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# CDMA-C1 AT Commands Reference Guide

## CDMA C1 AT Commands Reference Guide

S000478C, Version C

Use this AT Command Guide with the following:

SocketModem® Cell – MTSMC-C1, MTSMC-C1-V

MultiModem® iCell – MTSMC-C1-IP

MultiModem® rCell – MTCBA-C1-EN2

MultiConnect™ AW (MT200A2W-C1)

SocketModem iCell –MTSMC-C1-IP, MTSMC-C1-GP

MultiModem® iCell – MTCMR-C1

MultiModem® Cell – MTCBA-C1

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### Revisions

Revision	Date	Description
C	01/07/11	Added the MultiModem® CDMA C1X (MTCBA-C1X-xx). Added a note to +CFUN regarding resetting and powering down the modem. Removed "Power Down Using the ON/OFF Signal" from the +CFUN command.
D	05/10/12	Removed +WDMX, +WPRV, +WTUOOS, +DPRL, +WAKY, +WAOC, +WSDG, +WSCI, +CIMP, \$QCMIPRT, \$QCMIPMASS, \$QCMIPMHSS, \$QCMIPMASSX, \$QCMIPMHSSX, \$QCMIPMASPI, \$QCMIPMHSPi, \$QCMIPPHA, \$QCMIPSHA, \$SPNAI, +WSRA, \$WPLTIME, \$WSMPI, and antenna commands. Added +WERMER, +WRLY, \$QCVAD. Updated +WIPBR, +CGMR, +CGSN, +CGMI, +CGMM, +GCAP, +WIND, +CRC, +DS, +CLIP, +CCWA, +RING, +WPRV, +WANS, +WCNT, +WEND, +WORG, +WVMI, +CCFC, +WFSH, +VTS, +CSS, +CRM, +CREG, +WRMP, +CCED, +WIMI, +WMDN, +WPCCM, +WSID, +WDSI, +CMGS, +CMGL, +CPMS, +WMGF, +SPEAKER, +ECHO, +VIP, +WIPBR, +W32K, OTASP and OTAPA, host application scenarios, and the effects of AT&W, ATZ, and AT&F.

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# Chapter 1 – Introduction

This CDMA AT command set is designed to cover the following:

- IS707.3 AT commands
- GSM 07.07 when applicable
- GSM 07.05 when applicable
- ITU-T v25 when applicable
- Proprietary AT set
- Customer specific AT commands
- Qualcomm defined AT commands

Note that the GSM 7.07 and 7.05 specifications could not be followed in some instances because of differences between CDMA and GSM call processing behaviors. In these cases, minimal changes were made to GSM-related commands.

## Document Scope

This document describes CDMA AT commands, their syntax, responses, and result codes. It serves as the reference for wireless application development based on the CDMA modem and for its integration and testing. The intended audience is expected to be familiar with CDMA data services protocol and AT modem commands.

## Related References

This interface specification is based on the following recommendations or standards:

- ETSI GSM 07.05: Digital cellular telecommunications system (Phase 2): Use of DTE-DCE interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)
- ETSI GSM 07.07: Digital cellular telecommunications system (Phase 2): AT command set for GSM Mobile Equipment (ME)
- ITU-T Recommendation V.25 ter: Serial asynchronous automatic dialing and control
- ETSI GSM 03.40: Digital cellular telecommunications system (Phase 2): Technical implementation of the Short Message Service (SMS) Point-to-Point (PP)
- ETSI GSM 03.38: Digital cellular telecommunications system (Phase 2): Alphabets and language-specific information
- ETSI GSM 04.80: Digital cellular telecommunications system (Phase 2): Mobile radio interface layer 3, Supplementary service specification, Formats and coding
- AT Commands Interface Guide version 001/9.1
- TIA/EIA/IS-707.3: Data Service Options for Wideband Spread Spectrum Systems: AT Command Processing and the Rm Interface
- Qualcomm Application Note (CL93-V0327-1 X10): AT COMMANDS FOR DMSS
- IS-131: Data Transmissions Systems and Equipment – Extensions to Asynchronous Dialing and Control.
- WISMO-CDMA Q24x8 Product Technical Specification; WI\_HWD\_Q24X8\_PTS\_001.
- TIA/EIA-592: Asynchronous Facsimile DCE Control Standard - Service Class 2
- WM\_CCD\_Q24x8\_CTI\_009: TCP App Application note

# Chapter 2 – AT Commands Overview

## Serial Interface Settings

A modem serial interface is set with the following default values (factory settings):

- 115,200bps
- 8 bits data
- 1 stop bit
- no parity
- RTS/CTS flow control.

**Note:** Some models may have a different value for the default baud rate.

The +IPR, +IFC and +ICF commands can be used to change these settings, if required. Changes made using these commands become effective immediately following the transmission of the successful command result (OK).

## Overview

Use AT commands to communicate with modem equipment. The modem provides an AT command interface over the serial link between the modem and a host application. The AT command format is an ASCII string that always starts with “AT” and ends with a defined set of characters. The format is defined in detail later in this chapter.

AT command communication between the host application and the modem is blocking: the host application must wait for the completion of one command before issuing the next command. The behavior of the modem is undefined if a new command is issued before the previous command’s result code is returned.

While AT command communication is generally host-driven, unsolicited responses may also be sent to the host application when a certain events occur. Host applications should be prepared to receive unsolicited responses from the modem at any time except during AT command entry.

AT+CREG=0<CR>	Unsolicited response cannot occur between the ‘A’ and <CR>
<CR><LF>	Unsolicited response will not occur here unless otherwise documented
OK<CR><LF>	Unsolicited response can occur here

Multi-Tech supports only the AT commands listed in this document. Other AT commands may be functional as a result of the baseline code, but they will not be supported by Multi-Tech. The status of undocumented commands should not be assumed. We recommend that only the listed AT commands be used in a host application.

**Note:** The test command option associated with AT commands may also be present for a large percentage of the AT commands.

# Terminology

## Command Types

Terminology used to describe AT command communication

Term	Definition
AT Command	This is referred to as a command from the host application to modem with a request to perform a service.
Result Code	This is an immediate response to a command, informing the host application whether the execution of the command succeeded or failed. The strings “OK” or “ERROR” are the only two Result Codes available. A result code is always returned after an AT command has been sent to the modem.
Extended Reason Code	If enabled, (see AT+CME), the modem may respond with a result code of either +CME ERROR: or +CMS ERROR followed by a reason code rather than a result code of ERROR.
Response	A response contains data that has been requested via an AT command. A response is returned before the result code of the command. A response is provided only when the result code is OK.
Unsolicited Response	An unsolicited response is sent by modem when a specific event occurs. Some unsolicited responses can be turned on and off via AT commands. Some unsolicited responses are always enabled or turned on.

## AT Commands Types

Command Type	Definition
Action Command	Action commands are used to perform a function. Typically, action commands are used to change the value of a setting in modem, send data, or perform advanced queries that require input data.
Read Command	Read commands typically end with a “?”. Most read commands do not have any input parameters; however, in some cases an input parameter provides options for the response format. The read commands are used for reading values of certain settings in the modem.
Test Command	Test commands are not supported in the C1 modem.

# Command Format and Syntax

## Alphabet

The T.50 International Alphabet 5 (IA5) is used in this manual. Only the low-order seven bits of each character are significant to modem. Any eighth or higher-order bit(s) are ignored for the purpose of identifying commands and parameters. Lower-case characters (IA5 values from 0x61 to 0x7A) are considered identical to their upper-case equivalents (IA5 values from 0x41 to 0x5A) when received by modem from the host application. Result codes from the modem shall be in upper case.

All commands must begin with the characters A and T. If the A and T are not received by the software, the remaining characters will not be processed. This is important; should the A or T be lost in communication or not supplied, none of the characters sent to the modem will be echoed back until an AT sequence is observed.

## Command-Line Editing

The character defined by the command AT\$5, (default: backspace [IA5 0x08]) is intended to be interpreted as a request from the host application to the modem to delete the previous character.

Any control characters (IA5 0x00 through 0x1F, inclusive) that remain in the command line after receipt of the termination character are ignored by the modem.

Before checking for other characters, the modem checks characters from the host application to see if they match the termination character (S3), then it checks to see if they match the editing character (S5). This ensures that these characters will be properly recognized even if they are set to values that the modem uses for other purposes. If S3 and S5 are set to the same value, a matching character will be treated as matching S3 (S3 is checked before S5).

## Input Command Syntax

A command line is made up of the following three elements: the prefix, the body, and the termination character.

AT+CFUN=1<CR>

In the example above, AT is the prefix. The modem expects all commands to begin with the letters “AT” or “at”. If the host application inadvertently begins a command with characters other than “AT” or “at”, the modem will ignore the characters and will not echo them. The modem will continue to ignore input until the characters “AT” or “at” are received.

In some power save modes, the modem serial port UART is powered down. See section 19 for sleep related functionality.

In the example above, the body, +CFUN=1, includes commands and parameters. The termination character cannot appear in the body.

The termination character may be selected using the AT\$3 command. For more information, see Line Termination Character S3 section. The default value is CR (IA5 0x0D).

In addition, the modem supports multiple AT commands embedded in a single AT command string request. However We recommend that this feature be used with care. Response from the modem to multiple AT commands embedded in a single AT command string can be confusing. The modem will only return the status of the last instructional command of the string.

## Other Syntax

Syntax	Definition
< >	Name enclosed in angle brackets is a syntactical element. Do not use the angle brackets when entering a command line.
[ ]	Square brackets are used to indicate an optional parameter of a command or an optional part of a response. Do not use the brackets when entering a command.

**Note:** Commas separating parameters are usually NOT optional when delimiting a list of “optional” parameters. The commas are necessary to provide parameter matching with the modem parser.

## Output Response Syntax

The two characters defined in AT\$3 (the terminating character) and AT\$4 (Response formatting character) are used in all responses, reason codes, and result codes. The default values are <CR> (IA5 0x0D) and <LF> (IA5 0x0A) respectively. The following example illustrates how S3 and S4 are used with their default values.

Response with data:

```
AT+CGMI<CR>
<CR><LF>+CGMI: WAVECOM MODEM<CR><LF>
<CR><LF>OK<CR><LF>
```

Result code only:

```
AT<CR>
<CR><LF>OK<CR><LF>
```

## Parameter Defaults

When applicable, this document identifies default parameter values. Note that within the modem, parameter values can be either persistent or not persistent. Parameter settings that are NOT persistent are not saved over a power cycle; therefore, for every power cycle this type of parameter will be reset back to a predefined value. This predefined value is the listed default.

Values that are persistent are in fact saved over a power cycle. Therefore, the value when the modem is powered on will be set to the value during the previous power cycle. The default value that is listed for persistent parameters is the value the modem defaults to when the modem is created at the factory.

## Unsolicited Message Syntax

The modem can notify the application of events as they occur. There are two types of unsolicited messages: those that the modem will always report and those that are optional.

The format for unsolicited messages is:

```
<CR><LF>+WIND: 4<CR><LF>
```

As a general rule, unsolicited messages are not embedded in an AT command response. The unsolicited message may be returned after an AT command is issued and before the AT command response, but not in the middle.

Therefore, the following is NOT possible:

```
AT+CGMI<CR>
<CR><LF>WAVEC<CR><LF>RING<CR><LF>OM<CR><LF>
<CR><LF>OK<CR><LF>
```

However, the following example is possible:

```
AT+CGMI<CR>
<CR><LF>RING<CR><LF>
<CR><LF>+CGMI: WAVECOM MODEM <CR><LF>
<CR><LF>OK<CR><LF>
```

It is strongly recommended to design the host application parser to ignore unrecognized unsolicited messages. Such a design allows for modifications to the returned unsolicited messages for testing purposes and possible future enhancements to the modem. Unsolicited messages are discarded while the modem is in 32khz sleep.

Unsolicited messages can be buffered under certain conditions. The buffer is 15 entries deep and when full will drop the oldest messages for a new message. To control the unsolicited message continue, use AT+WUSLMSK. AT commands are buffered in PPP and TCP online data. We recommend that during buffering that the level of unsolicited messages be dropped back as far as possible; the Ring Indicator can be used as a replacement for many unsolicited messages.

## Chapter 3 - General Commands

Provides detailed descriptions of the AT commands supported by CDMA C1 modems. The functionality and syntax as well as expected result codes and responses are documented for each command.

### Attention AT

**Description:** This two-character command prefix is used to alert the modem software that a command has been entered for processing. This prefix must be included in all commands unless otherwise noted. When entered alone, the modem responds with OK to signify it is ready to process commands.

**Syntax:** AT

Command	Possible Responses
AT	<b>Note:</b> No response returned.

### Repeat Last Command A/

**Description:** This command repeats the previous command. Only the A/ command itself cannot be repeated.

**Note:** Not currently supported on Universal IP products.

**Syntax:** A/

Command	Possible Responses
A/	Response of the previous AT Command

### Echo E

**Description:** This command is used to determine whether or not the modem echoes characters received by an external application (DTE). This is a standard Hayes<sup>®</sup> modem AT command.

**Syntax:** ATE

Command	Possible Responses
ATE0 <b>Note:</b> Characters are not echoed	OK <b>Note:</b> Done
ATE1 <b>Note:</b> Characters are echoed	OK <b>Note:</b> Done

## Enable/Disable Individual Unsolicited Message Mask Bits +WUSLMSK

**Description:** The intent of this AT command is to enable/disable individual unsolicited message mask bits to be sent out to the serial port. This is a 64-bit mask that determines which messages are enabled or disabled. The setting is persistent over power cycle. The default setting is to allow all unsolicited messages.

**Syntax:** AT+WUSLMSK=<mask-bit>, <mask>

Command	Possible Responses
AT+WUSLMSK?<cr> <b>Note:</b> Ask for current setting	+WUSLMSK: FFFFFFFFEFFFFFFDE OK
AT+WUSLMSK=?<cr> <b>Note:</b> Ask for possible values	+WUSLMSK: (00000000-FFFFFFF),(0-1) OK
AT+WUSLMSK=FFFFFFF,0<cr> <b>Note:</b> Enable All Unsolicited Messages Associated with the lower 32 bit mask	OK
AT+WUSLMSK=00020000,0<cr> <b>Note:</b> Enable ONLY +WIND Unsolicited Messages in the lower 32bit mask	OK
AT+WUSLMSK<cr> <b>Note:</b> Enable All Unsolicited Messages	OK

### Values:

The parameters values are:

**<mask-bit>** Currently only 32 bits are used for masking of unsolicited responses.

**00000000** All mask bits off.

{various combinations in between (e.g., 0F817DFE).}

**FFFFFFF** All mask bits on.

**<mask>**

**0** Write bit mask values to the lower 32 bit mask.

**1** Write bit mask values to the upper 32 bit mask.

The <mask-bit> bits correspond to the unsolicited response table below. Upper 32-bit Mask is not used at this time.

#### Lower 32-Bit Mask

Bit	Mask Value	Unsolicited Response	Response for
0	0x00000001	"+WSRV:"	Service State change
1	0x00000002	"+CCWA:"	Call waiting notification
2	0x00000004	"+CSQ:"	RSSI change across threshold
3	0x00000008	"+CLIP:"	CPN or CNAP notification
4	0x00000010	"+WORG:"	Call State origination
5	0x00000020	"+CRING:"	Call State incoming
6	0x00000040	"+WANS:"	Call State answered
7	0x00000080	"+WCNT:"	Call State conversation
8	0x00000100	"+WEND:"	Call End status
9	0x00000200	"+COPS:"	System mode, band, roam settings
11	0x00000800	"+WPRV:"	Privacy change
12	0x00001000	"+WROM:"	Roaming change
13	0x00002000	"+CREG:"	Registration information

Bit	Mask Value	Unsolicited Response	Response for
15	0x00008000	"WSPS:"	Enter/Exit Power Save Mode (no service found)
16	0x00010000	"WNAM:"	Current NAM change
17	0x00020000	"WIND:"	generic unsolicited message WIND
18	0x00040000	"WOTA:"	OTASP or OTAPA programming info
19	0x00080000	"WUZ:"	User zone notification
20	0x00100000	"WTS:"	Diagnostic Timestamp
21	0x00200000	"DTMF:"	Uplink DTMF sent
22	0x00400000	"PINGRING"	Ping Ring
23	0x00800000	"BUSY TONE"	Busy Tone
24	0x01000000	"WMGF"	SMS +WMGF memory full notification
25	0x02000000	"WDSI: "	OMA/DM Event notifications
26	0x04000000	"DPRL:"	+DPRL PRL validated ok
27	0x08000000	"WVMI:"	Voice Mail Indication
28	0x10000000	"WAKETA"	Alert Timer Indicator
29	0x20000000	"RING"	Incoming call notification
30	0x40000000	"WANTS"	Antenna Diagnostics Status Change
31	0x80000000	"WBCI"	Battery Charging Status Change

## Request PRI Version information +WPRI

**Description:** This command requests Product Release Instructions (PRI) edition for the modem.  
The range for PRI label is 20 characters (not including the null termination).

**Syntax:** AT+WPRI?

Command	Possible Responses
AT+WPRI? <b>Note:</b> Request current PRI version	+WPRI: Version 1 OK
AT+WPRI? <b>Note:</b> Request current PRI edition	NO PRI <b>Note:</b> PRI request invalid because there's no PRI loaded.



# Chapter 4 – Identification Commands

## Request Revision Identification +CGMR

**Description:** This command is used to display the operating software version.

**Syntax:** AT+CGMR

Command	Possible Responses
AT+CGMR	AT+CGMR +CGMR: S/W VER: Q26EL001 R6A Sep 23 2011 13:47:48 OK
<b>Note:</b> Get software version	

## Hardware Version +WHWV

**Description:** This command displays the hardware version number.

The hardware version number is a factory defined three-digit character string of in the format of X.Y where S is the major version number and Y is the minor version number.

**Syntax:** AT+WHWV

Command	Possible Responses
AT+WHWV	+WHWV: 5.1 OK
AT+WHWV	+WHWV: 6.0 OK

## Electronic Serial Number +CGSN

**Description:** This command allows the user application to get the ESN of the product. The ESN value is displayed in hexadecimal format. If the MEID is present, then it is also displayed along with the pseudo ESN.

**Syntax:** AT+CGSN

Command	Possible Responses
AT+CGSN	AT+CGSN +CGSN: A100000942571B, 80F64C62 OK
<b>Note:</b> Get the ESN	<b>Note:</b> MEID and pseudo ESN is displayed. +CGSN: <MEID>,<pseudo ESN> OK <b>Note:</b> MEID and pseudo ESN

## Manufacturer Identification +CGMI

**Description:** This command gives the manufacturer identification.

**Syntax:** AT+CGMI

Command	Possible Responses
AT+CGMI <b>Note:</b> Get manufacturer identification	+CGMI: WAVECOM MODEM OK <b>Note:</b> Command valid, modem

## Request Model Identification (Frequency Bands) +CGMM

**Description:** This command is used to get the supported frequency bands. With multi-band products the response may be a combination of different bands.

**Syntax:** AT+CGMM

Command	Possible Responses
AT+CGMM <b>Note:</b> Get supported bands	MULTIBAND 800 1900 Model 65 OK <b>Note:</b> CDMA 800 MHz band and 1900 (PCS)

## Request Product Serial Number +WMSN

**Description:** The command allows the user application to get the serial number of the wireless modem.

**Syntax:** AT+WMSN

Command	Possible Responses
AT+WMSN? <b>Note:</b> Get the wireless modem serial number.	+WMSN: 123456789012345 OK <b>Note:</b> Serial Number read from NV memory

**Values:** The serial number is fifteen digits in length and the breakdown of the string is as follows:

Digits	Meaning
AA	Wireless modem type
B	Year built
CC	Week built
DDDDD	Unit number
EE	Bench number
FFF	Part Number

## Chapter 5 – Query Commands

### Capabilities List +GCAP

**Description:** This command gets the complete list of capabilities.

Faxing not supported

**Syntax:** AT+GCAP

Command	Possible Responses
AT+GCAP <b>Note:</b> Get capabilities list	+GCAP: +CIS707-A, +MS, +ES, +DS, +FCLASS OK

### Subscriber Number +CNUM

**Description:** This command is used to return the subscriber MSISDN for the current NAM.

**Syntax:** AT+CNUM

**Response**

**Syntax:** +CNUM: "Phone", <number1>, <type1>, <CR><LF>

Command	Possible Responses
AT+CNUM <b>Note:</b> Get MSISDN	+CNUM:"Phone","8585551212",129 <b>Note:</b> MSISDN displayed
AT+CNUM=?	+CNUM: OK

**Values:**

<numberx> string type phone number with format as specified by <typex>

<typex> type of address byte in integer format – supports only 129

# Chapter 6 – Global Configuration Commands

## Set Phone Functionality +CFUN

**Description:** This command selects the mobile station's level of functionality. The AT+CFUN=1 command restarts the entire CDMA stack and CDMA functionality: **a complete software reset is performed**. The OK response will be sent at the last baud rate defined by the +IPR command. Issuing the AT+CFUN with no arguments will act the same as AT+CFUN=1.

**Syntax:** AT+CFUN=<functionality level>

Command	Possible Responses
AT+CFUN? <b>Note:</b> Ask for current functionality level	+CFUN: 1 OK <b>Note:</b> Full functionality
AT+CFUN=0 <b>Note:</b> Powers off the modem	OK <b>Note:</b> Command valid
AT+CFUN=1 <b>Note:</b> Sets modem to ONLINE mode. Performs software reset	OK <b>Note:</b> Command valid

**Values:** <functionality level>

- 0** Powers off the modem.
- 1** Sets modem to ONLINE mode. Performs software reset

**Notes:** Powering Down and Hardware Reset

When possible use the following shutdown sequence before resetting or powering down the modem. The shutdown sequence tells the network that the mobile station is going offline, and saves critical data to the modem's flash memory.

AT+CFUN=0 (issues the command)

+WIND:10 (wait for this response from the modem)

The modem is now ready to be powered off or reset.

If you do not see the +WIND:10 response, you can enable this unsolicited message using the command AT+WUSLMSK=00020000,0<cr>.

## Display Configuration &V

**Description:** This command is used to display the modem configuration. It lists all the commands supported by the modem and their possible parameters. This is a standard Hayes® modem AT command.

**Syntax:** AT&V

Command	Possible Responses
AT&V <b>Note:</b> Display the active parameter settings	&C: 2; &D: 2; ... ... OK

## Restore Factory Settings &F

**Description:** This command is used to restore the factory settings from NV memory. This is a standard Hayes® modem AT command.

See Appendix "Effects of AT&W, ATZ and AT&F"

**Note:** There is a remote chance of NV memory corruption if a reset or power loss occurs during the processing of this command. Only use this command during the initial setup of the operating characteristics.

**Syntax:** AT&F

Command	Possible Responses
AT&F	OK <b>Note:</b> Command valid, modem resets

## Save Configuration &W

**Description:** This command writes the current configuration to NV. See table in Chapter 20 for a list of items. This is a standard Hayes® modem AT command.

**Syntax:** AT&W

Command	Possible Responses
AT&W	OK <b>Note:</b> Command valid

## Reset to Default Configuration Z0

**Description:** This command is used to restore the configuration last saved by AT&W.

**Syntax:** ATZ0

Command	Possible Responses
ATZ0 <b>Note:</b> reset to default configuration.	OK <b>Note:</b> Command is valid

# Chapter 7 – Status Commands

## General Indicator +WIND

**Description:** This is a general mechanism to send unsolicited non-standardized indications to the application. The identified unsolicited non-standardized indications are:

- Indication during mobile originated call setup that the calling party is ringing.
- Indication of the availability of the product to receive AT commands after boot.

The +WIND is overloaded with two functionalities:

- posts non-standardized indications and
- allows the user to specify indication level.

For each of these indications, a “bit flow” has to be indicated.

**Syntax:**

AT+WIND=<IndLevel>

Command	Possible Responses
AT+WIND? <b>Note:</b> Show current setting.	WIND: 8 OK <b>Note:</b> Default 204
AT+WIND=? <b>Note:</b> Show <IndLevel> range.	+WIND: (0-32767) OK
AT+WIND=128 <b>Note:</b> Turn on Network lost indication only.	OK <b>Note:</b> Command accepted.
AT+WIND <b>Note:</b> Set the default of 204.	OK <b>Note:</b> Command accepted.

**Values:**

<IndLevel>

<b>1 (bit-0)</b>	Reserved
<b>2 (bit-1)</b>	A calling party is alerting
<b>4 (bit-2)</b>	Product is ready to process read-only AT commands
<b>8 (bit-3)</b>	Indication that the product is ready to process all AT commands
<b>16 (bit-4)</b>	A call <idx> has been created (after ATD, +CCWA, etc.)
<b>32 (bit-5)</b>	A call <idx> has been released (NO_CARRIER, ATH, etc.)
<b>64 (bit-6)</b>	Network service available indication
<b>128 (bit-7)</b>	Network lost indication
<b>256 (bit-8)</b>	Reserved
<b>512 (bit-9)</b>	Shut down complete
<b>1024 (bit-10)</b>	Corrupted RF calibration values (checksum mismatch)
<b>2048 (bit-11)</b>	Reserved
<b>4096 (bit-12)</b>	Reserved
<b>8192 (bit-13)</b>	Reserved
<b>16384 (bit-14)</b>	SMS service ready indication

**Notes:** If <IndLevel> is equal to 0, no unsolicited “+WIND: <IndNb>” will occur.  
The power off indication, +WIND=10, will occur even if +WIND is equal to 0.  
A combination (addition of the values) is used to allow more than one indication flow.

$0 \leq \text{Ind Level} \leq 32767$ .

