ZTE Welink

Welink Your Smart

AT Commands Reference Guide for MG3732_V2/C Module

MG3732_V2/C

Version1.0, 2014-12-24

ZTE中兴

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Revision History

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Besides, ZTEWelink provides various technical support ways to the customers, such as support by phone, website, instant messaging, E-mail and on-site.

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.

Note:All the AT commands follow the Related Documents(3GPP (R99) TS27.005 and TS27.007) is as below:

- 3GPP TS 27.007 specification and rules

http://www.3gpp.org/ftp/Specs/archive/27_series/27.007/

- 3GPP TS 27.005 specification and rules

http://www.3gpp.org/ftp/Specs/archive/27_series/27.005/

1.2 Audience

Readers of this document should be familiar with our company's 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"

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)

Items	Description
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	Receive 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

Items	Description
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 our company's 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. This 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 our company 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
100	unknown
GPRS-related errors	
	Errors related to a failure to perform an Attach
103	Illegal MS (#3)
106	Illegal ME (#6)
107	GPRS services not allowed (#7)
111	PLMN not allowed (#11)
112	Location area not allowed (#12)
113	Roaming not allowed in this location area (#13)
	Errors related to a failure to Activate a Context
132	service option not supported (#32)
133	requested service option not subscribed (#33)
134	service option temporarily out of order (#34)
149	PDP authentication failure
	Other GPRS errors
150	invalid mobile class
148	unspecified GPRS error
	VBS / VGCS and eMLPP -related errors
151	VBS/VGCS not supported by the network
152	No service subscription on SIM
153	No subscription for group ID
154	Group Id not activated on SIM
155	No matching notification
156	VBS/VGCS call already present

157	Congestion
158	Network failure
159	Uplink busy
160	No access rights for SIM file
161	No subscription for priority
162	operation not applicable or not possible

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 our company's 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
D	65 (For voice call); Command ATS7 can set the timeout
+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"

"ZTEWelink Software Development Guide of Module Products"

3.3 AT Commands

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

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.

This AT command is invalid when USIM card is not applied.

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 inquired by command AT&V.

e.g.

```
AT+DR?
+DR: 0

OK
```

3.3.2.2 V.42 bis Data Compression +DS

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).

This AT command is invalid when USIM card is not applied.

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 inquiry command AT&V.

e.g.

```
AT+DS?
+DS: 0,0,2048,6

OK
```

3.3.2.3 Command Line Termination Character S3

Syntax

Command	Possible response(s)
S3=<val>	

Description

Set command sets the value of the character either recognized by the device as command line terminator and generated by the device as part of the header, trailer, and terminator for result codes and information text, along with S4 parameter.

This AT command is invalid when USIM card is not applied.

Defined values

<val>:

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 (ASCII <CR>). The value can be available from the inquiry command AT&V.

e.g.

```
ATS3=13
OK
```

3.3.2.4 Response Formatting Character S4

Syntax

Command	Possible response(s)
S4=<val>	

Description

Set command sets the value of the character generated by the device as part of the header, trailer, and terminator for result codes and information text, along with the S3 parameter.

This AT command is invalid when USIM card is not applied.

Defined values

<val>:

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 inquiry command AT&V.

e.g.

```
ATS4=10
OK
```

3.3.2.5 Command Line Editing Character S5

Syntax

Command	Possible response(s)
S5=<val>	

Description

Set command sets the value of the character recognized by the device as a request to delete from the command line the immediately preceding character.

This AT command is invalid when USIM card is not applied.

Defined values

<val>:

0 to 127 Set command line editing character to this value. factory default value is 8 (ASCII BS). The value can be available from the inquiry command AT&V.

e.g.

```
ATS5=8
OK
```

3.3.2.6 Pause before Blind Dialing S6

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.

This AT command is invalid when USIM card is not applied.

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 inquiry command AT&V.

e.g.

```
ATS6=2
OK
```

3.3.2.7 Connection Completion Timeout S7

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).

This AT command is invalid when USIM card is not applied.

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 inquiry command AT&V.

e.g.

```
ATS7=50
OK
```

3.3.2.8 Comma dial modifier time S8

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.

This AT command is invalid when USIM card is not applied.

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.

e.g.

```
ATS8=2
OK
```

3.3.2.9 Automatic Time Zone Update +CTZU

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.

This AT command is invalid when USIM card is not applied.

Defined values

<onoff>: integer type value indicating:

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

1 – Enable automatic time zone update via NITZ..

e.g.

```
AT+CTZU=?
+CTZU: (0-1)

OK

AT+CTZU?
+CTZU: 0

OK
```

3.3.2.10 Time Zone Reporting +CTZR

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.

e.g.

```
AT+CTZR=?
+CTZR: (0-1)

OK
AT+CTZR?
+CTZR: 0

OK
```

3.3.2.11 Optional Requests for More Time +ZMTime

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.

This AT command is invalid when USIM card is not applied.

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

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 differences among our module products.

The execution of AT&F command has no behavior currently.

Defined values

<n>:

0 Set parameters to factory defaults. if parameter <n> is omitted, the command has the same behavior as AT&F0

e.g.

```
AT&F
OK
```

3.3.3.2 Display Current Configuration &V

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.

This AT command is invalid when USIM card is not applied.

Defined values

None.

e.g.

```
AT&F
&C: 0; &D: 0; &E: 0; &F: 0;…

OK
```

3.3.3.3 Store AT command Setting &W

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.

This AT command is invalid when USIM card is not applied.

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>]
ATS0	<val>
ATS7	<val>
ATS10	<val>

e.g.

```
AT&W
OK
```

3.3.3.4 Return to Online Data State O

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.

This AT command is invalid when USIM card is not applied.

