AT Command reference guide for ZTEWelink Module

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Revision history

Version	Release Date	Description
1.0	2012-8-27	1st release
1.3	2012-10-10	After ITU commands being checked out
1.4	2012-10-20 2012-11-05	Seperated serveral category by function R&D 1st checked
1.4.1	2013-2-25	Modify AT commands of CLVL/CMVL Add AT commands of ZCTGAIN/ZTXGAIN This is for YUANTE temporarily.
1.4.2	2013-3-4	prove the commend AT&W, AT&F, etc.
1.5	2013-4-1	1. Modify the logo of cover and page footer 2. Modify Legal Information 3. Increase the chapter 4 of Common Usage Scenarios 4. Increase the availability table of AT commands for all ZTEWelink modules to make this AT set can be used to every modules. 5. Add some Acronyms and Abbreviations
	2013-5-7 to 2013-05-30	6. Add the commands of + ZTURNOFF, +ZRPMNV, +ZRPMC, +ZIPCODE, +ZADC1, +ZFLOW, +ZGPIO, +ZGPIOSET, +ZGPIOGET, +ZGPIOCNF for MF206A used for America program in chapter 3.3.20 7. Modify the commands of +ZDON, +ZPINPUK, +ZGPSR, +ZGMEASURE, +ZGPSEVENT, +DR, +DS, &F, &W, Z, D, +CSTA, +CBST, +CR, +VTS, +ZTXGAIN, +ZCTXGAIN, +ZDON, +CRSM, +ZSELI, +CMEE, +ZGURL, +ZIPCALL, +ZIPCLOSE, +ZIPRECV, +ZRSSI, +ZSNT, +ZPAS, +ZCPBR, +CGREG,+ZSTM, +ZDIST 8. Add the defined values in +CSCA 9. Add the commands of +ZCDS, +ZCPWR, +ZCNC, +ZCPS, +ZCCM, +ZCSM, +ZCCH, +ZCSUB, +ZCWD, +ZCOTA for ZM5202 used for Korea program in chapter 3.3.20 10. Add the Table of Estimated maximum time to get the response of parts AT commands in chapter 3.1.4 11. Delete the Implementation in all the AT command in this document

		12. Update the document format and all the tables
		13. Add the commands of +ZSAR,+ZREADY
	2013-05-31	14. Release as Version 1.5

Table of Contents

1 Introduction

1.1 Scope

This document is aimed at providing a detailed specification and a comprehensive listing as a reference for the whole set of AT command. All the AT commands follow 3GPP (R99) TS27.005 and TS27.007.

1.2 Audience

Readers of this document should be familiar with ZTEWelink modules and their ease of controlling by means of AT Commands.

1.3 Document Organization

This document contains the following chapters:

Chapter 1: "Introduction" provides a scope for this document, target audience, contact and support information, and text conventions.

Chapter 2: "Acronyms and Abbreviations"

Chapter 3: "AT Commands" The core of this reference guides.

Chapter 4: "The Common Usage Scenarios"

1.4 AT Commands Availability Table

The Table 1.4.1 is the classification of modules according to the package.

Table 1.4.1 The classification of modules according to the package

Package	LGA Type Ⅰ	LGA TYPE Ⅱ (except ZM5500)					Mini PCIE		
Module	MF206	MF206A	MF226	ZM 5202	ZM 5200	ZM 5500	MF 210	MF 212	MF210V

In the Table 1.4.2 below, it lists all the AT commands in the first raw, and the ZTEWelink wireless module family in the first column. The modules is classificed as shown in Table 1.4.1

In this table, "√" is stand for the module support this AT command, and "✕" does not.

Table 1.4.2 The AT Commands Availability Table

	AT	MF 206	MF 206A	MF 226	ZM5202	ZM 5200	ZM 5500	MF210	MF212	MF210V
	General Commands									
1	AT	√	√	√	√	√	√	√	√	√
2	+DR	√	√	√	√	√	√	√	√	√
3	+DS	√	√	√	√	√	√	√	√	√
4	S3	√	√	√	√	√	√	√	√	√
5	S4	√	√	√	√	√	√	√	√	√
6	S5	√	√	√	√	√	√	√	√	√
7	S6	√	√	√	√	√	√	√	√	√
8	S7	√	√	√	√	√	√	√	√	√
9	S8	√	√	√	√	√	√	√	√	√
10	+CTZU	√	√	√	√	√	√	√	√	√
11	+CTZR	√	√	√	√	√	√	√	√	√
12	+ZMTime	√	√	√	√	√	√	√	√	√
	Configuration Commands									
13	&F	√	√	√	√	√	√	√	√	√
14	&V	√	√	√	√	√	√	√	√	√
15	&W	√	√	√	√	√	√	√	√	√
16	O	√	√	√	√	√	√	√	√	√
17	Q	√	√	√	√	√	√	√	√	√
18	V	√	√	√	√	√	√	√	√	√
19	X	√	√	√	√	√	√	√	√	√
20	Z	√	√	√	√	√	√	√	√	√
21	+CFUN	√	√	√	√	√	√	√	√	√
22	+ZOPRT	√	√	√	√	√	√	√	√	√
23	+CSCS	√	√	√	√	√	√	√	√	√
24	+CLAC	√	√	√	√	√	√	√	√	√
	Identification Commands									
25	I	√	√	√	√	√	√	√	√	√
26	+CGMI	√	√	√	√	√	√	√	√	√
27	+CGMM	√	√	√	√	√	√	√	√	√

	AT	MF 206	MF 206A	MF 226	ZM5202	ZM 5200	ZM 5500	MF210	MF212	MF210V
28	+CGMR	√	√	√	√	√	√	√	√	√
29	+CGSN	√	√	√	√	√	√	√	√	√
30	+CIMI	√	√	√	√	√	√	√	√	√
31	+GMI	√	√	√	√	√	√	√	√	√
32	+GMM	√	√	√	√	√	√	√	√	√
33	+GMR	√	√	√	√	√	√	√	√	√
34	+GSN	√	√	√	√	√	√	√	√	√
35	+ZPCB	√	√	√	√	√	√	√	√	√
	Serial interface Control Commands									
36	&C	√	√	√	√	√	√	√	√	√
37	&D	√	√	√	√	√	√	√	√	√
38	&S	√	√	√	√	√	√	√	√	√
39	&K	√	√	×	√	√	√	×	×	×
40	+IFC	√	√	√	√	√	√	√	√	√
41	+ZFLOW	×	√	×	√	√	√	×	×	×
42	+IPR	√	√	√	√	√	√	√	√	√
43	E	√	√	√	√	√	√	√	√	√
44	+ZMUXMODE	×	√	×	×	×	×	×	×	×
45	+ZBITRATE	√	√	×	√	√	√	×	×	×
46	+UART	√	√	√	√	√	√	×	×	×
	Service Control Commands and Methods									
47	+CSTA	√	√	√	√	√	√	√	√	√
48	+CBST	√	√	√	√	√	√	√	√	√
49	+CRLP	√	√	√	√	√	√	√	√	√
50	+CR	√	√	√	√	√	√	√	√	√
51	+ZWPS	√	√	×	√	√	√	×	×	×
	Supplementary Service Commands									
52	+CPUC	√	√	√	√	√	√	√	√	√
53	+CCUG	√	√	√	√	√	√	√	√	√
54	+CUSD	√	√	√	√	√	√	√	√	√

	AT	MF 206	MF 206A	MF 226	ZM5202	ZM 5200	ZM 5500	MF210	MF212	MF210V
	Network Service Relative Commands									
55	+CREG	√	√	√	√	√	√	√	√	√
56	+COPS	√	√	√	√	√	√	√	√	√
57	+CSQ	√	√	√	√	√	√	√	√	√
58	+CPOL	√	√	√	√	√	√	√	√	√
59	+COPN	√	√	√	√	√	√	√	√	√
60	+ZRSSI	√	√	√	√	√	√	√	√	×
61	+ZDON	√	√	√	√	√	√	√	√	√
62	+ZSNT	√	√	√	√	√	√	√	√	√
63	+ZPAS	√	√	√	√	√	√	√	√	×
	Security Commands									
64	+CLCK	√	√	√	√	√	√	√	√	√
65	+CPWD	√	√	√	√	√	√	√	√	√
66	+CPIN	√	√	√	√	√	√	√	√	√
67	+ZPINPUK	√	√	√	×	×	×	×	×	×
	Phonebook Commands									
68	+CPBS	√	√	√	√	√	√	√	√	√
69	+CPBR	√	√	√	√	√	√	√	√	√
70	+CPBF	√	√	√	√	√	√	√	√	√
71	+CPBW	√	√	√	√	√	√	√	√	√
72	+ZCPBR	√	√	√	√	√	√	√	√	√
73	+ZCPBW	√	√	√	√	√	√	√	√	√
	Status Control Commands									
74	+CPAS	√	√	√	√	√	√	√	√	√
75	+CEER	√	√	√	√	√	√	√	√	√
	STK and SIM Commands									
76	+CSIM	√	√	√	√	√	√	√	√	√
77	+CRSM	√	√	√	√	√	√	√	√	√
78	+CNUM	√	√	√	√	√	√	√	√	√
79	+ZSTM	√	√	√	√	√	√	×	×	√
80	+ZSELM	√	√	√	×	×	×	×	×	√

	AT	MF 206	MF 206A	MF 226	ZM5202	ZM 5200	ZM 5500	MF210	MF212	MF210V
81	+ZSTI	√	√	×	×	×	×	×	×	×
82	+ZSELI	√	√	√	√	√	√	√	√	√
83	+ZDIST	√	√	√	√	√	√	√	√	√
84	+ZGINK	√	√	√	√	√	√	√	√	√
85	+ZGINP	√	√	√	√	√	√	√	√	√
86	+ZPSTM	√	√	√	√	√	√	√	√	√
87	+ZEND	√	√	√	√	√	√	√	√	√
88	+ZSMSR	√	√	√	√	√	√	√	√	√
89	+Zunsupport	√	√	√	√	√	√	√	√	√
90	+ZBK	√	√	√	√	√	√	√	√	√
91	+ZINKR	√	√	√	√	√	√	√	√	√
92	+ZINPR	√	√	√	√	√	√	√	√	√
93	+ZDISTR	√	√	√	√	√	√	√	√	√
94	+ZUSIM	√	√	√	√	√	√	√	√	√
95	+ZSEC	√	√	√	√	√	√	√	√	√
96	+ZNCK	√	√	√	×	×	×	√	√	√
97	+ZLKLIST	√	√	√	√	√	√	√	√	√
	Mobile Terminal Error Command									
98	+CMEE	√	√	√	√	√	√	√	√	√
	Commands for UMTS Packet Domain									
99	+CGDCONT	√	√	√	√	√	√	√	√	√
100	+CGQREQ	√	√	√	√	√	√	√	√	√
101	+CGQMIN	√	√	√	√	√	√	√	√	√
102	+CGEQREQ	√	√	√	√	√	√	√	√	√
103	+CGEQMIN	√	√	√	√	√	√	√	√	√
104	+CGATT	√	√	√	√	√	√	√	√	√
105	+CGACT	√	√	√	√	√	√	√	√	√
106	+CGDATA	√	√	√	√	√	√	√	√	√
107	+CGPADDR	√	√	√	√	√	√	√	√	√
108	+CGCLASS	√	√	√	√	√	√	√	√	√

	AT	MF 206	MF 206A	MF 226	ZM5202	ZM 5200	ZM 5500	MF210	MF212	MF210V
109	+CGEREP	√	√	√	√	√	√	√	√	√
110	+CGREG	√	√	√	√	√	√	√	√	√
111	+CGSMS	√	√	√	√	√	√	√	√	√
	Command from TIA IS									
112	+FCLASS	√	√	√	√	√	√	√	√	√
	Commands Relative for SMS and CBS									
113	+CSMS	√	√	√	√	√	√	√	√	√
114	+CMGF	√	√	√	√	√	√	√	√	√
115	+CMS ERROR	√	√	√	√	√	√	√	√	√
116	+CSCA	√	√	√	√	√	√	√	√	√
117	+CSMP	√	√	√	√	√	√	√	√	√
118	+CSCB	√	√	√	√	√	√	√	√	√
119	+CSAS	√	√	√	√	√	√	√	√	√
120	+CRES	√	√	√	√	√	√	√	√	√
121	+CNMI	√	√	√	√	√	√	√	√	√
122	+CMGL	√	√	√	√	√	√	√	√	√
123	+CMGR	√	√	√	√	√	√	√	√	√
124	+CNMA	√	√	√	√	√	√	√	√	√
125	+CMGS	√	√	√	√	√	√	√	√	√
126	+CMSS	√	√	√	√	√	√	√	√	√
127	+CMGW	√	√	√	√	√	√	√	√	√
128	+CMGD	√	√	√	√	√	√	√	√	√
129	+CMGC	√	√	√	√	√	√	√	√	√
130	+CMMS	√	√	√	√	√	√	√	√	√
131	+CPMS	√	√	√	√	√	√	√	√	√
132	+CMTI	√	√	√	√	√	√	√	√	√
133	+CDSI	√	√	√	√	√	√	√	√	√
134	+ZWAKEUPSMS	√	√	×	√	√	√	×	×	×
135	+ZSMSD	√	√	√	√	√	√	√	√	√

	AT	MF 206	MF 206A	MF 226	ZM5202	ZM 5200	ZM 5500	MF210	MF212	MF210V
	GPS Relative Commands									
136	+ZGINIT	√	√	√	√	√	√	√	√	√
137	+ZGMODE	√	√	√	√	√	√	√	√	√
138	+ZGFIXRATE	√	√	√	√	√	√	√	√	√
139	+ZGQOS	√	√	√	√	√	√	√	√	√
140	+ZGURL	√	√	√	√	√	√	√	√	√
141	+ZGPSERRO R	√	√	√	√	√	√	√	√	√
142	+ZGRST	×	×	√	√	√	√	×	×	×
143	+ZGPSAPN	×	×	√	√	√	√	×	×	×
144	+ZGMEASU RE	√	√	√	√	√	√	√	√	√
145	AT+ZGMEAS URE	×	×	×	√	√	√	×	×	×
146	+ZGPSR	√	√	√	√	√	√	√	√	√
147	AT+ZGPSR	×	×	×	√	√	√	×	×	×
148	+GPSEVENT	√	√	√	√	√	√	√	√	√
149	AT+GPSEVE NT	×	×	×	√	√	√	×	×	×
150	+ZGNI	×	√	×	×	×	×	×	×	×
151	+ZGRUN	√	√	√	√	√	√	√	√	√
	TCP/IP Relative Commands									
152	+ZIPCFG	√	√	√	√	√	√	√	√	√
153	+ZIPCALL	√	√	√	√	√	√	√	√	√
154	+ZIPOPEN	√	√	√	√	√	√	√	√	√
155	+ZIPCLOSE	√	√	√	√	√	√	√	√	√
156	+ZIPSEND	√	√	√	√	√	√	√	√	√
157	+ZIPRECV	√	√	√	√	√	√	√	√	√
158	+ZIPSTAT	√	√	√	√	√	√	√	√	√
159	+ZIPSLCFG	√	√	√	√	√	√	√	√	√
160	+ZIPLISTEN	√	√	√	√	√	√	√	√	√

	AT	MF 206	MF 206A	MF 226	ZM5202	ZM 5200	ZM 5500	MF210	MF212	MF210V
161	+ZIPFRWL	√	√	√	√	√	√	√	√	√
162	+ZIPCODE	×	√	×	×	×	×	×	×	×
	Hardware Relative Commands									
163	+CCLK	√	√	√	√	√	√	√	√	√
164	+ZTURNOFF	×	√	×	×	×	×	×	×	×
	Customized commands of MF206A module									
165	+ZIPCODE	×	√	×	×	×	×	×	×	×
166	+ZADC1	×	√	×	×	×	×	×	×	×
167	+ZFLOW	×	√	×	×	×	×	×	×	×
168	+ZGPIOCNF	×	√	×	×	×	×	×	×	×
169	+ZGPIOGET	×	√	×	×	×	×	×	×	×
170	+ZGPIOSET	×	√	×	×	×	×	×	×	×
171	+ZRPMC	×	√	×	×	×	×	×	×	×
172	+ZRPMNV	×	√	×	×	×	×	×	×	×
	Customized commands of ZM5202 module									
173	+ZCDS				√					
174	+ZCPWR				√					
175	+ZCNC				√					
176	+ZCPS				√					
177	+ZCCM				√					
178	+ZCSM				√					
179	+ZCCH				√					
180	+ZCSUB				√					
181	+ZCWD				√					
182	+ZCOTA				√					
183	+ZREADY				√					
184	+ZCTRSAR			√						

2 Acronyms and Abbreviations

For the purposes of the present document, the following abbreviations apply:

Items	Description
AT	Access terminal or Attention – DTE DCE command set originated by Hayes (seeTIA-707), depending on the context
ACK	Acknowledge(response from NW)
APN	Access Point Name
BCSMS	Broadcast short message services
BS	Base Station
CBS	Cell Broadcast Service
CBM	Cell Broadcast Message
CCM	Current Call Meter
CLIR	Calling Line Identification Restriction
CS	Circuit-switched domain
DCE	Data communication equipment or data circuit-terminating equipment depending on the context
DCD	Data Carrier Detect
DTE	Data terminal equipment
DCS	Digital Cellular System
DTR	Data Terminal Equipment
DNS	Domain Name System
DSR	Data Set Ready
EDGE	Enhanced Data Rate for GSM Evolution
GGA	GPS Fix data
GMT	Greenwich Mean Time
GPRS	Global Packet Radio Service
GPS	Global Positioning System
GERAN	GSM EDGE Radio Access Network
GSM	Global System Mobile
HDOP	Horizontal Dilution of Precision
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IRA	International Reference Alphabet (ITU-T Rec. T.50)
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector

IWF	Interworking Function
IEI	Information element identifier
MCC	Mobile Country Code
ME	Mobile equipment
MNC	Mobile Network Code
MT	Mobile-terminated
MO	Mobile-originated
MS	Mobile Station
MSC	Mobile-switching center or Message-switching center, depending on the context
NV	Nonvolatile
NVM	Non Volatile Memory
NW	Network
PDU	Protocol data unit
PDP	Packet Data Protocol
PID	Protocol Identifier
PIN	Personal Communication Service
PPP	Point to Point Protocol
PUK	Pin Unblocking Code
PS	Package-switched
RLP	Radio Link Protocol
RSSI	Reveive Signal Strength Indicator
SMS	Short message service
SAP	SIM Access Profile
SCA	Service Center Address
SIM	Subscriber identity module
SMSC	Short Message Service Center
SM-RL	Short message-relay layer
SM-RP	Short message-relay protocol
SR	Memory storage for SMS status report
TA	Terminal adaptor
TCP	Transmission Control Protocol
TE	Terminal equipment
TP	Transfer Protocol
TMSI	Temporary Mobile Subscriber Identity
UCS2	16-bit universal multiple-octet coded character set
UDP	User Datagram Protocol

USIM	UMTS subscriber identity module
USSD	Unstructured Supplementary Service Data
UTC	Coordinated Universal Time
UTRAN	Universal Terrestrial Radio Access Network
WCDMA	Wideband CDMA
3GPP	Third Generation Partnership

3 AT Commands

The following syntactical definitions apply:

<CR> **Carriage return character** is the command line and result code terminator character, which value, in decimal ASCII between 0 and 255, is specified within parameter S3. The default value is 13.

<LF> **Linefeed character** is the character recognized as line feed character. Its value, in decimal ASCII between 0 and 255, is specified within parameter S4. The default value is 10. The line feed character is output after carriage return character if verbose result codes are used (V1 option used) otherwise, if numeric format result codes are used (V0 option used) it will not appear in the result codes.

<...> Name enclosed in angle brackets is a syntactical element. They do not appear in the command line.

[...] Optional subparameter of a command or an optional part of TA information response is enclosed in square brackets. Brackets themselves do not appear in the command line. When subparameter is not given in AT commands which have a Read command, new value equals to its previous value. In AT commands which do not store the values of any of their subparameters, and so have not a Read command, which are called action type commands, action should be done on the basis of the recommended default setting of the subparameter.

3.1 AT Command Syntax

The syntax rules followed by ZTEWelink implementation of GSM/WCDMA commands are very similar to those of standard basic and extended AT commands.

There are two types of extended command:

- Parameter type commands. wThis type of commands may be "set" (to store a value or values for later use), "read" (to determine the current value or values stored), or "test" (to determine ranges of values supported). Each of them has a "test" (trailing =?) command to give information about the type of its subparameters; they also have a "read" (trailing?) command to check the current values of subparameters.

   NOTE: The response to the Test Command (trailing =?) may be changed in the future by ZTEWelink to allow the description of new values/functionalities.

If all the subparameters of a parameter type command +CMD are optional, issuing AT+CMD=<CR> causes the OK result code to be returned and the previous values of the omitted subparameters to be retained.

3.1.1 String Type Parameters

A string either enclosed between quotes or not, is considered to be a valid string type parameter input. According to V25.ter, space characters are ignored on the command line and may be used freely for formatting purposes, unless

they are embedded in numeric or quoted string constants; therefore a string containing a space character has to be enclosed between quotes to be considered a valid string type parameter (e.g. typing **AT+COPS=1,0,"A1"** is the same as typing **AT+COPS=1,0,A1**; typing **AT+COPS=1,0,"A BB"** is different from typing **AT+COPS=1,0,A BB**).

A small set of commands requires always writing the input string parameters within quotes: this is explicitly reported in the specific descriptions.

3.1.2   Command Lines

A command line is made up of three elements: the **prefix**, the **body** and the **termination character**. The **command line prefix** consists of the characters "**AT**" or "**at**", or, to repeat the execution of the previous command line, the characters "**A/**" or "**a/**". The **termination character** may be selected by a user option (parameter S3), the default being **<CR>**.

The basic structures of the command line are:

   ATCMD1<CR> where **AT** is the command line prefix, **CMD1** is the body of a **basic command** (nb: the name of the command never begins with the character "+") and <**CR>** is the command line terminator character

   ATCMD2=10<CR> where 10 is a subparameter

   AT+CMD1; +CMD2=, ,10<CR> These are two examples of **extended commands** (nb: the name of the command always begins with the character "+"). They are delimited with semicolon. In the second command the subparameter is omitted.

   +CMD1?<CR> This is a Read command for checking current subparameter values

   +CMD1=?<CR> This is a test command for checking possible subparameter values

These commands might be performed in a single command line as shown below:

ATCMD1 CMD2=10+CMD1; +CMD2=, ,10;+CMD1?;+CMD1=?<CR> anyway it is always preferable to separate into different command lines the basic commands and the extended commands. Furthermore it is suggested to avoid placing several action commands in the same command line, because if one of them fails, then an error message is received but it is not possible to argue which one of them has failed the execution.

If command **V1** is enabled (verbose responses codes) and all commands in a command line has been performed successfully, result code **<CR><LF>OK<CR><LF>** is sent from the TA to the TE, if subparameter values of a command are not accepted by the TA or command itself is invalid, or command cannot be performed for some reason, result code **<CR><LF>ERROR<CR><LF>** is sent and no subsequent commands in the command line are processed. If command **V0** is enabled (numeric responses codes), and all commands in a command line has been performed successfully, result code **0<CR>** is sent from the TA to the TE, if subparameter values of a command are not accepted by the TA or command itself is invalid, or command cannot be performed for some reason, result code **4<CR>** and no subsequent commands in the command line are processed.

In case of errors depending on ME operation, **ERROR (or 4)** response may be replaced by +CME **ERROR: <err>** or **+CMS ERROR: <err>**.

NOTE: The command line buffer accepts a maximum of 80 characters. If this number is exceeded none of the commands will be executed and TA returns **ERROR**.

ME Error Result Code - +CME ERROR: <err>

This is NOT a command, it is the error response to +Cxxx 3gpp TS 27.007 commands.

Syntax: +CME ERROR: <err>

Parameter: <err> - error code can be either numeric or verbose (see +CMEE).The possible values of <err> are reported in the table:

Numeric Format	Verbose Format
General error:	
0	Phone failure
1	No connection to phone
2	phone-adaptor link reserved
3	Operation not allowed
4	Operation not allowed
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	Incorrect password
17	SIM PIN2 required
18	SIM PUK2 require
20	Memory full
21	Invalid index
22	Not found
23	Memory failure
24	Text string too long
25	Invalid characters in text string
26	Dial string too long
27	Invalid characters in dial string
30	No network service
31	Network timer-out
32	Network not allowed -emergency calls only
40	Network personalization PIN required
41	Network personalization PUK required

42	Network subset personalization PIN required
43	Network subset personalization PUK required
44	Service provider personalization PIN required
45	Service provider personalization PUK required
46	Corporate personalization PIN required
47	corporate personalization PUK required
48	Hidden key required (NOTE: This key is required when accessing hidden phonebook
49	EAP method not supported
50	Incorrect parameters

Message Service Failure Result Code- +CMS ERROR: <err>

This is NOT a command; it is the error response to +Cxxx 3gpp TS 27.005 commands

Syntax: +CMS ERROR: <err>

Parameter: **<err>** - numeric error code. The **<err>** values are reported in the table:

Numeric Format	Meaning
General error:	
0…127	3gpp TS 24.011 Annex E-2 values
128…255	3gpp TS 24.040 sub clause 9.2.3.22 values
300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	SIM not inserted
311	SIM PIN required
312	PH-SIM PIN required
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network time-out
340	no +CNMA acknowledgement
500	unknown error

3.1.3 Information Responses and Result Codes

The TA response, in case of verbose response format enabled, for the previous examples command line could be as shown below:

Information response to +CMD1?   <CR><LF>+CMD1:2,1,10<CR><LF>

Information response to +CMD1=?   <CR><LF>+CMD1(0-2),(0,1),(0-15)<CR><LF>

Final result code   <CR><LF>OK<CR><LF>

Moreover there are other two types of result codes:

result codes that inform about progress of TA operation (e.g. connection establishment **CONNECT**)

result codes that indicate occurrence of an event not directly associated with issuance of a command from TE (e.g. ring indication **RING**).

Here the basic result codes according to ITU-T V25Ter recommendation

Result Codes (UNDEFINE)	
Numeric Format	Verbose form
0	OK
1	CONNECT
2	RING
3	NO CARRIER
4	ERROR
6	NO DIAL TONE
7	BUSY
8	NO ANSWER

3.1.4 Command Response Time-Out

Every command issued to the ZTEWelink modules returns a result response if response codes are enabled (default). The time needed to process the given command and return the response varies, depending on the command type. Commands that do not interact with the SIM or the network, and involve only internal set up settings or readings, have an immediate response, depending on SIM configuration(e.g., number of contacts stored in the phonebook, number of stored SMS), or on the network the command may interact with.

In the table below are listed only the commands whose interaction with the SIM or the network could lead to long response timings. When not otherwise specified, timing is referred to set command.

For phonebook and SMS writing and reading related commands, timing is referred to commands issued after phonebook sorting is completed.

For DTMF sending and dialing commands timing is referred to module registered on network ("AT+CREG?" answer is "+CREG: 0, 1" or "+CREG: 0, 5").

Command	Estimated maximum time to get response(Seconds)
+COPS	180 (For test command)
+CLCK	180
+CPWD	180
+CPIN	5
+CPBR	30
+CPBS	5
+CPBF	30
+CPBW	5
+CPUC	5
+CSCA	5
+CSAS	5
+CRES	5
+CMGS	180 after CTRL-Z; 1 to get '>' prompt
+CMSS	180 after CTRL-Z; 1 to get '>' prompt
+CMGW	5 after CTRL-Z; 1 to get '>' prompt
+CMGD	5 for single SMS deletion, and 25 for 50 SMS deletion
+CMGR	5
+CMGL	7
+CGACT	180
+CGATT	180
+COPN	45
+CRSM	5

3.1.5 Command Issuing Timing

The chain Command -> Response shall always be respected and a new command must not be issued before the module has terminated all the sending of its response result code (whatever it may be).

This applies especially to applications that "sense" the OK text and therefore may send the next command before the complete code <CR><LF>OK<CR><LF> is sent by the module. It is advisable anyway to wait for at least 20ms between the end of the reception of the response and the issue of the next AT command. If the response codes are disabled and therefore the module does not report any response to the command, then at least the 20ms pause time shall be respected.

During command mode, due to hardware limitations, under severe CPU load the serial port can lose some characters if placed in auto-bauding at high speeds. Therefore if you encounter this problem fix the baud rate with

+IPR command.

3.2 AT Commands References

"3gpp TS 27.005 specification"

"3gpp TS 27.007 specification"

"ITU-T V.25ter specification"

3.3 AT Commands Availability Table

3.3.1 Command Line General Format

Starting A Command Line – AT

AT The prefix AT, or at, is a two-character abbreviation (ATtention), always used to start a command line to be sent from TE to TA.

Last Command Automatic Repetition - A/

If the prefix A/ or a/ is issued, the MODULE immediately executes once again the body of the preceding command line. No editing is possible and no termination character is necessary. A command line may be repeated multiple times through this mechanism, if desired. If A/ is issued before any command line has been executed, the preceding command line is assumed to have been empty (that results in an OK result code).

NOTE: this command works only at fixed IPR.

3.3.2 General commands

3.3.2.1 Data compression reporting +DR

Syntax

Table3.3.2-1: +DR Parameter Command Syntax

Command	Possible response(s)
+DR=[<n>]	
+DR?	

+DR=?	

Description

This extended-format numeric parameter controls whether or not the extended-format "+DR." intermediate result code is transmitted from the DCE to the DTE. The +DR:<type> reported shall represent the current (negotiated or renegotiated) DCE-DCE data compression type. If enabled, the intermediate result code is transmitted at the point after error control negotiation (handshaking) at which the DCE has determined which data compression technique will be used (if any) and the direction of operation.

Defined values

See the table as follow.

Data compression reporting values

<n>	Description
0	Data compression reporting disabled (no +DR result code transmitted)
1	Data compression reporting enabled (+DR result code transmitted)

NOTE: the define value is 0; The value can be inqueried by command AT&V.

3.3.2.2 V.42 bis data compression +DS

Syntax

Table3.3.2-2: +DS Parameter Command Syntax

Command	Possible response(s)
+DS=[<direction>[,<compression_negotiation>[,<max_dict>[,<max_string>]]]]	
+DS?	+DS=<direction>,<compression_negotiation>,<max_dict>,<max_string>
+DS=?	(list of supported <direction> values),(list of supported <compression_negotiation>values),(list of supported <max_dict> values),(list of supported <max_string> values)

Description

This extended-format compound parameter controls the V.42 bis data compression function. It accepts four numeric subparameters:

<direction>, which specifies the desired direction(s) of operation of the data compression function; from the DTE point of view;

<compression_negotiation>, which specifies whether the DCE should continue to operate if the desired

result is not obtained;

<max_dict>, which specifies the maximum number of dictionary entries which should be negotiated (may be used by the DTE to limit the codeword size transmitted, based on its knowledge of the nature of the data to be transmitted);

<max_string>, which specifies the maximum string length to be negotiated (V.42 bis P2).

Defined values

Data compression control subparameters

<direction>	Description
0	Negotiated ... no compression (V.42 bis P0 = 0)
1	Transmit only
2	Receive only
3	Both directions, accept any direction (V.42 bis P0 = 11)
<compression_negotiation>	
0	Do not disconnect if ITU-T Rec. V.42 bis is not negotiated by the remote DCE as specified in <direction>
<max_dict>	512 to 2048
<max_string>	6

NOTE: the define value is 0,0,2048,6; The value can be available from the inquery command AT&V.