For example: 128 (network lost indication) + 64 (network service available indication) = 192.

The response is OK if the values are in the previous range.

## +WIND General Indicator Unsolicited Message

The unsolicited response indicates a variety of events.

### Result

**Examples:** +WIND: 4

**Note:** General indication that AT commands are ready to be accepted

The supported events are:

#### <event>

- 0** R-UIM absent or R-UIM failed to initialize
- 1** R-UIM present and initialized
- 2** A calling party is alerting
- 3** Product is ready to process read-only AT commands
- 4** Product is ready to process all AT commands that are not blocked by the R-UIM
- 5** A call <idx> has been created (after ATD, +CCWA, etc.)
- 6** A call <idx> has been released (NO\_CARRIER, ATH, etc.)
- 7** Network service is available
- 8** The network is lost.
- 9** Reserved
- 10** Shut down is complete
- 11** Corrupted RF calibration values (checksum mismatch)
- 12** Reserved
- 13** Reserved
- 14** Reserved
- 15** Reserved
- 16** SMS service ready indication

The following table indicates the correspondences between <InLevel> values and “+WIND: <event> [...]” indications that are activated.

<IndLevel> Value	Corresponding <event>
1	0 and 1
2	2
4	3
8	4
16	5
32	6
64	7
128	8
256	9
512	10
1024	11
2048	12
4096	13 and 14

<IndLevel> Value	Corresponding <event>
8192	15
16384	16

**Note:** To see +WIND: xx responses, use the AT+WUSLMSK command to enable +WIND unsolicited messages.

## Report Mobile Equipment Errors +CMEE

**Description:** This command disables or enables the use of the "Extended" error codes. The extended errors are output instead of "ERROR" when +CMEE is enabled. Extended error codes are output as "+CME ERROR: <xxx>" for most errors, or as "+CMS ERROR: <xxx>" for SMS-related commands. See error codes descriptions below.

**Syntax:** AT+CMEE=<error reporting flag>

Command	Possible Responses
AT+CMEE=0 <b>Note:</b> Disable MS error reports; use only « ERROR »	OK
AT+CMEE=1 <b>Note:</b> Enable «+CME ERROR: <xxx>»	OK

### CME

#### Error Codes:

<err>	Meaning
1-2	Reserved
3	Operation not allowed
4	Operation not supported
5-9	Reserved
10	UIM not inserted
11	UIM PIN1 required
12	UIM PUK1 required
13	UIM failure
14-15	Reserved
16	UIM wrong password
17	UIM PIN2 required
18	UIM PUK2 required
19	Reserved
20	Memory Full
21	Invalid Index
22	Entry Not Found
23	Reserved
24	Text string too long
25	Reserved
26	Dial string too long
27	Invalid Character in Dial String
28-29	Reserved
30	No network service
31	Reserved
32	Network not allowed – Emergency Calls only
33-40	Reserved
41	Software resource not available



<err>	Meaning
42	Invalid parameter
43	Non-Volatile Memory failure
45	Invalid WSPC provisioning code
46	OTKSL provisioning code access restricted
47-49	Reserved
50	Session already in progress
51	Invalid PD parameter
52	PD parameter not supported
53	Tracking mode requires +WPDFR setup
54	No active session
55-147	Reserved
148	Unsupported serial port baud rate
149	Socket transmit timeout
150-239	Reserved
240	FDN is active and number is not in FDN
241-299	Reserved
300-399	See CMS Errors
400-499	Reserved
500	unknown error.
502-512	Reserved
513	Lower layer failure (for SMS)
514	Reserved
515	Please wait. Initialization or command processing in progress.
516-518	Reserved
519	Reset the product to activate or change a new echo cancellation.
520-530	Reserved
531	Only FDN phonebook entries can be sent when the FD facility is enabled.
532-599	Reserved
601	PRL request invalid (no PRL)
800	WIP: Invalid option
801	WIP: Invalid option value
803	WIP: Operation not allowed in current stack state
804	WIP: Device already open
805	WIP: Network interface not established
806	WIP: Operation not allowed on bearer
808	WIP: Bearer connection failed
830	WIP: Bad index
832	WIP: Bad port number
834	WIP: Not implemented
835	WIP: Option not supported
837	WIP: Bad protocol
838	WIP: No sockets available
840	WIP: Socket in use
842	WIP: Destination Unreachable
844	WIP: Stack Already Started
850	WIP: Unknown error
860	WIP: Undefined protocol, Internal error
863	WIP: Protocol delete error

<err>	Meaning
864	WIP: Protocol list error

**CMS****Error Codes:**

<err>	Meaning
300-301	Reserved
302	Operation not allowed
303	Operation not supported
304	Invalid mode parameter
305	Invalid text mode parameter
306-320	Reserved
321	Invalid memory index
322-339	Reserved
340	No +CNMA acknowledgement expected
341	Non Volatile Memory failure
342-399	Reserved

## Cellular Result Codes +CRC

**Description:** This command gives more detailed ring information for an **incoming call**. Instead of the string “RING”, an extended string is used to indicate which type of call is ringing (e.g., +CRING:0).

These extended indications are:

+CRING: 0	Normal voice calls
+CRING: 1	Circuit switched data calls
+CRING: 2	Packet switched data calls
+CRING: 3	SMS calls
+CRING: 5	For markov, loopback, and test calls
+CRING: 6	For OTAPA calls
+CRING: 7	For standard OTASP calls
+CRING: 8	For non-standard OTASP calls

**Note:** To see +CRING: xx responses, use the AT+WUSLMSK command to enable +CRING unsolicited messages.

**Syntax:**

AT+CRC

Command	Possible Responses
AT+CRC=0 <b>Note:</b> Extended reports disabled	OK <b>Note:</b> Command valid
AT+CRC=1 <b>Note:</b> Extended reports enabled	OK <b>Note:</b> Command valid
AT+CRC=? <b>Note:</b> Show range	+CRC: (0-1) OK
AT+CRC? <b>Note:</b> Show current value	+CRC: 1 OK

## Phone Activity Status +CPAS

**Description:** This command returns the activity status of the mobile equipment.

**Syntax:** AT+CPAS

Command	Possible Responses
AT+CPAS	+CPAS: <pas>
<b>Note:</b> Current activity status	OK

**Values:**

&lt;pas&gt;

- 0** ready (allow commands from TA/TE)
- 1** unavailable (does not allow commands)
- 2** unknown
- 3** ringing (ringer is active)
- 4** call in progress
- 5** not supported, asleep (low functionality)
- 6** device not provisioned

## Non Volatile Memory Unsolicited Message +WNVM

**Description:** This unsolicited response is used to indicate various Non-Volatile Memory (NVM) events. The messages will only be presented during the startup sequence; before receiving +WIND:4. Synchronization at startup may occur if the modem was improperly shut down before an NVM synchronization between primary NVM storage and secondary NVM storage was completed. If during startup it is determined the primary NVM storage is not usable, the modem will boot from the secondary copy. This insures reasonable notification that the modem has started and is taking the necessary actions to correct the primary NVM storage.

**Results****Example:**

+WNVM: 1

+WNVM: 0

**Supported****Events:**

- 0** Synchronization stopped, Primary NVM storage to Secondary NVM storage
- 1** Synchronization started, Primary NVM storage to Secondary NVM storage
- 2** Primary NVM resulted in an error, booting using the secondary NVM image

## Chapter 8 – Communication Commands

### Fixed DTE Rate +IPR

**Description:** This command is used to specify the baud rate for the modem DATA port. The factory default value is 115200.

**Note:** Auto-baud (automatic detection of DTE rate) is not supported.

At power-up, the interface rate is set to the value that was active when the last AT&W command was used.

**Note:** The use of baud rates below 9600 may affect the operability of some software features; e.g., TCP App.

**Syntax:** AT+IPR

Command	Possible Responses
AT+IPR? <b>Note:</b> Read syntax.	+IPR: 9600 OK <b>Note:</b> Current rate is 9600 bps
AT+IPR=115200 <b>Note:</b> Set interface rate to 115200 bps	OK
AT+IPR=? <b>Note:</b> Lists supported <rate> values, [(list of fixed-only <rate> values)]	(),(300,600,1200,2400,4800,9600,19200,38400,57600,115200,230400) OK <b>Note:</b> Lists possible baud rates
AT+IPR <b>Note:</b> Set interface rate to factory default of 115200 bps	OK

### DTE-DCE Local Flow Control +IFC

**Description:** This command is used to specify the UART flow control method. The factory default value is 2,2. AT&F and AT&W are in effect. Software flow control is not supported.

**Syntax:** AT+IFC=<Tx>,<Rx>

Command	Possible Responses
AT+IFC=2,2 <b>Note:</b> Set values	OK <b>Note:</b> New values set.
AT+IFC <b>Note:</b> Set factory default values	OK
AT+IFC? <b>Note:</b> Display current settings.	+IFC: 2,2 OK
AT+IFC=? <b>Note:</b> Display valid parameter ranges.	+IFC: (0-3),(0-2) OK

<b>Values:</b> <Tx>		
0	None	Transmit data flow control disabled.
1	XON/XOFF	Not Supported. Remove Xon (0x19) and Xoff (0x17) characters from data stream.
2	Hardware	Use RTS (Request To Send) signal (default)
3	XON/XOFF	Not Supported. Leave Xon (0x19) and Xoff (0x17) characters in data stream.
<Rx>		
0	None	Receive data flow control disabled.
1	XON/XOFF	Not Supported. Remove Xon (0x19) and Xoff (0x17) characters from data stream.
2	Hardware	Use CTS (Clear To Send) signal (default)

## Set DCD Signal &C

**Description:** This command is used to specify the behavior of the Data Carrier Detect (DCD) signal on the modem DATA port. The factory default value is 2. The AT&F command restores the value to the factory setting.

**Syntax:** AT&C<n>

Command	Possible Responses
AT&C0 <b>Note:</b> DCD always on	OK <b>Note:</b> Command valid
AT&C1 <b>Note:</b> DCD matches the true state of the call.	OK <b>Note:</b> Command valid
AT&C2 <b>Note:</b> Wink DCD signal on call disconnect	OK <b>Note:</b> Command valid

<b>Values:</b> <n>	
0	The DCD signal is always asserted.
1	The DCD signal is asserted in a call and de-asserted when not in a call.
2	The DCD signal is always asserted except at the end of a call. At the end of a call, the DCD signal is de-asserted for 1 second. Default is 2

## Set DTR Signal &D

**Description:** This command controls the interpretation of the Data Terminal Ready (DTR) signal on the modem DATA port. The factory default value is 2. The AT&F command restores the value to the factory default.

**Syntax:** AT&D<n>

Command	Possible Responses
AT&D0 <b>Note:</b> The DTR signal is ignored	OK <b>Note:</b> Command valid
AT&D1 <b>Note:</b> Enter online command state following circuit 108/2 ON-to-OFF transition	OK <b>Note:</b> Command valid
AT&D2 <b>Note:</b> Enter command state following circuit 108/2 ON-to-OFF transition	OK <b>Note:</b> Command valid

- Values:** <n>
- 0** The DTR signal is ignored.
  - 1** Enter online command state following ON-to-OFF transition of circuit 108/2. Data call remains active.
  - 2** Enter AT command state following ON-to-OFF transition of circuit 108/2. Data call is terminated. (Default)
- Note:** All open sockets are automatically closed prior to terminating the data call.

## Set DSR Signal &S

**Description:** This commands controls the Data Set Ready (DSR) signal on the modem DATA port. The default value is 0. The AT&F command restores the value to the factory default setting.

**Syntax:** AT&S<n>

Command	Possible Responses
AT&S0 <b>Note:</b> The DSR signal always on.	OK <b>Note:</b> Command valid
AT&S1 <b>Note:</b> The DSR signal is always off.	OK <b>Note:</b> Command valid

- Values:** <n>
- 0** The DSR signal is always on. (Default)
  - 1** The DSR signal is always off.

## V.42bis Data Compression +DS

**Description:** This command enables or disables V.42bis data compression if this feature is provided on the PSTN in the IWF.

**Syntax:** AT+DS=<dir>,<neg>,<P1>,<P2>

Command	Possible Responses
AT+DS=0,0,2048,6 <b>Note:</b> Set new parameters	OK <b>Note:</b> Command valid
AT+DS? <b>Note:</b> Current values	+DS: 0,0,2048,6 OK <b>Note:</b> Command valid

- Values:** Four numeric sub-parameters are accepted:
- <dir>** Specifies the desired direction(s) of operation of the data compression function; from the DTE point of view.
    - 0** Negotiated ... no compression Default.
    - 1** Transmit only
    - 2** Receive only
    - 3** Both directions, accept any direction
  - <neg>** Specifies whether or not the DCE should continue to operate if the desired result is not obtained.
    - 0** Do not disconnect if V.42 bis is not negotiated by the remote DCE as specified in <dir> Default.

&lt;P1&gt;

**512-2048** Specifies the maximum number of dictionary entries that should be negotiated. Default is 2048.

&lt;P2&gt;

**6** Specifies the maximum string length to be negotiated. Default is 6.

## V.42bis Data Compression Report +DR

**Description:** This command returns the results of data compression capability. If data reporting is enabled, this command returns the data compression type of an incoming or outgoing data call. Otherwise, the command returns NONE.

The intermediate result code represents current DCE-DCE data compression type. The syntax for +DR reporting is: +DR<result>, and the result code is defined as follows:

+DR: NONE	Data compression is not in use
+DR: V42B	Rec. V.42bis is in use in both directions
+DR: V42B RD	Rec. V.42bis is in use in receive direction only
+DR: V42B TD	Rec. V.42bis is in use in transmit direction only

The +DR intermediate result code, if enabled, is issued before the final result code and after the service report control +CR.

**Syntax:** AT+DR=<val>

Command	Possible Responses
AT+DR=1 <b>Note:</b> Reporting enabled	OK <b>Note:</b> Command valid
AT+DR? <b>Note:</b> Display the current value	+DR: 1 OK <b>Note:</b> Command valid
AT+DR=? <b>Note:</b> Display the supported values	+DR: (0,1) OK <b>Note:</b> Command valid

**Values:** This syntax is for setting the +DR reporting method.

&lt;val&gt;

**0** Disable reporting (Default)

**1** Enable reporting

## Hang-Up 1x Data Command +WCHD

**Description:** The AT+WCHD command is used by the application to disconnect all 1x data calls. The alternative is to use the DTR pin.

**Syntax:** AT+WCHD

Command	Possible Responses
AT+WCHD <b>Note:</b> Ask for disconnection	OK NO CARRIER

## Automatic Answer S0

**Description:** This S0 (zero) S-register parameter determines and controls the product automatic answering mode. The setting is not persistent.

Use AT&W to save this value to the NVRAM. To restore the default value, use AT&F.

**Syntax:** ATS0=<value>

Command	Possible Responses
ATS0=2 <b>Note:</b> Automatic answer after 2 rings	OK
ATS0? <b>Note:</b> Current value	002 OK <b>Note:</b> always 3 characters padded with zeros
ATS0=0 <b>Note:</b> No automatic answer	OK

**Values:** <value> (0-255)

**0** No automatic answer. (Default)  
**1-255** Answers after the specified number of rings

## Line Termination Character S3

**Description:** This command is used to terminate an incoming command line. The value is not persistent.

**Syntax:** ATS3=<value>

Command	Possible Responses
ATS3=13 <b>Note:</b> Set detection character to carriage return	OK

**Values:** <char> Character decimal representation  
**1 – 127** Escape character (default is 13 or the carriage return character)

## Response Formatting Character S4

**Description:** This command sets the value of the AT defined character when formatting the result codes and information text. It is used together with the ATS3 command. The value is not persistent.

**Syntax:** ATS4=<value>

Command	Possible Responses
ATS4=10 <b>Note:</b> Set detection character to line feed	OK

**Values:** <char> Character decimal representation  
**1 – 127** Escape character (default is 10 or the carriage return character)



## Command Edit Character S5

**Description:** This command sets the value of the defined character for deleting the immediately preceding character from the command line. The value is not persistent.

**Syntax:** ATS5=<value>

Command	Possible Responses
ATS5=8 <b>Note:</b> Set detection character to backspace	OK

**Values:** <char> Character decimal representation  
1 – 127 Escape character (default is 8 or the carriage return character)

## Connection Completion Timeout S7

**Description:** This command defines the maximum time allowed between completion of dialing and the connection being established. If this time is exceeded, then the connection is aborted. The value is not persistent.

**Syntax:** ATS7=<value>

Command	Possible Responses
ATS7=100	OK

**Values:** <value> Timeout in seconds  
1 – 255 Default value is 50

## Carrier Detect Threshold S9

**Description:** This command defines the amount of time the carrier detect signal stays high. The value is not persistent.

**Syntax:** ATS9=<value>

Command	Possible Responses
ATS9=10	OK

**Values:** <value> Value in tenths of a second  
1 – 255 Default value is 6 (or .6 seconds)

## Automatic Disconnect Delay S10

**Description:** This command defines the duration of received-line-signal loss that the DCE tolerates. If the duration is exceeded, the DCE disconnects. The value is not persistent.

**Syntax:** ATS10=<value>

Command	Possible Responses
ATS10=10	OK

**Values:** <value> Value in tenths of a second  
1 – 254 Default value is 14 (or 1.4 seconds)  
255 Ignore received-line-signal loss; do not disconnect

## DTMF Duration and Spacing S11

**Description:** This command defines the DTMF pulse width for both burst and continuous DTMF. The value is not persistent.

**Syntax:**       ATS11=<value>

Command	Possible Responses
ATS11=150	OK

**Values:**

<value>	Value range
<b>50 – 149</b>	Burst DTMF time of 95ms digit time with 60ms inter-digit time (Default)
<b>150 – 199</b>	Burst DTMF time of 150ms digit time with 100ms inter-digit time
<b>200 – 249</b>	Burst DTMF time of 200ms digit time with 150ms inter-digit time
<b>250</b>	Burst DTMF time of 250ms digit time with 200ms inter-digit time
<b>251 – 255</b>	Continue DTMF in ms – Equation: (value-250) x 1000

# Chapter 9 – Call Control Commands

## Dial Command D

**Description:** The ATD command is used to originate a **voice** or **data** call. For a **data call**, the application sends the following ASCII string to the product:

ATD<nb>

where <nb> is the destination phone number.

**Note:** ATD<nb> is followed by PPP session startup and negotiation. Standard PPP packets are HDLC formatted. A packet data call is terminated by de-assertion of the DTR signal to the modem. See the AT&D command.

Command is not valid for Multi-Tech UIP devices when in a AT+WOPEN=1 state.

For a **voice call**, the application sends the following ASCII string to the product:

ATD<nb>;

where <nb> is the dialing string or destination phone number, followed by a semicolon

“;”. The dialing string may contain characters “0-9”, “#”, “\*” only.

Note that some countries may have specific numbering rules for their CDMA handset numbering.

If a call, voice or data, is already in progress, initiating a dial will return an ERROR.

The dial sequence is responsible for handling emergency calls. It is the host application's responsibility to tear down a data call if an outgoing emergency call has been initiated.

The response to the ATD command is one of the following:

Verbose Result Code	Numeric Code (with ATV0 set)	Description
OK	0	Command executed (voice)
ERROR		Call already in progress
CONNECT <speed>	10,11,12,13,14,1 5	If the call succeeds, for data calls only, <speed> takes the value negotiated by the product
BUSY	7	If the called party is already in communication
NO ANSWER	8	If no hang up is detected after a fixed network time-out
NO CARRIER	3	Call setup failed or remote user release
NO DIALTONE	6	Voice call with missing “;”

## Direct Dial

**Syntax:** ATD<nb>[:]

Command	Possible Responses
ATD18005551212; <b>Note:</b> Attempt a voice call.	OK <b>Note:</b> Command executed +WORG:18005551212 <b>Note:</b> Voice call origination sent to Base Station with dial string "18005551212". +WCNT: 9 <b>Note:</b> Call Connected, CDMA traffic channel established with service option 9. You can now hear audio of the calling party's phone ringing. However, this event does not mean the other calling party has answered.
ATD5551212; <b>Note:</b> Example of a failed voice call attempt.	OK <b>Note:</b> Command executed +WORG:5551212 <b>Note:</b> Voice call origination sent to Base Station with dialing string "5551212". +WEND: 3 <b>Note:</b> Call Attempt failed/ended. Reason 22, signal faded.

To receive +WCNT, +WORG, and +WEND unsolicited responses, set AT+WUSLMSK to enable responses.

## Hang-Up Command H

**Description:** The ATH (or ATH0) command is used by the application to disconnect the remote user. In the case of multiple calls, all calls are released (active, on-hold and waiting calls).

**Syntax:** ATH

Command	Possible Responses
ATH <b>Note:</b> Ask for disconnection	OK +WEND: 29 <b>Note:</b> Every call, if any, is released

To receive +WEND unsolicited responses, use the AT+WUSLMSK command to enable them.

## Answer a Call A

**Description:** When the product receives a call, it sets the **RingInd** signal and sends the ASCII **RING** or **+CRING:** <type> string to the application (+CRING if the cellular result code +CRC is enabled). Then it waits for the application to accept the call with the ATA command.

**Syntax:** ATA

Command	Possible Responses
	RING <b>Note:</b> Incoming call
ATA <b>Note:</b> Answer to this incoming call	+WANS:0 +WCNT: 10 <b>Note:</b> Call accepted
ATH <b>Note:</b> Disconnect call	OK +WEND: 29 <b>Note:</b> Call disconnected

To receive +WCNT and +WEND unsolicited responses, use the AT+WUSLSK command to enable them.

## Calling Line Identification Presentation +CLIP

**Description:** This command allows control of the incoming Calling Line Identification Presentation (CLIP) supplementary service. When CLIP is enabled, the +CLIP response is returned after the RING unsolicited result code. By default, +CLIP is enabled.

CLIP = Calling Line Identification Presentation is a supplementary service that allows the called party to receive the line identity of the calling party.

CNAP = Calling Name Presentation provides the name identification of the calling party to the called party based on the calling party's number. In this product, the CNAP will always be 129.

**Response****Syntax:** AT+CLIP=<mode>

Command	Possible Responses
AT+CLIP=1 <b>Note:</b> Enable CLIP	OK <b>Note:</b> CLIP is enabled
AT+CLIP? <b>Note:</b> Ask for current functionality	+CLIP:<mode> OK <b>Note:</b> <mode> defined as below
	RING +CLIP: "8585551212",129 <b>Note:</b> Incoming call with CLIP and CNAP
AT+CLIP=0 <b>Note:</b> Disable CLIP presentation	OK <b>Note:</b> Command valid

**Values:**

<b>&lt;mode&gt;</b>	This parameter enables or disables the caller +CLIP unsolicited response
<b>0</b>	Disable (Default)
<b>1</b>	Enable

## Caller ID Presentation Unsolicited Response +CLIP

This response indicates that CLIP (Calling Line Identification Presentation) is enabled for the current incoming call. See +CLIP for enable and disabling this result.

### Response

**Syntax:** +CLIP: <clip>, <cnap>

### Result

**Example 1:** +CLIP: "8585551212",129

**Note:** Incoming call with CLIP and CNAP available

### Result

**Example 2:** +CLIP: "", ""

**Note:** Incoming call with CLIP and CNAP not available. This result is due to either:  
UNKOWN information  
BLOCKED information by carrier

To receive +CLIP unsolicited response, set the AT+WUSLMSK command to enable the response.

## Call Waiting Indication +CCWA

**Description:** This response indicates that another incoming call is occurring during an existing call. See +WFSH for information about handling call-waiting situations.

### Response

**Syntax:** +CCWA: <caller\_id>, <type>

Result Example	
+CCWA: 18005551212,129	
<b>Note:</b> Incoming call from 1-800-555-1212, type always equals 129.	

**Values:**  
 <caller\_id> Calling Line Identification Presentation  
 <type> Always 129 for this response

To receive +CCWA unsolicited response, set AT+WUSLMSK to enable the response.

## Incoming Call +RING

**Description:** This response indicates an incoming call. Consecutive RING indications are spaced at 3 seconds.

### Response

**Syntax:** +RING

Result Example
+RING
+RING
<b>Note:</b> Incoming Call

To receive +RING unsolicited response, set AT+WUSLMSK to enable the response.

## Set Voice Privacy Level +WPRV

**Description:** This command requests the CDMA voice privacy level. CDMA voice privacy is an optional feature of CDMA networks. Therefore, voice privacy will only become enabled during a voice call if the base station supports voice privacy; otherwise this feature is unavailable on your CDMA carrier. This command enables a request from the modem to the base station for voice privacy. If voice privacy is activated by the base station, the unsolicited response +WPRV: 1 will appear indicating the long code PN mask for the traffic channel has been scrambled by the base station. This command may be issued before or during a voice call.

**Note:** When voice privacy is enabled, an audible alert will be generated if the state of voice privacy changes (loss or establishment).

**Syntax:** AT+WPRV=<voice privacy level>

Command	Possible Responses
AT+WPRV=0 <b>Note:</b> Set to normal voice call	OK
AT+WPRV=1 <b>Note:</b> Request a secure voice call  ATD18005551212;132-	OK  +WORG: 18005551212 +WPRV: 1 +WCNT: 3 <b>Note:</b> Voice Privacy is now ON
AT+WPRV? <b>Note:</b> Request current privacy setting	+WPRV: <voice privacy level> OK <b>Note:</b> <voice privacy level> defined below

**Values:** <voice privacy level>

- 0 normal privacy
- 1 enhanced privacy (Default)

## Call Privacy Indication Unsolicited Response +WPRV

This response confirms that the call privacy level has changed during a call.