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.

e.g.

```
ATO0
NO CARRIER
```

3.3.3.5 Result Code Suppression Q

Syntax

Command	Possible response(s)
Q<val>	

Description

Set command enables or disables the result codes. 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 inquiry command AT&V.

e.g.

```
ATQ
OK
```

3.3.3.6 DCE Response Format V

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 behavior as ATV0. The define value is 1, and the value can be available from the inquiry command AT&V or AT\S.

3.3.3.7 Result code selection and call progress monitoring control X

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.

This AT command is invalid when USIM card is not applied.

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 behavior as ATX0. The define value is 1, and the value can be available from the inquiry 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

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.

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
ATS0	NV
ATS7	NV
ATS10	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.

e.g.

```
ATZ
OK
```

3.3.3.9 Set Phone Functionality +CFUN

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 specific does this command affect network registration Command 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) (factory default)

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)

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.

e.g.

```
AT+CFUN?
+CFUN: 1

OK
AT+CFUN=?
+CFUN: (0-1,4-7),(0-1)

OK
```


3.3.3.10 Control Device Power Mode +ZOPRT

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

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.

This AT command is invalid when USIM card is not applied.

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
```

3.3.4 Identification Commands

3.3.4.1 Request Identification Information I

Syntax

Command	Possible response(s)
I	<module_info>

Description

This command causes the DCE to transmit one or more lines of information text, such as manufacturer, product name, software revision, IMEI etc., determined by the manufacturer, followed by a final result code.

3.3.4.2 Request Manufacturer Identification +CGMI

Syntax

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

Description

Execution command returns the device manufacturer identification code without command echo..

Defined values

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

e.g.

```
AT+CGMI
xxx CORPORATION
```



```
OK
```

3.3.4.3 Request Model Identification +CGMM

Syntax

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

Description

Execution command returns the device model identification code without command echo.

Defined values

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

e.g.

```
AT+CGMM
MG3732

OK
```

3.3.4.4 Request Revision Identification +CGMR

Syntax

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

Description

Execution command returns device software revision number without command echo.

Defined values

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

3.3.4.5 Request Product Serial Number Identification +CGSN

Syntax

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

Description

Execution command returns the product serial number, identified as the IMEI of the mobile, without command echo.

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

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

Description

Execution command returns the value of the Internal Mobile Subscriber Identity stored in the SIM without command echo.

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

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
xxx CORPORATION

OK
```

3.3.4.8 Request Model Identification +GMM

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
MG3732_V2

OK
```

3.3.4.9 Request Revision Identification +GMR

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

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

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

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 Data Carrier Detect (DCD) Control &C

Syntax

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

Description

Set command controls the RS232 DCD output behavior. 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, DCD (circuit 109) is not off until all data previously received from the remote DCE is delivered to the local DTE. However, such buffered data shall be discarded and DCD (circuit 109) turned off if the DTE turns off circuit 108 (if &D1 or &D2 is set).

This AT command is invalid when USIM card is not applied.

Defined values

<n>:

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

1 DCD (circuit 109) changes in accordance with the Carrier detect status,. 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 inquiry command AT&V.

e.g.

```
AT&C0
OK
```

3.3.5.2 Data Terminal Ready (DTR) Behaviour &D

Syntax

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

Description

This parameter determines how the DCE behavior to the RS232 DTR transitions during online data state.

This AT command is invalid when USIM card is not applied.

Defined values

<n>:

0 DCE ignores DTR transitions.

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 clear down of the call. The DCE disconnects from the line. Automatic answer is disabled while DTR (circuit 108/2) remains off.

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

e.g.

```
AT&D0
OK
```

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

Syntax

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

Description

Set command controls the RS232 DSR pin behavior.

This AT command is invalid when USIM card is not applied.

Defined values

<n>:

0 - always High

1 - High when connected

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

e.g.

```
AT&S0
OK
```

3.3.5.4 Enable or Disable flow control &K

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

Description

Set command is used to enable or disable flow control.

&K has no Read Command. To verify the current setting of &K, simply check the settings of the active profile issuing AT&V.

This AT command is invalid when USIM card is not applied.

Defined values

<n>:

0 - Disable flow control

3 - Enable flow control

e.g.

```
AT&K0
OK
```

3.3.5.5 DTE-DCE Local Flow Control +IFC

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 set command is used to control the operation of local flow control between the DTE and DCE during the data state. 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.

This AT command is invalid when USIM card is not applied.

Defined values

<DCE_by_DTE>	Description
0	flow control 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	flow control 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 inquiry command AT&V. AT command default value is <2> [,<2>]

e.g.

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

OK
```

3.3.5.6 Fixed DTE Rate +IPR

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

Set command 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.

This AT command is invalid when USIM card is not applied.

Defined values

The<rate>value specified should 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.

NOTE: 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).

AT command default value is 115200.

e.g.

```
AT+IPR?
+IPR: 115200

OK
```

3.3.5.7 Command Echo E

Syntax

Command	Possible response(s)
E<val>	

Description

The setting of this parameter enables/disables the command echo.

Defined values

<val>:

0 DCE disables command echo

1 DCE enables command echo (factory default) , hence command sent to the device are echoed back to the DTE

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

e.g.

```
ATE
OK
ATE0
OK
     //Input AT, but the device disable command echo
OK
```

3.3.5.8 Set Bit Rate Command +ZBITRATE

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 Switch the service mode of UART +UART

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

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 Call Control Commands and Methods

3.3.6.1 Request Packet Domian Service ATD*99#

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

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

This AT command is invalid when USIM card is not applied.

Description

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

Read command returns the current value of <type>.

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 dialling string includes international access code character "+", otherwise 129

e.g.

```
AT+CSTA?
+CSTA: 129

OK
```

3.3.6.3 Select Bearer Service Type +CBST

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.

