User Manual

Version 1.0

Contents

Notice

OEM integrators and installers are instructed that the phrase. This device contains transmitter FCC ID: T42ICM-E600 must be placed on the outside of the host.

	Warning: Exposure to Radio Frequency Radiation The radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna should not be less than 20cm during normal operation. The gain of the antenna for Cellular band must not exceed 4.510 dBi.

1. Introduction

1.1. Scope of this document

This document describes the AT command set supported by the CDMA2000 1xEVDO Modem products of INNOMTEK.

1.2. Conventions

Throughout the document, “Mobile Station” (MS) or “Mobile Equipment” (ME) is used to designate mobile terminals, and the controlling device at the other end of the serial interface is referred to as “Terminal Equipment” (TE).

1.2.1. AT command syntax

The “AT” or “at” prefix must be set at the beginning of each command line. To terminate a command line enter <CR>. Commands are usually followed by a response that includes “<CR><LF><response><CR><LF>”.

Types of AT commands are as follows.

Type	Appearance	Description
Test command	AT$CXXX=?	The mobile equipment returns the list of parameters and value ranges set with the corresponding Write command or by internal processes.
Read command	AT$CXXX?	This command returns the currently set value of the parameter or parameters.
Write command	AT$CXXX=<…>	This command sets user-definable parameter values.
Execution command	AT$CXXX	The execution command reads non-variable parameters affected by internal processes.

1.2.2. Unsolicited Result Codes (URC)

A URC is a report message sent from the ME to the TE. An unsolicited result code is delivered automatically when an event occurs. Typical URCs may be information regarding received SMS, level change of RSSI etc.

1.3. References

[1]. AT Commands for DMSS Application Note, CL93-V0327-1 Rev. C, QUALCOMM Inc.

[2]. ITU-T RECOMMENDATION V.25 *ter.* serial asynchronous automatic dialing and control

2. INNOMTEK AT Command Set

+ The INNOMTEK defined AT commands use a prefix '$'. The conventions of INNOMTEK defined AT command are as follows.

Symbol	Description
,	Used as a delimiter
[ ]	Used to indicate that the enclosed items are optional
…	Used to indicate omission
|	Used to list possible values. Actually, only one value is valid among them.
< >	Used to enclose the names of other syntactical elements. When those elements appear in an actual command line, the actual element is used and the angle brackets are omitted.

+ Types of NNOMTEK AT commands are as follows.

Command 종류	AT Command	Possible Response
Read	AT$CMD?	$CMD:<curr_val> OK or ERROR
Write	AT$CMD=<arg>	OK or ERROR
Execution	AT$CMD	OK or ERROR

2.1. AT command for CDMA module information and configuration

AT Command	Description
AT$GMINFO?	Request manufacturer information. Response $GMINFO:<manufacturer>,<model>,<sw_ver> OK or ERROR <manufacturer> – INNOMTEK <model> – UM1A <sw_ver> – S/W VER: software version
AT$STSINFO?	Request CDMA module information Response $STSINFO:<chan>,<sid>,<nid>,<callstate>,<rssi>,<ec/io>,<txadj>,<rxvocrate>,<txvocrate>,<p_rev>,<sci>,<slotmode>,<txpwr>,<pn0>,<pn1>,<pn2>,<bid>,<so>,<chcnt>,<ch0>,<ch1>,<ch2>, OK or ERROR <chan> – CDMA FA Channel Number <sid> – System ID <nid> – Network ID <callstate> – CDMA Call State 0 : Enter State, 1 : Init State 2 : Idle State, 3 : System Access State 4 : Traffic State, 5 : Exit State <rssi> – Received Signal Strength Indicator 32 (Strongest Signal) ~ 125 (Weakest Signal) 128 (No Service) <ec/io> – Signal to Noise Ratio, Ec/Io (0 ~ -31.5 dB)

	<txadj> – Closed Loop Power Control Adjustment Value (–63 ~ 64 dB) <rxvocrate> – RX Vocoder Rate 0 : BLANK rate, 1 : 1/8 rate 2 : 1/4 rate, 3 : HALF rate, 4 : FULL rate, 5 : ERASURE, 6 : ERROR <txvocrate> – TX Vocoder Rate 0 : BLANK rate, 1 : 1/8 rate, 2 : 1/4 rate, 3 : HALF rate, 4 : FULL rate, 5 : DTX rate <p_rev> – Protocol Revision In Use (1 ~ 7) <sci> – Slot Cycle Index (0 ~ 7) <slotmode> – Slot Mode 0 : Except Slotted state, 1 : slotted state <txpwr> – TX Power (–52 ~ 33 dBm) <pn0>,<pn1>,<pn2> – PN Offset pn0 : Active Set pn1, pn2 : Candidate Set <bid> – Base Station ID <so> – Service Option <chcnt> – Channel counts in channel list message (CLM) <ch0>,<ch1>,<ch2> – First 3 channel numbers in CLM
AT$STSINFOA?	Request manufacturer information. (Formatted Version) Response $STSINFOA:CH=<chan>,SID=<sid>,NID=<nid>,CALL=<callstate>,RSSI=<rssi>,ECIO=<ec/io>,TXADJ=<txadj>,RXVOC=<rxvocrate>,TXVOC=<txvocrate>,P_Rev=<p_rev>,SCI=<sci>,SLOTMODE=<slotmode>,TXPWR=<txpwr>,PN0=<pn0>,PN1=<pn1>,PN2=<pn2>,BID=<bid>,SO=<so>,CHCnt=<chcnt>,CH0=<ch0>,CH1=<ch1>,CH2=<ch2> OK or ERROR
AT$HDRSTSINFO?	Request HDR(1xEVDO) module information Response

	$HDRSTSINFO:<rri>,<auth_sts>,<subnetmask>,<prmin>,<prmax>,<ec/io>, <rssi>,<sinr>,<colorcode>,<chno>,<sess>,<pn>,<at_s>,<uati>,<subnetid>, <sn_att>,<txadj>,<txpwr>,<bid>,<sleep>, OK or ERROR <rri> – Reverse Rate Indicator 0 : HDRRMAC_PILOT_ONLY, 1 : HDRRMAC_9K6_BPS(9.6kbps) 2 : HDRRMAC_19K2_BPS, 3 : HDRRMAC_38K4_BPS, 4 : HDRRMAC_76K8_BPS, 5 : HDRRMAC_153K6_BPS <auth_sts> – Athentication Status 0 : Not Authenticated, 1 : Authenticated <subnet mask> – Subnet Mask, Hexadecimal Format (0x~) <prmin>,<prmax> – Protocol Revision MIN, MAX Value, Normal : 244 <ec/io> –HDR Signal to Noise Ratio, Ec/Io Range : -31.5 dB ~ 0 dB <rssi> – HDR Received Signal Strength Indicator <sinr> – Data Activity Indicator : 0 ~ 8 (highest data rate). <colorcode> – Color Code, Hexadecimal Format (0x~) <chno> – Channel Number in Service <sess> – Session State, Decimal Format 0 : HDRPLOG_SESSION_STATE_CLOSE 1 : HDRPLOG_SESSION_STATE_AMP_SETUP 2 : HDRPLOG_SESSION_STATE_AT_INIT 3 : HDRPLOG_SESSION_STATE_AN_INIT 4 : HDRPLOG_SESSION_STATE_OPEN <pn> – PN Offset in Service <at_s> – Access Terminal State, Decimal Format 0 : HDRPLOG_AT_STATE_INACTIVE 1 : HDRPLOG_AT_STATE_ACQ 2 : HDRPLOG_AT_STATE_SYNC 3 : HDRPLOG_AT_STATE_IDLE 4 : HDRPLOG_AT_STATE_ACCESS 5 : HDRPLOG_AT_STATE_CONNECTED <uati> – Access Terminal Identification : Unicast ATI, Hexdecimal Format (0x~) <subnet_id> – Subnet Identification Hexadecimal Format: 0000 0000 0000 0000 <sn_att> – Attempt Counts for HDR Session Negotiation

	<txadj> - HDR Tx Closed Loop Adjust (in dB, Valid only in TX) <txpwr> - HDR Tx Total Power (in dBm, Valid only in TX) <bid> - Base station ID, Hexadecimal Format (0x~) <sleep> - HDR Sleep Mode 0 : Until next 426.7ms SCC 1 : Until assigned 5.12s Control Channel Cycle 2 : Until 8 control channel cycles (40.96s) 255 : Not OK to Sleep
AT$HDRSTSINFOA?	Request HDR(1xEVDO) module information, (Formatted Version) Response $HDRSTSINFOA:RRI=<rri>,AUTHS=<auth_sts>,SUB_M=<subnetmask>,PRMIN=<prmin>,PRMAX=<prmax>,ECIO=<ec/io>,RSSI=<rssi>,SINR=<sinr>,COLC=<colorcode>,CHNO=<chno>,SESS_S=<sess>,PN=<pn>,AT_S=<at_s>,UATI=<uati>,SUBNETID=<subnetid>,SN_ATT=<sn_att>,TXADJ=<txadj>, TXPWR=<txpwr>,BID=<bid>,SLEEP=<sleep>, OK or ERROR
AT$CAD?	Request the service status of CDMA module Response $CAD:<status> OK or ERROR <status> 0 : No Service 1 : CDMA digital service is available 2 : Offline Mode 3 : Reserved, 4 : Reserved, 5 : Authentication failed (maintenance order received, or “$MODR1” URC issued status) 6 : Registration failed