### Response

**Syntax:** WPRV: <voice privacy level>

### Result

**Example 1:** +WPRV: 0 Voice privacy level change to “normal privacy”

### Result

**Example 2:** +WPRV: 1 Voice privacy level change to “enhanced privacy”

To receive +WPRV, +WORG, &+WCNT unsolicited responses, set the AT+WUSLMSK command to enable the responses.

## Emergency Mode +WSOS

**Description:** In the event of a user-originated emergency call, the modem will automatically put itself into Emergency callback state. The modem will remain on the same system to be able to receive callbacks from emergency personnel. The modem behavior during Emergency callback state depends on the factory-provisioned mode--Timer Reset Mode or Basic Mode. The mode is carrier-specific.

### Timer Reset

**Mode:** AT+WSOS can only query the Emergency callback state. The user cannot exit Emergency callback state using the AT+WSOS=0 command. Emergency callback state is exited when:

- The modem is reset,
- The user originates a normal voice call, or
- The emergency callback timer expires. This timer is carrier-specific and is set in the factory.

### Basic Mode/

**No Timer:** AT+WSOS=0 must be used to exit Emergency callback state. While in Emergency callback state, only calls to emergency numbers can be established. Emergency callback state is exited when:

- The modem is reset, or
- The user enters AT+WSOS=0 to exit emergency callback state.

If neither Timer Reset Mode nor Basic Mode has been set in the factory, then AT+WSOS will return ERROR.

In addition to 911, the modem software supports other emergency numbers. See the AT\$WEMER command.

**Syntax:** AT+WSOS=<Action>

Command	Possible Responses
AT+WSOS=0 <b>Note:</b> Exit Emergency callback state (Basic Mode only)	+WSOS: 0 OK <b>Note:</b> Successful exit of Emergency callback state
AT+WSOS=1	ERROR <b>Note:</b> Cannot enter Emergency callback state manually
AT+WSOS <b>Note:</b> Ask for current Emergency Mode state	+WSOS: 1 OK <b>Note:</b> Emergency mode is active

**Values:** The parameters values are the following ones:

<Action>

0 Exit Emergency Mode

<State>

0 Not in Emergency Mode

1 Is in Emergency Mode



## Call Answered +WANS

**Description:** This response indicates that a voice call has been answered.

### Response

**Syntax:** +WANS:<ct>

Command	Possible Responses
ATA	+RING OK +WANS:0 <b>Note:</b> Incoming call answered +WCNT:3

**Values:**

<ct>	Call Type
0	Voice
1	Circuit switch data
2	Packet switch data
3	SMS
4	Position determination
6	OTAPA
7	Standard OTASP
8	Non-standard OTASP
9	Emergency

To receive +RING, +WANS, and +WCNT unsolicited responses, set the AT+WUSLMSK command to enable the responses.

## Call Connected +WCNT

**Description:** This unsolicited response indicates that an incoming or outgoing voice call has been connected into a traffic channel state. If the service option is not available, +WCNT: will output "NULL".

### Response

**Syntax:** WCNT: <so>

Command	Possible Responses
ATD18005551212;	OK +WORG:18005551212 +WCNT:3 <b>Note:</b> Call Connected with service option 3

**Values:**

<so>	Service option of call.
Speech: 3, 17, 32768	
Loopback: 2, 9, 55	
OTAPA: 18, 19	
Position Determination: 35, 36	
SMS: 6, 14	
1xdata: 33	
Circuit Switch Data: 12	

To receive +WORG, and +WCNT unsolicited responses, set the AT+WUSLMSK command to enable the responses.

## Call Ended +WEND

**Description:** This response indicates that a voice call or attempt to establish a voice call has ended.

**Response**

**Syntax:** +WEND: <reason>

Command	Possible Responses
ATD18005551212;  ATH	OK +WORG:18005551212 +WCNT:3 OK +WEND:29 <b>Note:</b> Call Ended with a normal release
ATD18005551212;	OK +WORG:18005551212 +WEND:22 <b>Note:</b> Call failed because the signal faded.

**Values:**

<reason>

- 0** Phone is offline
- 20** Phone is CDMA locked
- 21** Phone has no service
- 22** Call Faded/Dropped
- 23** Received Intercept from Base Station
- 24** Received Reorder from Base Station
- 25** Received a Release from Base Station (This is a normal call termination).
- 26** Service Option rejected by Base Station
- 27** Received Incoming Call
- 28** Received an alert stop from Base Station
- 29** Software ended the call (Normal release).
- 30** Received End Activation – OTASP calls only.
- 31** Internal Software aborted the origination/call.
- 32** Maximum Access probes exhausted (The modem failed to contact the Base Station)
- 33** Persistence test failure
- 34** RUIM not present
- 35** Origination already in progress
- 36** General Access Failure
- 37** Received retry order (IS-2000 only).
- 38** Concurrent service is not supported by base station.
- 39** No response received from base station.
- 40** Call rejected by the base station.
- 41** Concurrent services requested were not compatible.
- 42** Access is blocked by base station. (Release A only).
- 43** Traffic channel already available.
- 44** Call is ended due to Emergency call is flashed over this call.
- 45** CM is ending a GPS call in favor of a user call. (GPS\_ONE only).
- 46** CM is ending a SMS call in favor of a user call.
- 47** CM is ending a DATA call in favor of an emergency call.

- 48** Call rejected because of redirection or handoff.
- 49** Access is blocked by base station for all mobiles. (KDDI specific).
- 50** OTASP SPC Error indication.
- 202** Call origination on IP Failed.
- 401** Origination throttled.
- 402** Unknown Error.

To receive +WORG, +WCNT, and +WEND unsolicited responses, set the AT+WUSLMSK command to enable the responses.

## Call Originated +WORG

**Description:** This response indicates that an attempt to establish a voice call has occurred.

### Response

**Syntax:** +WORG: <number>

Command	Possible Responses
ATD18005551212;	OK +WORG:18005551212 +WCNT:3 OK

### Notes:

<number> is the dialing string sent to the base station. You may see extra numbers before the intended dialing string; this is a result of pre-pended numbers or other call options.

<number> could also be the NULL string if there is no user supplied origination address as in the case of SMS.

If <number> is not present, check the +WUSLMSK settings.

## CPHS Command +CPHS

**Description:** This command is used to activate, deactivate or interrogate a CPHS feature (e.g., Voice Mail Indicator). When performing an interrogation (mode = 2), the selected <FctId> CPHS feature is automatically enabled (status = 1).

**Note:** This command will return +CME ERROR: 3 if the CPHS feature is disabled.

**Syntax:** AT+CPHS=<Mode>,<FctId>

Command	Possible Responses
AT+CPHS=<Mode>,<FctId>	OK
AT+CPHS?	+CPHS: <Status>,<FctId1><CR<LF> OK
AT+CPHS=? <b>Note:</b> display the range of values	+CPHS: (0-2),(1-1) OK

**Values:** <Mode>

- 0** Deactivate a CPHS feature
- 1** Activate a CPHS feature
- 2** Interrogate a CPHS status

<FctId>

- 1** Voice Mail Indicator

**<Status>**

- 0** CPHS feature disabled
- 1** CPHS feature enabled

## Voice Mail Indicator +WVMI

**Description:** This response indicates the status of the Voicemail Inbox.

### Response

**Syntax:** +WVMI: <LineId>,<Num>

Possible Responses
+WVMI: 1,2 OK <b>Note:</b> 2 messages are in your voicemail box.

### Values:

**<LineId>**

- 1** Line 1

**<Num>** The number of messages waiting in the inbox. Maximum value is 99.

- 0** No message waiting.
- 1** One message is waiting
- 3** Three messages are waiting

### Examples:

Command/Response	Explanation
AT+CPHS? +CPHS: 1,0 OK	Interrogate the status of CPHS functionality The voice mail indicator functionality is deactivated
AT+CPHS=3,1 +CME ERROR: 3	Syntax error
AT+CPHS=1,1 OK	Activate the voice mail indicator functionality
AT+CPHS? +CPHS: 1,1 OK	Interrogate the status of CPHS functionality The voice mail indicator functionality is activated
**** the message box contains 1 message ****	
+WVMI: 1,1	A message is waiting on Line 1
AT+CPS=2,1 +WVMI: 1,1 OK	Interrogate the status of voice mail indicator functionality A message is waiting on LINE 1
AT+CPHS? +CPHS: 1,1 OK	Interrogate the status of CPHS functionality The voice mail indicator functionality is activated

To receive +WVMI unsolicited response, set the AT+WUSLMSK command to enable the response.

## List Current Call State +CLCC

**Description:** This command is used to return the current call state of the modem. Note that when dormant mode is active, a “no call” status will be returned even though a data call may still be in progress.

**Syntax:** AT+CLCC  
 +CLCC: <state>, <mode>, <termination>

Command	Possible Responses
AT+CLCC <b>Note:</b> Seek current phone state	+CLCC: 0,9,0 OK <b>Note:</b> Command valid

**Values:**

**<state>** (state of the call)

- 0** no call
- 1** traffic
- 2** dialing (MO call)
- 3** incoming (MT call)

**<mode>** (teleservice)

- 0** voice
- 1** data
- 3** sms
- 4** otasp
- 5** markov or loopback
- 9** unknown or not applicable

**<termination>**

- 0** unknown or not applicable
- 1** mobile terminated (MT) call
- 2** mobile originated (MO) call

## Call Forwarding +CCFC

**Description:** This command allows control of the call forwarding supplementary service, if supported by the carrier. All calls will be forwarded unconditionally to the phone number specified. The modem will make a brief call to the CDMA network using a prefix number in NV memory. An audio tone will be produced in the audio path to confirm the change of the call forwarding state.

**Syntax:** AT+CCFC= <number>

Command	Possible Responses
AT+CCFC=8585551212 <b>Note:</b> Register to an unconditional call forwarding.	OK +WORG:*728585551212 +WCNT:3 <b>Note:</b> Call forwarding active for all incoming calls to phone number 858-555-1212
AT+CCFC=0 <b>Note:</b> Cancel unconditional call forwarding	OK +WORG:*720 +WCNT:3 <b>Note:</b> Call forwarding cancelled.

**Values:**        <number>        The phone number to which all calls are forwarded.

To receive unsolicited responses, set the AT+WUSLSK command to enable the responses.

## Send Flash to Base Station +WFSH

**Description:** 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 AT command will be returned if a flash was sent to the base station over the air. Note that on CDMA networks, this does not guarantee that an actual switch between calls took place, because there is no acknowledgement to the modem.

For 3-way calls, initiate the first call to party # 1 (see ATD). Then send a flash with information (AT+WFSH=18005551212) to initiate a call to party # 2; party # 1 will automatically be placed on hold. The “information” is the phone number of party # 2. Once a conversation with party # 2 is established, send a regular flash (AT+WFSH) to connect all 3 parties. Send another flash (AT+WFSH) to disconnect party # 2, or End call (see ATH) to end the call with all parties.

**Syntax:**        AT+WFSH  
                   AT+WFSH= < phone\_number > (for a flash with information)

### Unsolicited

**result Syntax:** +WFSH (confirms a flash was sent to the base station)

Command	Possible Responses
ATD8585551212; <b>Note:</b> Make a voice call	OK +WORG:8585551212 +WCNT:3 <b>Note:</b> Conversation...
AT+WFSH <b>Note:</b> Send a flash to the Base Station (toggle to the second call).  <b>Note:</b> Conversation with second call.	+CCWA:"8582701234",129 <b>Note:</b> Indication of another incoming call  OK +WFSH  <b>Note:</b> Flash sent to the Base Station. Call to the second call. However, this is not 100% guaranteed because there is no confirmation from the Base Station.
AT+WFSH <b>Note:</b> Send a flash to the Base Station (toggle to the first call).	OK +WFSH <b>Note:</b> Flash sent to the Base Station. Call switches to the first call. However, this is not 100% guaranteed because there is no confirmation from the Base Station.
ATH <b>Note:</b> Release all calls	OK +WEND: 29 <b>Note:</b> All Calls End

Command	Possible Responses
ATD858551212 <b>Note:</b> Make a voice call	OK +WORG:858551212 +WCNT:3 <b>Note:</b> Conversation...
AT+WFSH=6195552121 <b>Note:</b> Place first call on hold, connect to second party.	OK +WFSH Note Modem now places first call on hold and attempts connection to second call.
AT+WFSH <b>Note:</b> Connect all 3 parties.	OK +WFSH <b>Note:</b> All 3 parties now connected.
AT+WFSH	OK +WFSH <b>Note:</b> Disconnect second party, connected to first party only.
ATH	OK +WEND:29

### Flash Indication for +WFSH:

This response confirms that a flash has been sent to the base station.

#### Response

**Syntax:** +WFSH

Command	Possible Responses
AT+WFSH	OK +WFSH

To receive unsolicited responses, set the AT+WUSLMSK command to enable the responses.

## Send DTMF Tones +VTS

**Description:** The product supports the ability of the user application to send burst DTMF tones over the CDMA network. This command enables the transmission of burst DTMF tones.

To transmit DTMF tones (only when there is an active call), the application use ATS11 to configure the DTMF durations.

**Syntax:** AT+VTS=<Tone>

Command	Possible Responses
ATD858551212 <b>Note:</b> Make a voice call	OK +WORG:8585551212 +WCNT: 3 <b>Note:</b> Conversation...  +CCWA:"8582701234",129 <b>Note:</b> Indication of another incoming call
AT+VTS=1 <b>Note:</b> Send DTMF tone associated with the value of 1	OK
ATH <b>Note:</b> Release all calls	OK +WEND: 29 <b>Note:</b> All calls end

**Values:**

<tone> 0-9, \*, #

To receive unsolicited responses, set the AT+WUSLMSK command to enable the responses.



# Chapter 10 – Network Service Commands

## Serving System +CSS

**Description:** The numeric parameter is used to query the serving system.

**Syntax:** AT+CSS Returns: <Class>,<Band>,<SID>,<BS\_P\_REV\_IN\_USE>,<CHANNEL>

Command	Possible Responses
AT+CSS? <b>Note:</b> Display the current setting	+CSS: 2, PA, 4, 6, 384 OK <b>Note:</b> Command is valid
AT+CSS=? <b>Note:</b> Display the parameter range	+CSS: OK <b>Note:</b> Command is valid; however, range display is not supported for this command due to carrier-specific requirements

**Values:**

<Class>

- 0 No service
- 1 800 Mhz
- 2 1900 Mhz PCS

<Band>

- CA – CB Cellular 800
- PA – PF PCS 1900
- Z The mobile station is not registered

<SID>

- 0 – 32767 The mobile station is registered with the system indicated.
- 99999 The mobile station is not registered.

<P\_REV\_IN\_USE> (Protocol Revision In Use)

- 0 Unrecognized or non-CDMA system
- 1 J-STD-008
- 2 IS-95-A + TSB74
- 4 TIA/EIA-95-B
- 5 TIA/EIA-95-B
- 6 IS-2000
- 7 IS-2000A
- 8 IS-2000B
- 9 IS-2000C
- 10 IS-2000C

<CHANNEL>

- 0 – Max RF Channel Number

## Set Rm Interface Protocol +CRM

**Description:** The numeric parameter is used to set the Rm interface protocol. The Rm interface protocol value is affected by the current \$QCMIP setting. The Rm interface protocol can be set by the +CRM command only if \$QCMIP is set to zero (Mobile IP disabled; Single IP only).

**Syntax:** AT+CRM=<val>

Command	Possible Responses
AT+CRM? <b>Note:</b> Display the current setting.	+CRM: 0 OK <b>Note:</b> Command is valid
AT+CRM=? <b>Note:</b> Display the range of setting.	+CRM: (0-2) OK <b>Note:</b> Command is valid
AT+CRM=1 <b>Note:</b> Set to 1.	OK <b>Note:</b> Command is valid

**Values:** <val> The default value for the +CRM parameter will be 0 if supported by the DCE.

- 0** Asynchronous Data
- 1** Packet data service, Relay Layer Rm interface
- 2** Packet data service, Network Layer Rm interface, PPP

## Signal Quality +CSQ

**Description:** This command is used to ascertain the received signal strength indication (<rss>) and the channel frame error rate (<fer>). The algorithm used to calculate the RSSI is defined in ETSI TS 127.007.

The channel frame error rate is a function of the percentage of bad received frames in the total number of received frames since the device was reset. The channel frame error rate is only valid when the device is on a call.

**Syntax:** AT+CSQ

Command	Possible Responses
AT+CSQ	+CSQ: <rss>,<fer> OK <b>Note:</b> <rss> and <fer> as defined above
AT+CSQ?	+CSQ: <rss>,<fer> OK

**Values:** <rss>

**0-31** Valid value ranges. Signal strength can be computed using: dBm = 2(RSSI) - 113

- 0 = -113 dBm or less
- 1 = -111 dbm
- 2 - 30 = -109 to -53 dBm where one rssi step = 2 dBm.
- 31 = -51 dBm or greater.

**99** Represents an unknown signal quality.

<fer>

**0-7** Valid value ranges.

- 0 - <0.01%
- 1 - 0.01 to < 0.1%
- 2 - 0.1 to < 0.5%

- 3 - 0.5 to < 1.0%
- 4 - 1.0 to < 2.0%
- 5 - 2.0 to < 4.0%
- 6 - 4.0 to < 8.0%
- 7 - >= 8.0%

**99** <FER> is not known or is not detectable.

### Signal Quality Unsolicited Response for +CSQ:

The Signal Quality (CSQ) unsolicited response is reported whenever the signal quality changes by a predetermined threshold. See +CCED for enabling and disabling this result. This unsolicited response may also be suppressed by using the +WUSLSK command.

### Response

**Syntax:** +CSQ: <rssi>, <fer>

Result Example
+CSQ: 31,99 <b>Note:</b> Signal quality is now -51 dBm or greater. Frame error rate is unknown.

**Values:** <rssi> Received signal strength indication.  
<fer> Frame error rate.

## Network Registration & Roaming +CREG

**Description:** This command is used by the application to ascertain the registration and roaming status of the product.

### Command

**Syntax:** AT+CREG= <mode>

### Response

**Syntax:** +CREG: <mode>, <stat>

Command	Possible Responses
AT+CREG=0 <b>Note:</b> Disable network registration unsolicited result code.	+CREG: 0,1 OK <b>Note:</b> Command valid
AT+CREG=1 <b>Note:</b> Enable network registration unsolicited result code	+CREG: 1,1 OK <b>Note:</b> Command valid
AT+CREG?	+CREG: 1,5 OK <b>Note:</b> Unsolicited enabled, MS currently roaming.
AT+CREG=?	+CREG: (0-1) OK <b>Note:</b> 0,1 <mode> values are supported
<b>Note:</b> Example of the unsolicited result code. MS is searching for a base station.	+CREG: 2

**Values:** <mode>  
**0** Disable network registration unsolicited result code (**default**)  
**1** Enable network registration unsolicited code result code +CREG: <stat>  
<stat>

- 0** not registered; MS is not currently searching for a new operator
- 1** registered; home network
- 2** not registered; MS currently searching for a base station
- 4** unknown
- 5** registered; roaming

**Persistence:** The unsolicited response mode setting is not persistent unless written using the AT&W command. AT&F resets the CREG mode to the default value.

To receive +CREG unsolicited responses, set the AT+WUSLMSK command to enable the response.

## Network Registration & Roaming Unsolicited Response +CREG

This response indicates the current state of roaming.

### Response

**Syntax:** +CREG: <stat>

Result Example
+CREG: 1 <b>Note:</b> Modem has found the home network and is registered.

**Values:** <stat>

- 0** not registered; MS is not currently searching for a new operator
- 1** registered; home network
- 2** not registered; MS currently searching for a base station
- 4** unknown
- 5** registered; roaming

## Set More Preferred Rescans +WTBMPRS

**Description:** This command is used to update the time between more preferred rescans. The setting is saved in non-volatile memory and takes effect immediately.

The rescan value is defined in minutes. The range of values for rescan is between 1 and 255 minutes with the default being 3 minutes.

**Syntax:** AT+WTBMPRS=[<scanval>]

Command	Possible Responses
AT+WTBMPRS=1	OK <b>Note:</b> Command valid
AT+WTBMPRS? <b>Note:</b> Current values	+WTBMPRS: 1 OK <b>Note:</b> Command valid
AT+WTBMPRS=?	+WTBMPRS: (1-255) OK <b>Note:</b> Test Command

**Read Result:** +WTBMPRS: <scanval>

**Values:** < scanval >

**1-255** More preferred rescan value. (Default = 3 minutes)

## Band Preference +WBND

**Description:** The CDMA modem Band Preference governs the basic system acquisition behavior of the PRL (Preferring Roaming List). It's important to note that the PRL takes precedence over band preference when guiding the phone to a band. The PRL must allow a particular band first, before the band preference can take effect. In other words, a band preference change is simply a request; the PRL decides whether or not to allow it. If the setting is accepted by the MS, the value will be written to non-volatile RAM and persist after a power-cycle.

The behavior of Cellular A and cellular B has changed slightly from previous Multi-Tech command guide definitions. Cellular A now means cellular A is preferred, and cellular B means cellular B is preferred. As an example: If the device is set to cellular A, the modem will look for service on the A side first. If service cannot be found, the modem will then check the B side for service before reporting no service.

**Note:** The command may not be available in all software variations due to carrier requirements.

**Syntax:** AT+WBND=<band>,<persist>

Command	Possible Responses
AT+WBND? <b>Note:</b> Ask for current Band Preference	+WBND: 0 OK <b>Note:</b> Any
AT+WBND=?	+WBND: (0-4),(0-1) OK <b>Note:</b> Any, PCS, Cell, Cell A, Cell B
AT+WBND=0 <b>Note:</b> Allow Any Band	OK

**Values:** <band>

- 0 Any
- 1 PCS
- 2 Cellular A or B
- 3 Cellular A
- 4 Cellular B

<persist>

- 0 Do not save to NV
- 1 Save to NV (default)

## Service Indication +WSRV

**Description:** This response indicates the SID and NID of the service provider selected for the modem as dictated by the PRL, AT+WBND, and AT+WRMP commands.

**Response**

**Syntax:** +WSRV: <sid>, <nid>

Possible Responses
+WSRV: 69, 101

**Values:** <sid> <nid>

**0-65536** Values of the SID and NID.

Check AT+WUSLMSK settings if response is masked.

## Roam Preference +WRMP

**Description:** The CDMA modem Roam Preference informs the MS whether it is allowed to roam on foreign CDMA networks or if it is only allowed to operate on home networks. Foreign and home network determination is programmed into the PRL.

This command enables or disables the mobile station's ability to roam, based on the PRL configuration. If the mobile station accepts setting the MS, the value will be written to NVRAM and will persist after a power-cycle. After execution of the +WRMP command, the mobile station may change roaming states. The unsolicited result +WROM: <mode> will indicate the new state.

This command may be used in conjunction with the Auto-A, Auto-B feature (Auto A/B feature is a Verizon specific feature). If the roaming preference is set to 2 and the Auto-A, Auto-B feature flag is enabled the modem will perform Auto-A, Auto-B system selection.

**Notes:** Command may not be available in all software variations due to carrier requirements.

For Sprint ONLY, roaming on affiliated networks options is not allowed..

**Syntax:** AT+WRMP=<mode>,<persist>

Command	Possible Responses
AT+WRMP? <b>Note:</b> Ask for current Mode Preference	+WRMP: 0 OK <b>Note:</b> Home only
AT+WRMP=?	+WRMP: (0-2),,0-1) OK <b>Note:</b> Home, Affiliated, Any
AT+WRMP=0 <b>Note:</b> Allow Home only networks	OK +WROM: 0 <b>Note:</b> Unsolicited +WROM may or may not appear based on current circumstances
AT+WRMP=1 <b>Note:</b> Allow Roaming Affiliated Networks	OK +WROM: 1 <b>Note:</b> Unsolicited +WROM may or may not appear based on current circumstances
AT+WRMP=2 <b>Note:</b> Allow Roaming on Any Network	OK +WRMP: 2 <b>Note:</b> Unsolicited +WROM may or may not appear based on current circumstances

**Values:** The parameter values are the following ones:

**<mode>**

- 0** Home Networks only, as defined in the PRL (default value)
- 1** Roaming on Affiliated networks, as defined in the PRL
- 2** Roaming on Any Network, as defined in the PRL.

**<persist>**

- 0** Do not save to NV
- 1** Save to NV (default)

Check AT+WUSLSK settings if response is masked.

## Default Cell Band +WDCB

**Description:** This command allows the user to display or override the Auto-A or Auto-B selection made by a prior AT+WRMP command or an OTASP session. The Auto-A/Auto-B selection determines which cell bands, if any, are scanned when the channels listed in the PRL are not found. If the Auto-A/Auto-B feature is enabled, the default cell band is set based on the value of the home SID. The +WDCB command can be used to select the cell band, or none, as the default, or fallback.

This setting is persistent across power-downs.

**Note:** Command may not be available in all software variations due to carrier requirements.

**Syntax:** AT+WDCB=<value>

Command	Possible Responses
AT+WDCB=? <b>Note:</b> Display valid parameter range.	+WDCB: (0-2) OK
AT+WDCB? <b>Note:</b> Display current setting.	+WDCB: 2 OK
AT+WDCB=1 <b>Note:</b> Select A-band Cellular as fallback.	OK

**Values:** <value>

- 0** No fallback. Only entries in the PRL are scanned.
- 1** A-band Cellular is selected as fallback.
- 2** B-band Cellular is selected as fallback.

## Roaming Indication +WROM

**Description:** This response indicates that the roaming status has changed. This command can also be used in a read only capacity in order to read the roaming status at any time.