Read command returns current value of the parameters <speed>, <name> and <ce>.

Test command returns values supported as compound values.

This AT command is invalid when USIM card is not applied.

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 (Default Value)

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

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.

This AT command is invalid when USIM card is not applied.

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.

e.g.

```
AT+CRLP=?
+CRLP: (0-61),(0-61),(38-255),(1-255),0
+CRLP: (0-61),(0-61),(38-255),(1-255),1
+CRLP: (0-488),(0-488),(42-255),(1-255),2

OK
AT+CRLP?
+CRLP: 61,61,48,6,0
+CRLP: 61,61,48,6,1
+CRLP: 240,240,52,6,2

OK
```

3.3.6.5 Service Reporting Control +CR

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.

Read command returns whether or not intermediate result code +CR is enabled.

Test command returns values supported as a compound value.

This AT command is invalid when USIM card is not applied.

Defined values

<mode>:

0 disables +CR reporting (Default Value)

1 enables +CR 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.

e.g.

```
AT+CR?
+CR: 0

OK
```

3.3.6.6 Cellular Result Codes +CRC

Syntax

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

Description

Set command controls whether or not the extended format of incoming call indication or GPRS network request for PDP context activation or notification for VBS/VGCS calls is used. When enabled, an incoming call is indicated to the TE with unsolicited result code +CRING: <type> instead of the normal RING.

Test command returns values supported as a compound value.

This AT command is invalid when USIM card is not applied.

Defined values

<mode>:

0 disables extended format (Default Value)

1 enables extended format

<type>:

ASYNC	asynchronous transparent
SYNC	synchronous transparent
REL ASYNC	asynchronous non-transparent
REL SYNC	synchronous non-transparent
FAX	facsimile
VOICE	normal voice

GPRS <PDP_type>, <PDP_addr>[, [<L2P>][,<APN>]] GPRS network request for PDP context activation

<PDP_type> ,<PDP_addr> and <APN> are as defined in the Define PDP Context (+CGDCONT) command. 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. If the MT is unable to announce to the TE the network's request (for example it is in V.25ter online data state) the MT shall reject the request. No corresponding unsolicited result code shall be issued when the MT returns to a command state.

e.g.

```
AT+CRC=0
OK
```

3.3.6.7 Set Remote Wakeup Mode by SMS or CALL +ZWPS

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 or CALL remote wakeup. The value 0 is disable the remote wakeup function. Value 1 enable remote wakeup function by any SMS or CALL and value 2 enable remote wakeup function by specifica SMS or CALL.

Define values

<call_para>:

0: disable this function

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

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

<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=1,2
OK
```


3.3.7 Supplementary Service commands

3.3.7.1 Price per Unit and Currency Table +CPUC

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 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.

Test command returns the OK result code.

This AT command is invalid when USIM card is not applied.

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

e.g.

```
AT+CPUC=?
OK
```

3.3.7.2 Closed User Group +CCUG

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.

Read command reports the current value of the parameters

Test command returns the OK result code

This AT command is invalid when USIM card is not applied.

Defined values

<n>:

0 disable CUG temporary mode (Default Value)

1 enable CUG temporary mode

<index>:

0...9 CUG index(Default Value is 0)

10 no index (preferred CUG taken from subscriber data)

<info>:

0 no information (Default Value)

1 suppress OA

2 suppress preferential CUG

3 suppress OA and preferential CUG

e.g.

```
AT+CCUCG?
+CCUG: 0,0,0

OK
AT+CCUG=?
OK
```

3.3.7.3 Unstructured Supplementary Service Data +CUSD

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 Unstructured 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.

Read command reports the current value of the parameter <n>.

Test command returns values supported as a compound value.

This AT command is invalid when USIM card is not applied.

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

e.g.

```
AT+CUSD?
+CUSD: 0

OK
AT+CUSD=?
+CUSD: (0-2)

OK
```


3.3.8 Network Service Relative Commands

3.3.8.1 Network Registration +CREG

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.

Test command returns the range of supported <n>.

Defined values

<n>:

0 disable network registration unsolicited result code (default value)

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

e.g.

```
AT+CREG?
+CREG: 0,1

OK
AT+CREG=?
+CREG: (0-2)

OK
```

3.3.8.2 Operator Selection +COPS

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.

This AT command is invalid when USIM card is not applied.

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

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

0 - less than 0.2%

1 - 0.2% to 0.4%

2 - 0.4% to 0.8%

3 - 0.8% to 1.6%

4 - 1.6% to 3.2%

5 - 3.2% to 6.4%

6 - 6.4% to 12.8%

7 - more than 12.8%

99 not known or not detectable

e.g

```
AT+CSQ
+CSQ: 17,99

OK
```

3.3.8.4 Preferred Operator List +CPOL

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. 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.

This AT command is invalid when USIM card is not applied.

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

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.

Test command returns the OK result code.

This AT command is invalid when USIM card is not applied.

Defined values

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

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

e.g

```
AT+COPN=?
OK
AT+COPN

+COPN: "00101","Test PLMN 1-1"
+COPN: "00102","Test PLMN 1-2"
+COPN: "00201","Test PLMN 2-1"
+COPN: "20201","GR COSMOTE"
+COPN: "20201","GR COSMOTE"
+COPN: "20205","vodafone GR"
+COPN: "20210","TIM GR"
...

OK
```

3.3.8.6 Report Signal Strength +ZRSSI

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

e.g.