	(lock until reception of the power cycle order, or “$MODR2” URC issued status)
AT$SYSTIME?	Request system time Response %SYSTIME:<systime> OK or ERROR <cystime> - YYYYMMDDHHMMSSDAY Format (e.g. 20060117180023TUE)
AT$CHGDMR=<baud_rate>	Set baud rate of the serial interface Parameter <baud_rate> 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Default Baud Rate : 115200 Response OK or ERROR
AT$CHGDMR?	Request baud rate of the serial interface Response $CHGDMR:<baud_rate> OK or ERROR <baud_rate> 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Default Baud Rate : 115200
AT$SVCLED=<term>	Set the alert period of service LED. If the service is available the LED blinks periodically according to the specified value. The value is stored in a non-volatile memory in the module Parameter <term>

	0 : Off, 1 : 5 seconds, 2 : 10 seconds Response OK or ERROR
AT$SVCLED?	Get the specified alert period of service LED. Response $SVCLED:<term> OK or ERROR <term> 0 : Off, 1 : 5 seconds, 2 : 10 seconds
AT$SLEEPMODE=<0|1>	Set sleep mode Parameter <1> - Sleep <0> - Non-Sleep Response OK or ERROR
AT$SLEEPMODE?	Get sleep mode Response $SLEEPMODE:<0|1> OK or ERROR <1> - Sleep <0> - Non-Sleep
AT$TCALL=<calltype>,<callnumber>	For a test call per specified parameters Parameter <calltype> 0 : TDSO, 1 : 8K loopback, 2 : 13K loopback <callnumber> - calling number

	Response OK or ERROR
AT$RSSILVLURC=<0|1>	Set RSSI level notification. When this notification is enabled the RSSI level URC ("$RSSILVL:<val>") will be notified to TE in case of the change of the RSSI level. Parameter <0> – Disable Notification <1> – Enable Notification Response OK or ERROR
AT$RSSILVLURC?	Get the current configuration of RSSI level notification. Response $RSSILVLURC:<0|1> OK or ERROR
AT$RSSILVL?	Get the current RSSI level of ME. Response $RSSILVL:<rssilvl> OK or ERROR <rssilvl> 0 : No Service, 1(Weakest Signal Level) ~ 7(Strongest Signal Level)
AT$AVAILNET?	Get the current available network information of ME. Response $AVAILNET:<net> OK or

	ERROR <net> 0: No Service 1: IS-95A/B (2G) 2: IS-2000 Release 0 3: Reserved 4: EVDO

2.1.1. Notification Command

URC	Description
$MODR2	If an unregistered ME is being used, system issues lock order. In this case, this URC will be notified to TE. Then, ME goes to locked state.
$MODR1	If authentication failure appears while ME is operating in the authentication enabled network, this URC will be notified to TE.
$OFFLINE	When ME enters into offline mode, this URC will be notified to TE.
$RSSILVL:<rssilvl>	If this notification is enabled (AT$RSSILVLURC=1), the URC will be notified to TE per the change of the RSSI level. Parameter <rssilvl> 0 : No Service, 1(Weakest Signal Level) ~ 7(Strongest Signal Level)
$ROAMIND: <roamind>	Notify the roaming status when roaming indicator changes. Parameter <roamind> 0: Roam Indicator Off 1: Roam Indicator ON 2: Roam Indicator Blinking
$UAVAILNET: <net>	If the available network information changes when idle, this URC will be notified to TE. Parameter <net> 0: No Service 1: IS-95A/B (2G) 2: IS-2000 Release 0 3: Reserved 4: EVDO

2.2. AT command for SMS

AT Command	Description
AT$SMSMO=<origaddr>,<callbacknum>,<TI>,<data>,<priority>	Send an SMS Parameter <origaddr> Origination Address <callbacknum> Call-Back Number <TI> Teleservice ID 4097 : Wireless Paging Teleservice 4098 : Wireless Messaging Teleservice 4099 : Voice Mail Notification <data> Formatted Message The message should be enclosed with the value '1' at both ends in order to avoid confusion at the AT parser which resides in ME. e.g.) If the message is "origination message", then it will be like the below. <1sample message1> <priority> Priority 0 : Normal 1 : Urgent 2 : Emergency Response OK or Error When the transmission is successful : $SMSMOACK:<origaddr> When the transmission has failed : $SMSMONAK:<origaddr>
AT$REMO	Re-send an SMS Transmit again the message which has been sent just before Response OK or Error When the transmission is successful : $SMSMOACK:<origaddr> When the transmission has failed : $SMSMONAK:<origaddr>
AT$MTCNT? Or AT$SMSCNT?	Get the number of the received SMS held in the ME Response $MTCNT: <cnt>

	OK or Error <cnt> Received SMS Count
AT$SMSMT?	Get the message which has been received most recently from the ME. Response $SMSMT:<time>,<callbacknum>,<TI>,<priority>,<data> OK or Error <time> Receive Time <callbakcnum> Call-Back Number <TI> Teleservice ID <priority> Priority <data> Terminated Message ME formats the terminated message: First, the message is enclosed with a double quotation mark (") at both ends. Second, the message is encoded with some special value to avoid confusion with LF, CR at the AT parser which resides in TE. So, the encoded message should be decoded at TE. The encoding rules are as follows. 0x0A (LF) → 0x03 0x0D(CR) → 0x02 e.g.) If the message is "sample message", then it will be as below. <"sample message">
AT$IGNOREMT=<1|0>	Set SMS termination configuration Parameter <1> - Enable to reject SMS termination <0> - Disable to reject SMS termination Response OK or Error
AT$SMSSENT?	Return the result of originated SMS Response $SMSSENT:<orignum>,<moresult> OK or

	Error <orignum> Creation Number <moresult> Result of the creation 0 : Unknown 1 : Waiting 2 : Creation Success (ACK) 3 : Creation Failure (NAK)
AT$SMSBYPASS=<val>	Set SMS BYPASS Parameter <1> – Enable SMS BYPASS When a new SMS is being received, ME notifies TE of the URC of $NEWMT. After that ME doesn't store the received message in the local buffer. So, the message can't be read with the command "AT$SMSMT?" <0> – Disable SMS BYPASS When a new SMS is being received, the ME notifies TE of the URC of $NEWMT. After that, the ME stores the received message in local buffer. So, the message can be read with the command "AT$SMSMT?" Response OK or Error
AT$SMSBYPASS?	Get the configuration of SMS BYPASS Response $SMSBYPASS:<value> OK or Error <value> 1 : Enable SMS BYPASS 0 : Disable SMS BYPASS
AT$SMSMOEND	Stop transmitting an SMS during the transmission procedure. This command is usually used right after the command "AT$SMSMO" to cancel it. Response OK or Error
AT$SMSSTOFULL	This command is issued by the TE when there is no room to store a new message. Once this command is being received from TE, a new SMS message results in issuing the URC of "$NEWMT:ERASESTO" to the TE on the side of the ME.
AT$SMSSTOABLE	Issued by the TE to notify the ME of the storage availability for new message.

