CDMA DATA TERMINAL
AT Command User Manual

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AnyDATA.NET

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1. Introduction

1.1 Purpose

This document discusses, in detail, the AT commands that are implemented in the AnyDATA.NET wireless modem software. It includes the IS-707 AT command set, Qualcomm specific AT command set, and AnyDATA.NET proprietary AT command set.

1.2 Organization

This document provides a complete discussion of the AT commands implemented in the AnyDATA.NET wireless modem software:

- Section 2.1 – Discusses the IS-707 AT command set, and its implementation and usage
- Section 2.2 – Discusses the Qualcomm specific AT command set, and its implementation and usage
- Section 2.3 – Discusses the AnyDATA.NET proprietary AT command set, and its implementation and usage

1.3 Revision History

The revision history for this document is shown in Table 1-1.

Table 1-1 Revision History

Version	Date	Description
V1.0	April 2001	Initial Release – applicable DTS and DTSS series software
V1.1	June 2001	Added tables, changed SMS originating frame, and enabled MIN writing using AT commands

1.4 References

Reference documents, which may include standards, and resource documents, are listed in Table 1-2.

Table 1-2 Reference documents and standards

Ref.	Document	Standards
Standards		
1	Data Service Options for Spread Spectrum Systems: AT Command Processing and the Rm Interface	TIA/EIA/IS-707-A.3
2	Data Transmission System and Equipment – Serial	TIA/EIA-615

	Asynchronous Automatic Dialing and Control – Extended Command Syntax	
QUALCOMM		
1	AT Commands for DMSS: Application Note	CL93-V0327-1 X8

1.5 Acronym List

1. Shading indicates an AT command that has been modified by AnyDATA.NET.

1.6 Terms and Numeric Information

AT Command Set. Command set interface between data terminal equipment (DTE) and data circuit terminating equipment (DCE).

Base Station (BS). A station in the Domestic Public Cellular Radio Telecommunications Service, other than a mobile station, used for communicating with mobile stations. Depending upon the context, the term base station may refer to a cell, a sector within a cell, an MSC, an IWF, or other part of the cellular system.

Data Circuit-Terminating Equipment (DCE). A DCE connects a TE2 to the PSTN. A typical DCE would be a V-series modem. For Group-3 Fax Service, the DCE and its associated TE2 are often combined into a single Group-3 fax machine.

Error Correction Mode (ECM). A mode of operation for T.30 fax service providing end-to-end reliable data transport.

Facsimile (Fax.). The process by which a document is scanned, converted into the electrical signals, transmitted, and recorded or displayed as a copy of the original.

Interworking Function (IWF). An IWF provides the functions needed for terminal equipment connected to a mobile termination to inter-work with terminal equipment connected to the PSTN. A physical implementation may include a pool of modems.

Mobile Station (MS). A station in the Domestic Public Cellular Radio Telecommunications Service intended to be used while in motion or during halts at unspecified points. Mobile stations include portable units (e.g., hand-held personal units) and units installed in vehicles.

Mobile Termination 2 (MT2). An MT2 provides a non-ISDN (R m) user interface, e.g., CCITT V series or CCITT X series.

Terminal Equipment 2 (TE2). A TE2 is a data terminal device that has a non-ISDN user-network interface, e.g., CCITT V series or CCITT X series.

Um. The air interface between the MT2 and the BS/MSC.

Rm. The interface between an TE2 and MT2.

2. AT Commands Implementation

2.1 IS-707 AT Commands Implementation

This document is comprised of a series of tables; each is from IS-707.3 (AT Cmd Processing and the Rm Interface).

Bold types in all tables of this section indicate the default parameter that is used by AnyDATA.NET, Qualcomm and IS-707 standard.

2.1.1 Overview

Table 2-1 Column descriptions

Heading	Description
IS-707 Req't	The IS-707 requirement column (IS-707 Req't) in each table specifies the IS-707 requirement for both the Async/G3 Fax service and the Packet service. One of the following is applicable to each service IS-707: • Requires (req.) • Makes optional (opt.) • Not applicable (n/a)
Implement'n status	The Implementation Status column stipulates whether QUALCOMM has implemented the command according to IS-707 specifications: • 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 the 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 the perceived limited utility to the CDMA data user.

