter to start or stop sending bursts.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAGSTXBURST=<source>, <TSCindex>, <burstdur>
Response <source> <TSCindex> <burstdur >
OK
Purpose Set the receiver to start/stop sending bursts

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><source></td><td>0</td><td>Random data</td></tr>
<tr><td></td><td>1</td><td>Tone</td></tr>
<tr><td></td><td>2</td><td>Buffer data</td></tr>
<tr><td><TSCinde></td><td>0 – 9</td><td>Training sequence index</td></tr>
<tr><td><burstdur></td><td></td><td>Burst duration</td></tr>
<tr><td></td><td>1</td><td>Continuous</td></tr>
</table>
</td></tr>
<tr><td>!DAGSTXFRAME</td><td>
Set GSM Tx frame structure

This command configures the Tx slots for GSM operation. It must be issued eight times to set all eight slots.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAGSTXFRAME=<slotnum>, <onoff>, <pwr>, <mcs>
Response <slotnum> <onoff> <pwr> <mcs>
OK
Purpose Set the Tx frame structure

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><slotnum></td><td>0 – 7</td><td>Slot number</td></tr>
<tr><td><onoff></td><td></td><td>Enable or disable the specified slot</td></tr>
<tr><td></td><td>0</td><td>Off/disable</td></tr>
<tr><td></td><td>1</td><td>On/enable</td></tr>
<tr><td><pwr></td><td></td><td>Slot power level measured in dB*100
Maximum values:
• GMSK Mode
▪ 850/900 bands: 3200 (32 dBm)
▪ 1800/1900 bands: 2900 (29 dBm)
• 8PSK (EDGE) Mode
▪ 850/900 bands: 2700 (27 dBm)
▪ 1800/1900 bands: 2600 (26 dBm)</td></tr>
<tr><td><mcs></td><td>0 – 8</td><td>Modulation code scheme – MCS1 to MCS9</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DAOFFLINE</td><td>
Place modem offline

Usage
Execution AT!DAOFFLINE
Response OK
Purpose Put the modem offline
</td></tr>
<tr><td>!DASBAND</td><td>
Set frequency band

Set the modem to use a particular frequency band. You must use this command to select an appropriate band before running WCDMA, or GSM commands.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.

Usage
Execution AT!DASBAND=<rfband>
Response <rfband>
OK
Purpose Set frequency band

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><rfband></td><td></td><td>Unique value that maps to an RF band and technology. Note that it is not an actual 3GPP band number. For example, “18” is GSM 850, which corresponds to 3GPP band 5 (on a GSM network).
Band support is product specific – see the device’s Product Technical Specification document for details.
Refer to Table 34 Network Technology and Band Enumeration for the full list of available bands.</td></tr>
</table>
</td></tr>
<tr><td>!DASCHAN</td><td>
Set modem channel (frequency)

Set the modem to operate on a particular frequency channel. Before using this command, use the!DASBAND to set the band.
Once a channel is set, the modem continues to use that channel until the modem is reset or powered off and on.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND must be issued before this command can be used.

Usage
Execution AT!DASCHAN=<rfchannel>
Response <rfchannel>
OK
Purpose Set modem channel (frequency)

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><rfchannel></td><td></td><td>Uplink channel number (ARFCN)</td></tr>
<tr><td></td><td>128–251</td><td>GSM 850 MHz</td></tr>
<tr><td></td><td>1–24</td><td>GSM 900 MHz</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td>975–1023</td><td>GSM 900 MHz</td></tr>
<tr><td></td><td>512–885</td><td>GSM 1800 MHz</td></tr>
<tr><td></td><td>512–810</td><td>GSM 1900 MHz</td></tr>
<tr><td></td><td>9612–9888</td><td>WCDMA 2100</td></tr>
<tr><td></td><td>9262–9538</td><td>WCDMA 1900</td></tr>
<tr><td></td><td>4132–4233</td><td>WCDMA 850</td></tr>
<tr><td></td><td>2712–2863</td><td>WCDMA 900</td></tr>
<tr><td></td><td>18000–18599</td><td>LTE B1</td></tr>
<tr><td></td><td>19200–19949</td><td>LTE B3</td></tr>
<tr><td></td><td>19950–20399</td><td>LTE B4</td></tr>
<tr><td></td><td>20750–21449</td><td>LTE B7</td></tr>
<tr><td></td><td>21450–21799</td><td>LTE B8</td></tr>
<tr><td></td><td>23180–23279</td><td>LTE B13</td></tr>
<tr><td></td><td>23730–23849</td><td>LTE B17</td></tr>
<tr><td></td><td>24150–24449</td><td>LTE B20</td></tr>
</table>
</td></tr>
<tr><td>!DASLNAGAIN</td><td>
Set LNA gain state

Set the LNA (Low Noise Amplifier) range for the main or diversity path (if applicable), in either WCDMA or GSM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!LNAGAIN=<gain index>[, <path>]
Response <gain index>
OK
Purpose Set the LNA gain state for either the main or diversity paths

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><gain index></td><td>0</td><td>R0 (highest index)
Approximate switch from low to high gain: WCDMA (< -72 dBm); GSM (< -73 dBm)</td></tr>
<tr><td></td><td>1</td><td>R1
Approximate switch from low to high gain: WCDMA (< -72 up to -46 dBm); GSM (< -73 up to -58 dBm)</td></tr>
<tr><td></td><td>2</td><td>R2
Approximate switch from low to high gain: WCDMA (< -46 up to -36 dBm); GSM (< -58 up to -41 dBm)</td></tr>
<tr><td></td><td>3</td><td>R3 (lowest gain)
Approximate switch from low to high gain: WCDMA (> -36 dBm); GSM (< -41 dBm)</td></tr>
<tr><td colspan="3">The LNA gain state is set based on the expected receive power level. The gain state values listed above are provided as a guideline. The values are approximations and subject to change over time. The values are different than those from high to low gain.</td></tr>
<tr><td><path></td><td></td><td>Antenna path</td></tr>
<tr><td></td><td>0</td><td>Main path</td></tr>
<tr><td></td><td>1</td><td>Secondary (diversity) path</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DASPDM</td><td>
Set PDM value

Adjust the PDM (Pulse Duration Modulation), allowing you to apply frequency offset to the LO (Local Oscillator) or Tx AGC.
When Tx AGC (<PDM ID> = 2) is adjusted, the modem does not use a calibrated result but uses the raw AGC value. The resulting change in Tx power will vary from modem to modem, so it is usually necessary to tune this value by executing the command repeatedly with different settings for the <PDMvalue> until the desired Tx power is obtained.
When adjusting the tracking LO, the command must also be executed repeatedly with different settings for the <PDMvalue> until the desired frequency offset is obtained.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Query AT!DASPDM=<PDM ID>, <PDMvalue>
Response <PDM ID> <PDMvalue>
OK
Purpose Set the tracking LO and Tx AGC PDM

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><PDM ID></td><td></td><td>LO (Local Oscillator) or Tx AGC (Automatic Gain Control) to adjust</td></tr>
<tr><td></td><td>0</td><td>Tracking LO adjust (GSM only)</td></tr>
<tr><td></td><td>2</td><td>Tx AGC adjust (WCDMA only)</td></tr>
<tr><td></td><td>4</td><td>Tracking LO adjust (WCDMA only)</td></tr>
<tr><td><PDMvalue></td><td></td><td>Frequency offset value
If <PDMID> = 0 or 2, range = 0 – 511. Else, range = 0 – 65536</td></tr>
</table>
</td></tr>
<tr><td>!DASTXOFF</td><td>
Turn Tx PA off

Turn the transceiver PA off, after it has been turned on with !DASTXON.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DASTXOFF
Response OK
Purpose Turn the Tx PA off
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DASTXON</td><td>
Turn Tx PA on

Turn on the transceiver PA (either the WCDMA PA or the GSM PA, depending on the mode set with !DASBAND). The PA then remains on until you turn it off using the !DASTXOFF command, or until you reset or power the modem down and up.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DASTXON
Response OK
Purpose Turn the Tx PA on
</td></tr>
<tr><td>!DAWGAVGAGC</td><td>
Return averaged Rx AGC value (WCDMA only)

Return the averaged AGC (Automatic Gain Control) reading for a specific band for either the main path or diversity path (if applicable).
!DASBAND must be issued before this command can be used.

Usage
Execution AT!DAWGAVGAGC=<channel>, <LNA Index>[, <path>]
Response <agc>
OK
Purpose Return the averaged AGC for <channel> on the main path or diversity path

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><channel></td><td></td><td>Uplink channel number (UARFCN) for the band specified using !DASBAND</td></tr>
<tr><td><LNA Index></td><td></td><td>LNA offset index</td></tr>
<tr><td></td><td>0</td><td>R0 (highest gain)</td></tr>
<tr><td></td><td>1</td><td>R1</td></tr>
<tr><td></td><td>2</td><td>R2</td></tr>
<tr><td></td><td>3</td><td>R3 (lowest gain)</td></tr>
<tr><td><path></td><td></td><td>Antenna path</td></tr>
<tr><td></td><td>0</td><td>Main path</td></tr>
<tr><td></td><td>1</td><td>Diversity path</td></tr>
<tr><td><agc></td><td></td><td>Averaged Rx AGC in dBm</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DAWGRXAGC</td><td>
Return Rx AGC value (WCDMA only)

Return the Rx AGC (Automatic Gain Control) value of the main path or diversity path (if applicable).
This value can be converted to RSSI (Received Signal Strength Indicator) in dBm:
if (<AGC_value> < 511), <RX_dBm> = -106 + ((<AGC_value> + 512) / 12)
else <RX_dBm> = -106 + (((<AGC_value>-1024) + 512) / 12)
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAWGRXAGC?[<path>]
Response <AGC value>
OK
Purpose Return the <AGC value> for either the main or diversity paths. If no <path> is specified, the main path is assumed

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><path></td><td></td><td>Antenna path</td></tr>
<tr><td></td><td>0</td><td>Main path</td></tr>
<tr><td></td><td>1</td><td>Diversity path</td></tr>
<tr><td><AGC valye></td><td>-512 to +511</td><td>Rx AGC value for the specified path</td></tr>
</table>
</td></tr>
<tr><td>!DAWINFO</td><td>
Return WCDMA mode RF information (WCDMA only)

Return RF information for WCDMA mode when the modem is in CELL_DCH (Designated Channel) state.
!DAGINFO provides RF information for GSM mode.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.

Usage
Execution AT!DAWINFO
Response RXAGC:<rxAGC> TXAGC:<txAGC> TXADJ:<txAdj> TXLIM:<txLim> LNA:<lnaRange> PA ON:<paOn> TX ON:<txOn> PA Range:<paRange> RxD RXAGC:<RXDrxAGC> RxD LNA:<RXDlnaRange> HDET:<hdet>
OK
Purpose Return the RF information

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><rxAGC></td><td>0 – 65535</td><td>Rx AGC value</td></tr>
<tr><td><txAGC></td><td>0 – 65535</td><td>Tx AGC value</td></tr>
<tr><td><txAdj></td><td>0 – 65535</td><td>Tx AGC value after linearization (adjustment)</td></tr>
<tr><td><txLim></td><td>0 – 65535</td><td>Tx AGC limit</td></tr>
<tr><td><lnaRange></td><td>0 – 65535</td><td>State of the LNA</td></tr>
<tr><td><paOn></td><td>0 – 65535</td><td>State of PA_ON0</td></tr>
<tr><td><txOn></td><td>0 – 65535</td><td>State of TX_ON</td></tr>
<tr><td><paRange></td><td>0 – 65535</td><td>State of PA_R1: PA_R0</td></tr>
<tr><td><RXDrxAGC></td><td>0 – 65535</td><td>RxD Rx AGC value</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><RXDlnaRange></td><td>0 – 65535</td><td>Stea of the RxD LNA</td></tr>
<tr><td><hdet></td><td>0 – 255</td><td>Raw HDET (High Power Detector) data
HDET information appears devices using firmware revisions M3.0 Release 1 or higher</td></tr>
</table>
</td></tr>
<tr><td>!DAWSCONFIGRX</td><td>
Set WCDMA receiver to factory calibration settings

Configure the WCDMA receiver according to factory calibration settings stored in the modem's NV (non-volatile memory). This allows for accurate measurement of Rx AGC levels.
The command performs these steps:

Sets the channel.
Selects and sets LNA range (or LNA gain).
Sets the VGA gain offset based on the channel.
Sets the LNA range offset.

The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
<table>
<tr><td>Execution</td><td>AT!DAWSCONFIGRX=<channel>,<Rx_Level_dBm></td></tr>
<tr><td>Response</td><td><LNA Index>, <LNA Value>
OK</td></tr>
<tr><td>Purpose</td><td>Configure the receiver</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><channel></td><td></td><td>Uplonk channel number (ARFCN)</td></tr>
<tr><td><Rx_Level_dBm></td><td>-113 to 20</td><td>Approximate signal level in dBm being applied to the modem receiver</td></tr>
<tr><td><LNA Index></td><td></td><td>LNA offset index</td></tr>
<tr><td></td><td>0</td><td>R0 (highest gan)</td></tr>
<tr><td></td><td>1</td><td>R1</td></tr>
<tr><td></td><td>2</td><td>R2</td></tr>
<tr><td></td><td>3</td><td>R3 (lowest gain)</td></tr>
<tr><td><LNA Value></td><td></td><td>For internal Sierra Wireless use only</td></tr>
</table>
</td></tr>
<tr><td>!DAWSCONFIGRXDIV</td><td>
Set WCDMA diversity path receiver to factory calibration settings

This command is the same as !DAWSCONFIGRX, the difference between them is that this command is used to set the LNA offset of the diversity path while !DAWSCONFIGRX is used to set the main path.
The command performs these steps:

Sets the channel.
Selects and sets LNA range (or LNA gain).
Sets the VGA gain offset based on the channel.
Sets the LNA range offset.

The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND, !DASCHAN and !DAWSSCHAIN=1 must be issued before this command can be used.
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Usage
Execution AT! DAWSCONFIGRXDIV=<channel>,<Rx_Level_dBm>
Response <LNA Index>, <LNA Value>
OK
Purpose Configure the receiver

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><channel></td><td></td><td>Uplink channel number (ARFCN)</td></tr>
<tr><td><Rx_Level_dBm></td><td>-113 to 20</td><td>Approximate signal level in dBm being applied to the modem</td></tr>
<tr><td><LNA Index></td><td></td><td>LNA offset index</td></tr>
<tr><td></td><td>0</td><td>R0 (highest gain)</td></tr>
<tr><td></td><td>1</td><td>R1</td></tr>
<tr><td></td><td>2</td><td>R2</td></tr>
<tr><td></td><td>3</td><td>R3 (lowest gain)</td></tr>
<tr><td><LNA Value></td><td></td><td>For internal Sierra Wireless use only</td></tr>
</table>
</td></tr>
<tr><td>!DAWSPARANGE</td><td>
Set PA range state machine

Set the PA range state machine in WCDMA operation.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAWSPARANGE=<PA range>
Response <PA range>
OK
Purpose Set the PA range state machine

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><PA range></td><td></td><td></td></tr>
<tr><td></td><td>0</td><td>Low gain state of the PA – limited to about 16 dBm output power (R0=0, R1=0)</td></tr>
<tr><td></td><td>3</td><td>High gain state of the PA – up to the maximum output power of the modem (R0=1, R1=1)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DAWSSCHAIN</td><td>
Enable secondary receive chain (WCDMA only)

Enable or disable the secondary receive chain.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAWSSCHAIN=<state>
Response OK
Purpose Enable or disable the secondary receive chain

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td></td><td>Requested state for secondary receive chain</td></tr>
<tr><td></td><td>0</td><td>Off (disable)</td></tr>
<tr><td></td><td>1</td><td>On (enable)</td></tr>
</table>
</td></tr>
<tr><td>!DAWSCHAINTCM</td><td>
Place receive chain in test call mode (WCDMA only)

Place one or both of the primary and secondary receive chains in test call mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAWSCHAINTCM=<chain>
Response OK
Purpose Place requested receive chain(s) in test call mode

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><chain></td><td></td><td>Receive chain to place in test call mode</td></tr>
<tr><td></td><td>0</td><td>Main</td></tr>
<tr><td></td><td>1</td><td>Secondary</td></tr>
<tr><td></td><td>2</td><td>Both</td></tr>
</table>
</td></tr>
<tr><td>!DAWSTXCW</td><td>
Set waveform used by the transmitter

Set the waveform used by the transmitter – the modem can transmit either in carrier wave or WCDMA modulated.
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAWSTXCW=<waveform>
Response OK
Purpose Set the transmitter waveform

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><waveform></td><td></td><td>Waveform used by the transmitter</td></tr>
<tr><td></td><td>0</td><td>WCDMA</td></tr>
<tr><td></td><td>1</td><td>Carrier wave (no modulating signal applied)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!DAWSTXPWR</td><td>
Set desired Tx power level (WCDMA mode only)

Set the desired Tx power level in dBm. When this occurs, the PA range and PDM are automatically updated as well. (When this command is used, there is no need to use !DAWSPARANGE and !DASPDM.)
The modem must be in FTM mode to use this command – use !DAFTMACT to enter FTM mode.
!DASBAND and !DASCHAN must be issued before this command can be used.

Usage
Execution AT!DAWSTXPWR=<dBm>[,<use_temp_comp>]
Response <pa_range>, <pdm>
OK
Purpose Set the Tx power level to the requested <dBm> level, and automatically set the PA range and PDM

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><dBm></td><td>-57 to 28</td><td>Desired Tx power in dBm</td></tr>
<tr><td><use_temp_ comp></td><td></td><td>Apply temperature compensation to set desired Tx power
Frequency compensation is always applied</td></tr>
<tr><td></td><td>0</td><td>No
Default value</td></tr>
<tr><td></td><td>1</td><td>Yes</td></tr>
<tr><td><pa_range></td><td>0 – 3</td><td>PA range set as a result of the command</td></tr>
<tr><td><pdm></td><td>0 – 255</td><td>PDM set as a result of the command</td></tr>
</table>
</td></tr>
</table>

UMTS Specific AT Commands

1. 3GPP Standard AT Commands

This chapter identifies standard AT commands that are supported by the SL9090 and MC9090. These commands:

- Control serial communications over an asynchronous interface (ITU-T Serial Asynchronous Dialling and Control (Recommendation V.250), available on the International Telecommunication Union web site, www.itu.int)
- Control SMS functions for devices on GSM/WCDMA networks (3GPP TS 27.005, available on the 3GPP web site, www.3gpp.org)
- Control devices operating on GSM/WCDMA networks (3GPP TS 27.007, available on the 3GPP web site, www.3gpp.org)

The tables below identify commands that are supported on the SL9090 and MC9090. Commands that are partially supported include descriptions identifying any limitations on command usage.

Table 10. Supported ITU-T Recommendation V.250 AT Commands

Command	Description
&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
&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
+GSN	Request TA serial number identification
+ICF	Set TE-TA control character framing
+IFC	Set TE-TA local data flow control
+IPR	Set fixed local rate
A	Answer incoming call
A/	Re-issues last AT command given
D	Dial
D><N>	Originate call to phone number in current memory
E	Set command echo mode
H	Disconnect existing connections
I	Display product identification information
O	Switch from command mode to data mode
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

Command	Description
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
X	Set connect result code format and call monitoring
Z	Set all current parameters to user-defined profile

Table 11. Supported 27.005 AT Commands

Command	Description
+CBM	Cell broadcast message directly displayed
+CDS	SMS status report after sending a SMS
+CDSI	Incoming SMS status report
+CMGC	Send command
+CMGD	Delete message
+CMGF	Message format
+CMGL	List messages
+CMGR	Read message
+CMGS	Send message
+CMGW	Write message to memory
+CMMS	More messages to send
+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
+CSCA	Service center address
+CSCB	Select cell broadcast message types
+CSDH	Show text mode parameters
+CSMP	Set text mode parameters
+CSMS	Select message service

Table 12. Supported 27.007 AT Commands

Command	Description
+CBC	Battery charge
+CBST	Select bearer service type
+CCFC	Call forwarding number and conditions

Command	Description
+CCUG	Closed user group
+CCWA	Call waiting
+CFUN	Set phone functionality Partially supported: Format: **+CFUN = [<fun> [, <rst>]]** Limitations: Valid <fun> values: o 0 (minimum functionality, low power draw) o 1 (full functionality, high power draw)
+CGACT	PDP context activate or deactivate
+CGATT	PS attach or detach
+CGCLASS	GPRS mobile station class
+CGDATA	Enter data state
+CGDCONT	Define PDP Context
+CGDSCONT	Define Secondary PDP Context
+CGEQMIN	3G Quality of Service Profile (Minimum acceptable)
+CGEQNEG	3G Quality of Service Profile (Negotiated)
+CGEQREQ	3G Quality of Service Profile (Requested)
+CGEREP	Packet Domain event reporting
+CGEV	GPRS network event indication
+CGMI	Request manufacturer identification
+CGMM	Request model identification
+CGMR	Request revision identification
+CGPADDR	Show PDP address
+CGQMIN	Quality of Service Profile (Minimum acceptable)
+CGQREQ	Quality of Service Profile (Requested)
+CGREG	GPRS network registration status
+CGSMS	Select service for MO SMS messages
+CGSN	Request product serial number identification
+CGTFT	Traffic Flow Template
+CHLD	Call related supplementary services
+CHUP	Hangup call
+CIEV	Indicator event
+CIMI	Request international mobile subscriber identity
+CIND	Indicator control
+CLCC	List current calls
+CLCK	Facility lock
+CLIP	Calling line identification presentation
+CLIR	Calling line identification restriction
+CLVL	Set/return internal loudspeaker volume
+CME ERROR: <err>	Mobile Termination error result code
+CMEE	Report Mobile Termination error
+CMER	Mobile Termination event reporting
+CMOD	Call mode

Command	Description
+CMUT	Enable/disable uplink voice muting
+CMUX	Multiplexing mode
+CNUM	Subscriber number
+COLP	Connected line identification presentation
+COPN	Read operator names
+COPS	Operator selection
+CPAS	Phone activity status
+CPBF	Find phonebook entries
+CPBR	Read phonebook entries
+CPBS	Select phonebook memory storage
+CPBW	Write phonebook entry
+CPIN	Enter PIN
+CPOL	Preferred operator list
+CPUC	Price per unit and currency table
+CPWD	Change password
+CR	Service reporting control
+CRC	Cellular result codes
+CREG	Network registration
+CRING	Incoming call type
+CRLP	Radio link protocol
+CRSM	Restricted SIM access
+CSCS	Select TE character set
+CSIM	Generic SIM access
+CSQ	Signal quality
+CSSN	Supplementary service notifications
+CSTA	Select type of address
+CTFR	Call deflection
+CUSD	Unstructured supplementary service data
D	ITU T V.25ter [14] dial command
D*99#	Sets up a packet data call (PDP context) based on profile ID #1
D*99*<n>#**	Sets up a packet data call (PDP context) based on profile ID #<n> (<n> is the <cid> in the **+CGDCONT** command)
+VTD	Tone duration
+VTS	DTMF and arbitrary tone generation
+WS46	PCCA STD 101 [17] select wireless network

2. Phonebook Related Commands

2.1. Command Summary

Command	Description
^SCPBW	Write 3G phonebook on the EFS phonebook
^SCPBR	Read 3G phonebook on the EFS phonebook

2.2. Command Reference

Command	Description
^SCPBW	**Write 3G phonebook on the EFS phonebook** This command is not password-protected. **Usage** Execution: **AT^SCPBW=<index>,<p1>,<t1>,<p2>,<t2>,<p3>,<t3>,<p4>,<t4>,<name>,<type>,<email>** Response: **OK** **Parameters** Parameter / Value / Description <index> / 1 – 255 / Record index <p1> / / First phone number enclosed in quotation marks <p2> / / Second phone number enclosed in quotation marks <p3> / / Third phone number enclosed in quotation marks <p4> / / Fourth phone number enclosed in quotation marks <t1> / / Type of first phone number 145 / International number 129 / Normal number <t2> / / Type of second phone number 145 / International number 129 / Normal number <t3> / / Type of third phone number 145 / International number 129 / Normal number <t4> / / Type of fourth phone number 145 / International number 129 / Normal number <name> / / Name of contact enclosed in quotation marks <type> / 0 – 1 / Type of record – either ASCII or USC2

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Example
At^scpbw=1,"1111",129,"2221",129,"3331",129,"4441",129,
"jeff",0,"james@efs.com"
OK</td></tr>
<tr><td>^SCPBR</td><td>Read 3G phonebook on the EFS phonebook

This command is not password-protected.