2.2.1. Notification Command

URC	Description
$NEWMT : <time>, <callbacknum>,<TI>, <data>[,<voicemailcnt>]	Notify the TE of a new received message Parameter <time> Receive Time <callbakcnum> Call-Back Number <TI> Teleservice ID <priority> Priority <data> Terminated Message The ME formats the terminated message: A message is encoded with some special value to avoid confusion with LF, CR at the AT parser which resides in TE. So, the encoded message should be decoded at TE. The encoding rules are as follows. 0x0A (LF) → 0x03 0x0D(CR) → 0x02 e.g.) If the message is “sample message”, then it will be like the below. <”sample message”> <voicemailcnt> Voice Mail Count If the received TI is 4099 (Voice Mail Notification), then this argument is appended.
$RE:<cnt>	Notify TE that there are unread messages in ME periodically. Parameter <cnt> Unread Message Count

2.3. AT Command for Data

AT Command	Description
AT$CTA=<value>	Set Um packet data inactivity timer. Parameter <value> – Timer value (unit : second) 0 : Traffic Channel not release during inactivity period 1~255 : Release the Traffic Channel after <value>, 1 second intervals have elapsed since last sending or receiving RLP data frames on the Um interface (default : 150) Response OK or ERROR
AT$CTA?	Get Um packet data inactivity timer. Response $CTA:<value> OK or ERROR
AT$SCT=<time>	Set the value of Session Close Timer. Parameter <time> – Timer value (unit : second) 0 : Timer inactivation 1~65535 : Timer value range (default : 600) Response OK or ERROR
AT$SCT?	Get the value of Session Close Timer. Response $SCT:<time> OK or

	ERROR
AT$CHFIXEN= <fix_mode>, <cdma_ch>, <evdo_ch>	Fix the search channel in ME as specified. This command is used for verification only. Parameter <fix_mode> 0 : Follow the channel value specified by NAM 1 : IS95A/B, CDMA2000 channel fixing mode 2 : EVDO channel fixing mode 3 : Hybrid mode <cdma_ch> - CDMA channel number <evdo_ch> - EVDO channel number Response OK or ERROR
AT$CHFIXEN?	Get the information of channel fixing status from ME. Response $CHFIXEN:<fix_mode>,<cdma_ch>,<evdo_ch> OK or ERROR
AT$SCLEAR= <0|1>	Initialize HDR Session. After initialization ME reboots automatically. Parameter <0> - NOP <1> - Initialize HDR Session Response OK or ERROR
AT$DDTM=<0|1>	Set the Data Dedicated Transmission Mode. Activation of DDTM is valid only when the following conditions are satisfied. 1. In a hybrid HDR call. 2. MO SMS is not in progress.

	3. MO PD DBM is not in progress. When these conditions are not satisfied, the DDTM can't be activated because the response of the ME is irrelevant. Parameter <0> - Disable <1> - Enable Response OK or ERROR
AT$DDTM?	Get the status of the Data Dedicated Transmission Mode. Response $DDTM:<0|1> OK or ERROR
AT$RSCH=<0|1>	Set the use of the Reverse Supplemental Channel Parameter <0> - R-SCH OFF <1> - R-SCH ON Response OK or ERROR
AT$RSCH?	Get the current status for the use of the Reverse Supplemental Channel. Response $RSCH:<0|1> OK or ERROR
AT$HYBRIDMODE=<mode>	Set the configuration of the Hybrid Mode. Parameter <mode> - Hybrid Mode 0 : Hybrid

	1 : 1x only 2 : EVDO only Response OK or ERROR
AT$HYBRIDMODE?	Get the current configuration of the Hybrid Mode. Response $ HYBRIDMODE:<mode> OK or ERROR
AT$CHD	Ends an established packet data connection. Response OK or ERROR
AT$HDRANUID=<user id>	Set an user ID for the HDR Access Network Authentication Parameter <user id> string (max length 127) Response OK or ERROR
AT$HDRANUID?	Get an user ID for the HDR Access Network Authentication Response $HDRANUID:<user id> OK or ERROR <user id> string (max length 127)
AT$HDRANPW=<password>	Set a password for the HDR Access Network Authentication Parameter <password> string (max length 127)

	Response OK or ERROR

2.3.1. Notification Command

URC	Description
$DORMANT:<1|0>	A connection is being established but no data transfer is in progress. In that case ME may notify TE of entering into dormant mode. Parameter <1> entry <0> free
$CONNET:<net>	Once a connection is being established, the ME notifies the TE which network it is currently using. Parameter <net> 0: No Service 1: IS-95A/B (2G) 2: IS-2000 Release 0 3: Reserved 4: EVDO
$PKTEND	When a packet data connection is ended, the ME notifies it.

2.4. AT Command for NAM Programming

AT Command	Description
AT$NAMMODE= <mode>	Set NAM Mode. When the ME enters into NAM Mode, its operating mode is automatically changed into offline mode. For that reason exiting from NAM Mode results in resetting the ME. Parameter <mode> – NAM Mode 0 : End NAM mode 1 : Enter into simple NAM mode 2 : Reserved 3 : Enter into engineering mode Response OK or ERROR
AT$CURNAM= <nam_idx>	Set current NAM selection. Parameter <nam_idx> – NAM number to use (1~2) 1 : NAM1 2 : NAM2 Response OK or ERROR
AT$CURNAM?	Get current NAM selection. Response $CURNAM:<nam_idx> OK or ERROR <nam_idx> – Current NAM number (1~2)
AT$SETMDN=	Set the MDN of specified NAM. This command is also being used for

<nam_idx>, <mdn>	Simple NAM mode when the NAM1 was specified by <nam_idx>. Parameter <nam_idx> – NAM number (1~2) <mdn> – Mobile Directory Number (10 or 11 digits) Response OK or ERROR
AT$GETMDN= <nam_idx>	Get the MDN for the specified NAM. Response $GETMDN:<nam_idx>,<mdn> OK or ERROR <nam_idx> – NAM number (1~2) <mdn> – Mobile Directory Number (10 or 11 digits)
AT$SETMIN= <nam_idx>, <min>	Set the MIN for the specified NAM. Parameter <nam_idx> – NAM number (1~2) <min> – Mobile Identification Number (10 digits) Response OK or ERROR
AT$GETMIN= <nam_idx>	Get the MIN for the specified NAM. Response $GETMIN=<nam_idx>,<min> OK or ERROR <nam_idx> – NAM number (1~2) <min> – Mobile Identification Number (10 digits)

AT$SETNAMINFO= <nam_idx>, <sys_pref>, <pref_mode>, <home_reg>, <for_sid>,<for_nid>, <mcc>,<mnc>, <mdn>,<min>, <accolc>, <pch_a>,<pch_b>, <sch_a>,<sch_b>, <hsid_1>,<hnid_1>, <hsid_2>,<hnid_2>, <hsid_3>,<hnid_3>, <hsid_4>,<hnid_4>, <hsid_5>,<hnid_5>, <hsid_6>,<hnid_6>, <sidl_1>,<nidl_1>, <sidl_2>,<nidl_2>, <sidl_3>,<nidl_3>, <voc_mode>, <prlenable>, <otapaenable>	Set all parameters related to the specified NAM. Besides the whole parameter change, this command may be used to set parameters respectively by leaving irrelevant parameters blank. Parameter <nam_idx> – NAM number (1~2) <sys_pref> – System Preference (1 ~ 4) 1 : A_ONLY, 2 : B_ONLY, 3 : HOME_ONLY, 4 : HOME_PREF (Standard) <pref_mode> – Mode Preference (1 ~ 4) 1 : Digital only, 2 : Automatic 3 : HDR only, 4 : CDMA only <home_reg> – Home system registration 0 : Disable,1 : Enable <for_sid> – Registration in foreign SID 0 : Disable, 1 : Enable <for_nid> – Registration in foreign NID 0 : Disable,1 : Enable <mcc> – Mobile Country Code <mnc> – Mobile Network Code <mdn> – Mobile Directory Number <min> – Mobile Identification Number <accolc> – Access Overload Class <pch_a> – Primary Channel (A Band) <pch_b> – Primary Channel (B Band) <sch_a> – Secondary Channel (A Band) <sch_b> – Secondary Channel (B Band) <hsid_1>,<hnid_1>, … , <hsid_6>,<hnid_6> Home SID/NID List for CDMA <sidl_1>,<nidl_1>, … , <sidl_3>,<nidl_3> SID/NID Lock List for CDMA <voc_mode> – Vocoder Mode 0 : 8K EVRC, 1 : 13K QCELP <prlenable> – PRL Enabled 0 : Disable, 1 : Enable (Default: 1) <otapaenable> – OTAPA Enabled

	0 : Disable, 1 : Enable (Default: 1) Response OK or ERROR
AT$GETNAMINFO= <nam_idx>	Get all parameters related to the specified NAM. Refer AT$SETNAMINFO command for parameters. Response $GETNAMINFO:<nam_idx>,<sys_pref>,<pref_mode>, <home_reg>,<for_sid>,<for_nid>, <mcc>,<mnc>,<mdn>,<min>,<accolc>, <pch_a>,<pch_b>,<sch_a>,<sch_b>, <hsid_1>,<hnid_1>,<hsid_2>,<hnid_2>, <hsid_3>,<hnid_3>,<hsid_4>,<hnid_4>, <hsid_5>,<hnid_5>,<hsid_6>,<hnid_6>, <sidl_1>,<nidl_1>,<sidl_2>,<nidl_2>,<sidl_3>,<nidl_3>, <voc_mode>,<prlenable>,<otapaenable> OK or ERROR
AT$GETVOCMODE= <nam_idx>	Set the Vocoder Mode for the specified NAM. Response $GETVOCMODE:<nam_idx>,<voc_mode> OK or ERROR <nam_idx> - NAM number (1~2) <voc_mode> - Vocoder Mode 0 : 8K EVRC, 1 : 13K QCELP
AT$SETVOCMODE= <nam_idx>, <voc_mode>	Get the Vocoder Mode for the specified NAM. Parameter <nam_idx> - NAM number (1~2) <voc_mode> - Vocoder Mode