2.1.2 IS-707 AT command set implementation for DMSS

Table 2-2 IS-707.3 Table 7.1.1-1. Basic AT Parameters

Parm	Description	IS-707 req't	Implement'n 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	High 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	—
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 DIALTON*E. 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 *BUS*Y. 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 DIALTONE*. 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 On-to-Off transition of circuit 108/2.	Async: req. Pkt: req.	Fully implemented	End call following On-to-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. 'P' not sent in dial string.
&F0	Effect is implementation dependent.	Async: req. Pkt: req.	Fully implemented	Same behavior as Z.

Table 2-3 IS-707.3 Table 7.1.2-1. Basic S-Registers

Reg	Value	Description	IS-707 reqt	Implement'n status	Explanation
S0	**0** [1 to 255]	Disable automatic answering. [Enable automatic answering after (Value-1)×6sec]	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

Table 2-4 IS-707.3 Table 7.1.5-1. In-Band Control AT Command

Cmd	Description	IS-707 req't	Implement'n status	Explanation
+IBC	In-Band Control Compound Parameter. The AT+IBC compound parameter provides for the enabling, disabling, and configuration of In-Band Control Service. See Section 8 of ANSI/TIA/EIA-617 for a complete description of this command.	Async: n/a Pkt: opt.	Not implemented	Optional for Packet service. Needed for in-band control over Rm interface. This capability Not implemented by QUALCOMM.

Table 2-5 IS-707.3 Table 7.2-1. Extended AT Configuration Commands (Part 1 of 5)

Cmd	Value per	Description	IS-707 req't	Implement'n status	Explanation
+DR	IS-131	Data Compression Reporting. This extended-format numeric parameter controls whether the extended-format +DR: intermediate result code is transmitted from the IWF over the U m 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 present in the IWF).	Async: req. Pkt: n/a	Fully implemented	Remote Async/ Fax command Not relevant for Packet service
+ER	IS-131	Error Control Reporting. This extended-format numeric parameter controls whether the extended-format +ER: intermediate result code is transmitted from the IWF over the U m 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 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.42on 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

Table 2-6 IS-707.3 Table 7.2-1. Extended AT Configuration Commands (Part 2 of 5)

Cmd	Value per	Description	IS-707 req't	Implement'n status	Explanation
+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,+ES,+DS, +FCLASS	Async: req. Pkt: opt.	Fully implemented	details TBD
+GMI	IS-131	This command causes the MT2 to 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 manufacturer. Typically, the text will consist of a single line containing the name of the manufacturer, but manufacturers may choose to provide more information if desired (for example, address, telephone number for customer service, and so on).	Async: req. Pkt: opt.	Fully implemented	Mobile will return: "Made by: AnyDATA, Inc. 82-2-504-3361"
+GMM	IS-131	This command causes the MT2 to 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 will consist of a single line containing the name of the product, but manufacturers may choose to provide any information desired.	Async: req. Pkt: opt.	Fully implemented	Mobile will return "INFO: <NAM name> <phone number>" which identifies the current NAM and phone number

* The +CIS707 result code indicates support of the AT commands and result codes in Tables 7.4.1-1, 7.4.1-2, 7.4.1-3, 7.4.1-4, and 7.4.2-1.

Table 2-7 IS-707.3 Table 7.2-1. Extended AT Configuration Commands (Part 3 of 5)

Cmd	Value per	Description	IS-707 req't	Implement'n status	Explanation
+GMR	IS-131	This command causes the MT2 to 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 or date, or other pertinent information of the device. Typically, the text will consist of a single line containing the version of the product, but manufacturers may choose to provide any information desired.	Async: req. Pkt: opt.	Fully implemented	Mobile returns: "S/W VER:x.y.zz"
+GOI	IS-131	This command causes the MT2 to 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 of 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 causes the MT2 to 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 of a single line containing a manufacturer-determined alphanumeric string, but manufacturers may choose to provide any information desired.	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 used to determine the local serial port start-stop (asynchronous) character framing that the MT2 shall use while accepting TE2 commands and while transmitting 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 parameters.