Usage
Execution AT^SCPBR=index
AT^SCPBR=<index1>,<index2>
Response ^SCPBR:index,p1,t1,p2,t2,p3,t3,p4,t4,name,0,
email

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><index></td><td>1 – 255</td><td>Record index to read</td></tr><tr><td><index1></td><td>1 – 255</td><td>Index start</td></tr><tr><td><index2></td><td>1 – 255</td><td>Index end</td></tr></table></td></tr>
</table>

3. UMTS Generic Diagnostic Commands

3.1. Command Summary

Command	Description
!BAND	Select/return frequency band set
!GCIPHER	Enable/disable ciphering and integrity settings
!GETBAND	Return the current active band
!GETRAT	Return the current active radio access technology (RAT)
!GSMINFO	Return 2G network information
!GSTATUS	Return operational status
!GVER	Return the firmware version
!MXSTATS	Display/clear 27.010 statistics
!SELMODE	Set/return current service domain
!SELRAT	Set/return current radio access technology (RAT)
*CNTI	Report current, available, and supported network technologies
+CQI	Enable/disable/return averaged CQI return (WCDMA only)
+ECIO	Return total Energy per chip per power density value (WCDMA only)
+ETFCI	Enable/disable/return E-TFCI average value
+RSCP	Return Received Signal Code Power (RSCP) (WCDMA only)
+UPSC	Return Primary Scrambling Code (WCDMA only)
+USET	Return WCDMA set information
+WPOWER	Return average WCDMA power level over time period
+WTBI	Enable/disable GSM/GPRS Tx Burst indication
^SYSCONFIG	Set/return system configuration information
^SYSINFO	Return service status information
!CMEN	Enable/disable HSPA Compressed Mode stack functionality
!GCFEN	Enable/disable GCF test mode
!GCFUIMTYPE	Set/return current SIM type
!HSDCAT	Set/return HSDPA category
!HSUCAT	Set/report HSUPA category
!NVPLMN	Provision PLMN list for Network Personalization locking
!NVSPCODE	Provision Network Service Provider code list
!GWINFO	Return WCDMA status information
!ACQCHAN	Display current contents of the Acquisition Database (ACQ DB)

3.2. Command Reference

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!BAND</td><td>
Select/return frequency band set

Configure the modem to operate on a set of frequency bands, look up available sets, or return the current selection.
Note that these band sets are preconfigured by the device’s manufacturer. Bands displayed by the query command (AT!BAND=?) depend on this configuration.

Usage
Execution AT!BAND=<bandsetInd>
Response OK
Purpose Select a set of bands

Query AT!BAND?
Response <bandsetInd>, Band set description <state>
OK
or
Unknown band mask. Use AT!BAND to set band.
or
<bandmask>
OK
Purpose Report the current band selection

Query List AT!BAND=?
Response !SARSTATE: <state>
OK
Purpose Display allowed values for <bandsetInd> and the corresponding frequency bands

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><bandsetInd></td><td></td><td>Band index corresponding to a specific band or bands</td></tr>
<tr><td></td><td>00</td><td>All bands</td></tr>
<tr><td></td><td>01</td><td>WCDMA 2100</td></tr>
<tr><td></td><td>02</td><td>WCDMA 850/1900</td></tr>
<tr><td></td><td>03</td><td>GSM 900/1800</td></tr>
<tr><td></td><td>04</td><td>GSM 850/1900</td></tr>
<tr><td></td><td>05</td><td>GSM ALL</td></tr>
<tr><td></td><td>06</td><td>WCDMA 2100 GSM 900/1800</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GCIPHER</td><td>
Enable/disable ciphering and integrity settings

To register onto a network with WCDMA service, the modem's ciphering and integrity settings must be enabled or disabled to match the network settings. Most carriers enable both ciphering and integrity.
When testing the modem, you may be using a SIM that has different codes for ciphering and integrity than those used by the test system. In this case, you may need to disable ciphering and integrity checking to use the test system.

Usage
Execution AT!GCIPHER=<setting>
Response !GCIPHER
Ciphering: <ciphering>
Integrity: <integrity>
OK
Purpose Set the ciphering and integrity settings

Query AT!GCIPHER?
Response !GCIPHER:
Ciphering: <ciphering>
Integrity: <integrity>
OK
Purpose Report the current ciphering and integrity settings

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><setting></td><td></td><td>Enable/disable ciphering and integrity</td></tr>
<tr><td></td><td>0</td><td>Ciphering disabled; integrity disabled</td></tr>
<tr><td></td><td>1</td><td>Ciphering enabled; integrity disabled</td></tr>
<tr><td></td><td>2</td><td>Ciphering enabled; integrity enabled</td></tr>
<tr><td></td><td>3</td><td>Ciphering disabled; integrity enabled</td></tr>
</table>
</td></tr>
<tr><td>!GETBAND</td><td>
Return the current active band

Return the active band currently being used by the modem.
Note: Due to stack implementation requirements, !GETBAND reports W800 for both W800 and W850.

Usage
Query AT!GETBAND?
Response !GETBAND: <active band description>
OK
or
Unknown
OK
Purpose Return a description of the current active band, or return an error message
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!GETRAT</td><td>
Return the current active radio access technology (RAT)

Usage
Query AT!GETRAT?
Response !GETRAT: <active RAT description>
OK
or
Unknown
OK
Purpose Return a description of the current RAT, or return an error message
</td></tr>
<tr><td>!GSMINFO</td><td>
Return 2G network information

Return 2G network information for the “serving” cell and up to 6 “neighbor” cells.

Usage
Query AT!GSMINFO?
Response
!gsminfo:
Serving Cell:
PLMN: <mccmnc>
LAC: <lac>
Cell ID: <cellid>
BSIC: <bsic>
NCC: <ncc>
BSCC: <bscc>
RAC: <rac>
Min Rx Lvl Rqd: <minrx>
Max Rach: <maxrach>
Band: <band>
ARFCN: <arfcn>
RX level (dBm): <rxlvl>
C1: <c1>
C2: <c2>
C31: <c31>
C32: <c32>
Neighbor Cells:
Band: <band> <band> <band>
ARFCN: <arfcn> <arfcn> <arfcn>
RAC: <rac> <rac> <rac>
RX level (dBm): <rxlvl> <rxlvl> <rxlvl>
C1: <c1> <c1> <c1>
C2: <c2> <c2> <c2>
C31: <c31> <c31> <c31>
C32: <c32> <c32> <c32>
OK
Purpose Display serving cell and neighbor cell information

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mccmnc></td><td>16-bit decimal</td><td>Mobile Country Code and Mobile Network Code (combined to form the PLMN)</td></tr>
<tr><td><lac></td><td>16-bit decimal</td><td>Location area code</td></tr>
<tr><td><cellid></td><td>16-bit decimal</td><td>Cell ID</td></tr>
</table>
</td></tr>
</table>

Command	Description		
	<bsic>	8-bit decimal	Base station identity code
	<ncc>	8-bit decimal	Network color code
	<bscc>	8-bit decimal	Base station color code
	<rac>	8-bit decimal	Routing area code
	<minrx>	16-bit decimal	Minimum Rx level, in dBm, needed to register
	<maxrach>	16-bit decimal	Reserved for future use
	<band>		2G network band
		"E900"	
		"P900"	
		"1900"	
		"1800"	
		"850"	
		"Unknown"	
	<arfcn>	16-bit decimal	Absolute radio frequency channel number
	<rxlvl>	16-bit decimal	Received BCCH frequency level (in dBm)
	<c1>	16-bit decimal	C1 cell selection criteria
	<c2>	16-bit decimal	C2 cell selection criteria
	<c31>	16-bit decimal	C31 cell selection criteria
	<c32>	16-bit decimal	C32 cell selection criteria
!GSTATUS	**Return operational status** Return specific details about the current operational status of the modem. *Note: This command is also applicable in CDMA mode.* **Usage** Query: **AT!GSTATUS?** Response (GSM): **!GSTATUS:** **Current Time: <ctime> Temperature: <temp>** **Bootup Time: <btime> Mode: <mode>** **System mode: <smode> PS state: <PSstate>** **GSM band: <gband>** **GSM channel: <gchan>** **GMM (PS) state: <gmmstate> <gmmsubstate>** **MM (CS) state: <mmstate> <mmsubstate>** **Serving Cell: <gchan> (<gband>)** **RX level (dBm): <rxlev> LAC: <LAC>** **GPRS State: <gstate> Cell ID: <Cell ID>** **OK** Response (WCDMA): **!GSTATUS:** **Current Time: <ctime> Temperature: <temp>** **Bootup Time: <btime> Mode: <mode>** **System mode: <smode> PS state: <PSstate>** **WCDMA band: <wband>** **WCDMA channel: <wchan>** **GMM (PS) state: <gmmstate> <gmmsubstate>** **MM (CS) state: <mmstate> <mmsubstate>** **WCDMA L1 State: <wstate> RRC State: <wrstate>** **RX level C0 (dBm): <wrxlev> LAC: <LAC>**		

Command	Description
	RX level C1 (dBm): <wrxlev> Cell ID: <Cell ID> **OK** Response (CDMA) **!GSTATUS:** **Current Time: <ctime> Temperature: <temp>** **Bootup Time: <btime> Mode: <mode>** **System mode: <smode> PS state: <PSstate>** **CDMA band: <cband>** **CDMA channel: <cchan>** **GMM (PS) state: <gmmstate> <gmmsubstate>** **MM (CS) state: <mmstate> <mmsubstate>** **OK** Purpose Display modem operational status information

Parameters

Parameter	Value	Description
<ctime>		Current time (seconds from bootup)
<temperature>		Approximate temperature ±5°C
<btime>		Bootup time (seconds from reset)
<mode>		Current modem mode
	“POWERING OFF”	
	“FACTORY TEST”	
	“OFFLINE”	
	“LOW POWER MODE”	
	“RESETTING”	
	“NETWORK TEST”	
	“OFFLINE REQUEST”	
	“PSEUDO ONLINE”	
	“Unknown”	
<smode>		System mode acquired by modem
	“No service”	
	“AMPS”	
	“CDMA”	
	“GSM”	
	“HDR”	
	“WCDMA”	
	“GPS”	
	“WCDMA+GSM”	
	“Unkwnown”	
<PSstate>		Current PS state
	“Attached”	
	“Not attached”	
<wband>		Current WCDMA band being accessed
	“CDMA cell”	
	“CDMA PCS”	

Command	Description		
		“IMT2000”	
		“WCDMA1900”	
		“WCDMA1800”	
		“WCDMA800”	
		“GSM EGSM900”	
		“GSM DCS1800”	
		“GSM 850”	
		“GSM1900”	
		“GPS”	
		“No band”	
		“WCDMA900”	
	<gband>		Current GSM band, either BCCH (broadcast channel) or TCH (traffic channel)
		“GSM850”	
		“GSM900”	
		“DCS1800”	
		“PCS1900”	
		“Unknown”	
	<wchan>		WCDMA channel number
	<gchan>		GSM channel number (may be BCCH or TCH)
	<gmmstate>		Current GMM state
		“IDLE”	
		“DEREGISTERED”	
		“Registering”	
		“REGISTERED”	
		“Deregistering”	
		“RA updating”	
		“Requesting srvc”	
	<gmmsubstate>		Current GMM sub-state
		“NORMAL SERVICE”	
		“LIMITED SERVICE”	
		“ATT NEEDED”	
		“ATTEMPTING ATT”	
		“NO IMSI”	
		“NO SERVICE”	
		“PLMN SEARCH”	
		“SUSPENDED”	
		“UPDATE NEEDED”	
		“UPDATING”	
		“DEATACHING”	
		“---”	Undefined sub-state
	<mmstate>		Current MM state
		“NULL”	
		“IDLE”	
		“LA Rejected”	

Command	Description		
		“LA Start”	
		“CONNECTED”	
		“Network Command”	
		“---”	Undefined state
	<mmsubstate>		Current MM sub-state
		“NORMAL SERVICE”	
		“LIMITED SERVICE”	
		“NO IMSI”	
		“NO SERVICE”	
		“PLMN SEARCH”	
		“UPDATE NEEDED”	
		“UPDATING”	
		“---”	Undefined sub-state
	<rxlev>		GSM receive power in dBm Signed int16 (2 bytes)
	<gstate>		GSM to LLC interface state
		“GPRS IDLE”	
		“GPRS READY”	
		“GPRS STANDBY”	
	<wstate>		WCDMA L1 state
		“L1M_IDLE”	
		“L1M_FS”	
		“L1M_ACQ”	
		“L1M_BCH”	
		“L1M_PCH”	
		“L1M_FACH”	
		“L1M_DCH”	
		“L1M_DEACTIVE”	
		“L1M_PCH_SLEEP”	
		“L1M_DEEP_SLEEP”	
		“L1M_STOPPED”	
		“L1M_SUSPENDED”	
		“L1M_PCH_BPLMN”	
		“L1M_WAIT_TRM_STOP”	
		“---”	
	<wrstate>		WCDMA RRC state
		“DISCONNECTED”	
		“CONNECTING”	
		“CELL_FACH”	
		“CELL_DCH”	
		“CELL_PCH”	
		“URA_PCH”	
		“State N/A”	
		“---”	
	<wrxlev>		WCDMA receive power in dBm Signed int16 (2 bytes)

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><cband></td><td></td><td>CDMA band</td></tr>
<tr><td></td><td>“US Cellular”</td><td></td></tr>
<tr><td></td><td>“US PCS”</td><td></td></tr>
<tr><td></td><td>“JTACS”</td><td></td></tr>
<tr><td></td><td>“JCDMA”</td><td></td></tr>
<tr><td></td><td>“Korean PCS”</td><td></td></tr>
<tr><td></td><td>“NMT”</td><td></td></tr>
<tr><td></td><td>“IMT”</td><td></td></tr>
<tr><td></td><td>“No band”</td><td></td></tr>
<tr><td><rsrp></td><td>-140 to -44</td><td>Reference signal receive power in dBm</td></tr>
<tr><td><rsrq></td><td>-20 to -3</td><td>Rereference signal receive quality in dB</td></tr>
<tr><td><LAC></td><td></td><td>Location area code in hexadecimal and decimal format. For example:
“LAC FDF2 (65010)”</td></tr>
<tr><td><Cell ID></td><td></td><td>Cell ID in hexadecimal and decimal format. For example:
“Cell ID: 000DE0D4 (909524)”</td></tr>
<tr><td><cchan></td><td></td><td>CDMA Rx channel in decimal</td></tr>
</table>
</td></tr>
<tr><td>!GVER</td><td>
Return the firmware version

Usage
Query AT!GVER?
Response !GVER: <versionString>
OK
Purpose Return the firmware version number

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><versionString></td><td></td><td>Firmware version string in the format: yyyy/mm/dd hh:mm:ss</td></tr>
</table>
</td></tr>
</table>

Command	Description
!MXSTATS	**Display/clear 27.010 statistics** TS 27.010 is a standard that defines a multiplexing protocol between a mobile station and a terminal. This standard is supported on the modem and **!MXSTATS** is used to display statistics related to that protocol for debugging purposes. **Usage** Execution: **AT!MXSTATS=0** Response: **OK** Purpose: Clear the statistics Query: **AT!MXSTATS?** Response: **!MXSTATS:** **Sessions Started: <value>** **Sessions Ended: <value>** **SABM (Tx/Rx): <value> / <value>** **DISC (Tx/Rx): <value> / <value>** **UA (Tx/Rx): <value> / <value>** **DM (Tx/Rx): <value> / <value>** **UIH (Tx/Rx): <value> / <value>** **T1 expiry: <value>** **T2 expiry: <value>** **T3 expiry: <value>** **N1 count: <value>** **N2 count: <value>** **Bad Frame (addr): <value>** **Bad Frame (ctl): <value>** **Bad Frame (len): <value>** **Bad Frame (F9): <value>** **Bad Frame (fcs): <value>** **Bad Frame (mem): <value>** **OK** Purpose: Display the statistics **Parameters** **Parameter** / **Value** / **Description** <value> / Unique values for each statistic Values accumulate until cleared by issuing the command **AT!MXSTATS=0**

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SELMODE</td><td>
Set/return current service domain

Configure the modem to use a specific service domain.

Usage
Execution AT!SELMODE=<sdInd>
Response OK
Purpose Set the desired service domain

Query AT!SELMODE?
Response <sdInd>, Service Domain description
OK
or
Unknown service domain mask. Use AT!SELMODE to set service domain.
<sdInd>
OK
Purpose Return the current service domain index (<sdInd>) and description. If the <sdInd> is undefined, an error message is returned

Query List AT!SELMODE=?
Purpose Return a list of supported service domain indexes

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><sdInd></td><td></td><td>Service domain index</td></tr>
<tr><td></td><td>00</td><td>CS only</td></tr>
<tr><td></td><td>01</td><td>PS only</td></tr>
<tr><td></td><td>02</td><td>CS and PS</td></tr>
</table>
</td></tr>
<tr><td>!SELRAT</td><td>
Set/return current radio access technology (RAT)

Configure the modem to use a specific (or preferred) RAT.
Note: This command is also applicable in CDMA mode.

Usage
Execution AT!SELRAT=<ratInd>
Response OK
Purpose Set the desired RAT configuration

Query AT!SELRAT?
Response <ratInd>, RAT configuration description
OK
or
Unknown RAT mode. Use AT!SELRAT to set mode.
<ratInd>
OK
Purpose Return the current RAT configuration index (<ratInd>) and description. If the <ratInd> is undefined, an error message is returned
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Query List AT!SELRAT=?
Purpose Return a list of supported RAT configurations

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><ratInd></td><td></td><td>RAT configuration index</td></tr>
<tr><td></td><td>00</td><td>Automatic</td></tr>
<tr><td></td><td>01</td><td>UMTS 3G only</td></tr>
<tr><td></td><td>02</td><td>GSM 2G only</td></tr>
<tr><td></td><td>03</td><td>UMTS 3G preferred</td></tr>
<tr><td></td><td>04</td><td>GSM 2G preferred</td></tr>
<tr><td></td><td>05</td><td>GSM and UMTS only</td></tr>
<tr><td></td><td>06</td><td>LTE only</td></tr>
<tr><td></td><td>07</td><td>GSM, UMTS, LTE</td></tr>
<tr><td></td><td>08</td><td>CDMA, HRPD, GSM, UMTS, LTE</td></tr>
<tr><td></td><td>09</td><td>CDMA only</td></tr>
<tr><td></td><td>0A</td><td>HRPD only</td></tr>
<tr><td></td><td>0B</td><td>Hybrid CDMA/HRPD</td></tr>
<tr><td></td><td>0C</td><td>CDMA, LTE</td></tr>
<tr><td></td><td>0D</td><td>HRPD, LTE</td></tr>
<tr><td></td><td>0E</td><td>CDMA, HRPD, LTE</td></tr>
<tr><td></td><td>0F</td><td>CDMA, GSM, UMTS</td></tr>
<tr><td></td><td>10</td><td>CDMA, HRPD, GSM, UMTS</td></tr>
</table>
</td></tr>
<tr><td>*CNTI</td><td>
Report current, available, and supported network technologies

Display the network technology currently being used, the technologies available for use, or the technologies supported by the modem.

Usage
Execution AT*CNTI=<n>
Response *CNTI: <n>,<tech>[,<tech>[...]]
OK
or
+CME ERROR: <err>
Purpose Display current, available, and supported network technologies

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><n></td><td></td><td>Reporting option</td></tr>
<tr><td></td><td>0</td><td>Network technology currently in use</td></tr>
<tr><td></td><td>1</td><td>Available technologies on current network</td></tr>
<tr><td></td><td>2</td><td>All technologies supported by the modem</td></tr>
<tr><td><tech></td><td></td><td>Technology type; ASCII string</td></tr>
<tr><td></td><td>“GSM”</td><td></td></tr>
<tr><td></td><td>“GPRS”</td><td></td></tr>
<tr><td></td><td>“EDGE”</td><td></td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>“UMTS”
“HSDPA”
“HSUPA”
“HSDPA / HSUPA”
“HSPA+”
“LTE”
“Unknown”</td></tr>
<tr><td>+CQI</td><td>Enable/disable/return averaged CQI return (WCDMA only)

Enable or disable ability to return averaged CQI (Channel Quality Indicator) from the modem, or return the value (if enabled).

Usage
Execution: AT!CQI=<enableFlag>
Response: +CQI:
ENABLED!
OK
or
+CQI:
DISABLED!
OK
Purpose: Enable or disable the query command

Query: AT!CQI?
Response (single carrier cells): +CQI:
Status: <enableFlag>
total valid samples <n>, average cqi <m>
OK
Response (dual carrier cells): +CQI:
Status: <enableFlag>
total valid samples <n>, average Car0 CQI <m>
total valid samples <n>, average Car1 CQI <m>
OK
Purpose: Return the average CQI (<m>) and the number of samples (<n>) used to determine the average

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><enableFlag></td><td></td><td>Enable/disable CQI value retrieval</td></tr><tr><td></td><td>0</td><td>Disable retrieval</td></tr><tr><td></td><td>1</td><td>Enable retrieval</td></tr></table></td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>+ECIO</td><td>
Return total Energy per chip per power density value (WCDMA only)

Return the total energy per chip per power density (Ec/Io) value of the active set's three strongest cells.
Command +USET also displays Tot Ec/Io as one of its outputs.

Usage
Query AT+ECIO?
Response (single carrier cells) +ECIO:
Ec/Io: <value1> dB [<value2> dB [<value3> dB]]
Response (dual carrier cells) +ECIO:
Car0 Ec/Io: <value1> dB [<value2> dB [<value3> dB]]
Car1 Ec/Io: <value4> dB [<value5> dB [<value6> dB]]
Purpose Return the signed dB values of the three strongest cells in the active set. The values are listed from strongest to weakest, based on RSCP, and separated by tabs. If there are less than three cells, only those values appear

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><value></td><td>-31.5 dB to 0 dB</td><td>Ec/Io of cell in the active set</td></tr>
</table>
</td></tr>
<tr><td>+ETFCI</td><td>
Enable/disable/return E-TFCI average value

Enable/disable checking of average E-TFCI values during an HSUPA call, or return the value.
The average value is based on 64 sets of log values extracted from the E-DPCCH packet:
• Every 200 ms (for 10 ms TTI) – Each set includes 20 samples. A total of 1280 samples are taken (200 ms/set, 20 samples per set, 64 sets over 12.8 second period).
• Every 80 ms (for 2 ms TTI) – Each set includes 40 samples. A total of 2560 samples are taken (80 ms/set, 40 samples per set, 64 sets over 5.12 second period).

An HSUPA call must be in progress to obtain the E-TFCI.

Usage
Execution AT+ETFCI=<status>
Response +ETFCI:
ENABLED!
OK
or
+ETFCI:
DISABLED!
OK
Purpose Enable or disable the ability to check the average E-TFCI value
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Query AT+ETFCI?
Response +ETFCI:
Status: <status>
total samples 1280, average etfci <etfci>
OK
Purpose Indicate if E-TFCI checking is enabled, and report the total number of samples and average E-TFCI value

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><status></td><td></td><td>E-TFCI reporting status</td></tr>
<tr><td></td><td>0</td><td>Disabled</td></tr>
<tr><td></td><td>1</td><td>Enabled</td></tr>
<tr><td><etfci></td><td>0 – 127</td><td>Averaged E-TFCI value over sampling period</td></tr>
</table>
</td></tr>
<tr><td>+RSCP</td><td>
Return Received Signal Code Power (RSCP) (WCDMA only)

Return the RSCP of the active set’s three strongest cells.