3.3.2.3 Command line termination character S3

Syntax

Table3.3.2-4: S3 Parameter Command Syntax

Command	Possible response(s)
S3=<val>	

Description

This S-parameter represents the decimal IA5 value of the character recognized by the DCE from the DTE to terminate an incoming command line. It is also generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the S4 parameter (see the description of the V parameter for usage).

Defined values

0 to 127 Set command line termination character to this value.

NOTE: Carriage return character is the default value restore in the S3. Default value is 13. The value can be available from the inquery command AT&V.

3.3.2.4 Response formatting character S4

Syntax

Table3.3.2-5: S4 Parameter Command Syntax

Command	Possible response(s)
S4=<val>	

Description

This S-parameter represents the decimal IA5 value of the character generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the S3 parameter (see the description of the V parameter for usage).

Defined values

0 to 127 Set response formatting character to this value.

NOTE: Linefeed character is the default value restore in the S3. Default value is 10. The value can be available from the inquery command AT&V.

3.3.2.5 Command line editing character S5

Syntax

Table3.3.2-6: S5 Parameter Command Syntax

Command	Possible response(s)
S5=<val>	

Description

This S-parameter represents the decimal IA5 value of the character recognized by the DCE as a request to delete from the command line the immediately preceding character.

Defined values

<val>:

0 to 127   Set command line editing character to this value. The value can be available from the inquery command AT&V.

3.3.2.6 Pause before blind dialing S6

Syntax

Table3.3.2-7: S6 Parameter Command Syntax

Command	Possible response(s)
S6=<val>	
S6?	

Description

This parameter specifies the amount of time, in seconds, that the DCE shall wait between connecting to the line and signaling call-addressing information to network (dialing), when dial tone detection is not implemented or enabled.

Defined values

<val>:

002 to 010   Number of seconds to wait before blind dialing.

NOTE: the default value is 002, and the value can be available from the inquery command AT&V.

3.3.2.7   Connection completion timeout S7

Syntax

Table3.3.2-8: S7 Parameter Command Syntax

Command	Possible response(s)
S7=<val>	

Description

This parameter specifies the amount of time, in seconds, that the DCE shall allow between either answering a call (automatically or by the A command) or completion of signaling of call addressing information to network (dialing), and establishment of a connection with the remote DCE. If no connection is established during this time, the DCE disconnects from the line and returns a result code indicating the cause of the disconnection (see the descriptions of the A and D commands and related dial modifiers for more information).

Defined values

<val>:

1 to 255   Number of seconds in which connection must be established or call will be disconnected.

NOTE: the define value is 50, and the value can be available from the inquery command AT&V.

3.3.2.8   Comma dial modifier time S8

Syntax

Table3.3.2-9: S8 Parameter Command Syntax

Command	Possible response(s)
S8=<val>	

Description

This parameter specifies the amount of time, in seconds, that the DCE shall pause, during signaling of call addressing information to the network (dialing), when a "**,**" (comma) dial modifier is encountered in a dial string.

Defined values

`<val>`:

0   DCE does not pause when "**,**" encountered in dial string.

1 to 255   Number of seconds to pause.

NOTE: the define value is 2, and the value can be available from the inquery command AT&V.

3.3.2.9   Automatic Time Zone Update +CTZU

Syntax

Table 3.3.3-10: +CTZU parameter command syntax

Command	Possible response(s)
+CTZU=<onoff>	+CME ERROR: <err>
+CTZU?	+CTZU: <onoff> +CME ERROR: <err>
+CTZU=?	+CTZU: (list of supported <onoff>s) +CME ERROR: <err>

Description

Set command enables and disables automatic time zone update via NITZ. If setting fails in an MT error, +CME ERROR: <err> is returned.

Read command returns the current settings in the MT.

Test command returns supported on- and off-values.

Defined values

`<onoff>`: integer type value indicating:

   0 – Disable automatic time zone update via NITZ (default).

   1 – Enable automatic time zone update via NITZ.

3.3.2.10   Time Zone Reporting +CTZR

Syntax

Table 3.3.3-11: +CTZR parameter command syntax

Command	Possible response(s)
+CTZR=<onoff>	+CME ERROR: <err>

+CTZR?	+CTZR: <onoff>
	+CME ERROR: <err>
+CTZR=?	+CTZR: (list of supported <onoff>s)
	+CME ERROR: <err>

Description

This set command enables and disables the time zone change event reporting. If the reporting is enabled the MT returns the unsolicited result code +CTZV: <tz> whenever the time zone is changed. If setting fails in an MT error, +CME ERROR: <err> is returned.

Read command returns the current reporting settings in the MT.

Test command returns supported <onoff> values.

NOTE: The Time Zone reporting is not affected by the Automatic Time Zone setting command, +CTZU.

Defined values

<onoff>: integer type value indicating:

   0 – disable time zone change event reporting (default).

   1 – Enable time zone change event reporting.

3.3.2.11 Optional Requests for More Time ZMTime

Syntax

Table 3.3.5-12: +ZMTime parameter command syntax

Command	Possible response(s)
unsolicited code	+ZMTime: <cmd_id>

Description

When (U)SIM card requests for more time, the request is reported to TE using unsolicited code.

Defined values

<cmd_id>: the type of current STK command message ID.

<cmd_id>	Description
0x01-0x1F	Message ID's for proactive command messages sent to upper layers
0x81-0x94	Message ID's for envelop command response messages from SIM/USIM in response to an earlier envelope command sent by the upper layers
0x41-0x60	Message ID's for terminal response of proactive command messages sent form upper layers
0x61-0x74	Message ID's for envelop command messages from upper layers

3.3.3   Configuration Commands

3.3.3.1   Set to factory-defined configuration &F

Syntax

Table3.3.3-1: &F Parameter Command Syntax

Command	Possible response(s)
&F[<n>]	OK
	ERROR

Description

This command instructs the DCE to set all parameters to default values specified by the manufacturer, which may take into consideration hardware configuration switches and other manufacturer-defined criteria.

There are some differcnces among our products.

1) For ZM5202, the execution of at&f command will restore the following AT commands to the default value predefined in AT command table, the NV value reset to the default value also.

AT Command Settings storable with AT&F:

AT Command	Factory Defaults
ATE	<val> = 1, AT command default value
ATQ	<val> = 0, AT command default value
ATV	<val> = 1, AT command default value
ATX	<val> =0, AT command default value
AT&C	<n> = 1, AT command default value
AT&D	<n> = 2, AT command default value
AT&S	<n> = 0, AT command default value
+IFC	<2> [,<2>] , AT command default value
ATS7	<val> = 000 , AT command default value
+IPR	<17> /*115200*/ , AT command default value
+CREG	<n> = 0 , AT command default value
+CGREG	<n> = 0 , AT command default value
+CMEE	<n> = 0 , AT command default value

2) For others, the execution of at&f command will have no behavior, except the baud rate updating.

Defined values

<n>:

0   Set parameters to factory defaults.

3.3.3.2   Display Current Configuration &V

Syntax

Table3.3.3-2: &V Parameter Command Syntax

Command	Possible response(s)
&V	

Description

This command instructs the DCE to get all parameters values specified by the manufacturer, and it will returns the setting of several AT command parameters applicable to the current operating mode, including the single-letter AT command parameters which are not readable otherwise.

Defined values

None.

3.3.3.3   Store AT command Setting to User Defined Profile &W

Syntax

Table3.3.3-3: &W Parameter Command Syntax

Command	Possible response(s)
&W	

Description

This command instructs the modem to store the current AT command settings to a user defined profile in non-volatile memory. The AT command settings will automatically be restored from the user defined profile during power-up or if ATZ is used. AT&F restores AT command factory default settings. Hence, until first use of AT&W, ATZ works as AT&F. A list of parameters stored to the user profile can be found.

There are some differcnces among our products.

1)   For ZM5202, the execution of at&w command will store the current value of the following AT commands to the NV, and restore the last value from the NV for each power on.

AT Command Settings storable with AT&W:

AT Command	Stored paramaters
ATE	<val>
ATQ	<val>
ATV	<val>

ATX	<val>
AT&C	<n>
AT&D	<n>
AT&S	<n>
+IFC	<DCE_by_DTE> [,<DTE_by_DCE>]
ATS7	<val>
+IPR	<rate>
+CREG	<n>
+CGREG	<n>
+CMEE	<n>

2)   For others, the execution of at&w command will store the current value of the following AT commands to the NV only.

AT Command	Stored paramaters
ATE	<val>
ATQ	<val>
ATV	<val>
ATX	<val>
AT&C	<n>
AT&D	<n>
AT&S	<n>
+IFC	<DCE_by_DTE> [,<DTE_by_DCE>]
ATS7	<val>

3.3.3.4   Return to online data state O

Syntax

Table3.3.3-4: O Parameter Command Syntax

Command	Possible response(s)
O<val>	

Description

Causes the DCE to return to online data state and issue a CONNECT or CONNECT<text> result   code.

Defined values

`<val>:`

0   Return to online data state from online command state. Also used to retrain after a modem-on-hold transaction or to reconnect to a modem that has been placed in an on-hold state per V.92.

3.3.3.5 Result code suppression Q

Syntax

Table3.3-5: Q Parameter Command Syntax

Command	Possible response(s)
Q<val>	

Description

The setting of this parameter determines whether or not the DCE transmits result codes to the DTE. When result codes are being suppressed, no portion of any intermediate, final, or unsolicited result code – header, result text, line terminator, or trailer – is transmitted. Information text transmitted in response to commands is not affected by the setting of this parameter.

Defined values

`<val>:`

   0   DCE transmits result codes.

   1   result codes are suppressed and not transmitted.

NOTE: the define value is 0, ATQ means ATQ0, and the value can be available from the inquery command AT&V.

3.3.3.6 DCE response format V

Syntax

Table3.3-6: V Parameter Command Syntax

Command	Possible response(s)
V<val>	

Description

The setting of this parameter determines the contents of the header and trailer transmitted with result codes and information responses. It also determines whether result codes are transmitted in a numeric form or an alphabetic (or "verbose") form. The text portion of information responses is not affected by this setting.

Defined values

`<val>:`

   0   DCE transmits limited headers and trailers and numeric text.

1   DCE transmits full headers and trailers and verbose response text.

NOTE: if parameter <val> is omitted, the command has the same behaviour as ATV0. The define value is 1, and the value can be available from the inquery command AT&V or AT\S.

3.3.3.7   Result code selection and call progress monitoring control X

Syntax

Table3.3.3-7: X Parameter Command Syntax

Command	Possible response(s)
X<val>	

Description

The setting of this parameter determines whether or not the DCE transmits particular result codes to the DTE. It also controls whether or not the DCE verifies the presence of a dial tone when it first goes off-hook to begin dialing, and whether or not engaged tone (busy signal) detection is enabled. However, this setting has no effect on the operation of the W dial modifier, which always checks for a dial tone regardless of this setting, nor on the busy signal detection capability of the W and @dial modifiers.

Defined values

X<value>	Description
0	**CONNECT** result code is given upon entering online data state. Dial tone and busy detection are disabled.
1..4	**CONNECT <text>** result code is given upon entering online data state.

NOTE: if parameter <val> is omitted, the command has the same behaviour as ATX0. The define value is 1, and the value can be available from the inquery command AT&V or AT\S.

e.g

part1:
```
atx(atx0)
ok

atd*98*1#
CONNECT
```

part2:
```
atx<n>(n>0)
ok

at\v (at\v0)
```

```
ok
atd*98*1#
CONNECT 3600000 \\radio rate

at\v1
ok
atd*98*1#
CONNECT 3600000 PACKET "3gnet"/8/3600
```

3.3.3.8 Reset to default configuration Z

Syntax

Table3.3.3-8: Z Parameter Command Syntax

Command	Possible response(s)
Z<val>	

Description

This command instructs the DCE to set all parameters to their factory defaults as specified by the manufacturer. This may include taking into consideration the settings of hardware configuration switches or non-volatile parameter storage (if implemented). If the DCE is connected to the line, it is disconnected from the line, terminating any call in progress.

There are some differcnces among our products.

1) For ZM5202, the execution of atz command will restore the following AT commands to the default value predefined in AT command table, not from the NV storage value.

AT Command Settings storable with ATZ:

AT Command	Restored From
ATE	<val> = 1, AT command default value
ATQ	<val> = 0, AT command default value
ATV	<val> = 1, AT command default value
ATX	<val> = 0, AT command default value
AT&C	<val> = 1, AT command default value
AT&D	<val> = 2, AT command default value
AT&S	<val> = 0, AT command default value
+IFC	<2> [,<2>] , AT command default value
ATS7	<val> = 000 , AT command default value
+IPR	<17> /*115200*/ , AT command default value

2) For others, the execution of atz command will restore the following AT commands from the NV storage

value set by AT&W.

AT Command Settings storable with ATZ:

AT Command	Restored From
ATE	NV
ATQ	NV
ATV	NV
ATX	NV
AT&C	NV
AT&D	NV
AT&S	NV
+IFC	NV
ATS7	NV

Define values

NOTE: if parameter <val> is omitted, the command has the same behaviour as ATZ0. The define value is 0, and the value can be available from the inquery command AT&V or AT\S.

3.3.3.9 Set phone functionality +CFUN

Syntax

Table 3.3.3-9: +CFUN parameter command syntax

Command	Possible response(s)
+CFUN=[<fun>[,<rst>]]	+CME ERROR: <err>
+CFUN?	+CFUN: <fun>
	+CME ERROR: <err>
+CFUN=?	+CFUN: (list of supported <fun>s), (list of supported <rst>s)
	+CME ERROR: <err>

Description

Set command selects the level of functionality <fun> in the MT. Level "full functionality" is where the highest level of power is drawn. "Minimum functionality" is where minimum power is drawn. Level of functionality between these may also be specified by manufacturers. When supported by manufacturers, MT resetting with <rst> parameter may be utilized.

NOTE: It is manufacturer specificdoes this command affect network registrationCommand Operator Selection +COPS is used to force registration/deregistration.

Test command returns values supported as a compound value.

Defined values

`<fun>`:

    0   minimum functionality(MT before setting must not 7)

    1   full functionality(MT before setting must not 7)

    4   disable phone both transmit and receive RF circuits(MT before setting must not 7)

    5   Factory Test Mode(MT before setting must be 1)(NOTE, only used for UART)

    6   Reset MT(MT before setting must be 7)

    7   Offline Mode(MT before setting must not 5)

`<rst>`:

    0   do not reset the MT before setting it to <fun> power level

    NOTE: This shall be always default when <rst> is not given.

    1   reset the MT before setting it to <fun> power level

    NOTE: This shall be always use when < fun > is 1.

3.3.3.10 Control Device Power Mode +ZOPRT

Syntax

Table 3.3.3-10: +ZOPRT parameter command syntax

Command	Possible response(s)
+ZOPRT=<mode>	+CME ERROR: <err>
+ZOPRT?	+ZOPRT: <mode> +CME ERROR: <err>
+zoprt=?	

Description

This command is used to set and read the device power mode.

Defined values

`<mode>`: the device power mode

    1   FTM mode

    5   Online mode

    6   Low Power mode

e.g.

```
AT+ZOPRT=5
OK
```

3.3.3.11 Select TE character set +CSCS

Syntax

Table 3.3.3-11: +CSCS parameter command syntax

Command	Possible response(s)
+CSCS=[<chset>]	
+CSCS?	+CSCS: <chset>
+CSCS=?	+CSCS: (list of supported <chset>s)

Description

Set command informs TA which character set <chset> is used by the TE. TA is then able to convert character strings correctly between TE and MT character sets.

When TA-TE interface is set to 8-bit operation and used TE alphabet is 7-bit, the highest bit shall be set to zero.

NOTE 1 :   It is manufacturer specific how the internal alphabet of MT is converted to/from the TE alphabet.

Read command shows current setting and test command displays conversion schemes implemented in the TA.

Defined values

<chset>: (conversion schemes not listed here can be defined by manufacturers):"GSM"   GSM 7 bit default alphabet (3GPP TS 23.038); this setting causes easily software flow control (XON/XOFF) problems

NOTE 2: If MT is using GSM 7 bit default alphabet, its characters shall be padded with 8th bit (zero) before converting them to hexadecimal numbers (i.e. no SMS-style packing of 7-bit alphabet).

"IRA"   international reference alphabet (ITU-T T.50)

"UCS2"   16-bit universal multiple-octet coded character set (ISO/IEC10646); UCS2 character strings are converted to hexadecimal numbers from 0000 to FFFF; e.g. "004100620063" equals three 16-bit characters with decimal values 65, 98 and 99

e.g

```
AT+CSCS?
+CSCS: "IRA"

OK
AT+CSCS=?
+CSCS: ("IRA","GSM","UCS2")

OK
```

3.3.3.12 List all available AT commands +CLAC

Syntax

Table 3.3.3-12: +CLAC action command syntax

Command	Possible response(s)
+CLAC	`<AT Command1> [<CR> <LF> <AT Command2>[…]]`
	`+CME ERROR: <err>`
+CLAC=?	`+CME ERROR: <err>`

Description

Execution command causes the MT to return one or more lines of AT Commands.

NOTE: This command only returns the AT commands that are available for the user.

Defined values

`<AT Command>:`

Defines the AT command including the prefix AT. Text shall not contain the sequence `0<CR>` or `OK<CR>`

3.3.4   Identification Commands

3.3.4.1   Request identification information I

Syntax

Table3.3.4-1: I Parameter Command Syntax

Command	Possible response(s)
`I<val>`	

Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, followed by a final result code.

3.3.4.2   Request manufacturer identification +CGMI

Syntax

Table 3.3.4-2: +CGMI action command syntax

Command	Possible response(s)
+CGMI	`<manufacturer>`
	`+CME ERROR: <err>`
+CGMI=?	

Description

Execution command causes the TA to return one or more lines of information text `<manufacturer>`, determined by the MT manufacturer, which is intended to permit the user of the TA to identify the manufacturer of the MT to which it is connected to.

Defined values

`<manufacturer>:` the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

e.g

```
at+cgmi
ZTE CORPORATION

OK
```

3.3.4.3 Request model identification +CGMM

Syntax

Table 3.3.4-3: +CGMM action command syntax

Command	Possible response(s)
+CGMM	`<model>`
	`+CME ERROR: <err>`
+CGMM=?	

Description

Execution command causes the TA to return one or more lines of information text `<model>`, determined by the MT manufacturer, which is intended to permit the user of the TA to identify the specific model of the MT to which it is connected to. Typically, the text will consist of a single line containing the name of the product, but manufacturers may choose to provide more information if desired.

Defined values

`<model>:` the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

e.g

```
at+cgmm
MF206A

OK
```

3.3.4.4 Request revision identification +CGMR

Syntax

Table 3.3.4-4: +CGMR action command syntax

Command	Possible response(s)
+CGMR	`<revision>` `+CME ERROR: <err>`
+CGMR=?	

Description

Execution command causes the TA to return one or more lines of information text `<revision>`, determined by the MT manufacturer, which is intended to permit the user of the TA to identify the version, revision level or date, or other pertinent information of the MT to which it is connected to. Typically, the text will consist of a single line containing the version of the product, but manufacturers may choose to provide more information if desired.

Defined values

`<revision>`: the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

e.g

```
at+cgmr
BD_ATTMF206AV1.0.0B09

OK
```

3.3.4.5 Request product serial number identification +CGSN

Syntax

Table 3.3.4-5: +CGSN action command syntax

Command	Possible response(s)
+CGSN	`<sn>` `+CME ERROR: <err>`
+CGSN=?	

Description

Execution command causes the TA to return one or more lines of information text `<sn>`, determined by the MT manufacturer, which is intended to permit the user of the TA to identify the individual MT to which it is connected to. Typically, the text will consist of a single line containing the IMEI (International Mobile station Equipment Identity; refer 3GPP TS 23.003) number of the MT, but manufacturers may choose to provide more information if desired.

Defined values

`<sn>:` the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

e.g

```
AT+CGSN
356118040008583
```

OK

3.3.4.6 Request international mobile subscriber identity +CIMI

Syntax

Table 3.3.4-6: +CIMI action command syntax

Command	Possible response(s)
+CIMI	`<IMSI>`
	`+CME ERROR: <err>`
+CIMI=?	

Description

Execution command causes the TA to return `<IMSI>`, which is intended to permit the TE to identify the individual active application in the UICC (GSM or USIM) or SIM card which is attached to MT.

Defined values

`<IMSI>`: International Mobile Subscriber Identity (string without double quotes)

e.g

```
at+cimi
460022293763791

OK
```

3.3.4.7 Request manufacturer identification +GMI

Syntax

Table3.3.4-7: GMI Parameter Command Syntax

Command	Possible response(s)
+GMI	`returns the manufacturer identification`
+GMI=?	

Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the manufacturer.

Defined values

None.

e.g

```
AT+GMI
ZTE CORPORATION
```

```
OK
```

3.3.4.8 Request model identification +GMM

Syntax

Table3.3.4-8: GMM Parameter Command Syntax

Command	Possible response(s)
+GMM	returns the model identification
+GMM=?	

Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the specific model of device.

Defined values

None.

e.g

```
AT+GMM
MF206A

OK
```

3.3.4.9 Request revision identification +GMR

Syntax

Table3.3.4-9:+GMR Parameter Command Syntax

Command	Possible response(s)
+GMR	returns the software revision identification
+GMR=?	

Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the version, revision level or date, or other pertinent information of the device.

Defined values

None.

e.g

```
at+cgmr
BD_ATTMF206AV1.0.0B09

OK
```

3.3.4.10 Request product serial number identification +GSN

Syntax

Table3.3.4-10:+GSN Parameter Command Syntax

Command	Possible response(s)
+GSN	returns the device IMEI
	+CME ERROR: <err>
+GSN=?	

Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the individual device.

Defined values

None.

e.g

```
AT+GSN
356118040008583

OK
```

3.3.4.11 Check PCB No. +ZPCB

Syntax

Table 3.3.4-11: +ZPCB parameter command syntax

Command	Possible response(s)
+ZPCB?	+ZPCB: <PCB version>
	+CME ERROR: <err>
+ZPCB=?	

Description

This command is used to check PCB No. This command can just be used as read command (i.e. AT+ZPCB?).

Defined values

<PCB version>: PCB No., the string shall not exceed 64 characters

e.g.

```
AT+ZPCB?
+ZPCB: P660M1-5.0.0

OK
```

3.3.5   Serial interface control Commands

3.3.5.1   Circuit 109 (Received line signal detector) behavior &C

Syntax

Table3.3.5-1: &C Parameter Command Syntax

Command	Possible response(s)
&C[<n>]	

Description

This parameter determines how the state of circuit 109 relates to the detection of received line signal from the distant end. Changing the parameter will take effect immediately in both the command and online command states. In &C1 mode of operation, circuit 109 is not turned off until all data previously received from the remote DCE is delivered to the local DTE. However, such buffered data shall be discarded and circuit 109 turned off if the DTE turns off circuit 108 (if &D1 or &D2 is set).

Defined values

<n>:

    0   The DCE always presents the ON condition on circuit 109.

    1   Circuit 109 changes in accordance with the underlying DCE, which may include functions other than the physical layer functions (e.g., ITU-T Recs V.42, V.110, V.120 and V.13). DCD signal is high on the data mode;

    2   DCD signal is low for the first 1 seconds only with the data disconnected.

NOTE: the define value is AT&C0; Different with the document. And the value can be available from the inquery command AT&V.

3.3.5.2   Circuit 108 (Data terminal ready) behavior &D

Syntax

Table3.3.5-2: &D Parameter Command Syntax

Command	Possible response(s)
&D[<n>]	

Description

This parameter determines how the DCE responds when circuit 108/2 is changed from the ON to the OFF condition during online data state.

Defined values

<n>:

    0   DCE ignores circuit 108/2.

    1   Upon an on-to-off transition of circuit 108/2, the DCE enters online command state and issues an OK

result code; the call remains connected.

    2   Upon an on-to-off transition of circuit 108/2, the DCE instructs the underlying DCE to perform an orderly cleardown of the call. The disposition of any data in the DCE pending transmission to the remote DCE is controlled by the +ETBM parameter if implemented; otherwise, this data is sent before the call is cleared, unless the remote DCE clears the call first (in which case pending data is discarded). The DCE disconnects from the line. Automatic answer is disabled while circuit 108/2 remains off.

NOTE: if parameter is omitted, the command has the same behaviour of AT&D2. And the value can be available from the inquery command AT&V.

3.3.5.3   Set Data Set Ready (DSR) Line Mode &S

Syntax

Table3.3.5-3: &S Parameter Command Syntax

Command	Possible response(s)
&S[<n>]	

Description

Set command controls the RS232 DSR pin behaviour.

Defined values

<n>:

   0 - always High

   1 - High when connected

NOTE: if parameter is omitted, the command has the same behaviour of AT&S0. And the value can be available from the inquery command AT&V.

3.3.5.4   DTE-DCE local flow control +IFC

Syntax

Table3.3.5-4: +IFC Parameter Command Syntax

Command	Possible response(s)
+IFC=[<DCE_by_DTE> [,<DTE_by_DCE>]]	
+IFC?	+IFC: <DCE_by_DTE>,<DTE_by_DCE>
+IFC=?	+IFC: (list of supported <DCE_by_DTE> values),(list of supported <DTE_by_DCE> values)

Description

This extended-format compound parameter is used to control the operation of local flow control between the DTE

and DCE during the data state when V.42 error control is being used, or when fallback to non-error control mode is specified to include buffering and flow control. It accepts two numeric subparameters:

<DCE_by_DTE>, which specifies the method to be used by the DTE to control the flow of received data from the DCE;

<DTE_by_DCE>, which specifies the method to be used by the DCE to control the flow of transmitted data from the DTE.

Defined values

<DCE_by_DTE>	Description
0	None
1	DC1/DC3 on circuit 103; do not pass DC1/DC3 characters to the remote DCE
2	Circuit 133 (Ready for Receiving)
3	DC1/DC3 on circuit 103 with DC1/DC3 characters being passed through to the remote DCE in addition to being acted upon for local flow control
4 to 127	Reserved for future standardization
Other	Reserved for manufacturer-specific use
<DTE_by_DCE>	**Description**
0	None
1	DC1/DC3 on circuit 104
2	Circuit 106 (Clear to Send/Ready for Sending)
3 to 127	Reserved for future standardization
Other	Reserved for manufacturer-specific use
NOTE: DC1 is IA5 1/1; DC3 is IA5 1/3.	

NOTE: the value can be available from the inquery command AT&V.

e.g

```
at+ifc=?
+IFC: (0-3),(0-2)

OK
```

3.3.5.5 Fixed DTE rate +IPR

Syntax

Table 3.3.5-5: +IPR Parameter Command Syntax

Command	Possible response(s)
+IPR=<rate>	
+IPR?	+IPR: <rate>

+IPR=?	+IPR:(list of supported autodetectable rate values)[,(list of fixed-only rate values)]

Description

This numeric extended-format parameter specifies the data rate at which the DCE will accept commands, in addition to 1200 bit/s or 9600 bit/s. It may be used to select operation at rates at which the DCE is not capable of automatically detecting the data rate being used by the DTE. Specifying a value of 0 disables the function and allows operation only at rates automatically detectable by the DCE. The specified rate takes effect following the issuance of any result code(s) associated with the current command line.

The rate specified does not apply in online data state if direct mode of operation is selected.

Defined values

The<rate>value specified shall be the rate in bits per second at which the DTE-DCE interface should operate, e.g., "19200" or "115200". Now we support 460800, 230400, 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300. The rates supported by a particular DCE are manufacturer-specific; however, the +IPR parameter should permit the setting of any rate supported by the DCE during online operation. Rates which include a non-integral number of bits per second should be truncated to the next lower integer (e.g., 134.5 bit/s should be specified as 134; 45.45 bit/s should be specified as 45).

3.3.5.6 Command echo E

Syntax

Table3.3.5-6: E Parameter Command Syntax

Command	Possible response(s)
E<val>	

Description

The setting of this parameter determines whether or not the DCE echoes characters received from the DTE during command state and online command state

Defined values

<val>:

   0   DCE does not echo characters during command state and online command state.

   1   DCE echoes characters during command state and online command state.

NOTE: if parameter <val> is omitted, the command has the same behaviour as ATE0.

3.3.5.7 Port Mode Switch Command +ZMUXMODE

Syntax

Table 3.3.5-7: +ZMUXMODE parameter command syntax

Command	Possible response
+ZMUXMODE=<para>	

Description

Extensible AT command, this command is used to switch diag service between USB mode and MUX mode. This command is invalid, unless the MUX is enabled through the AT command AT+UART=M.

Defined values

<para>: switch parameter

      E: Enter MUX mode, diag service run on MUX in next power clycle.

      F: Quit MUX mode, diag service will run on USB in next power clycle.

      G: Query the current working port mode.

NOTE: After downloading image and restoring NV, Please input AT command AT+ZMUXMODE=E and restart the module in order to make the module work in MUX mode.

3.3.5.8 Set Bit Rate Command +ZBITRATE

Syntax

Table 3.3.5-8: +ZBITRATE parameter command syntax

Command	Possible response
+ZBITRATE=<para>	
+ZBITRATE?	
+ZBITRATE=?	

Description

Extensible AT command, this command is used to set the bit rate of the serial port.

Defined values

<Parameter>: The bit rate, MAX value is 4000000.

The value can be one of the follow: 460800, 230400, 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300

e.g.

```
at+zbitrate?
+ZBITRATE:115200

OK
```

3.3.5.9 Set Bit Rate Command +UART

Syntax

Table 3.3.5-9: +UART parameter command syntax

Command	Possible response
+UART=<para>	
+UART?	+UART: <mux>,<at><diag>,<data>

Description

Extensible AT command, this command is used to switch the service mode among the Diag service, AT service and MUX service. After processing set command, restart the module in order to make the certain service working.

NOTE: Make sure that only one flag file exists at anytime, because these services can NOT working simultaneously.

Defined values

<Parameter>: Service mode indicator.

    D: switch to Diag service

    A: switch to AT service

    M: switch to MUX service (only supported by MF206A module)

    N: switch to DATA service

    C: clear the flag file for Diag/AT/MUX.

<Mux>: MUX service

    0: close MUX service on uart

    1: open MUX service on uart

<At>: AT service

    0: close AT service on uart

    1: open AT service on uart

<Diag>: Diag service

    0: close Diag service on uart

    1: open Diag service on uart

<Data>: Data service

    0: Close Data service on uart

    1: open Data service on uart

e.g.

```
at+uart=m
OK
at+uart?
+UART: 0,0,0,1
```


OK

3.3.6 Service Control Commands and Methods

3.3.6.1 Request Packet Domian Service ATD*99#

Syntax

Table3.3.14-1: D Parameter Command Syntax

Command	Possible response(s)
ATD*99[* [<called_address>][* [<L2P>][* [<cid>]]]]#	

Description

Optional if the D (dial) command can be used to specify Packet Domain operation.The execution command causes the MT to perform whatever actions are necessary to establish communication between the TE

Defined values

<L2P>: a string parameter that indicates the layer 2 protocol to be used between the TE and MT

    PPP   Point-to-point protocol for a PDP such as IP

<cid>: a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

3.3.6.2 Select type of address +CSTA

Syntax

Table 3.3.6-6: +CSTA parameter command syntax

Command	Possible response(s)
+CSTA=[<type>]	
+CSTA?	+CSTA: <type>
+CSTA=?	+CSTA: (list of supported <type>s)

Description

Set command selects the type of number for further dialing commands (D) according to GSM/UMTS specifications.

Test command returns values supported as a compound value.