Table 2-8 IS-707.3 Table 7.2-1. Extended AT Configuration Commands (Part 4 of 5)

Cmd	Value per	Description	IS-707 req't	Implement'n status	Explanation
+IFC	IS-131	TE2-MT2 Local Flow Control. This extended-format compound parameter is used to control the operation of local flow control between the TE2 and MT2 [1].	Async: req. Pkt: req.	Fully implemented	Hardware and 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 R_M Rate. This numeric extended-format parameter specifies the data rate at which the MT2 will accept commands, 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 numeric parameter controls whether the extended-format +MCR:<carrier> and +MRR:<rate> intermediate result codes are transmitted from the IWF to the mobile station.	Async: req. Pkt: n/a	Fully implemented	Remote Async/Fax command.
+MS	IS-131	Modulation Selection. This extended-format compound parameter is used to control the manner of operation of the modulation capabilities in the IWF.	Async: req. Pkt: n/a	Fully implemented	Remote Async/Fax command.

Table 2-9 IS-707.3 Table 7.2-1. Extended AT Configuration Commands (Part 5 of 5)

Cmd	Value per	Description	IS-707 req't	Implement'n status	Explanation
+MV18R	IS-131	V.18 Reporting Control. This extended-format numeric parameter controls whether the extended-format +MV18R: result code is transmitted 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 manner of operation of the V.18 capabilities (if present in the IWF).	Async: opt. Pkt: n/a	Fully implemented	Remote Async/Fax command

NOTE TIA/EIA/IS-131 states that this command only applies when the V.42 error control is being used, or when fallback to nonerror control mode is specified to include buffering and flow control. In this standard, this command applies independently of the use and setting of V.42. If V.42 is not used or not configured appropriately, data loss may occur.

Table 2-10 IS-707.3 Table 7.3.1-1. Fax Parameters (Part 1 of 2)

Parameter	Value per	Description	Implementation status	Explanation
+FAA	EIA/TIA-592	Adaptive-answer parameter; see +FCLASS	Fully implemented	Remote
+FAP	EIA/TIA/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		DCE-capabilities parameters	Fully implemented	Remote
VR	EIA/TIA-592	Vertical-resolution subparameter		
[BR]		Bit-rate subparameter		
	0	• 2400 bits/s		
	1	• 4800 bits/s		
	2	• 7200 bits/s		
	3[1]	• 9600 bits/s		
WD	EIA/TIA-592	Page-width subparameter		
[LN]	EIA/TIA-592[2]	Page-length subparameter		
[DF]	EIA/TIA-592[2]	Data-compression-format subparameter		
[EC]	EIA/TIA-592[2]	Error-correction subparameter		
BF	EIA/TIA-592	Binary-file-transfer subparameter		
ST	EIA/TIA-592	Scan-time-per-line subparameter		
[+FCLASS]		Service-class selection parameter	Fully implemented	Remote; Mobile will Return ERROR For +FCLASS=1
	0	• Class-0		
	1	• [Class-1 support unavailable]		
	2[1]	• Class-2.0 fax service (EIA/TIA-592)		
+FCQ	EIA/TIA-592	Copy-quality-checking parameter	Fully implemented	Remote
[+FCR]	EIA/TIA-592[2]	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

Table 2-11 IS-707.3 Table 7.3.1-1. Fax Parameters (Part 2 of 2)

Parameter	Value per	Description	Implementation status	Explanation
+FFC	EIA/TIA-592	Format-conversion parameter	Fully implemented	Remote
+FHS	EIA/TIA-592	Call-termination-status parameter	Fully implemented	Remote
+FIE	EIA/TIA-592	Procedure-interrupt-enable parameter	Fully implemented	Remote
+FIS	EIA/TIA-592	Current-session negotiation	Fully implemented	Remote
[+FLI]	EIA/TIA-592[2]	Local-ID-string parameter (TSI or CSI)	Fully implemented	Remote
+FLO	EIA/TIA-592[2]	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	See 4.4.1.2.5
+FMM	EIA/TIA-592	Request DCE model	Fully implemented	See 4.4.1.2.5
+FMR	EIA/TIA-592	Request DCE revision	Fully implemented	See 4.4.1.2.5
[+FMS]	EIA/TIA-592[2]	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	EIA/TIA/IS-134	Selective Polling Address parameter	Fully implemented	Remote
[+FPI]	EIA/TIA-592[2]	Local-polling-ID-string parameter	Fully implemented	Remote
[+FPP]	EIA/TIA-592[4]	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[5]	Page-status parameter	Fully implemented	Remote
+FPW	EIA/TIA/IS-134	Password parameter (Sending or Polling)	Fully implemented	Remote
[+FRQ]	EIA/TIA-592[2]	Receive-quality-threshold parameters	Fully implemented	Remote
+FRY	EIA/TIA-592	ECM-retry-value parameter	Fully implemented	Remote
+FSA	EIA/TIA/IS-134	Subaddress parameter	Fully implemented	Remote
[+FSP]	EIA/TIA-592[2]	Request-to-poll parameter	Fully implemented	Remote

[1] Use of option 3 may cause degradations in the quality of certain faxes.
[2] Some values for this parameter are optional in EIA/TIA-592. In this standard, all parameters of this command shall be supported.
[3] Class 2.0 represents EIA/TIA-592.
[4] Support of packet protocol is optional.
[5] Values 4 and 5 of this parameter are optional.