```
AT+ZRSSI
+ZRSSI: 99,14,212

OK
```

3.3.8.7 Display Operator +ZDON

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.

This AT command is invalid when USIM card is not applied.

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

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

This AT command is invalid when USIM card is not applied.

Defined values

<cm_mode>: Preferred network mode.

0: AUTOMATIC (default)

1: GSM_ONLY

2: WCDMA_ONLY

<net_sel_mode>: selection of network selection mode

0: AUTOMATIC network selection (default)

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.

0 : AUTOMATIC order (default)

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

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+

<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

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).

Test command returns facility values supported as a compound value.

This AT command is invalid when USIM card is not applied.

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)

"OI" BOIC (Barr Outgoing International Calls) (refer 3GPP TS 22.088 clause 1)

"OX" BOIC-exHC (Barr Outgoing International Calls except to Home Country) (refer 3GPP TS 22.088 clause 1)

"AI" BAIC (Barr All Incoming Calls) (refer 3GPP TS 22.088 clause 2)

"IR" BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (refer 3GPP TS 22.088 clause 2)

"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", "OI", "OX", "AI", "IR", "FD", "PN", "PU", "PP", "PC" parameters need be supported by network. So, ERROR may be response to TE.

<mode>: defines the operation to be done on the facility

0 unlock

1 lock

2 query status

<status>: the current status of the facility

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):

1 voice (telephony)

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)

4 fax (facsimile services)

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 Facility Password +CPWD

Syntax

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

Description

Execution 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.

This AT command is invalid when USIM card is not applied.

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

e.g.

```
AT+CPWD=?
+CPWD:("AB",4),("AC",4),("AG",4),("AI",4),("AO",4),("IR",4),("OI",4),("OX",4),("SC",8),("P2",8
)

OK
```

3.3.9.3 Enter PIN +CPIN

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

e.g.

```
AT+CPIN?
+CPIN: READY

OK
AT+CPIN=?
OK
```


3.3.10 Phonebook Commands

3.3.10.1 Select Phonebook Memory Storage +CPBS

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.

This AT command is invalid when USIM card is not applied.

Defined values

<storage> values reserved by the present document:

"DC" MT dialed calls list (+CPBW may not be applicable for this storage)

"EN" active application in the UICC (GSM or USIM) or SIM card (or MT) emergency number (+CPBW is not be applicable for this storage)

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

"LD" active application in the UICC (GSM or USIM) or SIM card last-dialing-phonebook

"MC" MT missed (unanswered received) calls list (+CPBW may not be applicable for this storage)

"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)

"RC" MT received calls list (+CPBW may not be applicable for this storage)

"SM" SIM/UICC phonebook (Default Value)

"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

e.g.

```
AT+CPBS=?
+CPBS: ("SM","DC","FD","LD","MC","ME","RC","EN","ON")

OK
AT+CPBS?
+CPBS: "SM",4,254

OK
```

3.3.10.2 Read Phonebook Entries +CPBR

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. 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.

This AT command is invalid when USIM card is not applied.

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

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>. 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.

This AT command is invalid when USIM card is not applied.

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>

e.g.

```
AT+CPBF=?
+CPBF: 40,14

OK
```

3.3.10.4 Write Phonebook Entry +CPBW

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. 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.

This AT command is invalid when USIM card is not applied.

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>

e.g.

```
AT+CPBW=?
+CPBW: (1-254),40,(128-255),14

OK
```

3.3.10.5 Read USIM Phonebook Entries +ZCPBR

Syntax

Command	Possible response(s)
+ZCPBR=<index1>[,<index2>]	(1) standard phonebook not support (2) Our company's 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) Our company's 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.

This AT command is invalid when USIM card is not applied.

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","",31323343500746D652E636F6D",
+ZCPBR: 2,"123","544D4532","123","","3133",
+ZCPBR: 3,"678","544D4533","678","","36373800544D452E636F6D",

OK
```

3.3.10.6 Write USIM Phonebook Entry +ZCPBW

Syntax

Command	Possible response(s)
+ZCPBW=[<index>][,<number1>[,<type>[,<text>[,<number2>,<number3>[,<type>[…][,<email>]]]]]]	(1) standard phonebook not support (2) Our company's special phonebook +CME ERROR: <err>
+ZCPBW=?	(1) standard phonebook not support

	(2) Our company'sspecial 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. 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.

This AT command is invalid when USIM card is not applied.

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

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.

This AT command is invalid when USIM card is not applied.

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)

e.g.

```
AT+CPAS
+CPAS: 0

OK
AT+CPAS=?
+CPAS: (0,3,4)

OK
```

3.3.11.2 Extended Error Report +CEER

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 (originating or answering) 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.

Test command returns OK result code.

This AT command is invalid when USIM card is not applied.

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>.

e.g.

```
AT+CEER
+CEER: No cause information available

OK
AT+CEER=?
OK
```

3.3.12 STK and SIM Commands

3.3.12.1 Generic SIM Access +CSIM

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 a 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.

Test command returns the OK result code.

This AT command is invalid when USIM card is not applied.

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)

e.g.

```
AT+CSIM?
OK
```

3.3.12.2 Restricted SIM Access +CRSM

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.

Test command returns the OK result code.

This AT command is invalid when USIM card is not applied.

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

<fileid>: integer type; this is the identifier of an elementary data file 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

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 ((if the phone number of the device has been stored in the SIM card). If subscriber has different MSISDN for different services, each MSISDN is returned in a separate line.

This AT command is invalid when USIM card is not applied.

Defined values

<alpha*x*>: 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

e.g.

```
AT+CNUM=?
OK
```

3.3.12.4 Get STK Main Menu +ZSTM

Syntax

Command	Possible response(s)
+ZSTM	When the second parameter of +ZCFGSTK is 1,the response format is as follow: +ZSTM: <STK_main_menu_code>

Description

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

This AT command is invalid when USIM card is not applied.