Usage
Query AT!RSCP?
Response (single carrier cells) +RSCP:
RSCP: <value1> dBm [<value2> dBm [<value3> dBm]]
OK
Response (dual carrier cells) +RSCP:
Car0 RSCP: <value1> dBm [<value2> dBm [<value3> dBm]]
Car1 RSCP: <value4> dBm [<value5> dBm [<value6> dBm]]
Purpose Return the RSCP values (signed dBm) of up to three cells, from the strongest to weakest cell

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><value></td><td>-120 dB to -20 dB</td><td>RSCP of cell in the active set</td></tr>
</table>
</td></tr>
<tr><td>+UPSC</td><td>
Return Primary Scrambling Code (WCDMA only)

Return the Primary Scrambling Code (PSC) of the reference WCDMA cell.

Usage
Query AT+UPSC?
Response +UPSC: <psc>
OK
Purpose Display reference cell’s PSC

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><psc></td><td>0 – 254</td><td>Primary Scrambing Code of reference WCDMA cell</td></tr>
<tr><td></td><td>255</td><td>No valid cell</td></tr>
</table>
</td></tr>
</table>

Command	Description
+USET	**Return WCDMA set information** **Usage** Query: **AT+USET?<set>** Response: **+USET: <setName>** **Count: <count>** **PSC: <psc> <ref>** **SSC: <ssc>** **STTD: <sttd>** **Tot Ec/Io: <totEcIo>** **Ec/Io: <EcIo>** **RSCP: <rscp>** **Window Size: <sinSize>** **... (repeat for <count> items)** Purpose: Display detailed information about each item in the <set> Query List: **AT+USET=?** Purpose: Display valid <set> values **Parameters** **Parameter / Value / Description** <set> / 0 – 11 / Set for which details are requested <setName> / / Description of <set> value 0 / Active set 1 / Sync Neighbor Set 2 / Async Neighbor Set 3 / Unlisted Set 4 / Add-Candidate Set 5 / Drop-Candidate Set 6 / After failed W2G Set 7 / DCH-Only Set 8 / HHO Active Set 9 / HHO Active No PN Set 10 / Candidate to Unlisted Set 11 / Saved Set 12 / DC Active Set 13 / DC Sync All Set 14 / DC Saved Set <count> / 0 – 255 / Number of items in <set> <psc> / 0 – FFFF / Primary Scrambling Code <ref> / / Reference PSC designator string “REF” / Reference PSC “(Car1)” / Second carrier PSC <ssc> / 0 – FFFF / Secondary Scrambling Code <sttd> / / Common Pilot Channel (CPICH) supports Space Time Transit Diversity 0 / Not supported 1 / Supported

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><totEcIo></td><td>00 – FF</td><td>Total Ec/Io
To convert to a dB value, first convert to decimal and then divide by -2
Example: 0x0B/-2 = 11/-2 = -5.5dB</td></tr>
<tr><td><EcIo></td><td>00 – FF</td><td>Best path Ec/Io
To convert to a dB value, first convert to decimal and then divide by -2
Example: 0x0B/-2 = 11/-2 = -5.5dB</td></tr>
<tr><td><rscp></td><td>0 – FFFF</td><td>Received Signal Code Power</td></tr>
<tr><td><winSize></td><td>0000 – FFFFFFFF</td><td>Search window size</td></tr>
</table>
</td></tr>
<tr><td>+WPOWER</td><td>
Return average WCDMA power level over time period

Enable/disable logging of WCDMA power level values.

Usage
Execution AT+WPOWER=<state>
Response +WPOWER:
ENABLED!
or
+WPOWER:
DISABLED!
OK
Purpose Enable/disable logging of WCDMA power information

Query AT+WPOWER?
Response +WPOWER:
Status: 1
average RxM Power <rxm>dBm, total samples <numRXM>
no valid WCDMA RxD Power value available!
no valid WCDMA Tx Power value available!
OK
or
+WPOWER:
Status: 1
average RxM Power <rxm>dBm, total samples <numRXM>
average RxD Power <rxd>dBm, total samples <numRXD>
average Tx Power <txd>dBm, total samples <numTXD>
OK
or
+WPOWER:
Status: 1
average Car0 RxM Power <rxm0>dBm, total samples
<numRXM0>
average Car0 RxD Power <rxd0>dBm, total samples
<numRXD0>
average Car1 RxM Power <rxm1>dBm, total samples
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<numRXM1>
average Car1 RxD Power <rxd1>dBm, total samples
<numRXD1>
average Tx Power <txd>dBm, total samples <numTXD>
OK
or
+WPOWER:
Status: 0
no valid WCDMA Power value available!
Purpose Display power information

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td></td><td>WCDMA logging</td></tr>
<tr><td></td><td>0</td><td>Disabled
Default value</td></tr>
<tr><td></td><td>1</td><td>Enabled</td></tr>
<tr><td><rxm></td><td></td><td>Average Rx main power, single carrier</td></tr>
<tr><td><rxm0></td><td></td><td>Average Rx main power, first carrier for dual carrier device</td></tr>
<tr><td><rxm1></td><td></td><td>Average Rx main power, second carrier for dual carrier device</td></tr>
<tr><td><rxd></td><td></td><td>Average Rx diversity power, single carrier</td></tr>
<tr><td><rxd0></td><td></td><td>Average Rx diversity power, first carrier for dual carrier device</td></tr>
<tr><td><rxd1></td><td></td><td>Average Rx diversity power, second carrier for dual carrier device</td></tr>
<tr><td><tx></td><td>-120 dBm to -20 dBm</td><td>Average Tx power on the main antenna
Signed int 16 (2 bytes)</td></tr>
</table>
</td></tr>
<tr><td>+WTBI</td><td>
Enable/disable GSM/GPRS Tx Burst indication

Enable use of DIO channel 1 (GPIO_0) to indicate an upcoming GPRS Tx burst. (GSM/GPRS/EDGE mode only)
When enabled, the modem:

Asserts the GPIO ~200 µs before a Tx burst starts. (Provides time for the host to turn off peripherals before the burst.)
Deasserts ~40 µs after the burst completes. (Provides time to ensure RF activity is finished.)

If DIO channel 1 has been programmed as an input or output using AT!DIOCFG, the indication cannot be enabled.

Usage
Execution AT+WTBI=<state>
Response OK
Purpose Enable/disable the Tx Burst indication
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Query AT+WTBI?
Response +WTBI: <state>
OK
Purpose Display the current indication state (enabled/disabled)

Query List AT+WTBI=?
Purpose Display valid parameter values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td></td><td>Indication state storedin non-volatile memory</td></tr>
<tr><td></td><td>0</td><td>Disabled
Default value</td></tr>
<tr><td></td><td>1</td><td>Enabled</td></tr>
</table>
</td></tr>
<tr><td>^SYSCONFIG</td><td>
Set/return system configuration information

Usage
Execution AT^SYSCONFIG=<mode>, <acqOrder>, <roam>, <srvDomain>
Response OK
Purpose Set the various configuration parameters. You must specify all of the parameters

Query AT^SYSCONFIG?
Response <mode>, <acqOrder>, <roam>, <srvDomain>
OK
Purpose Return the current modem configuration information

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mode></td><td></td><td>Supported system mode</td></tr>
<tr><td></td><td>2</td><td>Auto-select</td></tr>
<tr><td></td><td>13</td><td>GSM only</td></tr>
<tr><td></td><td>14</td><td>WCDMA only</td></tr>
<tr><td></td><td>16</td><td>No change – use this value with the execution command if the current setting shouldn’t be changed</td></tr>
<tr><td><acqOrder></td><td></td><td>Network acquisition order</td></tr>
<tr><td></td><td>0</td><td>Automatic</td></tr>
<tr><td></td><td>1</td><td>GSM, then WCDMA</td></tr>
<tr><td></td><td>2</td><td>WCDMA, then GSM</td></tr>
<tr><td></td><td>3</td><td>No change – use this value with the execution command if the current setting shouldn’t be changed</td></tr>
<tr><td><roam></td><td></td><td>Roaming support</td></tr>
<tr><td></td><td>0</td><td>Not supported</td></tr>
<tr><td></td><td>1</td><td>Supported</td></tr>
<tr><td></td><td>2</td><td>No change – use this value with the execution command if the current setting shouldn’t be changed</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><srvDomain></td><td></td><td>Service domain support</td></tr>
<tr><td></td><td>0</td><td>Circuit-switched only</td></tr>
<tr><td></td><td>1</td><td>Packet-switched only</td></tr>
<tr><td></td><td>2</td><td>Circuit- and packet-switched</td></tr>
<tr><td></td><td>3</td><td>Any</td></tr>
<tr><td></td><td>4</td><td>No change – use this value with the execution command if the current setting shouldn’t be changed</td></tr>
</table>
</td></tr>
<tr><td>^SYSINFO</td><td>
Return service status information

Return current service type and availability information, and the current status of the module’s SIM in the format <srvStatus> <srvDomain> <roamStatus> <sysMode> <simState>.

Usage
<table>
<tr><td>Execution</td><td>AT^SYSINFO</td></tr>
<tr><td>Response</td><td><srvStatus>, <srvDomain>, <roamStatus>, <sysMode>, <simStatus>
OK</td></tr>
<tr><td>Purpose</td><td>Set the various configuration parameters. You must specify all of the parameters</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><srvStatus></td><td></td><td>Service availability</td></tr>
<tr><td></td><td>0</td><td>No service</td></tr>
<tr><td></td><td>1</td><td>Limited service</td></tr>
<tr><td></td><td>2</td><td>Service</td></tr>
<tr><td></td><td>3</td><td>Limited regional service</td></tr>
<tr><td></td><td>4</td><td>Power save mode or deep sleep mode</td></tr>
<tr><td><srvDomain></td><td></td><td>Service domain</td></tr>
<tr><td></td><td>0</td><td>No service</td></tr>
<tr><td></td><td>1</td><td>Circuit-switched service only</td></tr>
<tr><td></td><td>2</td><td>Packet-switched service only</td></tr>
<tr><td></td><td>3</td><td>Circuit- and packet-switched service</td></tr>
<tr><td><roamStatus></td><td></td><td>Roaming status indicator</td></tr>
<tr><td></td><td>0</td><td>Not roaming</td></tr>
<tr><td></td><td>1</td><td>Roaming</td></tr>
<tr><td><sysMode></td><td></td><td>System mode</td></tr>
<tr><td></td><td>0</td><td>No service</td></tr>
<tr><td></td><td>3</td><td>GSM/GPRS mode</td></tr>
<tr><td></td><td>5</td><td>WCDMA mode</td></tr>
<tr><td><simStatus></td><td></td><td>SIM status</td></tr>
<tr><td></td><td>0</td><td>SIM is not available</td></tr>
<tr><td></td><td>1</td><td>SIM is available</td></tr>
<tr><td></td><td>255</td><td>No SIM, or the SIM has been PIN-locked (invalid PIN was entered and must be reset)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!CMEN</td><td>
Enable/disable HSPA Compressed Mode stack functionality

Enable or disable HSDPA and HSUPA (for supporting modules) compressed mode functionality in the protocol stack. Typically, this command is used during testing of production networks.
Note: Only the execution operation is password-protected.

Usage
Execution AT!CMEN=<enableDPA>[, <enableUPA>]
Response OK
Purpose Enable or disable HSDPA and HSUPA compressed modes

Query AT!CMEN?
Response !CMEN:
HSDPA Compressed Mode: <enableDPA>
HSUPA Compressed Mode: <enableUPA>
OK
Purpose Display current state of HSDPA and HSUPA compressed modes. If the parameters have not previously been set, the default values are returned

Query List AT!CMEN=?
Purpose Display valid values for <enableDPA> and <enableUPA> parameters

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><enableDPA></td><td></td><td>Enable/disable HSDPA compressed mode</td></tr>
<tr><td></td><td>0</td><td>Disable compressed mode</td></tr>
<tr><td></td><td>1</td><td>Enable compressed mode
Default value
Used for normal operations</td></tr>
<tr><td><enableUPA></td><td></td><td>Enable/disable HSUPA compressed mode</td></tr>
<tr><td></td><td>0</td><td>Disable compressed mode</td></tr>
<tr><td></td><td>1</td><td>Enable compressed mode
Default value
Used for normal operations</td></tr>
<tr><td></td><td>2</td><td>Enable compressed mode but don’t broadcast</td></tr>
</table>
</td></tr>
<tr><td>!GCFEN</td><td>
Enable/disable GCF test mode

Place the modem in GCF testing mode or normal operating mode.
Note: Only the execution operation is password-protected.

Usage
Execution AT!GCFEN=<enableFlag>
Response OK
Purpose Place the modem in GCF testing mode or normal operating mode
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
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
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><enableFlag></td><td></td><td>Enable/disable GCF testing</td></tr>
<tr><td></td><td>0</td><td>Disable GCF test mode
Default value
Used for normal operations</td></tr>
<tr><td></td><td>1</td><td>Enable GCF test mode</td></tr>
</table>
</td></tr>
<tr><td>!GCFUIMTYPE</td><td>
Set/return current SIM type

Indicate (for GCF testing) the type of SIM that is installed in the module.
Note: Only the execution operation is password-protected.

Usage
Execution AT!GCFUIMTYPE=<simType>
Response OK
Purpose Indicate the type of SIM that is installed – the SIM type (2G SIM or 3G USIM) determines how the module behaves for GCF testing and normal operation. During GCF testing, using the 2G SIM type enables the module to pass some tests that cannot be passed using the 3G USIM type

Query AT!GCFUIMTYPE?
Response !GCFUIMTYPE:
<simType>
Purpose Return the type of SIM that is installed in the module (the current <simType> value)

Query List AT!GCFUIMTYPE=?
Purpose Return a list of supported SIM types

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><simType></td><td></td><td>Installed SIM type</td></tr>
<tr><td></td><td>0</td><td>2G SIM – This value is required to pass GCF testing</td></tr>
<tr><td></td><td>1</td><td>3G USIM – This value should be used for normal operations
Default value</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!HSDCAT</td><td>
Set/return HSDPA category

Indicate the UE’s current HSDPA category.
This command is not password-protected.

Usage
Execution AT!HSDCAT=<category>
Response OK
Purpose Set the HSDPA category

Query AT!HSDCAT?
Response !HSDCAT: <category>
OK
Purpose Return the current HSDPA <category>

Query List AT!HSDCAT=?
Purpose Return a list of supported <category> values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><category></td><td>6, 8, 12</td><td>HSDPA category
For value description, refer to Table 32 HSDPA-capable Terminals</td></tr>
</table>
</td></tr>
<tr><td>!HSUCAT</td><td>
Set/report HSUPA category

Indicate the UE’s current HSUPA category.
This command is not password-protected.

Usage
Execution AT!HSUCAT=<category>
Response OK
Purpose Set the HSUPA category

Query AT!HSUCAT?
Response !HSUCAT: <category>
OK
Purpose Return the current HSUPA <category>

Query List AT!HSUCAT=?
Purpose Return a list of supported <category> values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><category></td><td>6, 8, 12</td><td>HSUPA category
For value description, refer to Table 33 HSUPA-capable Terminals</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!NVPLMN</td><td>
Provision PLMN list for Network Personalization locking

Provision the list of PLMN (MCC/MNC pairs) used for Network Personalization locking.
Note: The execution command can only be performed one time (all MCC/MNC pairs must be set at the same time).
This command has no effect on operations when using Sierra Wireless' 27.010 MUX mode drivers.

Usage
Execution AT!NVPLMN=<MCC1>, <MNC1>, ..., <MCCn>, <MNCn>
Response OK
Purpose Add up to six MCC/MNC pairs to the PLMN list

Query AT!NVPLMN?
Response <MCC> <MNC>
...
OK
Purpose Return a list of NV items that can be read or written

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><MCC></td><td></td><td>3-digit Mobile Country Code</td></tr>
<tr><td><MNC></td><td></td><td>2-digit Mobile Network Code</td></tr>
</table>
</td></tr>
<tr><td>!NVSPCODE</td><td>
Provision Network Service Provider code list

Provisions the list of Network Service Provider codes that are used for Network Service Provider Personalization locking.

Usage
Execution AT!NVSPCODE=<SP Code>
Response OK
Purpose Add a Network Service Provider code to the list

Query AT!NVSPCODE?
Response SP Code:
(list of <SP Code> values)
OK
Purpose Provision the list of Network Service Provider codes

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><SP Code></td><td></td><td>1 – 2 digit Service Provider Code</td></tr>
</table>
</td></tr>
</table>

Command	Description

!GWINFO	**Return WCDMA status information**
	
	This command is not password-protected.
	
	Usage
	Query: `AT!GWINFO?`
	Response: `OK`
	
	Example
	`AT!GWINFO?`
	
	`Current System Mode: WCDMA`
	`!GWINFO:`
	`=== WCDMA Serving Cell ===`
	`PLMN: 000000`
	`LAC: 42282`
	`Cell ID: 57721`
	`PSC: 432`
	`RSCP(dbm): -69`
	`Ec/No(db): -3.0`
	`PATHLOSS(db): 0`
	`WCDMA channel: 10713`
	
	`=== Intra-Frequency Neighbour Cells ===`
	`PSC:`
	`RSCP(dbm):`
	`Ec/No(db):`
	`PATHLOSS(db):`
	
	`=== Inter-Frequency Neighbour Cells ===`
	`PSC:`
	`RSCP(dbm):`
	`Ec/No(db):`
	`WCDMA channel:`
	
	`=== Inter-RAT Neighbour Cells ===`
	`Cell ID:`
	`RSSI(dbm):`
	`ARFCN:`
	`BAND:`
	`OK`

!ACQCHAN	**Display the current contents of the Acquisition Database (ACQ DB)**
	
	This command is also used to clear all entries in the ACQ DB, as well as store the UARFCN, MCC and MNC into the ACQ DB for a supported RAT.
	
	Usage
	Execution: `AT!ACQCHAN = <uarfcn>[,<mcc>,<mnc>]`
	Response: `OK`
	
	Execution (clear ACQ DB): `AT!ACQCHAN=0`
	Response: `OK`
	
	Query: `AT!ACQCHAN?`
	Response:
	`2G ACQ DB`
	`Channel MCC MNC`
	`136 302 720`

Command	Description

```
  135   302 720
  133   302 720
  132   302 720
  129   302 720
  128   302 720
  142   302 720

3G ACQ DB
Channel MCC MNC
 4381   302 720


4G ACQ DB (only shown if supported)
Channel MCC MNC PCID Band  RB

  300   302 220   0    1   50

 2175   302 720   0    4   50

OK
```

Query List

```
AT!ACQCHAN=?
```

Response

```
!ACQCHAN=<rat>,<uarfcn>,<mcc>,<mnc>
<rat>:
  '0' = clear all ACQ database entries (no
other args needed)
  '1' = add UMTS ACQ channel
  '2' = add LTE ACQ channel
<uarfcn>: channel to be added
<mcc>: carrier's MCC
<mnc>: carrier's MNC
OK
```

Parameters

Parameter	Value	Description
<rat>	1	UMTS
	2	LTE
<uarfcn>		16-bit decimal UARFCN to be stored in the ACQ DB
<mcc>		3-digit decimal MCC to be stored in the ACQ DB
<mnc>		2- or 3-digit decimal MNC to be stored in the ACQ DB
<pcid>		16-bit decimal physical cell ID to be stored in the ACQ DB. This parameter is only needed when <rat>=2
<rb>		Number of resource blocks for the channel bandwidth to be stored in the ACQ DB. This parameter is only needed when <rat>=2
	6	1.4 MHz
	15	3 MHz
	25	5 MHz
	50	10 MHz
	75	15 MHz
	100	20 MHz

4. STK Commands

This chapter describes commands used to configure host support for STK features, monitor and respond to unsolicited proactive SIM commands, and present STK option menus provided by the SIM.

These commands implement a subset of the functions defined in 3GPP TS 11.14.

4.1. STK Interactions

The host STK support profile informs the SIM about the STK features the host supports. This profile is downloaded to the SIM each time the modem resets. At any time, the profile can be updated by using **AT!STKPD** and then resetting the modem.

4.1.1. Processing Unsolicited SIM Commands

The following steps show how to process commands issued by the SIM:

1. Enable the AT interface for STK functionality – issue the command **AT!CUSTOM="STKUIEN",2**.
2. Monitor the command prompt for unsolicited proactive SIM commands:
   - **AT!STKC: <cmdId>** – This is a command that requires a response
   - **AT!STKN: <cmdId>, <data>** – This is a notification that does not require a response
3. If the unsolicited SIM command is "AT!STKC: <cmdId>, follow the appropriate procedure below:
   - If <cmdId> = "81" (End of proactive session), no response is required.
   - If <cmdId> = "25" (Set Up Menu):
     - Respond with **AT!STKGC=<cmdId>** to retrieve the menu structure.
     - Respond with **AT!STKCR=25,0** to indicate success.
     - Determine the menu item to select (for example, present the menu to the user and get their input) and send it to the SIM using **AT!STKMS=<item>**.
     - The SIM will take action on the selected item and will send a new unsolicited command to the host for the next operation to be performed.
   - For any other <cmdId>:
     - Respond with **AT!STKGC=<cmdId>** to retrieve the data to use for <cmdId>.
     - Execute the requested command (<cmdId>) and respond with:

       AT!STKCR=<cmdId>,<result>, ...

       or, optionally

       AT!STKAUTOCR=<cmdId>

4.1.2. Configuring the Host's Profile

To configure the host's profile for STK support:

1. At any time, issue the command **AT!STKPD=<bitmask>** where the <bitmask> indicates supported features.
2. Reset the modem. When the modem restarts, the profile automatically downloads to the SIM.

4.1.3. Notifying SIM of Host-Monitored STK Events

If the SIM has been configured (typically, by the carrier) to request that the host monitor specific events:

- Use **!STKEVENTLIST** to determine which events are to be monitored.
- Use **!STKEVENT** to notify the SIM whenever a monitored event occurs.

4.2. Command Summary

Command	Description
!STKAUTOCR	Configure host responses to SIM commands
!STKC	Receive unsolicited SIM command
!STKCR	Respond to unsolicited SIM command
!STKEVENT	Notify SIM when monitored STK event occurs
!STKEVENTLIST	Return list of host-monitored STK events
!STKGC	Retrieve data for unsolicited SIM command
!STKMS	Request menu item selection or help from SIM
!STKPD	Update STK supported features profile
!STKPLI	Record local provisioning information
!STKVER	Display STK version

4.3. Command Reference

Command	Description
!STKAUTOCR	**Configure host responses to SIM commands** This command is used by the host to send 'command data' in response to specific proactive SIM commands. When the host receives one of the proactive SIM commands listed in the <cmdId> parameter description, it should issue this command to automatically send the appropriate command data. This command is not password-protected. **Usage** Execution: **!STKAUTOCR=<cmdId>** Response: **OK** or **ERROR** (Error is returned if <cmdId> does not match the previously received proactive SIM command.) Purpose: Send a response to a specific proactive command Query List: **AT!STKAUTOCR=?** Purpose: Return the expected command format

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><cmdId></td><td></td><td>STK command issued by the SIM</td></tr>
<tr><td></td><td>11</td><td>Command data for Send SS command</td></tr>
<tr><td></td><td>12</td><td>Command data for Send USSD command</td></tr>
<tr><td></td><td>13</td><td>Command data for Send SMS command</td></tr>
</table>
</td></tr>
<tr><td>!STKC</td><td>
Receive unsolicited SIM command

This command is used by the SIM to send unsolicited notifications to the host, and is used by the host to query the last command received.
This command is not password-protected.