Table 2-12 IS-707.3 Table 7.3.2-1. Fax Action Commands

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

Table 2-13 IS-707.3 Table 7.4.1-1. CDMA AT Parameter Commands (Part 1 of 4)

Command	Description	IS-707 req't	Implement'n status	Explanation
+CXT=<value>	Cellular Extension • **0** – Do not pass unrecognized commands to the IWF. • 1 – When detecting an unrecognized AT command, open transport layer connection and pass unrecognized command to the IWF.	Async: req. Pkt: n/a	Fully implemented	—
+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 an 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 • 2/3 – Not used • 4 – If CDMA data service is not available • 5 – If the mobile station is in the traffic state	Async: opt. Pkt: opt.	Fully implemented	—
+CDR	U_m 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	—

Table 2-14 IS-707.3 Table 7.4.1-1. CDMA AT Parameter Commands (Part 2 of 4)

Command	Description	IS-707 req't	Implement'n status	Explanation
+CDS	U_m Interface Data Compression. This extended-format compound parameter controls the V.42*bis* data compression function on the U_m interface. The command format is the same as for the TIA/EIA/IS-131 +DS command.	Async: req. Pkt: n/a	Fully implemented	Current mobile does not support V.42*bis* compression. Mobile will only accept 0 as a valid setting.
+CRM=<value>	Set R_m interface protocol • 0 – Asynchronous Data or Fax • 1 – Packet data service, Relay Layer R_m interface • 2 – Packet data service, Network Layer R_m interface, PPP • 3 – Packet data service, Network Layer R_m interface, SLIP • 4 –STU-III Service • 127 – Mobile-to-Mobile data(only supported in LG Telecom, Korea) • 130 – Packet data service using built-in TCP/IP protocol stack (AnyDATA.NET proprietary) **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.	Async: req. Pkt: req.	Fully implemented	• Mobile supports only Async/Fax and Packet Relay models. • Mode selection occurs automatically based on data received. • Mobile will accept only 0 and 1 as valid settings. No call will be initiated.
+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	—

Table 2-15 IS-707.3 Table 7.4.1-1. CDMA AT Parameter Commands (Part 3 of 4)

Command	Description	IS-707 req't	Implement'n status	Explanation
+CQD=<value>	Command State Inactivity Timer (see 3.9.1.3) • 0 – Ignored • 1-255 – Release call after 5x<value> sec have elapsed without activity. The default <value> shall be 10, corresponding to 50 sec.	Async: req. Pkt : n/a	Fully implemented	Remote Async/Fax command
+CRC=<value>	Cellular Result Codes (see Table 7.4.2-1) • **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 : n/a	Fully implemented	—
+CBIP?	Base Station IP Address or Destination IP Address Read-only. Returns the destination IP address if the CRM is 130, else returns the base 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 registered with a cellular system. • P – The mobile station is registered with a PCS system. Band: • CA – The mobile station is registered with a cellular A-band system. • CB – The mobile station is registered with a cellular B-band system. • PA – The mobile station is registered with a PCS A-band system. • PB – The mobile station is registered with a PCS B-band system. • PC – The mobile station is registered with a PCS C-band system. • PD – The mobile station is registered with a PCS D-band system. • PE – The mobile station is registered with an PCS E-band system. • PF – The mobile station is registered with a PCS F-band system. • Z – The mobile station is not registered. SID: • 0-16383 – The mobile station is registered with the system indicated. • 99999 – The mobile station is not registered.	Async: req. Pkt : opt	Fully implemented	—

Table 2-16 IS-707.3 Table 7.4.1-1. CDMA AT Parameter Commands (Part 4 of 4)

Command	Description	IS-707 req't	Implement'n status	Explanation
+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 (see "Note" below). • 99 – SQM is not known or is not detectable. All other values are 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 not known or is not detectable. All other values are 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 passthrough between DTE and MT2 • 0 – Audio Pass Through Disabled • 1 – Audio Pass Through Enabled	Async: n/a Pkt : n/a	Not implemented	—
+CFC=<value>	U_m Interface Fax Compression • **0** – No compression. • 1 –V.42*bis* compression with parameters as set by the +CDS command. • 2 – Modified the Modified Read compression.	Async: req. Pkt : n/a	Fully implemented	mobile does not support V.42*bis* compression. Mobile will only accept 0 as a valid parameter.