Defined values

<STK_main_menu_code>: the code of STK main menu

e.g.

```
Scene 1:
  AT+ZCFGSTK=1,1
   OK
   AT+ZSTM
   +ZSTM:
   D081C0810301250082028182850B80795E5DDE884C592957308F0A01808F7B677E95EE50198F0A038077ED4FE17F
   A453D18F0A04804F1860E05FEB8BAF8F0A07805E94752863A883508F0E098000530049004D84254E1A53858F080A
   80624B673A62A58F060B8098DE4FE18F0E0C806211768465E07EBF97F34E508F0C0D8000310032003500380030 8F
   0C0E8000310033003979 3E533A8F0C0F80624B673A4E9280547F518F0C108052A8529B0031003000308F0E088000
   530049004D53614FE1606F

   OK
```

3.3.12.5 Select Sub-menu Item +ZSELI

Syntax

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

Description

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

This AT command is invalid when USIM card is not applied.

Defined values

<item_id>: the ID of selected sub-menu item; the range of this value is from 0 to 255.

e.g.

```
AT+ZSELI=1
OK

+ZDIST:
D06E810301218182028102 0D63086B228FCE4F7F75288054901A300A59296C14988462A5300B4E1A52A1FF0C8D448D
390030002E00325143002F6B21FF0C4E0D542B901A4FE18D3930025BA2670D003A00340030003000360031003100 37
00380037003830027 86E8BA470B964ADFF1F
```

3.3.12.6 Request for Text Display +ZDIST

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

3.3.12.7 Requests for Character Input +ZGINK

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

3.3.12.8 Requests for Text String Input +ZGINP

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

3.3.12.9 Requests for Build Main Menu +ZPSTM

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

3.3.12.10 Requests for Rebuild Main Menu +ZEND

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.

3.3.12.11 SMS Sending Status Reports +ZSMSR

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

3.3.12.12 Support Current Command Type Reports +Zunsupport

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

3.3.12.13 Menu Backwards +ZBK

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.

This AT command is invalid when USIM card is not applied.

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
```

3.3.12.14 Input Character +ZINKR

Syntax

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

Description

This command is used to hint users to input character.

This AT command is invalid when USIM card is not applied.

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

3.3.12.15 Input Text String +ZINPR

Syntax

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

Description

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

This AT command is invalid when USIM card is not applied.

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

3.3.12.16 Text Display +ZDISTR

Syntax

Command	Possible response(s)
+ZDISTR	

Description

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

This AT command is invalid when USIM card is not applied.

Defined values

No value.

e.g.

```
AT+ZDISTR
OK
```

3.3.12.17 Check USIM Card Type +ZUSIM

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.

This AT command is invalid when USIM card is not applied.

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
```

3.3.12.18 Query the status of Network Lock +ZSEC

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
```

3.3.12.19 Query the MCC, MNC command +ZLKLIST

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.
This AT command is invalid when USIM card is not applied.

Defined values

<list0>:MCC MNC

e.g.

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

OK
```

3.3.12.20 STK function configuration command +ZCFGSTK

Syntax

Command	Possible response(s)
+ZCGFSTK=<switch>,<syntax>	OK or ERROR

+ZCGFSTK?	+ZCGFSTK: <switch>,<syntax> OK

Description

This command is an extended command, and is used to configure the function of STK. The set command will take effect after the next boot up.

Defined values

<swich>: enable or disable the function of STK.

1 enable STK function

0 disable STK function(Default Value)

<syntax>: set the data reporting format of STK.

1 the format of reporting data obeys the 3GPP protocol.

e.g.

```
AT+ZCFGSTK?
+ZCFGSTK: 1,1

OK
AT+ZCFGSTK=1,1
OK
```

3.3.13 Mobile Terminal Error Commands

3.3.13.1 Report Mobile Termination Error +CMEE

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> as 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.

Read command returns the current value of subparameter <n>.

Test command returns values supported as a compound value.

Defined values

<n>:

0 disable +CME ERROR: <err> result code and use ERROR instead (default value)

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

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>

e.g.

```
AT+CGDCONT?
+CGDCONT: 1,"IP","cmwap","0.0.0.0",0,0

OK
```

3.3.14.2 Quality of Service Profile (Requested) +CGQREQ

Syntax

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

This AT command is invalid when USIM card is not applied.

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

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.

This AT command is invalid when USIM card is not applied.

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

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 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

Command	Possible Response(s)
	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>: 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>: 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>: 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>: 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>: 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>: 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

Command	Possible Response(s)
+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>]]]]]]]]]]]]]	OK 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

Command	Possible Response(s)
	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 <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.

This AT command is invalid when USIM card is not applied.

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 $5•10^{-3}$ 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 $5•10^{-3}$ 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.

This AT command is invalid when USIM card is not applied.

Defined Values

<state>: indicates the state of PS attachment

0 - detached

1 - attached

e.g.

```
AT+CGATT?
+CGATT: 0

OK
```

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.

This AT command is invalid when USIM card is not applied.

Defined Values

<state>: indicates the state of PDP context activation

0 - deactivated

1 - activated

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

+CGDSCONT commands).

e.g.

```
AT+CGACT?
+CGACT: 1,0

OK
AT+CGACT=?
+CGACT: (0,1)

OK
```

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.

This AT command is invalid when USIM card is not applied.

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

e.g.

```
AT+CGDATA=?
+CGDATA: ("PPP")

OK
```


3.3.14.9 Show PDP Address +CGPADDR

Syntax

Table 3.3.14-9: +CGPADDR action command syntax

Command	Possible response(s)
+CGPADDR=[<cid> [,<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.

This AT command is invalid when USIM card is not applied.

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.

e.g.

```
AT+CGPADDR=?
+CGPADDR: ( 1)

OK
```

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.

This AT command is invalid when USIM card is not applied.