Usage
<table>
<tr><td>Unsolicited SIM command</td><td>!STKC: <cmdId></td></tr>
<tr><td>Purpose</td><td>Unsolicited notification sent by the SIM to the host</td></tr>
<tr><td>Query</td><td>AT!STKC?</td></tr>
<tr><td>Response</td><td>Outstanding Proactive Command: <cmdId>
OK
or
OK</td></tr>
<tr><td>Purpose</td><td>Return the <cmdId> received in the last unsolicited SIM command notification</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><cmdId></td><td></td><td>STK command issued by the SIM</td></tr>
<tr><td></td><td>05</td><td>Set up Event List command</td></tr>
<tr><td></td><td>10</td><td>Set up Call command</td></tr>
<tr><td></td><td>11</td><td>Send SS command</td></tr>
<tr><td></td><td>12</td><td>Send USSD command</td></tr>
<tr><td></td><td>13</td><td>Send SMS command</td></tr>
<tr><td></td><td>14</td><td>Send DTMF command</td></tr>
<tr><td></td><td>15</td><td>Launch Browser command</td></tr>
<tr><td></td><td>20</td><td>Play Tone command</td></tr>
<tr><td></td><td>21</td><td>Display Text command</td></tr>
<tr><td></td><td>22</td><td>Get Inkey command</td></tr>
<tr><td></td><td>23</td><td>Get Input command</td></tr>
<tr><td></td><td>24</td><td>Select Item command</td></tr>
<tr><td></td><td>25</td><td>Set Up menu command</td></tr>
<tr><td></td><td>28</td><td>Set Up Idle Mode Text command</td></tr>
<tr><td></td><td>35</td><td>Language Notification command</td></tr>
<tr><td></td><td>81</td><td>End of proactive session</td></tr>
</table>
</td></tr>
</table>

Command	Description
!STKCR	**Respond to unsolicited SIM command** Respond to the last received unsolicited SIM command, sending the results of the command's execution and any associated data (dependent on type of command executed). This command is not password-protected. **Usage** Execution: **AT!STKCR=<cmdId>, <result>[, <data>]** Response: **OK** or **ERROR** Purpose: Send the result of the command that was just executed and any associated data to the SIM Query List: **AT!STKCR=?** Purpose: Return the expected command format **Parameters** **Parameter / Value / Description** <cmdId> — STK command identified by the last received unsolicited SIM command 05 — Set up Event List command 10 — Set up Call command 11 — Send SS command 12 — Send USSD command 13 — Send SMS command 14 — Send DTMF command 15 — Launch Browser command 20 — Play Tone command 21 — Display Text command 22 — Get Inkey command 23 — Get Input command 24 — Select Item command 25 — Set Up menu command 28 — Set Up Idle Mode Text command 35 — Language Notification command <result> — Result of host's attempt to process <cmdId> Refer to section 4.4 STK Command (<cmdId>) Parameters for details <data> — Information obtained when <cmdId> was processed on the host Refer to section 4.4 STK Command (<cmdId>) Parameters for details

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!STKEVENT</td><td>
Notify SIM when monitored STK event occurs

To identify all monitored events, see !STKEVENTLIST.
This command is not password-protected.

Usage
Execution AT!STKEVENT=<event>
Response OK
or
ERROR
Purpose Send message to SIM indicating <event> has occurred

Query List AT!STKEVENT=?
Purpose Display the execution format and parameter values

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><event></td><td></td><td>STK event detected by the host</td></tr>
<tr><td></td><td>04</td><td>User activity</td></tr>
<tr><td></td><td>05</td><td>Idle screen</td></tr>
</table>
</td></tr>
<tr><td>!STKEVENTLIST</td><td>
Return list of host-monitored STK events

Display a list (hexadecimal string) of the STK events monitored by the host.
When a monitored event occurs, use !STKEVENT to notify the SIM.
This command is not password-protected.

Usage
Query AT!STKEVENTLIST?
Response !STKEVENTLIST: <event>[<event>]]
OK
Purpose Display a list of host-monitored STK events

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><event></td><td></td><td>STK event being monitored by the host</td></tr>
<tr><td></td><td>04</td><td>User activity</td></tr>
<tr><td></td><td>05</td><td>Idle screen</td></tr>
</table>
</td></tr>
<tr><td>!STKGC</td><td>
Retrieve data for unsolicited SIM command

Retrieve the data associated with the last received unsolicited SIM command.
This command is not password-protected.

Usage
Execution AT!STKGC=<cmdId>
Response OK
or
ERROR
Purpose Retrieve the data for <cmdId> identified in the last unsolicited SIM command. If the <cmdId> doesn’t match the last command, an error is returned
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Query List AT!STKGC=?
Purpose Return the expected command format

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><cmdID></td><td></td><td>STK command identified by the last received unsolicited SIM command</td></tr>
<tr><td></td><td>05</td><td>Set up Event List command</td></tr>
<tr><td></td><td>10</td><td>Set up Call command</td></tr>
<tr><td></td><td>11</td><td>Send SS command</td></tr>
<tr><td></td><td>12</td><td>Send USSD command</td></tr>
<tr><td></td><td>13</td><td>Send SMS command</td></tr>
<tr><td></td><td>14</td><td>Send DTMF command</td></tr>
<tr><td></td><td>15</td><td>Launch Browser command</td></tr>
<tr><td></td><td>20</td><td>Play Tone command</td></tr>
<tr><td></td><td>21</td><td>Display Text command</td></tr>
<tr><td></td><td>22</td><td>Get Inkey command</td></tr>
<tr><td></td><td>23</td><td>Get Input command</td></tr>
<tr><td></td><td>24</td><td>Select Item command</td></tr>
<tr><td></td><td>25</td><td>Set Up menu command</td></tr>
<tr><td></td><td>28</td><td>Set Up Idle Mode Text command</td></tr>
<tr><td></td><td>35</td><td>Language Notification command</td></tr>
<tr><td><data></td><td></td><td>Information needed to be able to execute the specified <cmdId>
Refer to section 4.4 STK Command (<cmdId>) Parameters for details</td></tr>
</table>
</td></tr>
<tr><td>!STKMS</td><td>
Request menu item selection or help from SIM

Instruct the SIM to select a menu item or to respond with help information for the menu item via a Display Text command (<cmdId = 21>).
This command is not password-protected.

Usage
Execution AT!STKMS=<item>[, <help>]
Response OK
or
ERROR
or
Error code: <error>
OK
Purpose Instruct the SIM to select the specified menu item, or to respond with help information for the specified menu item

Query List AT!STKMS=?
Purpose Return the expected command format
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><item></td><td></td><td>Integer value obtained from the previously processed Set Up Menu command (<cmdId=25>)</td></tr>
<tr><td><help></td><td>0</td><td>SIM should select the menu <item>
Default value if <help> is not specified</td></tr>
<tr><td></td><td>1</td><td>Provide help information for this menu <item> using a display text command (<cmdId = 21>)</td></tr>
<tr><td><error></td><td>0</td><td>Card is busy</td></tr>
<tr><td></td><td>1</td><td>General failure</td></tr>
</table>
</td></tr>
<tr><td>!STKPD</td><td>
Update STK supported features profile

Indicate to the SIM which STK features are supported by the host.
The modem must be restarted before the new profile information takes effect. (The modem downloads the profile to the SIM automatically each time it resets.)
This command is not password-protected.

Usage
<table>
<tr><td>Execution</td><td>AT!STKPD=<bitmask></td></tr>
<tr><td>Response</td><td>OK
or
ERROR</td></tr>
<tr><td>Purpose</td><td>Store the new profile on the host. The profile will be downloaded the next time the modem resets</td></tr>
<tr><td>Query</td><td>AT!STKPD?</td></tr>
<tr><td>Response</td><td>Profile config=<bitmask>
OK</td></tr>
<tr><td>Purpose</td><td>Return the current profile <bitmask></td></tr>
<tr><td>Query List</td><td>AT!STKPD=?</td></tr>
<tr><td>Purpose</td><td>Return the expected command format</td></tr>
</table>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><bitmask></td><td></td><td>Supported STK features
Format: Seven hexadecimal bytes
Byte order: 07 06 05 04 03 02 01
Bit order: 76543210</td></tr>
</table>
Example
“0A000000000001” – “Number of character support across ME” = 10 and “Menu selection support” = enabled. All other values are 0.
In the ‘bit’ references below, the code in brackets – “(BXbY)” – refers to the bit position in the terminal profile message defined in 3GPP TS 11.14, where “BX” = byte X, and “bY” = bit Y.
Byte 01:
Bit 0: Menu selection support (B1b4)
Bit 1: Support for alpha in call control (B2b5)
Bit 2: UCS2 entry support (B2b6)
Bit 3: UCS2 display support (B2b7)
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Bit 4: Display Text command support (B3b1)
Bit 5: Get Inkey command support (B3b2)
Bit 6: Get Input command support (B3b3)
Bit 7: Play Tone command support (B3b5)
Byte 02:
Bit 0: Select Item command support (B4b1)
Bit 1: Send SMS command support (B4b2)
Bit 2: Send SS command support (B4b3)
Bit 3: Send USSD command support (B4b4)
Bit 4: Set Up Call command support (B4b5)
Bit 5: Set Up Menu command support (B4b6)
Bit 6: Set Up Idle Mode Text command support (B8b5)
Bit 7: Second alpha in setup call support (B8b7)
Byte 03:
Bit 0: Second capability configuration parameter support (B8b8)
Bit 1: Sustained display text support (B9b1)
Bit 2: Send DTMF command support (B9b2)
Bit 3: Language notification command support (B9b6)
Bit 4: Launch Browser command support (B9b7)
Bit 5: Softkey support in select item command (B10b1)
Bit 6: Softkey support in setup menu command (B10b2)
Bit 7: Screen size support (B14b8)
Byte 04:
Bit 0: Variable font size support (B15b8)
Bit 1: Display resized support (B16b1)
Bit 2: Text wrapping support (B16b2)
Bit 3: Text scrolling support (B16b3)
Bit 4–Bit 7: Not used
Byte 05:
Bit 0–Bit 7: Maximum softkey size (B11b1–B11b8)
Byte 06:
Bit 0–Bit 4: Number of character support down ME (B14b1–B14b5)
Bit 5–Bit 7: Reduce width of menu support (B16b6–B16b8)
Byte 07:
Bit 0–Bit 6: Number of character support across ME (B15b1–B15b7)
Bit 7: Not used</td></tr>
<tr><td>!STKPLI</td><td>Record local provisioning information

This command, used when provisioning the modem, records a vendor-defined value for a specific command qualifier in NV memory. This value is then sent to the SIM automatically when the SIM issues a Provide Local Information proactive command – no action is required by the host.

Usage
Execution AT!STKPLI=<qualifier>, <value>
Response OK
or
ERROR
Purpose Store <value> in NV memory

Query List AT!STKPLI=?<qualifier>
Purpose Return the stored <value></td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><qualifier></td><td></td><td>Command qualifier for Provide Local Information proactive command
Represented as hexadecimal ASCII</td></tr><tr><td></td><td>0xFE</td><td>Reserved qualifier that is being overloaded to store the vendordefined <value></td></tr><tr><td><value></td><td>00 – FF</td><td>Single byte vendor-defined value
Represented as hexadecimal ASCII</td></tr></table></td></tr>
<tr><td>!STKVER</td><td>Display STK version

Usage
Query AT!STKVER?
Response <stkVersion>
OK
or
ERROR
(ERROR appears for any firmware revision that does not support the command.)
Purpose Return the current STK version

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><stkVersion></td><td></td><td>Versio of currently running STK</td></tr></table></td></tr>
</table>

4.4. STK Command (<cmdId>) Parameters

Table 13. Setup Event List (<cmdId=05>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <event>[<event>]		
<event>	Hex	Supported event list • 04 – User activity • 05 – Idle screen available Examples: • “05” • “0405”
!STKCR Parameters		
<data>		Not used
<result>	Integer	0—Command performed successfully

Table 14. Setup Call (<cmdId=10>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <method>, <TON>, <NPI>, <address>, <subaddress>, <ccp>, [<DCS1>,]<alphaId1>, <iconId>, <dispMode>, [<DCS2>,] <alphaId2>, <iconId>, <dispMode>,<redial>, <timeout>		
<method>	Integer	Call setup method • 0 – Only if there are no other calls • 1 – Put all other calls on hold • 2 – Disconnect all other calls
<TON>	Integer	Type of number • 0 – Unknown • 1 – International • 2 – National • 3 – Network specific
<NPI>	Integer	Numbering plan identifier • 0 – Unknown • 1 – ISDN telephony • 3 – Data • 4 – Telex • 9 – Private
<address>	Hex string	Dialing address
<subaddress>	Hex string	Dialing subaddress
<ccp>	Hex string	Capability configuration parameters
<DCS1>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId1> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId1>	Hex string	Alpha identifier for user confirmation
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replace any text string or <alphaId>) • 1 – Display with <alphaId> or text string
<DCS2>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId2> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId2>	Hex string	Alpha identifier for call setup display
<redial>	integer	• Redial flag • Redial not required • Redial required
<timeout>	Integer	Timeout period (in ms)

Parameter	Format	Description
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Command performed successfully • 1 – Command beyond ME's capabilities • 2 – Currently busy on call • 3 – Currently busy with SS transaction • 4 – Terminated by user • 5 – SS returned Result Error Code • 6 – Network currently unable to process command • 7 – Call setup not accepted • 8 – User cleared down call before connection or • network release

Table 15. Send SS (<cmdId=11>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <TON>, <NPI>, <address>, [<DCS>,] <alphaId>, <iconId>, <dispMode>		
<TON>	Integer	Type of number • 0 – Unknown • 1 – International • 2 – National • 3 – Network specific
<NPI>	Integer	Numbering plan identifier • 0 – Unknown • 1 – ISDN telephony • 3 – Data • 4 – Telex • 9 – Private
<address>	Hex string	SS address
<DCS>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId>	Hex string	Alpha identifier for user confirmation
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replace any text string or <alphaId>) • 1 – Display with <alphaId> or text string

Parameter	Format	Description
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Command performed successfully • 1 – Command beyond ME's capabilities • 2 – Currently busy with USSD transaction • 3 – Currently busy with SS transaction • 4 – Terminated by user • 5 – SS returned Result Error Code • 6 – Network currently unable to process command

Table 16. Send USSD (<cmdId=12>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <dcs1>, <ussd>, [<DCS2>,] <alphaId>, <iconId>, <dispMode>		
<dcs1>	Integer	Data coding scheme for <ussd> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<ussd>	Hex string	USSD string
<DCS2>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId>	Hex string	Alpha identifier for user confirmation
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replace any text string or alphaId>) • 1 – Display with <alphaId> or text string
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Command performed successfully • 1 – Command beyond ME's capabilities • 2 – Currently busy with USSD transaction • 3 – Currently busy with SS transaction • 4 – Terminated by user • 5 – SS returned Result Error Code • 6 – Network currently unable to process command

Table 17. Send SMS (<cmdId=13>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <pack>, <tpdu>, <TON>, <NPI>, <address>, [<DCS>,] <alphaId>, <iconId>,<dispMode>		
<pack>	Integer	Packing flag • 0 – Packing not required • 1 – Packing required
<tpdu>	Hex string	TPDU string
<TON>	Integer	Type of number • 0 – Unknown • 1 – International • 2 – National • 3 – Network specific
<NPI>	Integer	Numbering plan identifier • 0 – Unknown • 1 – ISDN telephony • 3 – Data • 4 – Telex • 9 – Private
<address>	Hex string	Destination address
<DCS>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId>	Hex string	Alpha identifier for user confirmation
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replace any text string or <alphaId>) • 1 – Display with <alphaId> or text string
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Command performed successfully • 1 – Command beyond ME's capabilities • 2 – SMS RP error

Table 18. Send DTMF (<cmdId=14>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <dtmf>, [<DCS>,] <alphaId>, <iconId>, <dispMode>		
<dtmf>	Hex string	DTMF string
<DCS>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId>	Hex string	Alpha identifier for user confirmation
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replace any text string or <alphaId>) • 1 – Display with <alphaId> or text string
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Command performed successfully • 1 – Command beyond ME's capabilities • 2 – Not in speech call • 3 – Terminate proactive session

Table 19. Launch Browser (<cmdId=15>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <comQual>, <url>, <browserId>, <bearer>, <dcs1>, <gateway>, [<DCS2>,] <alphaId>, <iconId>, <dispMode>, <numFiles>[, <provfiles>, [...]]		
<comQual>	Integer	Command qualifier • 0 – Launch browser if not already launched • 2 – Use existing browser • 3 – Close existing browser and launch new browser
<url>	Hex string	Initial browser URL 8-bit data using the GSM default 7-bit alphabet If the <url> is null (""), use the browser's default <url>
<browserId>	Hex string	Browser Id to use "00" – Use the default browser

Parameter	Format	Description
<bearer>	Hex string	List of one or more allowed bearers, sorted in priority order • "00" – SMS • "01" – CSD • "02" – USSD • "03" – GPRS Example: "010200"—CSD, USSD, and SMS support; CSD is highest priority
<dcs1>	Integer	Data coding scheme for <gateway> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<gateway>	Hex string	Gateway text string in <dcs> format
<DCS2>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId>	Hex string	Alpha identifier for user confirmation
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replace any text string or <alphaId>) • 1 – Display with <alphaId> or text string
<numFiles>	Integer	Number of provisioning files following this parameter
<provFiles>	Hex string	List of zero or more provisioning files separated by commas. Each file includes its full path.
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Command performed successfully • 1 – Command performed – partially completed • 2 – Command performed – missing information • 3 – Error – no specific cause given • 4 – Bearer unavailable • 5 – Browser unavailable • 6 – ME cannot process command • 7 – Network cannot process command • 8 – Command beyond ME's capabilities

Table 20. Play Tone (<cmdId=>20) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: [<DCS>,] <alphaId>, <tone>, <duration>		
<DCS>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId>	Hex string	Alpha identifier for user confirmation
<tone>	Hex string	Tone type. (SST – Standard Supervisory Tone; MPT – ME Proprietary Tone) If no tone is specified, ME defaults to General beep(“10”) • “01” – Dial (SST) • “02” – Called subscriber busy (SST) • “03” – Congestion (SST) • “04” – Radio path acknowledge (SST) • “05” – Radio path not available/Call dropped (SST) • “06” – Error/Special information (SST) • “07” – Call waiting (SST) • “08” – Ringing tone (SST) • “10” – General beep (MPT) • “11” – Positive ack (MPT) • “12” – Negative ack or Error (MPT)
<duration>	Integer	Duration of tone to be played (in ms) If <duration> = 0, use a host-defined default value
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Command performed successfully • 1 – Terminate proactive session • 2 – Specified tone not supported

Table 21. Display Text (<cmdId=21>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <dcs>, <text>, <priority>, <clear>, <iconId>, <dispMode>, <response>		
<dcs>	Integer	Data coding scheme for <text> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<text>	Hex string	Text string in <dcs> format
<priority>	Integer	Priority information flag • 0 – Do not display priority information • 1 – Display priority information

Parameter	Format	Description
<clear>	Integer	Clear message flag • 0 – Do not allow user to clear message • 1 – Allow user to clear message
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replace any text string or <alphaId>) • 1 – Display with <text> string
<response>	Integer	Response flag • 0 – Normal response expected • 1 – Immediate response expected
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Message displayed OK • 1 – Terminate proactive session • 2 – Screen is busy • 3 – Backward move requested • 4 – No response from user

Table 22. Get Inkey (<cmdId=22>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <dcs>, <text>, <response>, <helpInfo>, <iconId>, <dispMode>		
<dcs>	Integer	Data coding scheme for <text> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<text>	Hex string	Text string in <dcs> format
<response>	Integer	Expected response character format • 0 – SMS default alphabet • 1 – Yes/No response only • 2 – Digits only (0–9, *, #, +) • 3 – UCS2 alphabet
<helpInfo>	Integer	Help information flag • 0 – No help information available • 1 – Help information available
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag

Parameter	Format	Description
<dispMode>	Integer	Icon usage • 0 – Display icon only (replace the <text> string) • 1 – Display with <text> string
!STKCR Parameters		
<data>	[<dcs>, <text>]	Required for <result = 0>. (The SIM expects a single character to be provided in a Text String Data Object in the Terminal Response SIM command when data has been input.) Format: <dcs>, <text>
<dcs>	Integer	Data coding scheme • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<text>	Hex string	Text string in <dcs> format For Yes/No responses, use: • “00” – No • “01” – Yes
<result>	Integer	• 0 – Data entered OK • 1 – Terminate proactive session • 2 – Help information requested • 3 – Backward move requested • 4 – No response from user

Table 23. Get Input (<cmdId=23>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: **<dcs>, <text>, <response>, <echo>, <helpInfo>, <minLgth>, <maxLgth>, <dcs>, <default>, <iconId>, <dispMode>**		
<dcs>	Integer	Data coding scheme for <text> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<text>	Integer	Text string in <dcs> format
<response>	Integer	Expected response character format • 0 – SMS default alphabet • 1 – Yes/No response only • 2 – Digits only (0–9, *, #, +) • 3 – UCS2 alphabet
<echo>	Integer	Echo flag • 0 – No echo allowed. Actual input string can be hidden, or can be masked to indicate key entry using the following characters: 0–9, *, #. • 1 – Echo input to display
<helpInfo>	Integer	Help information flag • 0 – No help information available • 1 – Help information available

Parameter	Format	Description
<minLgth>	Integer	Minimum length of expected response • 0 – No minimum length requirement • 1…255
<maxLgth>	Integer	Maximum length of expected response • 0…254 • 255 – No maximum length requirement
<default>	Hex string	Text string in <dcs> format
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replaces any <text> string) • 1 – Display with <text> string
!STKCR Parameters		
<data>	[<dcs>, <text>]	If the <dcs> is present, but <text> is an empty string, then a null text string data object must be sent to the SIM. This is caused by the user making an 'empty' input. Format: <dcs>, <text>
<dcs>	Integer	Data coding scheme • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<text>	Hex string	Text string in <dcs> format
<result>	Integer	• 0 – Data entered OK • 1 – Terminate proactive session • 2 – Help information requested • 3 – Backward move requested • 4 – No response from user

Table 24. Select Item (<cmdId=24>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <numItems>, <selection>, [<default>,] <helpInfo>, [<DCS>,] <alphaId>, <iconId>, <dispMode>		
<numItems>	Integer	Number of items that are accessible in the menu structure • 0 – Remove existing menu from the ME's menu structure • 1 or higher – Number of menu items
<selection>	Integer	Preferred user selection method • 0 – No selection preference • 1 – Soft key selection preferred
<default>	Integer	Only returned if **AT!STKVER?** returns 1. Default selection item

Parameter	Format	Description
<helpInfo>	Integer	Help information flag • 0 – No help information available • 1 – Help information available
<DCS>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId>	Hex string	Alpha identifier for user confirmation
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replaces <alphaId>) • 1 – Display with <alphaId> string
!STKCR Parameters		
<data>	[<itemId>]	ID of item selected, or for which help is requested
<itemId>	Integer	Identifier of the item that was selected
<result>	Integer	• 0 – Item selected OK • 1 – Terminate proactive session • 2 – Help information requested • 3 – Backward move requested • 4 – No response given

Table 25. Set Up Menu (<cmdId=25>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: **<numItems>, <selection>, [<default>,] <helpInfo>, [<DCS>,] <alphaId>, <iconId>,<dispMode>[<itemId>, <itemText>, <iconId>, <dispMode>, <nai> [...]**		
<numItems>	Integer	Number of items that are accessible in the menu structure • 0 – Remove existing menu from the ME's menu structure • 1 or higher – Number of menu items
<selection>	Integer	Preferred user selection method • 0 – No selection preference • 1 – Soft key selection preferred
<default>	Integer	Only returned if **AT!STKVER?** returns ERROR. Default selection item
<helpInfo>	Integer	Help information flag • 0 – No help information available • 1 – Help information available

Parameter	Format	Description
<DCS>	Integer	Only returned if **AT!STKVER?** returns 1. Data coding scheme for <alphaId> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<alphaId>	Hex string	Alpha identifier for user confirmation
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replaces <alphaId> or <text> strings) • 1 – Display with <alphaId> or <text> strings
<itemId>	Integer	Menu item identifier
<itemText>	Hex string	Menu item text
<nai>	Hex string	Next action indicator (the next action the SIM will request when this menu item is selected)
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Menu successfully added/removed • 1 – Problem with menu operation

Table 26. Set Up Idle Mode (<cmdId=28>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <dcs>, <text>, <iconId>, <dispMode>		
<dcs>	Integer	Data coding scheme for <text> • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<text>	Hex string	Text string in <dcs> format
<iconId>	Integer	Numeric tag of the icon to display (matches the index in the SIM's image file) • 0 – No icon • 1…255 – Icon tag
<dispMode>	Integer	Icon usage • 0 – Display icon only (replaces <text> string) • 1 – Display with <text> string
!STKCR Parameters		
<data>		Not used
<result>	Integer	• 0 – Text successfully added/removed • 1 – Problem performing operation

Table 27. Language Notification (<cmdId=35>) Parameters

Parameter	Format	Description
!STKGC <data> parameter – Format: <spec>, <lang>		
<spec>	Integer	Language notification type • 0 – Non-specific language notification • 1 – Specific language notification
<lang>	Hex string	List of language codes
!STKCR Parameters		
<data>		Not used
<result>	Integer	0 – Command performed successfully