**Response**

**Syntax:** +WROM: <roam>

Command	Possible Responses
AT+WROM	+WROM: 0 OK
AT+WROM?	+WROM:1 OK
	+WROM:1

**Values:** <roam>

- 1** Service Unavailable (For Read Only)
- 0** Home.
- 1** Roam Icon ON (affiliated network)
- 2** Roam Icon Blink (foreign network)
- X** Enhanced Roaming Indicator value if ERI is enabled

The following values apply to enhanced roaming:

- 3** Out of Neighborhood
- 4** Out of Building
- 5** Roaming - Preferred System
- 6** Roaming - Available System

<b>7</b>	Roaming - Alliance Partner
<b>8</b>	Roaming - Premium Partner
<b>9</b>	Roaming - Full Service Functionality
<b>10</b>	Roaming - Partial Service Functionality
<b>11</b>	Roaming Banner On
<b>12</b>	Roaming Banner Off
<b>13 - 63</b>	Reserved for Standard Enhanced Roaming Indicator Numbers
<b>64 - 127</b>	Reserved for Non-Standard Enhanced Roaming Indicator Numbers
<b>128 - 255</b>	Reserved

## Enhanced Roaming Indication +WERI

**Description:** Indicates that the enhanced roaming status has changed.

### Response

**Syntax:** +WERI: <indicator>, <icon image>, <icon mode>, <call prompt>, <alert/callid>, <chari type>, <text>

Command	Possible Responses
Example of acquiring service with enhanced roaming.	+WROM:2 +WERI:69,2,0,0,4,2, Extended Network <b>Note:</b> Both +WERI and +WROM responses.
Example of acquiring service without enhanced roaming.	+WROM: 1

### Values:

<indicator>

**3-255** Index number identifying the roaming indicator entry.

<icon image>

**0** Standard Roam Icon On

**1** Roam Icon Off

**2** Standard Roam Icon Flashing

**3-15** Verizon defined custom icon image. Refer to <icon mode> to determine the display state of the icon.

<icon mode> Verizon defined value that specifies how a custom icon image is displayed. This value is only applicable when <icon image> is greater than 2.

**0** Custom Icon On

**1** Custom Icon Flashing

<call prompt>

**0-3** Verizon defined value that identifies the Call Prompt displayed for each roaming indicator. This field is set to a value of 0 when no call prompt is used. Note that this field is currently not implemented in the Verizon user interface specs, but it may be used in the future.

<alert/call id>

**0-7** Verizon defined value that identifies the Alert Sound that is used for the indicator. This value reflects the Alert Sound ID that the mobile annunciates to the end user.



**<chari type>**

0-31 Character Encoding Type identifies the character code table used for the <text> field. (Usually set to 2.)

Type	Bit Length	Character Encoding
0	8	Octet, unspecified
1	see IS-91	IS-91 Extended Protocol Message
2	7	7-bit ASCII (ANSI x3.4)
3	7	IA5 (Table 11 of ITU-T T.50)
4	16	UNICODE (ISO/IEC 10646-1:1993)
5	8 or 16	Shift-JIS
6	8 or 16	Korean (KS x 1001:1998)
7	8	Latin/Hebrew (ISO 8859-8:1988)
8	8	Latin (ISO 8859-8:1988)
9	7	GSM 7-bit default alphabet
10-31	X	Reserved

**<text>**

Verizon defined variable length field that contains the text data used for the banner. The text is in the format specified in the Character Encoding Type. The text field is limited to a 32 character maximum length.

## Cell Environment and RxLev Indication +CCED

**Description:** This command can be used by the application to retrieve information about the serving cell. This is an extended command that may be used in two different settings:

1. Interrogation of the cell environment information
2. Interrogation of the received signal strength indication (RSSI)

The +CCED command supports two modes of operation: on request by the application or automatically by the product every 5 seconds. Signal strength can also be reported when the change exceeds a threshold.

**Syntax:** AT+CCED=<mode>[, <requested dump>[,<sqStep>]]

Command	Possible Responses
AT+CCED=?	+CCED: (0-2),(1,8,9),(0-5) OK
AT+CCED? <b>Note:</b> <requested dump> is the most recently requested one. If none requested, <requested dump>=1 will be displayed.	+CCED: 0,1,0  OK
AT+CCED=0 <b>Note:</b> One time dump of the <requested dump> that was last requested. If none requested, <requested dump>=1 will be displayed	+CSQ: 15, 99 or +CCED: 0,160,69,101,6,144,2690,2,18,-85,-51,-63 OK
AT+CCED=0,1 <b>Note:</b> one time, dump main cell	+CCED: 0,160,69,101,6,144,2690,2,18,-85,-51,-63 OK
AT+CCED <b>Note:</b> one time, previous <requested dump> value is used	+CCED: 0,160,69,101,6,144,2690,2,18,-85,-51,-63 OK

Command	Possible Responses
AT+CCED=0,9	+CSQ: 15, 99 +CCED: 0,160,69,101,6,144,2690,2,18,-85,-51,-63 OK
AT+CCED=1,8 <b>Note:</b> Start automatic snapshots and dump <rss>.	OK +CSQ: 18, 99 <b>Note:</b> +CSQ response output every 5 seconds.
AT+CCED=2	OK <b>Note:</b> Stop automatic snapshots.
AT+CCED=,,1	OK +CSQ: 18, 99 <b>Note:</b> New +CSQ response output when change in RSSI equals or exceeds <CsqStep>
AT+CCED=1,9 <b>Note:</b> Start automatic snapshots and dump cell environment and <rss>	OK +CSQ: 15, 99 +CCED: 0,160,69,101,6,144,2690,2,18,-85,-51,-63

**Values:****<mode>**

- 0** Requests a single snapshot of cell data
- 1** Start automatic snapshot mode. The unsolicited responses +CCED and/or +CSQ will be used to return the requested information.
- 2** Stop automatic snapshot mode

**<requested dump>** This parameter is summation of one or more of the following values:

- 1** Main Cell Indication
- 2** Main Cell RSSI Indication (RxLev) from 0 to 31 and frame error rate. Set the AT+CSQ command description for more information.

**<CsqStep>**

- 0** Unsolicited +CSQ reports due to changing RSSI levels are disabled.
- 1-5:** Whenever the RSSI changes by this amount or more, an unsolicited +CSQ report is generated.

**Notes:**

The CCED response format is <band class>, <Channel #>, SID, NID, <Base Station P Rev>,<Pilot PN offset>, <Base Station ID>, <Slot cycle index>, <Ec/Io>, <Rx power>, <Tx power>, <Tx Adj> in units of dBm.

<band\_class> values are 0 for cellular band (800 MHz) or 1 for PCS band (1900 MHz).

The value displayed for <Ec/Io> is the index of the Active set in 0.5dB steps from 0 (0dB) to 63 (-31.5dB). For example: 0 = 0dB, 1 = 0.5dB, 2 = 1dB, ... 62 = 31dB, 63 = 31.5dB. The value displayed for <Rx power>, <Tx power>, and <Tx Adj> is in units of dBm.

If the <requested dump> parameter is not specified, the <requested dump> value from the most recent invocation of the +CCED command with an explicit <requested dump> value will be used. If no previous +CCED <requested dump> value is available, a value of 9 (8 and 1) will be used. For <requested dump> 8, the information is output using the unsolicited +CSQ response. The 07.07 format of the +CSQ response is respected. Automatic snapshots are supported in idle mode and during communication.

Either or both the +CCED and +CSQ responses are used for automatic snapshot output depending upon the <requested dump> value at the time the snapshot activation was requested.

# Chapter 11 – Provisioning Control Commands

## Change NAM Selection +WNAM

**Description:** This command is used to request a change in the NAM (Number Assignment Modem) selection. The modem supports up to 2 NAMs. However, if a NAM is not fully programmed, the modem will not switch to the requested NAM. The default NAM for the modem is 1. The response to this command is only OK, and there is no guarantee that the NAM will change. If the NAM selection request is accepted, the unsolicited response +WNAM: <nam> will be returned.

**Syntax:** AT+WNAM=<nam>

Command	Possible Responses
AT+WNAM=2 <b>Note:</b> Use NAM 2, if programmed	OK +WNAM: 2
AT+WNAM?	+WNAM: 1
AT+WNAM=?	+WNAM: (1-2) or +WNAM: (1)

**Values:** <nam>

- 1 NAM 1
- 2 NAM 2

**Notes:** Verizon based modems propagate the new NAM MDN to SIP NAI, MIP NAI, tethered NAI, and PPP user ID when the NAM is changed.

In addition, some modems are configured to support only a single NAM. This is carrier-dependent and settable at the factory. When only a single NAM is allowed, NAM1 is the only supported value.

### Current NAM Change Unsolicited Response +WNAM

Indicates that the current NAM has changed.

#### Response

**Syntax:** +WNAM: <nam>

Possible Responses
+WNAM: 2

**Values:** <nam>

- 1 NAM 1
- 2 NAM 2

## Service Programming Code +WSPC

**Description:** This command allows for entry of the service programming code (either MSL or OTKSL). Upon successful entry of this code, all other service provisioning AT commands may be used. If this code is not properly entered prior to attempting other provisioning AT commands, all provisioning commands will return ERROR. If the OTKSL is used to enter provisioning mode, only the +WIMI, +WMDN, and +WCMT commands will be allowed. All other commands will return ERROR.

Once the correct SPC code is entered, the modem transitions to the Service Programming state. This state is not exited until a commit is done (+WCMT). While in the Service Programming state, subsequent validations of the SPC code are ignored until the Service Programming state is reset.

Verizon requires the following additional action:

- If the SPC fails verification 15 consecutive times, the modem will provide an unsolicited message indicating excessive SPC verification failures (see Excess SPC Failures +WLCK) and then shutdown. This is in accordance to Verizon's OTA specification. The host application must prevent the modem from restarting for 1 minute when this condition occurs.

**Syntax:** AT+WSPC=[<lock type>[,<code>]]

Command	Possible Responses
AT+WSPC? <b>Note:</b> Service programming code request	ERROR <b>Note:</b> Invalid request
AT+WSPC=?	ERROR <b>Note:</b> Invalid request
AT+WSPC=1,111111 <b>Note:</b> Enter service programming code 111111	ERROR <b>Note:</b> Code invalid
AT+WSPC=1,000000 <b>Note:</b> Enter service programming code 000000	OK <b>Note:</b> Code valid

**Values:**

<lock type>

**0** OTKSL – One Time Key Subsidy Lock

**1** MSL – Master Subsidy Lock

<code> Six character programming code.

## Excess SPC Failures +WLCK

**Description:** This response indicates that 15 failed attempts have been made to enter the service programming code. If the modem is not in emergency mode, any active call will be terminated and the modem will go into offline mode.

**Note:** For access to modem configuration data, the service programming code must be successfully entered.

### Response

**Syntax:** +WLCK: "Excess SPC failures!"

Command	Possible Responses
AT+WSPC=0,123456 <b>Note:</b> 15th attempt to enter the SPC.	+WLCK: "Excess SPC failures!" <b>Note:</b> Modem now in offline mode.

## Request PRL Version Information +WPRL

**Description:** This command requests PRL Version information for the currently selected NAM.

**Notes:** The range for PRL is a 16-bit type.  
The module service programming code must be successfully entered before using this command. See +WSPC.

**Syntax:** AT+WPRL?

Command	Possible Responses
AT+WPRL? <b>Note:</b> Request current NAM's PRL version	+WPRL: 1024 OK
AT+WPRL? <b>Note:</b> Request current NAM's PRL version	+CME ERROR: 41 <b>Note:</b> PRL request invalid because there's no PRL loaded.

AT+WSPC=1,000000 <b>Note:</b> Enter service programming code. The SPC code for your modem may be different	OK
---	----

## Commit Changes +WCMT

**Description:** This command is used to commit or to undo/revert any changes done during the service programming session. Changes performed during this session will not take place until a commit command has been sent (AT+WCMT=1). Commission of these changes will force a software reset of the modem. Sending this command indicates this service provisioning session is complete. To perform any subsequent provisioning, use the +WSPC command to enter the service programming code.

**Syntax:** +WCMT=<val>

Command	Possible Responses
AT+WCMT=0 <b>Note:</b> Undo any changes performed during this provisioning AT session	OK
AT+WCMT=1 <b>Note:</b> Commit all changes performed during this provisioning AT session to non-volatile memory.	OK <b>Note:</b> software reset is performed

**Values:** <val>

**0**      undo changes  
**1**      commit changes

## Set IMSI +WIMI

**Description:** This command is used to set the IMSI. A valid IMSI is 15 digits in length: MCC (3), MNC (2), MIN2 (3), MIN1 (7). For support of Wireless Number Portability, changes to the IMSI will **NOT** update the MDN. If the MDN is modified via the WMDN command, the IMSI\_M portion of the IMSI will be automatically updated to the least significant 10 digits of the MDN, but the update will not be visible or applied until the commit command is issued via the WCMT command. Changes to the IMSI will automatically update Access Overload Class values unless specifically modified using +WAOC.

The module service programming code must be successfully entered before using this command. See +WSPC.

**Syntax:** AT+WIMI=<number>

Command	Possible Responses
AT+WSPC=1,000000 <b>Note:</b> Enter service programming code. The SPC code for your modem may be different	OK
AT+WIMI? <b>Note:</b> Get current IMSI	+WIMI: 310008581111111 OK
AT+WIMI=310008585551212 <b>Note:</b> Set IMSI to 310008585551212	OK

## Mobile Directory Number +WMDN

**Description:** This command is used to enter a new mobile directory number. Valid numbers are between 10 and 15 digits in length. For support of Wireless Number Portability in all non-RUIM software versions, changes to the MDN will update the IMSI\_M portion (least significant 10 digits) of the IMSI. Changes to the MDN will also automatically update the Access Overload Class values unless specifically modified using the +WAOC command. The new IMSI\_M and Access Overload Class values will not be visible in the WIMI and WAOC commands until after the changes are committed with the WCMT command.

The module service programming code must be successfully entered before using this command. See +WSPC.

**Syntax:** Command **Syntax:** AT+WMDN=<number>

Command	Possible Responses
AT+WSPC=1,000000 <b>Note:</b> Enter service programming code. The SPC code for your modem may be different	OK
AT+WMDN? <b>Note:</b> Get current mobile directory number	+WMDN: 85811111111 OK
AT+WMDN=8585551212 <b>Note:</b> Set mobile directory number to 8585551212	OK

**Note:** Verizon based wireless modems propagate the MDN to SIP NAI, MIP NAI, tethered NAI, and PPP user ID when the MDN is committed using the AT+WCMT=1 command.

**Value:** <number> Can be up to 15 digits

## Primary CDMA Channels +WPCC

**Description:** This command is used to set the primary CDMA channels for 800Mhz CDMA operation only. Values entered must be valid CDMA 800Mhz Channel numbers. If an invalid channel number is entered, the number will be automatically set to the appropriate default value at restart. The module service programming code must be successfully entered before using this command. See +WSPC.

**Syntax:** AT+WPCC=<channel a number>,<channel b number>

Command	Possible Responses
AT+WSPC=1,000000 <b>Note:</b> Enter service programming code. The SPC code for your modem may be different	OK
AT+WPCC? <b>Note:</b> Get current primary CDMA channels	+WPCC: 283,384 OK
AT+WPCC=211,432 <b>Note:</b> Set the primary CDMA channels	OK
AT+WPCC=?	+WPCC: (0-2047),(0-2047)

**Values:** <channel a number> Value range: 0 – 2047  
<channel b number> Value range: 0 – 2047

## Secondary CDMA Channels +WSCC

**Description:** This command is used to set the secondary CDMA channels for 800Mhz CDMA operation only. Values entered must be valid CDMA 800Mhz Channel numbers. If an invalid channel number is entered, the number will be automatically set to the appropriate default value at restart. The module service programming code must be successfully entered before using this command. See +WSPC.

**Syntax:** AT+WSCC=<channel a number>,<channel b number>

Command	Possible responses
AT+WSPC=1,000000 <b>Note:</b> Enter service programming code. The SPC code for your modem may be different	OK
AT+WSCC? <b>Note:</b> Get current secondary CDMA channels	+WSCC: 691,777 OK
AT+WSCC=511,632 <b>Note:</b> Set the secondary CDMA channels	OK
AT+WSCC=?	+WSCC: (0-2047),(0-2047)

**Values:** <channel a number> Value range: 0 – 2047  
<channel b number> Value range: 0 – 2047

## SID and NID +WSID

**Description:** This command is used to set the home SID and NID for 800Mhz CDMA operation only. The new SID/NID values are committed to NV with the +WCMT command. The +WSID command is part of the Sierra Wireless suite of service programming commands. The module service programming code must be successfully entered before using this command. See +WSPC.

**Syntax:** AT+WSID=<index>,<SID number>,<NID number>

Command	Possible Responses
AT+WSPC=1,000000 <b>Note:</b> Enter service programming code. The SPC code for your modem may be different	OK
AT+WSID? <b>Note:</b> Get all modified SID/NID pairs. If no pairs have been modified, the first entry in location 0 will be retrieved.	+WSID: 0, 45, 84 +WSID: 1, 56, 9 OK
AT+WSID=3, 4145, 2102 AT+WSID? <b>Note:</b> Set SID to 4145 and NID to 2102. Store in location 3 of the SID/NID list.	OK +WSID: 3, 4145, 2102 OK <b>Note:</b> The SID/NID pair 4145,2102 in location 3 is selected.
AT+WSID=2 AT+WSID? <b>Note:</b> Set SID to 0 and NID to 0. Store in location 2 of the SID/NID list.	OK +WSID: 2, 0, 0 OK <b>Note:</b> The SID/NID pair 0,0 in location 2 is selected.
AT+WSID=4, 64 AT+WSID? <b>Note:</b> Set SID to 64 and NID to 0. Store in location 4 of the SID/NID list.	OK +WSID: 4, 64, 0 OK <b>Note:</b> The SID/NID pair 64,0 in location 4 is selected.
AT+WSID=, 64, 1024 AT+WSID? <b>Note:</b> Set SID to 64 and NID to 1024. Store in the currently selected location of the SID/NID list.	OK +WSID: 4, 64, 1024 OK <b>Note:</b> The SID/NID pair 64,1024 in location 4 is selected.
AT+WSID=, , AT+WSID? <b>Note:</b> Set SID and NID to default value 0. Store in the default selected location of the SID/NID list.	OK +WSID: 0, 0, 0 OK <b>Note:</b> The SID/NID pair 0,0 in location 0 is selected.

**Values:**

**<index>** The location in the SID/NID list to store the values. Supports a maximum of 20 entries (0-19). Returns error if the specified index value is not in the valid range.

**<SID number>** SID value range – 0 to 32767.

**<NID number>** NID value range – 0 to 65535. Defaults to 65535 if not specified.

Updating the first entry in the SID/NID list will update the A/B side setting with odd SID for A side and even SID for B side.



# Chapter 12 – OTASP / OTAPA Indications

- OTASP** Over the Air Service Programming gives a wireless carrier the ability to provision new services over the network, rather than requiring the customers to bring the terminal device into a store for programming. For example, an automatic update in internal software parameters PRL can be performed.
- OTAPA** Over the Air Parameter Administration gives a wireless carrier the ability to automatically update internal software parameters by means of a specially defined CDMA data call that is mobile terminated (MT).

The unsolicited indications outlined in this chapter may appear during OTASP / OTAPA. If they do not appear issue command AT+WUSLMSK=00040000 to enable the responses.

## Initial Programming Required +WOT0

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that initial device programming is required.

### Response

**Syntax:** +WOT0: "Initial programming required!"

Possible Responses
+WOT0: "Initial programming required!"

## Programming In Progress +WOT1

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that device programming is in progress.

### Response

**Syntax:** +WOT1: "Programming in progress"

Possible Responses
+WOT1: "Programming in progress"

## Programming Successful +WOT2

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that device programming has been completed successfully.

### Response

**Syntax:** +WOT2: "Programming Successful"

Possible Responses
+WOT2: "Programming Successful"

## Programming Unsuccessful +WOT3

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that device programming has been completed unsuccessfully

### Response

**Syntax:** +WOT3: "Programming Unsuccessful"

Possible Responses
+WOT3: "Programming Unsuccessful"

## Commit Successful +WOTC

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that the programmed parameters have been successfully committed to NV memory.

### Response

**Syntax:** +WOTC: "Commit Successful"

Possible Responses
+WOTC: "Commit Successful"

## SPL Unlocked +WOTS

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that the Software Provisioning Lock is in the unlocked state.

### Response

**Syntax:** +WOTS: "SPL unlocked"

Possible Responses
+WOTS: "SPL unlocked"

## NAM Download OK +WOTN

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that the NAM download has been completed successfully.

### Response

**Syntax:** +WOTN: "NAM Download OK"

Possible Responses
+WOTN: "NAM Download OK"

## MDM Download OK +WOTM

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that the MDM download has been completed successfully.

### Response

**Syntax:** +WOTM: "MDM Download OK"

Possible Responses
+WOTM: "MDM Download OK"

## IMSI Download OK +WOTI

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that the IMSI download has been completed successfully.

### Response

**Syntax:** +WOTI: "IMSI Download OK"

Possible Responses
+WOTI: "IMSI Download OK"

## PRL Download OK +WOTP

**Description:** This Over-The-Air Service Provisioning (OTASP) response indicates that the PRL download has been completed successfully.

### Response

**Syntax:** +WOTP: "PRL Download OK"

Possible Responses
+WOTP: "PRL Download OK"

# Chapter 13 – OMA / DM Control Commands

## Device Services Session +WDSS

**Description:** This command allows a user to configure a dedicated Network Access Point (NAP) and to initiate a connection to the OMA/DM server.

**Syntax:** +WDSS: =<Mode>,<Apn>[,<User>[,<Pwd>]]

Command	Possible Responses
AT+WDSS?	+WDSS: 0,<Apn> +WDSS: 1,<Action> OK
AT+WDSS=?	+WDSS: 0,(Max length for <Apn>),(Max length for <User>),(Max length for <Pwd>), +WDSS: 1,(0-1) OK
AT+WDSS=1,<Action>	OK
AT+WDSS=0,<Apn>[,<User>[,<Pwd>]] <b>Note:</b> Define the APN for Device Services	OK

**Values:**

<Mode>

- 0** PDP context configuration for Device Services
  - 1** User Initiated connection to the Device Services server
- <Apn> Access point name for Device Services. String type, up to 50 chars.
- <User> Login for the APN. String type, up to 30 chars.
- <Pwd> Password for the APN. String type, up to 30 chars.
- <Action> Only for <Mode>=1
- 0** Abort the current session with the Device Services server. Default.
  - 1** Establish a Device Configuration session with the Device Services server.
  - 2** Establish a Firmware Update session with the Device Services server.
  - 3** Establish a PRL Update session with the Device Services server.

**Parameter**

**Storage:** <APN>,<User> and <Pwd> parameters are stored in flash without using the AT&W command. AT&F has no effect on these parameters.

## Device Services Error +WDSE

**Description:** This command allows a user to display the last HTTP response received by the device during an OMA session.

**Syntax:** AT+WDSE

Command	Possible Responses
AT+WDSE	+WDSE: <HTTP Status> OK

**Values:**      **<HTTP Status>** Last HTTP response received by the device.

<b>100</b>	Continue
<b>101</b>	Switching Protocols
<b>200</b>	OK
<b>201</b>	Created
<b>202</b>	Accepted
<b>203</b>	Non-Authoritative Information
<b>204</b>	No Content
<b>205</b>	Reset Content
<b>206</b>	Partial Content
<b>300</b>	Multiple Choices
<b>301</b>	Moved Permanently
<b>302</b>	Found
<b>303</b>	See Other
<b>304</b>	Not Modified
<b>305</b>	Use Proxy
<b>307</b>	Temporary Redirect
<b>400</b>	Bad Request
<b>401</b>	Unauthorized
<b>402</b>	Payment Required
<b>403</b>	Forbidden
<b>404</b>	Not Found
<b>405</b>	Method Not Allowed
<b>406</b>	Not Acceptable
<b>407</b>	Proxy Authentication Required
<b>408</b>	Request Time-out
<b>409</b>	Conflict
<b>410</b>	Gone
<b>411</b>	Length Required
<b>412</b>	Precondition Failed
<b>413</b>	Request Entity Too Large
<b>414</b>	Request-URI Too Large
<b>415</b>	Unsupported Media Type
<b>416</b>	Requested range not correct
<b>417</b>	Expectation Failed
<b>500</b>	Internal Server Error
<b>501</b>	Not Implemented
<b>502</b>	Bad Gateway
<b>503</b>	Service Unavailable
<b>504</b>	Gateway Time-out
<b>505</b>	HTTP Version not supported

**Note:**      If no session was made with the server, AT+WDSE only returns OK response, without any +WDSE: <HTTP Status> response.

## Device Services Reply +WDSR

**Description:** This command allows a user to respond to the Device Services server request when user agreement is requested for connection, download and/or package install (see +WDSI command).

**Notes:** It is not possible to refuse an install request. AT+WDSR=5,0 will return a +CME ERROR: 3 response.  
After an install delay, if the modem is powered down until after the delay, it's not powered on and the new user agreement request should be returned at the next start up.