Defined values

<type>: type of address octet in integer format (refer GSM 04.08); default 145 when dialing string includes

international access code character "+", otherwise 129

3.3.6.3 Select bearer service type +CBST

Syntax

Table 3.3.6-8: +CBST parameter command syntax

Command	Possible response(s)
+CBST=[<speed>[,<name>[,<ce>]]]	
+CBST?	+CBST: <speed>,<name>,<ce>
+CBST=?	+CBST: (list of supported <speed>s),(list of supported <name>s),(list of supported <ce>s)

Description

Set command selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated (refer 3GPP TS 22.002). Values may also be used during mobile terminated data call setup, especially in case of single numbering scheme calls (refer +CSNS).

Test command returns values supported as compound values.

Defined values

NOTE: The default values of the subparameters are manufacturer specific since they depend on the purpose of the device and data services provided by it. Not all combinations of these subparameters are supported by GSM/UMTS (refer 3GPP TS 22.002).

<speed>:

 0   autobauding (automatic selection of the speed; this setting is possible in case of 3.1 kHz modem and non-transparent service)

 7   9600 bps (V.32)

 12   9600 bps (V.34)

 14   14400 bps (V.34)

 16   28800 bps (V.34)

 17   33600 bps (V.34)

 39   9600 bps (V.120)

 43   14400 bps (V.120)

 48   28800 bps (V.120)

 51   56000 bps (V.120)

 71   9600 bps (V.110 or X.31 flag stuffing)

 75   14400 bps (V.110 or X.31 flag stuffing)

 80   28800 bps (V.110 or X.31 flag stuffing)

 81   38400 bps (V.110 or X.31 flag stuffing)

 83   56000 bps (V.110 or X.31 flag stuffing; this setting can be used in conjunction with asynchronous

non-transparent UDI or RDI service in order to get FTM)

   84   64000 bps (X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent

         UDI service in order to get FTM)

   116   64000 bps (bit transparent)

   134   64000 bps (multimedia)

`<name>`:

   0   data circuit asynchronous (UDI or 3.1 kHz modem)

   1   data circuit synchronous (UDI or 3.1 kHz modem)

   4   data circuit asynchronous (RDI)

`<ce>`:

   0   transparent

   1   non-transparent

The parameters in the command of `AT+CBST=[<speed>[,<name>[,<ce>]]]` can not be set at random.

The values of `[<speed>[,<name>[,<ce>]]]` can be set as one of the followings:

0,0,1

7,0,1

12,0,1

14,0,1

16,0,1

17,0,1

39,0,1

43,0,1

48,0,1

51,0,1

71,0,1

75,0,1

80,0,1

81,0,1

83,0,1

83,4,1

84,0,1

116,1,0

134,1,0

e.g.

```
at+cbst?
+CBST: 0,0,1

OK
at+cbst=?
+CBST: (0,7,12,14,16,17,39,43,48,51,71,75,80,81,83,84,116,134),(0,1,4),(0,1)

OK
```

3.3.6.4 Radio link protocol +CRLP

Syntax

Table 3.3.6-9: +CRLP parameter command syntax

Command	Possible response(s)
+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>[,<T4>]]]]]]	
+CRLP?	+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver1>[,<T4>]] [+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver2>[,<T4>]] [...]]
+CRLP=?	+CRLP: (list of supported <iws>s),(list of supported <mws>s), (list of supported <T1>s),(list of supported <N2>s)[,<ver1> [,(list of supported <T4>s)]] [+CRLP: (list of supported <iws>s),(list of supported <mws>s),(list of supported <T1>s),(list of supported <N2>s) [,<ver1>[,(list of supported <T4>s)]] [...]]

Description

Radio link protocol (RLP) parameters used when non-transparent data calls are originated may be altered with set command. Available command subparameters depend on the RLP versions implemented by the device (e.g. <ver> may not be available if device supports only versions 0 and 1).

Read command returns current settings for each supported RLP version <verx>. Only RLP parameters applicable to the corresponding <verx> are returned.

Test command returns values supported as a compound value. If MT/TA supports several RLP versions <verx>, the RLP parameter value ranges for each <verx> are returned in a separate line.

Defined values

`<ver>, <verx>`: RLP version number in integer format; when version indication is not present it shall equal 0

NOTE 2: Versions 0 and 1 share the same parameter set. Read and test commands shall return only one line for this set (where <verx> is not present).

`<iws>, <mws>, <T1>, <N2>, <T4>`: IWF to MS window size, MS to IWF window size, acknowledgement timer T1, retransmission attempts N2, re-sequencing period T4 in integer format (default values and value ranges depend on RLP version; refer 3GPP TS 24.022): T1 and T4 are in units of 10 ms.

3.3.6.5 Service reporting control +CR

Syntax

Table 3.3.6-10: +CR parameter command syntax

Command	Possible response(s)
+CR=[<mode>]	
+CR?	+CR: <mode>
+CR=?	+CR: (list of supported <mode>s)

Description

Set command controls whether or not intermediate result code `+CR: <serv>` is returned from the TA to the TE.

Test command returns values supported as a compound value.

Defined values

`<mode>`:

    0   disables reporting

    1   enables reporting

`<serv>`:

    ASYNC   asynchronous transparent

    SYNC   synchronous transparent

    REL ASYNC   asynchronous non-transparent

    REL SYNC   synchronous non-transparent

    GPRS [<L2P>]   GPRS

The optional `<L2P>` proposes a layer 2 protocol to use between the MT and the TE. It is defined in the Enter GPRS Data Mode (+CGDATA) command.

3.3.6.6 Set the wakeup mode for SMS remote wakeup +ZWPS

Syntax

Table 3.3.6-24: + ZWPS parameter command syntax

Command	Possible response
+ZWPS=<call_para>,<sms_para>	
+ZWPS?	+ZWPS: <call_para>,<sms_para>
+ZWPS=?	+ZWPS: (0,1,2),(0,1,2)

Description

Extensible AT command, this command is used to set the wakeup mode for SMS remote wakeup. The value 0 is disable the remote wakeup function. Enalble for any sms remote wakeup function for 1 and enable for specification sms or call remote wakeup function for 2.

Define values

<sms_para>:

    0: disable this function

    1: enable this function which any sms header will wakeup the AP client.

    2: enable this function which specified sms header will wakeup the AP client.

  NOTE: The config file associated setting will be failure,when this AT command is used.

e.g.

```
at+zwps=0,2
OK
```

3.3.7 Supplementary Service commands

3.3.7.1 Price per unit and currency table +CPUC

Syntax

Table 3.3.7-4: +CPUC parameter command syntax

Command	Possible response(s)
+CPUC=<currency>,<ppu>[,<passwd>]	+CME ERROR: <err>
+CPUC?	+CPUC: <currency>,<ppu>
	+CME ERROR: <err>
+CPUC=?	

Description

Set command sets the parameters of Advice of Charge related price per unit and currency table in an active

application in the UICC (GSM or USIM) or SIM card file EF$_{PUCT}$. PUCT information can be used to convert the home units (as used in +CAOC) into currency units. SIM PIN2 is usually required to set the parameters. If setting fails in an MT error, +CME ERROR: <err> is returned.

Read command returns the current parameters of PUCT.

Defined values

<currency>: string type; three-character currency code (e.g. "GBP", "DEM"); character set as specified by command Select TE Character Set +CSCS

<ppu>: string type; price per unit; dot is used as a decimal separator

<passwd>: string type; SIM PIN2

3.3.7.2 Closed user group +CCUG

Syntax

Table 3.3.7-5: +CCUG parameter command syntax

Command	Possible response(s)
+CCUG=[<n>[,<index>[,<info>]]]	
+CCUG?	+CCUG: <n>,<index>,<info>
+CCUG=?	

Description

This command allows control of the Closed User Group supplementary service (refer 3GPP TS 22.085). Set command enables the served subscriber to select a CUG index, to suppress the Outgoing Access (OA), and to suppress the preferential CUG.

Set command with <n>=1 enables to control the CUG information on the air interface as a default adjustment for all following outgoing calls. The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standard.

Defined values

<n>:
    0   disable CUG temporary mode
    1   enable CUG temporary mode

<index>:
    0...9   CUG index
    10   no index (preferred CUG taken from subscriber data)

<info>:
    0   no information
    1   suppress OA
    2   suppress preferential CUG

3   suppress OA and preferential CUG

3.3.7.3 **Unstuctured supplementary service data +CUSD**

Syntax

Table 3.3.7-13: +CUSD parameter command syntax

Command	Possible response(s)
+CUSD=[<n>[,<str>[,<dcs>]]]	+CME ERROR: <err>
+CUSD?	+CUSD: <n>
+CUSD=?	+CUSD: (list of supported <n>s)

Description

This command allows control of the Unstuctured Supplementary Service Data (USSD) according to 3GPP TS 22.090. Both network and mobile initiated operations are supported. Parameter <n> is used to disable/enable the presentation of an unsolicited result code (USSD response from the network, or network initiated operation) +CUSD: <m>[,<str>,<dcs>] to the TE. In addition, value <n>=2 is used to cancel an ongoing USSD session.

When <str> is given, a mobile initiated USSD-string or a response USSD-string to a network initiated operation is sent to the network. The response USSD-string from the network is returned in a subsequent unsolicited +CUSD result code.

Test command returns values supported as a compound value.

Defined values

<n>:

    0   disable the result code presentation to the TE
    1   enable the result code presentation to the TE
    2   cancel session (not applicable to read command response)

<str>: string type USSD-string (when <str> parameter is not given, network is not interrogated):

<dcs>: 3GPP TS 23.038 Cell Broadcast Data Coding Scheme in integer format (default 0)

<m>:

    0   no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)

    1   further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation)

    2   USSD terminated by network

    3   other local client has responded

4   operation not supported

5   network time out

3.3.8   Network service relative commands

3.3.8.1   Network registration +CREG

Syntax

Table 3.3.8-1: +CREG parameter command syntax

Command	Possible response(s)
+CREG=[<n>]	
+CREG?	+CREG: <n>,<stat>[,[<lac>],[<ci>],[<AcT>]]
	+CME ERROR: <err>
+CREG=?	+CREG: (list of supported <n>s)

Description

Set command controls the presentation of an unsolicited result code +CREG: <stat> when <n>=1 and there is a change in the MT network registration status, or code +CREG: <stat>[,[<lac>],[<ci>],[<AcT>]] when <n>=2 and there is a change of the network cell.

Read command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. Location information elements <lac> and <ci> are returned only when <n>=2 and MT is registered in the network.

Defined values

<n>:

0   disable network registration unsolicited result code

1   enable network registration unsolicited result code +CREG: <stat>

2   enable network registration and location information unsolicited result code

+CREG: <stat>[,[<lac>],[<ci>],[<AcT>]]

`<stat>`:

- 0   not registered, MT is not currently searching a new operator to register to
- 1   registered, home network
- 2   not registered, but MT is currently searching a new operator to register to
- 3   registration denied
- 4   unknown
- 5   registered, roaming

`<lac>`: string type; two bytes location area code in hexadecimal format

`<ci>`: string type; four byte cell ID in hexadecimal format

`<AcT>`: integer type; access technology of the serving cell

- 0   GSM
- 1   GSM Compact
- 2   UTRAN
- 3   GSM w/EGPRS
- 4   UTRAN w/HSDPA
- 5   UTRAN w/HSUPA
- 6   UTRAN w/HSDPA and HSUPA
- 7   E-UTRAN

3.3.8.2   Operator selection +COPS

Syntax

Table 3.3.8-2: +COPS parameter command syntax

Command	Possible response(s)
+COPS=[<mode>[,<format> [,<oper>[,<AcT>]]]]	+CME ERROR: <err>
+COPS?	+COPS: <mode>[,<format>,<oper>[,<AcT>]] +CME ERROR: <err>
+COPS=?	+COPS: [list of supported (<stat>,long alphanumeric <oper>,short alphanumeric <oper>,numeric <oper>[,<AcT>])s][,,(list of supported <mode>s),(list of supported <format>s)] +CME ERROR: <err>

Description

Set command forces an attempt to select and register the GSM/UMTS network operator. `<mode>` is used to select

whether the selection is done automatically by the MT or is forced by this command to operator `<oper>`.

Read command returns the current mode and the currently selected operator. If no operator is selected, `<format>` and `<oper>` are omitted.

Test command returns a list of quadruplets, each representing an operator present in the network.

Defined values

`<mode>`:

   0   automatic (`<oper>` field is ignored)

   1   manual (`<oper>` field shall be present)

   2   deregister from network

   3   set only `<format>` (for read command +COPS?), do not attempt registration/deregistration (`<oper>` field is ignored); this value is not applicable in read command response

   4   manual/automatic (`<oper>` field shall be present); if manual selection fails, automatic mode (`<mode>`=0) is entered

`<format>`:

   0   long format alphanumeric <oper>

   1   short format alphanumeric `<oper>`

   2   numeric `<oper>`

`<oper>`: string type;

`<AcT>`: access technology selected:

   0   GSM

   1   GSM Compact

   2   UTRAN

   3   GSM w/EGPRS

   4   UTRAN w/HSDPA

   5   UTRAN w/HSUPA

   6   UTRAN w/HSDPA and HSUPA

   7   E-UTRAN

`<format>` indicates if the format is alphanumeric or numeric;

`<stat>`:

   0   unknown

   1   available

   2   current

   3   forbidden

e.g

```
at+cops=?
+COPS: (2,"China Mobile Communication Corp.","China Mobile","46002",2),(3,"CHINA
MOBILE","CMCC","46000",0),(3,"CHN-UNICOM","UNICOM","46001",0),


OK
```

3.3.8.3   Signal quality +CSQ

Syntax

Table 3.3.8-3: +CSQ action command syntax

Command	Possible response(s)
+CSQ	+CSQ: \<rssi\>,\<ber\>
	+CME ERROR: \<err\>
+CSQ=?	+CSQ: (list of supported \<rssi\>s),(list of supported \<ber\>s)

Description

Execution command returns received signal strength indication \<rssi\> and channel bit error rate \<ber\> from the MT.

Test command returns values supported as compound values.

Defined values

\<rssi\>:

    0   -113 dBm or less

    1   -111 dBm

    2...30   -109... -53 dBm

    31   -51 dBm or greater

    99   not known or not detectable

\<ber\> (in percent):

    0...7 as RXQUAL values in the table in GSM 05.08 subclause 8.2.4

    99   not known or not detectable

3.3.8.4   Preferred operator list +CPOL

Syntax

Table 3.3.8-4:+CPOL parameter command syntax

Command	Possible response(s)
+CPOL=[<index>][, <format>[,<oper>[,<GSM_AcT>,<GSM_Compact_AcT>,<UTRAN_AcT>]]]	+CME ERROR: <err>
+CPOL?	+CPOL: <index1>,<format>,<oper1>[,<GSM_AcT1>, <GSM_Compact_AcT1>,<UTRAN_AcT1>] +CPOL: <index2>,<format>,<oper2>[,<GSM_AcT2>, <GSM_Compact_AcT2>,<UTRAN_AcT2>] [...]] +CME ERROR: <err>
+CPOL=?	+CPOL: (list of supported <index>s),(list of supported <format>s) +CME ERROR: <err>

Description

This command is used to edit the PLMN selector with Access Technology lists in the SIM card or active application in the UICC(GSM or USIM).

Execute command writes an entry in the SIM/USIM list of preferred PLMNs, previously selected by the command +CPLS. If no list has been previously selected, the User controlled PLMN selector with Access Technology, EF$_{PLMNwAcT,}$ is the one accessed by default. If <index> is given but <oper> is left out, entry is deleted. If <oper> is given but <index> is left out, <oper> is put in the next free location. If only <format> is given, the format of the <oper> in the read command is changed. The Access Technology selection parameters, <GSM_AcT>, <GSM_Compact_AcT> and <UTRAN_AcT>, are required when writing User controlled PLMN selector with Access Technology, EF EF$_{PLMNwAcT}$, Operator controlled PLMN selector with Access Technology EF$_{OPLMNwAcT}$ and HPLMN selector with Access Technology EF$_{HPLMNwAcT}$, see TS 31.102.

Read command returns all used entries from the SIM/USIM list of preferred PLMNs, previously selected by the command +CPLS, with the Access Technologies for each PLMN in the list.

Test command returns the whole index range supported by the SIM.

Defined values

<index$n$>: integer type; the order number of operator in the SIM/USIM preferred operator list (1~12)

<format>:

- 0   long format alphanumeric <oper>
- 1   short format alphanumeric <oper>
- 2   numeric <oper>

<oper$n$>: string type; <format> indicates if the format is alphanumeric or numeric (see +COPS)

<GSM_AcTn>: GSM access technology:

- 0   access technology not selected

1   access technology selected

<GSM_Compact_AcTn>: GSM compact access technology:

    0   access technology not selected

    1   access technology selected

<UTRA_AcTn>: UTRA access technology:

    0   access technology not selected

    1   access technology selected

e.g

```
at+cpol=,2,"46001",0,0,1
OK
at+cpol=1
OK
at+cpol?
+CPOL: 1,2,"46001",0,0,1
+CPOL: 2,2,"46000",0,0,1
+CPOL: 3,2,"46002",0,0,1

OK
at+cpol=,0
OK
at+cpol?
+CPOL: 1,0,"CHN-UNICOM",0,0,1
+CPOL: 2,0,"CHINA  MOBILE",0,0,1
+CPOL: 3,0,"China Mobile Communication Corp.",0,0,1

OK
at+cpol=,1
OK
at+cpol?
+CPOL: 1,1,"UNICOM",0,0,1
+CPOL: 2,1,"CMCC",0,0,1
+CPOL: 3,1,"China Mobile",0,0,1

OK
```

3.3.8.5   Read operator names +COPN

Syntax

Table 3.3.8-5:+COPN action command syntax

Command	Possible response(s)
+COPN	+COPN: <numeric1>,<alpha1>
	[+COPN: <numeric2>,<alpha2>
	[...]]
	+CME ERROR: <err>
+COPN=?	

Description

Execute command returns the list of operator names from the MT. Each operator code <numeric*n*> that has an alphanumeric equivalent <alpha*n*> in the MT memory shall be returned.

Defined values

<numeric*n*>: string type; operator in numeric format (see +COPS)

<alpha*n*>: string type; operator in long alphanumeric format (see +COPS)

3.3.8.6 Report signal strength +ZRSSI

Syntax

Table3.3.8-6: +ZRSSI parameter command syntax

Command	Possible response(s)
+ZRSSI	+ZRSSI: <rssi>,<ecio>,<rscp>
	When there is other MS-related error:
	+CME ERROR: <err>
+ZRSSI=?	+ZRSSI: (RSSI,EC/IO,RSCP) for description the parameters

Description

This command is used to report signal strength.

Defined values

3G network（registered to 3G network）

+ZRSSI: rssi, ecio, rscp

The unit of Rscp is 0.5dbm (in 0.5 dBm step with no sign).

The unit of Ecio is 0.5db (in 0.5 dB step with no sign).

The relation is: 2*rssi=rscp-ecio

e.g

1. 3G network

+ZRSSI: 49, 8,106

$Rssi_{dbm}$ = -rssi = -49dbm

$Ecio_{db}$ = -ecio/2= -4db

$Rscp_{dbm} = - rscp /2 = -53dbm$

2. 2G network

+ZRSSI: rssi,1000,1000

NOTE: there is no ecio and rscp value when registered in 2G network, so set value of 1000

3. No network

+ZRSSI：OK

3.3.8.7   Display operator +ZDON

Syntax

Table 3.3.8-7: +ZDON parameter command syntax

Command	Possible response(s)
+ZDON?	+ZDON: <RPLMN>,<RMCC>,<RMNC>,<HPLMN>,<HMCC>,<HMNC>,<ROAM_STATUS> +CME ERROR: <err>

Description

This command is used to display the current operator, including the name and PLMN. This command can just be used as read command (i.e. AT+ZDON?).

When the operator changes, the new operator information is routed to TE using unsolicited code.

Defined values

<RPLMN>: the name of local operator

<RMCC>: the MCC of local operator

<RMNC>: the MNC of local operator

<HPLMN>: the name of home operator

<HMCC>: the MCC of home operator

<HMNC>: the MNC of home operator

<ROAM_STATUS>:

ROAM _NONE

ROAM _OFF

ROAM _ON

e.g.

```
AT+ZDON?
+ZDON: "CMCC",460,0,"China Mobile",460,2,"ROAM_OFF"

OK
```

3.3.8.8 Configuration of Network Selection Mode +ZSNT

Syntax

Table 3.3.8-8: +ZSNT parameter command syntax

Command	Possible response(s)
+ZSNT=<cm_mode>,<net_sel_mode>,<pref_acq>	+CME ERROR: <err>
+ZSNT?	+ZSNT: <cm_mode>,<net_sel_mode>,<pref_acq> +CME ERROR: <err>
+ZSNT=?	

Description

This command is used to set and read the network selection mode. The set command format is as follows:

AT+ZSNT=0,0,0   AUTOMATIC network selection，GSM+WCDMA

AT+ZSNT=0,0,1   AUTOMATIC network selection，GSM+WCDMA，GSM preferred

AT+ZSNT=0,0,2   AUTOMATIC network selection，GSM+WCDMA，WCDMA preferred

AT+ZSNT=1,0,0   AUTOMATIC network selection，GSM only

AT+ZSNT=2,0,0   AUTOMATIC network selection，WCDMA only

NOTE: Command like "AT+ZSNT=x, 1, y" shouldn't be used. Set manual network selection should use AT+COPS.

The read command format is as follows:

+ZSNT: 1, 1, x   MANUAL network selection, GSM only

+ZSNT: 2, 1, x   MANUAL network selection, WCDMA only

+ZSNT: 0, 1, 0   MANUAL network selection, UMTS pref

+ZSNT: 0, 1, 2   MANUAL network selection, UMTS pref

Defined values

<cm_mode>: Preferred network mode,   as "Preferred" parameter in QPST system panel.

　0: AUTOMATIC

　1: GSM_ONLY

　2: WCDMA_ONLY

<net_sel_mode>: selection of network selection mode, as "preferred selection mode" parameter in QPST system panel.

　0: AUTOMATIC network selection

　1: MANUAL network selection.

　NOTE: This parameter only used for read command. Set manual network selection should use AT+COPS.

　2: LIMITIED network selection

<pref_acq>: Preferred network mode acquisition parameter, as "preferred Acquisition" parameter in QPST system panel.

0： AUTOMATIC order

1： GSM_WCDMA prefer

2: WCDMA_GSM prefer

e.g.

```
AT+ZSNT=0,0,2
OK
```

3.3.8.9 Check Module Status +ZPAS

Syntax

Table 3.3.8-9: +ZPAS parameter command syntax

Command	Possible response(s)
+ZPAS?	+ZPAS: <network>,<srv_domain>
	+CME ERROR: <err>

Description

This command is used to check module status, including the type of current network and service domain. This command can just be used as read command (i.e. AT+ZPAS?).

When the network changes, the new type of network is routed to TE using unsolicited code.

Defined values

<network>: the type of current network

No Service

Limited Service

GSM

GPRS

EDGE

UMTS

HSDPA

HSUPA

HSPA

HSPA+

DC-HSPA+

LTE

<srv_domain>: service domain

CS_ONLY: CS domain service available.

PS_ONLY: PS domain service available.

CS_PS: CS&PS domain service available.

CAMPED: camped in a cell.

e.g.

```
AT+ZPAS?
+ZPAS: "GPRS","CS_PS"


OK
```

3.3.9   Security commands

3.3.9.1   Facility lock +CLCK

Syntax

Table3.3.9-1: +CLCK action command syntax

Command	Possible response(s)
+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	+CME ERROR: <err> when <mode>=2 and command successful: +CLCK: <status>[,<class1> [+CLCK: <status>,<class2> [...]]
+CLCK=?	+CLCK: (list of supported <fac>s) +CME ERROR: <err>

Description

Execute command is used to lock, unlock or interrogate a MT or a network facility <fac>. Password is normally needed to do such actions. When querying the status of a network service (<mode>=2) the response line for 'not active' case (<status>=0) should be returned only if service is not active for any <class>. This command should be abortable when network facilities are set or interrogated.

Call barring facilities are based on GSM/UMTS supplementary services (refer 3GPP TS 22.088). The interaction of these with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standard.

Test command returns facility values supported as a compound value.

Defined values

<fac> values reserved by the present document:

"PF"   lock Phone to the very First inserted SIM/UICC card (also referred in the present document as PH-FSIM) (MT asks password when other than the first SIM/UICC card is inserted)

"SC"   SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command issued)

"AO"   BAOC (Barr All Outgoing Calls) (refer 3GPP TS 22.088clause 1)

"FD"   SIM card or active application in the UICC (GSM or USIM) fixed dialing memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as <passwd>)

"PN"   Network Personalization (refer 3GPP TS 22.022)

"PU"   network sUbset Personalization (refer 3GPP TS 22.022

"PP"   service Provider Personalization (refer 3GPP TS 22.022)

"PC"   Corporate Personalization (refer 3GPP TS 22.022)

NOTE: "PF", "SC", "AO", "FD", "PN", "PU", "PP", "PC" parameters need be supported by network. So, ERROR may be response to TE.

<mode>:

    0   unlock

    1   lock

    2   query status

<status>:

    0   not active

    1   active

<passwd>: string type; shall be the same as password specified for the facility from the MT user interface or with command Change Password +CPWD

<class$x$> is a sum of integers each representing a class of information (default 7):

    2   data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64 and 128)

    8   short message service

    16   data circuit sync

    32   data circuit async

    64   dedicated packet access

    128 dedicated PAD access

e.g
```
at+clck="PU",2,"1234"
+clck: 0
OK
at+clck="PP",2,"1234"
+clck: 0
OK
at+clck="PC",2,"1234"
+clck: 0
at+clck="SC",1,"1234"
OK
at+clck="SC",0,"1234"
OK
```

3.3.9.2 Change password +CPWD

Syntax

Table 3.3.9-2: +CPWD action command syntax

Command	Possible response(s)
+CPWD=<fac>,<oldpwd>,<newpwd>	+CME ERROR: <err>
+CPWD=?	+CPWD: list of supported (<fac>,<pwdlength>)s
	+CME ERROR: <err>

Description

Action command sets a new password for the facility lock function defined by command Facility Lock +CLCK.

Test command returns a list of pairs which present the available facilities and the maximum length of their password.

Defined values

<fac>:

"P2"   SIM PIN2

 refer Facility Lock +CLCK for other values

<oldpwd>, <newpwd>: string type; <oldpwd> shall be the same as password specified for the facility from the MT user interface or with command Change Password +CPWD and <newpwd> is the new password; maximum length of password can be determined with <pwdlength>

<pwdlength>: integer type maximum length of the password for the facility

3.3.9.3 Enter PIN +CPIN

Syntax

Table 3.3. 9-3: +CPIN parameter command syntax

Command	Possible response(s)
+CPIN=<pin>[,<newpin>]	+CME ERROR: <err>
+CPIN?	+CPIN: <code>
	+CME ERROR: <err>
+CPIN=?	

Description

Set command sends to the MT a password which is necessary before it can be operated (SIM PIN, SIM PUK, PH-SIM PIN, etc.). If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken towards MT and an error message, +CME ERROR, is returned to TE.

If the PIN required is SIM PUK or SIM PUK2, the second pin is required. This second pin, <newpin>, is used to replace the old pin in the active application in the UICC (GSM or USIM) or SIM card.

Read command returns an alphanumeric string indicating whether some password is required or not.

Defined values

`<pin>`, `<newpin>`: string type values

`<code>` values reserved by the present document:

READY	MT is not pending for any password
SIM PIN	MT is waiting UICC/SIM PIN to be given
SIM PUK	MT is waiting UICC/SIM PUK to be given
PH-SIM PIN	MT is waiting phone-to-SIM/UICC card password to be given
PH-FSIM PIN	MT is waiting phone-to-very first SIM/UICC card password to be given
PH-FSIM PUK	MT is waiting phone-to-very first SIM/UICC card unblocking password to be given

SIM PIN2   MT is waiting active application in the UICC (GSM or USIM) or SIM card PIN2 to be given (this `<code>` is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. `+CME ERROR: 17`); if PIN2 is not entered right after the failure, it is recommended that MT does not block its operation)

SIM PUK2   MT is waiting active application in the UICC (GSM or USIM) or SIM card PUK2 to be given (this `<code>` is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. `+CME ERROR: 18`); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that MT does not block its operation)

PH-NET PIN	MT is waiting network personalization password to be given
PH-NET PUK	MT is waiting network personalization unblocking password to be given
PH-NETSUB PIN	MT is waiting network subset personalization password to be given
PH-NETSUB PUK	MT is waiting network subset personalization unblocking password to be given
PH-SP PIN	MT is waiting service provider personalization password to be given
PH-SP PUK	MT is waiting service provider personalization unblocking password to be given
PH-CORP PIN	MT is waiting corporate personalization password to be given
PH-CORP PUK	MT is waiting corporate personalization unblocking password to be given

3.3.9.4   Check PIN and PUK retry times +ZPINPUK

Syntax

Table 3.3. 9-4: +ZPINPUK parameter command syntax

Command	Possible response(s)
+ZPINPUK=?	+ZPINPUK: <pinnumber>,<puknumber>

Description

This command is used to check PIN and PUK left retry times.

Defined values

`<pinnumber>`: PIN left retry times

`<puknumber>`: PUK left retry times

e.g.

```
AT+ZPINPUK=?
+ZPINPUK: 3,10

OK
```

3.3.10 Phonebook Commands

3.3.10.1 Select phonebook memory storage +CPBS

Syntax

Table 3.3.10-1: +CPBS parameter command syntax

Command	Possible response(s)
+CPBS=<storage>[,<password>]	+CME ERROR: <err>
+CPBS?	+CPBS: <storage>[,<used>,<total>] +CME ERROR: <err>
+CPBS=?	+CPBS: (list of supported <storage>s)

Description

Set command selects phonebook memory storage `<storage>`, which is used by other phonebook commands. If setting fails in an MT error, `+CME ERROR: <err>` is returned.

Read command returns currently selected memory, and when supported by manufacturer, number of used locations and total number of locations in the memory.

Test command returns supported storages as compound value.

Defined values

`<storage>` values reserved by the present document:

"FD"   active application in the UICC (GSM or USIM) or SIM card fixdialing-phonebook

"ME"   MT phonebook

"MT"   combined MT and SIM/UICC phonebook

"ON"   active application in the UICC (GSM or USIM) or SIM card (or MT) own numbers (MSISDNs) list (reading of this storage may be available through +CNUM also)

"SM"   SIM/UICC phonebook

"TA"   TA phonebook

`<password>`: string type value representing the PIN2-code required when selecting PIN2-code locked `<storage>` is as above, e.g. "FD".

<used>: integer type value indicating the number of used locations in selected memory

<total>: integer type value indicating the total number of locations in selected memory

3.3.10.2 Read phonebook entries +CPBR

Syntax

Table3.3. 10-2: +CPBR action command syntax

Command	Possible response(s)
+CPBR=<index1> [,<index2>]	[+CPBR:<index1>,<number>,<type>,<text> if the range from index1 to index2 more than two +CPBR: <index2>,<number>,<type>,<text>] +CME ERROR: <err>
+CPBR=?	+CPBR: (list of supported <index>s),[<nlength>],[<tlength>] +CME ERROR: <err>

Description

Execution command returns phonebook entries in location number range <index1>... <index2> from the current phonebook memory storage selected with +CPBS. If <index2> is left out, only location <index1> is returned. Entry fields returned are location number <indexn>, phone number stored there <number> (of format <type>) and text <text> associated with the number. If all queried locations are empty (but available), no information text lines may be returnedIf listing fails in an MT error, +CME ERROR: <err> is returned.

Test command returns location range supported by the current storage as a compound value and the maximum lengths of <number> and <text> fields. In case of SIM/UICC storage, the lengths may not be available. If MT is not currently reachable, +CME ERROR: <err> is returned.