Table 28. Response Notification to MO Call Control Request (<cmdId=D4>) Parameters

Parameter	Format	Description
!STKN <data> parameter – Format (depends on call type): **Voice: <result>, <repeatind>, <alphaId>, 0, <TON>, <NPI>, <address>, <subaddress>, <ccp1>, <ccp2>** **SS: <result>, <repeatind>, <alphaId>, 1, <TON>, <NPI>, <address>** **USSD: <result>, <repeatind>, <alphaId>, 2, <dcs>, <ussd>** **PDP context: <result>, <repeatind>, <alphaId>, 6, <pdp>** **None: <result>, <repeatind>, <alphaId>, 7**		
<result>	Integer	Call control result • 0 – Allowed with no modifications • 1 – Not allowed • 2 – Allowed with modifications
<repeatind>	Integer	BC repeat indicator • 1 – Alternate mode • 3 – Sequential mode
<alphaId>	Hex string	Alpha identifier
<TON>	Integer	Type of number • 0 – Unknown • 1 – International • 2 – National • 3 – Network specific
<NPI>	Integer	Numbering plan identifier • 0 – Unknown • 1 – ISDN telephony • 3 – Data • 4 – Telex • 9 – Private
<address>	Hex string	New dialing address
<subaddress>	Hex string	New dialing subaddress
<ccp1>	Hex string	First capability configuration parameters
<ccp2>	Hex string	Second capability configuration parameters

Parameter	Format	Description
<dcs>	Integer	Data coding scheme • 0 – 7-bit GSM default alphabet (packed) • 4 – 8-bit GSM default alphabet (unpacked) • 8 – UCS2 alphabet
<ussd>	Hex string	USSD control string
<pdp>	Hex string	PDP control string

Table 29. Response Notification to MO SMS Control Request (<cmdId=D5>) Parameters

Parameter	Format	Description
!STKN <data> parameter – Format: <result>, <alphaId>, <TON>, <NPI>, <rpaddress>, <TON>, <NPI>, <tpaddress>		
<result>	Integer	SMS control result • 0 – Allowed with no modifications • 1 – Not allowed • 2 – Allowed with modifications
<alphaId>	Hex string	Alpha identifier
<TON>	Integer	Type of number • 0 – Unknown • 1 – International • 2 – National • 3 – Network specific
<NPI>	Integer	Numbering plan identifier • 0 – Unknown • 1 – ISDN telephony • 3 – Data • 4 – Telex • 9 – Private
<rpaddress>	Hex string	RP (Relay Layer Protocol) address
<tpaddress>	Hex string	TP (Transport Layer Protocol) address

5. Session Control Commands

*Note: Except for **!SCACT**, all other session control commands are only applicable in DIP mode.*

5.1. Command Summary

Command	Description
!SCACT	Activate/deactivate PDP context for FIFO interface
!SCDFTPROF	Set/return default profile ID
!SCDNS	Set/return profile ID DNS address
!SCNETDNS	Return DNS addresses for active profiles
!SCPADDR	Return IP address for specified PDP context
!SCPROF	Set/return SWI-specific profile information
!SCPROFDEL	Erase profile information
!SCWINS	Set/return profile's WINS addresses

5.2. Command Reference

Command	Description
!SCACT	**Activate/deactivate PDP context for FIFO interface** *Note: This command is also available in modes other than DIP mode.* **Usage** Execution: **AT!SCACT=<state>[,<pid>]** Response: **OK** Purpose: Set the state of the identified profile (<pid>). If no <pid> is specified, profile 1 is updated Query: **AT!SCACT?[<pid>]** Response: **!SCACT: <pid>, <state>** **[!SCACT: <pid>, <state>** **[...]]** Purpose: Report the status of the identified profile (<pid>). If no <pid> is specified, the status of all profiles is returned **Parameters** **Parameter** / **Value** / **Description** <state> / / PDP contect activation state / 0 / Deactivated / 1 / Activated <pid> / 1 – 16 / PDP context definition

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SCDFTPROF</td><td>
Set/return default profile ID

Usage
Execution AT!SCDFTPROF=<pid>
Response OK
Purpose Set the default profile ID to <pid>

Query AT!SCDFTPROF?
Response !SCDFTPROF: <pid>
OK
Purpose Return the default profile ID

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><pid></td><td>1 – 16</td><td>Valid profile ID that will be used as the default</td></tr>
</table>
</td></tr>
<tr><td>!SCDNS</td><td>
Set/return profile ID DNS address

Set or return the primary and secondary DNS addresses of a profile.

Usage
Execution AT!SCDNS=<pid>,<pri_dns>,<sec_dns>
Response OK
Purpose Set the default primary and secondary IP addresses for domain name services

Query AT!SCDNS?<pid>
Response !SCDNS: <pid>, <pri_dns>, <sec_dns>
OK
Purpose Return the primary and secondary DNS addresses for the specified profile

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><pid></td><td>1 – 16</td><td>Profile ID</td></tr>
<tr><td><pri_dns></td><td></td><td>Default primary IP address for DNS lookup in dot-format IP address
Example: 10.10.10.1
Overrides the DNS server address received over the air during PDP context activation</td></tr>
<tr><td><sec_dns></td><td></td><td>Default secondary IP address for DNS lookup in dot-format IP address
Example: 10.10.10.1
Overrides the DNS server address received over the air during PDP context activation</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SCNETDNS</td><td>
Return DNS addresses for active profiles

Return the network-provided DNS addresses associated with all active profiles.

Usage
Query AT!SCNETDNS?
Response
!SCNETDNS: <pid 1>, <dns 1>
!SCNETDNS: <pid 1>, <dns 2>
...
!SCNETDNS: <pid n>, <dns m>
OK
Purpose: Return all DNS address for each active profile

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><pid></td><td>1 – 16</td><td>Profile ID</td></tr>
<tr><td><dns></td><td></td><td>Network-provided IPv4 or IPv6 DNS address
Address provided OTA during PDP context activation, or through user-provided override
Example: 10.10.10.1 or FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:0001</td></tr>
</table>
</td></tr>
<tr><td>!SCPADDR</td><td>
Return IP address for specified PDP context

Return the IP address of the specified PDP context (profile), or for all profiles.

Usage
Execution AT!SCPADDR=[<pid>]
Response
!SCPADDR: <pid><addr>
[!SCPADDR: <pid>, <addr>
[...]]
OK
Purpose: Return the IP address for the specified <pid>. If <pid> is blank, return IP addresses for all defined profiles

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><pid></td><td>1 – 16</td><td>Profile ID</td></tr>
<tr><td><addr></td><td></td><td>IP address in dot-format
Example: 255.255.255.0</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SCPROF</td><td>
Set/return SWI-specific profile information

Usage
Execution !SCPROF=<pid>, Label>, <autoconnect>, <promptforpassword>, <autolaunchapp>, <rffu>
Response OK
Purpose Set the SWI-specific information for the specified profile

Query !SCPROF?<pid>
Response !SCPROF: <pid>, <label< <autoconnect>, <promptforpassword>, <autolaunchapp>, <rffu>
OK
Purpose Report current SWI-specific information for the specified profile

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><pid></td><td>1 – 16</td><td>Profile ID</td></tr>
<tr><td><label></td><td></td><td>Configuration buffer label
30-character string enclosed by quotation marks</td></tr>
<tr><td><autoconnect></td><td></td><td>Automatic context activation mode</td></tr>
<tr><td></td><td>0</td><td>Manual activation</td></tr>
<tr><td></td><td>1</td><td>Auto activation</td></tr>
<tr><td><promptforpassword></td><td></td><td>Prompt for password flag</td></tr>
<tr><td></td><td>0</td><td>Do not prompt for password</td></tr>
<tr><td></td><td>1</td><td>Prompt for password</td></tr>
<tr><td><autolaunchapp></td><td></td><td>Auto launch application flag</td></tr>
<tr><td></td><td>0</td><td>Do not auto launch the application</td></tr>
<tr><td></td><td>1</td><td>Auto launch the application</td></tr>
<tr><td><rffu></td><td>0 – 32767</td><td>Reserved for future use</td></tr>
</table>
</td></tr>
<tr><td>!SCPROFDEL</td><td>
Erase profile information

Erase the information for one or all profiles.

Usage
Execution !SCPROFDEL=<pid>
Response OK
Purpose Delete the identified profile. If <pid> is blank, delete all profiles

Query List !SCPROFDEL=?<pid>
Purpose Return usage instructions

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><pid></td><td>1 – 16</td><td>PDP context definition</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SCWINS</td><td>
Set/return profile’s WINS addresses

Set or return a profile’s primary and secondary WINS (Windows Internet Name Services) addresses.

Usage
Execution !SCWINS=<pid>,<pri_wins>,<sec_wins>
Response OK
Purpose Set the primary and secondary WINS addresses for the specified profile

Query !SCWINS?<pid>
Response <pid>, <pri_wins>, <sec_wins>
OK
Purpose Return the primary and secondary WINS addresses for the specified profile

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><pid></td><td>1 – 16</td><td>PDP context definition</td></tr>
<tr><td><pri_wins></td><td></td><td>Primary IP address used for WINS in dot-format IP address
Example: 10.10.10.1
Overrides WINS address received over the air during PDP context activation</td></tr>
<tr><td><sec_wins></td><td></td><td>Secondary IP address used for WINS in dot-format IP address
Example: 10.10.10.2
Overrides WINS address received over the air during PDP context activation</td></tr>
</table>
</td></tr>
</table>

6. SIM Related Commands

6.1. Command Summary

Command	Description
!SPN	Return (U)SIM card's SPN
!SIMNOTINSTALLED	Return SIM installation status
!SIMRFSC	Enable/disable SIM refresh reset notification
+CPINC	Return number of unlock attempts remaining
^CARDMODE	Return SIM card mode (card type)
!ICCID	Return (U)SIM card's ICCID
+CPIN2	Query SIM card PIN2 status or verify PIN2 code
!NSET	Query current NSET value
+CPHS	Manage a CPHS feature

6.2. Command Reference

Command	Description
!SPN	**Return (U)SIM card's SPN** Return a (U)SIM's SPN (Service Provider Name) and ME display requirements (as defined in 3GPP 31.1028). **Usage** Query: **AT!SPN?** Response: **!SPN: <display>, <spn>** **OK** or **ERROR** Purpose: Display the SIM's SPN **Parameters** **Parameter** / **Value** / **Description** <display> / 0 – 255 / PLMN/SPN name display requirement 8-bit Integer value Bit 0 (Registered PLMN name display requirement): Indicates if ME must display registered PLMN name when the registered PLMN is either HPLMN or a PLMN in the service provider PLMN list. 0=Not required 1=Required Bit 1 (SPN name display requirement):

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Indicates if ME must display the SPN when the registered PLMN is neither HPLMN nor a PLMN in the service provider PLMN list.
0=Required
1=Not required
<spn> Service provider name
ASCII string enclosed in quotation marks</td></tr>
<tr><td>!SIMNOTINSTALLED</td><td>Return SIM installation status

Indicate if a SIM is installed in the modem.

Usage
Query AT!SIMNOTINSTALLED?
Response OK (SIM is not installed)
or
ERROR (SIM is installed)
Purpose Indicate if SIM is installed</td></tr>
<tr><td>!SIMRFSC</td><td>Enable/disable SIM refresh reset notification

Enable/disable the unsolicited SIM refresh reset notification.
This command is not password-protected.

Note: This command is also applicable in CDMA mode.

Usage
Execution AT!SIMRFSC=<n>
Response OK
or
ERROR
Purpose Enable/disable the notification

Query AT!SIMRFSC?
Response !SIMRFSC: <n>
OK
Purpose Show current state of the notification

Query List AT!SIMRFSC=?
Response !SIMRFSC: <n>
OK

Unsolicited notification !SIMRFSN: <event>

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><n></td><td></td><td>Notification state</td></tr><tr><td></td><td>0</td><td>Disable</td></tr><tr><td></td><td>1</td><td>Enable</td></tr></table></td></tr>
</table>

Command	Description		
	<event>	0	This event indicates that the SIM is usable and we can start full service (e.g., after REFRESH Proactive Command)
		1	This event indicates that a Warm RESET has been performed on the card as a result of a REFRESH with the RESET command, which implicitly asks for PIN verification procedure again. Note that **!SIMRFSN: 1** is equal to **!SIMRSTN**
+CPINC	**Return number of unlock attempts remaining** Return the number of valid attempts remaining for PIN1/CHV1, PIN2/CHV2, PUK1, and PUK2. **Usage** Query: **AT+CPINC?** or **AT+CPINC** Response: **+CPINC: <n1>, <n2>, <k1>, <k2>** **OK** Purpose: Show number of remaining attempts for each identifier **Parameters**		

Parameter	Value	Description
<n1>		Remaining attempts for PIN1/CHV1
	0	Blocked
	1 – 3	Remaining attempts
<n2>		Remaining attempts for PIN2/CHV2
	0	Blocked
	1 – 3	Remaining attempts
<k1>		Remaining attempts for PUK1
	0	Blocked
	1 – 10	Remaining attempts
<k2>		Remaining attempts for PUK2
	0	Blocked
	1 – 10	Remaining attempts

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>^CARDMODE</td><td>
Return SIM card mode (card type)

Identify the type of SIM card being used.

Usage
Execution AT^CARDMODE
Response ^CARDMODE: <sim_type>
OK
Purpose Identify the SIM card type in the device

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><sim_type></td><td></td><td>SIM card type</td></tr>
<tr><td></td><td>0</td><td>Unknown</td></tr>
<tr><td></td><td>1</td><td>SIM</td></tr>
<tr><td></td><td>2</td><td>USIM</td></tr>
</table>
</td></tr>
<tr><td>!ICCID</td><td>
Return (U)SIM card’s ICCID

Return a (U)SIM’s ICCID (Integrated Circuit Card ID).

Usage
Query AT!ICCID?
Response !ICCID: <iccid>
OK
Purpose Display the ICCID

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><iccid></td><td></td><td>ICCID of the (U)SIM currently being tested
20-digit decimal number (this is often printed on the (U)SIM card)</td></tr>
</table>
</td></tr>
<tr><td>+CPIN2</td><td>
Query SIM card PIN2 status or verify PIN2 code

Usage
Execution AT+CPIN2=<PIN2>
Response OK
or
ERROR
or
+CME ERROR: <err>
Purpose Verify the PIN2 code

Query AT+CPIN2?
Response +CPIN2: SIM PIN2
or
+CPIN2: READY
Purpose Get the CPIN2 status
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><PIN2></td><td></td><td>PIN2 code of the SIM card</td></tr></table></td></tr>
<tr><td>!NSET</td><td>Query current NSET value

This command is not password-protected.

Usage
Query AT!NSET?
Response !NSET:
NSET: <n>
OK
or
ERROR
Purpose Get the CPIN2 status

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><n></td><td></td><td>List of supported customizations</td></tr><tr><td></td><td>“None”</td><td></td></tr><tr><td></td><td>“GSM and UMTS only”</td><td></td></tr><tr><td></td><td>“GSM only”</td><td></td></tr><tr><td></td><td>“WCDMA only”</td><td></td></tr><tr><td></td><td>“Automatic”</td><td></td></tr><tr><td></td><td>“LTE only”</td><td></td></tr></table></td></tr>
<tr><td>+CPHS</td><td>Manage a CPHS feature

This command is used to activate, deactivate or interrogate a CPHS feature as well as activates the unsolicited response +WMVI which indicates the status of the LINE 1, LINE 2, DATA or FAX mailboxes.
This command is not password-protected.
Note: This command is also applicable in CDMA mode.

Usage
Execution (for <mode>=0 or 1 AT+CPHS=<Mode>,<FctId>
Response OK
Execution (for <mode>=2 and <FctId>=1 AT+CPHS=<Mode>,<FctId>
Response +WVMI: <LineId>,<VoiceMailStatus>
[+WVMI:
<LineId>,<VoiceMailStatus>[…]]
OK
Execution (for <mode>=2 regardless of <FctId> value AT+CPHS=<Mode>,<FctId>
Response OK

Query AT+CPHS?
Response +CPHS: <FctId>[,<Status>]
[+CPHS: <FctId>[,<Status>][…]]
OK</td></tr>
</table>

Command	Description

Query List **AT+CPHS=?**

Response **OK**

Unsolicited notification (when <FctId>=1 and <Status>=1) **+WVMI: <LineId>,<VoiceMailStatus>**

Parameters

Parameter	Value	Description
<Mode>		Requested operation
	0	Deactivate a CPHS feature
	1	Activate a CPHS feature
	2	Interrogate a CPHS feature
<FctId>	1	Voice mail indicator
<Status>		CPHS feature state
	0	Disabled
	1	Enabled
<LineId>		Line identity
	1	Line 1
	2	Line 2
	3	Data
	4	Fax
<VoiceMailStatus>	0	No message waiting
	1	At lease one message is waiting

7. PCSC Related Commands

7.1. Command Summary

Command	Description
!PCSCCONFIG	Configure PCSC interface
!PCSCOPEN	Open a logical channel to the SIM
!PCSCCLOSE	Close a logical channel
!PCSCSEND	Send 7816 compliant APDU data down to the SIM
!PCSC	Enable/disable the PC/SC interface
!AUTH	Run authentication algorithm on SIM or USIM

7.2. Command Reference

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!PCSCCONFIG</td><td>
Configure PCSC interface

Configure PCSC interface to override the ATR and SIM status.
This command is not password-protected.

Usage
Execution AT!PCSCCONFIG=<overrideon>,<simstate>,<ATR>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><overrideon></td><td></td><td>Override mode</td></tr>
<tr><td></td><td>0</td><td>Off</td></tr>
<tr><td></td><td>1</td><td>On</td></tr>
<tr><td><simstate></td><td></td><td>SIM state to override
Only valid if <overrideon> = 1</td></tr>
<tr><td></td><td>0</td><td>No SIM</td></tr>
<tr><td></td><td>1</td><td>SIM is present</td></tr>
<tr><td></td><td>2</td><td>SIM state unknown</td></tr>
<tr><td><ATR></td><td></td><td>ATR value
Only valid if <overrideon> = 1</td></tr>
</table>
</td></tr>
<tr><td>!PCSCOPEN</td><td>
Open a logical channel to the SIM

This command is not password-protected.

Usage
Execution AT!PCSCOPEN=<chanID>,<reqChanID>
Response AT!PCSC: ,00,00
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><chanID></td><td>0 – 255</td><td>Channel ID of the channel to open</td></tr>
<tr><td><reqChanID></td><td>0 – 255</td><td>Requested channel ID</td></tr>
</table>
</td></tr>
<tr><td>!PCSCCLOSE</td><td>
Close a logical channel

This command is not password-protected.

Usage
Execution AT!PCSCCLOSE
Response AT!PCSC: ,00,00
</td></tr>
<tr><td>!PCSCSEND</td><td>
Send 7816 compliant APDU data down to the SIM

This command is not password-protected.

Usage
Execution AT!PCSCSEND=<APPDU>
Response AT!PCSC: resp,00,00

Query AT!PCSCSEND=<APPDU>
Response AT!PCSC: sw1sw2,00,00

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><APPDU></td><td>0 – 32</td><td>APDU to send</td></tr>
</table>
Example
at!pcscopen=0
AT!PCSC: ,00,00
OK

at!pcscsend=a0a40000027f20
AT!PCSC:
000000327F2002000000000000991001F0800838A828A9000,9F,16
OK

at!pcscsend=a0880000101234567890123456789012345678901234567890
AT!PCSC: B791F3DD35B791F3DD35B7919000,9F,0C
OK
</td></tr>
<tr><td>!PCSC</td><td>
Enable/disable the PC/SC interface

Note: The query operation is not password-protected.

Usage
Execution AT!PCSC=<value>
Response OK

Query AT!PCSC?
Response <state>
OK
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><state></td><td>0</td><td>Dsiable</td></tr><tr><td></td><td>1</td><td>Enable</td></tr></table></td></tr>
<tr><td>!AUTH</td><td>Run authentication algorithm on SIM or USIM

This command is not password-protected.

Usage
Execution AT!AUTH=<rand>
Response AT!AUTH: <SRES>,<CK>
OK
or
ERROR (no SIM or “PCSCDISABLE” customization bit 1 set)

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><rand></td><td></td><td>Random value passed to the authentication algorithm</td></tr><tr><td><SRES></td><td></td><td>SIM response</td></tr><tr><td><CK></td><td></td><td>Cipher key</td></tr></table></td></tr>
</table>

8. SMS Configuration Commands

8.1. Command Summary

Command	Description
!SMSRETRY	Set/return SMS retry period and interval
!SMSSTSEN	Enable/disable SMS status reports

8.2. Command Reference

Command	Description
!SMSRETRY	**Set/return SMS retry period and interval** Configure the SMS retry period and interval for MO-SMS. **Usage** Execution: **AT!SMSRETRY=<period>, <interval>** Response: **OK** Purpose: Set the retry period and retry interval Query: **AT!SMSRETRY?** Response: **!SMSRETRY:** **<period>,<interval>** **OK** Purpose: Return the current <period> and <interval> settings Query List: **AT!SMSRETRY=?** Purpose: Display the execution command format **Parameters** **Parameter** / **Value** / **Description** <period> / 0 – 255 / Number of seconds allowed for MO-SMS retry attempts <interval> / 0 – 255 / Number of seconds to wait between MO-SMS retry attempts If <interval> is greater than <period>, a single retry attempt is made <interval> ignores the time spent actually performing a retry attempt. If <interval> = 5, attempts are made at elapsedTime = 0, 5, 10, etc. until an attempt is successful or <period> - elapsedTime < <interval>. Example 1: Assume a retry attempt takes 2 seconds. If <period> = 1 and <interval> = 8, and no attempts are successful:

Command	Description
	Time=0: Retry attempt fails at time = 2. No more attempts are made because <period> has expired. Example 2: Assume a retry attempt takes 2 seconds. If <period> = 3 and <interval> = 5, and no attempts are successful: Time=0: Retry attempt fails at time = 2. No more attempts are made because <period> will expire before the <interval> passes. Example 3: Assume a retry attempt takes 2 seconds. If <period> = 14 and <interval> = 5, and no attempts are successful: Time=0: Retry attempt fails at time = 2; next attempt will begin at time=5 (the <interval> counts from the beginning of the previous attempt) Time=5: Retry attempt fails at time = 7; next attempt will begin at time=10 Time=10: retry attempt fails at time = 12; No more attempts will be made because the <period> will expire before another <interval> of 5 seconds can pass.

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SMSSTSEN</td><td>
Enable/disable SMS status reports

Enable/disable SMS status reports for MO-SMS messages, or indicate if the user should be able to enable/disable the reports.
The status report indicates when a message is delivered to its intended recipient (in addition to the report that is sent when the network first receives the message).

Usage
Execution AT!SMSSTSEN=<enable>, <mode>
Response OK
Purpose Enable/disable status reports, and indicate if the user can enable/disable the feature

Query AT!SMSSTSEN?
Response !SMSSTSEN:
<enable>, <mode>
OK
Purpose Return the current <enable> and <mode> settings

Query List AT!SMSSTSEN=?
Purpose Display the execution command format

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><enable></td><td></td><td>Enable/disable SMS status reports</td></tr>
<tr><td></td><td>0</td><td>Disable</td></tr>
<tr><td></td><td>1</td><td>Enable</td></tr>
<tr><td><mode></td><td></td><td>User access to reporting feature</td></tr>
<tr><td></td><td>0</td><td>Read/write (user can enable/disable the feature)</td></tr>
<tr><td></td><td>1</td><td>Read only (user cannot enable/disable the feature – feature is preset by the device provider)</td></tr>
</table>
</td></tr>
</table>

9. Emergency Call Related Commands

9.1. Command Summary

Command	Description
!NVENUM	Set/query emergency numbers

9.2. Command Reference

Command	Description

!NVENUM	**Set/query emergency numbers**
	
	Note: The query operation is not password-protected.
	This command is also applicable in CDMA mode.
	