**Syntax:** AT+WDSR=<Reply>[,<Timer>]

Command	Possible Responses
AT+WDSR=?	+WDSR: (0-5),(0-1440) OK
AT+WDSR=5,10 <b>Note:</b> A delay (10 minutes) is requested to a firmware installation request.	OK <b>Note:</b> the WDSI request for package installation will be re-issued 10 minutes later.
AT+WDSR=2,0 <b>Note:</b> Refuse the package download.	OK

**Values:**

**<Reply>** Reply to a user agreement request from the modem. (Refer to the +WDSI command description.)

- 0** Delay or refuse the connection to the server
- 1** Accept the connection to the server
- 2** Delay or refuse the download
- 3** Accept the download (download now)
- 4** Accept the install (Install now)
- 5** Delay the install (Install later)

**<Timer>** Timer until a new User agreement request is returned by the modem. This parameter is only available for <Reply>=0, 2 and 5.  
Units: minutes (0-1440). When this value is not filled, a default value is set to 30 minutes later. Value 0 indicates that the application refuses the user agreement (impossible for <Reply>=5).

**Parameter**

**Storage:** No parameter storage.

**Command**

**Availability:** This command is not available when the modem is provisioned for Sprint.

**Results:** OK when the command is proceed correctly.  
+CME ERROR: 3 when the parameter is out of range.

## Device Services Wireless +WDSW

**Description:** This command allows carrier- or customer-specific configuration of Device Services.

**Note:** The auto-registration operation is available for only for modem configured for the Sprint network.

**Syntax:** AT+WDSW=<Operation>,<Action>

Command	Possible Responses
AT+WDSW=?	ERROR
AT+WDSW=12,0 <b>Note:</b> Clear auto-registration complete	OK
AT+WDSW=12,1 <b>Note:</b> Mark auto-registration complete	OK
AT+WDSW? <b>Note:</b> Display auto-registration state	+WDSW: 12,1 <b>Note:</b> Auto-registration is complete
AT+WDSW? <b>Note:</b> Display auto-registration state	+WDSW: 12,0 <b>Note:</b> Auto-registration is incomplete.

**Values:** <Operation>

**12** Auto-registration. This operation allows auto-registration status to be set or cleared. The Service Provisioning Code must be entered using the +WSPC command prior to attempting to set or clear auto-registration.

<Action>

**0** Clear auto-registration. Auto-registration will be attempted after the next power cycle.

**1** Mark auto-registration complete. No further auto-registration attempts will be made.

**Parameter**

**Storage:** Parameters are stored in flash without using the AT&W command. AT&F has no effect on these parameters.

## Device Services Indications +WDSI

**Description:** This command allows a user to select which Device Services events are reported. Device Services events are reported through the +WDSI unsolicited response.

**Syntax:** AT+WDSI=<Level>

Command	Possible Responses
AT+WDSI?	+WDSI: <Level> OK
AT+WDSI=?	+WDSI: (0-8388607) OK
AT+WDSI=8388607 <b>Note:</b> Enable all Device Services event notifications	OK
AT+WDSI <b>Note:</b> Enable all Device Services event notifications (default)	OK
+WDSI: <Event>[,<Data>] <b>Note:</b> Unsolicited response	OK

<b>Values:</b>	<b>&lt;Level&gt;</b>	Indications level, bit field (default value = 0) bit set to 0: indication deactivated bit set to 1: indication activated
	<b>0</b>	No indication
	<b>1 (bit 0)</b>	Reserved
	<b>2 (bit 1)</b>	Reserved
	<b>4 (bit 2)</b>	Activate the authentication indications (<Event> = 4 & 5)
	<b>8 (bit 3)</b>	Activate the session start indication (<Event> = 6, 7 & 8)
	<b>16 (bit 4)</b>	Activate the package download indications (<Event> = 9, 10 & 11)
	<b>32 (bit 5)</b>	Reserved
	<b>64 (bit 6)</b>	Activate the update indications (<Event> = 14, 15 & 16)
	<b>128 (bit 7)</b>	Reserved
	<b>256 (bit 8)</b>	Activate download progress indication (<Event>=18)
	<b>512 (bit 9)</b>	Reserved
	<b>1024 (bit 10)</b>	Reserved
	<b>2048 (bit 11)</b>	Reserved
	<b>4096 (bit 12)</b>	Activate automatic registration indication (<Event>=22)
	<b>8192 (bit 13)</b>	Reserved
	<b>16384 (bit 14)</b>	Reserved
	<b>32768 (bit 15)</b>	Reserved
	<b>65536 (bit 16)</b>	Reserved
	<b>131072 (bit 17)</b>	Reserved
	<b>262144 (bit 18)</b>	Reserved
	<b>524288 (bit 19)</b>	Reserved
	<b>1048576 (bit 20)</b>	Reserved
	<b>2097152 (bit 21)</b>	Reserved
	<b>4193304 (bit 22)</b>	Reserved
	<b>&lt;Event&gt;</b>	
	<b>0</b>	Reserved
	<b>1</b>	Reserved
	<b>2</b>	Reserved
	<b>3</b>	Reserved
	<b>4</b>	The modem starts sending data to the server.
	<b>5</b>	Authentication with the server failed.
	<b>6</b>	The authentication has succeeded, a session with the server started.
	<b>7</b>	The session with the server failed.
	<b>8</b>	The session with the server is finished.
	<b>9</b>	Reserved
	<b>10</b>	A package was successfully downloaded and stored in flash.
	<b>11</b>	An error occurred while downloading a package.
	<b>12</b>	Reserved
	<b>13</b>	Reserved
	<b>14</b>	The firmware update process will be launched.
	<b>15</b>	The firmware update has failed.
	<b>16</b>	The firmware update has succeeded.
	<b>17</b>	Reserved



<b>18</b>	Download progress. This event is returned without <Data> parameter to indicate that a download starts. During the download, progress in total number of bytes downloaded and download size is indicated in <Data> parameter.
<b>19</b>	Reserved
<b>20</b>	Reserved
<b>21</b>	A provisioning was made by the server
<b>22</b>	Automatic registration status
<b>&lt;Data&gt;</b>	Specific data for some <event> For <Event>=8, <Data>=0, if no update took place. <Data>=1, if an update took place. For <Event>=15, <Data> indicates the failure reason. For <Event>=18, <Data> indicates the progress as “,<percentage downloaded>”,<download size>. For <Event>=21, <Data> indicates the parameters which was provisioned <b>10:</b> Preferred Roaming List (PRL) For <Event>=22, <Data> indicates the status of the automatic registration <b>0:</b> Registration in progress <b>1:</b> Registration failed (after retries) <b>2:</b> Registration succeeded

**Parameter**

**Storage:** The <Level> parameter is stored in EEPROM without using AT&W command. The default value can be restored using AT&F.

**Command**

**Availability:** This command is available when the modem has finished its initialization and the +WIND: 3 unsolicited event is received by the application.

**Results:** This command returns OK when the command is processed correctly.  
This command returns +CME ERROR: 3 or ERROR when the parameter is out of range.

**Example 1:** Client-initiated device configuration request, no errors

```
AT+WDSS=1,1
OK
+WDSI: 4
+WDSI: 6
+WDSI: 8
```

**Example 2:** Client-initiated device configuration request, authentication error

```
AT+WDSS=1,1
OK
+WDSI: 4
+WDSI: 5
```

## Device Services Configuration +WDSC

**Description:** This command allows a user to configure:

- The user agreement for connection, package download and package install
- The mode of automatic registration to the IDS server

**Syntax:** AT+WDSS=<Mode>,<State> || <Config>

Command	Possible Responses
<Mode>= 0, 1, 2, 3 AT+WDSC=<Mode>,<State> <Mode>= 5 AT+WDSC=<Mode>,<Config>	OK  <b>Note:</b> No connection to the server and the used PDP context for the next connection is the one defined by the provisioning.
AT+WDSC?	+WDSC: 0,<State> +WDSC: 1,<State> +WDSC: 2,<State> +WDSC: 5,<Config> OK
AT+WDSC=?	+WDSC: (list of supported<Mode>s), (list of supported [<State>s ]<Config>] OK

**Values:**

**<Mode>**

- 0** User agreement for connection  
 When this mode is activated and when a notification SMS is received by the modem, an indication (see +WDSI indication) is returned by the modem to request an agreement before connecting to the IDS server.
- 1** User agreement for package download  
 When this mode is activated, an indication (see +WDSI indication) is returned by the modem to request an agreement before downloading any package.
- 2** User agreement for package install  
 When this mode is activated, an indication (see +WDSI indication) is returned by the modem to request an agreement before installing any package.
- 3** Not Supported
- 4** Not Supported
- 5** Registration configuration  
 The registration is performed using +WDSS command.

**<State>** Status of the mode (Only for <Mode>= 0, 1, 2)

**0** Disabled (default value)

**1** Enabled

**<Config>** Status of the Registration configuration (Only for <Mode>= 5)

**0** Not configured (default value)

**1** Configured

**Parameter**

**Storage:** <State> and <Config> parameters are stored in flash without using &W command. &F has no effect on these parameters.

# Chapter 14 – Short Message Service Control Commands

## Send Message +CMGS

**Description:** This command is used to send an SMS message.

The <da> field is the address of the terminal to which the message is sent. To send the text message, type <ctrl-Z> (0x1A) as the final character of the message. This command can be aborted using the <ESC> (0x1B) character while entering the message text.

The <length> parameter is optional, it is used to set the length of the text string. When <length> is specified, the CMGS command will only process the number of bytes specified by <length> regardless of whether it contains <ctrl-Z>, <ESC>, or <backspace> characters.

The <priority>, <privacy>, <reply option>, and <cbn> parameters are optional. Defaults are used when not specified.

The +CMGS: <mr> unsolicited message and OK response indicate that the +CMGS command has been accepted without errors and an attempt to deliver the SMS to the network is being made.

We recommend that +CDS: unsolicited messages are enabled using the AT+CNMI command. +CDS: indicates that the message has been received by the network and the network is delivering the SMS or there is an error in attempting to send the SMS. Attempting to send a second SMS prior to the +CDS: unsolicited message will result in an error.

**Syntax:** +CMGS=<da> [,<length>] [,<priority>] [,<privacy>] [,<reply>] [,<cbn>] <cr><message text>ctrl-Z /ESC>

Command	Possible responses
AT+WSCL=1,2  Note: Set language to English, encoding to ASCII  AT+CMGS="8585551212"<cr> Please call me soon, Fred. <ctrl-Z> <b>Note:</b> Send a message	OK  +CMGS:<mr> OK +CDS: <fo>, <mr>, [<ra>] , [<tora>], <scts>, <dt>, <st>
AT+CMGS="8585551212",12<cr> Please call. <b>Note:</b> Automatically send message after receiving 12 bytes.	+CMGS:<mr> OK
AT+CMGS="8585551212",,2,1,1,"5550000"<cr> Please call ASAP<ctrl-Z> <b>Note:</b> Send a message with the specified priority, privacy, reply option and call back number. Note omitted length field.	+CMGS:<mr> OK

<b>Values:</b>	<b>&lt;da&gt;</b>	Destination address value in string format.
	<b>&lt;length&gt;</b>	Length of the text message (in bytes).
	<b>&lt;priority&gt;</b>	The priority level of the message.
	<b>0</b>	Normal (Default)
	<b>1</b>	Interactive Not currently supported
	<b>2</b>	Urgent
	<b>3</b>	Emergency Not currently supported
	<b>&lt;privacy&gt;</b>	The privacy level of the message.
	<b>0</b>	Normal (Default)
	<b>1</b>	Restricted
	<b>2</b>	Confidential
	<b>3</b>	Secret
	<b>&lt;reply&gt;</b>	The reply options for the message.
	<b>0</b>	No acknowledgement requested (Default)
	<b>1</b>	Positive user acknowledgement request
	<b>2</b>	Delivery acknowledgement request
	<b>3</b>	Request both user acknowledgement and delivery acknowledgement
	<b>&lt;cbn&gt;</b>	The call back number (not included by default).

## Read Message +CMGR

**Description:** This command allows the application to read stored messages. The messages are read from the memory selected by the +CPMS command. A message read with status “REC UNREAD” will be updated in memory with the status “REC READ”.  
Currently “Sent/Unsent” and “Status Report” messages are not being stored and therefore can not be read using the +CMGR command.

### Command

**Syntax:** AT+CMGR=<index>

### Response

**Syntax:** +CMGR: <stat> [,<oa>], <scts>, <lang>, <encod>, <priority>[,<cbn>], <length> <CR><LF> <data>  
(for **SMS-DELIVER** only)

Command	Possible Responses
AT+CMGR=1 <b>Note:</b> Read a message (index 1)	+CMGR: “REC UNREAD”, “8585551212”, “98/10/01,18 :22 :11+00”, 1,2,0, “8585550000”, 9<CR><LF> ABCdefGHI OK
AT+CMGR=1 <b>Note:</b> Read the message again	+CMGR: “REC READ”, “8585551212”, “98/10/01,18 :22 :11”, 1,2,0, “8585550000”, 9<CR><LF> ABCdefGHI OK <b>Note:</b> Message is now indicating "read"
AT+CMGR=2 <b>Note:</b> Read at a wrong index	ERROR <b>Note:</b> Error : invalid index

Values:

<index>	0-99						
<stat>	Status of message in memory. Possible values are as follows: <table><tr><th>Text Mode Possible Values</th><th>Status of Messages in Memory</th></tr><tr><td>"REC UNREAD"</td><td>received unread messages</td></tr><tr><td>"REC READ"</td><td>received read messages</td></tr></table>	Text Mode Possible Values	Status of Messages in Memory	"REC UNREAD"	received unread messages	"REC READ"	received read messages
Text Mode Possible Values	Status of Messages in Memory						
"REC UNREAD"	received unread messages						
"REC READ"	received read messages						
<oa/da>	Origination/destination address value in string format.						
<scts>	Service Center Time Stamp in string format : "yy/MM/dd,hh :mm :ss" (Year/Month/Day,Hour:Min:Seconds)						
<lang>	Language (network specific)						
0	Unspecified						
1	English						
2	French						
3	Spanish						
4	Japanese						
5	Korean						
6	Chinese						
7	Hebrew						
<encod>	Encoding (network specific)						
0	Octet (or Unspecified)						
1	IS91EP						
2	ASCII						
3	IA5						
4	UCS-2 Unicode						
<priority>	Message priority:						
0	Normal						
1	Interactive						
2	Urgent						
3	Emergency						
<cbn>	Call Back Number						
<length>	Length of the text message (in bytes). The maximum message text length for all other software editions is 160 characters.						
<data>	Message text						

## List Message +CMGL

**Description:** This command allows the application to list stored messages as indicated by the type of the message to read. The messages are listed from the memory selected by the **+CPMS** command. Note that these messages are NOT marked as "Read" if previously "Unread".

### Command

**Syntax:** AT+CMGL=<type>

### Response

**Syntax:** +CMGL: <index>,<stat>,<da/oa>,<lang>,<encod>,<length><CR><LF>  
 <data> (for **SMS-DELIVER** and **SMS-SUBMIT**, may be followed by other  
 <CR><LF>+CMGL:<index>...)

Command	Possible Responses
AT+CMGL="UREAD" <b>Note:</b> List unread messages in text mode	+CMGL: 1,"REC UNREAD","8585551212",1,2,15 <CR><LF>Unread message!  +CMGL: 3,"REC UNREAD", "8585551212", 1,2,5<CR><LF>Hello  OK
AT+CMGL="READ" <b>Note:</b> List read messages in text mode	+CMGL: 2,"REC READ","8585551212",1,2,9<CR><LF> Keep cool OK
AT+CMGL="ALL"	+CMGL: 1,"REC UNREAD","8585551212", 1,2,15<CR><LF>Unread message!  +CMGL: 2,"REC READ","8585551212", 1,2,9<CR><LF>Keep cool +CMGL: 3,"REC UNREAD", "8585551212", 1,2,5<CR><LF>Hello OK

**Values:**

**<index>** Place of storage in memory.

**<stat>** Possible values, the status of messages in memory, are as follows:

Text Mode Possible Values	Status of Messages in Memory
"REC UNREAD"	received unread messages
"REC READ"	received read messages

**<oa/da>** Origination/destination address value in string format.

**<lang>**

<b>0</b>	Unspecified
<b>1</b>	French
<b>3</b>	Spanish
<b>4</b>	Japanese
<b>5</b>	Korean
<b>6</b>	Chinese
<b>7</b>	Hebrew

**<encod>** Encoding (network specific)

<b>0</b>	Octet (or Unspecified)
<b>1</b>	IS91EP
<b>2</b>	ASCII
<b>3</b>	IA5
<b>4</b>	UCS-2 Unicode

**<length>** Length of the text message (in bytes).

**<data>** Message text

## Delete Message +CMGD

**Description:** This command is used to delete one or several messages from preferred message storage.

**Syntax:** AT+CMGD=<Index> [,<DelFlag>]

Command	Possible Responses
AT+CMGD=1	OK <b>Note:</b> The message from the preferred message storage at the location 1 is deleted
	ERROR <b>Note:</b> There is no message stored at preferred message storage location 1
AT+CMGD=1,0 <b>Note:</b> Delete message stored in location (index) 1 (with optional <DelFlag>)	
	ERROR <b>Note:</b> There is no message stored at preferred message storage location 1
AT+CMGD=1,1	OK <b>Note:</b> All READ messages from the preferred message storage are deleted
AT+CMGD=1,4	OK <b>Note:</b> All messages are deleted

**Values:**

<index>

0-99

<DelFlag>

- 0** Delete message at location <index>
- 1** Delete all READ messages
- 2** Reserved (unsupported)
- 3** Reserved (unsupported)
- 4** Delete all messages.

## Preferred Message Storage +CPMS

**Description:** This command allows the message storage area to be selected (for reading, writing, etc). The total storage area size is: 100 for “MT”.

**Syntax:** AT+CPMS=<mem1>,<used>,<total>

Command	Possible Responses
AT+CPMS=? <b>Note:</b> Display available message storage areas.	+CPMS: (“MT”) OK
AT+CPMS? <b>Note:</b> Display currently selected area information.	+CPMS: “MT”,3,99 OK
AT+CPMS=“BC” <b>Note:</b> Select invalid message storage area.	+CMS ERROR: 302
AT+CPMS=“MT” <b>Note:</b> Select NV message storage	+CPMS: 0,99 OK

<b>Values:</b>	<b>&lt;mem1&gt;</b>	Memory area to be used to list, read and delete messages. It can be:
	<b>"MT"</b>	SMS Mobile Terminated message storage in NV (default) Each reported memory area includes information about current used & total storage locations. When <mem1> is selected, all following +CMGL, +CMGR and +CMGD commands are related to the type of SMS stored in this memory.
	<b>&lt;used&gt;</b>	The number of used storage locations in the reported area.
	<b>&lt;total&gt;</b>	The total number of available storage locations.

## Set SMS Compose Language and Encoding +WSCL

**Description:** The +WSCL command sets the SMS composition language and encoding types. When composing a message (+CMGS), the SMS language and encoding fields will be set using the current +WSCL value.

**Syntax:** AT+WSCL = <lang>, <encod>

Command	Possible Responses
AT+WSCL=1,2	OK <b>Note:</b> Set language to English, encoding to ASCII
AT+WSCL=6,4	OK <b>Note:</b> Set language to Chinese, encoding to USC-2 UNICODE
AT+CMGS="8585551212"<CR> ÃûxÖ<ctrl-Z> <b>Note:</b> Send a message in Chinese	+CMGS: <mr> OK <b>Note:</b> Message sent

<b>Values:</b>	<b>&lt;lang&gt;</b>
	<b>0</b> Unspecified (default)
	<b>1</b> English
	<b>2</b> French
	<b>3</b> Spanish
	<b>4</b> Japanese
	<b>5</b> Korean
	<b>6</b> Chinese
	<b>7</b> Hebrew
	<b>&lt;enc&gt;</b>
	<b>0</b> Octet (or Unspecified) (default)
	<b>1</b> IS91EP
	<b>2</b> ASCII
	<b>3</b> IA5
	<b>4</b> USC-2 UNICODE

## New Message Indication +CNMI

**Description:** This command selects the procedure for message reception from the network.

**Note:** Cell Broadcast messages and Status Report messages are not stored.

**Syntax:** +CNMI=<mode>,<mt>,<bm>,<ds>,<bfr>



Command	Possible Responses
AT+CNMI=2,1,0,0,0 <b>Note:</b> <mt>=1	OK
	AT+CMTI : "MT",1 <b>Note:</b> message received
AT+CNMI=2,2,0,0,0 <b>Note:</b> <mt>=2	OK
	+CMT : "8585551212","98/10/01,12 :30 00", 129,1,2,0,5<CR><LF> Hello <b>Note:</b> message received
AT+CNMI=2,0,0,1,0 <b>Note:</b> <ds>=1	OK
AT+CMGS="8585551212"<CR> Message to send <ctrl-Z> <b>Note:</b> Send a message in text mode	+CMGS : 7 OK <b>Note:</b> Successful transmission
	+CDS : 2, 116, "8585551212", 129, "98/10/01,12 :30 :07", "98/10/01 12 :30 :08", 32768 <b>Note:</b> message was correctly delivered

**Values:**

- <mode>** The <mode> value controls the processing of unsolicited result codes. Only mode 2 is supported at this time.
- 2** Buffer unsolicited result codes in the TA when TA-TE link is reserved and flush them to the TE after reservation. Otherwise forward the messages directly to the TE without storing.
- <mt>** Sets the result code indication routing for SMS-DELIVERs. Default is 1.
- 0** No SMS-DELIVER indications are routed.
- 1** SMS-DELIVERs are routed using unsolicited code: +CMTI: "MT", <index>
- 2 or 3** SMS-DELIVERs (except class 2 messages) are routed using unsolicited code: +CMT: <oa>, <scts>, <toa>, <lang>, <encod>, <priority>[,<cbn>],<length><CR><LF><data> (text mode)
- <bm>** Sets the result code indication routing for received Cell Broadcast Messages. Default is 0.
- 0** No CBM indications are routed to the TE. The CBMs are **not** stored.
- 2 or 3** New CBMs are routed directly to the TE using unsolicited result code (format matches that of +CBM: <oa>, [<alpha>], <scts> [,<toa>, <length>] <CR><LF><data> (text mode)
- <ds>** Sets the routing for SMS-STATUS-REPORTs. Default is 0.
- 0** No SMS-STATUS-REPORTs are routed.
- 1** SMS-STATUS-REPORTs are routed using unsolicited code: +CDS: <fo>, <mr>, [<ra>] , [<tora>], <scts>, <dt>, <st> (Text mode)
- <bfr>** Since <mode> cannot be changed, this parameter is no longer used, but these values are still accepted for legacy purposes. Default is 0.
- 0** TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes)
- 1** TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered.

# Incoming Message Directly Displayed +CMT

**Description:** This response indicates that an incoming message has been received and according to the message storage preferences (+CNMI), is to be directly displayed.

**Response**

**Syntax:** +CMT: <oa>, <scts>, <toa>, <lang>, <encod>, <priority> [,<cbn>], <length> <CR><LF> <data> (text mode)

Example Result
+CMT: "123456","98/10/01,12 :30 00",129,1,2,0,5<CR><LF> Hello <b>Note:</b> message received

- Values:**
- <oa>                    Originator Address.
  - <scts>                  Service Center Time Stamp in string format : "yy/MM/dd,hh :mm :ss±zz"  
(Year/Month/Day,Hour:Min:Seconds±TimeZone)
  - <toa>                    Type-of-Address of <oa>
  - <lang>                   Language
  - <encod>                  Encoding method
  - <priority>                Message priority:  
                              **0** – Normal  
                              **1** – Interactive  
                              **2** – Urgent  
                              **3** – Emergency
  - <cbn>                    Call Back Number
  - <length>                 The number of characters in the following <data> field
  - <data>                    Message contents

# Incoming Message Stored in Memory +CMTI

**Description:** This response indicates that an incoming message has been received and according to the message storage preferences (+CNMI), is to be stored in memory.

**Response**

**Syntax:** +CMTI: <mem>,<index>,<priority>

Example Result
+CMTI: "MT",1,0 <b>Note:</b> Message received

- Value:**
- <mem>                    NVRAM storage area (always "MT" for this response)
  - <index>                   Location of message within storage area
  - <priority>                Message priority  
                              **0** – Normal  
                              **1** – Interactive  
                              **2** – Urgent  
                              **3** – Emergency

## SMS Status Report Indication Directly Displayed +CDS

**Description:** This response indicates an SMS status report has been received and according to the message storage preferences (+CNMI), is to be directly displayed.

Status report messages are not saved to NV; the host application must be communicating with the modem by either the UART or USB channel. In addition, there is not RI pulse.

### Response

**Syntax:** +CDS: <n>, <mr>, [<ra>], [<tora>], <scts>,<dt>,<st> (Text mode)

Example Result
+CDS : 2, 1, "3146290800", 129, "98/10/01,12 :30 :07+04", "98/10/01 12 :30 :08+04", 32768
<b>Note:</b> SMS status report received

### Values:

- <n> Always 2
- <mr> Message Reference
- <ra> Recipient Address
- <tora> Type-of-Address of <ra>
- <scts> Service Center Time Stamp in string format : "yy/MM/dd,hh :mm :ss±zz"  
(Year/Month/Day,Hour:Min:Seconds±TimeZone)
- <dt> Discharge Time in string format: "yy/MM/dd,hh :mm :ss±zz"  
(Year [00-99], Month [01-12], Day [01-31], Hour, Minute, Second and Time Zone [quarters of an hour] )
- <st> Status of a SMS-STATUS-REPORT (See table below)

### SMS Status

#### Report Codes:

Code	Description
<b>Network Problems</b>	
0	Address vacant
1	Address translation failure
2	Network resource shortage
3	Network failure
4	Invalid teleservice ID
5	Other network problem
<b>Terminal Problems</b>	
32	No page response
33	Destination busy
34	No acknowledgment from transport layer
35	Destination resource shortage
36	SMS delivery postponed
37	Destination out of service
38	Destination no longer at this address
39	Other terminal problem
<b>Radio Interface Problems</b>	
64	Radio interface resource shortage
65	Radio interface incompatible
66	Other radio interface problem
<b>General problems (IS-41D)</b>	

Code	Description
96	Unexpected parameter size
97	SMS Origination denied
98	SMS Termination denied
99	Supplementary service not supported
100	SMS not supported
101	Reserved
102	Missing expected parameters
103	Missing mandatory parameters
104	Unrecognized parameter value
105	Unexpected parameter value
106	User data size error
107-255	No acknowledgement / Unknown error
General Codes	
32768	SMS OK. Message successfully transmitted/received
32770	Out of resources
32771	Message too large for access channel
32772	Message too large for dedicated channel
32773	Network not ready
32774	Phone not ready
32775	Not allowed in AMPS
32776	Cannot send broadcast

## SMS Message Storage Full +WMGF

**Description:** This response indicates that the SMS Service Center has attempted to send an SMS message but it was rejected because SMS Message Storage is Full. No new SMS messages will be received until some room is created by deleting old messages from SMS storage. Message deletion can be done using AT+CMGD.