	0 : 8K EVRC, 1 : 13K QCELP Response OK or ERROR
AT$GETPRLID= <nam_idx>	Get the PRL(Preferred Roaming List) ID for the specified NAM. Parameter <nam_idx> - NAM number (1~2) Response $GETPRLID:<nam_idx>,<prl_id> OK or ERROR <nam_idx> - NAM number (1~2) <plr_id> - PRL ID
AT$GETPRLACT= <nam_idx>	Get the status of the PRL activation for the specified NAM Response $ GETPRLACT:<nam_idx>,<status> OK or ERROR <nam_idx> - NAM number (1~2) <status> - PRL activation status 0 : Deactivate, 1 : Activate
AT$SETPRLACT= <nam_idx>, <status>	Activate/Deactivate a PRL of a specified NAM. Parameter <nam_idx> - NAM number (1~2) <status> - PRL activation status 0 : Deactivate, 1 : Activate Response

	OK or ERROR
AT$AKEY= <nam_idx>, <a_key>	Set the A-Key for a specified NAM. The A-Key includes 26 digits: 20 random decimal digits plus 6 decimal digits (checksum). Parameter <nam_idx> - NAM number (1~2) <a_key> - A-Key (6 ~ 26 digits) Response OK or ERROR
AT$CLRMRU= <value>	Delete the MRU record for a specified NAM. Parameter <value> 0 : Erase all 1 : Delete NAM1 record 2 : Delete NAM2 record Response OK or ERROR
AT$SCI=<index>	Set the Slot Cycle Index (SCI). Parameter <index> - Slot Cycle Index 0 : 1.28 sec (16*80ms) 1 : 2.56 sec (32*80ms) 2 : 5.12 sec (64*80ms) ... 7 : 163.84 sec (2048*80ms) Response OK or ERROR
AT$SCI?	Get the Slot Cycle Index (SCI). Response $SCI:<index>

	OK or ERROR <index> – Slot Cycle Index
AT$QPCH=<0|1>	Set the configuration of the Quick Paging Channel. Parameter <0> – Deactivate <1> – Activate Response OK or ERROR
AT$QPCH?	Get the configuration of the Quick Paging Channel. Response $QPCH:<0|1> OK or ERROR

3. AT Command Set

3.1. IS-707 AT Command Set Implementation

This chapter describes "IS-707 AT Command Set" supported by the QUALCOMM DMSS.

Heading	Description
IS-707 Requirement	■ Requires (req.) ■ Makes optional (opt.) ■ Not applicable (N/A)
Implementation status	■ Fully implemented – Note that remote commands require no action to be performed by the mobile ■ Command accepted, no action taken – The phone will accept the command and return OK, but will not perform the command action. This allows fixed command scripts to operate with the QUALCOMM CDMA data phone ■ Not implemented – QUALCOMM's DMSS 3000 Release 3.0 will not interpret the command (ERROR is returned) ■ Mobile supports – The mobile implementation will support the command; however, the Interworking Function (IWF) must provide this capability. This is used in the Cellular Result Codes table.
Explanation	The Explanation column provides insight into the reasoning behind the implementation. Many of the commands are remote commands that are passed to the IWF for processing. There are several AT commands that QUALCOMM has chosen not to implement because of a limited necessity for most of the CDMA data users.

3.1.1. Basic Action Command

Command	Description
A/	Re-execute previous command
A	Enter the online state (Answer a incoming call)
D<dial string>	Causes the MT2 to transition from the command state to the online state. The <dial string> is optional. For circuit switched data services, the dial string may contain the following characters: Digits 0 to 9, *, #, A, B, C, and D. The dial string may contain the following dial modifiers: T Tone dialing P Pulse dialing , Pause during dialing W Wait for quiet answer ! Hook flash $ Wait for billing tone (for credit-card calls) ; After dialing up, the IWF enters the online command state and maintains the connection
H	Causes the MT2 to transition from online command status to command status.
O	Causes the MT2 to transition from online command status to online status.

3.1.2. Basic Result Codes

Numeric	Verbal	Description	Async	Pkt
0	OK	Command executed.	Req.	Req.
1	CONNECT	Entering online status.	Req.	Req.
2	RING	Alerting signal received from the network	Req.	N/A
3	NO CARRIER	Unable to activate the service.	Req.	Req.
4	ERROR	Command not recognized or could not be executed.	Req.	Req.
6	NO DIAL TONE	No dial tone detected within the timeout period	Req.	N/A
7	BUSY	Reorder (Busy signal) received.	Req.	Req.
8	NO ANSWER	Five seconds of silence not detected after ring back when @ dial modifier is in use.	Req.	N/A

3.1.3. Basic AT Parameters

Parameter	Description	IS-707 requirement	Implementation status	Explanation
E0	Do not echo commands in command state or online command state	Async: req. Pkt: opt.	Fully implemented	
E1	Echo commands in command state or online command state.	Async: req. Pkt: opt.	Fully implemented	
L0	Low speaker volume.	Async: req. Pkt: N/A	Command accepted, no action taken	Mobile audio stream not used for Async Data or G3 FAX
L1	Low speaker volume.	Async: req. Pkt: N/A	Command accepted, no action taken	Mobile audio stream not used for Async Data or G3 FAX
L2	Med speaker volume.	Async: req. Pkt: N/A	Command accepted, no action taken	Mobile audio stream not used for Async Data or G3 FAX
L3	Med speaker volume.	Async: req. Pkt: N/A	Command accepted, no action taken	Mobile audio stream not used for Async Data or G3 FAX
M0	Speaker off.	Async: req. Pkt: N/A	Command accepted, no action taken	Mobile audio stream not used for Async Data or G3 FAX
M1	Speaker on until carrier reported (support of this feature is optional).	Async: req. Pkt: N/A	Command accepted, no action taken	Mobile audio stream not used for Async Data or G3 FAX
Q0	Return result codes.	Async: req. Pkt: req.	Fully implemented	
Q1	Do not return result codes.	Async: req. Pkt: req.	Fully implemented	
V0	Display result codes as numbers.	Async: req. Pkt: req.	Fully implemented	
V1	Display result codes as words	Async: req. Pkt: opt.	Fully implemented	
X0	Sends a CONNECT message	Async: req.	Fully	Remote Async/Fax

	when a connection is being established through a blind dialing. Ignores dial tone and busy signal.	Pkt: N/A	implemented	command.
X1	Enable additional result code CONNECT <rate>. Disable dial tone and busy detection.	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command.
X2	Enable additional result codes CONNECT <rate> and NO DIAL TONE. Disable busy detection. Enable dial tone detection.	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command.
X3	Enable additional result codes CONNECT <rate> and BUSY. Enable busy detection. Disable dial tone detection.	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command.
X4	Enable additional result codes CONNECT <rate>, BUSY and NO DIAL TONE. Enable busy and dial tone detection.	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command.
Z0	Reset to default configuration.	Async: req. Pkt: req.	Fully implemented	
&C0	Circuit 109 (CF) always ON.	Async: req. Pkt: req.	Fully implemented	
&C1	Circuit 109 (CF) ON in accordance with the specified service.	Async: req. Pkt: req.	Fully implemented	
&C2	Circuit 109 (CF) always on except wink on channel disconnect.	No reference	Fully implemented	QUALCOMM implementation
&D0	Ignore circuit 108/2 (CD).	Async: req. Pkt: req.	Fully implemented	
&D1	Enter online command state following ON-to-OFF transition of circuit 108/2.	Async: req. Pkt: req.	Fully implemented	Async service: as stated Pkt: End call following ON-to-OFF transition of 108/2
&D2	Enter command state following	Async: req.	Fully	End call following ON-to-

	ON-to-OFF transition of circuit 108/2.	Pkt: req.	implemented	OFF transition of 108/2.
T	Select tone dialing.	Async: req. Pkt: N/A.	Command accepted, performs normal dial	Tone dialing not relevant to CDMA data services. 'T' not sent in dial string.
P	Select pulse dialing.	Async: req. Pkt: N/A.	Command accepted, performs normal dial	Pulse dialing not relevant to CDMA data services. 'T' not sent in dial string.
&F0	Effect is implementation dependent.	Async: Pkt:	Fully implemented	Same behavior as Z.