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) (Default Value)

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

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.

e.g.

```
AT+CGCLASS?
+CGCLASS: A

OK
AT+CGCLASS=?
+CGCLASS: ("A","B","CG","CC")

OK
```

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.

This AT command is invalid when USIM card is not applied.

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: REJECT <PDP_type>, <PDP_addr>

A network request for PDP context activation occurred when the MT was unable to report it to the TE with a +CRING unsolicited result code and was automatically rejected.

+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).

e.g.

```
AT+CGEREP=?
+CGEREP: (0-2),(0-1)

OK
AT+CGEREP?
+CGEREP: 0,0

OK
```

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 (default value)

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
4 UTRAN w/HSDPA
5 UTRAN w/HSUPA
6 UTRAN w/HSDPA and HSUPA
7 E-UTRAN

e.g.

```
AT+CGREG?
+CGREG: 0,0

OK
```

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.

This AT command is invalid when USIM card is not applied.

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)

e.g.

```
AT+CGSMS?
+CGSMS: 1
```

```
OK
AT+CGSMS=?
+CGSMS: (0-3)

OK
```

3.3.15 Commands from TIA IS

3.3.15.1 Select Active Service Class +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, voice etc.). This causes the TA to process information in a manner suitable for that type of information.

Defined Values

<n> Mode

0 data

8 voice

e.g.

```
AT+FCLASS?
0

OK
```

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>: the default value is 17 (0x11, SMS-SUBMIT with validity period in relative format).

MTI define in the <fo> of SMS-SUBMIT message, reference to GSM 03.40. As first octet has the following bit field description.

bit7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
RP	UDHI	SRR	VPF		MMS	MTI	

<MTI>: Message Type Indicator, 2-bit field describing the message type;

b1 b0:

0 0, SMS-DELIVER

0 1, SMS-SUBMIT

<MMS>: b2

0 More messages are waiting for the MS in this SC

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

<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:

[00] - Validity Period field not present

[01] - Validity Period field present in enhanced format (i.e. quoted time-string type, see below)

[10] - Validity Period field present in relative format, (i.e. integer type, see below)

[11] - Validity Period field present in absolute format (i.e. quoted time-string type, see below)

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

<SRR>: b5. Status Report Request, 1-bit field indicating the MS is requesting a status report (default is [0]);

0 MS is not requesting a status report

1 MS is requesting a status report

<UDH>, <UDHI>: b6. 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, user is not responsible for setting this bit and, if any set, it will have no meaning. refer to 3GPP TS 24.040 9.2.3.23 for detail.

<RP>: b7, Reply Path, 1-bit field indicating the request for Reply Path

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

<ct>:[0]~255 3GPP TS 24.040 TP-Command-Type integer format. 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.

<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 indentify the unique message from the NW. Refer to 3GPP TS 24.040 9.2.3.12.

<pid>: 3GPP TS 23.040 TP-Protocol-Identifier in integer format (default 0).refer to 3GPP TS 24.040 9.2.3.9

<dcs>:depending on the command or result code: 3GPP TS 23.038 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme, 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 containing 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-Centre-Address, Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into currently selected character set (see +CSCS);

<toda>,<tooa>,<tosca>:Type of address given by <da>, <oa>,<sca>, for TP-Destination-Address, TP-Originating -Address, TP-Service-Centre-Address;

129 - number in national format

145 - number in international format

<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.

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. 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.

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 inflected by the parameter <service>.

This AT command is invalid when USIM card is not applied.

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. (Default Value)

<mt> for mobile terminated messages,

0 type not supported

1 type supported

<mo> for mobile originated messages

0 type not supported

1 type supported

<bm> for broadcast type messages

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 selects 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.

Read command reports the current value of the parameter <mode>.

Test command returns supported modes as a compound value.

This AT command is invalid when USIM card is not applied.

Defined Values

<mode>:

0 PDU mode (default when implemented)

1 text mode

e.g.

```
AT+CMGF=?
+CMGF: (0-1)

OK
AT+CMGF?
+CMGF: 0

OK
```


3.3.16.4 Message Service Failure Result Code +CMS ERROR

Syntax

`+CMS ERROR: <err>`

Description

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

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.

Read command reports the current value of the SCA.

Test command returns the OK result code.

This AT command is invalid when USIM card is not applied.

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".

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 SMS is sent to the network or placed in storage when text format message mode is selected (AT+CMGF=1).

It is possible to set the validity period starting from when the SMS 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

Test command returns the OK result code.

This AT command is invalid when USIM card is not applied.

Define values

<fo>: first octet of 3GPP TS 23.040, refer to the chapter of 3.3.16.1

<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>: depending on the command or result code: 3GPP TS 23.038 [2] SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format.

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.

Read command reports the current value of parameters <mode>, <mids> and <dcss>.

Test command returns supported modes as a compound value.

This AT command is invalid when USIM card is not applied.

Defined Values

<mode>:

0 message types specified in <mids> and <dcss> are accepted (Default Value)

1 message types specified in <mids> and <dcss> are rejected

<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"

e.g.

```
AT+CSCB?
+CSCB: 0, "50,4370,0-65535",""

OK
AT+CSCB=?
+CSCB: (0-1)

OK
```

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. 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 cannot 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.

This AT command is invalid when USIM card is not applied.

Defined Values

<profile>:

0 Settings specified in commands +CSCA +CSMP +CSCB are saved to NV.

e.g.

```
AT+CSAS=?
+CSAS: 0

OK
```

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. 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.

This AT command is invalid when USIM card is not applied.

Defined Values

<profile>:

0 Settings specified in commands +CSCA +CSMP +CSCB are restored to NV.

e.g.

```
AT+CRES=?
+CRES: 0

OK
```

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 DTE.

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).

This AT command is invalid when USIM card is not applied.

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.