### Response

**Syntax:** +WMGF

Example Result
+WMGF <b>Note:</b> Incoming message rejected. Message center notified with “out of resources” message. Message center will attempt to re-send the message at a later time.

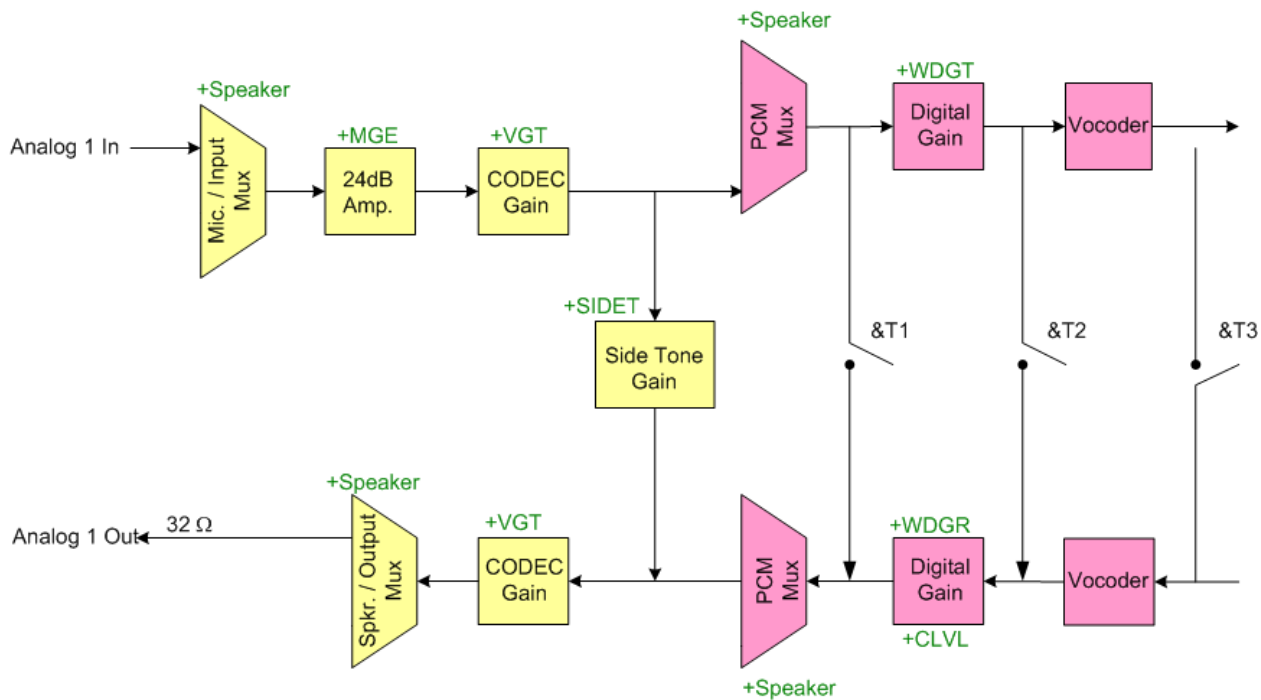
To receive +WMGF unsolicited response, set the AT+WUSLMSK command to enable the response.

# Chapter 15 – Audio Commands

Use these audio commands only with the SocketModem model MTSMC-C1-V, which includes microphone input and speaker output.

## Audio Subsystem Overview

The audio sub-system block diagram below indicates where the various gains and AT commands take effect. Since the AT command values are saved separately for each audio path, the audio gains should be tuned independently for each audio path. Note that the +CLVL is intended to operate like a volume control, so it should be set to 0dB gain during the tuning process (this is the default value).



## Tuning Audio

Audio parameters need to be set for each device connected to the audio sub-system. The audio parameters are saved independently for the audio path: Analog 2. Tune the audio parameters using the procedures detailed below.

### Analog

1. Select the relevant audio path, and issue the AT+VIP command to set the audio parameters to their default values.
2. Set +MGE so that the microphone output plus MGE gain is 23dB to 25dB below 2.828Vpp.
3. Make a voice call.
4. Adjust +VGT to appropriate levels.
5. Adjust +VGR to appropriate levels.

## Speaker & Microphone Selection +SPEAKER

**Description:** This command is used to select the voice path, and activates a speaker/microphone audio path. The modem supports one audio path: analog1. An audio path is functional only with appropriate external hardware.

Voice paths may be changed while a call is in progress as well as in the idle state.

**Syntax:** AT+SPEAKER=<n>

Command	Possible Responses
AT+SPEAKER=0 <b>Note:</b> Select analog1 audio path.	OK <b>Note:</b> Command valid.
AT+SPEAKER <b>Note:</b> Select analog1 audio path.	OK <b>Note:</b> Command valid (default path)
AT+SPEAKER?	+SPEAKER: 0 OK <b>Note:</b> analog1 audio path active.
AT+SPEAKER=? <b>Note:</b> Get the range of values.	+SPEAKER: (0-2)

**Values:** < n >

- 0** Analog1 – LINE\_IN and HPH\_OUT. (default)
- 1** (not supported)
- 2** (not supported)

If no argument is supplied to the command, the default value is assumed. The configuration is saved immediately. The Analog 1 output is designed to drive a 32Ω speaker. See the Audio Overview section for more information.

## Microphone Gain Enable +MGE

**Description:** This command enables or disables the 24dB microphone gain amplifier.

**Syntax:** AT+MGE=<val1>

Command	Possible Responses
AT+MGE	OK <b>Note:</b> Sets default value of 0
AT+MGE=0	OK <b>Note:</b> Disable amplifier
AT+MGE? <b>Note:</b> Interrogate value	+MGE: 1 OK <b>Note:</b> Current value
AT+MGE=? <b>Note:</b> Test command	+MGE : (0-1) OK <b>Note:</b> Possible values

**Values:** <Gain>

- 0** Amplifier Disabled (0dB gain) (default)
- 1** Amplifier Enabled (24dB gain)

If no argument is supplied to the command, the default value is assumed. The configuration is saved immediately. See the Audio Overview section for more information.

## Microphone Gain +VGT

**Description:** This command sets the voice gain in the transmit direction (microphone gain) of the audio path.

**Syntax:** AT+VGT=<MicGain>

Command	Possible Responses
AT+VGT	OK <b>Note:</b> Sets default value of 20
AT+VGT=2	OK <b>Note:</b> Command valid
AT+VGT? <b>Note:</b> Interrogate value	+VGT: 2 OK <b>Note:</b> Current value
AT+VGT=? <b>Note:</b> Test command	+VGT : (0-24) OK <b>Note:</b> Possible values

**Values:** <Gain>

0	-84dB
1	-80dB
2	-76dB
3	-72dB
4	-68dB
5	-64dB
6	-60dB
7	-56dB
8	-52dB
9	-48dB
10	-44dB
11	-40dB
12	-36dB
13	-32dB
14	-28dB
15	-24dB
16	-20dB
17	-16dB
18	-12dB
19	-8dB
20	-4dB (default)
21	0dB
22	+4dB
23	+8dB
24	+12dB

If no argument is supplied to the command, the default value is assumed. The configuration is saved immediately. See the Audio Overview section for more information.

## Speaker Gain Control +VGR

**Description:** This command sets the voice gain in the receiver direction (speaker gain) of the audio path.

**Syntax:** AT+VGR=<Rgain>

Command	Possible Responses
AT+VGR	OK <b>Note:</b> Sets default value of 22
AT+VGR=2	OK <b>Note:</b> Command valid
AT+VGR? <b>Note:</b> Interrogate value	+VGR: 2 OK <b>Note:</b> Current value
AT+VGR=? <b>Note:</b> Test command	+VGR : (0-24) OK <b>Note:</b> Possible values

**Values:**

<Gain>

0	-84dB
1	-80dB
2	-76dB
3	-72dB
4	-68dB
5	-64dB
6	-60dB
7	-56dB
8	-52dB
9	-48dB
10	-44dB
11	-40dB
12	-36dB
13	-32dB
14	-28dB
15	-24dB
16	-20dB
17	-16dB
18	-12dB
19	-8dB
20	-4dB
21	0dB
22	+4dB default
23	+8dB
24	+12dB

If no argument is supplied to the command, the default value is assumed. The configuration is saved immediately. See the Audio Overview section for more information.



## Digital Gain Transmit +WDGT

**Description:** This command sets the digital gain in the transmit direction (microphone gain) of the audio path.

**Syntax:** AT+WDGT=<Gain>

Command	Possible Responses
AT+WDGT	OK <b>Note:</b> Sets default value of 22
AT+WDGT=2	OK <b>Note:</b> Command valid
AT+WDGT? <b>Note:</b> Interrogate value	+WDGT: 2 OK <b>Note:</b> Current value
AT+WDGT=? <b>Note:</b> Test command	+WDGT: (0-24) OK <b>Note:</b> Possible values

**Values:** <Gain>

0	-84db
1	-80dB
2	-76dB
3	-72dB
4	-68dB
5	-64dB
6	-60dB
7	-56dB
8	-52dB
9	-48dB
10	-44dB
11	-40dB
12	-36dB
13	-32dB
14	-28dB
15	-24dB
16	-20dB
17	-16dB
18	-12dB
19	-8dB
20	-4dB
21	0dB
22	+4dB default
23	+8dB
24	+12dB

If no argument is supplied to the command, the default value is assumed. The configuration is saved immediately. See the Audio Overview section for more information.

## Digital Gain Receive +WDGR

**Description:** This command sets the digital gain in the receive direction (speaker gain) of the audio path.

**Syntax:** AT+WDGR=<Gain>

Command	Possible Responses
AT+WDGR	OK <b>Note:</b> Sets default value of 21
AT+WDGR=2	OK <b>Note:</b> Command valid
AT+WDGR? <b>Note:</b> Interrogate value	+WDGR: 2 OK <b>Note:</b> Current value
AT+WDGR=? <b>Note:</b> Test command	+WDGR: (0-24) OK <b>Note:</b> Possible values

**Values:** <Gain>

0	-84db
1	-80dB
2	-76db
3	-72dB
4	-68dB
5	-64dB
6	-60dB
7	-56dB
8	-52dB
9	-48dB
10	-44dB
11	-40dB
12	-36dB
13	-32dB
14	-28dB
15	-24dB
16	-20dB
17	-16dB
18	-12dB
19	-8dB
20	-4dB
21	0dB default
22	+4dB
23	+8dB
24	+12dB

If no argument is supplied to the command, the default value is assumed. The configuration is saved immediately. See the Audio Overview section for more information.

## Side Tone Modification +SIDET

**Description:** This command is used to set the level of **audio feedback** in the speaker (microphone feedback in the speaker).

**Syntax:** AT+SIDET=<val1>,<val2>

Command	Possible Responses
AT+SIDET	OK <b>Note:</b> Set default values of 0, 0
AT+SIDET=1,0	OK <b>Note:</b> Command valid
AT+SIDET? <b>Note:</b> Current value	+SIDET: 1,0 OK <b>Note:</b> Command valid
AT+SIDET=?	+SIDET: (1-0),(0-24) OK <b>Note:</b> Test command

**Values:**

**<val1>**

**0** Sidetone is disabled (Default)

**1** Sidetone is enabled

Note that if val1 is set to zero (0), then val2 (level) is forced to zero (0).

**<val2>**

0	-96dB (default)
1	-92dB
2	-88dB
3	-84dB
4	-80dB
5	-76dB
6	-72dB
7	-68dB
8	-64dB
9	-60dB
10	-56dB
11	-52dB
12	-48dB
13	-44dB
14	-40dB
15	-36dB (typical handset level)
16	-32dB
17	-28dB
18	-24dB (typical headset level)
19	-20dB
20	-16dB
21	-12dB
22	-8dB
23	-4dB
24	0dB

If no argument is supplied to the command, the default value is assumed. The configuration is saved immediately. See the Audio Overview section for more information.

## Echo Cancellation +ECHO

**Description:** This command is used to enable, disable or configure the Echo Cancellation functions for voice calls (in rooms, in cars, etc.). The +SPEAKER function automatically sets echo cancellation based upon audio path choice and this command allows non-standard operation.

**Syntax:** AT+ECHO= <mode>

Command	Possible Responses
AT+ECHO? <b>Note:</b> Read current settings	+ECHO: 0 OK
AT+ECHO=0 <b>Note:</b> Set Echo Cancellation Off	OK
AT+ECHO=1 <b>Note:</b> Set Echo Cancellation to Ear Seal	OK
AT+ECHO=2 <b>Note:</b> Set Echo Cancellation to Headset	OK
AT+ECHO=4 <b>Note:</b> Set Echo Cancellation to Handset	OK
AT+ECHO=5 <b>Note:</b> Set Echo Cancellation to Default Path	OK
AT+ECHO	OK Note Set to 5 (default)
AT+ECHO=? <b>Note:</b> Test command	+ECHO: (0-5) OK <b>Note:</b> Possible values

**Values:** <mode>

- 0 Vocoder Echo Cancellation Off
- 1 Ear Seal Echo Cancellation (default for Analog 1 path)
- 2 Head Set Echo Cancellation
- 3 Acoustic Echo Cancellation (AEC)
- 4 Speaker Echo Cancellation for car kit operation
- 5 Default Echo Cancellation for current path settings (default)

If no argument is supplied to the command, the default value is assumed. The configuration is saved immediately. See the Audio Overview section for more information.

## Loudspeaker Volume Level +CLVL

**Description:** This command sets the loudspeaker volume level of the audio path.

**Syntax:** AT+CLVL=<Level>

Command	Possible Responses
AT+CLVL	OK <b>Note:</b> Sets default value of 9
AT+CLVL=2	OK <b>Note:</b> Command valid
AT+CLVL? <b>Note:</b> Interrogate value	+CLVL: 2 OK <b>Note:</b> Current value
AT+CLVL=? <b>Note:</b> Test command	+CLVL: (0-12) OK <b>Note:</b> Possible values

**Values:**

&lt;Level&gt;

0	-84dB (no output)
1	-32dB
2	-28dB
3	-24dB
4	-20dB
5	-16dB
6	-12dB
7	-8dB
8	-4dB
9	0dB (default)
10	4dB
11	8dB
12	12dB

If no argument is supplied to the command, the default value is assumed. The configuration is saved immediately. See the Audio Overview section for more information.

**Special****Considerations:**

The +CLVL gain value is added onto the +WDGR gain. Depending on the gain setting of +WDGR, the full range of the +CLVL command may not be realized.

**Example:**

If +WDGR is set to +12dB gain, the +CLVL command cannot add any more positive gain. Setting the +CLVL command to +12dB gain would not yield a total of +24dB gain, since the gain stage can only supply a maximum of +12dB gain.

The following formulas govern the total digital receive gain:

Total Gain = (WDGR Gain + CLVL Gain)

-84dB <= Total Gain <= +12dB

## Initialize Voice Parameters +VIP

**Description:** This resets audio parameters back to factory default values.

The following parameters are restored:

Gain control (+VGR, +VGT)

Speaker & microphone selection (+SPEAKER)

Echo cancellation (+ECHO)

Side tone selection (+SIDET)

Digital gain (+WDGT, +WDGR)

Microphone gain enable (+MGE)

Loudspeaker volume level (+CLVL)

**Syntax:**

AT+VIP

Command	Possible Responses
AT+VIP	OK <b>Note:</b> Command valid

## Audio Loopback &T

**Description:** This command is used to perform audio loop back of the current audio path. This command can be used to validate the audio loop. This is a standard Hayes<sup>®</sup> modem AT command.

**Syntax:** AT&T<num>

Command	Possible Responses
AT&T0	OK <b>Note:</b> Audio loopback is off.
AT&T1	OK <b>Note:</b> Audio loopback is on.

**Values:** <num>

- 0** Audio loopback of off.
- 1** Audio loopback for PCM interface is enabled.
- 2** Audio loopback for DSP interface is enabled.
- 3** Audio loopback for Remote End is enabled.

# Chapter 16 – Data Commands

## Quick Net Connect \$QCQNC

**Description:** This command is used to enable or disable the Quick Net Connect (QNC) feature.

**Syntax:** AT\$QCQNC=<Val>

Command	Possible Responses
AT\$QCQNC? <b>Note:</b> Display the current setting	\$QCQNC: 0 OK <b>Note:</b> Command is valid
AT\$QCQNC=? <b>Note:</b> Display the range of values	\$QCQNC: (0-1) OK <b>Note:</b> Command is valid
AT\$QCQNC=1 <b>Note:</b> Enable QNC compatibility	OK <b>Note:</b> Command is valid
AT\$QCQNC <b>Note:</b> Default – Enable QNC compatibility	OK <b>Note:</b> Command is valid

**Values:** <Val>

- 0** Disable QNC capability. This means that packet Originations will use the Packet Data Service Option number.
- 1** Enable QNC capability. This means that Packet Originations will use the Asynchronous Data Service Option number. Default.

## Set Data Service Option \$QCSO

**Description:** This command is used to Set Data Service Option number set; saves to non-volatile memory.

**Syntax:** AT\$QCSO =<Val>

Command	Possible Responses
AT\$QCSO? <b>Note:</b> Display the current setting	\$QCSO: 2 OK <b>Note:</b> Command is valid
AT\$QCSO =? <b>Note:</b> Display the range of values	\$QCSO: (0-2) OK <b>Note:</b> Command is valid
AT\$QCSO =1 <b>Note:</b> Set proprietary SO numbers.	OK <b>Note:</b> Command is valid

**Values:** <Val>

- 0** Pre-707 SO numbers (RS 1: Async 4, packet 7; RS 2: Async 12, packet 15)
- 1** Proprietary SO numbers (RS 1: Async 4, packet 7; RS 2: Async 0x8021, packet 0x8020)
- 2** IS-707 SO numbers (RS 1: Async 0x1004, packet 0x1007; RS 2: Async 12, packet 15)

## R-SCH Selection \$QCMIP

**Description:** This command is used to enable or disable mobile IP.

The default value is carrier-specific.

This command is for test purposes only and should not be issued by the mobile phone user.

**Syntax:** AT\$QCMIP=<Val>

Command	Possible Responses
AT\$QCMIP? <b>Note:</b> Display the current setting	\$QCMIP: 1 OK <b>Note:</b> Command is valid
AT\$QCMIP=? <b>Note:</b> Display the range of values	\$QCMIP: (0-2) OK <b>Note:</b> Command is valid
AT\$QCMIP=0 <b>Note:</b> Set value to 0	OK <b>Note:</b> Command is valid

**Values:** <Val>

- 0** Mobile IP disabled, Simple IP only.
- 1** Mobile IP preferred. In the initial MIP registration, if the network does not support Mobile IP, then the mobile automatically reverts to Simple IP (force a PPP renegotiation by sending a LCP C-Req).  
However, if a Mobile IP session is registered, and then enters a network that does not support Mobile IP, the mobile will drop the session and inform the upper layers of the failure (for example, by dropping DCD to a laptop).
- 2** 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 (for example, by dropping DCD to a laptop).
- Note:** When the AT\$QCMIP value is changed to 1 or 2, this modifies the value of AT+CRM to 2. AT+CRM with a value of 2 enables network model operation. Changing the value to 0 will reset the AT+CRM to its original value.

## MIP Selection \$QCMIPP

**Description:** This command is used to select and activate an MIP user profile.

**Syntax:** AT\$QCMIPP

Command	Possible Responses
AT\$QCMIPP? <b>Note:</b> Display the current setting	\$QCMIPP: 0 <b>Note:</b> User profile 1 is currently used
AT\$QCMIPP=2 <b>Note:</b> Set to user profile 2	OK <b>Note:</b> Command is valid
AT\$QCMIPP=? <b>Note:</b> Display the range of values	\$QCMIPP: (0-5) OK <b>Note:</b> Command is valid

**Note:** Takes a profile number between 0 and 5. This value is stored in NV. This AT command is used to configure Dial-Up Networking. Although 5 is the absolute maximum profile number, the actual number may be limited by the carrier.



## Current Active Profile \$QCMIPPEP

**Description:** This command is used to enable or disable the currently active profile.

**Syntax:** AT\$QCMIPPEP=<Val>

Command	Possible Responses
AT\$QCMIPPEP? <b>Note:</b> Display the current setting	\$QCMIPPEP: 1 OK <b>Note:</b> Command is valid
AT\$QCMIPPEP=? <b>Note:</b> Display the range of values	\$QCMIPPEP: (0-1) OK <b>Note:</b> Command is valid
AT\$QCMIPPEP=0 <b>Note:</b> Set value to 0	OK <b>Note:</b> Command is valid

**Values:** <Val>

- 0** Disable the currently active profile (profile is unavailable until it is re-enabled).
- 1** Enable the currently active profile.

## Return Profile Information \$QCMIPGETP

**Description:** This command is used to return all information corresponding to the specified profile number.

**Note:** The number of MIP user profiles supported is determined by the carrier.

**Syntax:** AT\$QCMIPGETP=<Val>

Command	Possible Responses
AT\$QCMIPGETP? <b>Note:</b> Display the current setting	ERROR <b>Note:</b> Command is not valid
AT\$QCMIPGETP=? <b>Note:</b> Display the range of values	\$QCMIPGETP: (0-5) OK <b>Note:</b> Command is valid
AT\$QCMIPGETP=0 <b>Note:</b> Set value to 0	Profile:0 Enabled ..... OK <b>Note:</b> Command is valid

**Values:** <Val>

**(0-5)** Profile #

**Note:** If no profile number is entered, all information corresponding to the currently active profile is returned. If there is no profile associated with the specified number, an error is returned. Although 5 is the absolute maximum profile number the actual number may be limited by the carrier.

## Set NAI for Active Profile \$QCMIPNAI

**Description:** This command is used to set the network access identifier (NAI) for the currently active profile.

**Note:** Writing the NAI is not allowed for a Verizon configuration. Command will return ERROR if the modem is configured for Verizon.

**Syntax:** AT\$QCMIPNAI=<String>,<Val>

Command	Possible Responses
AT\$QCMIPNAI? <b>Note:</b> Display the current setting	<a href="mailto:sprintcdmadata03@sprintpcs.com">sprintcdmadata03@sprintpcs.com</a> ,1 OK <b>Note:</b> Command is valid
AT\$QCMIPNAI=? <b>Note:</b> Display the range of accepted character values.	\$QCMIPNAI: (20,21,23-7E),(0-1) OK <b>Note:</b> ASCII hexadecimal character range supported by this command. (All non-control codes.)
AT\$QCMIPNAI="myName@myDomain.com",0 <b>Note:</b> Non-committed value set	OK <b>Note:</b> NAI is now: myName@MyDomain.com

**Values:** <String> The network access identifier text to be stored.

<Val>

0 Do not commit to NV

1 Commit to NV

## \$QCVAD= Sets or Reads the Mode for Answering Data Calls

**Description:** Used to set the expected incoming call type. When a data option is set and a page message that has a voice service option is received, the module responds with a page response that has a data service option.

**Syntax:** AT\$QCVAD =<Val>

Command	Possible Responses
AT\$QCVAD? <b>Note:</b> Display current setting	\$QCVAD: 0 OK <b>Note:</b> Command is valid
AT\$QCVAD=? <b>Note:</b> Display range of values	\$QCVAD: (0-4) OK <b>Note:</b> Command is valid
AT\$QCVAD=3 <b>Note:</b> Force a data call for the next incoming call	OK <b>Note:</b> Command is valid

**Values:**

0 Speech

1 Not supported

2 Not supported

3 Async data for next call (10 minute timeout)

4 Async data for all calls

## Chapter 17 – TCP App AT Commands (For Non-UIP Builds)

These commands are available with the TCP App feature. TCP App allows for multiple TCP and UDP compliant non-blocking socket connections over an IP network while retaining AT command level modem control. TCP App includes AT commands and unsolicited responses for host application initialization and control.

**Note:** These commands are not available on UIP modems.

### Configure TCP/IP +WIPCFG

**Description:** This command is used to start and stop the TCP/IP stack, set TCP/IP configuration parameters and save/restore configuration to/from NV memory.