	Usage
	Execution: `AT!NVENUM=<operate><e_enum1><e_enum2>...<e_enum10>`
	Response: `OK`
	
	Query: `AT!NVENUM?`
	Response:
	`!NVENUM:`
	`1,"e_enum1"`
	`2,"e_enum2"`
	`...`
	`3."e_enum?"`
	`OK`
	
	Query List: `AT!NVENUM=?`
	Response:
	`!NVENUM=<operate><e_enum1><e_enum2>...<e_enum10>`
	`<operate>: 0 - Clear all emergency numbers`
	`1 - Add new emergency numbers`
	`2 - Delete specified emergency numbers`
	`<e_enumx>: 00-999999 - Emergency number`
	`OK`
	
	Parameters
	Parameter / Value / Description
	<operate> / 0 / Clear all emergency numbers
	1 / Add a new emergency number
	2 / Delete specified emergency number
	<e_enumx> / 00 – 999999 / Emergency number
	Total number of emergency numbers is 10

10. Call Setting Commands

10.1. Command Summary

Command	Description
!SWICALLPROG	Enable/disable Call Progress Notification

10.2. Command Reference

Command	Description
!SWICALLPROG	**Enable/disable Call Progress Notification** Enable or disable call progress notification. This allows the host to receive call status updates such as type of call, answered, on hold, etc. *Note: When call progress notification is enabled, the standard AT command +CLCC (List Current Calls) is disabled.* **Usage** Execution: **AT!SWICALLPROG=<cpnStatus>** Response: **!SWICALLPROG:<idx1>, <dir>, <state>, <mode>, <mpty>, <number>, <type>, <alpha>** **!SWICALLPROG:<idx2>, <dir>, <state>, <mode>, <mpty>, <number>, <type>, <alpha>** **...** Purpose: Display information on current calls, when the call status changes Query: **AT!SWICALLPROG?** Response: **<cpnStatus>** **OK** Purpose: Return the current call progress notification status **Parameters** **Parameter / Value / Description** <cpnStatus> / / Call progress notification status / 0 / Disabled / 1 / Output on AT channel if AT is not blocked / 2 / Output on AT channel even if AT is blocked <idx> / / Call identification number Integer value as described in GSM 02.30 Section 4.5.5.1 <dir> / / Call direction / 0 / Mobile-originated (MO) / 1 / Mobile-terminated (MT)

Command	Description		
	<state>		Call state
		0	Active
		1	Held
		2	Dialing (MO calls)
		3	Alerting (MO calls)
		4	Incoming (MT calls)
		5	Waiting (MT calls)
		6	Disconnected
	<mode>		Bearer/teleservice mode
		0	Voice
		1	Data
		2	Fax
	<mpty>		Multiparty status
		0	Not part of a multiparty/conference call
		1	Part of a multiparty/conference call
	<number>		Telephone number at the other end of the conversation Format is specified by <type>
	<type>		Address octet type Two bitfields identifying the type of telephone number and numbering plan type (national/international). Format specified in 3GPP TS 24.008 Section 10.5.4.7
	<alpha>		Tag associated with <number> in the phonebook Example: “John Doe”

11. Connection Watch Dog

This function only works in DIP mode.

11.1. Command summary

Command	Description
!CWSETUP	Sets up and displays Connection Watchdog configuration
!CWSTATS	Displays the EFS logs of OMA-DM session. Also used to reset the reset/disconnect count to zero

11.2. Command Reference

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>AT!CWSETUP</td><td>
Sets up and displays Connection Watchdog configuration

Usage
Execution AT!CWSETUP=<mode>,<PingIP>,<dnsname>,<rxint>,<valint>,<reset>
Response OK
Purpose Setup the connection configuration

Query AT!CWSETUP?
Response <mode>,<PingIP>,<dnsname>,<rxint>,<valint>,<reset>
OK
Purpose Get the connection cofiguration

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><Mode></td><td>0</td><td>CW is disabled</td></tr>
<tr><td></td><td>1</td><td>CW uses Ping method</td></tr>
<tr><td></td><td>2</td><td>CW uses DNS method</td></tr>
<tr><td><PingIP></td><td></td><td>Ping server IP address (nnn.nnn.nnn.nnn)</td></tr>
<tr><td><dnsname></td><td></td><td>Domain name for the DNS lookup (maximum of 28 characters)</td></tr>
<tr><td><Rxint></td><td>1 – 1440</td><td>Interval in minutes at which the modem checks if new data has been received since the last check</td></tr>
<tr><td><Valint></td><td>1 – 10</td><td>Interval in minutes at which the modem checks if new data has been received since the last check</td></tr>
<tr><td><reset></td><td>0</td><td>Do not reset the modem if CW detects a bad connection; reestablish data connection</td></tr>
<tr><td></td><td>1</td><td>Reset the modem if CW detects a bad connection</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>AT!CWSTATS</td><td>
Reset the counter to zero or get the status of the Connection Watchdog.

Usage
Execution AT!CWSTATS=0
Response OK
Purpose Reset the reset/disconnect counter to zero

Query AT!CWSTATS?
Response <state>,<check counter>,<RD_cnt>
OK
Purpose Get the counter inforamtion

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><State></td><td>Off</td><td></td></tr>
<tr><td></td><td>Validating</td><td></td></tr>
<tr><td></td><td>Active</td><td></td></tr>
<tr><td><Check Counter></td><td></td><td>Number of times CW has sent a Ping/DNS to check the connection since power up</td></tr>
<tr><td></td><td>0</td><td>Maximum</td></tr>
<tr><td><Rd_cnt></td><td></td><td>Number of times CW has caused a reset or disconnect</td></tr>
<tr><td></td><td>0</td><td>Maximum</td></tr>
</table>
</td></tr>
</table>

CDMA Specific AT Commands

1. Call Setting Commands

1.1. Command Summary

Command	Description
+WFSH	Send flash or flash information to base station

1.2. Command Reference

Command	Description
+WFSH	**Send flash or flash information to base station** This command sends a flash or flash with information to the base station. The flash command is used to manage call waiting and 3-way calls. For call waiting situations when the 3rd party call is received, send a flash (**AT+WFSH**) to toggle between the two different call parties. The **+WFSH** unsolicited ATcommand will be returned if a flash was sent to the base station over the air. Note that this does not guarantee that an actual switch between calls took place, because there is no acknowledgement to the module. For 3-way calls, initiate the first call to party # 1 then send a flash with information (**AT+WFSH=18005551212**) where the "information" is the phone number of party **#** 2 to initiate a call to party # 2. Once a conversation with party # 2 is established, party # 1 will automatically be placed on hold. This command is not password-protected. **Usage** Execution (send flash): `AT+WFSH` Response: **OK** **+WFSH** Execution (send flash with information): **AT+WFSH=<phone number>** Response: **OK** **+WFSH**

2. SMS Operation Commands

2.1. Command Summary

Command	Description
$QCMGD	Delete a specific SMS, or a set of short messages.
$QCMGF	Message format
$QCMGL	Lists message
$QCMGR	Read MT SMS from the modem
$QCMGS	Send MO SMS
$QCMGW	Writes message to memory
$QCMSS	Sends message from storage
$QCNMI	New message indications to TE
$QCPMS	Preferred message storage
$QCSMP	Sets Text mode parameters
+RCHVVER	Verify CHV
+RCHVUNBLK	Generate new PIN code using PUK
+RCHVCHG	Change PIN code
+RCHVEN	Enable/disable CHV state

2.2. Command Reference

Command	Description
$QCMGD	**Delete a specific SMS, or a set of short messages** **Usage** Execution: `$QCMGD=<index>` or `$QCMGD=0, <smsset>` Query: `$QCMGD=?` **Parameters** Parameter / Value / Description: <index> / 0 – 4294967295 / SMS index <smsset> / / The SMS set to be deleted 1 / Read MT SMS 2 / Read MT SMS and sent MO SMS 3 / Read MT SMS, sent MO SMS and not sent MO SMS 4 / All SMS (read MT SMS, sent MO SMS, not sent MO SMS and not read MT SMS)

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>$QCMGF</td><td>
Message format

Usage
Execution $QCMGF=<mode>
Query $QCMGF=<mode>
Query List $QCMGF=?
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mode></td><td></td><td>SMS format mode</td></tr>
<tr><td></td><td>0</td><td>PDU mode (not supported)</td></tr>
<tr><td></td><td>1</td><td>Text mode</td></tr>
</table>
</td></tr>
<tr><td>$QCMGL</td><td>
List message

Usage
Execution $QCMGL=<Stat>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><Stat></td><td></td><td>Status of message in memory</td></tr>
<tr><td></td><td>“REC UNREAD”</td><td>Received unread message</td></tr>
<tr><td></td><td>“REC READ”</td><td>Received read message</td></tr>
<tr><td></td><td>“STO UNSENT”</td><td>Stored unsent message</td></tr>
<tr><td></td><td>“STO SENT”</td><td>Stored sent message</td></tr>
</table>
</td></tr>
<tr><td>$QCMGR</td><td>
Read a MT SMS which is specified by <index>

Usage
Execution $QCMGR=<index>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><index></td><td>0 – 4294967295</td><td>SMS index</td></tr>
</table>
</td></tr>
<tr><td>$QCMGS+CMGS</td><td>
Send a MO SMS from TE to network

Usage
Execution $QCMGS+CMGS=<da>[,<toda>]<CR>
text is entered<ctrl-Z/ESC>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><da></td><td></td><td>Destination address</td></tr>
<tr><td><toda></td><td></td><td>Type of address</td></tr>
<tr><td></td><td>0</td><td>Unknown</td></tr>
<tr><td></td><td>1</td><td>International</td></tr>
<tr><td></td><td>2</td><td>National</td></tr>
<tr><td></td><td>3</td><td>Network</td></tr>
<tr><td></td><td>4</td><td>Subscriber</td></tr>
<tr><td></td><td>5</td><td>Alphanumeric</td></tr>
<tr><td></td><td>6</td><td>Abbreviated</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>$QCMGW</td><td>
Writes message to memory

Usage
Execution $QCMGW=<da>[,<toda>]<CR>
text is entered<ctrl-Z/ESC>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><da></td><td></td><td>Destination address</td></tr>
<tr><td><toda></td><td></td><td>Type of address</td></tr>
<tr><td></td><td>0</td><td>Unknown</td></tr>
<tr><td></td><td>1</td><td>International</td></tr>
<tr><td></td><td>2</td><td>National</td></tr>
<tr><td></td><td>3</td><td>Network</td></tr>
<tr><td></td><td>4</td><td>Subscriber</td></tr>
<tr><td></td><td>5</td><td>Alphanumeric</td></tr>
<tr><td></td><td>6</td><td>Abbreviated</td></tr>
</table>
</td></tr>
<tr><td>$QCMSS</td><td>
Send message from storage

Usage
Execution $QCMSS=<index>[,<da>[,<toda>]]
Response +CMSS: <mr>
OK

Query $QCMSS=?

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><index></td><td></td><td>Place of storage in memory</td></tr>
<tr><td><da></td><td></td><td>Destination address</td></tr>
<tr><td><toda></td><td></td><td>Type of address</td></tr>
<tr><td></td><td>0</td><td>Unknown</td></tr>
<tr><td></td><td>1</td><td>International</td></tr>
<tr><td></td><td>2</td><td>National</td></tr>
<tr><td></td><td>3</td><td>Network</td></tr>
<tr><td></td><td>4</td><td>Subscriber</td></tr>
<tr><td></td><td>5</td><td>Alphanumeric</td></tr>
<tr><td></td><td>6</td><td>Abbreviated</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>$QCNMI</td><td>
New message indications to TE

Usage
Execution $QCNMI=[<mode>[,<mt>[,<bfr>]]]
Query $QCNMI?
Query List $QCNMI=?

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mode></td><td></td><td>Controls the processing of unsolicited result codes</td></tr>
<tr><td></td><td>0</td><td>Buffer unsolicited result codes in the TA</td></tr>
<tr><td></td><td>1</td><td>Discard indication and reject new received message unsolicited result codes when TA-TE link is. Otherwise forward them directly to the TE</td></tr>
<tr><td></td><td>2</td><td>Buffer unsolicited result codes in the TA when TA-TE link is reserved and flush them to the TE after reservation. Otherwise forward them directly to the TE</td></tr>
<tr><td><mt></td><td></td><td>Rule for storing received SMS</td></tr>
<tr><td></td><td>0</td><td>If SMS-DELIVER is stored into ME/TA, indication to the TE using unsolicited result code:+CMTI</td></tr>
<tr><td></td><td>1</td><td>SMS are routed directly to the TE using unsolicited result code:+CMT</td></tr>
<tr><td></td><td>2</td><td>SMS are routed directly to the TE using unsolicited result code:+ CMTI</td></tr>
<tr><td><Bfr></td><td></td><td>Rule for TA buffer</td></tr>
<tr><td></td><td>0</td><td>TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered</td></tr>
<tr><td></td><td>1</td><td>TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered</td></tr>
</table>
</td></tr>
<tr><td>$QCPMS</td><td>
Preferred message storage

Usage
Execution $QCPMS=<mem1>,<mem2>,<mem3>
Query $QCPMS?
Query List $QCPMS=?

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mem></td><td></td><td>Memory to store the SMS</td></tr>
<tr><td></td><td>“ME”</td><td></td></tr>
<tr><td></td><td>“MT”</td><td></td></tr>
<tr><td></td><td>“SM”</td><td></td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>$QCSMP</td><td>
Sets text mode parameters

Usage
Execution $QCSMP=<tid>,<vpf>,<vp>,<ddtf>,<ddt>
Query $QCSMP?

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><tid></td><td>4095 – 4102</td><td>Teleservice ID</td></tr>
<tr><td><vpf></td><td></td><td>Validity period format</td></tr>
<tr><td></td><td>0</td><td>Absolute</td></tr>
<tr><td></td><td>1</td><td>Relative</td></tr>
<tr><td><vp></td><td></td><td>Validity period
String; maximum 22 characters</td></tr>
<tr><td><ddtf></td><td></td><td>Deferred delivery time format</td></tr>
<tr><td></td><td>0</td><td>Absolute</td></tr>
<tr><td></td><td>1</td><td>Relative</td></tr>
<tr><td><ddt></td><td></td><td>Deferred delivery time
String; maximum of 22 characters</td></tr>
</table>
</td></tr>
<tr><td>+RCHVVER</td><td>
Verify CHV

This command does the CHV verification with CHV enabled. After entering an invalid pin code for 3 times, the pin code becomes invalid.
This command is not password-protected.

Usage
Execution AT+RCHVVER=<state>, <pin_code>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td>1</td><td></td></tr>
<tr><td><pin_code></td><td></td><td>8-digit number</td></tr>
</table>
</td></tr>
<tr><td>+RCHVUNBLK</td><td>
Generate new PIN code using PUK

This command generates a new PIN code using the PUK code. If the PUK count is 0, the RUIM card is disabled.
This command is not password-protected.

Usage
Execution AT+RCHVUNBLK=<state>, <pin_new>, <puk>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td>3</td><td></td></tr>
<tr><td><pin_new></td><td></td><td>8-digit number</td></tr>
<tr><td><puk></td><td></td><td>8-digit number</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>+RCHVCHG</td><td>
Change PIN code

This command should only be used when CHV is enabled.
This command is not password-protected.

Usage
Execution AT+RCHVCHG =<state>, <pin_old>, <pin_new>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td>1</td><td></td></tr>
<tr><td><pin_new></td><td></td><td>8-digit number</td></tr>
<tr><td><puk></td><td></td><td>8-digit number</td></tr>
</table>
</td></tr>
<tr><td>+RCHVEN</td><td>
Enable/disable CHV state

This command enables or disables the CHV state.
This command is not password-protected.

Usage
Execution AT+RCHVEN=<dis_enable>, <pin_code>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><dis_enable></td><td>0</td><td>Disable CHV</td></tr>
<tr><td></td><td>1</td><td>Enable CHV</td></tr>
<tr><td><pin_code></td><td></td><td>8-digit number</td></tr>
</table>
</td></tr>
</table>

3. Non-Signaling Test Commands

3.1. Command Summary

Command	Description
!CHAN	Tune to a channel or read the current channel
!RX	Power the receiver block on or off
!RX2	Power the second receiver block on or off
!RXAGC	Read RX_AGC_ADJ
!RX2AGC	Read second RX_AGC_ADJ
!TX	Power the transmitter on or off
!KEYON	Key the transmitter on
!KEYOFF	Key the transmitter off
!TXAGC	Write to the TX_AGC_ADJ
!DIAG	Set diagnostic mode

3.2. Command Reference

Command	Description
!CHAN	**Tune to a channel or read the current channel** This command is used to tune the synthesizer to a channel on a specific band or read the current channel. **Usage** Execution: `AT!CHAN=<channel>[,<band>]` Response: `OK` Query: `AT!CHAN?` Response: `Current channel` **Parameters** Parameter / Value / Description <channel> — Channel. Valid values for Cellular are: 0 – 799, 991 – 1023. Valid values for PCS are 0 – 1200 <band> — 0: US Cellular; 1: US PCS; 2: GPS

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!RX</td><td>
Power the receiver block on or off

This command requires diagnostic mode to be run.

Usage
Execution AT!RX=<mode>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mode></td><td>0</td><td>Off</td></tr>
<tr><td></td><td>1</td><td>On</td></tr>
</table>
</td></tr>
<tr><td>!RX2</td><td>
Power the second receiver block on or off

This command requires diagnostic mode to be run.

Usage
Execution AT!RX2=<mode>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mode></td><td>0</td><td>Off</td></tr>
<tr><td></td><td>1</td><td>On</td></tr>
</table>
</td></tr>
<tr><td>!RXAGC</td><td>
Read RX_AGC_ADJ

This command requires diagnostic mode to be run.

Usage
Execution AT!RXAGC?
Response <AGC value>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><AGC value></td><td>000 – 3FFF</td><td>AGC value
000 = most positive RX_AGC value
200 = 50% duty cycle
3FF = lowest RX_AGC value</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!RX2AGC</td><td>
Read second RX_AGC_ADJ

This command requires diagnostic mode to be run.

Usage
Execution AT!RX2AGC?
Response <AGC value>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><AGC value></td><td>000 – 3FFF</td><td>AGC value
000 = most positive RX_AGC value
200 = 50% duty cycle
3FF = lowest RX_AGC value</td></tr>
</table>
</td></tr>
<tr><td>!TX</td><td>
Power the transmitter on or off

This command requires diagnostic mode to be run.

Usage
Execution AT!TX=<mode>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><mode></td><td>0</td><td>Off</td></tr>
<tr><td></td><td>1</td><td>On</td></tr>
</table>
</td></tr>
<tr><td>!KEYON</td><td>
Key the transmitter on

This command requires diagnostic mode to be run.

Usage
Execution AT!KEYON=<channel>,<band>,<signal>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><channel></td><td></td><td>Channel number</td></tr>
<tr><td><band></td><td>0</td><td>Cellular</td></tr>
<tr><td></td><td>1</td><td>PCS</td></tr>
<tr><td><signal></td><td>0</td><td>PN</td></tr>
<tr><td></td><td>1</td><td>SINE</td></tr>
</table>
</td></tr>
<tr><td>!KEYOFF</td><td>
Key the transmitter off

This command requires diagnostic mode to be run.

Usage
Execution AT!KEYOFF
Response OK
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!TXAGC</td><td>
Write to the TX_AGC_ADJ

This command requires diagnostic mode to be run.

Usage
Execution AT!TXAGC=<value>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><value></td><td>000 - 1FF</td><td>TX AGC value
000 = lowest TX_AGC_ADJ value
100 = 50% duty cycle
1FF = most positive TX_AGC_ADJ value</td></tr>
</table>
</td></tr>
<tr><td>!DIAG</td><td>
Set diagnostic mode

When the modem enters diagnostics mode all of the radio-specific firmware tasks (e.g. TX, RXTX, SRCH) are disabled. In order to exit diagnostics mode, it is recommended that the modem be reset.
This command is not password-protected.

Usage
Execution AT!DIAG
Response OK
</td></tr>
</table>

4. Mobile/Simple IP Configuration Commands

4.1. Command Summary

Command	Description
$QCMIP	Mobile IP behavior
$QCMIPEP	Enables/disables the currently active Mobile IP user profile
$QCMIPGETP	Query a user profile
$QCMIPNAI	Set the Network Access ID (NAI) for the currently active profile
$QCMIPP	Select one of the Mobile IP user profiles to be the current active profile
!SIPID	User ID information for Simple IP setup
!SIPPWD	Password information for Simple IP setup

4.2. Command Reference

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>$QCMIP</td><td>
Mobile IP (MIP) behavior

If a connected data device wants to use its own Mobile IP implementation, the mobile's IP implementation should be disabled by setting AT$QCMIP to 0.

<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td></td><td>0</td><td>Mobile IP disabled. Simple IP only</td></tr>
<tr><td></td><td>1</td><td>Mobile IP preferred.
In the initial MIP registration, if the network does not support Mobile IP, then the mobile automatically reverts to Simple IP.
However, if a Mobile IP session is registered and then the mobile enters a network that does not support Mobile IP, the mobile will drop the session and inform the upper layers of the failure</td></tr>
<tr><td></td><td>2</td><td>Mobile IP only.
The mobile will make data calls only when Mobile IP is supported in the network. During a MIP session, if the mobile hands off to a network that does not support MIP, then the mobile will drop the session and inform the upper layers of the failure</td></tr>
</table>
</td></tr>
<tr><td>$QCMIPEP</td><td>
Enables/disables the currently active mobile IP user profile

To enable the currently active profile, use AT$QCMIPEP = 1.
To disable the currently active profile, use AT$QCMIPEP = 0.
See also $QCMIPP.
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>$QCMIPGETP</td><td>Query a user profile

AT$QCDMIPGETP = 1 – 5 (profile number)
The command returns the following parameters for the selected profile:
NAI
Home Addr
Primary HA
Secondary HA
MN-AAA SPI
MN-HA SPI
Rev Tun (Reverse Tunneling)
MN-AAA SS
MN-HA SS
If a profile number is not entered, then the AT command returns all the information corresponding to the currently active profile.</td></tr>
<tr><td>$QCMIPNAI</td><td>Set the Network Access ID (NAI) for the currently active profile

AT$QCMIPNAI= "user@domain", 0 or 1
Note: The double quotes (“ ”) are required only if the string contains a comma.

<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td></td><td>0</td><td>Do not store in NOVRAM</td></tr><tr><td></td><td>1</td><td>Store in NOVRAM</td></tr></table></td></tr>
<tr><td>$QCMIPP</td><td>Select one of the Mobile IP user profiles to be the current active profile

AT$QCMIPP can be used to configure specific dial-up for various user profiles.
AT$QCMIPP = 1-5 (profile number)
To enable/disable a currently active profile, see $QCMIPEP.</td></tr>
<tr><td>!SIPID</td><td>User ID information for Simple IP setup. See also !SIPPWD.

Usage
Execution !SIPID=<user id></td></tr>
<tr><td>!SIPPWD</td><td>Password information for Simple IP setup. See also !SIPID.

Usage
Execution !SIPPWD=<passwrd></td></tr>
</table>

5. Provisioning Commands

5.1. Command Summary

Command	Description
!NAMLCK	NAM Lock – enter the subsidy lock or SPC required to write account data
!NAMVAL	NAM Values – query or set the account data
!ACTSTAT	Activation status
!AKEY	Calculate the A-Key checksum; write the A-Key
$MDN	Read or write the mobile directory number
$MSID	Read or write the mobile station ID
$RTN	Set device to facroty defaults
$1XRXPWR	Query CDMA 1X RX power
$DORXPWR	Query CDMA DO RX power
$1XECIO	Query CDMA 1X Ec/Io measurements
$DOSINR	Query CDMA DO SINR measurements

5.2. Command Reference

Command	Description
!NAMLCK=<n>	**NAM lock** Stores a passcode number for comparison to the modem's 6-digit OTSL (One Time Subsidy Lock), MSL (Master Subsidy Lock), or SPC (Service Provisioning Code). The service provider provides this number to you at the time of service activation. If the number is an acceptable format, the OK result code is returned. If the parameter's format is rejected (such as too many digits), the ERROR result is returned. The actual comparison of the passcode entered with this command and the lock codes encoded in the modem does not take place until an attempt is made to write a NAM profile account using **!NAMVAL**. *Note: This command is used to replace the **~NAMLCK**.*

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!NAMVAL</td><td>
NAM values

This command has three functions related to the account or NAM (Number Assignment Module):

Set the active account index
The modem supports one account. Using only the <nam> parameter (0) sets that account as the active account used by the modem.
Syntax: !NAMVAL=<nam> [,<MDN>, <MIN>,<SID>, <NID>]

Read the current account information
The query form of the command will report the details of the specified account (0):
MDN: 9999999999 (10 digit phone number)
MIN: 9999999999 10-digit MIN (encoded and stored into MIN1 and MIN2)
SID: 99999 (System ID)
NID: 99999 (Network ID)
Syntax: !NAMVAL?<nam>

Write account activation data
This form requires the optional parameters. The modem will first compare the passcode stored using !NAMLCK. If the passcode fails to match, the ERROR result is returned. If the OK result is received, the NAM profile account was successfully activated.
The parameter values are as noted for the query form of the command. The service provider will tell you what numbers to enter for NUM, MIN, SID, and NID. NAM must be 0.
Following writing the values, the modem must be reset to have the values take effect.
Note: This command is used to replace ~NAMVAL.
</td></tr>
<tr><td>!ACTSTAT</td><td>
Query the activation status

This command checks for a valid MIN.