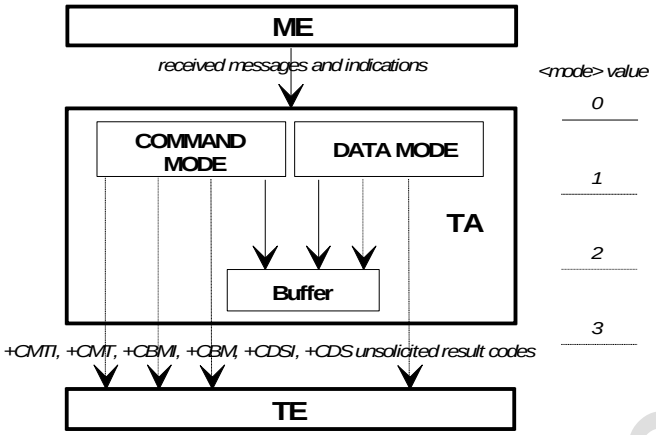

Figure 3.3.4-1: <mode> parameter

<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 3.3.16.9: <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: 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 3.3.16.11: <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 3.3.16.11-2: 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 3.3.16-12-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.

This AT command is invalid when USIM card is not applied.

Define values

<stat> :

"REC UNREAD":

"REC READ"

"STO UNSENT"

"STO SENT"

"ALL"

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

PDU Mode:

Syntax

Table 3.3.16-12-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.

This AT command is invalid when USIM card is not applied.

Define values

<stat>:

0 REC UNREAD

1 REC READ

2 STO UNSENT

3 STO SENT

4 ALL

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

3.3.16.12 Read Message +CMGR

TEXT Mode:

Syntax

Table 3.3.16-13-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>[,<tooa>,<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. Test command returns the OK result code.

This AT command is invalid when USIM card is not applied.

Define values

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

PDU Mode:

Syntax

Table 3.3.16-13-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.

Test command returns the OK result code.

This AT command is invalid when USIM card is not applied.

Define values

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

3.3.16.13 New Message Acknowledgement to ME/TA +CNMA

TEXT Mode:

Syntax

Table 3.3.16-14-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.

Test command returns the OK result code.

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.

This AT command is invalid when USIM card is not applied.

PDU Mode:

Syntax

Table 3.3.16-14-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.

This AT command is invalid when USIM card is not applied.

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 3.3.16-15-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.

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

This AT command is invalid when USIM card is not applied.

PDU Mode:

Syntax

Table 3.3.16-15-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.

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

This AT command is invalid when USIM card is not applied.

3.3.16.15 Send Message from Storage +CMSS

TEXT Mode:

Syntax

Table3.3.16-16-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 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.

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

This AT command is invalid when USIM card is not applied.

PDU Mode:

Syntax

Table 3.3.16-16-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.

This AT command is invalid when USIM card is not applied.

Define values

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

3.3.16.16 Write Message to Memory +CMGW

TEXT Mode:

Syntax

Table3.3.16-17-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.

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

This AT command is invalid when USIM card is not applied.

PDU Mode:

Syntax

Table 3.3.16-17-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.

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

This AT command is invalid when USIM card is not applied.

3.3.16.17 Delete Message +CMGD

Syntax

Table 3.3.16-18: +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>.

This AT command is invalid when USIM card is not applied.

Define values

<delflag>: an integer indicating multiple message deletion request as follows:

<delflag>	Description
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.

3.3.16.18 Send Command +CMGC

TEXT Mode:

Syntax

Table 3.3.16-19-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.

This AT command is invalid when USIM card is not applied.

Define values

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

PDU Mode:

Syntax

Table 3.3.16-19-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.

This AT command is invalid when USIM card is not applied.

Define values

For details about these parameters, please refer to 3.3.16.1 SMS parameter.

e.g.

```
AT+CMGC=14
>
0891685109200905F011000B8181980160 32F90011FF00_

+CMGC: 251

OK
```

3.3.16.19 More Messages to Send +CMMS

Syntax

Table 3.3.16-20: +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.

Read command reports the current value of the parameter <n> .

Test command returns supported values as a compound value.

This AT command is invalid when USIM card is not applied.

Defined Values

<n>:

0 disable (Default Value)

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)

e.g.


```
AT+CMMS?
+CMMS: 0

OK
AT+CMMS=?
+CMMS: (0-2)

OK
```

3.3.16.20 Preferred Message Storage +CPMS

Syntax

Table 3.3.16-21: +CPMS Parameter Command Syntax

Command	Possible response(s)
+CPMS=<mem1>[,<mem2>[,<mem3>]]	+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> +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.

Read command reports the message storage status.

Test command returns lists of memory storages supported by the TA

This AT command is invalid when USIM card is not applied.

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 (Default Value)

"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 3.3.16-22: +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 3.3.16-23: +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 3.3.16-24: +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 detail.

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 latest writing.

e.g.

```
AT+ZWAKEUPSMS=123
OK
```

3.3.16.24 Select message storage +ZSMSD

Syntax

Table 3.3.16-26: +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.

This AT command is invalid when USIM card is not applied.

Defined values

<value>: the preferential message storage position

0 Network preference in storage, set the MT message route according to the message class. (Default Value)

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 Hardware Relative Commands

3.3.17.1 Clock +CCLK

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.

Test command returns the OK result code.

This AT command is invalid when USIM card is not applied.