**Syntax:** AT+WIPCFG=<mode>[[,<optnum>],[,<value>]]

Command	Possible Responses
AT+WIPCFG? <b>Note:</b> Display current TCP/IP configuration settings.	+WIPCFG: 0,64 +WIPCFG: 3,16384 +WIPCFG: 4,536 +WIPCFG: 6,8 +WIPCFG: 12,60 +WIPCFG: 54,1460 +WIPCFG: 55,0 OK
AT+WIPCFG=0 <b>Note:</b> Stop TCP/IP stack	OK <b>Note:</b> Command valid
AT+WIPCFG=1 <b>Note:</b> Start TCP/IP stack	OK <b>Note:</b> Command valid
AT+WIPCFG=2,0 <b>Note:</b> Set Time-to-Live to default value of 64	OK <b>Note:</b> Command valid
AT+WIPCFG=2,0,255 <b>Note:</b> Set Time-to-Live to maximum value	OK <b>Note:</b> Command valid
AT+WIPCFG=2,3 <b>Note:</b> Set Number of bytes of initial TCP window to default value of 16384	OK <b>Note:</b> Command valid
AT+WIPCFG=2,3,1000 <b>Note:</b> Set Number of bytes of initial TCP window to 1000	OK <b>Note:</b> Command valid
AT+WIPCFG=2,4 <b>Note:</b> Set MSS to default value of 536	OK <b>Note:</b> Command valid
AT+WIPCFG=2,6,5 <b>Note:</b> Set Total number of TCP and UDP sockets to 5	OK <b>Note:</b> Command valid
AT+WIPCFG=2,12,10 <b>Note:</b> Set TCP Timeout to 1 second (10 * 100msec)	OK <b>Note:</b> Command valid
AT+WIPCFG=4,0 <b>Note:</b> Restore configuration from NV memory	OK <b>Note:</b> Command valid
AT+WIPCFG=4,1 <b>Note:</b> Save configuration to NV memory	OK <b>Note:</b> Command valid

**Values:** <mode>

- 0** Stop TCP/IP stack
  - 1** Start TCP/IP stack
  - 2** Configure TCP/IP stack
  - 4** Save/Restore Configuration to/from NV memory
- <optnum> when <mode> = 2**
- 0** Default TTL of outgoing data grams. This option is a limit on the period of time or number of iterations or transmissions that a unit of data can experience before it should be discarded. The time to live (TTL) is an 8-bit field in the Internet Protocol (IP) header. It is the 9th octet of 20. Its value can be considered as an upper bound on the time that an IP datagram can exist in an internet system. The TTL field is set by the sender of the datagram, and reduced by every host on the route to its destination. If the TTL field reaches zero before the datagram arrives at its destination, then the datagram is discarded. This is used to avoid a situation in which an undelivered datagram keeps circulating in the network. Valid range is 0-255. The default value is 64.
  - 3** Number of bytes of initial TCP window. This option is used to specify the number of bytes in the initial TCP window. A TCP window specifies the amount of outstanding (unacknowledged by the recipient) data a sender can send on a particular connection before it gets an acknowledgement back from the receiver. The primary reason for the window is congestion control. Valid range is 536 to 65535. The default value is 16384.
  - 4** Default MSS of off-link connections. This parameter specifies the initial size of TCP segment which would be sent. Note that the TCP protocol layer will negotiate this parameter when the socket is opened. Valid range is 536 to 1460. The default value is 536.
  - 6** Total number of sockets (TCP and UDP) that are allowed. This option specifies the maximum number of TCP and UDP sockets that can be created at one particular time. Valid range is 1 to 8. The default value is 8.
  - 12** This option is used to specify the time from the first character received on the UART/serial port until TCP data is sent to the network. It allows the application to buffer TCP data before writing to the TCP socket. **Note:** If 536 bytes of data are received on the UART/serial port before the timeout, the TCP data will also be removed from the UART and written to the TCP socket.  
This option value represents the number of 100 millisecond time periods to wait. For example, setting this option to 10 will make the application wait at least 1 second (10 \* 100msec) before sending data on the IP network. Valid range is 1 to 100. The default value is 3.
  - 54** The UDP packet size. When the socket is opened as a UDP socket, this option determines the UDP packet size. The valid range is 536 to 1460. The default value is 1460.
  - 55** ICMP Ping Reply. This is a flag which indicates if the modem should reply to the ICMP echo request which is used by ping. The valid values are 0 and 1. The default value is 0 which means that no reply will be sent.
- <optnum> when <mode> = 4**
- 0** Restore configuration data from NV memory. The current working TCP/IP configuration will be overwritten with the configuration stored in NV memory.
  - 1** Save configuration data to NV memory. The current working TCP/IP configuration will be written to NV memory.

## Bearer Configuration +WIPBR

**Description:** Used to open or close a PPP session with the carrier and to read PPP session options. Originates a CDMA 1xRTT data call when a PPP session is started and terminated the call when a PPP session is closed. The modem must be in the idle state (no call in progress) when a new PPP session is requested; otherwise, an error will be returned.

**Syntax:** AT+WIPBR=<cmdtype>,<bld>[,<opt num>,<mode>]

Command	Possible Responses
AT+WIPBR=2,6,0,"userid"  <b>Note:</b> Set userid for SIP based PPP session (not required for MIP based PPP session). And providing a non-blank user-id will enable module to use user-provided credentials for PPP authentication during SIP data call.  <b>Note:</b> Providing a blank userid will undo the change and use userid/password from RUIM/NV	OK <b>Note:</b> Command valid
AT+WIPBR=2,6,1,"password" <b>Note:</b> Password can be blank. (Not required for MIP based PPP session)	OK <b>Note:</b> Command valid
AT+WIPBR=4,6 <b>Note:</b> Start PPP session	OK <b>Note:</b> Command valid
AT+WIPBR? <b>Note:</b> Ask for current functionality level	+WIPBR: 6,1 OK <b>Note:</b> PPP session active
AT+WIPBR=3,6,15 <b>Note:</b> Get IP address of PPP session	+WIPBR: 6,15,"66.193.79.243" OK <b>Note:</b> PPP session active
AT+WIPBR=5,6 <b>Note:</b> Stop PPP session	OK <b>Note:</b> Command valid

### Values:

#### <cmdtype>

- 2 Set value of PPP session options (allowed only for SIP username/password)
- 3 Get value of PPP session options
- 4 Originate a 1xRTT data call and open a PPP session
- 5 Close a PPP session and terminate the 1xRTT data call

#### <bld>

- 6 1xRTT/PPP Bearer Id

**<opt num>** Opt Num 0,1 only used to set username and password for SIP PPP authentication.

- 0 Username
- 1 Password

**Valid when <cmdtype>=3 and PPP session is active**

- 15 Local IP address
- 17 Primary DNS server IP address
- 18 Secondary DNS server IP address

**<mode>** Only valid when <cmdtype>=4

- 0 Client operation

## Bearer Status +WIPBR

**Description:** This unsolicited response indicates the status of the bearer.

### Response

**Syntax:** +WIPBR: <bld>,<status>

Possible Responses
+WIPBR: 6,1
<b>Note:</b> PPP is active

### Response

**Values:**

**<bld>**

**6** 1xRTT/PPP Bearer Id

**<status>**

**1** Session active

**0** Session not active

## Service Creation +WIPCREATE

**Description:** The +WIPCREATE command is used to create UDP, TCP client, and TCP server sockets associated with the specified index and service.

If a local port is specified while creating a socket, the created socket will be assigned to this port; if not, a port will be assigned dynamically. If peer IP and peer port are specified, the created socket will be connected to the specified IP and port.

TCP server cannot be used to transfer data. To transfer data, it creates a local TCP client socket. This process of creating local socket is referred to as “spawning”. When a server socket is created, the socket passively listens on a specified port for incoming connections. On reception of a connection request from a remote client socket, a server socket does the following:

- Spawns a new socket (client) to connect to the remote socket
- Data transfer is done between the spawned socket and the remote socket
- Server socket remains in the listening mode and is ready to accept the request from other clients

A UDP socket can be created which acts as a “listening” socket waiting for first incoming datagram to the specified local port. This is accomplished by creating a socket with protocol set to 1 (UDP) and specifying only a Local Port, without providing a Peer IP Address or Peer Port. The +WIPDATA unsolicited response is output when a datagram is received on the port.

**Note:** The UDP “Listen” socket can receive incoming datagrams; however, it does not bind to the peer IP Address/port, and thus cannot be used to transmit data. To reply to the received datagram, a new UDP socket must be created using the datagrams source IP Address and port.

**Syntax:**

If <protocol> = 1: AT+WIPCREATE=<protocol>,<index>,<local port>] [<peer IP>,<peer port>]

If <protocol> = 2: AT+WIPCREATE=<protocol>,<index>,<peer IP>,<peer port>

If <protocol> = 3: AT+WIPCREATE=<protocol>,<server index>,<local port>,<from idx>,<to idx>

Command	Possible Responses
AT+WIPCREATE=1,<index>,<local port> [ <peer IP>,<peer port>]	OK +WIPREADY: 1,<index>
AT+WIPCREATE=2,<index>,<peer IP>, <peer port>	OK +WIPREADY: 2,<index>
AT+WIPCREATE=3,<server index>, <local port>,<from idx>,<to idx>	OK
AT+WIPCREATE?	Lists all open sockets. +WIPCREATE: <protocol>,<index>,<local port>, <peer IP>,<peer port> OK

**Values:****<protocol>**

- 1** UDP
- 2** TCP client
- 3** TCP server

**<index>**

- 1-8** Socket or session identifier

**<local port>**

- 0 – 65535** Local TCP/UDP port

**<peer IP>** Peer IP address; a string between quotes indicating an address either in numeric form (e.g., “85.12.133.10”) or as a DNS entry (e.g., www.multitech.com)

**<peer port>**

- 0 – 65535** Peer TCP/UDP port

**<server index>**

- 1-4** TCP server socket index

**<from idx>**

- 1-8** Minimum index for spawned TCP client sockets

**<to idx>**

- 1-8:** Maximum index for spawned TCP client sockets

**Notes:**

Starting a TCP server requires specifying the maximum number of client sockets that can be spawned. Do with using the <from idx> and <to idx> parameters. The value set for <to idx> should be equal or more than <from idx>.

It is not possible to create a client socket with AT+WIPCREATE=2, x, y, z when x is already reserved by a server with AT+WIPCREATE=3,<server idx>,<local port>,a,b if one of the TCP client sockets indexes between a and b is already reserved, be it by a client or a sever range.

The <from idx> and <to idx> are reserved for the server socket till the server socket and the spawned sockets are closed explicitly. So when trying to create a new TCP server socket, the <from idx> and <to idx> should be different from what was used earlier. A parameter used as <from idx> can’t be used as <to idx> anymore for other TCP server socket creation until spawned sockets with specified <from idx> and <to idx> are closed along with the TCP server socket explicitly and vice versa.

When there are no available client indexes in the TCP server’s range (or no more resources to accept incoming connections), any peer trying to connect to the server will receive an “accept” immediate followed by a shutdown (“peer close”).

## Service Status Unsolicited Response 1 +WIPREADY

**Description:** This unsolicited response indicates the status of the created service.

### Response

**Syntax:** +WIPREADY: <protocol>,<index>

Possible Responses
+WIPREADY: 2,3 <b>Note:</b> TCP connected socket index 3

### Response

**Values:** <protocol>

1	UDP
2	TCP client

<index>

1-8	Socket or session identifier
-----	------------------------------

## Service Status Unsolicited Response 2 +WIPACCEPT

**Description:** This unsolicited response indicates an incoming connection is accepted on a TCP server socket and the TCP client socket has been spawned.

### Response

**Syntax:** +WIPACCEPT: <server index>,<client index>

Possible Responses
+WIPACCEPT: 1,5 <b>Note:</b> Server index 1 accepted a connection; resulting TCP client assigned to index 5

### Response

**Values:** <server index>

1-4	TCP server socket or session identifier
-----	---

<client index>

1-8	TCP client socket or session identifier
-----	---

## Service Status Unsolicited Response 3 +WIPERROR

**Description:** This unsolicited response indicates an error occurred while attempting to connect a socket to its peer, or that an error occurred on the socket after the socket was created. The AT+WIPCREATE command immediately returns OK after the command syntax is verified, therefore the unsolicited response +WIPERROR is needed to indicate any error conditions when the socket can not connect to the peer, or when the socket loses connection to the peer.

### Response

**Syntax:** +WIPERROR: <protocol>,<index>,<error>

Sample Responses
+WIPACCEPT: 1,5 <b>Note:</b> Server index 1 accepted a connection; resulting TCP client assigned to index 5



**Response****Values:**

&lt;protocol&gt;

**1** UDP**2** TCP client

&lt;index&gt;

**1-8** Socket or session identifier

&lt;error&gt;

+WIPERR error codes and their descriptions are shown below.

<error>	Meaning
100	Invalid socket descriptor
103	Address family not supported
107	No more sockets available for opening
108	Operation not supported
109	Address already in use
110	Destination address required
113	IP address changed, causing TCP reset
114	Socket not connected
115	Connection attempt refused
116	Connection attempt timed out
117	Connection reset
118	Connection aborted
119	Broken pipe
120	Network subsystem unavailable
124	Invalid operation
125	Domain Name Error or Host not found
126	Domain Name not found
127	Network is not opened
129	The DNS resolve system is already in use or Temporary error
133	No address for the domain name
201	Network subsystem establishment in progress
202	Network subsystem unavailable
203	PPP is closing

**Last Socket Error Query +WIPERR****Description:** The +WIPERR command is used query the last error that occurred within the socket subsystem.**Syntax:** AT+WIPERR?

Command	Possible Responses
AT+WIPERR?	+WIPERR: <error>

**Values:** <error> See Service Status Unsolicited Response 3 for list of possible error indications.**0** No error found

## Socket Data Exchange +WIPDATA

**Description:** The +WIPDATA command is used to read from or write to a socket. On successful execution of the command, the UART switches to online data mode. The UART can be switched back to online command mode (AT mode with PPP data call established) by sending an escape sequence (“+++”) within a 1 second guard time before and after the sequence. De-asserting DTR can also switch the mode from Data mode to Online Command mode (depending on the &D setting). If data is not read using +WIPDATA command, further data will be delayed.

**Syntax:** AT+WIPDATA=<protocol>,<index>,<mode>

Command	Possible Responses
AT+WIPDATA=<protocol>,<index>,<mode>	CONNECT
AT+WIPDATA=?	OK
AT+WIPDATA?	OK or displays pending data in socket as follows: <b>Note:</b> if <protocol> equals 1: +WIPDATA: <protocol>,<index>,<datagram size>,<peer IP>,<peer port> <b>Note:</b> if <protocol> equals 2: +WIPDATA: <protocol>,<index>,<number of readable bytes>

**Values:**

<protocol>

- 1 UDP
- 2 TCP client

<index>

- 1-8 Socket or session identifier

<mode> Mode of operation.

- 1 Continuous Mode

Data mode used by UDP sockets. Data is collected from UART until the [ETX] character is encountered in the data stream, or until the maximum size of the buffer is reached, then sent as a single datagram. If the [ETX] character needs to be transmitted then it must be preceded by the [DLE] character. This mode is only supported by UDP protocol.

- 2 Continuous Transparent Mode

Data mode used by TCP sockets. All data received on UART is treated as data. In this mode, [DLE]/[ETX] characters are considered as normal data and not special characters. This mode is only supported for TCP protocol.

### +WIPDATA

#### Unsolicited

**Response:** The +WIPDATA unsolicited response is output when data is received on a given socket while in Online Command mode. If data is not read using +WIPDATA command, further data will be delayed and +WIPDATA will not be shown.

## TCP/IP Service Option Handling +WIOPT

**Description:** The +WIOPT command is used to read and/or configure different parameters on sockets.

**Syntax:** AT+WIOPT=<protocol>,<idx>,<action>,<optnum>[,<optval>]

Command	Possible Responses
AT+WIOPT=2,1,1,0 <b>Note:</b> Display local port number for connection on TCP socket 1	+WIOPT: 2,0,56228 OK <b>Note:</b> Display is +WIOPT: <protocol>,<optnum>,<result>
AT+WIOPT=2,1,1,2 <b>Note:</b> Display peer IP address of the connection on TCP socket 1	+WIOPT: 2,2,"192.168.13.34" OK
AT+WIOPT=1,2,1,6 <b>Note:</b> Display bytes available to be read on UDP socket 2	+WIOPT: 1,6,23 OK
AT+WIOPT=2,2,2,8,32 <b>Note:</b> Set Time to Live for TCP socket 2 to value of 32	OK
AT+WIOPT?	ERROR

**Values:**

<protocol>

- 1 UDP
- 2 TCP client
- 3 TCP server

<idx>

- 1-8 Socket or session identifier

<action>

- 1 Read (<optval> not allowed)
- 2 Write (<optval> required)

<optnum> Option to read or write (see Options and Values listed next)

<optval> Value of option to write (see Options and Values listed next)

**Options and**

**Values:**

Optnum	Value Format	Description	UDP	TCP Client	TCP Server
0	0-65535	Local port number of the socket	R	R	R
1	0-65535	Port of the peer socket	R	R	-
2	String	Address of the peer socket	R	R	-
3	0-1	Specifies whether the socket is bound to a peer socket or not. See notes below. default: 1	R		-
4	536-36864	Size in bytes of the local transmit buffer. default: 10240	-	RW	RW
5	536-65535	Size in bytes of the local receive buffer. default: 16384	-	RW	RW
6	0-65535	Number of bytes that can currently be read on the socket	R	R	-
7	0-1	When set to TRUE, TCP packets are sent immediately, even if the buffer is not full enough.	-	RW	RW

Optnum	Value Format	Description	UDP	TCP Client	TCP Server
		When set to FALSE, the packets will be sent either, a) by combining several small packets into a bigger packet b) when the data is ready to send and the stack is idle. default: 0			
8	0-255	Time-to-live for IP packets default: 64	RW	RW	RW
9	0-255	Type of Service default: 0	RW	RW	RW

**Notes:**

The +WIPOPT command will return ERROR if the socket is not active.

Option 3 is used to check whether an UDP socket is bound to any other UDP socket or not. When the UDP socket is created without specifying the IP address of the peer, then option 3 will be read as 0 ( FALSE). This is because there is no destination IP address to communicate with. If the UDP socket is created by specifying the peer IP address, the option will be read as 1 (TRUE). This is because the peer IP address will be resolved by the DNS and the socket is said to be bounded to the peer socket. Hence this option will be read as TRUE.

## Closing a Service +WIPCLOSE

**Description:** The +WIPCLOSE command is used to close a socket session. AT+WIPCLOSE closes the local socket at which point the index can be re-used. When AT+WIPCLOSE is used to close a TCP socket, a TCP FIN is sent to the peer socket notifying the peer the local socket has closed.

When a TCP socket session is closed by its peer, an unsolicited event is generated (+WIPPEERCLOSE). However, the local socket must still be closed using AT+WIPCLOSE.

**Syntax:** AT+WIPCLOSE=<protocol>,<index> Command Possible responses

Command	Possible Responses
AT+WIPCLOSE=<protocol>,<index>	OK
AT+WIPCLOSE=?	OK
AT+WIPCLOSE?	AT+WIPDATA=<protocol>,<index>

**Values:**

<protocol>

- 1 UDP
- 2 TCP client
- 3 TCP server

<index>

- 1-8 Socket or session identifier

## Close Service Status +WIPPEERCLOSE

**Description:** This unsolicited response indicates the local socket was closed by the peer. This response will only be output for connected TCP sockets.

**Response****Syntax:** AT+WIPPEERCLOSE=<protocol>,<index>

Possible Responses
+WIPPEERCLOSE: 2,3
<b>Note:</b> TCP socket index 3 is closed

**Response****Values:** <protocol>**2** TCP Client

&lt;index&gt;

**1-8** Socket or session identifier

## Enable Relay Mode for SIP Dial-Up +WRLY

**Description:** The +WRLY command is used to enable user-provided userid/password from Dial-Up client for SIP data call in relay mode. This mainly applies to RUIM variants. For this command to work, value of AT\$QCMIP? should be 0 (SIP call only), AT+CRM? should be 1 (relay mode)

**Syntax:** AT+WRLY=<setting>

Command	Possible Responses
AT+WRLY=1 <b>Note:</b> Enable	OK
AT+WRLY=0 <b>Note:</b> Disable	OK
AT+WRLY? <b>Note:</b> Query current setting	+WRLY: 0 OK
AT+WRLY=? <b>Note:</b> Query available settings	+WRLY: (0-1) OK

**Value:** <setting>**0** Disable**1** Enable

# Chapter 18 – Sleep Commands (Not for UIP)

## 32kHz Sleep Mode +W32K

**Description:** This specific command allows the 32kHz sleep mode to be enabled or disabled. When sleep mode is entered, the product uses a 32kHz internal clock during inactivity stages.

**Syntax:** AT+W32K=<mode>

Command	Possible Responses
AT+W32K=<mode>[,<DTR Used>]	OK
AT+W32K? <b>Note:</b> Query current setting	+W32K: 1,0 OK
AT+W32K=? <b>Note:</b> Query available settings	+W32K: (0-1),(0-1) OK

**Values:**

<mode>

- 0** Disable 32kHz sleep mode
- 1** Enable 32kHz sleep mode

<DTR Used>

- 0** DTR cannot be used to wake up the modem
- 1** DTR can be used to wake up the modem. DTR high wakes up the modem. DTR low puts the modem to sleep.

**Notes:**

The modem will not go to sleep if any of the following conditions are true:

- The modem is not registered to the network. If it has stopped searching for a network due to a UOOS timeout, the modem will go to sleep.
- The modem is in the middle of an NV Backup.
- DTR is asserted, and it has been enabled as a sleep control (AT+W32K=1,1).
- The modem is in a call state other than idle.
- Deep Sleep mode is disabled; i.e., AT+W32K=1 has not been issued.
- The modem can take up to a minute to enter sleep after the +W32K command is issued. This can occur when it is in the middle of GPS processing such as GPS demodulation.

The modem will wake up from sleep when any of the following conditions are true.

- An incoming call can wakeup the modem from deep sleep. Once the call hangs up, the modem will go back to deep sleep.
- The UART is connected and the DTR pin is asserted (if AT+W32K=1,1 was issued).
- In deep sleep, unsolicited messages are not buffered and will be discarded. If real-time notifications of events are needed, the Ring Indicator can be used. After the modem wakes up, new unsolicited messages will be received.

## Query Scan Sleep State +WSPS

**Description:** This specific command queries the state of the service scan. It returns the same data as the +WSPS unsolicited message.

**Syntax:** AT+WSPS: <state>

Command	Possible Responses
AT+WSPS	+WSPS: 0 OK

**Values:** <state>

- 0** Not in power-saving state
- 1** In power-saving state

## Close Service Status Unsolicited Response +WSPS

**Description:** This unsolicited response indicates the a change in the power save status as it pertaining to scanning for service

**Response**

**Syntax:** +WSPS: <state>

Possible Responses
+WSPS: 0

**Response**

**Values:** <state>

- Leaving power-saving state
- Entering power-saving state

## Set CDMA Network Time Format +WNETTIMEFMT

**Description:** This command sets the CDMA time response output format for the WNETTIMEGET command. This setting is not persistent.

**Syntax:** AT+WNETTIMEFMT=[<val1>]

Command	Possible Responses
AT+WNETTIMEFMT	OK <b>Note:</b> Set default value of 0
AT+WNETTIMEFMT=1	OK
AT+WNETTIMEFMT?	+WNETTIMEFMT: 0 OK
AT+WNETTIMEFMT=?	+WNETTIME: (0-2) OK

**Values:** <val1>

- 0** Terse mode, only GMTtime is returned (Default)
- 1** Verbose mode, GMTtime, LeapSeconds, TimeZone, and Daylight Savings are returned
- 2** Julian time format, for example: <hhmmss>,<yymmdd>,<dw>

## Read CDMA Network Time +WNETTIMEGET

**Description:** This command returns the time as defined in the CDMA network. For time to be returned, the modem must have CDMA service. Time will be returned in seconds from 1/6/80.

If CDMA service is not present, GMTTime format returns 16 zeros and Julian time returns ERROR.

The use of CDMA time when handling E911 location data is strongly discouraged since the CDMA time does not reflect the time the GPS data was retrieved. Furthermore, GPS time and CDMA time are not exactly the same time constants.

According to IS95A, section 7.7.1.3, local time is calculated by GMTtime – LeapSec + TimeZone.

**Note:** Daylight savings time is available, but it is already factored into TimeZone and, therefore, should not be used in the calculation.

The format of the command response output is defined by the AT+WNETTIMEFMT command setting.

**Syntax:** +WNETTIMEGET?

Command	Possible Responses
AT+WNETTIMEGET? <b>Note:</b> response when WNETTIMEFMT = 0	+WNETTIME: <GMTTime> OK
AT+WNETTIMEGET? <b>Note:</b> response when WNETTIMEFMT = 1	+WNETTIME: <GMTTime>,<LeapSecs>,<TimeZone>,<Daylight Savings> OK
AT+WNETTIMEGET? <b>Note:</b> response when WNETTIMEFMT = 2	+WNETTIME: <hhmmss>,<yymmdd>,<dw> OK

### Response Field

**Description:**

Parameter	Description
<GMTtime>	Time at GMT. Hex value in seconds from 1/6/80. The format is a 16 digit hex number, preceded with zeros, for example: 0000000035f27ec5.
<TimeZone>	Time zone offset from GMT. Signed decimal value in seconds.
<LeapSecs>	Leap seconds since 1/1/80 in decimal.
<Daylight Savings>	Daylight saving indicator, 0 = no, 1 = yes
<hhmmss>	Time in hours(0-23), minutes(0-59), seconds(0-59).
<yymmdd>	Date in years(0-99), month(1-12), day(1-31).
<dw>	Monday(0) through Sunday(6).



# Chapter 19 – Host Application Scenarios

## Introduction

This chapter described how to use many of the features supported by CDMA C1 devices. Earlier chapters focused on AT command syntax and function. This chapter focuses on using the commands and how they relate to each other.