NOTE The exact meaning of the SQM shall be manufacturer-defined. The lowest quality reported by SQM shall be defined as value 00. The highest quality reported by SQM shall be defined as value 31.

Table 2-17 IS-707.3 Table 7.4.1-2. Cellular AT Command Extensions in Support of Voice Services

Command	Description	IS-707 req't	Implementation status	Explanation
+CHV<value>	Hangup 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 cause the MT2 to change to the online state.	Async: opt. Pkt : n/a	Fully implemented	—

Table 2-18 IS-707.3 Table 7.4.1-3. Cellular Identification AT Command Extensions (Part 1 of 2)

Cmd	Value per	Description	IS-707 req't	Implement'n 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 +<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	Async: opt. Pkt : n/a	Fully implemented	Remote Async/Fax command
+CGMI	IS-131	This command causes the IWF to 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 of a single line containing the name of the manufacturer, but manufacturers may choose to provide more information 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 causes the IWF to 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 of a single line containing the name of the product, but manufacturers may choose to provide any information desired.	Async: opt. Pkt : n/a	Fully implemented	Remote Async/Fax command

* The +CIS707 result code indicates support of the AT commands and result codes in Tables 7.4.1-1, 7.4.1-2, 7.4.1-3, 7.4.1-4 and 7.4.2-1

Table 2-19 IS-707.3 Table 7.4.1-3. Cellular Identification AT Command Extensions (Part 2 of 2)

Cmd	Value per	Description	IS-707 req't	Implement'n status	Explanation
+CGMR	IS-131	This command causes the IWF to 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 version, revision level or date, or other pertinent information of the device. Typically, the text will consist of a single line containing the version of the product, but manufacturers may choose to provide any information desired.	Async: opt. Pkt : n/a	Fully implemented	Remote Async/Fax command
+CGOI	IS-131	This command causes the IWF to 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 of 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 causes the IWF to 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 of a single line containing a manufacturer determined alphanumeric string, but manufacturers may choose to provide any information desired.	Async: opt. Pkt : n/a	Fully implemented	Remote Async/Fax command

Table 2-20 IS-707.3 Table 7.4.1-4. Cellular AT Commands for Packet Data Services

Command	Description	Implementation status	Explanation
+CTA=<value>	Set/Read/Test U_m packet data inactivity timer • 0 – Traffic Channel not released during 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. • **0 – (default)**	Fully implemented	Relevant only for Packet service 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

Table 2-21 IS-707.3 Table 7.4.2-1. Cellular Result Codes

Result code	Description	IS-707 req't	Implement'n status	Explanation
+CERROR: BAD REQUEST	Intercept received after call origination.	Async: req. Pkt: n/a	Not implemented	—
+CERROR: INIT FAILED <failed command>	Initialization string failed (see 5.1).	Async: req. Pkt: n/a	Mobile supports	Remote Async/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	Origination 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> SERVICE	The indicated service option was rejected. The <service option> shall be ASYNC or FAX.	Async: req. Pkt: n/a	Not implemented	—
+CERROR: PAGE FAIL	Mobile station received a page but not an alert.	Async: req. Pkt: n/a	Not implemented	—
+CERROR: PAGED	Mobile station attempted to originate after receiving a page.	Async: req. Pkt: n/a	Not implemented	—
+CERROR: PAGED	Indicates call release.	Async: req. Pkt: n/a	Not implemented	—
+CERROR: RETRY	Reorder received after call origination.	Async: req. Pkt: n/a	Not implemented	—
+CPROG: ANSWER	Indicates remote DCE has answered.	Async: req. Pkt: n/a	Mobile supports	Remote Async/Fax command
+CPROG: BONGTONE	Billing Tone was detected.	Async: req. Pkt: n/a	Mobile supports	Remote Async/Fax command
+CPROG: DIALING <number>	Indicates PSTN Dialing.	Async: req. Pkt: n/a	Mobile supports	Remote Async/Fax command
+CPROG: DIALTONE	Dial tone was detected.	Async: req. Pkt: n/a	Mobile supports	Remote Async/Fax command
+CPROG: QUIET ANSWER	Indicates Quiet Answer.	Async: req. Pkt: n/a	Mobile supports	Remote Async/Fax command
+CPROG: RINGING	Indicates PSTN Ringing.	Async: req. Pkt: n/a	Mobile supports	Remote Async/Fax command
+CPROG: VOICE	Voice detected on the PSTN connection.	Async: req. Pkt: n/a	Mobile supports	Remote Async/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	—