Defined values

<index1>, <index2>, <index>: integer type values in the range of location numbers of phonebook memory

<number>: string type phone number of format <type>

<type>: type of address octet in integer format (refer GSM 04.08 subclause 10.5.4.7)

<text>: string type field of maximum length <tlength>; character set as specified by command Select TE Character Set +CSCS

<nlength>: integer type value indicating the maximum length of field <number>

<tlength>: integer type value indicating the maximum length of field <text>

e.g

```
at+cpbr=?
+CPBR: (1-500),40,16
```

```
OK
at+cpbr=1,20
+CPBR: 1,"567389",129,"aiuhg"
+CPBR: 2,"18891006239",129,"lili"
+CPBR: 3,"10086",129,"yy"
+CPBR: 4,"15114850503",129,";"

OK
```

3.3.10.3 Find phonebook entries +CPBF

Syntax

Table3.3. 10-3: +CPBF action command syntax

Command	Possible response(s)
+CPBF=<findtext>	[+CPBF: <index1>,<number>,<type>,<text>
	[+CBPF: <index2>,<number>,<type>,<text>][...]]
	+CME ERROR: <err>
+CPBF=?	+CPBF: [<nlength>],[<tlength>]
	+CME ERROR: <err>

Description

Execution command returns phonebook entries (from the current phonebook memory storage selected with +CPBS) which alphanumeric field starts with string <findtext>. Entry fields returned are location number <index*n*>, phone number stored there <number> (of format <type>) and text <text> associated with the number. If listing fails in an MT error, +CME ERROR: <err> is returned.

Test command returns the maximum lengths of <number> and <text> fields. In case of SIM/UICC storage, the lengths may not be available. If MT is not currently reachable, +CME ERROR: <err> is returned.

Defined values

<index1>, <index2>: integer type values in the range of location numbers of phonebook memory

<number>: string type phone number of format <type>

<type>: type of address octet in integer format (refer GSM 04.08 subclause 10.5.4.7)

<findtext>, <text>: string type field of maximum length <tlength>; character set as specified by command Select TE Character Set +CSCS

<nlength>: integer type value indicating the maximum length of field <number>

<tlength>: integer type value indicating the maximum length of field <text>

3.3.10.4 Write phonebook entry +CPBW

Syntax

Table3.3. 10-4: +CPBW action command syntax

Command	Possible response(s)
+CPBW=[<index>][,<number> [,<type>[,<text>]]]	+CME ERROR: <err>
+CPBW=?	+CPBW: (list of supported <index>s),[<nlength>], (list of supported <type>s),[<tlength>] +CME ERROR: <err>

Description

Execution command writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS. Entry fields written are phone number <number> (in the format <type>) and text <text> associated with the number. If those fields are omitted, phonebook entry is deleted. If <index> is left out, but <number> is given, entry is written to the first free location in the phonebook (the implementation of this feature is manufacturer specific). If writing fails in an MT error, +CME ERROR: <err> is returned.

Test command returns location range supported by the current storage as a compound value, the maximum length of <number> field, supported number formats of the storage, and the maximum length of <text> field. In case of SIM/UICC storage, the lengths may not be available. If MT is not currently reachable, +CME ERROR: <err> is returned. If storage does not offer format information, the format list should be empty parenthesis.

Defined values

<index>: integer type values in the range of location numbers of phonebook memory

<number>: string type phone number of format <type>

<type>: type of address octet in integer format (refer GSM 04.08 subclause 10.5.4.7) ; default 145 when dialing string includes international access code character "+", otherwise 129

<text>: string type field of maximum length <tlength>; character set as specified by command Select TE Character Set +CSCS

<nlength>: integer type value indicating the maximum length of field <number>

<tlength>: integer type value indicating the maximum length of field <text>

3.3.10.5 Read USIM phonebook entries +ZCPBR

Syntax

Table 3.3. 10-5: +ZCPBR action command syntax

Command	Possible response(s)

+ZCPBR=<index1 >[,<index2>]	(1) standard phonebook
	`not support`
	(2) ZTE special phonebook
	For 3G phonebook
	`+ZCPBR: <index1>,<number><type><text>[<additionum1>,[<`
	`additionum2>][,<email>]]`
	`+ZCPBR: <index2>,<number><type><text>[<additionum1>,[<`
	`additionum2>][,<email>]]`
	`OK`
	
	For 2G phonebook
	`+ZCPBR: <index1>,<number><type><text>`
	`+ZCPBR: <index2>,<number><type><text>]`
	`OK`
	`or`
	`+CME ERROR: <err>`

+ZCPBR=?	(1) standard phonebook
	`not support`
	(2) ZTE special phonebook
	`+ZCPBR: (list of supported<index>s),[<nlength>],[<`
	`tlength>],[<mlenth>]`
	`+CME ERROR: <err>`

Description

This command is used to read phonebook entries from USIM card, including the accessorial number and email info.

Execution command returns USIM phonebook entries in location number range <index1>... <index2> from the current phonebook memory storage selected with +CPBS. If <index2> is left out, only location <index1> is returned. Entry fields returned are location number <indexn>, phone number stored there <number> (of format <type>) and text <text> associated with the number. If all queried locations are empty (but available), no information text lines may be returned. If listing fails in an MT error, +CME ERROR: <err> is returned.

Test command returns location range supported by the current storage as a compound value and the maximum lengths of <number> and <text> fields. In case of SIM/UICC storage, the lengths may not be available. If MT is not currently reachable, +CME ERROR: <err> is returned.

Defined values

<index1>, <index2>, <index>: integer type values in the range of location numbers of phonebook memory

<number1>, <number2>, <number3>: string type phone number of format <type>

<type>: type of address octet in integer format

`<text>`: string type field of maximum length `<tlength>`

`<email>`: string type field of maximum length `<mlenth>`

`<nlength>`: integer type value indicating the maximum length of field `<number>`

`<tlength>`: integer type value indicating the maximum length of field `<text>`

`<mlenth>`: integer type value indicating the maximum length of field `<email>`

e.g.

```
AT+ZCPBR=1, 10
not support
AT+ZCPBR=1, 10
+ZCPBR: 1,"12345","544D45","12345","","313233343500746D652E636F6D",
+ZCPBR: 2,"123","544D4532","123","","3133",
+ZCPBR: 3,"678","544D4533","678","","36373800544D452E636F6D",

OK
```

3.3.10.6 Write USIM phonebook entry +ZCPBW

Syntax

Table 3.3. 10-6: +ZCPBW action command syntax

Command	Possible response(s)
+ZCPBW=[<index>][,<number1>[,<type>[,<text>[,<number2>,<number3>[,<type>[…][,<email>]]]]]]	(1) standard phonebook not support (2) ZTE special phonebook +CME ERROR: <err>
+ZCPBW=?	(1) standard phonebook not support (2) ZTE special phonebook +ZCPBW: (list of supported <index>s),[<nlength>], (list of supported <type>s),[<tlength>],[<mlength>] +CME ERROR: <err>

Description

This command is used to write phonebook entries on USIM card, including the accessorial number and email info.

Execution command writes USIM phonebook entry in location number `<index>` in the current phonebook memory storage selected with +CPBS. Entry fields written are phone number `<number>` (in the format `<type>`) and text `<text>` associated with the number. If those fields are omitted, phonebook entry is deleted. If `<index>` is left out, but `<number>` is given, entry is written to the first free location in the phonebook (the implementation of this feature is manufacturer specific). If writing fails in an MT error, `+CME ERROR: <err>` is returned.

Test command returns location range supported by the current storage as a compound value, the maximum length of `<number>` field, supported number formats of the storage, and the maximum length of `<text>` field. In case of SIM/UICC storage, the lengths may not be available. If MT is not currently reachable, `+CME ERROR: <err>` is returned. If storage does not offer format information, the format list should be empty parenthesis.

Defined values

`<index>`: integer type values in the range of location numbers of phonebook memory

`<number1>`, `<number2>`: string type phone number of format `<type>`

`<type>`: type of address octet in integer format; default 145 when dialing string includes international access code character "+", otherwise 129

`<text>`: string type field of maximum length <tlength>

`<nlength>`: integer type value indicating the maximum length of field `<number>`

`<tlength>`: integer type value indicating the maximum length of field `<text>`

`<mlenth>`: integer type value indicating the maximum length of field `<email>`

e.g.

```
AT+ZCPBW=3,"678", 129,"544D4533","678","451","36373800544D452E636F6D"
OK
```

3.3.11 Status Control Commands

3.3.11.1 Phone activity status +CPAS

Syntax

Table 3.3.11-1: +CPAS action command syntax

Command	Possible response(s)
+CPAS	+CPAS: <pas>
	+CME ERROR: <err>
+CPAS=?	+CPAS: (list of supported <pas>s)
	+CME ERROR: <err>

Description

Execution command returns the activity status `<pas>` of the MT. It can be used to interrogate the MT before requesting action from the phone.

Test command returns values supported as a compound value.

Defined values

`<pas>`:

   0   ready (MT allows commands from TA/TE)

3 ringing (MT is ready for commands from TA/TE, but the ringer is active)

4 call in progress (MT is ready for commands from TA/TE, but a call is in progress)

3.3.11.2 Extended error report +CEER

Syntax

Table 3.3. 11-2: +CEER action command syntax

Command	Possible response(s)
+CEER	+CEER: <report>
+CEER=?	

Description

Execution command causes the TA to return one or more lines of information text <report>, determined by the MT manufacturer, which should offer the user of the TA an extended report of the reason for

  the failure in the last unsuccessful call setup or in-call modification;

  the last call release;

  the last unsuccessful GPRS attach or unsuccessful PDP context activation;

  the last GPRS detach or PDP context deactivation.

Typically, the text will consist of a single line containing the cause information given by GSM/UMTS network in textual format.

Defined values

 <report>: the total number of characters, including line terminators, in the information text shall not exceed 2041 characters.

Text shall not contain the sequence 0<CR> or OK<CR>.

3.3.12 STK and SIM Commands

3.3.12.1 Generic SIM access +CSIM

Syntax

Table 3.3.12-1: +CSIM action command syntax

Command	Possible response(s)
+CSIM=<length>,<command>	+CSIM: <length>,<response>
	+CME ERROR: <err>
+CSIM=?	

Description

Set command transmits to the MT the <command> it then shall send as it is to the SIM. In the same manner the SIM <response> shall be sent back by the MT to the TA as it is.

This command allows a direct control of the SIM by an distant application on the TE. The TE shall then take care of processing SIM information within the frame specified by GSM/UMTS.

NOTE: Compared to Restricted SIM Access command +CRSM, the definition of +CSIM allows TE to take more control over the SIM- MT interface. The locking and unlocking of the interface may be done by a special <command> value or automatically by TA/ MT (by interpreting <command> parameter). In case that TE application does not use the unlock command (or does not send a <command> causing automatic unlock) in a certain timeout value, MT may release the locking.

Defined values

<length>: integer type; length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response)

<command>: command passed on by the MT to the SIM in the format as described in GSM 11.11 (hexadecimal character format; refer +CSCS)

<response>: response to the command passed on by the SIM to the MT in the format as described in GSM 11.11 (hexadecimal character format; refer +CSCS)

3.3.12.2 Restricted SIM access +CRSM

Syntax

Table 3.3.12-2: +CRSM action command syntax

Command	Possible response(s)
+CRSM=<command>[,<fileid> [,<P1>,<P2>,<P3>[,<data>]]]	+CRSM: <sw1>,<sw2>[,<response>]
	+CME ERROR: <err>
+CRSM=?	

Description

By using this command instead of Generic SIM Access +CSIM TE application has easier but more limited access to the SIM database. Set command transmits to the MT the SIM <command> and its required parameters. MT handles internally all SIM- MT interface locking and file selection routines. As response to the command, MT sends the actual SIM information parameters and response data. MT error result code +CME ERROR may be

returned when the command cannot be passed to the SIM, but failure in the execution of the command in the SIM is reported in <sw1> and <sw2> parameters. Refer to subclause 3.1.2 for <err> values.

Coordination of command requests to SIM and the ones issued by GSM/UMTS application inside the MT is implementation dependent. However the TE should be aware of the precedence of the GSM/UMTS application commands to the TE commands.

Defined values

<command> (command passed on by the MT to the SIM; refer GSM 11.11):

176	READ BINARY
178	READ RECORD
192	GET RESPONSE
214	UPDATE BINARY
220	UPDATE RECORD
242	STATUS

all other values are reserved

<fileid>: integer type; this is the identifier of a elementary datafile on SIM. Mandatory for every command except STATUS

<P1>, <P2>, <P3>: integer type; parameters passed on by the MT to the SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in GSM 11.11

<data>: information which shall be written to the SIM (hexadecimal character format; refer +CSCS)

<sw1>, <sw2>: integer type; information from the SIM about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command

<response>: response of a successful completion of the command previously issued (hexadecimal character format; refer +CSCS). STATUS and GET RESPONSE return data, which gives information about the current elementary datafield. This information includes the type of file and its size. After READ BINARY or READ RECORD command the requested data will be returned. <response> is not returned after a successful UPDATE BINARY or UPDATE RECORD command.

e.g.
```
AT+CRSM = 176,12258,0,0,10
+CRSM: 144,0,"98680090911109001080"

OK
```

3.3.12.3 Subscriber number +CNUM

Syntax

Table 3.3.12-3: +CNUM action command syntax

Command	Possible response(s)
+CNUM	+CNUM: [<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]] [+CNUM: [<alpha2>],<number2>,<type2>[,<speed>,<service> [,<itc>]] [...]] +CME ERROR: <err>
+CNUM=?	

Description

Action command returns the MSISDNs related to the subscriber (This information can be stored in the SIM/UICC or in the MT. When storing information in the SIM/UICC, if a SIM card is inserted or if a UICC with an active GSM application is present, the information is stored in the EF $_{MSISDN}$ under DF$_{Telecom}$. If the UICC with an active USIM application is present, the information is stored in the EF$_{MSISDN}$ under ADF$_{USIM}$.). If subscriber has different MSISDN for different services, each MSISDN is returned in a separate line.

Defined values

<alpha*x*>: optional alphanumeric string associated with <number*x*>; used character set should be the one selected with command Select TE Character Set +CSCS

<number*x*>: string type phone number of format specified by <type*x*>

<type*x*>: type of address octet in integer format (refer GSM 04.08 subclause 10.5.4.7)

<speed>: Please refer to the value defined in the command of +CBST

<service> (service related to the phone number):

    0   asynchronous modem

    1   synchronous modem

    2   PAD Access (asynchronous)

    3   Packet Access (synchronous)

    4   voice

    5   fax

<itc> (information transfer capability):

    0   3,1 kHz

    1   UDI

3.3.12.4 Get STK Main Menu +ZSTM

Syntax

Table 3.3.12-4: +ZSTM parameter command syntax

Command	Possible response(s)
+ZSTM	+ZSTM: <STK_main_menu_code>

Description

This command is used to inquire the STK main menu information.

Defined values

<STK_main_menu_code>: the code of STK main menu

e.g.

```
AT+ZSTM
+ZSTM: D081C08103012500820281828 50B80795E5DDE884C592957308F0A01808F7B677E95EE50198F0A038077ED4
FE17FA453D18F0A04804F1860E05FEB8BAF8F0A07805E94752863A883508F0E098000530049004D84254E1A53858F0
80A80624B673A62A58F060B8098DE4FE18F0E0C806211768465E07EBF97F34E508F0C0D8000310032003500380030B
F0C0E80003100330039793E533A8F0C0F80624B673A4E9280547F518F0C108052A8529B0031003000308F0E0880005
30049004D53614FE1606F
```

```
OK
```

3.3.12.5 Select Main Menu Item +ZSELM

Syntax

Table 3.3.12-5: +ZSELM parameter command syntax

Command	Possible response(s)
+ZSELM=<menu_item_id>	

Description

This command is used to select the STK main menu item.

Defined values

<menu_item_id>: the ID of selected main menu item; this ID is obtained in the response of AT+ZSTM, the range of this value is from 0 to 255.

e.g.

```
AT+ZSELM=6
OK
+ZSTI: 3,;19,8079FB52A852A97406;50,8065E05FE75C0F52A9624B;51,8
```

3.3.12.6 Sub-menu Items Reports +ZSTI

Syntax

Table 3.3.12-6: +ZSTI parameter command syntax

Command	Possible response(s)
unsolicited code	+ZSTI: <num_items_N>,<item_title>;<itme1_id>,<item1_text>;<item2_

	id>,<item2_text>;……<itemN_id>,<itemN_text>

Description

When users select one of the main menu item, the sub-items under this main menu item is reported to TE using unsolicited code.

Defined values

<num_items_N>: the number of items

<item_title>: the title of item

<item1_id>: the ID of item1

<item1_text>: the text of item1

<item2_id>: the ID of item2

<item2_text>: the text of item2

…………

<itemN_id>: the ID of itemN

<itemN_text>: the text of itemN .

3.3.12.7 Select Sub-menu Item +ZSELI

Syntax

Table 3.3.12-7: +ZSELI parameter command syntax

Command	Possible response(s)
+ZSELI=<item_id>	

Description

This command is used to select the STK sub-menu item.

Defined values

<item_id>：the ID of selected sub-menu item; this ID is obtained in the report of AT+ZSTI, the range of this value is from 0 to 255.

e.g.

```
at+zseli=1
OK

+ZDIST:
D06E8103012181820281020D63086B228FCE4F7F75288054901A300A59296C14988462A5300B4E1A52A1FF0C8D448D
390030002E00325143002F6B21FF0C4E0D542B901A4FE18D3930025BA2670D003A0034003000300036003100310037
0038003700383002786E8BA470B964ADFF1F
```

3.3.12.8 Requests for Text Display +ZDIST

Syntax

Table 3.3.12-8: +ZDIST parameter command syntax

Command	Possible response(s)
unsolicited code	+ZDIST: <text_string>

Description

When (U)SIM card requests for displaying text, the text string is reported to TE using unsolicited code.

Defined values

<text_string>：the text string reported to display

3.3.12.9 Requests for Character Input +ZGINK

Syntax

Table 3.3.12-9: +ZGINK parameter command syntax

Command	Possible response(s)
unsolicited code	+ZGINK: <hint_text>,<input_dcs>

Description

When (U)SIM card requests for inputting a single character, the request is reported to TE using unsolicited code.

Defined values

<hint_text>：the hint character

<input_dcs>：the data code scheme of user input

3.3.12.10 Requests for Text String Input +ZGINP

Syntax

Table 3.3.12-10: +ZGINP parameter command syntax

Command	Possible response(s)
unsolicited code	+ZGINP: <hint_text>,<input_dcs>,<max_input_length>,<min_input_length>

Description

When (U) SIM card requests for inputting text string, the request is reported to TE using unsolicited code.

Defined values

<hint_text>：the hint text string

<input_dcs>：the data code scheme of user input

`<max_input_length>`: the max length that user can input

`<min_input_length>`: the min length that user can input

3.3.12.11 Requests for Build Main Menu +ZPSTM

Syntax

Table 3.3.12-11: +ZPSTM parameter command syntax

Command	Possible response(s)
unsolicited code	+ZPSTM: <menu_number_N>,<menu_title>;<item1_id>,<item1_text>;<item2_id>,<item2_text>;……<itemN_id>,<itemN_text>

Description

When (U) SIM card requests for building main menu, the request is reported to TE using unsolicited code.

Defined values

`<menu_number_N>`: the number of main menus

`<menu _title>`: the title of the main menu

`<item1_id>`: the ID of item1

`<item1_text>`: the text of item1

`<item2_id>`: the ID of item2

`<item2_text>`: the text of item2

………..

`<itemN_id>`: the ID of itemN

`<itemN_text>`: the text of itemN

3.3.12.12 Requests for Rebuild Main Menu +ZEND

Syntax

Table 3.3.12-12: +ZEND parameter command syntax

Command	Possible response(s)
unsolicited code	+ZEND

Description

When (U) SIM card requests session-end, the request for rebuilding main menu is reported to TE using unsolicited code.

Defined values

No value.

3.3.12.13 SMS Sending Status Reports +ZSMSR

Syntax

Table 3.3.12-13: +ZSMSR parameter command syntax

Command	Possible response(s)
unsolicited code	+ZSMSR: <text_string>

Description

When (U)SIM card sends SMS of STK service, the SMS sending status reports is routed to TE using unsolicited code.

Defined values

<text_string>: the text string of STK SMS sending status reports

3.3.12.14 Support Current Command Type Reports +Zunsupport

Syntax

Table 3.3.12-14: +Zunsupport parameter command syntax

Command	Possible response(s)
unsolicited code	+Zunsupport: <cmd_id>

Description

When (U)SIM card doesn't support the type of current STK command, the report is routed to TE using unsolicited code.

Defined values

<cmd_id>: the type of current STK command

3.3.12.15 Menu Backwards +ZBK

Syntax

Table 3.3.12-15: +ZBK parameter command syntax

Command	Possible response(s)
+ZBK=<itemid>	

Description

This command is used to select that the menu return to the upper menu or main menu.

Defined values

<itemid>: the ID of the item

    0: return to the main menu

    1: return to the upper menu

e.g.

```
AT+ZBK=1
OK
```

3.3.12.16 Input Character +ZINKR

Syntax

Table 3.3.12-16: +ZINKR parameter command syntax

Command	Possible response(s)
+ZINKR=<input_dcs>,<input_text>	

Description

This command is used to hint users to input character.

Defined values

<input_dcs>: the data code scheme of user input

    0: SMS_DEF_ALPHABET

    1: YES_NO

    2: NUMERICAL_ONLY

    3: UCS2_ALPHABET

    4: NUMERCIAL_UCS2

<input_text>: the text user input

3.3.12.17 Input Text String +ZINPR

Syntax

Table 3.3.12-17: +ZINPR parameter command syntax

Command	Possible response(s)
+ZINPR=<input_dcs>,<input_text>	

Description

This command is used to hint users to input text string.

Defined values

<input_dcs>: the data code scheme of user input

    0: SMS_DEF_ALPHABET

1: YES_NO

2: NUMERICAL_ONLY

3: UCS2_ALPHABET

4: NUMERCIAL_UCS2

`<input_text>`: the text user input

3.3.12.18 Text Display +ZDISTR

Syntax

Table 3.3.12-18: + ZDISTR parameter command syntax

Command	Possible response(s)
+ZDISTR	

Description

This command is used to hint users to validate text string display.

Defined values

No value.

e.g.

```
AT+ZDISTR
OK
```

3.3.12.19 Check USIM Card Type +ZUSIM

Syntax

Table 3.3.12-19: +ZUSIM parameter command syntax

Command	Possible response(s)
+ZUSIM=?	+ZUSIM: <usim_card>
	+CME ERROR: <err>

Description

This command is used to check the type of current (U) SIM card.

Defined values

`<usim_card>` : the type of current (U)SIM card

0: current is SIM card

1: current is USIM card

e.g.

```
AT+ZUSIM=?
+ZUSIM: 0
```

OK

3.3.12.20 Query the status of Network Lock +ZSEC

Syntax

Table 3.3.12-20: + ZSEC parameter command syntax

Command	Possible response(s)
+ZSEC?	+ZSEC: <SEC_STATUE>,<SEC_ITEMS> MS Error : +CME ERROR: <err>

Description

Extensible AT command, this command is for querying the status of encryption. (The appropriative function of Network Lock)

Defined values

<SEC_STATUE >:

 0:   Initializing the encryption (Insignificant SEC_ITEMS)

 1:   Encrypt error. (Insignificant SEC_ITEMS)

 2:   Lock Encryption

 3:   Unlocked or correct MCC/MNC/EF_GID1

<SEC_ITEMS>:

 0:   No action

 1:   Network lock

 2:   (U) SIM card lock

 3:   Network Lock and (U) SIM card Lock

e.g.

AT+ZSEC?
+ZSEC: 3,0

OK

3.3.12.21 Unlock and query the unlock residual time +ZNCK

Syntax

Table 3.3.12-21: +ZNCK parameter command syntax

Command	Possible response(s)
+ZNCK=<"nck_code">	MS error:

	+CME ERROR: <err>
+ZNCK?	+ZNCK: <nck_time>
	MS error:
	+CME ERROR: <err>

Description

Extensible AT command, this command is for unlock and querying the residual time of this function. (The appropriative function of Network Lock)

The Unlock Code would be fed back by the command EXECUTION.

The unlock residual time would be fed back by the command READ.

Defined values

<"nck_code">: Unlock code

e.g.

```
AT+ZNCK?
+ZNCK: 5

OK
AT+ZNCK="707054c4b4926836"
OK
```

3.3.12.22 Query the MCC, MNC command +ZLKLIST

Syntax

Table 3.3.12-22: +ZLKLIST parameter command syntax

Command	Possible response(s)
+ZLKLIST?	+ZLKLIST: <list0>,[<list1>,<list2>,<list3>....]
	MS error:
	+CME ERROR: <err>

Description

This command returns the mcc, mnc list; it is used to control the auto installation function.

Defined values

<list0>:MCC MNC

e.g.

```
AT+ZLKLIST?
+ZLKLIST: 46000,46002

OK
```

3.3.13 Mobile Terminal Error Commands

3.3.13.1 Report Mobile Termination error +CMEE

Syntax

Table 3.3.13-1: +CMEE parameter command syntax

Command	Possible response(s)
+CMEE=[<n>]	
+CMEE?	+CMEE: <n>
+CMEE=?	+CMEE: (list of supported <n>s)

Description

Set command disables or enables the use of result code +CME ERROR: <err> an indication of an error relating to the functionality of the MT. When enabled, MT related errors cause +CME ERROR: <err> final result code instead of the regular ERROR final result code. ERROR is returned normally when error is related to syntax, invalid parameters, or TA functionality.

Test command returns values supported as a compound value.

Defined values

<n>:

   0   disable +CME ERROR: <err> result code and use ERROR instead

   1   enable +CME ERROR: <err> result code and use numeric <err> values (refer subclause 3.1.2)

   2   enable +CME ERROR: <err> result code and use verbose <err> values (refer subclause 3.1.2)

e.g.

```
AT+CMEE=0   (+CME ERROR shall not be used)
OK
AT+CGMI
ERROR
AT+CMEE=1   (use numeric <err>)
OK
AT+CGMI
+CME ERROR: 1
AT+CMEE=2   (use verbose <err>)
OK
AT+CGMI
+CME ERROR: no connection to phone
```

3.3.14 Commands for UMTS Packet Domain

3.3.14.1 Define PDP Context +CGDCONT

Syntax

Table 3.3. 14-1: +CGDCONT parameter command syntax

Command	Possible response(s)
+CGDCONT=[<cid> [,<PDP_type> [,<APN> [,<PDP_addr> [,<d_comp> [,<h_comp> [,<pd1> [,…[,pdN]]]]]]]]]	OK ERROR
+CGDCONT?	+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<pd1>[,…[,pdN]]] [+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<pd1>[,…[,pdN]]] [...]]
+CGDCONT=?	+CGDCONT: (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s)[,(list of supported <pd1>s)[,…[,(list of supported <pdN>s)]]] [+CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s)[,(list of supported <pd1>s)[,…[,(list of supported <pdN>s)]]] [...]]

Description

The set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>.

The read command returns the current settings for each defined context.

The test command returns values supported as a compound value. If the MT supports several PDP types, <PDP_type>, the parameter value ranges for each <PDP_type> are returned on a separate line.

NOTE: A special form of the set command, +CGDCONT=<cid>, causes the values for context number <cid> to become undefined.

Defined values

<cid>: (PDP Context Identifier) a numeric parameter which specifies a particular PDP context definition.

<PDP_type>: (Packet Data Protocol type) a string parameter which specifies the type of packet data protocol

    IP   Internet Protocol (IETF STD 5)

    IPV6   Internet Protocol, version 6 (IETF RFC 2460)

    PPP   Point to Point Protocol (IETF STD 51)

<APN>: (Access Point Name) a string parameter which is a logical name that is used to select the GGSN or the external packet data network.

If the value is null or omitted, then the subscription value will be requested.

<PDP_address>: a string parameter that identifies the MT in the address space applicable to the PDP.

If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested.
The allocated address may be read using the +CGPADDR command.

<d_comp>: a numeric parameter that controls PDP data compression

    0 - off   (default if value is omitted)

    1 - on (manufacturer preferred compression)

    2 - V.42bis

<h_comp>: a numeric parameter that controls PDP header compression (refer 3GPP TS 04.65)

    0 – off (default if value is omitted)

    1 – on (manufacturer preferred compression)

    2 – RFC1144

    3 – RFC2507

    4 - RFC3095 (applicable for PDCP only)

<pd1> … <pdN>: zero to N string parameters whose meanings are specific to the <PDP_type>

3.3.14.2 Quality of Service Profile (Requested) +CGQREQ

Syntax

Table 3.3. 14-2: +CGQREQ parameter command syntax

Command	Possible Response(s)
+CGQREQ=[<cid> [,<precedence > [,<delay> [,<reliability.>	OK ERROR

[,<peak> [,<mean>]]]]]]	
+CGQREQ?	+CGQREQ: <cid>, <precedence >, <delay>, <reliability>, <peak>, <mean> [+CGQREQ: <cid>, <precedence >, <delay>, <reliability.>, <peak>, <mean> […]]
+CGQREQ=?	+CGQREQ: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s) [+CGQREQ: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s) […]]

Description

This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network.

The set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. Since this is the same parameter that is used in the +CGDCONT and +CGDSCONT commands, the +CGQREQ command is effectively an extension to these commands. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

A special form of the set command, +CGQREQ= <cid> causes the requested profile for context number <cid> to become undefined.

The read command returns the current settings for each defined context.

The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

Defined values

<cid>: a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

<precedence>: a numeric parameter which specifies the precedence class

<delay>: a numeric parameter which specifies the delay class

<reliability>: a numeric parameter which specifies the reliability class

<peak>: a numeric parameter which specifies the peak throughput class

<mean>: a numeric parameter which specifies the mean throughput class

If a value is omitted for a particular class then the value is considered to be unspecified.

e.g

```
at+cgqreq=1,2,4,5,6,31
```

OK

3.3.14.3 Quality of Service Profile (Minimum acceptable) +CGQMIN

Syntax

Table 3.3. 14-3: +CGQMIN parameter command syntax

Command	Possible Response(s)
+CGQMIN=[<cid> [,<precedence> [,<delay> [,<reliability.> [,<peak> [,<mean>]]]]]]	OK ERROR
+CGQMIN?	+CGQMIN: <cid>, <precedence >, <delay>, <reliability>, <peak>, <mean> [+CGQMIN: <cid>, <precedence >, <delay>, <reliability.>, <peak>, <mean> […]]
+CGQMIN=?	+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s) [+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s) […]]

Description

This command allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile returned in the Activate PDP Context Accept message.

The set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

A special form of the set command, +CGQMIN= <cid> causes the minimum acceptable profile for context number <cid> to become undefined. In this case no check is made against the negotiated profile.

The read command returns the current settings for each defined context.