3.1.4. Basic S-Registers

Register	Value	Description	IS-707 Requirement	Implementation status	Explanantion
S0	0 [1 to 255]	Disable automatic answering. [Enable automatic answering after (Value-1) x 6 sec.]	Async: req. Pkt: N/A.	Fully implemented	
S3	13	Carriage Return Character.	Async: req. Pkt: opt.	Fully implemented	
S4	10	Line Feed character.	Async: req. Pkt: opt.	Fully implemented	
S5	8	Backspace character.	Async: req. Pkt: opt.	Fully implemented	
S6	2 to 10 2	Pause before blind dialing.	Async: req. Pkt: N/A.	Fully implemented	Remote Async/Fax command
S7	1 to 255 [50]	Number of seconds to establish end-to-end data connection	Async: req. Pkt: opt.	Fully implemented	Remote Async/Fax command
S8	0 to 255 2	Number of seconds to pause when "," is encountered in dial string	Async: req. Pkt: N/A.	Fully implemented	Remote Async/Fax command

[S9]	0 to 255 6	Carrier detect threshold in increments of 0.1 seconds.	Async: req. Pkt: N/A.	Fully implemented	Remote Async/Fax command
S10	1 to 254 [14]	Number of tenths of a second from carrier loss to disconnect.	Async: req. Pkt: N/A.	Fully implemented	Remote Async/Fax command
	[255]	[Disable carrier detect.]			
[S11]	50 to 255 95	DTMF tone duration and spacing in milliseconds.	Async: opt. Pkt: N/A.	Fully implemented	Remote Async/Fax command

3.1.5. Extended AT Configuration Commands

Cmd	Value per	Description	IS-707 requirement	Implementation status	Explanation
+DR	IS-131	Data Compression Reporting. This extended-format numeric parameter controls whether the extended-format +DR: intermediated result code is transmitted from the IWF over the Um interface.	Async: req. Pkt: opt.	Fully implemented	Remote Async/Fax command Not relevant for Packet service
+DS	IS-131	Data Compression. This extended-format compound parameter controls the V.42 bis data compression function on the PSTN link if provided in the IWF.	Async: req. Pkt: opt.	Fully implemented	Remote Async/Fax command Not relevant for Packet service
+EB	IS-131	Break Handling in Error Control Operation. This extended-format compound parameter is used to control the manner of V.42 operation on the PSTN link (if present in the IWF).	Async: req. Pkt: opt.	Fully implemented	Remote Async/Fax command Not relevant for Packet service
+EFCS	IS-131	This extended-format numeric parameter controls the use of the 32-bit frame check sequence option in V.42 on the PSTN link (if	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command Not relevant for Packet service

		present in the IWF).			
+ER	IS-131	Error Control Reporting. This extended-format numeric parameter controls whether the extended-format +ER: intermediated result code is transmitted from the IWF over the Um interface	Async: req. Pkt: opt.	Fully implemented	Remote Async/Fax command Not relevant for Packet service
+ES	IS-131	Error Control Selection. This extended-format compound parameter is being used to control the manner of operation of the V.42 protocol on the PSTN link (if present in the IWF).	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command Not relevant for Packet service
+ESR	IS-131	This extended-format numeric parameter controls the use of the selective repeat (SREJ) option in V.42 on the PSTN link (if present in the IWF).	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command Not relevant for Packet service
+ETBM	IS-131	This extended-format compound parameter controls the handling of data remaining in IWF buffers upon service termination.	Async: req. Pkt: opt.	Fully implemented	Remote Async/Fax command Not relevant for Packet service
+GCAP	IS-131	This extended-format command causes the MT2 to transmit one or more lines of information text in a specific format. The content is a list of additional capabilities command +<name>s, which is intended to permit the user of the MT2 to identify the minimum capabilities of the MT2. An MT2 conforming to this standard shall include the following items, as a minimum, in the result code for the +GCAP command: +CIS707, +MS,	Async: req. Pkt: opt.	Fully implemented	Mobile will return: +CIS707 (+CIS707-A when IS-2000 is defined), +MS, +ES, +DS, +FCLASS

		+ES, +DS, +FCLASS			
+GMI	IS-131	This command makes the MT2 transmit one of more lines of information text, determined by the manufacturer, which is intended to permit the user of the MT2 to identify the manufacturer. Typically, the text will consist of a single line containing the name of the manufacturer, but manufacturers may choose to provide more details if desired (for example, address, telephone number for customer service, and so no).	Async: req. Pkt: opt.	Fully implemented	Mobile will return: "Made by: QUALCOMM, Inc. 1-800-349-4478"
+GMM	IS-131	This command makes the MT2 transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the MT2 to identify the specific model of the device. Typically, the text consists in a single line containing the name of the product, but manufacturers may choose to provide any other detail.	Async: req. Pkt: opt.	Fully implemented	Mobile will return "INFO: <NAM name> <phone number>" which identifies the current NAM and phone number
+GMR	IS-131	This command makes the MT2 transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the MT2 to identify the version, revision level of date, or other pertinent information of the device. Typically, the text consists in a single line containing the version of the product, but manufacturers may choose to	Async: req. Pkt: opt.	Fully implemented	Mobile returns: "S/W VER:x.y.zz"

		provide any other detail.			
+GOI	IS-131	This command makes the MT2 transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the MT2 to identify the device, based on the ISO system for registering unique object identifiers. Typically the text will consist in a single line containing numeric strings delimited by period characters.	Async: req. Pkt: opt.	Fully implemented	No information text provided
+GSN	IS-131	This command makes the MT2 transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the MT2 to identify the individual device. Typically, the text will consist in a single line containing a manufacturer-determined alphanumeric string, but manufacturers may choose to provide any other detail.	Async: req. Pkt: opt.	Fully implemented	Mobile returns “ESN: xx xx xx xx” in hexadecimal format
+ICF	IS-131	TE2-MT2 Character Framing. This extended-format compound parameter is being used to determine the local serial port start-stop (asynchronous) character framing that the MT2 shall use while accepting TE2 commands and while transmitting the information text and result codes to the TE2, if this is not determined automatically (see +IPR).	Async: req. Pkt: req.	Fully implemented	QUALCOMM Rm interface fixed at 8 data bits, No parity, 1 stop bit. Error returned for any other parameter.
+IFC	IS-	TE2-MT2 Local Flow Control. This	Async: req.	Fully	Hardware and

	131	extended-format compound parameter is being used to control the operation of the local flow control between the TE2 and MT2.	Pkt: req.	implemented	software flow control supported for both Async and Packet services.
+ILRR	IS-131	TE2-MT2 Local Rate Reporting. This extended-format numeric parameter controls whether the extended-format +ILRR:<rate> information text is transmitted from the MT2 to the TE2.	Async: req. Pkt: opt.	Fully implemented	Mobile Accepts only "OFF"
+IPR	IS-131	Fixed Rm Rate. This numeric extended-format parameter specifies the data rate at which in addition to 1200 bit/s or 9600 bit/s (as required in EIA/TIA-602). It may be used to select operation at rates at which the MT2 is not capable of automatically detecting the data rate being used by the TE2.	Async: req. Pkt: req.	Fully implemented	Rm rate fixed at 19200 bps. Mobile will only accept 19200 as a valid parameter
+MA	IS-131	Modulation Automode Control. This extended-format compound parameter is a list of modulations that the base station may use to connect with the remote DCE in Automode operation, for answering or originating data calls, as additional alternatives to the modulation specified in the +MS command	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command
+MR	IS-131	Modulation Reporting Control. This extended-format compound parameter controls whether the extended-format +MCR:<carrier> and +MRR:<rate> intermediate result codes are transmitted from	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command

		the IWF to the mobile station.			
+MS	IS-131	Modulation Selection. This extended-format compound parameter is being used to control the way of operating the modulation capabilities in the IWF.	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command
+MV18R	IS-131	V.18 Reporting Control. This extended-format numeric parameter controls the transmission of the extended-format +MV18R result code from the IWF to the mobile station.	Async: opt. Pkt: N/A	Fully implemented	Remote Async/Fax command
+MV18S	IS-131	V.18 Selection. This extended-format compound parameter is used to control the way of operating for the V.18 capabilities (if present in the IWF)	Async: opt. Pkt: N/A	Fully implemented	Remote Async/Fax command

3.1.6. Fax Parameters

Parameter	Value per	Description	Implementation status	Explanation
+FAA	EIA/TIA-592	Adaptive-answer parameter; see +FCLASS	Fully implemented	Remote
+FAP	TIA/EIA/IS-134	Addressing and polling capabilities parameter	Fully implemented	Remote
+FBO	EIA/TIA-592	Phase-C data-bit-order parameter	Fully implemented	Remote
+FBS	EIA/TIA-592	Buffer size; read-only parameter	Fully implemented	Local
+FBU	EIA/TIA-592	HDLC-frame-reporting parameter	Fully implemented	Remote
+FCC VR [BR]	 EIA/TIA-592 0 1 2 3	DCE-capabilities parameter Vertical-resolution sub parameter Bit-rate sub parameter ■ 2400 bits/s ■ 4800 bits/s ■ 7200 bits/s ■ 9600 bits/s	Fully implemented	Remote