Usage
Execution !ACTSTAT?

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td></td><td>0</td><td>The modem has not been activated</td></tr>
<tr><td></td><td>1</td><td>The modem has been activated</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!AKEY</td><td>
Calculate the A-Key checksum; write the A-Key

If the value entered is a 20-digit number, the 6 digit checksum is returned.
If the value entered is a 26-digit number, the modem validates the last six digits (the checksum), before writing the validated A-Key to the modem.
If the checksum is invalid, or the A-Key has already been written, ERROR is returned.
Run this command only AFTER the modem has been calibrated, default NV items have been loaded, and the modem has been reset. Otherwise, the produced checksum will be incorrect.

Usage
Execution !AKEY=<value>

Example
To write the A-Key for NAM 0:
AT!AKEY=00,DF,D9,37,E5,9F,E0,86,2F
204516
OK
</td></tr>
<tr><td>$MDN</td><td>
Read or write the mobile directory number

This command is not password-protected.

Usage
Execution AT$MDN=<MSL>,<target_MDN>
Response OK

Query AT$MDN?
Response <target_MDN>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><MSL></td><td>000000 – 999999</td><td>6-digit SPC</td></tr>
<tr><td><target_MDN></td><td>00000000000 – 9999999999</td><td>10-digit mobile directory number</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>$MSID</td><td>
Read or write the mobile station ID

This command is not password-protected.

Usage
Execution AT$MDN=<MSL>,<target_MSID>
Response OK

Query AT$MSID?
Response <target_MSID>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><MSL></td><td>000000 – 999999</td><td>6-digit SPC</td></tr>
<tr><td><target_MSID></td><td>00000000000 – 9999999999</td><td>10-digit mobile station ID</td></tr>
</table>
</td></tr>
<tr><td>$RTN</td><td>
Set device to facroty defaults

This command sets the device to factory defaults and power cycles the device if the correct MSL is entered.
This command is not password-protected.

Usage
Execution AT$MDN=<MSL>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><MSL></td><td>000000 – 999999</td><td>6-digit SPC</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>$1XRXPWR</td><td>
Query CDMA 1X RX power

This command is used to query the CDMA 1X channel, pilot, and immediate RSSI measurements in dBm for each antenna on separate lines in the format: <antenna>,<channel>,<pilot offset>,<RSSI>.
Note that if the device does not support multiple antennas, only one value is returned. If the device supports multiple antennas, the primary antenna is listed first followed by additional antennas.
This command is not password-protected.

Usage
Query AT$1XRXPWR?
Response <antenna>,<channel>,<pilot offset>,<RSSI>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><antenna></td><td></td><td>Antenna</td></tr>
<tr><td><channel></td><td></td><td>Channel</td></tr>
<tr><td><pilot offset></td><td></td><td>Pilot offset</td></tr>
<tr><td><RSSI></td><td>-25 to limit of device sensitivity</td><td>Received signal strength indication</td></tr>
</table>
Example
at$1xrxpwr?
0,283,98,-105.16
OK
</td></tr>
<tr><td>$DORXPWR</td><td>
Query CDMA EVDO RX power

This command is used to query the CDMA EVDO channel, pilot, and immediate RSSI measurements in dBm for each antenna on separate lines in the format: <antenna>,<channel>,<pilot offset>,<RSSI>.
Note that if the device does not support multiple antennas, only one value is returned. If the device supports multiple antennas, the primary antenna is listed first followed by additional antennas.
This command is not password-protected.

Usage
Query AT$DORXPWR?
Response <antenna>,<channel>,<pilot offset>,<RSSI>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><antenna></td><td></td><td>Antenna</td></tr>
<tr><td><channel></td><td></td><td>Channel</td></tr>
<tr><td><pilot offset></td><td></td><td>Pilot offset</td></tr>
<tr><td><RSSI></td><td>-25 to limit of device sensitivity</td><td>Received signal strength indication</td></tr>
</table>
Example
at$dorxpwr?
0,100,247,-97.5
OK
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>$1XECIO</td><td>
Query CDMA 1X Ec/Io measurements

This command is used to query the CD CDMA 1X channel, Pilot, and immediate Ec/Io measurements in dBm for each antenna on separate lines in the format: <antenna>,<channel>,<pilot offset>,<Ec/Io>.
Note that if the device does not support multiple antennas, only one value is returned. If the device supports multiple antennas, the primary antenna is listed first followed by additional antennas.
This command is not password-protected.

Usage
Query AT$1XECIO?
Response <antenna>,<channel>,<pilot offset>,<Ec/Io>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><antenna></td><td></td><td>Antenna</td></tr>
<tr><td><channel></td><td></td><td>Channel</td></tr>
<tr><td><pilot offset></td><td></td><td>Pilot offset</td></tr>
<tr><td><Ec/Io></td><td></td><td>Ec/Io</td></tr>
</table>
Example
AT$1XECIO?
0,283,98,-6.0
OK
</td></tr>
<tr><td>$DOSINR</td><td>
Query CDMA DO SINR measurements

This command is used to query the CDMA EVDO channel and immediate SINR measurements in dBm for each antenna on separate lines in the format: <antenna>,<channel>,<pilot offset>,<SINR>.
Note that if the device does not support multiple antennas, only one value is returned. If the device supports multiple antennas, the primary antenna is listed first followed by additional antennas.
This command is not password-protected.

Usage
Query AT$DOSINR?
Response <antenna>,<channel>,<pilot offset>,<SINR>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><antenna></td><td></td><td>Antenna</td></tr>
<tr><td><channel></td><td></td><td>Channel</td></tr>
<tr><td><pilot offset></td><td></td><td>Pilot offset</td></tr>
<tr><td><SINR></td><td></td><td>Signal to interference ratio</td></tr>
</table>
Example
AT$DOSINR?
0,78,98,-48
OK
</td></tr>
</table>

6. Status Inquiry Commands

6.1. Command Summary

Command	Description
!RSSI	Received Signal Strength Indication
!STATUS	Modem status report
$1XECIO	Get the Ec/Io
!APPSUBTYPES	Application subtypes negotiated for the four streams
!MUFWDRESET	Resets all data reported by **!MUFWDSTATS**
!MUFWDSTATS	Current Multi-User Forward Traffic Channel Statistics
!PERSONALITY	Current personality and its negotiated protocol subtypes
!PROTSUBTYPES	Negotiated subtypes for all protocols in all stored personalities
!SCPCUSTCONFIG	Current Session Configuration Protocol Customer configuration
!SESSIONSTATUS	Current HDR session status
!SLEEPPARMS	1xEV-DO Rev. A sleep parameters (slot cycle indexes and sleep periods)
!SUFWDCCSTATS	Current Single User Forward Channel Statistics (Single User packet early slot termination count for all supported DRCs on Forward Control Channel)
!SUFWDCRCS	Current Single User Forward Channel Statistics (Single User packet CRCs and Packet Error Rate)
!SUFWDRESET	Resets the data reported by **!SUFWDCCSTATS**, **!SUFWDCRCS** and **!SUFWDCSTATS**
!SUFWDCSTATS	Current Single User Forward Channel Statistics (Single User packet early slot termination count for all supported DRCs on Forward Traffic Channel)
+SERVICE	Read modem's current available service
!GMODE	Return modem's current mode
!EVDOCONFIG	Return and update HDR configuration
!SCI	Return or set the slot cycle index (SCI)
$MIPERR	Display modem's last MIP error
$DEBUG	Display current status of the modem
$RMGUARD	Display modem's current roam guard status
$ERI	Display current enhanced roaming indicator
$ROAM	Read or write the modem's roam preference
$PDE	Set PDE IP address and port ID
$LOCATION	Read or write the modem's location services availability
$LOCMODE	Set parameters for a GPS fix
$GETLOCATION	Retrieve GPS fix

6.2. Command Reference

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!RSSI</td><td>
Received Signal Strength Indication

Reports the current RSSI (P(AGC)+Ec/Io) in dBm using a (N-1)/N IIR filter for smoother display.
This command is supported in the online command state and in the command state.

Usage
Query !RSSI?

When no signal is present it reports -125. Reported values can be interpreted as follows:
< -90 = very poor
-90 to -86 = poor
-85 to -81 = fair
-80 to -76 = good
> -76 = excellent
</td></tr>
<tr><td>!STATUS</td><td>
Status of the modem

Reports the modem’s status as follows:
Current band: <band>
Current channel: <chan>
SID: <sid>
NID: <nid> 1xRoam: <n> HDRRoam: <n>
Temp: <temp> State: <state> Sys Mode: <mode>
Pilot [NOT] acquired
Modem has [NOT] registered
HDR revision: <HRD_rev>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><band></td><td></td><td>Current band</td></tr>
<tr><td></td><td>OFFLINE</td><td></td></tr>
<tr><td></td><td>PCS CDMA</td><td></td></tr>
<tr><td></td><td>Cellular CDMA</td><td></td></tr>
<tr><td></td><td>PCS Sleep</td><td></td></tr>
<tr><td></td><td>Cellular Sleep</td><td></td></tr>
<tr><td></td><td>HDR PCS</td><td></td></tr>
<tr><td></td><td>HDR Cellular</td><td></td></tr>
<tr><td></td><td>GPS</td><td></td></tr>
<tr><td><chan></td><td></td><td>Current channel</td></tr>
<tr><td><sid></td><td></td><td>SID</td></tr>
<tr><td><nid></td><td></td><td>NID</td></tr>
<tr><td><n></td><td></td><td>Roaming indicator
Values larger than 2 indicate ERI usage; to obtain the ERI banner, icon state, and icon image, parse the carrier’s ERI file</td></tr>
<tr><td><temp></td><td></td><td>Radio temperature in degree Celsius</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td><state></td><td></td><td>State</td></tr>
<tr><td><mode></td><td></td><td>System mode</td></tr>
<tr><td></td><td>NO SRV</td><td></td></tr>
<tr><td></td><td>CDMA</td><td></td></tr>
<tr><td></td><td>HDR</td><td></td></tr>
<tr><td></td><td>GPS</td><td></td></tr>
<tr><td><NOT></td><td></td><td>Pilot has not been found, or modem has not registered</td></tr>
<tr><td><HRD_rev></td><td>0, A</td><td>1xEV-DO service</td></tr>
</table>
</td></tr>
<tr><td>$1XECIO?</td><td>Ec/Io

If there is an active pilot, returns the current Ec/Io in units of 1dB.</td></tr>
<tr><td>!APPSUBTYPES</td><td>Application subtypes negotiated for the four streams

Example
AT!APPSUBTYPES
Stream0: Default Signaling Application
Stream1: Default Packet Application for SN
Stream2: Default Packet Application for AN
Stream3: Default Test Application
OK</td></tr>
<tr><td>!MUFWDRESET</td><td>Resets all the data reported by !MUFWDSTATS</td></tr>
<tr><td>!MUFWDSTATS</td><td>Current multi-user forward traffic channel statistics

!MUFWDRESET resets the data reported by this command.

Example
AT!MUFWDSTATS
FORWARD TRAFFIC CHANNEL
CRC Count Termination Slot Count
Good CRCs Bad CRCs 1 2 3 4
DRC3_128 0 - 0 0 0 0
DRC3_256 0 - 0 0 0 0
DRC3_512 0 - 0 0 0 0
DRC3_1024 0 0 0 0 0 0
DRC5_2048 0 0 0 0 0 0
DRC8_3072 0 0 0 0
DRC10_4096 0 0 0 0
DRC13_5120 0 0 0 0
Packet Error Rate (%): 0.000
OK</td></tr>
</table>

Command	Description
!PERSONALITY?	**Current personality and its negotiated protocol subtypes** **Example** AT!PERSONALITY? Current Personality: 0 Physical Layer Protocol Subtype: 0 Control Channel MAC Protocol Subtype: 0 Access Channel MAC Protocol Subtype: 0 Fwd Traffic Channel MAC Protocol Subtype: 0 Rev Traffic Channel MAC Protocol Subtype: 0 Key Exchange Protocol Subtype: 0 Authentication Protocol Subtype: 0 Encryption Protocol Subtype: 0 Security Protocol Subtype: 0 Idle State Protocol Subtype: 0 Generic MM Cap Disc Protocol Subtype: 0 Generic Virtual Stream Protocol Subtype: 0 OK
!PROTSUBTYPES?	**Negotiated subtypes for all protocols in all stored personalities** **Example** AT!PROTSUBTYPES Number of Stored Personalities: 1 Current Personality: 0 Personality: 0 Physical Layer Protocol Subtype: 0 Control Channel MAC Protocol Subtype: 0 Access Channel MAC Protocol Subtype: 0 Fwd Traffic Channel MAC Protocol Subtype: 0 Rev Traffic Channel MAC Protocol Subtype: 0 Key Exchange Protocol Subtype: 0 Authentication Protocol Subtype: 0 Encryption Protocol Subtype: 0 Security Protocol Subtype: 0 Idle State Protocol Subtype: 0 Generic MM Cap Disc Protocol Subtype: 0 Generic Virtual Stream Protocol Subtype: 0 OK
!SCPCUSTCONFIG?	**Sets or reads the current session configuration protocol customer configuration** **Example** AT!SCPCUSTCONFIG? 1 - Custom Config is Active Protocol Subtypes: 1 - Subtype 2 Physical Layer 0 - Enhanced CCMAC 1 - Enhanced ACMAC 1 - Enhanced FTCMAC 0 - Enhanced 3 RTCMAC 0 - Enhanced 1 RTCMAC 0 - Enhanced Idle Broadcast Subtypes: 0 - Generic Broadcast Enabled Applications Subtypes: 1 - SN Multiflow Packet App OK To set this item, enter 13 hex bytes. For xample: AT!SCPCUSTCONFIG=01,0D,00,00,00,00,00,00,00,01,00,00,00 OK

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SESSIONSTATUS</td><td>
Set or read the current session status

Usage
Execution !SESSIONSTATUS=<lower_byte>, <upper_byte>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td></td><td>0</td><td>Inactive – there is no session</td></tr>
<tr><td></td><td>1</td><td>Default – there is a session, but no negotiation has been completed</td></tr>
<tr><td></td><td>2</td><td>Active – there is a session, and all parameters have had at least one chance to be negotiated</td></tr>
</table>
In testing and debugging procedures, it is useful to force the session status to Inactive, so that Session negotiation and configuration occur upon the next power up.
For the change to occur, the modem must be reset.
When the HDR session is negotiated, the session status is stored in NV RAM. Upon next power up, if the session status is Active, the session parameters are not renegotiated, unless a new network is acquired.

Example
AT!SESSIONSTATUS
HDR Session Status: 2
OK
AT!SESSIONSTATUS =00,00
OK
AT!SESSIONSTATUS?
HDR Session Status: 0
OK
</td></tr>
<tr><td>!SLEEPPARMS</td><td>
Returns 1xEV-DO Rev.A sleep parameters (slot cycle indexes and sleep periods)

Slot cycle timeouts are listed in Julian time format (year month day day-of-week hour:minutes:seconds).

Example
AT!SLEEPPARMS
Slot Cycle1:3
Slot Cycle2:0
Slot Cycle3:0
Slot Cycle1 Timeout:1980 01 06 6 00:00:00
Slot Cycle2 Timeout:1980 01 06 6 00:00:00
OK

AT!SLEEPPARMS
HDR Rev.A not currently available
OK
</td></tr>
</table>

Command	Description
!SUFWDCCSTATS	**Reports the current single user forward channel statistics** This is the Single User packet early slot termination count for all supported DRCs on Forward Control Channel; (columns are tab separated). **!SUFWDRESET** resets the data reported by this command. **Example** **AT!SUFWDCCSTATS** **FORWARD CONTROL CHANNEL - Early Termination Slot Count** **1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 DRC0** **0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 DRC1 0** **0 0 0 0 0 0 0** **OK**
!SUFWDCRCS	**Reports the current single user forward channel statistics** This is the Single User packet CRCs and Packet Error Rate. **!SUFWDRESET** resets the data reported by this command. **Example** **AT!SUFWDCRCS** **FORWARD TRAFFIC CHANNEL** **Good CRCs Bad CRCs** **DRC0 0 0** **DRC1 0 0** **DRC2 0 0** **DRC3 0 0** **DRC4 0 0** **DRC5 0 0** **DRC6 0 0** **DRC7 0 0** **DRC8 0 0** **DRC9 0 0** **DRC10 0 0** **DRC11 0 0** **DRC12 0 0** **DRC13 0 0** **DRC14 0 0** **FORWARD CONTROL CHANNEL** **Good CRCs Bad CRCs** **DRC0 0 0** **DRC1 0 0** **Packet Error Rate (%): 0.000** **OK**
!SUFWDRESET	Resets the data reported by **!SUFWDCCSTATS**, **!SUFWDCRCS**, and **!SUFWDTCSTATS**.

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!SUFWDTCSTATS</td><td>
Current Single User Forward Channel Statistics

This is the Single User packet early slot termination count for all supported DRCs on Forward Traffic Channel.
!SUFWDRESET resets the data reported by this command.

Example
<pre>
AT!SUFWDTCSTATS
FORWARD TRAFFIC CHANNEL - Early Termination Slot Count
      1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
DRC0 0 0 0 0 0 0 0 0 0 0   0 0   0   0   0   0
DRC1 0 0 0 0 0 0 0 0 0 0   0 0   0   0   0   0
DRC2 0 0 0 0 0 0 0 0
DRC3 0 0 0 0
DRC4 0 0
DRC5 0 0 0 0
DRC6 0
DRC7 0 0
DRC8 0 0
DRC9 0
DRC10 0 0
DRC11 0
DRC12 0
DRC13 0 0
DRC14 0
OK
</pre>
</td></tr>
<tr><td>+SERVICE</td><td>
Read modem’s current available service

This command will only report 1 service (not hybrid) with a preference for EVDO. This command is not password-protected.

Usage
Query AT+SERVICE?
Response 3 – EVDO Rev A.
OK
</td></tr>
<tr><td>!GMODE</td><td>
Return modem’s current mode

This command is not password-protected.

Usage
Execution AT!GMODE
Response <state>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><state></td><td>ONLINE</td><td>Modem is online</td></tr>
<tr><td></td><td>OFFLINE</td><td>Modem is offline</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!EVDOCONFIG</td><td>
Return and update HDR configuration

This command is not password-protected.

Usage
Execution AT!EVDOCONFIG=<value>
Response OK

Query AT!EVDOCONFIG?
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><value></td><td>0</td><td>Set for Release 0</td></tr>
<tr><td></td><td>1</td><td>Set for Release A</td></tr>
</table>
</td></tr>
<tr><td>!SCI</td><td>
Return or set the slot cycle index (SCI)

This command returns or sets the SCI and stores the new value in non-volatile memory. The modem must be reset for the changes to take effect.
This command is not password-protected.

Usage
Execution AT!SCI=<SCI>
Response OK

Query AT!SCI?
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><SCI></td><td></td><td>Slot cycle index</td></tr>
</table>
</td></tr>
<tr><td>$MIPERR</td><td>
Display modem’s last MIP error

This command is not password-protected.

Usage
Execution AT$MIPERR
Response
MIP_RRP_CODE_SUCCESS (0)
MIP_RRP_CODE_SUCCESS_NO_SIM_BINDINGS (1)
MIP_RRP_CODE_FAILURE_FA_REASON_UNSPECIFIED (64)
MIP_RRP_CODE_FAILURE_FA_ADMIN_PROHIBITED (65)
MIP_RRP_CODE_FAILURE_FA_INSUFFICIENT_RESOURCES (66)
MIP_RRP_CODE_FAILURE_FA_MOBILE_NODE_FAILED_AUTH (67)
MIP_RRP_CODE_FAILURE_FA_HA_FAILED_AUTH (68)
MIP_RRP_CODE_FAILURE_FA_REQUESTED_LIFETIME_TOO_LONG (69)

#define
MIP_RRP_CODE_FAILURE_FA_MALFORMED_REQUEST (70)
MIP_RRP_CODE_FAILURE_FA_MALFORMED_REPLY (71)
</td></tr>
</table>

Command	Description
	MIP_RRP_CODE_FAILURE_FA_ENCAPSULATION _UNAVAILABLE (72) MIP_RRP_CODE_FAILURE_FA_VJHC_UNAVAILABLE (73) MIP_RRP_CODE_FAILURE_FA_CANT_REV_TUN (74) MIP_RRP_CODE_FAILURE_FA_MUST_REV_TUN (75) MIP_RRP_CODE_FAILURE_FA_BAD_TTL (76) MIP_RRP_CODE_FAILURE_FA_DELIVERY_STYLE_NOT _SUPPORTED (79) MIP_RRP_CODE_FAILURE_FA_VS_REASON (89) MIP_RRP_CODE_FAILURE_MISSING_MISSING_NAI (97) MIP_RRP_CODE_FAILURE_MISSING_HA_ADDR (98) MIP_RRP_CODE_FAILURE_MISSING_HOMEADDR (99) MIP_RRP_CODE_FAILURE_UNKNOWN_CHALLENGE (104) MIP_RRP_CODE_FAILURE_MISSING_CHALLENGE (105) MIP_RRP_CODE_FAILURE_STALE_CHALLENGE (106) MIP_RRP_CODE_FAILURE_HA_REASON_UNSPECIFIED (128) MIP_RRP_CODE_FAILURE_HA_ADMIN_PROHIBITED (129) MIP_RRP_CODE_FAILURE_HA_INSUFFICIENT_RESOURCES (130) MIP_RRP_CODE_FAILURE_HA_MOBILE_NODE_FAILED_AUTH (131) MIP_RRP_CODE_FAILURE_HA_FA_FAILED_AUTH (132) MIP_RRP_CODE_FAILURE_HA_REG_ID_MISMATCH (133) MIP_RRP_CODE_FAILURE_HA_MALFORMED_REQUEST (134) MIP_RRP_CODE_FAILURE_UNKNOWN_HA (136) MIP_RRP_CODE_FAILURE_HA_CANT_REV_TUN (137) MIP_RRP_CODE_FAILURE_HA_MUST_REV_TUN (138) MIP_RRP_CODE_FAILURE_HA_ENCAPSULATION_UNAVAILABLE (139) MIP_RRP_CODE_FAILURE_INVALID_COA (77) MIP_RRP_CODE_FAILURE_MISSING_MN_FA (107) MIP_RRP_CODE_FAILURE_REDIRECTED_HA (143) MIP_RRP_CODE_FAILURE_HA_BAD_AAA_AUTH (144)
$DEBUG	**Display current status of the modem** This command is not password-protected. **Usage** Query AT$DEBUG? Response Returned info as below: 1x Engineering State: SO : Channel : Band class : SID: NID: Base ID : PN : P_rev : Latitude : Longitude : Rx Pwr : Rx Ec/Io : Tx Pwr : Active Set : Neighbor Set : EVDO Engineering State: MAC Index : Channel : Color Code :

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Sector ID :
PN :
Rx Pwr :
PER:
Pilot Energy :
DRC :
SNR :
AN-AAA status:
IP :

Configuration
Technology :
QLIC :
PRL :
Chipset :
AMSS Version :
Hardware Version :
Browser :
Multimedia Version :

Bluetooth
Bluetooth Chipset :
Bluetooth version :
Bluetooth Stack :
Profiles :
MAC address :

Data Status
Technology:
IP Address:
Last Error code:

Memory Utilization
Free memory :
Total Memory:
OK</td></tr>
<tr><td>$RMGUARD</td><td>Display modem’s current roam guard status

Since the host controls the roam guard, this will always return a canned response; it has no effect on the modem’s behavior.
This command is not password-protected.