The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

Defined values

<cid>: a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

`<precedence>:` a numeric parameter which specifies the precedence class

`<delay>:` a numeric parameter which specifies the delay class

`<reliability>:` a numeric parameter which specifies the reliability class

`<peak>:` a numeric parameter which specifies the peak throughput class

`<mean>:` a numeric parameter which specifies the mean throughput class

If a value is omitted for a particular class then this class is not checked.

e.g.

```
at+cgqmin=1,2,4,5,6,31
OK
```

3.3.14.4 3G Quality of Service Profile (Requested) +CGEQREQ

Syntax

Table 3.3. 14-4: +CGEQREQ parameter command syntax

Command	Possible Response(s)
+CGEQREQ=[<cid> [,<Traffic class> [,<Maximum bitrate UL> [,<Maximum bitrate DL> [,<Guaranteed bitrate UL> [,<Guaranteed bitrate DL> [,<Delivery order> [,<Maximum SDU size> [,<SDU error ratio> [,<Residual bit error ratio> [,<Delivery of erroneous SDUs> [,<Transfer delay> [,<Traffic handling priority>]]]]]]]]]]]]]	OK ERROR
+CGEQREQ?	+CGEQREQ: <cid>, <Traffic class> ,<Maximum bitrate UL> ,<Maximum bitrate DL> ,<Guaranteed bitrate UL> ,<Guaranteed bitrate DL> ,<Delivery order> ,<Maximum SDU size> ,<SDU error ratio> ,<Residual bit error ratio> ,<Delivery of erroneous SDUs> ,<Transfer delay> ,<Traffic handling priority> [+CGEQREQ: <cid>, <Traffic class> ,<Maximum bitrate UL> ,<Maximum bitrate DL> ,<Guaranteed bitrate UL> ,<Guaranteed bitrate DL> ,<Delivery order> ,<Maximum SDU size> ,<SDU error ratio> ,<Residual bit error ratio> ,<Delivery of erroneous

Command	Possible Response(s)
	SDUs> ,<Transfer delay> ,<Traffic handling priority> […]]
+CGEQREQ=?	+CGEQREQ: <PDP_type>, (list of supported <Traffic class>s) ,(list of supported <Maximum bitrate UL>s), (list of supported <Maximum bitrate DL>s), (list of supported <Guaranteed bitrate UL>s), (list of supported <Guaranteed bitrate DL>s),(list of supported <Delivery order>s) ,(list of supported <Maximum SDU size>s) ,(list of supported <SDU error ratio>s) ,(list of supported <Residual bit error ratio>s) ,(list of supported <Delivery of erroneous SDUs>s) ,(list of supported <Transfer delay>s) ,(list of supported <Traffic handling priority>s) [+CGEQREQ: <PDP_type>, (list of supported <Traffic class>s) ,(list of supported <Maximum bitrate UL>s), (list of supported <Maximum bitrate DL>s), (list of supported <Guaranteed bitrate UL>s), (list of supported <Guaranteed bitrate DL>s),(list of supported <Delivery order>s) ,(list of supported <Maximum SDU size>s) ,(list of supported <SDU error ratio>s) ,(list of supported <Residual bit error ratio>s) ,(list of supported <Delivery of erroneous SDUs>s) ,(list of supported <Transfer delay>s) ,(list of supported <Traffic handling priority>s) […]]

Description

This command allows the TE to specify a UMTS Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network.

The set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. The specified profile will be stored in the MT and sent to the network only at activation or MS-initiated modification of the related context. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

A special form of the set command, +CGEQREQ= <cid> causes the requested profile for context number <cid>

to become undefined.

The read command returns the current settings for each defined context.

The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

Defined values

`<cid>`: a numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands).

`<Traffic class>`: a numeric parameter that indicates the type of application for which the UMTS bearer service is optimised.

0 - conversational

1 - streaming

2 - interactive

3 - background

4 - subscribed value

`<Maximum bitrate UL>`: a numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…, 32 …).

`<Maximum bitrate DL>`: a numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…, 32 …). If the parameter is set to '0' the subscribed value will be requested.

`<Guaranteed bitrate UL>`: a numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…, 32 …). If the parameter is set to '0' the subscribed value will be requested.

`<Guaranteed bitrate DL>`: a numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…, 32 …). If the parameter is set to '0' the subscribed value will be requested.

`<Delivery order>`: a numeric parameter that indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not.

0 - no

1 - yes

2 - subscribed value.

`<Maximum SDU size>`: a numeric parameter (1,2,3,…) that indicates the maximum allowed SDU size in octets. If the parameter is set to '0' the subscribed value will be requested.

`<SDU error ratio>`: a string parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of $5 \cdot 10^{-3}$ would be specified as '5E3' (e.g. AT+CGEQREQ=…,"5E3"…). '0E0' means subscribed value.

`<Residual bit error ratio>`: a string parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as 'mEe'.

`<Delivery of erroneous SDUs>`: a numeric parameter that indicates whether SDUs detected as erroneous shall be delivered or not.

0 - no

1 - yes

2 - no detect

3 - subscribed value

`<Transfer delay>`: a numeric parameter (0, 1, 2…) that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds. If the parameter is set to '0' the subscribed value will be requested.

`<Traffic handling priority>`: a numeric parameter (1, 2, 3…) that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers. If the parameter is set to '0' the subscribed value will be requested.

`<PDP_type>`: (see +CGDCONT and +CGDSCONT commands).

If a value is omitted for a particular class then the value is considered unspecified.

e.g.

```
at+cgeqreq=1,3,384,384,0,0,2,0,"0E0","0E0",3,0,0
OK
```

3.3.14.5 3G Quality of Service Profile (Minimum acceptable) +CGEQMIN

Syntax

Table 3.3. 14-5: +CGEQMIN parameter command syntax

Command	Possible Response(s)
+CGEQMIN=[<cid> [,<Traffic	OK

Command	Possible Response(s)
class> [,<Maximum bitrate UL> [,<Maximum bitrate DL> [,<Guaranteed bitrate UL> [,<Guaranteed bitrate DL> [,<Delivery order> [,<Maximum SDU size> [,<SDU error ratio> [,<Residual bit error ratio> [,<Delivery of erroneous SDUs> [,<Transfer delay> [,<Traffic handling priority>]]]]]]]]]]]]	ERROR
+CGEQMIN?	+CGEQMIN: <cid>, <Traffic class> ,<Maximum bitrate UL>, <Maximum bitrate DL> ,<Guaranteed bitrate UL> ,<Guaranteed bitrate DL>, <Delivery order> ,<Maximum SDU size> ,<SDU error ratio> ,<Residual bit error ratio> ,<Delivery of erroneous SDUs> ,<Transfer delay> ,<Traffic handling priority> [+CGEQMIN: <cid>, <Traffic class> ,<Maximum bitrate UL> ,<Maximum bitrate DL> ,<Guaranteed bitrate UL> ,<Guaranteed bitrate DL>, <Delivery order> ,<Maximum SDU size> ,<SDU error ratio> ,<Residual bit error ratio> ,<Delivery of erroneous SDUs> ,<Transfer delay> ,<Traffic handling priority> […]]
+CGEQMIN=?	+CGEQMIN: <PDP_type>, (list of supported <Traffic class>s) ,(list of supported <Maximum bitrate UL>s) ,(list of supported <Maximum bitrate DL>s), (list of supported <Guaranteed bitrate UL>s), (list of supported <Guaranteed bitrate DL>s) ,(list of supported <Delivery order>s) ,(list of supported <Maximum SDU size>s) ,(list of supported <SDU error ratio>s) ,(list of supported <Residual bit error ratio>s) ,(list of supported <Delivery of erroneous SDUs>s) ,(list of supported <Transfer delay>s) ,(list of supported <Traffic handling priority>s) [+CGEQMIN: <PDP_type>, (list of supported

Command	Possible Response(s)

	`<Traffic class>s) ,(list of supported`
	`<Maximum bitrate UL>s), (list of supported`
	`<Maximum bitrate DL>s) ,(list of supported`
	`<Guaranteed bitrate UL >s), (list of`
	`supported <Guaranteed bitrate DL >s) ,(list`
	`of supported <Delivery order>s) ,(list of`
	`supported <Maximum SDU size>s) ,(list of`
	`supported <SDU error ratio>s) ,(list of`
	`supported <Residual bit error`
	`ratio>s) ,(list of supported <Delivery of`
	`erroneous SDUs>s) ,(list of supported`
	`<Transfer delay>s) ,(list of supported`
	`<Traffic handling priority>s)`
	
	`[…]]`

Description

This command allows the TE to specify a minimum acceptable profile, which is checked by the MT against the negotiated profile returned in the Activate/Modify PDP Context Accept message.

The set command specifies a profile for the context identified by the (local) context identification parameter, `<cid>`. The specified profile will be stored in the MT and checked against the negotiated profile only at activation or MS-initiated modification of the related context. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

A special form of the set command, `+CGEQMIN= <cid>` causes the minimum acceptable profile for context number `<cid>` to become undefined. In this case no check is made against the negotiated profile.

The read command returns the current settings for each defined context.

The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

Defined values

`<cid>`: a numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands).

`<Traffic class>`: a numeric parameter that indicates the type of application for which the UMTS bearer service is optimised.

  0 - conversational

  1 - streaming

  2 - interactive

  3 - background

`<Maximum bitrate UL>`: Maximum bitrate Up Link (kbits/s)

`<Maximum bitrate DL>`: Maximum bitrate down link (kbits/s)

`<Guaranteed bitrate UL>`: the guaranteed bitrate up link(kbits/s)

`<Guaranteed bitrate DL>`: the guaranteed bitrate down link(kbits/s)

`<Delivery order>`: a numeric parameter that indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not.

    0 - no

    1 - yes

`<Maximum SDU size>`: a numeric parameter (1,2,3,…) that indicates the maximum allowed SDU size in octets.

`<SDU error ratio>`: a string parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of $5 \cdot 10^{-3}$ would be specified as '5E3' (e.g. AT+CGEQMIN=…,"5E3"…).

`<Residual bit error ratio>`: a string parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. The value is specified as 'mEe'. As an example a target residual bit error ratio of $5 \cdot 10^{-3}$ would be specified as '5E3' (e.g. AT+CGEQMIN=…,"5E3"…).

`<Delivery of erroneous SDUs>`: a numeric parameter that indicates whether SDUs detected as erroneous shall be delivered or not.

    0 - no

    1 - yes

    2 - no detect

`<Transfer delay>`: a numeric parameter that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds.

`<Traffic handling priority>`: a numeric parameter that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers.

`<PDP_type>`: (see +CGDCONT and +CGDSCONT commands).

If a value is omitted for a particular class then the value is considered unspecified.

e.g.

```
at+cgeqmin=1,3,192,192,0,0,2,0,"0E0","0E0",3,0,0
OK
```

3.3.14.6 PS attach or detach +CGATT

Syntax

Table 3.3. 14-6: CGATT action command syntax

Command	Possible Response(s)
+CGATT= [<state>]	OK ERROR
+CGATT?	+CGATT: <state>
+CGATT=?	+CGATT: (list of supported <state>s)

Description

The execution command is used to attach the MT to, or detach the MT from, the Packet Domain service.

Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.

The read command returns the current Packet Domain service state.

The test command is used for requesting information on the supported Packet Domain service states.

Defined Values

<state>: indicates the state of PS attachment

    0 - detached

    1 – attached

    Other values are reserved and will result in an ERROR response to the execution command.

3.3.14.7 PDP context activate or deactivate +CGACT

Syntax

Table 3.3. 14-7: CGACT action command syntax

Command	Possible Response(s)
+CGACT=[<state> [,<cid>[,<cid>[,…]]]]	OK ERROR
+CGACT?	+CGACT: <cid>, <state> [+CGACT: <cid>, <state> [...]]
+CGACT=?	+CGACT: (list of supported <state>s)

Description

The execution command is used to activate or deactivate the specified PDP context (s).

If no <cid>s are specified the activation form of the command activates all defined contexts.

If no <cid>s are specified the deactivation form of the command deactivates all active contexts.

The read command returns the current activation states for all the defined PDP contexts.

The test command is used for requesting information on the supported PDP context activation states.

Defined Values

`<state>`: indicates the state of PDP context activation

    0 - deactivated

    1 – activated

    Other values are reserved and will result in an ERROR response to the execution command.

`<cid>`: a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

3.3.14.8 Enter data state +CGDATA

Syntax

Table 3.3. 14-8: +CGDATA action command syntax

Command	Possible Response(s)
+CGDATA=[<L2P> ,[<cid> [,<cid> [,…]]]]	CONNECT
	ERROR
+CGDATA=?	+CGDATA: (list of supported <L2P>s)

Description

The execution command causes the MT to perform whatever actions are necessary to establish communication between the TE and the network using one or more Packet Domain PDP types.

The test command is used for requesting information on the supported layer 2 protocols.

NOTE: if parameter `<L2P>` is omitted, the layer 2 protocol is unspecified.

Defined Values

`<L2P>`: a string parameter that indicates the layer 2 protocol to be used between the TE and MT

PPP   Point-to-point protocol for a PDP such as IP

`<cid>`: a numeric parameter which specifies a particular PDP context definition

3.3.14.9 Show PDP address +CGPADDR

Syntax

Table 3.3. 14-9: +CGPADDR action command syntax

Command	Possible response(s)
+CGPADDR=[<c id> [,<cid> [,…]]]	+CGPADDR: <cid>,<PDP_addr> [+CGPADDR: <cid>,<PDP_addr> [...]]
+CGPADDR=?	+CGPADDR: (list of defined <cid>s)

Description

The execution command returns a list of PDP addresses for the specified context identifiers.

The test command returns a list of defined <cid>s.

Defined values

<cid>: a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands). If no <cid> is specified, the addresses for all defined contexts are returned.

<PDP_address>: a string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT and +CGDSCONT commands when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>.<PDP_address> is omitted if none is available.

3.3.14.10 GPRS mobile station class +CGCLASS

Syntax

Table 3.3. 14-10: CGCLASS parameter command syntax

Command	Possible Response(s)
+CGCLASS= [<class>]	OK ERROR
+CGCLASS?	+CGCLASS: <class>
+CGCLASS=?	+CGCLASS: (list of supported <class>s)

Description

The set command is used to set the MT to operate according to the specified mode of operation. If the requested mode of operation is not supported, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

The read command returns the mode of operation set by the TE, independent of the current serving cell capability and independent of the current serving cell Access Technology. If no value has been set by the TE previously, the return value shall be the highest mode of operation that can be supported by the MT.

The test command is used for requesting information on the supported MT mode of operation.

Defined Values

`<class>`: a string parameter which indicates the mode of operation

A   Class-A mode of operation (A/Gb mode), or CS/PS mode of operation (Iu mode) (highest mode of operation)

B   Class-B mode of operation (A/Gb mode), (not applicable in Iu mode)

CG   Class-C mode of operation in PS only mode (A/Gb mode), or PS mode of operation (Iu mode)

CC   Class-C mode of operation in CS only mode (A/Gb mode), or CS (Iu mode) (lowest mode of operation)

> NOTE: `<class>` A means that the MT would operate simultaneous PS and CS service
>
>   `<class>` B means that the MT would operate PS and CS services but not simultaneously
>
>   `<class>` CG means that the MT would only operate PS services
>
>   `<class>` CC means that the MT would only operate CS services

Other values are reserved and will result in an ERROR response to the set command.

If the MT is attached to the PS domain when the set command is issued with a `<class>` = CC specified, a PS detach shall be performed by the MT.

3.3.14.11 Packet Domain event reporting +CGEREP

Syntax

Table 3.3. 14-11: CGEREP parameter command syntax

Command	Possible response(s)
+CGEREP=[<mode>[,<bfr>]]	OK ERROR
+CGEREP?	+CGEREP: <mode>,<bfr>
+CGEREP=?	+CGEREP: (list of supported <mode>s),(list of supported <bfr>s)

Description

Set command enables or disables sending of unsolicited result codes, +CGEV: XXX from MT to TE in the case of certain events occurring in the Packet Domain MT or the network. If a setting is not supported by the MT, ERROR or +CME ERROR:<err> is returned.

Read command returns the current mode and buffer settings

Test command returns the modes and buffer settings supported by the MT as compound values.

Defined values

`<mode>`: controls the processing of unsolicited result codes specified within this command

    0   buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded.

No codes are forwarded to the TE.

1   discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE

2   buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE

<bfr>:

0   MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered

1   MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes)

Defined events

The following unsolicited result codes and the corresponding events are defined -

+CGEV: NW REACT   <PDP_type>, <PDP_addr>, [<cid>]

The network has requested a context reactivation. The <cid> that was used to reactivate the context is provided if known to the MT.

+CGEV: NW DEACT   <PDP_type>, <PDP_addr>, [<cid>]

The network has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.

+CGEV: ME DEACT   <PDP_type>, <PDP_addr>, [<cid>]

The mobile termination has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.

+CGEV: NW DETACH

The network has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

+CGEV: ME DETACH

The mobile termination has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

+CGEV: NW CLASS <class>

The network has forced a change of UE class. The highest available class is reported (see +CGCLASS).

+CGEV: ME CLASS <class>

The mobile termination has forced a change of UE class. The highest available class is reported (see

+CGCLASS).

3.3.14.12 GPRS network registration status +CGREG

Syntax

Table 3.3. 14-12: CGREG parameter command syntax

Command	Possible response(s)
+CGREG=[<n>]	
+CGREG?	+CGREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]] +CME ERROR: <err>
+CGREG=?	+CGREG: (list of supported <n>s)

Description

The set command controls the presentation of an unsolicited result code +CGREG: <stat> when <n>=1 and there is a change in the MT's GPRS network registration status, or code +CGREG: <stat>[,<lac>,<ci>[,<AcT>]] when <n>=2 and there is a change of the network cell.

> NOTE: If the GPRS MT also supports circuit mode services, the +CREG command and +CREG: result codes apply to the registration status and location information for those services.

The read command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. Location information elements <lac>, <ci>, <AcT>are returned only when <n>=2 and MT is registered in the network.

Defined values

<n>:

0   disable network registration unsolicited result code

1   enable network registration unsolicited result code +CGREG: <stat>

2   enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>[,<AcT>]]

<stat>: GPRS registration status

0   not registered, MT is not currently searching an operator to register to

1   registered, home network

2   not registered, but MT is currently trying to attach or searching an operator to register to

3   registrations denied

4   unknown

5   registered, roaming

`<lac>:` string type; two byte location area code or tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

`<ci>:` string type; four byte GERAN/UTRAN/E-UTRAN cell ID in hexadecimal format

`<AcT>:` access technology of the registered network

0   GSM

1   GSM Compact

2   UTRAN

3   GSM w/EGPRS (see NOTE 1)

4   UTRAN w/HSDPA (see NOTE 2)

5   UTRAN w/HSUPA (see NOTE 2)

6   UTRAN w/HSDPA and HSUPA (see NOTE 2)

7   E-UTRAN

3.3.14.13 Select service for MO SMS messages +CGSMS

Syntax

Table 3.3. 14-13: CGSMS parameter command syntax

Command	Possible Response(s)
+CGSMS= [<service>]	OK ERROR
+CGSMS?	+CGSMS: <service>
+CGSMS=?	+CGSMS: (list of currently available <service>s)

Description

The set command is used to specify the service or service preference that the MT will use to send MO SMS messages.

The read command returns the currently selected service or service preference.

The test command is used for requesting information on the currently available services and service preferences.

Defined Values

`<service>`: a numeric parameter which indicates the service or service preference to be used

    0   Packet Domain

    1   circuit switched

    2   Packet Domain preferred (use circuit switched if GPRS not available)

    3   circuit switched preferred (use Packet Domain if circuit switched not available)

Other values are reserved and will result in an ERROR response to the set command.

3.3.15 Commands from TIA IS

3.3.15.1 Select mode +FCLASS

Syntax

Table 3.3.15-1: +FCLASS parameter command syntax

Command	Return
+FCLASS=<n>	
+FCLASS?	<n>
+FCLASS=?	(list of supported <n>s)

Description

This command puts the TA into a particular mode of operation (data, fax, voice etc.). This causes the TA to process information in a manner suitable for that type of information (rather than for other types of information). The values and meanings of parameter `<n>` are specified in the following table.

Defined Values

`<n>`   Mode

    0   data

    1   fax class 1 (TIA-578-A)

3.3.16 Commands Relative for SMS and CBS

3.3.16.1 SMS parameters

All SMS command relative parameters will be introduce here, it includes `<fo>`, `<da>`, `<toda>`, `<oa>`, `<tooa>`, `<sca>`, `<tosca>`, `<rp>`, `<rd>`, `<udh>`, `<udhi>`, `<mr>`, `<pid>`, `<dcs>`, `<scts>`,

`<pdu>, <mem1>, <mem2>, <mem3>, <length>.`

`<fo>:`

MTI define in the `<fo>` of SMS-SUBMIT message, reference to GSM 03.40.

b7	b6	b5	b4	b3	b2	b1	b0
RP	UDHI	SRR	VPF		MMS	MTI	

`<MTI>:`

b1 b0:

0   0, SMS-DELIVER

0   1, SMS-SUBMIT

`<rp>:`

0   TP-Reply-Path parameter is not set in this SMS-SUBMIT/DELIVER

1   TP-Reply-Path parameter is set in this SMS-SUBMIT/DELIVER

`<mms>:`

0   More messages are waiting for the MS in this SC

1   No more messages are waiting for the MS in this SC

`<ssr>:`

0   not request for submit status ack

1   request for submit status ack

`<vp>,<vpf>:`

The TP Validity Period Format is a 2 bit field, located within bit no 3 and 4 of the first octet of SMS SUBMIT, and to be given the following values:

b4   b3:

0   0, TP VP field not present

1   0, TP VP field present - relative format

0   1, TP-VP field present - enhanced format

1   1, TP VP field present - absolute format

For details, please refer to 3GPP TS 24.040 9.2.3.12.

`<udh>, <udhi>:`

User data header indicator for UDH.

The TP User Data Header Indicator is a 1 bit field within bit 6 of the first octet of the PDUs, refer to 3GPP TS 24.040 9.2.3.23 for detail.

`<ct>:`

[0]~255   Command type. 3GPP TS 24.040 TP-Command-Type integer format.

`<mn>:`

[0]~255   Message number. 3GPP TS 24.040 TP-Message-Number integer format.

`<mr>:`

0~65535   Reference number (uint16) to identify all segments of the concatenated SMS. Used for inditify the uique message from the NW. Refer to 3GPP TS 24.040 9.2.3.12.

`<pid>:`

refer to 3GPP TS 24.040 9.2.3.9

`<dcs>:`

refer to 3GPP TS 24.040 9.2.3.10

`<scts>:`

Service Centre Time Stamp 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format.

`<ud>:`

In case of SMS: 3GPP TS 23.040 TP-User-Data in text mode responses; format:

If `<dcs>` indicates that 3GPP TS 23.038 default alphabet is used and `<fo>` indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set: UE converts GSM alphabet into current TE character set.

If `<dcs>` indicates that 8-bit or UCS2 data coding scheme is used, or `<fo>` indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set: UE converts each 8-bit octet into hexadecimal numbers con-taining two IRA characters.

In case of CBS: 3GPP TS 23.041 CBM Content of Message in text mode responses; format:

If `<dcs>` indicates that 3GPP TS 23.038 default alphabet is used: UE converts GSM alphabet into current TE character set.

If `<dcs>` indicates that 8-bit or UCS2 data coding scheme is used: UE converts each 8-bit octet into hexadecimal numbers containing two IRA characters.

`<da>,<oa>,<sca>:`

3GPP TS 23.040 TP-Destination-Address, TP-Originating-Address, TP-Service-Center-Address, Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters;

`<toda>,<tooa>,<tosca>:`

Type of address given by <toda>, for TP-Destination-Address, TP-Originating-Address, TP-Service-Center-Address;

`<mem1>, <mem2>, <mem3>:`

`<mem1>,` Memory to be used when listing, reading and deleting messages:

"SM"   SIM message storage

"ME" GSM/UMTS Mobile Engine message storage

"MT" Same as "ME" storage

<mem2>, Memory to be used when writing and sending messages:

"SM" SIM message storage

"ME" GSM/UMTS Mobile Engine message storage

"MT" Same as "ME" storage

<mem3>, Received messages will be placed in this memory storage if routing to TE is not set. See command AT+CNMI with parameter <mt>=2.

"SM" SIM message storage

"ME" GSM/UMTS Mobile Engine message storage

"MT" Same as "ME" storage<length>:

Message Length, Integer type value indicating in PDU mode (AT+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length), For concatenated SMS messages the maximum length will be reduced by the length of the user data header with respect to <ieia> (6 bytes for <ieia>=8 and 7 bytes for <ieia>=16). In the case of 8-bit data, the maximum length of the short message field is: 140 octets - (6 or 7) = 134 or 133. In the case of GSM 7 bit default alphabet data, the maximum length of the short message is (140 - (6 or 7))*8/7 = 153 or 152 characters. In the case of 16 bit UC2 data, the maximum length of the short message is: (140 - (6 or 7))/2)= 67 or 66 characters.

<ct>: The TP Command Type is an 8 bit field specifying the type of operation that the SC is to perform.refer to 3GPP TS 24.040 9.2.3.19 for detail.

3.3.16.2 Select Message Service +CSMS

Syntax

Table 3.3.16-1: +CSMS Parameter Command Syntax

Command	Possible response(s)
+CSMS=<service>	+CSMS: <mt>,<mo>,<bm>
	+CMS ERROR: <err>
+CSMS?	+CSMS: <service>,<mt>,<mo>,<bm>
+CSMS=?	+CSMS: (list of supported <service>s)

Description

Set command selects messaging service <service>. It returns the types of messages supported by the ME: <mt> for mobile terminated messages, <mo> for mobile originated messages and <bm> for broadcast type messages. If chosen service is not supported by the ME (but is supported by the TA), final result code +CMS ERROR: <err>

shall be returned. See chapter Message Service Failure Result Code for a list of `<err>` values.

Also read command returns supported message types along the current service setting.

Test command returns a list of all services supported by the TA.

NOTE: The +CMGS, +CMGC , +CNMA can be influced by the parameter `<service>`.

Defined Values

`<service>`:

  0 3GPP TS 23.040 and 3GPP TS 23.041 , all type of messages supported.
  1 3GPP TS 23.040 and 3GPP TS 23.041, the requirement of <service> setting 1 is mentioned under corresponding command descriptions) , all type of messages supported.

`<mt>`, `<mo>`, `<bm>`:

  0 type not supported
  1 type supported

e.g.

```
//CSMS:1
at+csms=1
+CSMS: 1,1,1

OK
at+csms?
+CSMS: 1,1,1,1

OK
at+cmgf=1
OK
at+cmgs="18891006239"
> this

+CMGS: 248,"12/11/05,14:45:39+32"

OK

//CSMS:0
at+csms=0
+CSMS: 1,1,1

OK
at+csms?
+CSMS: 0,1,1,1

OK
at+cmgs="18891006239"

> this
```

```
+CMGS: 249

OK
```

3.3.16.3 Message Format +CMGF

Syntax

Table 3.3.16-2: +CMGF Parameter Command Syntax

Command	Possible response(s)
+CMGF=[<mode>]	
+CMGF?	+CMGF: <mode>
+CMGF=?	+CMGF: (list of supported <mode>s)

Description

Set command tells the TA, which input and output format of messages to use. <mode> indicates the format of messages used with send, list, read and write commands and unsolicited result codes resulting from received messages. Mode can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters). Text mode uses the value of parameter <chset> specified by command Select TE Character Set +CSCS to inform the character set to be used in the message body in the TA-TE interface. Test command returns supported modes as a compound value.

Defined Values

<mode>:

0   PDU mode (default when implemented)

1   text mode

3.3.16.4 Message Service Failure Result Code +CMS ERROR

Syntax

Description

Final result code +CMS ERROR: <err> indicates an error related to mobile equipment or network. The operation is similar to ERROR result code. None of the following commands in the same command line is executed. Neither ERROR nor OK result code shall be returned. ERROR is returned normally when error is related to syntax or invalid parameters.

Defined Values

<err> values used by common messaging commands:

0...127   3GPP TS 24.011 clause E.2 values

128...255   3GPP TS 23.040 clause 9.2.3.22 values.

300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	(U)SIM not inserted
311	(U)SIM PIN required
312	PH-(U)SIM PIN required
313	(U)SIM failure
314	(U)SIM busy
315	(U)SIM wrong
316	(U)SIM PUK required
317	(U)SIM PIN2 required
318	(U)SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network timeout
340	no +CNMA acknowledgement expected
500	unknown error

3.3.16.5 Service Centre Address +CSCA

Syntax

Table 3.3.16-3: +CSCA Parameter Command Syntax

Command	Possible response(s)
+CSCA=<sca>[,<tosca>]	
+CSCA?	+CSCA: <sca>,<tosca>
+CSCA=?	

Description

Set command updates the SMSC address, through which mobile originated SMs are transmitted. In text mode, setting is used by send and write commands. In PDU mode, setting is used by the same commands, but only when the length of the SMSC address coded into <pdu> parameter equals zero.

Define Values

`<sca>:`

String value. It indicates the SMSC number. The number is composed '*', '#' ,'+' and '0'~'9' The '+' must be the very beginning of the number. The number contains 20 characters at most.

`<tosca>:`

Integer value. It indicates the number type, where "145" means an international call. For the specific values, see also the definition of the "type_addr" parameter in the SC number, as described in the section "Short message sending +CMGS". If no `<tosca>` parameter is included, it is equivalent to the effect that the `<tosca>` parameter is not modified.

e.g.

```
at+csca?
+CSCA: "+8613010851500",145

OK
```

3.3.16.6 Set Text Mode Parameters +CSMP

Syntax

Table 3.3.16-4: +CSMP Parameter Command Syntax

Command	Possible response(s)
+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]	
+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dcs>
+CSMP=?	

Description

Set command is used to select values for additional parameters needed when SM is sent to the network or placed in storage when text format message mode is selected.

It is possible to set the validity period starting from when the SM is received by the SMSC (`<vp>` is in range 0...255) or define the absolute time of the validity period termination (`<vp>` is a string). If TA supports the EVPF, see 3GPP TS 23.040, it shall be given as a hexadecimal coded string (refer e.g. `<pdu>`) with double quotes.

Read command reports the current setting in the format

Define vlaues

`<fo>:` the default value is 17 (0x11).

`<vp>:` the default value is 167. depending on SMS-SUBMIT `<fo>` setting:

`<pid>:` the default value is 0. 3GPP TS 03.40/23.040 TP-Protocol-Identifier in integer format.

`<dcs>:` the default value is 0.

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

e.g.

```
at+csmp=25,"12/11/05,14:45:39+32",0,0
```

```
OK
at+csmp=17,169,0,0
OK
at+csmp=25,169,0,0
ERROR
```

3.3.16.7 Select Cell Broadcast Message Types +CSCB

Syntax

Table 3.3.16-5: +CSCB Parameter Command Syntax

Command	Possible response(s)
+CSCB=[<mode>[,<mids>[,<dcss>]]]	
+CSCB?	+CSCB: <mode>,<mids>,<dcss>
+CSCB=?	+CSCB: (list of supported <mode>s)

Description

Set command selects which types of CBMs are to be received by the ME.

Test command returns supported modes as a compound value.

Defined Values

<mode>:

0　message types specified in <mids> and <dcss> are accepted

1　message types specified in <mids> and <dcss> are not accepted

<mids>: string type; all different possible combinations of CBM message identifiers (refer <mid>) (default is empty string); e.g. "0,1,5,320-478,922"

<dcss>: string type; all different possible combinations of CBM data coding schemes (refer <dcs>) (default is empty string); e.g. "0-3,5"

3.3.16.8 Save Settings +CSAS

Syntax

Table 3.3.16-6: +CSAS Action Command Syntax

Command	Possible response(s)
+CSAS[=<profile>]	+CMS ERROR: <err>
+CSAS=?	+CSAS: (list of supported <profile>s)

Description

Execution command saves active message service settings to a non-volatile memory. A TA can contain several

profiles of settings. Settings specified in commands Service Centre Address +CSCA, Set Message Parameters +CSMP and Select Cell Broadcast Message Types +CSCB (if implemented) are saved. Certain settings may not be supported by the storage (e.g. (U)SIM SMS parameters) and therefore can not be saved. See chapter Message Service Failure Result Code for <err> values.

Test command shall display the supported profile numbers for reading and writing of settings.