Table 2-22 IS-707.3 Table 7.4.2-2. Cellular Result Codes for Packet Data Services

Result code	Description	Implement'n 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 state. Sent autonomously when +CPSR=1. • 0 – Packet data service is in the Inactive state. • 1 – Packet data service is in the Active state, and the call control function is in the Initialization/Idle state. • 2 – Packet data service is in the Active state, and the call control function is in the Initialization/Traffic state. • 3 – Packet data service is in the Active state, the call control function is in the Connected state, and the packet data service option is using primary traffic. • 4 – Packet data service is in the Active state, the call control function is in the Connected state, and the packet data service option is using secondary traffic. • 5 – Packet data service is in the Active state, and the call control function is in the Dormant/Idle state. • 6 – Packet data service is in the Active state, and the call control function is in the Dormant/Traffic state. • 7 – Packet data service is in the Active state, and the call control function is in the Reconnect/Idle state. • 8 – Packet data service is in the Active state, and the call control function is in the Reconnect/Traffic state. • 9-255 – Reserved.	Not implemented	Packet call state reporting *not* supported
+CPER:<value>	Packet call event. Sent autonomously when +CPER=1. • 0 – Enter Idle State • 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 a reconnect attempt.	Not implemented	—

2.2 Qualcomm-Specific AT Commands Implementation

Bold types in all tables of this section indicate the default parameter that is used by AnyDATA.NET, Qualcomm and IS-707 standard.

Table 2-23 Qualcomm-specific AT commands

Command	Description	Operation
$QCDMG	Transition to Diagnostics 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 originations will use the packet data service option number.** • 1 := enable QNC capability. This means that Packet Originations will use the Async Data Service Option number.
$QCMTOM	Originate Mobile-to-Mobile Packet Data call using QUALCOMM proprietary Service Option number	Complete command is AT$QCMTOM = <number>, where <number> is the phone number to dial. This command will originate a Mobile-to-Mobile Packet data call using the QUALCOMM-proprietary Service Option number 0x8003. This is a Rate Set 1 call.
$QCRLPD	Dump RLP protocol statistics **(option)**	This command will dump the RLP statistics in ASCII format to the TE2. This does not apply to RLP 3 statistics (see $QCRL3D).
$QCRLPR	Reset RLP protocol statistics **(option)**	This command will zero all the RLP statistics counters. This does not apply to RLP 3 statistics (see $QCRL3R).
$QCPPPD	Dump PPP protocol statistics **(option)**	This command will dump the PPP statistics in ASCII format to the TE2.
$QCPPPR	Reset PPP protocol statistics **(option)**	This command will zero all of the PPP statistics counters.
$QCIPD	Dump IP protocol statistics **(option)**	This command will dump the IP statistics in ASCII format to the TE2.
$QCIPR	Reset IP protocol statistics **(option)**	This command will zero all of the IP statistics counters.
$QCUDPD	Dump UDP protocol statistics **(option)**	This command will dump the UDP statistics in ASCII format to the TE2.
$QCUDPR	Reset UDP protocol statistics **(option)**	This command will zero all the UDP statistics counters.
$QCTCPD	Dump TCP protocol statistics **(option)**	This command will dump the TCP statistics in ASCII format to the TE2.
$QCTCPR	Reset TCP protocol statistics **(option)**	This command will zero all the TCP statistics counters.
&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; saves to non-volatile memory	• **0 := pre-707 SO numbers (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 0x8021, 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.
$QCCAV	Answer incoming voice call	This command provides a means to answer an incoming voice call via an AT command.
$QCCPND	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 just prior dial command (that is, AtdX #), then the mobile will originate a packet (or QNC) data call. • **1 := Enable Packet No Dial. Reception of a PPP packet without a just prior dial command will NOT originate a PPP packet (or QNC) call.**