WD [LN] [DF] [EC] BF ST	EIA/TIA-592 EIA/TIA-592 EIA/TIA-592 EIA/TIA-592 EIA/TIA-592 EIA/TIA-592	Page-width sub parameter Page-length sub parameter Data-compression format sub parameter Error-correction sub parameter Binary-file-transfer sub parameter Scan-time-per-line sub parameter		
[+FCLASS]	0 1 2.0	Service-class selection parameter ■ Class-0 ■ [Class-1 support unavailable] ■ Class-2.0 fax service (EIA/TIA-592)	Fully implemented	Remote; mobile will return ERROR for +FCLASS=1
+FCQ	EIA/TIA-592	Copy-quality-checking parameter	Fully implemented	Remote
[+FCR]	EIA/TIA-592	Capability-to-receive parameter	Fully implemented	Remote
+FCS	EIA/TIA-592	Current-session results parameter	Not implemented	Remote
+FCT	EIA/TIA-592	DTE phase-C timeout parameter	Fully implemented	Remote
+FEA	EIA/TIA-592	Phase-C received EOL-alignment parameter	Fully implemented	Remote
+FFC	EIA/TIA-592	Format-conversion parameter	Fully implemented	Remote
+FHS	EIA/TIA-592	Cell-termination-status parameter	Fully implemented	Remote
+FIE	EIA/TIA-592	Procedure-interrupt-enable parameter	Fully implemented	Remote
+FIS	EIA/TIA-592	Current-session negotiation parameter	Fully implemented	Remote
[+FLI]	EIA/TIA-592	Local-ID-string parameter (TSI or CSI).	Fully implemented	Remote
+FLO	EIA/TIA-592	Flow-control-select parameter	Fully implemented	Local
+FLP	EIA/TIA-592	Indicate-document-to-poll parameter	Fully implemented	Remote
+FMI	EIA/TIA-592	Request DCE manufacturer identification	Fully implemented	
+FMM	EIA/TIA-592	Request DCE model.	Fully implemented	
+FMR	EIA/TIA-592	Request DCE revision.	Fully implemented	
[+FMS]	EIA/TIA-592	Minimum-Phase-C-speed parameter	Fully implemented	Remote

+FNR	EIA/TIA-592	Negotiation-message-reporting control parameters.	Fully implemented	Remote
+FNS	EIA/TIA-592	Nonstandard-frame FIF parameter	Fully implemented	Remote
+FPA	TIA/EIA/IS-134	Selective Polling Address parameter	Fully implemented	Remote
[+FPI]	EIA/TIA-592	Local-polling-ID-string parameter	Fully implemented	Remote
[+FPP]	EIA/TIA-592	Packet-protocol-control parameter	Not implemented	Local
+FPR	EIA/TIA-592	Serial-port-rate-control parameter.	Fully implemented	Local. Mobile will accept only 19200
[+FPS]	EIA/TIA-592	Page-status parameter	Fully implemented	Remote
+FPW	TIA/EIA/IS-134	Password parameter (Sending or Polling)	Fully implemented	Remote
[+FRQ]	EIA/TIA-592	Receive-quality-threshold parameter	Fully implemented	Remote
+FRY	EIA/TIA-592	ECM-retry-value parameter	Fully implemented	Remote
+FSA	TIA/EIA/IS-134	Sub address parameter	Fully implemented	Remote
[+FSP]	EIA/TIA-592	Request-to-poll parameter	Fully implemented	Remote

3.1.7. Fax Action Commands

Command	Description	Implementation	Explanation
+FDR	Receive Phase-C data	Fully implemented	Remote
+FDT	Transmit Phase-C data	Fully implemented	Remote
+FIP	Initialize facsimile parameter	Fully implemented	Remote
+FKS	Terminate session	Fully implemented	Remote

3.1.8. CDMA AT Parameter Commands

Command	Description	IS-707 requirement	Implementation status	Explanation
+CXT= <value>	Cellular Extension ■ 0 – Do not pass unrecognized commands to the IWF.	Async: req. Pkt: N/A	Fully implemented	

	■ 1 – When detecting an unrecognized AT command, open transport layer connection and pass unrecognized command to the IWF			
+CFG= "<string>"	Configuration String The string (up to and including the termination character) will be stored by the MT2 and sent to the base station prior to dialing. Each transmission of a AT+CFG command from the TE2 replaces the contents of the previous string. The string may be up to 248 characters.	Async: req. Pkt: N/A	Fully implemented	
+CAD?	Query Analog or Digital Service Returns ■ 0 – If no service is available ■ 1 – If CDMA Digital service is available ■ 2 – If TDMA Digital service is available ■ 3 – If Analog service is available (values 4 to 255 reserved)	Async: opt. Pkt: opt.	Fully implemented	2 (TDMA) is not supported.
+CDR	Um Interface Data Compression Reporting. This extended-format numeric parameter controls whether the extended-format +CDR: intermediate result code is transmitted by the MT2. The result code is the same as for the TIA/EIA/IS-131 +DR: result code.	Async: req. Pkt: N/A	Fully implemented	
+CDS	Um Interface Data Compression. This extended-format compound parameter controls the V.42bis data compression function on the Um interface. The command format is the same as for the TIA/EIA/IS-131 +DS command.	Async: req. Pkt: N/A	Fully implemented	Current QUALCOMM mobile does not support V.42bis compression. Mobile will only accept 0 as a valid setting
+CRM= <value>	Set Rm interface protocol ■ 0 – Asynchronous Data or Fax	Async: req. Pkt: req.	Fully implemented	Mode selection occurs

	■ 1 – Packet data service, Relay Layer Rm interface ■ 2 – Packet data service, Network Layer Rm interface, PPP ■ 3 – Packet data service, Network Layer Rm interface, SLIP ■ 4 – STU-III Service ■ 5 – 127 – Reserved for future use ■ 128 – 255 – Reserved for manufacturer-specific use Note: The default value for the +CRM parameter shall be 0 if this value is supported by the MT2. If 0 is not supported, the default +CRM value shall be manufacturer-specific.			automatically based on data received.
+CBC?	Battery Charge Read-only. Returns <BCS>,<BCL> BCS: ■ 0 – MT2 powered by battery, BCL – status ■ 1 – MT2 connected to external power ■ 2 – Battery status not available ■ 3 – Recognized power fault; calls inhibited BCL: ■ 0 – 100 – Remaining battery capacity is 0 to 100 %	Async: req. Pkt: opt	Fully implemented	
+CQD=<value>	Command State Inactivity Timer ■ 0 – Ignored ■ 1-255 – Release call after 5x<value> sec have elapsed without activity. The default <value> shall be 10,	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command

	corresponding to 50 sec.			
+CRC= <value>	Cellular Result Codes ■ 0 – Disable Cellular Result Codes ■ 1 – Enable Cellular Result Codes	Async: req. Pkt: N/A	Fully implemented	Remote Async/Fax command
+CMIP?	Mobile Station IP Address Read-only. Returns the mobile station's temporary IP address.	Async: req. Pkt: opt.	Fully implemented	
+CBIP?	Base Station IP Address Read-only. Returns the bas station's IP address.	Async: req. Pkt: opt.	Fully implemented	
+CSS?	Serving System. Read-only. Returns <Band Class>,<Band>,<SID> Band Class: ■ C – The mobile station is being registered with a cellular system. ■ P – The mobile station is being registered with a PCS system ■ CA – The mobile station is being registered with a cellular A-band system ■ CB – The mobile station is being registered with a cellular B-band system ■ PA – The mobile station is being registered with a PCS A-band system ■ PB – The mobile station is being registered with a PCS B-band system ■ PC – The mobile station is being registered with a PCS C-band system ■ PD – The mobile station is being registered with a PCS D-band system ■ PE – The mobile station is being registered with a PCS E-band system ■ PF – The mobile station is being registered with a PCS F-band system	Async: req. Pkt: opt.	Fully implemented	