Defined Values

<profile>:

0   Settings specified in commands +CSCA +CSMP +CSCB are saved to NV.

3.3.16.9 Restore Settings +CRES

Syntax

Table 3.3.16-7: +CRES Action Command Syntax

Command	Possible response(s)
+CRES[=<profile>]	+CMS ERROR: <err>
+CRES=?	+CRES: (list of supported <profile>s)

Description

Execution command restores message service settings from non-volatile memory to active memory. A TA can contain several profiles of settings. Settings specified in commands Service Centre Address +CSCA, Set Message Parameters +CSMP and Select Cell Broadcast Message Types +CSCB (if implemented) are restored. Certain settings may not be supported by the storage (e.g. (U)SIM SMS parameters) and therefore can not be restored. See chapter Message Service Failure Result Code for <err> values.

Defined Values

<profile>:

0   Settings specified in commands +CSCA +CSMP +CSCB are restored to NV.

3.3.16.10 New Message Indications to TE +CNMI

Syntax

Table 3.3.16-8: +CNMI Parameter Command Syntax

Command	Possible response(s)
+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	+CMS ERROR: <err>
+CNMI?	+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>

+CNMI=?	+CNMI: (list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s)

Description

Set command selects the procedure, how receiving of new messages from the network is indicated to the TE when TE is active.

If ME does not support requested item (although TA does), final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values.

Test command gives the settings supported by the TA as compound values.

> NOTE: Command Select Message Service +CSMS should be used to detect ME support of mobile terminated SMs and CBMs, and to define whether a message routed directly to TE should be acknowledged or not (refer command +CNMA).

Defined Values

<mode>– controls the processing of unsolicited result codes specified within this command

> NOTE: The buffering mechanism may as well be located in the ME; the setting affects only to unsolicited result codes specified within this command):

0 Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.

1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.

2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.

3 Forward unsolicited result codes directly to the TE. TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode. (when TA is in on-line data mode,it seems need a MT call to enable TA report to TE)

> NOTE: It is possible that ME/TA result code buffer is in volatile memory. In this case messages may get lost if the power of ME/TA is switched off before codes are sent to TE. Thus, it is not recommended to use direct message routing (<mt>=2 or 3, <bm>=2 or 3, or <ds>=1) with <mode> value 0 or 2.
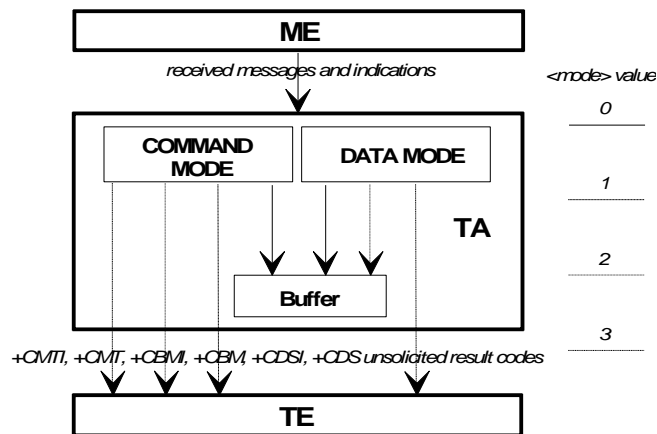
Figure 3.3.4-1: <mode> parameter

<mt> -sets the result code indication routing for SMS-DELIVERs (the rules for storing received SMs depend on its data coding scheme, preferred memory storage (+CPMS) setting and this value; refer table 3.3.16.10-1;

NOTE: If AT command interface is acting as the only display device, the ME must support storing of class 0 messages and messages in the message waiting indication group (discard message):

0   No SMS-DELIVER indications are routed to the TE.

1   If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index>

2   SMS-DELIVERs (except class 2 messages and messages in the message waiting indication group (store message)) are routed directly to the TE using unsolicited result code:

  +CMT: [<alpha>],<length><pdu> (PDU mode enabled); or
  +CMT: <oa>, [<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>, <length>]<data> (text mode enabled)

If ME has its own display device then class 0 messages and messages in the message waiting indication group (discard message) may be copied to both ME display and to TE. In this case, ME shall send the acknowledgement to the network.

Class 2 messages and messages in the message waiting indication group (store message) result in indication as defined in <mt>=1.

3   Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in <mt>=2. Messages of other data coding schemes result in indication as defined in <mt>=1.

Table 3.3.16.10-1: <mt> parameter

<mt>	Receiving procedure for different message data coding schemes (refer 3GPP TS 23.038)
0	no class: as in 3GPP TS 23.038, but use <mem3> as preferred memory class 0: as in 3GPP TS 23.038, but use <mem3> as preferred memory if message is tried to be stored class 1: as in 3GPP TS 23.038, but use <mem3> as preferred memory class 2: as in 3GPP TS 23.038 class 3: as in 3GPP TS 23.038, but use <mem3> as preferred memory message waiting indication group (discard message): as in 3GPP TS 23.038, but use <mem3> as preferred memory if message is tried to be stored message waiting indication group (store message): as in 3GPP TS 23.038, but use <mem3> as preferred memory
1	as <mt>=0 but send indication if message stored successfully
2	no class: route message to TE class 0: as in 3GPP TS 23.038, but also route message to TE and do not try to store it in memory class 1: route message to TE class 2: as <mt>=1 class 3: route message to TE message waiting indication group (discard message): as in 3GPP TS 23.038, but also route message to TE and do not try to store it in memory message waiting indication group (store message): as <mt>=1
3	class 3: route message to TE others: as <mt>=1

Table 3.3.16.10-2: SMS-DELIVER result code and acknowledgement summary

<mt>	no class or class 1	class 0 or message waiting indication group (discard)	class 2 or message waiting indication group (store)	class 3
1	+CMTI	[+CMTI[1]]	+CMTI	+CMTI
2	+CMT & +CNMA[3]	+CMT [& +CNMA[2]]	+CMTI	+CMT & +CNMA[3]
3	+CMTI	[+CMTI[1]]	+CMTI	+CMT & +CNMA[3]
[1]	result code is sent when ME does not have other display device than AT interface.			
[2]	acknowledgement command must be sent when +CSMS <service> value equals 1 and ME does not have other display device than AT interface.			
[3]	acknowledgement command must be sent when +CSMS <service> value equals 1.			

<bm> -for CBMs (the rules for storing received CBMs depend on its data coding scheme, the setting of Select CBM Types (+CSCB) and this value):

0   No CBM indications are routed to the TE.

1   If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:

+CBMI: <mem>,<index>

2   New CBMs are routed directly to the TE using unsolicited result code:

+CBM: <length><pdu> (PDU mode enabled); or

+CBM: <sn>,<mid>,<dcs>,<page>,<pages><data> (text mode enabled)

If ME supports data coding groups which define special routing also for messages other than class 3 (e.g. (U)SIM specific messages), ME may choose not to route messages of such data coding schemes into TE (indication of a stored CBM may be given as defined in <bm>=1).

3   Class 3 CBMs are routed directly to TE using unsolicited result codes defined in <bm>=2. If CBM storage is supported, messages of other classes result in indication as defined in <bm>=1.

Table 3.3.4.10-3: <bm> parameter

<bm>	Receiving procedure for different message data coding schemes (refer 3GPP TS 23.038)
0	all schemes: as in 3GPP TS 23.038; if CBM storage is supported, store message to "BM" (or some manufacturer or data coding scheme specific memory)
1	all schemes: as <bm>=0 but send indication if message stored successfully
2	all schemes: route message to TE unless ME has detected a special routing to somewhere else (e.g. to (U)SIM; an indication may be sent if message stored successfully)
3	class 3: route message to TE others: as <bm>=1 (if CBM memory storage is supported)

<ds>-for SMS-STATUS-REPORTs:

0   No SMS-STATUS-REPORTs are routed to the TE.

1   SMS-STATUS-REPORTs are routed to the TE using unsolicited result code:

+CDS: <length><pdu> (PDU mode enabled); or

+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled)

2   If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:

+CDSI: <mem>,<index>

Table 3.3.4.10-4: SMS-STATUS-REPORT result code and acknowledgement summary

<ds>	result codes and commands
1	+CDS & +CNMA[1)
2	+CDSI
[1) acknowledgement command must be sent when +CSMS <service> value equals 1	

<bfr>- defines the handling method for buffered result codes when <mode> 1, 2 or 3 is enabled:

0 TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes).

1 TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered.

3.3.16.11 List Messages +CMGL

TEXT Mode：

Syntax

Table 3.3.16-9-TEXT: +CMGL Action Command Syntax

Command	Possible response(s)

+CMGL[=< stat>]	if text mode (+CMGF=1), command successful and SMS-SUBMITs and/or SMS-DELIVERs:
	+CMGL: <index>,<stat>,<oa/da>,[<alpha>],[<scts>][,<tooa/toda>, <length>]<data>[
	+CMGL: <index>,<stat>,<da/oa>,[<alpha>],[<scts>][,<tooa/toda>, <length>]<data>[...]]
	if text mode (+CMGF=1), command successful and SMS-STATUS-REPORTs:
	+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> [
	+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> [...]]
	if text mode (+CMGF=1), command successful and SMS-COMMANDs:
	+CMGL: <index>,<stat>,<fo>,<ct>[
	+CMGL: <index>,<stat>,<fo>,<ct>[...]]
	if text mode (+CMGF=1), command successful and CBM storage:
	+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages> <data>[
	+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages> <data>[...]]
	otherwise:
	+CMS ERROR: <err>

+CMGL=?	+CMGL: (list of supported <stat>s)

Description

Execution command returns messages with status value <stat> from message storage <mem1> to the TE. If status of the message is 'received unread', status in the storage changes to 'received read'. If listing fails, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

> NOTE: If the selected <mem1> can contain different types of SMs (e.g. SMS-DELIVERs, SMS-SUBMITs, SMS-STATUS-REPORTs and SMS-COMMANDs), the response may be a mix of the responses of different SM types. TE application can recognize the response format by examining the third response parameter.

Test command shall give a list of all status values supported by the TA.

Define values

<stat> :

   "REC UNREAD":

   "REC READ"

   "STO UNSENT"

   "STO SENT"

   "ALL"

PDU Mode：

Syntax

Table 3.3.16-9-PDU +CMGL Action Command Syntax

Command	Possible response(s)
+CMGL[=<stat>]	if PDU mode (+CMGF=0) and command successful: +CMGL: <index>,<stat>,[<alpha>],<length><pdu> [+CMGL:<index>,<stat>,[<alpha>],<length><pdu> [...]] otherwise: +CMS ERROR: <err>
+CMGL=?	+CMGL: (list of supported <stat>s)

Description

Execution command returns messages with status value <stat> from preferred message storage <mem1> to the TE. Entire data units <pdu> are returned. If status of the message is 'received unread', status in the storage changes to 'received read'. If listing fails, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

Test command shall give a list of all status values supported by the TA.

Define values

<stat> :

0   REC UNREAD

1   REC READ

2   STO UNSENT

3   STO SENT

4   ALL

3.3.16.12 Read Message +CMGR

TEXT Mode：

Syntax

Table 3.3.16-10-TEXT: +CMGR Action Command Syntax

Command	Possible response(s)
+CMGR=<index>	if text mode (+CMGF=1), command successful and SMS-DELIVER:
	+CMGR: <stat>,<oa>,[<alpha>],<scts>[,<toda>,<fo>,<pid>,<dcs>, <sca>,<tosca>,<length>]<data>
	if text mode (+CMGF=1), command successful and SMS-SUBMIT:
	+CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>], <sca>,<tosca>,<length>]<data>
	if text mode (+CMGF=1), command successful and SMS-STATUS-REPORT:
	+CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>
	if text mode (+CMGF=1), command successful and SMS-COMMAND:
	+CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length> <cdata>]
	if text mode (+CMGF=1), command successful and CBM storage:
	+CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><data>
	otherwise:
	+CMS ERROR: <err>
+CMGR=?	

Description

Execution command returns message with location value <index> from message storage <mem1> to the TE. If

status of the message is 'received unread', status in the storage changes to 'received read'. If reading fails, final result

code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

Define values

PDU Mode :

Syntax

Table 3.3. 16-10-PDU +CMGR Action Command Syntax

Command	Possible response(s)
+CMGR=<index>	if PDU mode (+CMGF=0) and command successful: +CMGR: <stat>,[<alpha>],<length><pdu> otherwise: +CMS ERROR: <err>
+CMGR=?	

Description

Execution command returns message with location value <index> from preferred message storage <mem1> to the TE. Status of the message and entire message data unit <pdu> is returned. If status of the message is 'received unread', status in the storage changes to 'received read'. If reading fails, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

Define values

3.3.16.13 New Message Acknowledgement to ME/TA +CNMA

TEXT Mode :

Syntax

Table 3.3.16-11-TEXT: +CNMA Action Command Syntax

Command	Possible response(s)
if text mode (+CMGF=1): +CNMA	In case of SMS-related error: +CMS ERROR: <err>
+CNMA=?	

Description

Execution command confirms correct reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE. This acknowledgement command (causing ME to send RP-ACK to the network) shall be used when +CSMS parameter <service> equals 1. TA shall not send another +CMT or +CDS result code to TE before previous one is acknowledged.

If ME does not get acknowledgement within required time (network timeout), ME should respond as specified in 3GPP TS 24.011 to the network.   ME/TA shall automatically disable routing to TE by setting both <mt> and <ds> values of +CNMI to zero.

If command is executed, but no acknowledgement is expected, or some other ME related error occurs, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values.

NOTE: In case that a directly routed message must be buffered in ME/TA (possible when +CNMI parameter `<mode>` equals 0 or 2) or AT interpreter remains too long in a state where result codes cannot be sent to TE (e.g. user is entering a message using +CMGS), acknowledgement (RP-ACK) must be sent to the network without waiting +CNMA command from TE. Later, when buffered result codes are flushed to TE, TE must send +CNMA acknowledgement for each result code. In this way, ME/TA can determine if message should be placed in non-volatile memory and routing to TE disabled (+CNMA not received). Refer command +CNMI for more details how to use `<mode>` parameter reliably.

Define values

PDU Mode:

Syntax

Table 3.3.4-11-PDU +CNMA Action Command Syntax

Command	Possible response(s)
if PDU mode (+CMGF=0): +CNMA[=<n>[,<length>[<CR> PDU is given<ctrl-Z/ESC>]]]	+CMS ERROR: <err>
+CNMA=?	if PDU mode (+CMGF=0): +CNMA: (list of supported <n>s)

Description

Execution command confirms reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE. This acknowledgement command shall be used when +CSMS parameter `<service>` equals 1. In PDU mode, it is possible to send either positive (RP-ACK) or negative (RP-ERROR) acknowledgement to the network. Parameter `<n>` defines which one will be sent. Optionally (when `<length>` is greater than zero) an acknowledgement TPDU (SMS-DELIVER-REPORT for RP-ACK or RP-ERROR) may be sent to the network. The entering of PDU is done similarly as specified in command Send Message +CMGS, except that the format of `<ackpdu>` is used instead of `<pdu>` (i.e. SMSC address field is not present). PDU shall not be bounded by double quotes. TA shall not send another +CMT or +CDS result code to TE before previous one is acknowledged.

If ME does not get acknowledgement within required time (network timeout), ME should respond as specified in 3GPP TS 24.011 to the network. ME/TA shall automatically disable routing to TE by setting both `<mt>` and `<ds>` values of +CNMI to zero.

If command is executed, but no acknowledgement is expected, or some other ME related error occurs, final result code +CMS ERROR: `<err>` is returned. See chapter Message Service Failure Result Code for a list of `<err>` values.

NOTE: In case that a directly routed message must be buffered in ME/TA (possible when +CNMI parameter <mode> equals 0 or 2) or AT interpreter remains too long in a state where result codes cannot be sent to TE (e.g. user is entering a message using +CMGS), acknowledgement (RP-ACK) must be sent to the network without waiting +CNMA command from TE. Later, when buffered result codes are flushed to TE, TE must send +CNMA[=0] acknowledgement for each result code. In this way, ME/TA can determine if message should be placed in non-volatile memory and routing to TE disabled (+CNMA[=0] not received). Refer command +CNMI for more details how to use <mode> parameter reliably.

Test command returns a list of supported <n> values. If the only value supported is 0, the device does not support sending of TPDU.

Defined Values

<n>:

0   command operates similarly as defined for the text mode

1   send RP-ACK (or buffered result code received correctly)

2   send RP-ERROR (if PDU is not given, ME/TA shall send SMS-DELIVER-REPORT with 3GPP TS 23.040 TP-FCS value set to 'FF' (unspecified error cause))

3.3.16.14 Send Message +CMGS

TEXT Mode :

Syntax

Table 3.3.16-12-TEXT: +CMGS Action Command Syntax

Command	Possible response(s)

if text mode (+CMGF=1):
+CMGS=<da>[,<toda>]<CR>
text is entered<ctrl-Z/ESC>
	if text mode (+CMGF=1) and sending successful:
	+CMGS: <mr>[,<scts>]
	if sending fails:
	+CMS ERROR: <err>

+CMGS=?	

Description

Execution command sends message from a TE to the network (SMS-SUBMIT). Message reference value <mr> is returned to the TE on successful message delivery. Value can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values. This command should be abortable.

- entered text (3GPP TS 23.040TP-Data-Unit) is sent to address <da> and all current settings (refer Set Text Mode Parameters +CSMP and Service Centre Address +CSCA) are used to construct the actual PDU in ME/TA.

- the TA shall send a four character sequence <greater_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>; after that text can be entered from TE to ME/TA.

- the DCD signal shall be in ON state while text is entered.

- the echoing of entered characters back from the TA is controlled by V.25ter echo command E.

- the entered text should be formatted as follows:

  - if <dcs> (set with +CSMP) indicates that 3GPP TS 23.038 GSM 7 bit default alphabet is used and <fo> indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set:

    - if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in 3GPP TS 27.007): ME/TA converts the entered text into the GSM 7 bit default alphabet according to rules of Annex A; backspace can be used to delete last character and carriage returns can be used (previously mentioned four character sequence shall be sent to the TE after every carriage return entered by the user);

    - if TE character set is "HEX": the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into the GSM 7 bit default alphabet characters. (e.g. 17 (IRA 49 and 55) will be converted to character Π (GSM 7 bit default alphabet 23)).

  - if <dcs> indicates that 8-bit or UCS2 data coding scheme is used or <fo> indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set: the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. two characters 2A (IRA 50 and 65) will be converted to an octet with integer value 42).

- sending can be cancelled by giving <ESC> character (IRA 27).

- <ctrl-Z> (IRA 26) must be used to indicate the ending of the message body.

Define values

PDU Mode :

Syntax

Table 3.3.4-12-PDU +CMGS Action Command Syntax

Command	Possible response(s)

if PDU mode (+CMGF=0):
 	
+CMGS=\<length>\<CR>
 	
PDU is given\<ctrl-Z/ESC>
	if PDU mode (+CMGF=0) and sending successful:
	
	+CMGS: \<mr>[,\<ackpdu>]
	
	if sending fails:
	
	+CMS ERROR: \<err>

+CMGS=?	

Description

Execution command sends message from a TE to the network (SMS-SUBMIT). Message reference value \<mr> is returned to the TE on successful message delivery. Optionally (when +CSMS \<service> value is 1 and network supports) \<ackpdu> is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: \<err> is returned. See chapter Message Service Failure Result Code for a list of \<err> values. This command should be abortable.

- \<length> must indicate the number of octets coded in the TP layer data unit to be given (i.e. SMSC address octets are excluded).

- the TA shall send a four character sequence \<greater_than>\<space> (IRA 13, 10, 62, 32) after command line is terminated with \<CR>; after that PDU can be given from TE to ME/TA.

- the DCD signal shall be in ON state while PDU is given.

- the echoing of given characters back from the TA is controlled by V.25ter echo command E.

- the PDU shall be hexadecimal format (similarly as specified for \<pdu>) and given in one line; ME/TA converts this coding into the actual octets of PDU.

- when the length octet of the SMSC address (given in the PDU) equals zero, the SMSC address set with command Service Centre Address +CSCA is used; in this case the SMSC Type-of-Address octet shall not be present in the PDU, i.e. TPDU starts right after SMSC length octet.

- sending can be cancelled by giving \<ESC> character (IRA 27).

- \<ctrl-Z> (IRA 26) must be used to indicate the ending of PDU.

3.3.16.15 Send Message from Storage +CMSS

TEXT Mode :

Syntax

Table3.3.16-13-TEXT: +CMSS Action Command Syntax

Command	Possible response(s)

+CMSS=<index>[,<da>[,<toda>]]	if text mode (+CMGF=1) and sending successful:
	+CMSS: <mr>[,<scts>]
	if sending fails:
	+CMS ERROR: <err>

+CMSS=?	

Description

Execution command sends message with location value <index> from preferred message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address <da> is given given for SMS-SUBMIT, it shall be used instead of the one stored with the message. Reference value <mr> is returned to the TE on successful message delivery. Optionally (when +CSMS <service> value is 1 and network supports) <scts> is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values. This command should be abortable.

PDU Mode :
Syntax

Table 3.3.4-13-PDU +CMSS Action Command Syntax

Command	Possible response(s)

+CMSS=<index>[,<da>[,<toda>]]	if PDU mode (+CMGF=0) and sending successful:
	+CMSS: <mr>[,<ackpdu>]
	if sending fails:
	+CMS ERROR: <err>

+CMSS=?	

Description

Execution command sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address <da> is given for SMS-SUBMIT, it shall be used instead of the one stored with the message. Reference value <mr> is returned to the TE on successful message delivery. Optionally (when +CSMS <service> value is 1 and network supports) <ackpdu> is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values. This command should be abortable.

Define values

3.3.16.16 Write Message to Memory +CMGW

TEXT Mode :

Syntax

Table3.3.16-14-TEXT: +CMGW Action Command Syntax

Command	Possible response(s)

`if text mode (+CMGF=1):`
`+CMGW[=<oa/da>[,<tooa/toda>[,<stat>]]]<CR>`
`text is entered<ctrl-Z/ESC>`
	`+CMGW: <index>`
	`+CMS ERROR: <err>`

`+CMGW=?`	

Description

Execution command stores message (either SMS-DELIVER or SMS-SUBMIT) to memory storage `<mem2>`. Memory location `<index>` of the stored message is returned. By default message status will be set to 'stored unsent', but parameter `<stat>` allows also other status values to be given. The entering of text is done similarly as specified in command Send Message +CMGS. If writing fails, final result code `+CMS ERROR: <err>` is returned. See chapter Message Service Failure Result Code for `<err>` values.

NOTE: SMS-COMMANDs and SMS-STATUS-REPORTs can not be stored in text mode.

Define values

PDU Mode :

Syntax

Table 3.3.16-14-PDU +CMGW Action Command Syntax

Command	Possible response(s)
`if PDU mode (+CMGF=0):` `+CMGW=<length>[,<stat>]<CR>PDU is given<ctrl-Z/ESC>`	`+CMGW: <index>` `+CMS ERROR: <err>`
`+CMGW=?`	

Description

Execution command stores a message to memory storage `<mem2>`. Memory location `<index>` of the stored message is returned. By default message status will be set to 'stored unsent', but parameter `<stat>` allows also other status values to be given. (ME/TA manufacturer may choose to use different default `<stat>` values for different message types.) The entering of PDU is done similarly as specified in command Send Message +CMGS. If writing fails, final result code `+CMS ERROR: <err>` is returned. See chapter Message Service Failure Result Code for `<err>` values.

Define values

3.3.16.17 Delete Message +CMGD

Syntax

Table 3.3.16-15: +CMGD Action Command Syntax

Command	Possible response(s)
+CMGD=<index>[,<delflag>]	+CMS ERROR: <err>
+CMGD=?	+CMGD: (list of supported <index>s)[,(list of supported <delflag>s)]

Description

Execution command deletes message from preferred message storage <mem1> location <index>. If <delflag> is present and not set to 0 then the ME shall ignore <index> and follow the rules for <delflag> shown below. If deleting fails, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

Test command shows the valid memory locations and optionally the supported values of <delflag>.

<delflag>: an integer indicating multiple message deletion request as follows:

    0 (or omitted)   Delete the message specified in <index>

    1   Delete all read messages from preferred message storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched

    2   Delete all read messages from preferred message storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched

    3   Delete all read messages from preferred message storage, sent and unsent mobile originated messages leaving unread messages untouched.

    4   Delete all messages from preferred message storage including unread messages.

Define values

3.3.16.18   Send Command +CMGC

TEXT Mode :

Syntax

Table 3.3.16-16-TEXT: +CMGC Action Command Syntax

Command	Possible response(s)

`if text mode (+CMGF=1):`
`+CMGC=<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]`
`]<CR>`
`text is entered<ctrl-Z/ESC>`
	`if text mode (+CMGF=1)`
	`and sending`
	`successful:`
	`+CMGC: <mr>[,<scts>]`
	`if sending fails:`
	`+CMS ERROR: <err>`

`+CMGC=?`	

Description

Execution command sends a command message from a TE to the network (SMS-COMMAND). The entering of text (3GPP TS 23.040 TP-Command-Data) is done similarly as specified in command Send Message +CMGS, but the format is fixed to be a sequence of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octets (refer +CMGS). Message reference value $<mr>$ is returned to the TE on successful message delivery. Optionally (when +CSMS $<service>$ value is 1 and network supports) $<scts>$ is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: $<err>$ is returned. See chapter Message Service Failure Result Code for a list of $<err>$ values. This command should be abortable.

Define values

PDU Mode :

Syntax

Table 3.3.4-16-PDU +CMGC Action Command Syntax

Command	Possible response(s)

`if PDU mode (+CMGF=0):`
`+CMGC=<length><CR>`
`PDU is given<ctrl-Z/ESC>`
	`if PDU mode (+CMGF=0) and sending`
	`successful:`
	`+CMGC: <mr>[,<ackpdu>]`
	`if sending fails:`
	`+CMS ERROR: <err>`

`+CMGC=?`	

Description

Execution command sends a command message from a TE to the network (SMS-COMMAND). The entering of PDU is done similarly as specified in command Send Message +CMGS. Message reference value $<mr>$ is returned to the TE on successful message delivery. Optionally (when +CSMS $<service>$ value is 1 and network supports) $<ackpdu>$ is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: $<err>$ is returned. See chapter Message Service Failure Result Code for a list of $<err>$ values. This command should be abortable.

Define values

e.g.

`at+cmgc=14`

```
>
0891685109200905F011000B818198016032F90011FF00_
```

```
+CMGC: 251
```

```
OK
```

3.3.16.19 More Messages to Send +CMMS

Syntax

Table 3.3.16-17: +CMMS Parameter Command Syntax

Command	Possible response(s)
+CMMS=[<n>]	
+CMMS?	+CMMS: <n>
+CMMS=?	+CMMS: (list of supported <n>s)

Description

Set command controls the continuity of SMS relay protocol link. When feature is enabled (and supported by network) multiple messages can be sent much faster as link is kept open.

Test command returns supported values as a compound value.

Defined Values

<n>:

0 disable

1 keep enabled until the time between the response of the latest message send command (+CMGS, +CMSS, etc.) and the next send command exceeds 1-5 seconds (the exact value is up to ME implementation), then ME shall close the link and TA switches <n> automatically back to 0

2 enable (if the time between the response of the latest message send command and the next send command exceeds 1-5 seconds (the exact value is up to ME implementation), ME shall close the link but TA shall not switch automatically back to <n>=0)

3.3.16.20 Preferred Message Storage +CPMS

Syntax

Table 3.3.16-18: +CPMS Parameter Command Syntax

Command	Possible response(s)
+CPMS=<mem1>[,	+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>

<mem2>[,<mem3>]]	+CMS ERROR: <err>
+CPMS?	+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> +CMS ERROR: <err>
+CPMS=?	+CPMS: (list of supported <mem1>s),(list of supported <mem2>s), (list of supported <mem3>s)

Description

Set command selects memory storages <mem1>, <mem2> and <mem3> to be used for reading, writing, etc. If chosen storage is not appropriate for the ME (but is supported by the TA), final result code +CMS ERROR: <err> shall be returned. See chapter Message Service Failure Result Code for a list of possible <err> values.

Test command returns lists of memory storages supported by the TA

Defined Values

<mem1>: string type; memory from which messages are read and deleted (commands List Messages +CMGL, Read Message +CMGR and Delete Message +CMGD); defined values (others are manufacturer specific):

"ME"   ME message storage

"SM"   (U)SIM message storage

<mem2>: string type; memory to which writing and sending operations are made (commands Send Message from Storage +CMSS and Write Message to Memory +CMGW)); refer <mem1> for defined values

<mem3>: string type; memory to which received SMs are preferred to be stored (unless forwarded directly to TE; refer command New Message Indications +CNMI); refer <mem1> for defined values; received CBMs are always stored in "BM" (or some manufacturer specific storage) unless directly forwarded to TE; received status reports are always stored in "SR" (or some manufacturer specific storage) unless directly forwarded to TE

<total1>: integer type; total number of message locations in <mem1>

<total2>: integer type; total number of message locations in <mem2>

<total3>: integer type; total number of message locations in <mem3>

<used1>: integer type; number of messages currently in <mem1>

<used2>: integer type; number of messages currently in <mem2>

<used3>: integer type; number of messages currently in <mem3>

e.g.

```
AT+CPMS?
+CPMS: "SM",10,40,"SM",10,40,"ME",1,100

OK
```

3.3.16.21 New Message Indications +CMTI

Syntax

Table 3.3.16-19: +CMTI Parameter Command Syntax

Command	Possible response(s)
	`<CR><LF>+CMTI: <mem>,<index><CR><LF>`

Description

When new message is received and stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code.

Defined Values

`<mem1>:` string type

    "ME"   ME message storage

    "SM"   (U)SIM message storage

    "SR"   status report storage

`<index>:` integer type; value in the range of location numbers supported by the associated memory

.

3.3.16.22 New SMS-STATUS-REPORT Indications +CDSI

Syntax

Table 3.3.16-20: +CDSI Parameter Command Syntax

Command	Possible response(s)
	`+CDSI: <mem>,<index>`

Description

When new SMS-STATUS-REPORT is received and stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code.

Defined Values

`<mem1>:` string type

    "ME"   ME message storage

"SM"   (U)SIM message storage

"SR"   status report storage

<index>: integer type; value in the range of location numbers supported by the associated memory

3.3.16.23 Set Message Header for SMS Remote Wakeup +ZWAKEUPSMS

Syntax

Table 3.3.16-21: +ZWAKEUPSMS parameter command syntax

Command	Possible response
+ZWAKEUPSMS=<para>	
+ZWAKEUPSMS?	+ZWAKEUPSMS: <para>
+ZWAKEUPSMS=?	

Description

Extensible AT command, this command is used to wakeup the remote device which act as the client of the modem. After processing set command, the SMS wakeup function which depend on the set value of config file. The SMS specified or any received from the network will wakeup the AP client . Besides, the action of the AT is also dependent on +ZWPS. Please refer the command +ZWPS for more detial.

Define values

<para>

The supported characters only include 'A'~'Z', 'a'~'z', '1'~'9'. The length of the SMS header is not more than 10 characters. This parameter is saved in NVM with the lastest writing.

e.g.

```
at+zwakeupsms=123
OK
```

3.3.16.24 Set Message Header for SMS Remote Wakeup +WAKEUPSMS

Syntax

Table 3.3.16-22: +WAKEUPSMS parameter command syntax

Command	Possible response
+WAKEUPSMS=<para>	
+WAKEUPSMS?	+WAKEUPSMS: <para>
+WAKEUPSMS=?	

Description

This command has the same role as the command of +ZWAKEUPSMS. Refer to +ZWAKEUPSMS for detail. The

command of +zwakeupsms is recommanded to use.