$QCVAD=	Prearrangement setting; respond to Page message that has a Voice service option with a Page response that has a Data service option	• **0 := Off** • 1 := Fax for next call • 2 := Fax for all calls • 3 := Async for next call • 4 := Async for all calls
$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 not negotiate to MDR or Low-Speed Packet service options if SO 33 is not available..
$QCRL3D	Dump RLP 3 protocol statistics **(option)**	This command will dump the RLP 3 statistics in ASCII format to the TE2. This does not apply to other versions of RLP (see $QCRLPD).
$QCRL3R	Reset RLP 3 protocol statistics **(option)**	This command will zero all of the RLP 3 statistics counters. This does not apply to other versions of RLP (see $QCRLPR).
$QCSCRM	Enable/Disable mobile from 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. ***For MSM5000, MSM5100, and MSM5105 ASICs only.**
$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. ***For MSM5000, MSM5100, and MSM5105 ASICs only.**

* **Option** can be changed by user's requirements.

2.3 AnyDATA.NET Proprietary AT Commands Implementation

Bold types in all tables of this section indicate the default parameter that is used by AnyDATA.NET, Qualcomm and IS-707 standard.

2.3.1 AnyDATA general AT command

Table 2-24 AnyDATA Extended AT Commands

Cmd	Description	Operation
+MIN?	Mobile Station MIN Read-only. Returns the mobile station's MIN.	+MIN:<value> OK
+TIME?	UCT time(CDMA System time) Read-only. Returns the UCT time and Date(CDMA system time).	+ TIME:6/12/00 14:00:05 x OK (x = 0~7, 0: SUN, 1: MON, …, 7: ERROR)
+DTMF=x	Set the DTMF code to be sent in the traffic channel.	+DTMF=x 0 ~ 9 : 0 ~ 9 DTMF tone 10 : *(star) DTMF tone 11 : #(pound) DTMF tone
+RESET	Reset mobile station	+RESET
+VOL = x	Adjust the audio volume level Level x : 0 ~ 3	+VOL=x OK
+VIB = x	Set the vibrator mode to ON(OFF) **x=1** : vibrator OFF x=2 : vibrator ON	+VIB=x

2.3.2 AnyDATA TCP/IP related AT command

Table 2-25 AnyDATA TCP/IP related AT Commands

Cmd	Description	Operation
+RPORT?	Retrieve the destination port number	+ RPORT:xxx OK
+DPORT="xxxx"	Set the destination port number when the CRM is 130	+DPORT= "1800" OK
+DIP="x.x.x.x"	Set the destination IP address when the CRM is 130	+DIP="123.123.123.123" OK
+PDIAL=x	**x = 0** : pre-dialing OFF x = 1 : pre-dialing ON if pdial is enable, modem only connects PPP to the IWF. It is not try TCP/IP connection. When DTE changed the GPIO_INT1, modem tries the TCP/IP connection.	+PDIAL=0 OK

2.3.3 AnyDATA SMS related AT command

Table 2-26 AnyDATA SMS related AT Commands

Cmd	Description	Operation
+SMSG	Set the serial port to SMS origination mode	+SMSG OK
+SMSD	Delete all new SMS message	+SMSD OK
+SMSR	Read the latest SMS message and delete that message.	+SMSR OK

+SMSA?	Check available address count	+SMSA : <value>
+SMSO?	Check text, old message count	+SMSO : <value>
+SMSC?	Check text, new, urgent message + new, non-urgent message count	+SMSC : <value>
+SMSS?	Query SMS origination state	+SMSS : <value> 1 : Transmission Success 2 : Transmission Failure 3 : Transmitted from DTE to AnyDATA.NET modem 5 : On transmission 6 : No Service
+RSMS = x	Read x (index) address sms	+RSMS = 0 OK
+DSMS = x	Delete x (index) address sms	+DSMS = 0 OK

2.3.4 AnyDATA MIN writing related AT command

Table 2-27 AnyDATA MIN writing related AT Commands

Cmd	Description	Operation
+SPC = “xxxxxx”	Set the SPC code for the NAM programming.	+SPC=“000000” OK
+WMIN = “xxxxxxxxxx”	Program the mobile station MIN when the SPC is unlocked.	+WMIN=“01x1234567” or “1x12345678” OK