	■ Z – The mobile station is not registered SID: ■ 0 – 16383 – The mobile station is being registered with the system indicated. ■ 99999 – The mobile station is not registered.			
+CSQ?	Query Received Signal Quality. Returns the Signal Quality Measure <SQM> and the Frame Error Rate <FER> as follows: Signal Quality Measure <SQM> ■ 0 – 31 – Signal Quality Measurement ■ 99 – SQM is not known or is not detectable. All other values are being reserved. Frame Error Rate <FER> ■ 0 – < 0.01% ■ 1 – 0.01 % to less than 0.1 % ■ 2 – 0.1 % to less than 0.5 % ■ 3 – 0.5 % to less than 1.0 % ■ 4 – 1.0 % to less than 2.0 % ■ 5 – 2.0 % to less than 4.0 % ■ 6 – 4.0 % to less than 8.0 % ■ 7 – ≥8.0 % ■ 99 – <FER> is unknown or is not detectable. All other values are being reserved.	Async: req. Pkt: opt.	Fully implemented	
AT+CSO = <n>	Change Service Option to Service Option <n>	Async: opt. Pkt: opt.	Not implemented	
AT+CMUX = <n>	Select Multiplex Option ■ 1 – Multiplex Option 1 ■ 2 – Multiplex Option 2	Async: opt. Pkt: opt.	Fully implemented	

AT+CAU = <n>	Audio pass-through between DTE and MT2 ■ 0 – Audio Pass Through Disabled ■ 1 – Audio Pass Through Enabled	Async: N/A Pkt: N/A	Not implemented	
+CFC= <value>	Um Interface Fax Compression ■ 0 – No compression. ■ 1 – V.42bis compression with parameters as set by the +CDS command. ■ 2 – Modified the Modified Read compression.	Async: req. Pkt: N/A	Fully implemented	Current QUALCOMM mobile does not support V.42bis compression. Mobile will only accept 0 as a valid parameter.

3.1.9. Cellular AT Command Extensions in Support of Voice Services

Command	Description	IS-707 requirement	Implementation status	Explanation
+CHV<value>	Hang-up Voice ■ 0 – Hang-up voice call ■ 1 – 255 – Reserved	Async: opt. Pkt: N/A	Fully implemented	
+CDV<dial string>	Dial command for voice calls. The format of <dial string> is identical to that for the ATD command. This command does not make the MT2 change to the online status.	Async: opt. Pkt: N/A	Fully implemented	

3.1.10. Cellular Identification AT Command Extensions

Cmd	Value per	Description	IS-707 requirement	Implementation status	Explanation
+CGCAP	IS-131	This extended-format command causes the IWF to transmit one or more lines of information text in a specific format. The content is a list of additional capabilities command	Async: opt. Pkt: N/A	Fully implemented	Remote Async/Fax command

		+<name>s, which is intended to permit the user of the IWF to identify the minimum capabilities of the IWF. IWFs conforming to this standard shall include the following items, as a minimum, in the result code for the +CGCAP command: +CIS707, +MS, +ES, +DS, +FCLASS			
+CGMI	IS-131	This command makes the IWF transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the IWF to identify the manufacturer. Typically, the text will consist in a single line containing the name of the manufacturer, but manufacturers may choose to provide more details if desired (for example, address, telephone number for customer service, and so on)	Async: opt. Pkt: N/A	Fully implemented	Remote Async/Fax command
+CGMM	IS-131	This command makes the IWF transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the IWF to identify the specific model of the device. Typically, the text will consist in a single line containing the name of the product, but manufacturers may choose to provide any other detail.	Async: opt. Pkt: N/A	Fully implemented	Remote Async/Fax command
+CGMR	IS-131	This command makes the IWF transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the IWF to identify	Async: opt. Pkt: N/A	Fully implemented	Remote Async/Fax command

		the version, revision level or date, or other pertinent information of the device. Typically, the text will consist in a single line containing the version of the product, but manufacturers may choose to provide any other detail.			
+CGOI	IS-131	This command makes the IWF transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the IWF to identify the device, based on the ISO system for registering unique object identifiers. Typically, the text will consist in a single line containing numeric strings delimited by period characters.	Async: opt. Pkt: N/A	Fully implemented	Remote Async/Fax command
+CGSN	IS-131	This command makes the IWF transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the IWF to identify the individual device. Typically, the text will consist in a single line containing a manufacturer determined alphanumeric string, but manufacturers may choose to provide any other detail.	Async: opt. Pkt: N/A	Fully implemented	Remote Async/Fax command

3.1.11. Cellular AT Commands for Packet Data Services

Command	Description	Implementation status	Explanation
+CTA=<value>	Set/Read/Test Um packet data inactivity timer ▪ 0 – Traffic Channel not release during	Fully implemented	Relevant only for Packet service

	inactivity periods. ■ 1 – 255 – Release the Traffic Channel after <value> 1-second intervals have elapsed since last sending or receiving RLP data frames on the Um interface. ■ 20 – (default)		operation
+CPS=<value>	Select the service option to be used for packet data service. Values shall be as specified in TSB58	Not implemented	
+CPSR=<value>	Enables/disables packet call state reporting ■ 0 – Disables call state reporting ■ 1 – Enables call state reporting	Not implemented	Call State reporting NOT supported
+CPTC=<value>	Controls Traffic Channel state without affecting the IWF Link Layer connection ■ 0 – Release Traffic Channel ■ 1 – Originate Traffic Channel	Not implemented	
+CPER=<value>	Enables/disables packet call event reporting ■ 0 – Disables call event reporting ■ 1 – Enables call event reporting	Not implemented	Packet Call Event reporting Not supported

3.1.12. Cellular Result Codes

Result code	Description	IS-707 requirement	Implementation status	Explanation
+CERROR: BAD REQUEST	Intercept received after call creation	Async: req. Pkt: N/A	Not implemented	
+CERROR: INIT FAILED<failed command>	Initialization string failed	Async: req. Pkt: N/A	Mobile supports	Remote Asnyc/Fax command
+CERROR: LINK FAIL	Mobile station has declared a loss of the Traffic Channel	Async: req. Pkt: N/A	Not implemented	
+CERROR: NO SERVICE	Creation was attempted while the mobile station was not able to monitor a CDMA Paging Channel	Async: req. Pkt: N/A	Not implemented	
+CERROR: NO <service option>	The indicated service option was rejected. The <service option>	Async: req. Pkt: N/A	Not implemented	

SERVICE	shall be ASYNC or FAX.			
+CERROR: PAGE FAIL	Mobile station received a page but not an alert.	Async: req. Pkt: N/A	Not implemented	
+CERROR: PAGED	Mobile station attempted a creation after receiving a page.	Async: req. Pkt: N/A	Not implemented	
+CERROR: RELEASE	Indicates call release.	Async: req. Pkt: N/A	Not implemented	
+CERROR: RETRY	Reorder received after call creation	Async: req. Pkt: N/A	Not implemented	
+CPROG: ANSWER	Indicates remote DCE has answered	Async: req. Pkt: N/A	Mobile supports	Remote Asnyc/Fax command
+CPROG: BONGTONE	Billing Tone was detected.	Async: req. Pkt: N/A	Mobile supports	Remote Asnyc/Fax command
+CPROG: DIALING <number>	Indicates PSTN Dialing.	Async: req. Pkt: N/A	Mobile supports	Remote Asnyc/Fax command
+CPROG: DIALTONE	Dial tone was detected.	Async: req. Pkt: N/A	Mobile supports	Remote Asnyc/Fax command
+CPROG: QUIET ANSWER	Indicates Quiet Answer.	Async: req. Pkt: N/A	Mobile supports	Remote Asnyc/Fax command
+CPROG: RINGING	Indicates PSTN Ringing.	Async: req. Pkt: N/A	Mobile supports	Remote Asnyc/Fax command
+CPROG: VOICE	Voice detected on the PSTN connection	Async: req. Pkt: N/A	Mobile supports	Remote Asnyc/Fax command
RING <service option>	Specifies active service option. The <service option> shall be “ASYNC”, “FAX”, or “STU-III”.	Async: req. Pkt: N/A	Fully implemented	

3.1.13. Cellular Result Codes for Packet Data Services

Result code	Description	Implementation status	Explanation
+CPACKET	May be returned after AT+CRM=1 or 2 or 3. Indicates packet data service is in the Active State.	Not implemented	+CRM performs no action on QUALCOMM mobile
+CPSR:<value>	Packet call status. Sent autonomously when +CPSR=1. ■ 0 – Packet data service is in the Inactive status. ■ 1 – Packet data service is in the Active status, and the call control function is in the Initialization/Idle state. ■ 2 – Packet data service is in the Active status, and the call control function is in the Initialization/Traffic status. ■ 3 – Packet data service is in the Active status, and the call control function is in the Connected status, and the packet data service option is using primary traffic. ■ 4 – Packet data service is in the Active state, and the call control function is in the Connected status, and the packet data service option is using secondary traffic. ■ 5 – Packet data service is in the Active status, and the call control function is in the Dormant/Idle status. ■ 6 – Packet data service is in the Active status, and the call control function is in the Dormant/Traffic status. ■ 7 – Packet data service is in the Active status, and the call control function is in the Reconnect/Idle status. ■ 8 – Packet data service is in the Active status, and the call control function is in the	Not implemented	Packet call state reporting not supported