3.3.16.25 Select message storage +ZSMSD

Syntax

Table 3.3.12-23: +ZSMSD parameter command syntax

Command	Possible response(s)
+ZSMSD=<value>	+CME ERROR: <err>
+ZSMSD?	+ZSMSD: <value> +CME ERROR: <err>
+ZSMSD=?	

Description

This command is used to set and read the preferential message storage position.

Defined values

<value> : the preferential message storage position

    0   Network preference in storage, set the mt message route according to the message class.

    1   (U)SIM preference in storage, the message store in (U)SIM firstly

    2   NV preference in storage, the message store in NV firstly

e.g.

```
AT+ZSMSD=1
OK
```

3.3.17 GPS Relative Commands

3.3.17.1 Initialization Location command +ZGINIT

Syntax

Table 3.3.17-1: +ZGINIT parameter command syntax

Command	Possible response
+ZGINIT	OK MS error: ERROR

Description

Init a client for GPS application.

e.g.

```
AT+ZGINIT
```

OK

3.3.17.2 Set location mode +ZGMODE

Syntax

Table 3.3.17-2: +ZGMODE parameter command syntax

Command	Possible response
+ZGMODE=<flag>	OK MS error: ERROR
+ZGMODE?	+ZGMODE: <flag> MS error: ERROR
+zgmode=?	+ZGMODE: <flag>

Description

This command is used for set location mode by user.

Defined values

<flag>:

  1: MS-BASED

  2: MS-ASSISTED

  3: STANDALONE_ONLY

e.g.

AT+ZGMODE=1

OK

3.3.17.3 Set fix rate for tracking sessions +ZGFIXRATE

Syntax

Table 3.3.17-3: +ZGFIXRATE parameter command syntax

Command	Possible response
+ZGFIXRATE=<flag1>,<flag2>	OK MS error: ERROR
+ZGFIXRATE?	+ZGFIXRATE: <flag1>,<flag2> MS error: ERROR
+ZGFIXRATE=?	+ZGFIXRATE: <flag1>,<flag2>

Description

Set fix rate for tracking sessions

Defined values

<flag1>: Fix numbers(defaut : 100)

<flag2>: Positioning time interval(defaut : 0)

e.g.

```
AT+ZGFIXRATE=2, 5
OK
AT+ZGFIXRATE?
+ZGFIXRATE: 2, 5

OK
```

3.3.17.4 Set QOS for location +ZGQOS

Syntax

Table3.3.17-4: +ZGQOS parameter command syntax

Command	Possible response
+ZGQOS=<flag1>,<flag2>	OK MS error: ERROR
+ZGQOS?	+ZGQOS: <flag1>,<flag2> MS error: ERROR
+ZGQOS=?	+ZGQOS: <flag1>,<flag2>

Description

This command used for set QOS for location.

Defined values

<flag1>: Positioning accuracy(defaut : 50)

<flag2>: Desired level of performance. (0-255) (defaut : 255)

e.g.

```
AT+ZGQOS=50,100
OK
AT+ZGQOS?
+ZGQOS: 50,100

OK
```

3.3.17.5 Set URL of SUPL server +ZGURL

Syntax

Table3.3.17-5: +ZGURL parameter command syntax

Command	Possible response
+ZGURL=<flag>	MS error: ERROR
+ZGURL?	+ZGURL: <flag> MS error: ERROR
+ZGURL=?	+ZGURL: <flag>

Description

This command used for Set URL of SUPL server.

Defined values

<flag>: SUPL server URL

e.g.

```
AT+ZGURL= http://supl.google.com:7276
OK
AT+ZGURL?
+ZGURL: http://supl.google.com:7276


OK
```

3.3.17.6 Location mode choice +ZGRUN

Syntax

Table3.3.17-6: +ZGRUN parameter command syntax

Command	Possible response
+ZGRUN=<flag>	OK MS error: ERROR
+ZGRUN?	+ZGRUN: <running_state>

Description

Start or stop GPS Application，and choice one-shot or tracking mode location mode.

Defined values

<flag>:

- 0   Stop GPS location command

- 1   Start one-shot location mode

- 2   Start tracking mode（not applicable for MSA）,controlled by MS

<running_state>:

  0   GPS is off

  1   GPS is on

e.g.

AT+ZGRUN=0

OK

3.3.17.7 Report error code +ZGPSERROR

Syntax

Table3.3.17-7: +ZGPSERROR parameter command syntax

Command	Possible response
	+ZGPSERROR: <flag>

Description

Report error code when some error happen in location process

Defined values

<flag>:

  0   ERROR_ACCESS_DENIED

  1   ERROR_ BAD_NET_RESP

  2   ERROR_ BUSY

  3   ERROR_ CANCELLED

  4   ERROR_ CONNECTION_ABORTED

  5   ERROR_ CONTINUE

  6   ERROR_ FATAL_ERROR

  7   ERROR_ GEN_FAILURE

  8   ERROR_ INCORRECT_ADDRESS

  9   GPS_ERR_INSUFFICIENT_SAT_SIGNAL

 10   ERROR_ INVALID_CATEGORY

 11   ERROR_ INVALID_PARAMETER

 12   ERROR_ NETWORK_UNREACHABLE

 13   ERROR_ NOT_AUTHENTICATED

 14   ERROR_ NOT_CONNECTED

 15   ERROR_ REQUEST_ABORTED

 16   ERROR_ RETRY

 17   ERROR_ OUTOFMEMORY

 18   ERROR_ TIMEOUT

 19   ERROR_ RADIO_OFF

e.g.

```
+ZGPSERROR: 3
```

3.3.17.8 Reset GPS +ZGRST

Syntax

Table3.3.17-8: +GPS parameter command syntax

Command	Possible response
+ZGRST=<mode>	OK MS error: ERROR

Description

This command excutes GPS reset.

Defined values

<mode>:

- 0   Cold restart
- 1   Warm restart
- 2   Hot restart

NOTE: This command should be operated when GPS is enabled.

e.g.

```
AT+ ZGRST =1
OK
```

3.3.17.9 Set AGPS APN +ZGPSAPN

Syntax

Table3.3.17-9: + ZGPSAPN parameter command syntax

Command	Possible response
+ZGPSAPN =<apn_name>	OK MS error: ERROR
+ZGPSAPN?	+ZGPSAPN: <apn_name>
+ZGPSAPN=?	+ZGPSAPN: <apn >

Description

Set data link status for GPS engine.

Defined values

<apn>:Access Point Name for A-GPS

e.g.

```
AT+ZGPSAPN=3gnet
OK
AT+ZGPSAPN?
+ZGPSAPN: 3gnet

OK
```

3.3.17.10 Report satellites measurements +ZGMEASURE

Syntax

Table3.3.17-10: +ZGMEASURE parameter command syntax

Command	Possible response
	`+ZGMEASURE: <flag1>,<flag2>,<flag3>,<flag4>,<flag5>,<….>`

Description

Report sv_num and cn0 of the satellites.

It 's a URC command, not supported writ & read operation.

Defined values

Table3.3.5-11: parameters explantion

Flag	Explanation	Data type
Flag1	Eph_svmask	Unsigned 32 bit value
Flag2	Alm_svmask	Unsigned 32 bit value
Flag3	Sv_num	Unsigned 8 bit value
Flag4	Prn, SV ID	Unsigned 8 bit value
Flag5	Cn0,SV signal strenth	Unsigned 16 bit value

e.g.

```
+ZGMEASURE: 25485222222, 2130706431,15,55,25,21,45,86
```

📖 NOTE : This AT command has some differences(increase the following function) in ZM5202 Module as follows:

syntax

Command	Possible response
`+ZGMEASURE=<status>`	
`+ZGMEASURE?`	`+ZGMEASURE: <status>`

Description

Set GPS ZGMEASURE Report enable or not.

Defined values

`<status>`:

1   enable

0   disable

e.g.

```
at+zgmeasure=1
OK
at+zgmeasure?
+ZGMEASURE: 1
```

```
OK
```

3.3.17.11 Report location data +ZGPSR

Syntax

Table 3.3. 17-12: +ZGPSR parameter command syntax

Command	Possible response
	`+ZGPSR:` `<UTC>,<latitude>,<longitude>,<hdop>,<altitude>,<fix>,<cog>,<spkm>,<spkn>,<date>,<nsat>`

Description

Report UTC time,   lon, lat and speed e.g.

Defined values

`<UTC>`   UTC time (hhmmss.sss) referred to GGA sentence

`<latitude>`   format is ddmm.mmmm N/S (referred to GGA sentence)

where:

dd - degrees

00..90

mm.mmmm - minutes

00.0000..59.9999

N/S: North / South

`<longitude>`   format is dddmm.mmmm E/W (referred to GGA sentence)

where:

ddd - degrees

000..180

mm.mmmm - minutes

00.0000..59.9999

144

E/W: East / West

`<hdop>`   x.x - Horizontal Diluition of Precision (referred to GGA sentence)

`<altitude>`   x.x Altitude - mean-sea-level (geoid) in meters (referred to GGA sentence)

`<fix>:`

  0 - Invalid Fix

  2 - 2D fix

  3 - 3D fix

`<cog>`   ddd.mm - Course over Ground (degrees, True) (referred to VTG sentence)

where:

ddd - degrees

000..360

mm - minutes

00..59

`<spkm>`   x.

`<spkm>`   x.x Speed over ground (Km/hr) (referred to VTG sentence)

`<spkn>`   x.x- Speed over ground (knots) (referred to VTG sentence)

`<date>`   ddmmyy Date of Fix (referred to RMC sentence)

where:

dd - day

01..31

mm - month

01..12

yy - year

00..99 - 2000 to 2099

`<nsat>`   nn - Total number of satellites in use (referred to GGA sentence)

00..12

e.g.

`+ZGPSR: 063309.800,3411.2655N,10852.5821E,3.3,357.3,2,154.12,0.3,0.5,160812,04`

NOTE : This AT command has some differences(increase the following function) in ZM5202 Module as follows:

Syntax

Command	Possible response
+ZGPSR=<status>	
+ZGPSR?	+ZGPSR: <status>

Description

Set ZGPSR Report of GPS enable or not.

Defined values

<status >:

   1:enable

   0:disable

e.g.

```
at+ZGPSR=1
OK
at+ZGPSR?
+ZGPSR: 1

OK
```

3.3.17.12   Report location status event +GPSEVENT

Syntax

Table 3.3.17-13: +GPSEVENT parameter command syntax

Command	Possible response
	+GPSEVENT: <flag>

Description

Report location event code

Defined values

Table 3.3.17-14: parameters explanation

Flag	Explanation	Data type
0x08	Indicates session completion	Uint32
0x10	Indicates that the PD session has been ended	Uint32
0x20	Indicates start of a session	Uint32
0x40	Indicates that the UE is attempting to communicate with the network	Uint32
0x80	Indicates connection; triggered when the connection	Uint32

	with the network has been established	
0x100	Indicates a failure in communication with network; this might be due to any number of errors	Uint32
0x200	Marks the conclusion of communication with the server;	Uint32
0x4000	GPS receiver is turned on	Uint32
0x8000	GPS receiver is turned off	Uint32

e.g.

```
+GPSEVENT: 8
OK
```

 NOTE : This AT command has some differences(increase the following function) in ZM5202 Module as follows:

Syntax

Command	Possible response
+GPSEVENT=<status>	
+GPSEVENT?	+ZGPSEVENT: <status>

Description

Set GPSEVENT Report of GPS enable or not

Defined values

<status> :

   1:enable

   0:disable

e.g.

```
at+ GPSEVENT =1
OK
at+GPSEVENT?
+GPSEVENT: 1

OK
```

3.3.18 TCP/IP Relative Commands

3.3.18.1 Initialization Location command +ZIPCFG

Syntax

Table 3.3.18-1: +ZIPCFG parameter command syntax

Command	Possible response(s)
+ZIPCFG=<APN>[,<Username>,<Password>]	
+ZIPCFG?	+ZIPCFG: <APN>[,<User

	name>,<Password>]

Description

Extensible AT command, this command is used to Set and Query the params of PS Call.

Defined values

<APN>：The Access Point Name.

<User name>：Usernanme when start a call

<Password>：Password when start a call

e.g.

```
AT+ZIPCFG=cmwap,zte,ztepasswd
OK
AT+ZIPCFG?
+ZIPCFG: cmwap, zte, ztepasswd

OK
```

3.3.18.2 Start or end PS Call +ZIPCALL

Syntax

Table 3.3.18-2: + ZIPCALL parameter command syntax

Command	Possible response(s)
+ZIPCALL=<State>	For ZM5202 module used in the Korea program only:
	+ZIPCALL: < State >,[,<IP address>]
	OK
	For all the other modules which support this command:
	OK
	+ZIPCALL: <State>[,<IP address>]
+ZIPCALL?	+ZIPCALL: <State>[,<IP address>]
+ZIPCALL=?	+ZIPCALL: (list of supported <State>s)

Description

Extensible AT command, this command is used to Start or end PS Call, If PS call successful. It will report IP address automaticly.

Defined values

<State>：Socket call connection state.

    0：Disconnected

    1：Connected

    2：Connecting   (should not be used to set)

    3：Disconnecting   (should not be used to set)

<IP address>：The IP address when connect to Network successful.

e.g.

```
AT+ZIPCALL=1
OK


+ZIPCALL: 1, 1.1.72.120
AT+ZIPCALL?
+ZIPCALL: 1, 1.1.72.120

OK
AT+ZIPCALL=0
OK


+ZIPCALL: 0, 0.0.0.0
AT+ZIPCALL?
+ZIPCALL: 0

OK
For ZM5202 module:
at+zipcall=1
+ZIPCALL: 1,10.166.211.13

OK
```

3.3.18.3 Establish TCP/UDP Connection +ZIPOPEN

Syntax

Table 3.3.18-3: + ZIPOPEN parameter command syntax

Command	Possible response(s)
+ZIPOPEN=<Socket id>,<Type>, <Remote IP>,<Remote port>[,< Local port>]	+ZIPSTAT: <Socket id>,<Status> OR ERROR
+ZIPOPEN?	+ZIPOPEN: <Socket id>,<Type>,<Remote IP>,<Remote port> [+ZIPOPEN: <Socket id>,<Type>,<Remote IP >,<Remote port> [...]] OR +ZIPOPEN: 0
+ZIPOPEN=?	+ZIPOPEN: (range of supported <Socket id>s), (range of supported <Type>)[, (range of supported <Remote port>)]

Description

Extensible AT command, this command is used to Establish TCP/UDP connection with remote server. It will

report +ZIPSTAT automaticly to indicate the socket state.

Defined values

`<Socket id>`: Socket Connection indication

    0：Invalid Socket id

    1～5：Valid Socket id

`<Type>`: The protocal type of socket connection

    0：TCP

    1：UDP

`<Remote IP >`: IP address or Domainname of Romote server.

`<Remote port>`: Server port of Romote server, range: 1-65535

`<Local port>`: Local port，range: 1-65535

`<Status>`: State of Socket Connection

    0：Socket connection is closed.

    1：Socket connection is open, both send data and receive data normally.

    2：Socket connection is open, receive data narmal, but send buffer is full.

    3，Socket connection is opening.

    4，Socket connection is closing.

e.g.

```
AT+ZIPOPEN=1, 1, 192.232.33.10, 21
OK

+ZIPSTAT: 1, 1
AT+ZIPOPEN?
+ZIPOPEN :( 1, 1, 21, 192.232.33.10)
+ZIPOPEN :( 5, 1, 21, 192.232.33.10)

OK
```

3.3.18.4 Close TCP/UDP Connection +ZIPCLOSE

Syntax

Table 3.3.18-4: + ZIPCLOSE parameter command syntax

Command	Possible response(s)
+ZIPCLOSE =<Socket id>	OK +ZIPSTAT: <Socket id>,<Status> OR ERROR

+ZIPCLOSE?	+ZIPCLOSE: [(<Socket1>, <Status>)[,(<Socket2>, <Status>)[, (<Socket3>, <Status>)[,(<Socket4>, <Status>)[,(<Socket5>, <Status>)]]]]] OR +ZIPCLOSE: 0
+ZIPCLOSE=?	+ZIPCLOSE: (range of <Socket id>)

Description

Extensible AT command, this command is used to Close TCP/UDP connection. it will report +ZIPSTAT automaticly to indicate the socket state.

Defined values

<Socket id>: Socket Connection indication

   0：Invalid Socket id

   1~5：Valid Socket id

<Status>: State of Socket Connection

   0：Socket connection closed.

   1：Socket connection open, both send data and receive data normally.

   2：Socket connection open, receive data narmal, but send buffer is full.

   3：Socket connection opening.

   4：Socket connection closing.

e.g.

```
AT+ZIPCLOSE=1
OK

+ZIPSTAT: 1, 0
AT+ZIPCLOSE?
+ZIPCLOSE: (Socket1, 0) (Socket2, 0) (Socket3, 0) (Socket4, 0) (Socket5, 0)

OK
```

3.3.18.5 TCP/UDP Data Send +ZIPSEND

Syntax

Table 3.3.18-5: + ZIPSEND parameter command syntax

Command	Possible response(s)
+ZIPSEND=<Socket id>, <Data>	+ZIPSEND: <Socket id>,<Size> OR ERROR
+ZIPSEND?	+ZIPSEND: <Socket id>,<Size> [+ZIPSEND: <Socket id>,<Size>[...]]

	(For all opened Socket)

Description

Extensible AT command, this command is used to send data. The data can be sent only when the socket state is 1(Socket connection open, both send data and receive data normally), if socket state become to 2(Socket connection open, receive data narmal, but send buffer is full). It will report +ZIPSTAT: <Socket id>,2 automaticly. At this time, user can not send data until the socket state become to 1.

Defined values

<Socket id>: Socket Connection indication

0：Invalid Socket id

1～5：Valid Socket id

<Data>: The data lenth can be 1024Bytes at more. And the data should be encoded.

Eg: "48656C6C6F21" means "Hello!".

e.g.

```
AT+ZIPSEND=1,32302D46696C
OK

+ZIPSEND: 1, 6
AT+ZIPSEND?
+ZIPSEND: 1, 6

OK
```

3.3.18.6 TCP/UDP Data Receive +ZIPRECV

Syntax

Table 3.3.18-6:   +ZIPRECV parameter command syntax

Command	Possible response(s)
	For ZM5202 module used in the Korea program only:
	+ZIPRECV: <Socket id>,<Data len>,<Data>
	For all the other modules which support this command:
	+ZIPRECV: <Socket id>,<Remote IP>,<Remote port>,<Data len>,<Data>

Description

Extensible AT command, this command is used to reveive data. The data will be reported to TE automaticly when module received data. The data lenth should less than 1024Bytes.

Defined values

<Socket id>: Socket Connection indication

0：Invalid Socket id

1～5：Valid Socket id

`<Remote port>`: Server port of Romote server, range: 1-65535

`<Local port>`: Local port，range: 1-65535

`<Data len>`: The leath of received data, should less than 1024Bytes.

`<Data>`: data should be encoded. Eg: "48656C6C6F21" indicate to "Hello!".

e.g.

```
+ZIPRECV: 1, 192.232.33.10, 21, 10, 48656C6C6F213C454F46
```

```
+ZIPRECV:
1,42,3232302D46696C655A696C6C61205365727665722076657273696F6E20302E392E323220626574610D0A
```

3.3.18.7 Query Socket State + ZIPSTAT

Syntax

Table 3.3.18-7: + ZIPSTAT parameter command syntax

Command	Possible response(s)
+ZIPSTAT=<Socket id>	+ZIPSTAT: <Socket id>,<Status>
Auto report	+ZIPSTAT: <Socket id>,<Status>
+ZIPSTAT=?	+ZIPSTAT: (range of <State>)

Description

Extensible AT command, this command is used to Query Socket State. When the socket state changed, the new state will be reported automaticlly.

Defined values

`<Socket id>`: Socket Connection indication

> 0：Invalid Socket id

> 1～5：Valid Socket id

`<Status>`: State of Socket Connection

> 0：Socket connection closed.

> 1：Socket connection open, both send data and receive data normally.

> 2：Socket connection open, receive data narmal, but send buffer is full.

> 3，Socket connection opening.

> 4，Socket connection closing.

e.g.

```
AT+ZIPSTAT=3
+ZIPSTAT: 3, 0

OK
```

3.3.18.8 Set parameters of TCP/UDP server +ZIPSLCFG

Syntax

Table 3.3.18-8: + ZIPSLCFG parameter command syntax

Command	Possible response(s)
+ZIPSLCFG=<Type>,<Source port>,<Time out>	OK or ERROR
+ZIPSLCFG?	+ZIPSLCFG:<Type>,<Source port>,<Time out> [+ZIPSLCFG:<Type>,<Source port>,<Time out>]
+ZIPSLCFG=?	+ZIPSLCFG: (range of supported <Type >), (range of supported <Source port>), (range of supported <Time out>)

Description

Extensible AT command, this command is used to Set parameters of TCP/UDP server.

Defined values

<Type>: protocal type

    0 - TCP

    1 - UDP

< Source port >: the Listening port, range: 1-65535

<Time out>：Max idle time of UDP connection. When the max idle time large than the value of time out, this udp connection will be released automatic, the parameter just used for udp server.

    0 – the idle time is infinite.

    1~3600 – idle time, means several seconds, the default value is 600 senconds。

e.g.

```
AT+ZIPSLCFG=0, 5000, 0
OK
AT+ZIPSLCFG=1, 5001, 60
OK
AT+ZIPSLCFG?
+ZIPSLCFG: 0, 5000, 0
+ZIPSLCFG: 1,5001,60

OK
```

3.3.18.9 Open/Close TCP/UDP server + ZIPLISTEN

Syntax

Table 3.3.18-9: + ZIPLISTEN parameter command syntax

Command	Possible response(s)
+ZIPLISTEN=<Mode>, <Type>	+ZIPLISTEN: <Status>,<Type>,<Socket id><Remote IP>,< Remote port>reported when the remote client connect to the listening port or ERROR
+ZIPLISTEN?	+ZIPLISTEN:<Status>, <Type> [+ZIPLISTEN:<Status>, <Type>] or +ZIPLISTEN:<Status>, <Type> [+ZIPLISTEN:<Status>, <Type>] +ZIPLISTEN: <Status>,<Type>,<Socket id ><Remote IP>,<Remote port> [+ZIPLISTEN: <Status>,<Type>,< Socket id ><Remote IP>,<Remote port>[...]]
+ZIPLISTEN=?	+ZIPLISTEN: (range of supported <Mode>), (range of supported <Type>)[, (range of supported <Source port>)]

Description

Extensible AT command, this command is used to Open/Close TCP/UDP server. It can support a udp server and a tcp server simultaneously, the infomation of romote cliect connected to the server will be reported automatically.

Defined values

<Mode>：TCP/UDP server listening mode

    0 – close TCP/UDP server

    1 - open TCP/UDP server

<Type>：protocal type

    0 - TCP

    1 – UDP

<Status>：State of TCP/UDP server

    0 – server listening is close

    1 – server listening is open

<Socket id>: Socket Connection indication

    0：Invalid Socket id

    1~5：Valid Socket id

<Remote IP>： IP address of remote client

<Remote port>： port of romote client，range: 1-65535

e.g.

```
AT+ZIPLISTEN=1, 0 //Open tcp server
OK

+ZIPLISTEN: 1, 0, 1, 119.75.1.1, 5005
```

//TCP server is in the listening state, and a remote client connected to the server.

```
AT+ZIPLISTEN=1, 1 //Open udp server
OK

+ZIPLISTEN: 1, 1, 2, 119.75.1.1, 5005
```

//UDP server is in the listening state, and a remote client connected to the server.

3.3.18.10 Set TCP/UDP internal Firewall   +ZIPFRWL

Syntax

Table 3.3.18-10: +ZIPFRWL parameter command syntax

Command	Possible response(s)
+ZIPFRWL=< Cmd type >[, <IP address>,<Net mask>]	OK or ERROR
+ZIPFRWL?	+ZIPFRWL: <State> +ZIPFRWL: <IP address>,<Net mask> [+ZIPFRWL: <IP address>, <Net mask> [...]]
+ZIPFRWL=?	+ZIPFRWL: (range of supported <Cmd type>)

Description

Extensible AT command, this command is used to Set TCP/UDP internal Firewall.

The Internal firewall is used to allow the module be connected with clients whose ip address are in the visit list. The firewall works when the TCP/UDP server is in the listening state.

The visit list includes an IP address and an IP subnet mask..and the firewall suppost at most 10 visit list.

The visit lists can be edited only when there are no socket are open and the firewall is in close state. The firewall has no use to the sockets established before firewall starts.When the modual is restarted, the firewall will in the close state, and the visit lists will be initialized as empty.

Defined values

<Cmd type>:

    0 – Close firewall

    1 – Open firewall

    2 – add new ip address to the visit lists

    3 - delete ip address from the visit lists

    4 - initialized the visit lists as empty

<state>: firewall state

    0 – firewall is in the close state

1 - firewall is in the open state

`<IP adress>`: ip address to add or delete

It can be any valid IP address, fomat is: XXX.XXX.XXX.XXX

`<Net mask>`: submet mask of the ip address to add or delete

It can be any valid IP address mak, fomat is: XXX.XXX.XXX.XXX

e.g.

```
AT+ZIPFRWL=1 //open firewall
OK
AT+ZIPFRWL=2,"192.158.1.1","255.255.0.0"      //Add ipaddr to list
OK
AT+ZIPFRWL=?
+ZIPFRWL: (0,4)

OK
AT+ZIPFRWL?         //Query firewall list
+ZIPFRWL: 1
+ZIPFRWL: "192.158.1.1","255.255.0.0"

OK
```

3.3.19 Hardware Relative Commands

3.3.19.1 Clock +CCLK

Syntax

Table 3.3.19-1: +CCLK parameter command syntax

Command	Possible response(s)
+CCLK=<time>	+CME ERROR: <err>
+CCLK?	+CCLK: <time>
	+CME ERROR: <err>
+CCLK=?	

Description

Set command sets the real-time clock of the MT. If setting fails in an MT error, +CME ERROR: <err> is returned.

Read command returns the current setting of the clock.

Defined values

`<time>`: string type value; format is "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -47...+48). E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to

"94/05/06,22:10:00+08"

NOTE: If MT does not support time zone information then the three last characters of <time> are not returned by +CCLK?. The format of <time> is specified by use of the +CSDF command.

3.3.19.2 Turn off the Modem +ZTURNOFF

Syntax

Table 3.3.19-2: +ZTURNOFF parameter command syntax

Command	Possible response(s)
+ZTURNOFF	No response can get from the modem, because the modem is turned off.
+ZTURNOFF?	+CME ERROR: <err>

Description

This is a command to turn off the modem.

e.g.

AT+ZTURNOFF

3.3.20 Other Extended and customized Command

3.3.20.1 RPM Parameter setting +ZRPMC

Syntax

Table 3.3.20-1: + ZRPMC parameter command syntax

Command	Possible response(s)
+ZRPMC=<Parameter >,<Value>	
+ZRPMC?	+ZRPMC: (current RPM value <Parameter>,<Value>)
+ZPRMC=?	

Description

Extensible AT command, this command is used to read and set RPM parameters.

Defined values

<Parameter>:

RPM parameter default values are listed in the following table.

Name	Description	Value
E	RPM_Flag. Indicates whether RPM functionality is to be enabled or disabled at power up	1 (ON)

N1	Max number of SW resets per Hour allowed by RPM following "permanent" MM/GMM reject	20
T1	Average time before RPM resets modem following permanent MM/GMM reject	60 minutes
F1	Max number of PDP Activation Requests per Hour allowed by RPM following a PDP Activation Ignore Scenario	60
F2	Max number of PDP Activation Requests per Hour allowed by RPM following a "Permanent" PDP Activation Reject	30
F3	Max number of PDP Activation Requests per Hour allowed by RPM following a "Temporary" PDP Activation Reject	60
F4	Max number of PDP Activation/Deactivation Requests per Hour allowed by RPM	30
I1	mm and gmm time window	60
I2	sm time window	60
R	random time	5
D	Set it to default value	1

`<Value>:`

Timer value of T1 and R shoud be defined in minute.

Time window of I1 and I2 should be defined in minute.

The range of parameters(N1, T1, F1-F4, I1, I2, R) are not limited, the customer can set them to the appropriate values according to the need.

The Enable flag value of E should be defined as follows:

   0: disable

   1: enable

The parameter of D must be set to 1.

e.g.
```
AT+ZRPMC?
+ZRPMC: rpm_flag=1, I1=60, I2=60,N1=20, T1=60, F1=60, F2=30, F3=60, F4=30

OK
AT+ZRPMC=T1,30
OK
AT+ZRPMC=D,1
OK
```

3.3.20.2 RPM lefttime and reset counts +ZRPMNV

Syntax

Table 3.3.20-1 : + ZRPMNV parameter command syntax

Command	Possible response(s)
+ZRPMNV=<Lefttime>,<Resetcount>	
+ZRPMNV?	+ ZRPMNV: <Parameter> ,<Value>
+ZRPMNV=?	

Description

Extensible AT command, this command is used to read and set RPM left time and reset counts parameters.

Defined values

<Lefttime>:

The left time of time window in second. The default value of this parameter is 3600. The range of parameter is not limited, the customer can set it to the appropriate value according to the need.

<Resetcount>:

The reset counts during the time window. The default value of this parameter is 0.

e.g.

AT+ZRPMNV=60000,2
OK

3.3.20.3 ADC status and value inquiry + ZADC1

Syntax

Table 3-3: + ZADC1 parameter command syntax

Command	Possible response(s)
+ZADC1?	+ZADC1: <status>,<pResult.raw>
	OK
	or
	+ZADC1: <2>,<Input Is Out Of Range>
	ERROR

Description

Extensible AT command, this command is used to inquire ADC status and value. The range of the return value of parameter 2(pResult.raw) is 0 to 2199, unit is mV. When the input is out of range, it will return an error message.

The return value these parameters are shows in the table:

parameter	range	remarks
<status>	0	success
	1	read error
	2	reading out of range

	3	underway
`<pResult.raw>`	0~2199	uint is mV
	Input Is Out Of Range	reading out of range

NOTE1: "1" is number one in "+ ZADC1".

NOTE 2: ADC pin should not be no connection.

e.g.

```
AT+ZADC1?
+ZADC1: 0,2000
OK

AT+ ZADC1?
+ZADC1: 2, input Is Out Of Range.
ERROR
```

3.3.20.4 GPIO configuration and inquiry + ZGPIOCNF

Syntax

Table 3.3.20-4: + ZGPIOCNF parameter command syntax

Command	Possible response(s)
+ZGPIOCNF=<pin>	+ZGPIOCNF: <pin>,<mode> OK +ZGPIOCNF: <all pins mode> OK ERROR
+ZGPIOCNF=<pin>,<mode>	OK or ERROR
+ZGPIOCNF=<pin>,<mode>,<status>	OK or ERROR
+ZGPIOCNF=?	+ZGPIOCNF: <0000－FFFF> OK or ERROR

Description

Extensible AT command, this command is used to configure and inquire GPIO.