Each scenario lists the AT commands that are used in the examples. You should be familiar with the command descriptions before studying examples. The user scenarios are a supplement to the AT command references and do not include all necessary details.

**Note:** Whether or not the unsolicited responses indicated in these scenarios appear on your device depends on the setting of the +WUSLMSK mask.

## Set Up for Serial Communication

The device's UART1 is configured as an EIA232 DCE device. Refer to the device Specifications sections in the Developer Guide or the User Guides for more information about the UART1 configuration and pin-out.

At a minimum, the serial connection between the host processor and the CDMA-C1 device must include the Rx/D, Tx/D and GND signals. However, We recommend that hardware flow control be used whenever possible since it provides the best protection against serial port data overruns that could disrupt host-to-device communications. Hardware flow control requires at a minimum that the signal lines RTS (RFR) and CTS are connected as well.

The additional modem control lines RI, DTR, DSR and DCD are used by the device for advanced features like data signaling, device ready indication, wakeup and online data mode. Even if you do not currently plan to use these features, We recommend that you connect these signal lines between the host processor and the CDMA- C1 device to provide for future enhancements.

If you are using the Development Kit and your host processor or PC is configured as DTE, be sure that your serial cable is a straight-through modem cable or DTE-DCE cable.

The UART1 default serial port settings are 115,200 bps, 8 bits, no parity, 1 stop bit and hardware flow control enabled. These settings work well for many host applications. If you need to change UART1 settings, please refer to the commands in the Communication Commands section. You can return the settings to their defaults by using the AT&F command.

The remainder of the examples in this section assume that the CDMA-C1 device has been configured for 115200,n,8,1 and hardware flow control.

## Acquiring Cellular Service

If your device has not been activated, refer to the Account Activation topic in the Developer Guide or User Guide. Activation information is also online at [www.multitech.com/activation.go](http://www.multitech.com/activation.go).

# Call Processing

## Call Origination

Use the ATD command to originate calls.

## Answer Incoming Call

To answer incoming calls either use the ATA command or set the Automatic Answer S0 register value to a non-zero value.

## Hang Up Call

To terminate calls either use the ATH command or negate the modem signal DTR on UART1. See the AT&D command for more information.

## Subscriber Calling Features

Subscriber Calling Features provides voice call services beyond making a single call. The services are implemented to a large extent on the network side and can vary among different operators. The examples below are for the service provider Verizon, but should apply for most operators.

The services supported by the CDMA-C1 device are:

- Calling Line ID
- Call Forwarding
- Call Waiting
- Three-way calling

See *Call Commands* for more information about voice call services.

### Calling Line ID

The caller's ID, if presented to the network during an incoming call, is reported as a +CLIP unsolicited message if the AT+CLIP=1 command is issued. For example:

```
AT+CLIP =1
OK
RING
+CLIP: "9195551212",129
```

### Call Forwarding

Your application can unconditionally forward or cancel forwarding of all incoming calls by using the AT+CCFC command.

### Call Waiting

The device will report an incoming call while a call is active by using the +CCWA unsolicited response.

### Three-Way Calling

Use AT+WFSH command to initiate and manage three-way calling.

# SMS

## Mobile Originated (MO) Messages

Use the AT+CMGS command to originate SMS messages. You can send up to 140 characters in a text message. Note that ctrl-Z terminates the message text entry. Refer to *SMS Control Commands* for more information.

Example:

```
AT+CMGS="9195551212"
> hi, there.<ctrl-Z>
+CMGS: 150
OK
+WORG:
+WCNT: 6
+WEND: 29
```

We recommend that you enable ASCII mode for text messages using the AT+WSCL command.

## Sending Binary Data

Send binary data as short messages using AT+CMGS. Since the usual text entry terminator, ctrl-Z, might be legitimate data, define the message length in bytes in the AT+CMGS command. At the text entry prompt, enter the message length bytes. The message is sent when the number of bytes equal to the message length has been entered.

Example:

```
AT+CMGS="9195551212",10
> hi, there.
+CMGS: 151
OK
+WORG:
+WCNT: 6
+WEND: 29
```

We recommend that you enable octet mode for binary messages using the AT+WSCL command.

## Sending Text to Email Address

Many carriers support SMS-to-email gateways, which allows you to send short messages to an e-mail address.

To send a message to an email address, enter 6245 (this spells mail) in the Address field, enter the recipient's email address in the beginning of the message field, followed by a space and then the text of the message.

**Note:** 6245 – SMS gateway number for most carriers.

Send up to 140 characters in a text message. This count includes recipient's email address, space and the message to be sent.

Example:

```
AT+CMGS="6245"
>someone@example.com hi, there.<ctrl-Z>
+CMGS: 150
OK
+WORG:
```

```
+WCNT: 6
+WEND: 29
```

## Mobile Terminated (MT) Messages

The device uses the +CMT unsolicited response to report receipt of messages. The +CNMI command determines the content of the +CMT unsolicited response and the disposition of the received short. The message can be transmitted to the TE or can be stored in NVRAM on the device.

Example, to transmit a received message to the TE:

```
AT+CNMI=2,2,2,1,0
OK
+WANS: 3
+WCNT: 6
+CMT: "9195551212","09/07/20,13:43:55",129,0,2,0,,10
hi there.
+WEND: 25
```

## Temporarily Store SMS Messages

If short messages are stored to non-volatile memory on the module, the +CMTI unsolicited response reports the receipt and storage of the message. The +CMGL, +CMGR and +CMGD commands can be used to list, read and delete the stored messages.

Example:

```
AT+CNMI=2,1,2,1,0
OK
+WANS: 3
+WCNT: 6
+CMTI: "MT",0,0
+WEND: 25
AT+CMGL
+CMGL: 0,"REC UNREAD","9195551212",0,2,9
hi there.
OK
AT+CMGR=0
+CMGR: "REC UNREAD","9195551212","09/07/20,13:49:17",0,2,0,9
hi there.
OK
at+cmgd=0
OK
```

## TCP Socket Examples

The modem provides a comprehensive set of AT commands that allow the application to use TCP/IP for data communications with a remote application. UART1 is time-multiplexed between on-line command mode and

on-line data mode, allowing the single serial channel to carry both AT commands and application data. The device allows both TCP and UDP connections.

## TCP Client Socket Connection

Example, establishes a TCP connection with a remote echo server application.

```

AT+WIPBR=4,6 // open PPP bearer
OK
+WORG: #777
+WCNT: 33
+WIPBR: 6,1
+WEND: 25
AT+WIPCREATE=2,1,"1.2.3.4",5009 // open TCP connection 1
OK
+WORG: #777
+WCNT: 33
+WIPREADY: 2,1 // connection 1 is open
+WIPDATA: 2,1,35 // data available on connection 1
+WEND: 25
AT+WIPDATA=2,1,2 // enter on-line data mode on connection 1
CONNECT
Welcome to echo server, port 5009
// +++ entered to escape on-line data mode
OK
AT+WIPCLOSE=2,1 // close connection 1
OK
+WORG: #777
+WCNT: 33
+WEND: 25
AT+WIPBR=5,6 // close PPP bearer
OK
+WORG: #777
+WCNT: 33
+WIPBR: 6,0
+WEND: 29

```

## TCP Server Example

The device can also act as a server and wait for incoming connections. In this example, a listening socket is opened. When a connection is established from a client, the module receives an unsolicited response. When the client sends data, another unsolicited response is received. The application switches the module to on-line data mode to read the received data. The client closes the connection and the module receives another unsolicited response.

Example:

```
AT+WIPBR=4,6 // open PPP bearer
OK
+WORG: #777
+WCNT: 33
+WIPBR: 6,1
+WEND: 25
AT+WIPBR=3,6,15 // find our IP address
+WIPBR: 6,15,"75.251.5.204"
OK
AT+WIPCREATE=3,1,80,5,8 // create TCP listen socket on port 80 as connection 1
OK
+WANS: 2
+WCNT: 33
+WIPACCEPT: 1,5 // incoming connection request. Connection 5 active.
+WEND: 29
+WANS: 2
+WCNT: 33
+WIPDATA: 2,5,8 // 8 bytes available on TCP connection 5.
+WEND: 29
AT+WIPDATA=2,5,2 // enter on-line data mode on connection 5
CONNECT
hi there // received data
NO CARRIER
+WANS: 2
+WCNT: 33
+WEND: 29
+WIPPEERCLOSE: 2,5 // peer closed connection 5
+WANS: 2
+WCNT: 33
+WEND: 29
AT+WIPCLOSE=3,1 // close listening socket
OK
AT+WIPBR=5,6 // close PPP bearer
OK
+WORG: #777
+WCNT: 33
+WIPBR: 6,0
+WEND: 29
```

## Chapter 20 – Effects of AT&W, ATZ, and AT&F

The below table shows what impact AT&W, ATZ, and AT&F has on the various commands.

- **AT&W – Save Configuration.** This command writes the current configuration to NV.
- **ATZ – Reset to Default Configuration.** This command restores the configuration last saved by AT&W.
- **AT&F – Restore Factory Settings.** This command restores the factory default setting.

Command Name	Saved Directly to NV	Saved to NV with &W	Affected by Z	Affected by &F	Listed by &V
\$QCMIP	No	No	Yes (Set to 0)	Yes (Set to 0)	No
\$QCMIPPEP	No	No	Yes (Set to 0)	Yes (Set to 0)	No
\$QCMIPGETP	No	No	Yes (Set to 0)	Yes (Set to 0)	No
\$QCMIPNAI	No	No	No	No	No
\$QCMIPP	No	No	Yes (Set to 0)	Yes (Set to 0)	No
\$QCQNC	No	No	Yes (Set to 1)	Yes (Set to 1)	No
\$QCSO	No	No	Yes (Set to 2)	Yes (Set to 2)	No
\$WEMER	No	No	No	No	No
&C	No	Yes	Yes (Set to NV)	Yes (Set to 2)	Yes
&D	No	Yes	Yes (Set to NV)	Yes (Set to 2)	Yes
&F	No	No	No	No	Yes
&S	No	Yes	Yes (Set to NV)	Yes (Set to 0)	Yes
&V	No	No	No	No	No
&W	No	No	No	No	No
+CCFC	No	No	No	No	No
+CFUN	No	No	No	No	Yes
+CGMR	No	No	No	No	No
+CGSN	No	No	No	No	No
+CLCC	No	No	No	No	No
+CLIP	No	Yes	Yes (Set to NV)	Yes (Set to 0)	Yes
+CLVL	No	No	No	No	No
+CMEE	No	No	No	No	Yes
+CMGD	No	No	No	No	No
+CMGL	No	No	No	No	No
+CMGR	No	No	No	No	No
+CMGS	No	No	No	No	No
+CNMI	Yes	Yes	Yes (Set to NV)	Yes (Set to 2,1,2,1,0)	Yes
+CNUM	No	No	No	No	No
+CPAS	No	No	No	No	No
+CPHS	Yes	Yes	Yes (Set to NV)	Yes (Set to 1,1)	Yes
+CPMS	No	No	Yes (Set to MT)	Yes (Set to MT)	Yes
+CRC	No	No	Yes (Set to 0)	Yes (Set to 0)	Yes
+CREG	No	Yes	Yes (Set to NV)	Yes (Set to 0)	Yes
+CRM	No	No	Yes (Set to 2)	Yes (Set to 2)	Yes
+CSQ	No	No	No	No	No
+CSS	No	No	No	No	No

Command Name	Saved Directly to NV	Saved to NV with &W	Affected by Z	Affected by &F	Listed by &V
+DR	No	No	Yes (Set to 0)	Yes (Set to 0)	Yes
+DS	No	No	Yes (Set to 0,0,2048,6)	Yes (Set to 0,0,2048,6)	Yes
+ECHO	Yes	No	No	No	No
+GCAP	No	No	No	No	No
+IFC	No	Yes	Yes (Set to NV)	Yes (Set to 2,2)	Yes
+IPR	Yes	No	No	No	Yes
+MGE	Yes	No	No	No	No
+SIDET	Yes	No	No	No	No
+SPEAKER	Yes	No	No	No	No
+VGR	Yes	No	No	No	No
+VGT	Yes	No	No	No	No
+VIP	Yes	No	No	No	No
+VTS	No	No	No	No	Yes
+W32K	No	No	Yes (Set to 0,0)	Yes (Set to 0,0)	Yes
+WAKY	No	No	No	No	No
+WANT	Yes	Yes	Yes (Set to NV)	Yes (Set to 0)	Yes
+WBND	Yes	No	No	No	Yes
+WCHD	No	No	No	No	No
+WCMT	Yes	No	No	No	No
+WDSI	Yes	Yes	Yes (Set to NV)	Yes (Set to 0)	Yes
+WDSS	Yes	No	No	No	No
+WFSH	No	No	No	No	No
+WHWV	No	No	No	No	No
+WIMI	No	No (+WCMT)	No	No	No
+WIND	Yes	Yes	Yes (Set to NV)	Yes (Set to 196)	Yes
+WIPBR	No	No	No	No	No
+WIPCFG	No	No	No	No	No
+WIPCLOSE	No	No	No	No	No
+WIPCREATE	No	No	No	No	No
+WIPDATA	No	No	No	No	No
+WIPOPT	No	No	No	No	No
+WMDN	No	No	No	No	No
+WMSN	No	No	No	No	No
+WNAM	Yes	No	No	No	No
+WNETTIMEFMT	No	No	Yes (Set to 0)	Yes (Set to 0)	Yes
+WNETTIMEGET	No	No	No	No	No
+WPCC	Yes	No	No	No	No
+WGPSPARAM	Yes	No	No	No	Yes
+WPDR	No	No (+WCMT)	No	No	No
+WPDUC	No	No	No	No	Yes
+WGSPFIX	No	No	No	No	No
+WPRL	No	No	No	No	No
+WPRV	Yes	Yes	Yes (Set to NV)	Yes (Set to 1)	Yes
+WRID	Yes	Yes	Yes (Set to NV)	Yes (Set to 50)	Yes
+WRMP	Yes	No	No	No	Yes
+WSCC	Yes	No	No	No	No



Command Name	Saved Directly to NV	Saved to NV with &W	Affected by Z	Affected by &F	Listed by &V
+WSCL	Yes	Yes	Yes (Set to NV)	Yes (Set to 0,0)	Yes
+WSID	No	No (+WCMT)	No	No	No
+WSPS	No	No	No	No	No
+WSOS	No	No	No	No	No
+WSPC	Yes	No	No	No	No
+WTBMPRS	Yes	Yes	Yes (Set to NV)	Yes (Set to 3)	Yes
+WUSLMSK	Yes	Yes	Yes (Set to NV)	Yes (Set to FFFDFF6,0)	Yes
+WWAKE	No	No	No	No	No
A	No	No	No	No	No
D	No	No	No	No	No
E	No	No	Yes (Set to 1)	Yes (Set to 1)	Yes
H	No	No	No	No	No
I	No	No	No	No	No
L	No	No	Yes (Set to 0)	Yes (Set to 0)	Yes
M	No	No	Yes (Set to 0)	Yes (Set to 0)	Yes
S0	No	No	Yes (Set to 0)	Yes (Set to 0)	Yes
S10	No	No	Yes (Set to 14)	Yes (Set to 14)	Yes
S11	No	No	Yes (Set to 95)	Yes (Set to 95)	Yes
S3	No	No	Yes (Set to 13)	Yes (Set to 13)	Yes
S4	No	No	Yes (Set to 10)	Yes (Set to 10)	Yes
S5	No	No	Yes (Set to 8)	Yes (Set to 8)	Yes
S6	No	No	Yes (Set to 2)	Yes (Set to 2)	Yes
S7	No	No	Yes (Set to 50)	Yes (Set to 50)	Yes
S8	No	No	Yes (Set to 2)	Yes (Set to 2)	Yes
S9	No	No	Yes (Set to 6)	Yes (Set to 6)	Yes
T	No	No	No	No	No
Z	No	No	No	No	Yes

## Chapter 21 – CDMA Terminology and Acronyms

This is an alphabetical list of the CDMA cellular industry's terminology and acronyms.

<b>2G</b>	<b>Second Generation.</b> This is an all digital cellular systems developed to replace the first analog cellular systems. (GSM and CDMA).
<b>3G</b>	<b>Third Generation.</b> This is the next generation digital cellular systems designed to have high-speed data access and higher voice capacity (WCDMA & CDMA2000).
<b>AFLT</b>	<b>Advanced Forward Link Trilateration.</b> A type of handset-based position location technology. GPS satellites are not used to determine location. To determine location using AFLT, the phone takes measurements of signals from nearby cellular base stations (towers) and reports the time/distance readings back to the network, which are then used to triangulate an approximate location of the handset. In general, at least three surrounding base stations are required to get an optimal position fix.
<b>CDMA</b>	<b>CDMA (Code Division Multiple Access).</b> CDMA is a spread spectrum, digital cellular modulation scheme for cellular communications systems. It has approximately 3 times the voice capacity of GSM networks. See IS-95, IS95A, IS-95B, IS-2000.
<b>cdmaONE</b>	A brand name, trademarked and reserved for the exclusive use of the CDMA Development Group (see their Web site at <a href="http://cdg.org">cdg.org</a> ). cdmaOne describes a complete cellular system that incorporates the IS-95 CDMA air interface, the ANSI-41 network standard for switch interconnection and many other standards that make up a complete cellular system.
<b>cdma2000</b>	<b>cdma2000</b> is a third generation (3G) cellular system. It contains a significant increase in voice capacity and high-speed data rates. It is backward compatible with IS-95B and IS-95A.
<b>cdma2000 1xRTT</b>	<b>"1xRTT"</b> stands for 1 times Radio Transmission Technology and is used to identify the version of CDMA2000 radio technology that operates in a pair of 1.25-MHz radio channels (one times 1.25 MHz, as opposed to three times 1.25 MHz in 3xRTT). Although theoretically capable of higher data rates, most carrier implementations have limited the peak data rate to 144 kbit/s. While 1xRTT officially qualifies as 3G technology, 1xRTT is considered by some to be a 2.5G.
<b>DCE</b>	<b>Data Communications Equipment.</b> This is the modem in the traditional serial communication paradigm of a computer connected via two modems to another computer.
<b>DTE</b>	<b>Data Terminal Equipment.</b> This is the computer in the traditional serial communication paradigm of a computer connected via two modems to another computer.
<b>DTMF</b>	<b>Dual Tone Multi-Frequency:</b> A pre-defined set of tones sent over the air when keys are pressed on the keypad.
<b>ESN</b>	<b>"ESN" stands for Electronic Serial Number.</b> It is a 32-bit binary number that identifies each cellular phone.
<b>Handset (Path)</b>	<b>Handset (Path).</b> This is the audio path (microphone & speaker) that connects to a traditional hand held telephone receiver, usually dual balanced electrical lines.
<b>Headset (Path)</b>	<b>Headset (Path).</b> This is the audio path (microphone & speaker) that connects to an earpiece with a microphone, usually single electrical lines.
<b>IMSI</b>	<b>International Mobile Station IS.</b> This is an international 15 digit phone number that uniquely identifies a mobile. IMSI=MCC + MNC + MIN.
<b>IOTA</b>	<b>IOTA</b> stands for Internet Over The Air.

<b>IS-95</b>	IS-95 is the first CDMA standard published by Qualcomm in 1993. It is a TIA standard for North American cellular systems based on CDMA. It is widely deployed in North America and Asia.
<b>IS-95A</b>	IS-95A is a CDMA standard with improved voice quality. IS-95A defines what generally is known as cdmaOne, which supports voice and 14.4 Kbps data rates. This standard is widely used throughout the world.
<b>IS-95B</b>	CDMA standard contains Medium Data Rate capabilities and bug fixes for system access failures. It is considered a 2.5G system. It supports data rates up to 115 Kbps.
<b>IS-2000</b>	The first 3G CDMA standard based on IS-95B. It contains a significant increase in voice capacity and high-speed data rates. It is backward compatible with IS-95B and IS-95A.
<b>IS-707</b>	<b>TIA/EIA/IS-707</b> describes data services available on wideband spread spectrum systems. It is organized into a series of related recommendations, some of which address functions common to all CDMA data services and others that describe a specific data service.
<b>IWF</b>	<b>Interworking Function.</b> A process that acts as a gateway or interface between two or more communication components. For example, an IWF is used to interface wireless CDMA networks and wire line PSTN or packet-data networks.
<b>LAPM</b>	<b>Link Access Procedure for Modems.</b> An error control protocol defined in the ITU-T recommendations V.42. Like the MNP protocols, LAPM uses cyclic redundancy checking (CRC) and retransmission of corrupted data (ARQ) to ensure data reliability.
<b>MCC</b>	<b>Mobile Country Code</b> is a pre-defined 3-digit number that represents a country in the IMSI.
<b>MDN</b>	<b>MDN</b> stands for the 10 digit Mobile Data Number or the mobile phone number.
<b>MIN</b>	<b>MIN</b> stands for the 10 digit Mobile Identification Number or mobile user account number. The first three digits also known as MIN2. Last seven digits also known as MIN1
<b>MNC</b>	<b>MNC</b> stands for Mobile Network Code, a pre-defined 2-digital number that represents a sub-network in the IMSI (usually set to "00").
<b>MO</b>	<b>Mobile Originated</b> , an action (usually a call) that is first started from the phone. An outgoing call or SMS.
<b>MS</b>	<b>Mobile Station.</b> The term MS is commonly used to represent the phone or mobile.
<b>MT</b>	<b>MT</b> stands for Mobile Terminated. MT is an action, usually a call that is first started from a land based network. An incoming call or SMS.
<b>MSM</b>	<b>MSM</b> stands for Mobile Station Modem.
<b>NAM</b>	<b>NAM</b> stands for Number Assignment Modem. The NAM is collection of internal parameters that define a working phone for a given network (phone number, access parameters, etc.).
<b>NID</b>	<b>NID</b> stands for Network ID. The NID is an identification number that represents geographic location of a common coverage area; but is a subset of the SID, usually a neighborhood in a large city. Also see SID.
<b>NVRAM</b>	<b>NVRAM</b> stands for Non-Volatile Random Access Memory. NVRAM is a data storage device that does not lose its data when power is turned off.
<b>OTAPA</b>	<b>Over The Air Parameter Administration.</b> It is an automatic update in internal software parameters (PRL for example) by means of a specially defined CDMA data call that is mobile terminated (MT).
<b>OTASP</b>	<b>Over The Air Service Programming.</b> It is an automatic update in internal software parameters PRL; for example, PRL by means of a specially defined CDMA data call that is mobile terminated (MT).
<b>OTKSL</b>	<b>One-Time Keypad Subsidy Lock.</b>
<b>PD</b>	<b>Position Determination.</b> Process by which the mobile GPS position is obtained.

<b>PDU</b>	<b>Protocol Data Unit.</b> It is a GSM SMS standard whereby any type of binary data can be transported via an SMS message. In the CDMA system, the PDU mode will not be supported; instead, the Unicode format message is supported.
<b>PN Offset</b>	<b>Pseudorandom Noise Offset.</b> In a CDMA network the PN offset is a variable time delay offset of a repeating random noise generator that is used to distinguish individual sectors of a base station.
<b>P-REV</b>	The CDMA revision of the mobile or base station.
<b>PRI</b>	<b>Provisioning Information.</b> Provisioning Information is your cellular network carrier's profile of information that must be programmed into your cellular modem in order for it to operate on the carrier's cellular network.
<b>PRL</b>	<b>Preferred Roaming List.</b> The Roaming List is provided by the cellular network carrier during the process of provisioning your SocketModem. The PRL is a list of cellular service provider's preferred roaming partners.
<b>PSTN</b>	<b>Public Switching Telephone Network.</b> It is the traditional telephone network.
<b>RF</b>	<b>Radio Frequency.</b>
<b>RSSI</b>	<b>Receive Signal Strength Indicator.</b> This parameter represents the total RF received signal power from the base station(s) the mobile sees.
<b>R-UIM</b>	<b>Removable User Identity SocketModem.</b> The R-UIM is similar to a SIM (Subscriber Identity SocketModem), but it is designed for networks other than GSM (Global System for Mobile Telecommunications); i.e., networks such as CDMA.  The R-UIM card contains user information and data features on a removable smart card about the size of a postage stamp. It is a dual-mode solution that can store both GSM provisioning and CDMA provisioning on a single card. When used with a GSM handset, the R-UIM operates like a GSM SIM.
<b>SID</b>	<b>System ID.</b> The SID is an identification number that represents geographic locations of a common coverage area, usually a large city. Also see NID.
<b>SIM</b>	<b>Subscriber Identity SocketModem.</b> A SIM card is a portable memory chip. The SIM holds personal identity information, cell phone number, phone book, text messages and other data.
<b>SMS</b>	<b>Short Messaging Service.</b> A supplementary service capable of sending and receiving short length text messages to/from the mobile.
<b>SREJ</b>	<b>Selective Reject.</b> An optional feature of V.42 which enhances data throughput on noisy connections. As data blocks are sent out, the remote side acknowledges only after an agreed upon number of blocks are received (window size). If any block is received bad, the sender is notified of the rejected bad block so it can be retransmitted.
<b>TA/TE</b>	<b>Terminal Application/Terminal Equipment.</b> This is the end "device" (combination of hardware and software) that communicates with a modem via a serial link. In this context, it is the device (PDA/Computer) connected to the modem. Also see DTE.
<b>TON/NPI</b>	<b>Type of Number/Numbering Plan Identification.</b>
<b>V24-V25</b>	A data compression algorithm.
<b>V42</b>	A data compression algorithm.

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