	Reconnect/Traffic status. ■ 9 – 255 – Reserved		
+CPER:<value>	Packet call event. Sent autonomously when +CPER=1. ■ 0 – Enter Idle Status ■ 1 – Idle handoff, same system ■ 2 – Idle handoff, new system ■ 3 – Page received ■ 4 – Origination sent ■ 5 – Traffic Channel assigned ■ 6 – Hard handoff ■ 7 – 255 – Reserved		Packet call event reporting not supported
+CERROR: LINK FAIL	Mobile station has declared a loss of the Traffic Channel.	Not implemented	
+CERROR: NO SERVICE	Mobile station is not able to monitor a Paging Channel	Not implemented	
+CERROR: RETRY	Reorder received during an attempt to reconnect.	Not implemented	

3.2. QUALCOMM Proprietary AT Command

3.2.1. Vendor-specific AT commands

Command	Description	Operation
$QCDMG	Transition to Diagnostic Monitor (DM) operation	This command will return “OK” and then transition the phone serial port to DM mode. DM mode runs at 38.4 Kbps and uses a proprietary half-duplex protocol.
$QCQNC	Enable/Disable Quick Net Connect (QNC)	■ 0 := Disable QNC capability. This means that packet Creations will use the Packet Data Service Option number ■ 1 := Enable QNC capability. This means that Packet Creations will use the Async Data Service Option number
$QCMTOM	Originate Mobile-to-Mobile Packet Data call using QUALCOMM proprietary Service	Complete command is AT$QCMTOM = <number>, where <number> is the phone number to dial. This command will create a Mobile-to-Mobile Packet data call using the QUALCOMM-proprietary Service Option number 0x8003. This is

	Option number	a Rate Set 1 call.
$QCPREV	Protocol revision in use	Returns one of the following codes: 1: JSTD008, 3: IS_95A, 4: IS_95B, 6: IS_2000
&V	Dump configuration parameters	This command will dump the status of all AT parameters. This includes the single-letter parameters not otherwise readable, but does not include the +QC parameters.
&C2	Carrier Detect pin behavior	This command setting will 'wink' (briefly transition off, then back on) the Rm port Carrier Detect pin when Packet Data calls end.
$QCSO=	Set Data Service Option number set; saved into the non-volatile memory	■ 0 := pre-707 SO number (RS 1: Async 4, G3 Fax 5, packet 7; RS 2: Async 12, G3 Fax 13, packet 15) ■ 1 := proprietary SO numbers (RS 1: Async 4, G3 Fax 5, packet 7; RS 2: Async 0x8201, G3 Fax 0x8022, packet 0x8020) ■ 2 := IS-707 SO numbers (RS 1: Async 0x1004, G3 Fax 0x1005, packet 0x1007; RS 2: Async 12, G3 Fax 13, packet 15)
$QCCLR	Clear mobile error log	This command will clear the mobile error log.
$QCPKND	Enable/Disable Automatic Packet Detection after a Dial command	■ 0 := Disable Packet No Dial. If a PPP packet is received by the mobile without a prior dial command (that is, AtdX #), then the mobile will create a Packet (or QNC) data call. ■ 1 := Enable Packet No Dial. Reception of a PPP packet without a just prior dial command wil NOT Create a PPP packet (or QNC) call.
$QCDMR=	Set DM baud rate	19200, 38400, 57600, 115200
$QCMDR=	Set Medium Data Rate (MDR) (also known as HSPD) setting	Valid values are 0 to 3: ■ 0 := MDR Service Only. The mobile will originate with SO 22 or SO 25. The mobile will not negotiate to any other service option if SO 22 and SO 25 are unavailable. ■ 1 := MDR Service, if available. The mobile will originate with SO 22 or SO 25, but will negotiate to a Low-Speed Packet service option if MDR is not available. The mobile will not negotiate to SO 33. ■ 2 := LSPD only. The mobile will originate a Low-Speed Packet call only. The mobile will not negotiate to SO 22, SO 25, or SO 33.

		■ 3 := SO 33, if available. The mobile will negotiate to MDR or Low-Speed Packet service options if SO 33 is not available.
$QCSCRM	Enable/disable mobile form SCRM'ing	■ 0 := Mobile never SCRMs. ■ 1 := Mobile can SCRM as needed. Command only applies to SO 33 calls. This value is stored in NV. The default is 1.
$QCTRTL	Enable/disable R-SCH throttling	■ 0 := Mobile never throttles R-SCH ■ 1 := Mobile can throttle R-SCH as needed. Command only applies to SO 33 calls. This value is stored in NV. The default is 1.

3.3. Packet Data AT Commands

3.3.1. AT commands for Packet Data Services

AT command	Command purpose	Background	Settings
at&cX	Carrier Detect pin settings	Carrier Detect pin is the RS-232 signal pin that informs the DTE device (laptop) of the state of the DCE device communications channel.	Values: ■ X=0 → leave Carrier Detect pin Asserted at all times ■ X=1 → Carrier Detect pin Asserted when mobile is on the Traffic Channel, otherwise deasserted (default setting) ■ X=2 → Carrier Detect Asserted at all times but will wink (deassert briefly then re-Assert) when the Traffic Channel drops
at&dX	DTR pin settings	Data Terminal Ready (DTR) pin is the RS-232 signal that the DTE device uses to drop the DCE communications channel	Values: ■ X=0 → Ignore DTR ■ X=1 → Answer Packet Call when DTR is asserted, Drop Traffic Channel on DTR deasserts (default) ■ X=2 → same as X=1
at$qcqnc=X	Enable/disable QNC capability	Quick Net Connect (QNC) is a different means of performing basic packet	Values: ■ X=0 → Disable QNC (use Packet Data service option numbers) (default for HSPD

		data service	builds) ■ X=1 → Enable QNC (use Async Data service option numbers for Packet Data calls)
at$qcso=X	Service Option Set settings	The QUALCOMM mobile is capable of using pre-IS707 (IS-99 and IS-653) and IS-707 Service Options.	Values: ■ X=0 → uses pre-IS-707 Service Option numbers (only affects Rate Set 1 Service Option numbers) ■ X=2 → uses IS-707/IS-707A Service Option numbers (default for HSPD builds)
at+cta=X	Inactive channel timeout setting	This command is being used to set the timeout value for dropping the Traffic Channel X seconds after data flow ceases. It is being used in conjunction with the dormant mode operation.	X := the number of seconds of channel inactivity before the Traffic Channel is dropped. Zero (0) means leave channel up indefinitely (default is 0).
at+cmux=A,B	Multiplex option settings	This command is used to set the maximum number of multiplex options for the forward and reverse links for MDR (HSPD) calls.	Values: ■ A := max. multiplex option to use for the Forward link. Valid numbers are 1 to F (hexadecimal). ■ B := max. multiplex option to use for the Reverse link. Valid numbers are 1 and 2. Default is C, 2. Rules: ■ If A is being omitted, it is assumed to have the same value as B. If A is not omitted, its value remains the same as the previous invocation (or the default). A and B must be either both odd or both even. ■ If A & B are odd, then the phone will originate Data calls using Rate Set 1. If A & B are even, then the phone will originate Data calls using Rate Set 2.

at&qcmdr=X	MDR settings	This command specifies the manner in which Packet Data calls are Originated.	Valid Values are 0 to 3. ■ 0 := MDR Service only. The mobile will originate with SO 22 or SO 25. the mobile will not negotiate to any other service option if SO 22 and SO 25 are unavailable. ■ 1 := MDR Service, if available. The mobile will originate with SO 22 or SO 25, but will negotiate to a Low-Speed Packet service option if MDR is not available. The mobile will not negotiate to SO 33. ■ 2 := LSPD only. The mobile will originate a Low-Speed Packet call only. The mobile will not negotiate to SO 22, SO 25, or SO 33. ■ 3 := SO33, if available. The mobile will negotiate to MDR or Low-Speed Packet service options if SO 33 is not available.
at$qcscrm=X	SCRM enable/disable	For IS2000 mobiles, this enables/disables the mobile from SCRM'ing.	Values: ■ 0 := Mobile never SCRMs. ■ 1 := Mobile can SCRM as needed. Command only applies to SO 33 calls. This value is stored in NV. The default is 1
at$qctrtl=X	R-SCH throttling enable/disable	For IS2000 mobiles, this enables/disables the mobile from throttling the R-SCH. The R-SCH rate is considered "too high" and could over utilize the CPU.	Values: ■ 0 := Mobile never throttles R-SCH ■ 1 := Mobile can throttle R-SCH as needed. Command only applies to SO 33 calls. This value is stored in NV. Default is 1.