The value of these parameters are shows in the table :

parameter	range	remarks
<pin>	0	Stand for all GPIO.
	1~4	Stand for single GPIO
<mode>	0	Input
	1	Output
<status>	0	High
	1	Low

Defined values

Parameter One:

<pin>	return	remarks
0	ZGPIOCNF:<1,1>,<2,1>,<3,0>,<4,1> OK (default)	Inquire all GPIO mode.
1~4	ZGPIOCNF: <pin>,<mode> OK	Inquire single GPIO mode.
other	ERROR	

Parameter Two:

<pin>	<mode>	return	remarks
0	0 / 1	OK	Set all GPIO mode.
1~4	0 / 1	OK	Set single GPIO mode.
other	other	ERROR	

Parameter Three:

<pin>	<mode>	<status>	return	remarks
0	0	0 / 1	ERROR	Input mode can,t set status.
0	1	0 / 1	OK	Set all GPIO status.
1~4	0	0 / 1	ERROR	Input mode can,t set status.
1~4	1	0 / 1	OK	Set single GPIO status.
other	her	other	ERROR	

e.g.

```
AT+ZGPIOCNF=0
+ZGPIOCNF: <1,1>,<2,1>,<3,0>,<4,1>
OK (default)
Remarks: It returns all GPIO mode.


AT+ZGPIOCNF=2,0
OK
Remarks: It sets GPIO2 to be input mode.


AT+ZGPIOCNF=4,1,1
OK
Remarks: It sets GPIO1 to be output mode and output high level.
```

3.3.20.5 GPIO output setting + ZGPIOSET

Syntax

Table 3.3.20-5: + ZGPIOSET parameter command syntax

Command	Possible response(s)
+ZGPIOSET=\<pin\>,\< status\>	OK +ZGPIOSET: Change Pin's Mode. ERROR ERROR
+ZGPIOSET=?	+ZGPIOSET: (1,2,3,4),(0-1) OK ERROR

Description

Extensible AT command, this command is used to set GPIO to output high or low level.

\<pin\>: 1~4-stands for 4 single GPIO.

\<status\>: 1-HIGH, 0-LOW.

Defined values

The parameter is shown as follows:

\<pin\>	\< status \>	\<mode\>	return	remarks
1~4	0 / 1	0	+ZGPIOSET: Change Pin's Mode. ERROR	Input mode can't set status.
1~4	0 / 1	1	OK	Set single GPIO status.
other	other	other	ERROR	

e.g.

```
AT+ZGPIOSET=1,1
OK
Remarks: It sets GPIO1 to output high level.

AT+ZGPIOCNF=3,0
+ZGPIOSET: Change Pin's Mode.
ERROR
Remarks: It sets GPIO3 to output low level but fails, because GPIO3 is input mode.
```

3.3.20.6 GPIO status inquiry +ZGPIOGET

Syntax

Table3.3.20-6: + ZGPIOGET parameter command syntax

Command	Possible response(s)
+ZGPIOGET=<pin>	+ZGPIOGET: <pin>,<status> OK ERROR
+ZGPIOGET =?	+ZGPIOGET:(1,2,3,4) OK ERROR

Description

Extensible AT command, this command is used to get GPIO status.

<pin>: 1~4-stands for 4 single GPIO.

Defined values

<pin>	<mode>	return	remarks
1~4	0	OK	GPIO should not be no connection.
1~4	1	OK	
other	other	ERROR	

e.g.

```
AT+ZGPIOGET=1
+ZGPIOGET: 1,1
OK
Remarks: It gets GPIO1 status and the status is high level.
```

3.3.20.7 DTE-DCE local flow control +ZFLOW

Syntax

Table 3.3.20-7: + ZFLOW parameter command syntax

Command	Possible response(s)
+ZFLOW=< State >	OK or ERROR
+ZFLOW?	+ZFLOW: <State>
+ZFLOW=?	+ZFLOW: (range of supported <State>)

Description

Extensible AT command, this command is used to Set the DTE-DCE flow control without USIM. This is similar to +IFC. It acceps one numeric parameters which is used to control the operation of local flow control between the DTE and DCE during the data state when v.42 error control is being used, or when fallback to non-error control mode is specified to include buffering and flow control.

Defined values

`<State>:`

0: Disable flow control (IFC=0,0)

3: Enable RTS/CTS（default for data modem）(IFC=2,2)

4: Enable XON/XOFF (IFC=1,1)

5: Enable transport XON/XOFF (IFC=3,1)

e.g.

```
AT+ZFLOW=0 //Disable flow control
OK
AT+ZFLOW=?
+ZFLOW: (0-5)
OK
AT+ZFLOW?
+ZFLOW: 0
OK
```

3.3.20.8 Set Encoding Format: +ZIPCODE

Syntax

Table 3.3.20-8: + ZIPCODE parameter command syntax

Command	Possible response(s)
+ZIPCODE=<CODE_TYPE>	OK or ERROR
+ZIPCODE?	+ZIPCODE: <CODE_TYPE>

Description

This command is an extended command, and it is used to query and set the encoding format of transmit data. Now module MF206A supports ASCII and binary encoding format, and the default encoding format is binary.

Defined values

`<CODE_TYPE>:` the encoding format of transmit data

0：ASCII

1：BINARY

3.3.20.9 Display debug screen +ZCDS

Syntax

Table 3.3.20-9: +ZCDS parameter command syntax

Command	Possible response(s)
+ZCDS?	+ZCDS: <Channel>,<Cell_ID>,<PLMN>,<NT>,<SD>,<NOM>,<LAC>,<RAC>, <DRX>,<RSSI>,<PSC>,<RSCP>,<Ec/Io>,<IMSI>, OK OR ERROR

Description

Extensible AT command, this command is used to display debug screen.

Defined values

<Channel> : UARFCN UMTS assigned radio channel

<Cell_ID> : Cell ID

<PLMN> : Country code and operator code(MCC, MNC)

<NT> : Network Type   R4/R5/R6 etc

<SD> : Service Domain(0 : No Service, 1 : CS only, 2 : PS only, 3 : CS+PS)

<NOM>: Network Operator Mode

<LAC>: Localization Area Code

<RAC> : Routing Area Code

<DRX> : Discontinuous reception cycle Length(cycle length : display using ms)

<RSSI> : Received Signal Strength Indication

<PSC> : Active PSC(Primary Synchronization Code)

<RSCP> : Active RSCP (Received Signal Code Power in dBm)

<Ec/Io> : Active Ec/Io(chip energy per total wideband power in dBm)

<IMSI>: International Mobile Station ID

e.g.

```
AT+ZCDS?
+ZCDS: 450 05,10737,75,-74,-67,-7.0,450 08,2011,11,2825220,64,1,450050203619261,3

OK
```

3.3.20.10 Display TX power and BLER +ZCPWR

Syntax

Table 3.3.20-10: + ZCPWR parameter command syntax

Command	Possible response(s)
+ZCPWR?	+ ZCPWR: <TX power>,<BLER> OK or ERROR

Description

Extensible AT command, this command is used to display TX power and BLER.

Defined values

<TX power> :Tx Power

<BLER> : Block Error Rate(007 means 0.7 %)

e.g.

```
AT+ZCPWR
+ZCPWR : 1,007
OK
```

3.3.20.11 Display Network Cause URC +ZCNC

Syntax

Table 3.3.20-11: +ZCNCparameter command syntax

Command	Possible response(s)
+ZCNC= [<MM>[,<SMSRP>[,<s m>]]]	OK or ERROR
+ZCNC?	+ZCNC: <MM,<SMSRP>,<SMS> OK or ERROR

Description

Extensible AT command, this command is used to display network cause URC.

Defined values

<MM>

　　0 - disables URC of MM or GMM cause (factory default)

　　1 - enables URC of MM or GMM cause

<SMSRP>

    0 - disables URC of SMS RP cause (factory default)

    1 - enables URC of SMS RP cause

<SM>

    0 - disables URC of SM cause (factory default)

    1 - enables URC of SM cause

Note : NOM(Nom Network Operation Mode), OTA - OTA message mode, Dummy value (not used)

Note: <Cause> is defined in 3GPP Specification.

3.3.20.12 Display Protocol State +ZCPS

Syntax

Table 3.3.20-12: +ZCPS parameter command syntax

Command	Possible response(s)
+ZCPS?	+ZCPS: <MM idle>,<MM_Sub>,<GMM_Idle>,<GMM_Sub>,<RRC_state> OK or ERROR

Description

Extensible AT command, this command is used to display protocol state.

Defined values

<MM idle> : MM idle state

<MM_Sub> : MM sub-state

<GMM_Idle> : GMM idel

<GMM_Sub> : GMM sub-state

<RRC_state> : RRC state

3.3.20.13 Display cell monitoring +ZCCM

Syntax

Table 3.3.20-13: +ZCCM parameter command syntax

Command	Possible response(s)
+ZCCM?	+ZCCM: \<Cell Set Type>,\<UARFCN>,\<SCR code>,\<RSCP>,\<ECIO>,\<Path Loss> [+ZCCM: \<Cell Set Type>,\<UARFCN>,\<SCR code>,\<RSCP>,\<ECIO>,\<Path Loss> […]] OK or ERROR

Description

Extensible AT command, this command is used to display cell monitoring.

Defined values

\<CSI> : Cell Set Type (A: Active set, M: Monitored set, C: Candidate set)

\<UARFCN> : UMTS assigned radio channel

\<SCR code> : Scrambling Code of the cell

\<RSCP> : Active RSCP (Received Signal Code Power in dBm)

\<Ec/Io> : Active Ec/Io(chip energy per total wideband power in dBm)

\<Path loss> : Active set Pathloss [30 - 165dB]

The difference between the output power on the CPICH (when sent from the Node B) and the power received by the UE.

The formula for calculating it looks like this: Pathloss = Primary CPICH Tx power - RSCP.

Primary CPICH Tx Power is read from the SIB11.

e.g.

```
AT+ZCCM
+ZCCM: A,10737,6528,-74,-7.0,50,
+ZCCM: A,10737,1002,-84,-8.0,61
+ZCCM: A,10737,1200,-94,-9.0,65
+ZCCM: M,10664,3221,-95,-9.0,70
+ZCCM: C,10689,3331,-96,-10.0,80

OK
```

3.3.20.14 Set security mode +ZCSM

Syntax

Table 3.3.20-14: +ZCSM parameter command syntax

Command	Possible response(s)
+ZCSM=<integrity>,<ciphering>,<fake security>	OK or ERROR
+ZCSM?	+ZCSM: <integrity>,<ciphering>,<fake security> OK or ERROR

Description

Extensible AT command, this command is used to set security mode.

Defined values

<integrity> : 0 – disable integrity, 1 – enable integrity(default)

<ciphering> : 0 – disable ciphering, 1 – enable ciphering(default)

<fake security> : 0 – disable fake security(default), 1 – enable fake security

Note : This command should be reboot the module after setting of security mode

e.g.

```
AT+ZCSM=1,1,0
OK

AT+ZCSM?
+ZCSM : 1,1,0

OK
```

3.3.20.15 Set channel fixing +ZCCH

Syntax

Table 3.3.20-15: +ZCCH parameter command syntax

Command	Possible response(s)
+ZCCH=<mode>,<channel>	OK or ERROR
+ZCCH?	+ZCCH: <mode>,<channel> OK or ERROR

Description

Extensible AT command, this command is used to set channel fixing.

Defined values

`<mode>` : 0 – disable channel fixing(default), 1 – enable channel fixing

`<channel>` : fixing channel such as 10713 or 10737

Note : If channel fixing is enabled, the channel of module should be fixed to fixing channel.

e.g.

```
AT+ZCCH=1,10713
OK

AT+ZCCH?
+ZCCH : 1,10713

OK
```

3.3.20.16 Set Subscription Status +ZCSUB

Syntax

Table 3.3.20-16: +ZCSUB parameter command syntax

Command	Possible response(s)
+ZCSUB=<Subscription>	OK or ERROR
+ZCSUB?	+ZCSUB:<Subscription Status> OK or ERROR

Description

Extensible AT command, this command is used to set subscription status.

Defined values

`<Subscription>` :

    0 - registration start in OTA mode

    1- deregistration start in OTA mode

```
<Subscription Status>
```

    0 - not registered, ME is not currently searching a new operator to register to

    1 - registered, home network

    2 - not registered, but ME is currently searching a new operator to register to

    3 - registration denied

    4 -unknown

    5 - registered, roaming

e.g.

```
AT+ZCSUB=1
OK

AT+ZCSUB?
+ZCSUB : 1

OK
```

3.3.20.17 Set WCDMA Domain +ZCWD

Syntax

Table 3.3.20-17: +ZCWD parameter command syntax

Command	Possible response(s)
+ZCWD=<WCDMA domain>	OK or ERROR
+ZCWD?	+ZCWD:<WCDMA domain> OK or ERROR

Description

Extensible AT command, this command is used to set WCDMA domain.

Defined values

```
<WCDMA domain>
```

    0 : R4(default)

    1 : R5

2 : R6

Note : Please refer to UE capability.

e.g.

```
AT+ZCWD=0
OK

AT+ZCWD?
+ZCWD : 0

OK
```

3.3.20.18 SET and Query OTA mode +ZCOTA

Syntax

Table 3.3.20-18: + ZCOTA parameter command syntax

Command	Possible response(s)
+ZCOTA=<ota_mode>	OK or ERROR
+ZCOTA?	+ZCOTA: ota_mode

Description

Extensible AT command, this command is used to set and query the skt ota mode.

Defined values

<ota_mode>:

0：non ota mode

1：ota mode

e.g.

```
AT+ZCOTA=1    //set the modem to skt ota mode.
OK

at+zcota?        //query the modem skt ota mode.
+ZCOTA: 1

OK
```

3.3.20.19 Module port ready +ZREADY

Table 3.3.20-19: +ZREADY parameter command syntax

Command	Possible response(s)
unsolicited code	+ ZREADY

Description

Extensible AT command, this command stands for the ports of module is ready and users can send AT commands to it after the module is power on.

3.3.20.20 Control the SAR +ZCTRSAR(美国 ATT，6200-1577 分支)

Table 3.3.20-20: + ZCTRSAR parameter command syntax

Command	Possible response(s)
+ ZCTRSAR=<op_type>,<sar_value>	OK or ERROR
+ ZCTRSAR?	+ZCTRSAR: <sar_total_value>

Description

Extensible AT command, this command is used to control the SAR .

Defined values

<op_type>:

    up/UP   add the level of SAR

    down/DOWN   reduce the level of SAR

NOTE: If the set value of <op_type> is up/UP, and the value is greater than 8, the level of SAR will be set as default value zero. If the set value of <op_type> is down/DOWN, and the value is less than 0, the level of SAR will be set as the former level of SAR.

<sar_total_value>:

0 to 8   It stands for the current level of SAR.

e.g.

4 The Common Usage Scenarios

4.1   SMS Operation

4.1.1   Receive message

1. **Set new message indication（+CNMI）**

TXT Mode:

AT+CNMI=3,1,0,2,0

OK

at+cpms="me","me","me"

+CPMS: 1,100,1,100,1,100

OK

at+cpms?

+CPMS: "ME",41,100,"ME",41,100,"ME",41,100

OK

at+cnmi?

+CNMI: 3,1,0,2,0

OK

at+cmgf=1　　//TXT mode

OK

at+cmgs="18891006239"

> this

+CMGS: 38

OK

+CMTI: "ME",34

+CDSI: "SR",57

at+cpms?

+CPMS: "ME",43,100,"ME",43,100,"ME",43,100

OK

Note: In this new message indication, choose the storage of sms and status report and report the indexes,.The counter of sms in storages increases 2.

PDU Mode:

+CNMI to Set new message indication：

AT+CNMI=3,1,0,2,0

OK

at+cpms?

+CPMS: "ME",38,100,"ME",38,100,"ME",38,100

OK

at+cnmi?

+CNMI: 3,1,0,2,0

OK

at+cmgf=0

OK

at+cmgs=18

> 0891685109200905F031000B818198016032F90011FF0474747A0E

+CMGS: 25

OK

+CMTI: "ME",22

+CDSI: "SR",66

at+cpms?

+CPMS: "ME",40,100,"ME",40,100,"ME",40,100

OK

Note: In this new message indication, choose the storage of sms and status report and report the indexes,.The counter of sms in storages increases 2.

2. **Receive new sms and save to ME (MEM3)**

AT+CPMS ="ME","ME","ME"

+CPMS: 15,100,15,100,15,100

OK

at+cpms?

+CPMS: "ME",15,100,"ME",15,100,"ME",15,100

OK

+CMTI: " ME ", 33

+ CMTI: " ME ", 34

at+cpms?

+CPMS: "ME",17,100,"ME",17,100,"ME",17,100

OK

3. **Receive new sms and save to(U)SIM(MEM3)**

AT+CPMS ="ME","ME","SM"

+CPMS: 17,100,17,100,2,40

OK

+ CMTI: " SM ", 2

+ CMTI: " SM ", 3

at+cpms?

+CPMS: "ME",17,100,"ME",17,100,"SM",4,40

OK

4.1.2 Send message

1. Send TXT SMS

AT+CMGF=1

OK

AT + CPMS =" ME "," ME "," ME "

+ CPMS: " ME ",32,50," ME ",32,50," ME ",32,50

OK

AT+CMGS="18891006239"

>this is test message

+CMGS: 224

OK   //Enter CTRL+Z to send sms, the longest time to receive "+CMGS:224" is 30 seconds, or it's fail.

2. Send PDU SMS

AT+CMGF=0   //Switch to PDU mode

OK

at+cmgs=32

>0891683110801505F011000B815190515821F00011FF1474747A0E4ACF41F4F29C0E6A97E7F3F0B90C

+cmgs: 225

ok   //Enter CTRL+Z to send sms, the longest time to receive "+CMGS:225" is 30 seconds, or it's fail.

3. Send the sms stored in the MEM2

TXT Mode:

at+csmp=49,169,0,0

OK

at+cmgw="18891006239"

> this

+CMGW: 13

OK
at+cmss=13

+CMSS: 70

OK

+CMTI: "ME",0

+CDSI: "SR",50

PDU Mode:
at+cmgf=0

OK
at+cmgw=18

> 0891685109200905F031000B818198016032F90011FF0474747A0E

+CMGW: 14

OK
at+cmss=14

+CMSS: 71

OK

+CMTI: "ME",3

+CDSI: "SR",51

4. Mass texting
at+cmgf=1

OK

at+cmgs="18891006239"

> this

+CMGS: 72

OK

+CMTI: "ME",0

at+cmgs="18891006240"

> this

+CMGS: 73

OK

+CDSI: "SR",52

at+cmgs="18891006241"

> this

+CMGS: 74

OK

+CDSI: "SR",53

+CDSI: "SR",54

4.1.3 Read message

TXT Mode:

AT+CMGF=1

OK

AT+CMGR=0

+CMGR: "REC READ","+8618891006239",,"12/11/05,14:36:02+32"

this

OK

AT+CMGR=1

+CMGR: "REC READ","+8618891006239",,"12/11/05,14:43:38+32"

this

OK

PDU Mode:

AT+CMGF =0

OK

AT+CMGR=0

+CMGR: 1,,24

0891685109200905F0040D91688198016032F900002111504163202304747 47A0E

OK

AT+CMGR=2

+CMGR: 1,,24

0891685109200905F0040D91688198016032F900112111504154102304747 47A0E

OK

AT+CPMS="SR","SR","SR"

+CPMS: 1,100,1,100,1,100

OK

AT+CMGR=3   // Read the status report

+cmgr: 0,,25 0891683110801505F011000B815190515821F00011FF1474747A0E4ACF41F4F29

C0E6A97E7F3F0B90C

AT+CMGL=4   //Read all the message

+CMGL: 0,1,,24

0891685109200905F0040D91688198016032F9000021115041632023047474A0E

+CMGL: 1,1,,24

0891685109200905F0040D91688198016032F9001121115041348323047474A0E

+CMGL: 2,1,,24

0891685109200905F0040D91688198016032F9001121115041541023047474A0E

+CMGL: 3,1,,24

0891685109200905F0040D91688198016032F9000021115041549323047474A0E

+CMGL: 4,1,,24

0891685109200905F0040D91688198016032F9000021115041745123047474A0E

+CMGL: 5,1,,24

OK

4.1.4   Message storage(MEM2)

TXT Mode:

AT+CPMS="SM","SM"

+CPMS: 1,40,1,40,1,40

OK

AT+CMGW="18629582100"

>

THIS IS TEST

+CMGW: 2

OK

PDU Mode:

AT+CPMS="SM","SM"

+CPMS: 1,40,1,40,1,40

OK

AT+CMGW=108

>

0891683108200905F20405810180F600081190624122242805C5C0A656C768452A8611F57305E265BA26

237FF1A60A85F5367087D2F8BA18BDD8D394E3A00350035002E003300345143FF0C529E740651765

B834E1A52A18BF756DE590D76F85E944E1A52A14EE3780181F3003100300030003000380036

+CMGW: 1

OK

4.1.5 Delete sms

AT+CPMS="SM","SM",""

+CPMS: 10,40,10,40,10,100

OK

AT+CMGD=0

OK

AT+CMGD=1

OK

AT+CMGD=*, 1   // "*" stands for any index number value or null.

OK

AT+CMGD=*, 2   //"*" is as above

OK

AT+CMGD=*, 3   //"*" is as above

OK

AT+CMGD=*, 4   // "*" is as above, delete all the stored message.

OK

AT+CPMS?

+CPMS: "ME",0,50,"ME",0,50,"ME",0,50

OK

4.1.6 Remote wakeup by sms

1. Remote wakeup by any sms.

    AT+ZWPS=,1

OK

2. Rmote wakeup by specified sms

AT+ZWPS=,2

OK

AT+ZWAKEUPSMS="xxxx"   //Set the specified sms to remote wakeup AP.

OK

3. Disable the function of remote wakeup by sms.

AT+ZWPS=,0

OK

4.2   Data service

4.2.1 Set up data call（**The RAS dail**）

1. Read whether the PS service domainis available
AT+ZPAS?
+ZPAS: UMTS,CS_PS(PS_ONLY)

OK

2. Set the parameters of data connector
AT+CGDCONT=1,"IP","APN"

OK

Note: For example, the APN of Unicom is 3gnet.

3. Set up data call
ATD*99#
CONNECT 3600000
OR
ATD*98*N#   N is used to set the Profile for dail.
CONNECT 3600000

4.3   (U)SIM

4.3.1   Enable or disable the pin operation

1. **Read the pin is enable or disable**

    At+clck="SC",2

    If the response is as follow:

    +CLCK: 0

    OK   It indicates that the pin is disable now.

    If the response is as follow:

    +CLCK: 1   It indicates that the pin is enable now.

    OK

2. **In the status of disable pin, the following command can be used to enable the pin.**

    at+clck="SC",1,"1234"

    OK

3. **In the status of enable pin, the following command can be used to disable the pin.**

    at+clck="SC",0,"1234"

    OK

4.3.2   The operation of unlocking pin

1. **Read the status of pin.**

    At+cpin?

    If the returned status is as follow:

    +CPIN: SIM PIN

    OK   //It indicates that MT is waiting UICC/SIM PIN to be given before it can be operated.

    If the returned status is as follow:

    +CPIN: READY

ZTE Welink

OK　　　　　//It indicates that the initialization of SIM is finished.

2.　The operation of unlock pin

At+cpin="pin"

OK　　　　　// It indicates that the pin is unlock success.

At+cpin="pin"

ERROR　　　　// It indicates that the pin is error and needs to unlock the pin again.

If input the pin for three times, the status of pin will be "SIM PUK" as follows:

At+cpin?

+CPIN: SIM PUK

OK

The following at command is needed to unlock PUK:

At+cpin="puk", "pin"

OK

4.4　　STK Function

1.　Use command: at+cpin? to read the status of pin.

2.　If the returned status is"SIM PIN", use the command:at+cpin="code" to enter the password. If the returned status is "SIM Ready",do the step four.

3.　Use command: at+cpin? to read the status of pin until the returned status is "SIM Ready" then do the step four.

4.　Use the command: at+zstm to get STK main menu, the returned value is showed as the step 5 or 6.

5.　at+zstm

error

// It indicates that the main menu is not set up successfully, and the STK needs to stop.

6.　at+zstm

+ZSTM:D081A2810301250082028182850F80005500530049004D53615E9475288F0A37807CBE54C163A883508F0A628059296C14988462A58F0A6480822A73ED67E58BE28F0A668051FA884C630753578F0A68804F53575B5FEB8BAF8F0CA28065B095FB65E9665A62A58F0AA480624B673A97F34E508F0AA680624B673A96058BFB8F0AA880624B673A90AE7BB18F0AAA8077ED4FE152A974068F0CAC80624B673A84254E1A5385

// It indicates that the main menu is set up successfully.

7. Use the command: at+zselm=id to select main menu item.

at+zselm=98

OK

+ZSTI:

D0398103012400820281828F06018070B964AD8F0602805B9A52368F0A038066F4636257CE5E028F060480

53D66D888F0A05804E1A52A14ECB7ECD

8. Use the command: at+zseli=id to select sub menu item.

at+zseli=1

OK

+ZDIST:

D06E8103012181820281020D63086B228FCE4F7F75288054901A300A59296C14988462A5300B4E1A52A1F

F0C8D448D390030002E00325143002F6B21FF0C4E0D542B901A4FE18D3930025BA2670D003A0034003000

030003600310031003700380037003830027 86E8BA470B964ADFF1F

9. Return to main menu

At+zbk=0

OK

4.5   Phonebook

1   Write phonebook

at+cpbw= 1,"132131",129,"tewtrwe"

OK

2   Read phonebook

at+cpbr=1

+CPBR: 1,"132131",129,"tewtrwe"

OK

3   Find phonebook

at+cpbf="tewtrwe"

+CPBF: 1,"132131",129,"tewtrwe"

OK

4   Delete phonebook

at+cpbw=1

OK

at+cpbr=1

+CME ERROR: not found

Note：After the operation of delete phonebook, you have to read the phonebook to check if it's deleted or not by the return value. If the return is"not found",the phonebook is deleted success.

4.6   TCP/IP

4.6.1   TCP/UDP data sending

Environment: The examples below is in the test network, and the TCP server is the server in the test network.

1.   Set Access Point Name

at+zipcfg=cmwap

OK

Note: We must set the access point name everytime when the module is power on.

2.   Start the PS call

at+zipcall=1

OK

+ZIPCALL: 1,1.1.66.174

at+zipcall?

+ZIPCALL: 1,10.166.211.13

OK

Note:Start the PS call, and 1.1.66.174 is the client IP address which is assigned by the network.

The longest response time is more than 3 minutes.

3.   Establish TCP/UDP connection

at+zipopen=1,0,192.232.33.20,21,6800

OK

+ZIPSTAT: 1,1

Note: This command is used to Establish TCP/UDP connection with remote server. The second parameter 0 is TCP protocal of socket connection. The third parameter 192.232.33.20 is IP address or Domainname of Romote server. The fourth parameter 21 is port of Romote server. The fifth parameter is the local port.

The longest response time is more than 3 minutes.

4.   Send data

at+zipsend=1, 414243

OK

+ZIPSEND: 1,3

Note:Send the data, the parameter 3 of "+ZIPSEND: 1,3" is the length of sending data.

The longest response time is more than 3 minutes.

4.6.2   TCP/UDP data receiving

+ZIPRECV: 1, 192.232.33.10, 21, 10, 48656C6C6F213C454F46

Note: The data will be reported to TE automaticly when modual received data. 1 is the socket ID, 192.232.33.10 is the remote IP address,21 is the remote port, 10 is the length of received data, 48656C6C6F213C454F46 is the received data.

4.6.3   Set parameters of TCP/UDP server

1.   Set Access Point Name

at+zipcfg=cmwap

OK

Note: We must set the access point name everytime when the module is power on.

2.   Start the PS call

at+zipcall=1

OK

+ZIPCALL: 1,1.1.66.174

Note:Start the PS call, and 1.1.66.174 is the client IP address which is assigned by the network.

The longest response time is more than 3 minutes.

3.   Set parameters of TCP/UDP server

at+zipslcfg=0,6800,0

OK

Note: This at command is used for setting parameters of TCP/UDP server. The first parameter 0 is the TCP protocol, and the second parameter 6800 is the listening port, the third parameter 0 is the max idle time of UDP connection. When the max idle time large than the value of time out, this udp connection will be released automatic, the parameter just used for udp server.

4.   Open/Close TCP/UDP server

at+ziplisten=1,0

OK

Note: Open the TCP/UDP server listening. The first parameter 1 is open the TCP/UDP server listening, and the second parameter 0 is the TCP protocol.

4.6.4   Disconnect the TCP/UDP connector

In the condition of TCP/UDP connection:

at+zipclose=1

OK

+ZIPSTAT: 1, 0

Note：This is the command to disconnect the specified TCP/UDP link.

The longest response time is more than 3 minutes.

4.6.5   Disconnect the data connector

In the condition of data connection:

at+zipcall=0

OK

+ZIPCALL: 0, 0.0.0.0

Note：This is the command to disconnect the data link.

The longest response time is more than 3 minutes.

4.6.6 Set TCP/UDP internal Firewall

1. Set Access Point Name

at+zipcfg=cmwap

OK

Note: We must set the access point name everytime when the module is power on.

2. Start the PS call

at+zipcall=1

OK

+ZIPCALL: 1,1.1.66.174

Note:Start the PS call, and 1.1.66.174 is the client IP address which is assigned by the network.

The longest response time is more than 3 minutes.

3. Set parameters of TCP/UDP server

at+zipslcfg=0,6800,0

OK

Note: This at command is used for setting parameters of TCP/UDP server. The first parameter 0 is the TCP protocol, and the second parameter 6800 is the listening port, the third parameter 0 is the max idle time of UDP connection. When the max idle time large than the value of time out, this udp connection will be released automatic, the parameter just used for udp server.

4. Open/Close TCP/UDP server

at+ziplisten=1,0

OK

Note: Open the TCP/UDP server listening. The first parameter 1 is open the TCP/UDP server listening, and the second parameter 0 is the TCP protocol.

5. Open firewall

at+zipfrwl=1

OK

Note: The firewall must be opened before set TCP/UDP internal firewall

6. Add new ip address to the visit lists

at+zipfrwl=2,"192.158.1.1","255.255.0.0"

OK

Note: Add new ip address 192.158.1.1 to the visit lists.

The Internal firewall is used to allow the module be connected with clients whose ip address are in the visit list.

The visit lists can be edited only when there are no socket are open and the firewall is in close state.

4.7   GPS Location

4.7.1   Initialization GPS

at+zginit   //It must be initialized everytime when the module is power on.

at+zgqos=50,255   // Positioning accuracy is 50m. Desired level of performance is255s

at+zgfixrate=100000,0   // Set fix rate for tracking sessions，The fix numbers is 100000 here. The fix numbers is effective in tracking-mode, and the positioning time interval is 0. The positioning time interval is the time to remove the time for GPS internal engine to calculate the location.Although the interval is set as zero, the interval between locations is about 1 second actually.

4.7.2   Set location mode as MS_BASED

at+zginit

at+zgfixrate=10000,0

at+zgqos=50,255

at+zgmode=1

at+zgpsapn=3gnet   //Unicom SIM is used for test in domestic. The apn of AGPS is 3gnet

at+zgurl=http://supl.google.com:7276   //Set the URL of SUPL server. We can only use google's SUPL for test in domestic.

at+zgrun=1   //It is in the mode of one-shot here, and it can also in the tracking-mode.

4.7.3   Set location mode as MS_ASSISTED

at+zginit

at+zgfixrate=10000,0

at+zgqos=50,255

at+zgmode=2

at+zgpsapn=3gnet

at+zgurl=http://supl.google.com:7276

at+zgrun=1   // It can only be set in the mode of one-shot here.

4.7.4 Set location mode as STANDALONE_ONLY

at+zginit

at+zgfixrate=10000,0

at+zgqos=50,255

at+zgmode=3

at+zgrun=2   //Support the mode of one_short and tracking, and it is recommended to use

tracking mode.

4.7.5 Stop GPS

at+zgrun=0

4.7.6 Restart GPS

at+zgrst=1   //warm reset

at+zgrst=0   //cold reset

at+zgrst=2   //hot reset