Usage
Execution AT$RMGUARD=<arg>
Response OK

Query AT$RMGUARD=?
Response <arg>
OK

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><arg></td><td>1 – 2</td><td>Roam guard state</td></tr></table></td></tr>
<tr><td>$ERI</td><td>Display current enhanced roaming indicator

This command is not password-protected.</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Usage
Query AT$ERI?
Response NA — No Servie
0 — Roaming indicator off
1 — Roaming indicator on
2 — Roaming indicator flashing
3 — Out of neighborhood
4 — Out of building
5 — Roaming: preferred system
6 — Roaming: available system
7 — Roaming: alliance partner
8 — Roaming: premium partner
9 — Roaming: full service functionality
10 — Roaming: partial service functionality
11 — Roaming banner on
12 — Roaming banner offOK</td></tr>
<tr><td>$ROAM</td><td>Read or write the modem’s roam preference

This command is not password-protected.

Usage
Query AT$ROAM?
Response <UPSC>
OK

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><UPSC></td><td>0</td><td>Sprint only</td></tr><tr><td></td><td>1</td><td>Automatic</td></tr></table></td></tr>
<tr><td>$PDE</td><td>Set PDE IP address and port ID

This command is not password-protected.
Note: This command is also applicable in WCDMA mode.

Usage
Execution AT$PDE=<IP ADDRESS>,<PORT_ID>
Response OK

Parameters
<table><tr><th>Parameter</th><th>Value</th><th>Description</th></tr><tr><td><IP ADDRESS></td><td>0 – 255</td><td>IP address in xxx.xxx.xxx.xxx format
Each block of xxx can range from 0 – 255</td></tr><tr><td><PORT_ID></td><td>0 – FFFFFFFF</td><td>Port ID</td></tr></table></td></tr>
<tr><td>$LOCATION</td><td>Read or write the modem’s location services availability

This command is not password-protected.
Note: This command is also applicable in WCDMA mode.

Usage
Execution AT$LOCATION=<arg>
Response OK</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Query AT$LOCATION=?
Response <arg>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><arg></td><td>0</td><td>Location services are off</td></tr>
<tr><td></td><td>1</td><td>Location services are on</td></tr>
</table>
</td></tr>
<tr><td>$LOCMODE</td><td>
Set parameters for a GPS fix

This command is used to initiate certain GPS fixes.
This commans is not password-protected.
Note: This command is also applicable in WCDMA mode.

Usage
Execution AT$LOCMODE=<locmode type>
Response OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><locmode type></td><td></td><td>GPS fix profile</td></tr>
<tr><td></td><td>1</td><td>ATGPS_LOCMODE_MS_ASSISTED_ SINGLE_FIX</td></tr>
<tr><td></td><td>2</td><td>ATGPS_LOCMODE_MS_BASED_TRACK</td></tr>
<tr><td></td><td>3</td><td>ATGPS_LOCMODE_MS_ASSISTED_ AFTL_SINGLE_FIX</td></tr>
<tr><td></td><td>4</td><td>ATGPS_LOCMODE_AUTONOMOUS_ GPS_TRACK</td></tr>
</table>
</td></tr>
<tr><td>$GETLOCATION</td><td>
Retrieve GPS fix

This command retrieves a GPS fix using an MS-based fix.
This command is not password-protected.
Note: This command is also applicable in WCDMA mode.

Usage
Execution AT$GETLOCATION
Response 04/27/2009, 14:57:48, 38.916015, -94.657426, 296, HEPE: 586, Speed: 125, Heading: -67.0, Satellites: 7
or
ErrCode = xx
OK
</td></tr>
</table>

7. Device Management Commands

OMA Device Management is a device management (DM) protocol specified by the Open Mobile Alliance (OMA) Device Management Working Group and the Data Synchronization (DS) Working Group.

Note: OMA feature is only supported by the AirPrime SL9090 and MC9090 Sprint release. All commands listed in this chapter only works in the Sprint network.

7.1. Command Summary

Command	Description
!IDSCANCEL	Cancels or aborts an active DM session
!IDSUIAT	Enable/disable AT terminal as OMA UI
!IDSUISELECT	User selection
+FUMO	Enable/disable NIFUMO or launch CIFUMO
+OMADM	Enable/disable NIDC or launch CIDC
+OMALOG	Enable/disable OMA log
+PRL	Enable/disable NIPRL, enable/disable PRL periodic update, launch a CIPRL
!UPDATE	Launch a user initiated HFA
!IDSRDTREE	Read a note and its subnodes in the DM tree
!IDSAUTOFOTA	Configure auto settings with FOTA updates
!PRLVER	Return PRL version

7.2. Command Reference

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.

Command	Description
!IDSCANCEL	**Cancels or aborts an active DM session** If there is not an active session, this command does nothing. This command works only if **!IDSUIAT=1** is issued first. This command is not password-protected. **Example** **AT!IDSCANCEL** **OK**

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!IDSUIAT</td><td>
Enable/disable AT terminal as OMA UI

If enable all OMA command/info is input/output through AT, or else AT port is disconnected from OMA.
This command is not password-protected.

Usage
Execution !IDSUIAT=<enable>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><enable></td><td>0</td><td>Disable the AT as OMA UI</td></tr>
<tr><td></td><td>1</td><td>Enable the AT as OMA UI</td></tr>
</table>
Example
AT!IDSUIAT=1
OK
</td></tr>
<tr><td>!IDSUISELECT</td><td>
User selection

This command allows the user to make a selection and send it to the device in response to a previous query from the device.
This command works only if !IDSUIAT=1 is issued first.
This command is not password-protected.

Usage
Execution !IDSUISELECT= <selection>

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><selection></td><td>0</td><td>Reject</td></tr>
<tr><td></td><td>1</td><td>Accept</td></tr>
<tr><td></td><td>2</td><td>Delay</td></tr>
<tr><td></td><td>3</td><td>Delay One Hour</td></tr>
<tr><td></td><td>4</td><td>Delay Four Hour</td></tr>
<tr><td></td><td>5</td><td>Install FUMO Image at 2:00 AM</td></tr>
</table>
</td></tr>
<tr><td>+FUMO</td><td>
Enable/disable NIFUMO or launch CIFUMO

If there is an active OMA session when +FUMO=2 is issued, a CIFUMO session is inserted into waiting queue, and will be actived until all active and pending sessions finish.
If there is an pending HFA session (for example, an HFA PRL is in pending state for 10 secs after HFA DC is finised.), +FUMO=2 actives this pending session rather than initite a new CIFUMO.
This command works only if !IDSUIAT=1 is issued first.
This command is not password-protected.

Usage
Execution +FUMO=<FUMO_INPUT>

Query +FUMO=?
Response +FUMO:<FUMO_ENABLE>
OK
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>
Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><FUMO_INPUT></td><td>0</td><td>Disable NIFUMO</td></tr>
<tr><td></td><td>1</td><td>Enable NIFUMO</td></tr>
<tr><td></td><td>2</td><td>Launch a CIFUMO</td></tr>
<tr><td><FUMO_ENABLE></td><td>0</td><td>NIFUMO disable</td></tr>
<tr><td></td><td>1</td><td>NIFUMO enable</td></tr>
</table>
</td></tr>
<tr><td>+OMADM</td><td>
Enable/disable NIDC or launch CIDC

If there is an active OMA session when +OMADM=2 is issued, a CIDC session is inserted into waiting queue, and will be actived until all active and pending sessions finish.
If there is an pending HFA session (for example, an HFA PRL is in pending state for 10 secs after HFA DC is finised.), +OMADM=2 actives this pending session rather than initite a new CIDC.
This command works only if !IDSUIAT=1 is issued first.
This command is not password-protected.

Usage
Execution +OMADM=<DM_INPUT>

Query +OMADM?
Response +OMADM:<DM_ENABLE>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><DM_INPUT></td><td>0</td><td>Disable NIDC</td></tr>
<tr><td></td><td>1</td><td>Enable NIDC</td></tr>
<tr><td></td><td>2</td><td>Launch a CIDC</td></tr>
<tr><td><DM_ENABLE></td><td>0</td><td>NIDC disable</td></tr>
<tr><td></td><td>1</td><td>NIDC enable</td></tr>
</table>
</td></tr>
<tr><td>+OMALOG</td><td>
Enable/disable OMA log

This command enable/disable saving OMA DM SyncML logs to EFS of “/omadmlog/omadm.log”.
The newest OMA log replaces the older one when OMA log enable.
This command works only if !IDSUIAT=1 is issued first.
This command is not password-protected.

Usage
Execution +OMALOG=<OMALOG_ENABLE>
Query +OMALOG=?

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><OMALOG_ENABLE></td><td>0</td><td>OMA log disable</td></tr>
<tr><td></td><td>1</td><td>OMA log enable</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>+PRL</td><td>
Enable/disable NIPRL, enable/disable PRL periodic update, launch a CIPRL

If there is an active OMA session when +PRL=2 is issued, a CIPRL session is inserted into waiting queue, and will be actived until all active and pending sessions finish.
If there is an pending HFA session (for example, an HFA PRL is in pending state for 10 secs after HFA DC is finised.), +PRL=2 actives this pending session rather than initite a new CIPRL.
This command works only if !IDSUIAT=1 is issued first.
This command is not password-protected.

Usage
Execution +PRL= <PRL_INPUT>

Query +PRL=?
Response +PRL: <PRL_ENABLE>
OK

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><PRL_INPUT></td><td>0</td><td>Disable NIPRL</td></tr>
<tr><td></td><td>1</td><td>Enable NIPRL</td></tr>
<tr><td></td><td>2</td><td>Launch a CIPRL</td></tr>
<tr><td></td><td>3</td><td>Enable NIPRL and automatically update PRL every 45 days</td></tr>
<tr><td></td><td>4</td><td>Enable CIPRL and automatically update PRL every 90 days</td></tr>
<tr><td><PRL_ENABLE></td><td>0</td><td>NIPRL disable</td></tr>
<tr><td></td><td>1</td><td>NIPRL enable</td></tr>
</table>
</td></tr>
<tr><td>!UPDATE</td><td>
Launch a user initiated HFA

If there is an active OMA session when !UPDATE =2 is issued, a HFA request is inserted into waiting queue, and will be actived until all active and pending sessions finish.
If there is an pending HFA session (for example, an HFA PRL is in pending state for 10 secs after HFA DC is finised.), !UPDATE actives this pending session rather than initite a new CIPRL.
This command works only if !IDSUIAT=1 is issued first.
This command is not password-protected.

Example
AT!UPDATE
OK
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>!IDSRDTREE</td><td>
Read a note and its subnodes in the DM tree

This command is not password-protected.

Usage
Execution at!idsrdtree=<node>
Response <List of node and subnodes in the DM tree and their value>
OK
or
ERROR

Query at!idsrdtree=?
Response AT!IDSRDTREE="<node>"

Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><node></td><td></td><td>Nodes tring name including path from root; maximum of 128 characters
Example: ./DMAcc</td></tr>
</table>
</td></tr>
<tr><td>!IDSAUTOFOTA</td><td>
Configure auto settings with FOTA updates

This command configures the autodownload, autoupdate and autocheck flags associated with over-the-air firmware update. When the autodownload and autoupdate flags are set, the device skips requesting user permission before proceeding with the download or update. When the autocheck flag is set, the device starts a device initiated FOTA session on every start up to check if the server has a firmware update available.
This command is not password-protected.

Usage
Execution at!idsautofota=<autodownload>,
<autoupdate>,<autocheck>
Response OK
or
ERROR

Query at!idsautofota?
Response !IDSAUTOFOTA:<autodownload>,
<autoupdate>,<autocheck>
OK

Query List at!idsautofota=?
Response AT!IDSAUTOFOTA=<autodownload>,
<autoupdate>,<autocheck>
autodownload: 0:disable; 1:enable
autoupdate: 0:disable; 1:enable; 2:auto update on power up
autocheck: 0:disable; 1:enable
OK
</td></tr>
</table>

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td></td><td>Parameters
<table>
<tr><th>Parameter</th><th>Value</th><th>Description</th></tr>
<tr><td><autodownload></td><td>0</td><td>User permission is required before downloading</td></tr>
<tr><td></td><td>1</td><td>No user permission is required before downloading</td></tr>
<tr><td><autoupdate></td><td>0</td><td>User permission is required before updating firmware</td></tr>
<tr><td></td><td>1</td><td>No user permission is required before updating firmware</td></tr>
<tr><td><autocheck></td><td>0</td><td>Disable check for firmware update on startup</td></tr>
<tr><td></td><td>1</td><td>Enable check for firmware update on startup</td></tr>
</table></td></tr>
<tr><td>!PRLVER</td><td>Return PRL version

This command returns the version of the PRL currenly stored in the modem.
This command is not password-protected.

Usage
Execution AT!PRLVER
Response PRL VER: 0
OK</td></tr>
</table>

Appendix A: Test Frequencies/Channel Lists (UMTS)

The following tables describe the frequencies and channels typically used when checking receiver and transmit paths for the SL9090 and MC9090 in UMTS.

Table 30. GSM/EDGE Channels

Band	Channel	Tx Frequency (MHz)	Rx Frequency (MHz)
GSM850	128	824.20	869.20
	190	836.60	881.60
	251	848.80	893.80
EGSM900	975	880.20	925.20
	979	881.00	926.00
	62	902.40	947.40
	65	903.00	948.00
	120	914.00	959.00
	124	914.80	959.80
DCS1800	512	1710.20	1805.20
	520	1711.80	1806.80
	697	1747.20	1842.20
	880	1783.80	1878.80
	885	1784.80	1879.80
PCS1900	512	1850.20	1930.20
	520	1851.80	1931.80
	661	1880.00	1960.00
	804	1908.60	1988.60
	810	1909.80	1989.80

Note: When testing, use the Rx frequencies plus a 67 kHz offset. For example, to test GSM850, channel 190, use a signal generator setting of 881.667 MHz.

Table 31. WCDMA Channels

Band	Tx Channel	UE Tx (MHz)	Rx Channel	UE Rx (MHz)
UMTS Band I (2100)	9612	1922.40	10562	2112.40
	9750	1950.00	10700	2140.00
	9888	1977.60	10838	2167.60
UMTS Band II (1900)	9262	1852.40	9662	1932.40
	9400	1880.00	9800	1960.00
	9538	1907.60	9938	1987.60
UMTS Band V (850)	4132	826.40	4357	871.40
	4182	836.40	4407	881.40
	4233	846.60	4458	891.60

Band	Tx Channel	UE Tx (MHz)	Rx Channel	UE Rx (MHz)
UMTS Band VIII (900)	2712	882.40	2937	927.40
	2787	897.40	3012	942.40
	2863	912.60	3088	957.60

Note: When testing, use the UE Rx frequencies plus a 1.2 MHz offset. For example, to test Band V (850 MHz), channel 4407, use a signal generator setting of 882.60 MHz.

Appendix B: HSDPA/HSUPA Categories

The following tables describe standard HSDPA and HSUPA categories.

Table 32. HSDPA-capable Terminals

Category	Maximum Number of Supported HS-DSCH Codes	Minimum Inter-TTI Interval	Number of Soft Values in Terminal's Hybrid ARQ Buffer	Theoretical Download Maximum (L1 peak rate [Mbps])	Modulation
Category 1	5	3	19,200	1.2	16QAM, QPSK
Category 2	5	3	28,800	1.2	16QAM, QPSK
Category 3	5	2	28,800	1.8	16QAM, QPSK
Category 4	5	2	38,400	1.8	16QAM, QPSK
Category 5	5	1	57,600	3.6	16QAM, QPSK
Category 6	5	1	67,200	3.6	16QAM, QPSK
Category 7	10	1	115,200	7.2	16QAM, QPSK
Category 8	10	1	134,400	7.2	16QAM, QPSK
Category 9	15	1	172,800	10.0	16QAM, QPSK
Category 10	15	1	172,800	14.0	16QAM, QPSK
Category 11	5	2	14,400	0.9	QPSK
Category 12	5	1	28,800	1.8	QPSK

Table 33. HSUPA-capable Terminals

E-DCH Category	Maximum Number of E-DCH Codes Transmitted	Minimum Spreading Factor	Support for 10 ms; 2 ms TTI E-DCH	Maximum Data Rate with 10 ms TTI	Maximum Data Rate with 2 ms TTI
Category 1	1	SF4	10 ms only	0.72 Mbps	N/A
Category 2	2	SF4	10 ms and 2 ms	1.45 Mbps	1.45 Mbps
Category 3	2	SF4	10 ms only	1.45 Mbps	N/A
Category 4	2	SF2	10 ms and 2 ms	2.0 Mbps	2.91 Mbps
Category 5	2	SF2	10 ms only	2.0 Mbps	N/A
Category 6	4	SF2	10 ms and 2 ms	2.0 Mbps	5.76 Mbps

Appendix C: Band Definitions

Some commands described in this document include input and/or output band parameters which are listed in the following tables.

Table 34. Network Technology and Band Enumeration

<band>	Description
0	CDMA
2	Sleep
5	CDMA 800
6	CDMA 1900
7	HDR
8	CDMA 1800
9	WCDMA IMT
10	GSM 900
11	GSM 1800
12	GSM 1900
14	JCDMA
15	WCDMA 1900A
16	WCDMA 1900B
17	CDMA 450
18	GSM 850
19	IMT
20	HDR 800
21	HDR 1900
22	WCDMA 800
25	WCDMA BC3
26	CDMA BC14
27	CDMA BC11
28	WCDMA BC4
29	WCDMA BC8
30	MF 700
31	WCDMA BC9
32	CDMA BC15
33	CDMA BC10
34	LTE B1
35	LTE B7
36	LTE B13
37	LTE B17
38	LTE B38
39	LTE B40
40	WCDMA BC11
41	LTE B11
42	LTE B4

<band>	Description
43	LTE B2
44	LTE B3
45	LTE B5
46	LTE B6
47	LTE B8
48	LTE B9
49	LTE B10
50	LTE B12
51	LTE B14
52	LTE B15
53	LTE B16
54	LTE B18
55	LTE B19
56	LTE B20
57	LTE B21
58	LTE B22
59	LTE B23
60	LTE B24
61	LTE B25
62	LTE B26
63	LTE B27
64	LTE B28
65	LTE B29
66	LTE B30
67	LTE B31
68	LTE B32
69	LTE B33
70	LTE B34
71	LTE B35
72	LTE B36
73	LTE B37
74	LTE B39
75	WCDMA BC19
76	LTE B41

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

Table 35. 3GPP Bands

Band	RX Frequency (MHz)	TX Frequency (MHz)
1	1920–1980	2110–2170
2	1850–1910	1930–1990
3	1710–1785	1805–1880
4	1710–1755	2110–2155

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

Appendix D: ASCII Table

Table 36. ASCII Table

Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
NUL	0	00	SP	32	20	@	64	40	‘	96	60
SOH	1	01	!	33	21	A	65	41	a	97	61
STX	2	02	“	34	22	B	66	42	b	98	62
ETX	3	03	#	35	23	C	67	43	c	99	63
EOT	4	04	$	36	24	D	68	44	d	100	64
ENQ	5	05	%	37	25	E	69	45	e	101	65
ACK	6	06	&	38	26	F	70	46	f	102	66
BEL	7	07	’	39	27	G	71	47	g	103	67
BS	8	08	(	40	28	H	72	48	h	104	68
HT	9	09	)	41	29	I	73	49	i	105	69
LF	10	0A	*	42	2A	J	74	4A	j	106	6A
VT	11	0B	+	43	2B	K	75	4B	k	107	6B
FF	12	0C	,	44	2C	L	76	4C	l	108	6C
CR	13	0D	-	45	2D	M	77	4D	m	109	6D
SO	14	0E	.	46	2E	N	78	4E	n	110	6E
SI	15	0F	/	47	2F	O	79	4F	o	111	6F
DLE	16	10	0	48	30	P	80	50	p	112	70
XON	17	11	1	49	31	Q	81	51	q	113	71
DC2	18	12	2	50	32	R	82	52	r	114	72
XOFF	19	13	3	51	33	S	83	53	s	115	73
DC4	20	14	4	52	34	T	84	54	t	116	74
NAK	21	15	5	53	35	U	85	55	u	117	75
SYN	22	16	6	54	36	V	86	56	v	118	76
ETB	23	17	7	55	37	W	87	57	w	119	77
CAN	24	18	8	56	38	X	88	58	x	120	78
EM	25	19	9	57	39	Y	89	59	y	121	79
SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
ESC	27	1B	;	59	3B	[	91	5B	{	123	7B
FS	28	1C	<	60	3C	\	92	5C	|	124	7C
GS	29	1D	=	61	3D	]	93	5D	}	125	7D
RS	30	1E	>	62	3E	^	94	5E	~	126	7E
US	31	1F	?	63	3F	_	95	5F	DEL	127	7F

Appendix E: Acronyms and Definitions

Table 37. Acronyms and Definitions

Acronym or Term	Definition
AGC	Automatic Gain Control
Cellular	800MHz radio spectrum air interface
CI	Client-Initiated
CIDC	Client-Initiated Device Configuration
CIFUMO	Client-Initiated Firmware Update Management Object
CIPRL	Client-Initiated PRL Update
CnS	Control and Status (language) – a proprietary protocol for managing the control and status of the modem.
dB	Decibel = 10 x log10 (P1/P2) (Power dB) Decibel = 20 x log10 (V1/V2) (Voltage dB)
dBm	Decibels, relative to 1 mW - Decibel(mW) = 10 x log10 (Pwr (mW)/1mW)
DM	Device Management. See also OMA-DM
EFS	Encrypted File System
endpoint, USB	A uniquely addressable portion of a USB device used to transfer information between the host and module.
EP	See endpoint (above).
FER	Frame Error Rate – a measure of receive sensitivity
FUMO	Firmware Update Management Object
GSM	Global Positioning System – a system that uses a series of 24 geosynchronous satellites to provide navigational data.
HFA	Hands Free Activation
IOTA	Internet Over The Air – an automated feature, supported by some service providers, to perform account setup for you by making a connection to the CDMA network and using a secure Internet connection to download account parameters to your modem.
IS-95	2G radio standards targeted for voice (cdmaONE)
MHz	MegaHertz = 1e6 Hertz (Hertz = 1/second)
MIN	Mobile Identification Number—a number that identifies a specific mobile unit within a wireless carrier's network.
MIP	Mobile IP
NAM	Number Assignment Module—a CDMA account definition that includes a phone number and other unique unit and network identifiers.
NDIS	Network Driver Interface Specification—a programming interface specification for connecting network interface cards in Windows.
NI	Network-Initiated
NIA	Network-Initiated Alert
NID	Network Identification – a number that uniquely identifies a network.
NIDC	Network-Initiated Device Configuration
NIFUMO	Network-Initiated Firmware Update Management Object
NIPRL	Network-Initiated PRL Update
NV	Non-Volatile (memory) – Random Access Memory that retains its contents even if the power is removed.

Acronym or Term	Definition
OEM	Original Equipment Manufacturer – a company that manufactures a product and sells it to a reseller.
OMA-DM	Open Mobile Alliance - Device Management. A device management (DM) protocol specified by the Open Mobile Alliance (OMA) Device Management Working Group and the Data Synchronization (DS) Working Group.
PCS	Personal Communication System - PCS spans the 1.9GHz radio spectrum.
PDE	Position Determination Entity – the device that the mobile communicates with for assistance in acquiring a GPS location fix.
PRI	Product Release Instructions—a file that contains the settings used to configure wireless products for a particular service provider, customer, or purpose.
PRL	Preferred Roaming List—an account configuration item set by the user's service provider. It controls the radio channels/network carrier used by the modem.
response	A response from the modem that is issued prior to a result code.
result code	A numeric or text code that is returned after all commands (except resets).
RF	Radio Frequency
Sensitivity (RF)	Measure of lowest power signal that the receiver can measure.
TTY	TeleTYpe – a device that allows people who are deaf, hard of hearing, or speech-impaired to use the telephone to communicate.

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