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.

e.g.

```
AT+CCLK=?
OK
AT+CCLK?

+CCLK: "80/01/06,01:39:39"

OK
```

3.3.18 The Specific Extended Commands in Module

3.3.18.1 DTE-DCE Local Flow Control +ZFLOW

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
```

3.3.18.2 CMUX setting +CMUX

Syntax

Command	Possible response(s)
+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]	OK

Description

This set command is used to enable a multiplexing protocol running on their equipment in order to use the CMUX function provided by the module.

When using "AT+CMUX=0" enable CMUX, the channel 1 can be only used for the AT command interaction, and the channel 2 can be only used for data exchange.

Defined values

<mode>：Int type, the mode in the state of MUX opening, and it can be saved when the module power-off. 0 is supported currently.

0：Basic mode (default value)

1：Enhance mode

<subset>： Int type, and it can be saved when the module power-off, not supported currently

0：UIH frames used only (default value)
1：UI frames used only

<port_speed>： Int type , not supported currently
1：9600bit/s
2：19200bit/s
3：38400bit/s
4：57600bit/s
5：115200bit/s (default value)
6：230400bit/s
7：460800bit/s
8：921600bit/s

<N1>：Int type，default value is 31 (if set the Enhance mode, the default value is 64)，and it can be saved when the module power-off. not supported currently，1~32768 the max. frame length;
<T1>：Int type，default value is 10 (100ms), and it can be saved when the module power-off. not supported currently，1~255 the timer of receiving confirmation. 1 is on behalf of 10 milliseconds;
<N2>：Int type, default value is 3, and it can be saved when the module power-off. not supported currently,0~100 the max. reconnection times;
<T2>：Int type, default value is 30, and it can be saved when the module power-off. not supported currently, 2~255 the timer of CMUX channel's response. 2 is on behalf of 20 milliseconds;
<T3>：Int type, default value is 10, and it can be saved when the module power-off. not supported currently, 1~255 the timer of wake response, 1 is on behalf of 1 second;
<k>：Int type, default value is 2，and it can be saved when the module power-off. not supported currently, 1~7 is used to support the error recovery in the Enhance mode.

e.g.

```
AT+CMUX=0
OK
```

3.3.18.3 Set Band Status +ZBANDI

Syntax

Command	Possible response(s)
+ZBANDI=<band>	OK
+ ZBANDI?	+ZBANDI: <band>

Description

This set command is used to change the band status.

Defined values

<band>:

0 Automatic (Auto) - Default
1 UMTS 850 + GSM 900/1800
2 UMTS 2100 + GSM 900/1800 (Europe)
3 UMTS 850/2100 + GSM 900/1800

4 UMTS 850/1900 + GSM 850/1900

e.g.

```
AT+ZBANDI?
+ZBANDI: 0

OK
```

3.3.18.4 Start or End PS Call ^IPCALL

Syntax

Command	Possible response(s)
^IPCALL=<Operation>[,<"user_name">,<"password">]	OK ^IPCALL: <IP_address> Or ERROR Or OK ^IPCALL: 0
^IPCALL?	^IPCALL: <status>[,<IP>]
^IPCALL=?	^IPCALL: (<operation_list>)

Description

This command can be used to set up a PPP connection and get an effective IP address.

NOTE: Before the obtained of IP address, the command of ^IPCALL won't return any message, and the period of this process will completed in 40s, or it may be timeout. All the process will take about 9s. So in this process, other commands is not allowed to use. When use the SIM card belong to CMCC, you should input the command "AT+CGDCONT=1,"IP","CMNET"" to set the APN before the command of ^IPCALL.

This AT command is invalid when USIM card is not applied.

Defined Values

<status>:

0 disconnection

1 connection

<"user_name">: String type. If SIP has already used, an username and password need to be specified, while the data connection of MIP need not.

<"password">: String type

<IP_address>: the IP address supported by the server.

e.g.

```
AT^IPCALL?
^IPCALL: 0
```

```
OK
AT^IPCALL=?
^IPCALL: (0,1)

OK
AT^IPCALL=2
ERROR
AT^IPCALL=1,"",""
OK

^IPCALL: 10.86.181.20
AT^IPCALL?
^IPCALL: 1,10.86.181.20

OK
AT^IPCALL=1,"",""
OK

^IPCALL: 0
AT^IPCALL=0
OK

^IPCALL:0
```

3.3.18.5 Establish TCP/UDP Connection ^IPOPEN

Syntax

Command	Possible response(s)
^IPOPEN=<socket_ID>, <source_port>, <"remote_IP">, <remote_port>, <protocol>	OK Or ^IPSTAT: <socket ID>,<status> Or ERROR
^IPOPEN=?	^IPOPEN: (<support_socket_ID>),(<support_source_port>),(<"support_destination_IP">),(<support_destination_port>),(<support_protocol>)
^IPOPEN?	If connection has already serup: ^IPOPEN: <socket_ID>,<protocol>,<remote_IP>,<remote_port> If there is no free socket: ^IPOPEN: 0

Description

Extensible AT command, this command is used to Establish TCP/UDP connection with remote server. If not connected, it will report ^IPSTAT automatically to indicate the socket state.

This AT command is invalid when USIM card is not applied.

Defined Values

<socket_ID>: 1, 2, 3, 4

<source_port>: The range of this parameter is 1 to 65535. It's the local port

<remote_IP>: String type, the remote IP address

<remote_port>: The range of this parameter is 1 to 65535. It's the remote port

<protocol>:

1 UDP protocol

0 TCP protocol

<status>: the status of socket

1 active

0 not active

NOTE: We recommended the customer not to use the port below 1024, as they are reserved to the OS.

e.g.

```
AT^IPOPEN=1,2300,"10.125.27.118",5000,0
OK

^IPOPEN: 1,1
```

3.3.18.6 Socket Listen ^IPLISTEN

Syntax

Command	Possible response(s)
^IPLISTEN=<socket_ID>,<source_port>,<protocol>	OK Or when other client connected and listened, report ^IPLISTEN as follow: ^IPLISTEN: <socket_ID_new>,<state>[,<remote_IP>,<remote_port>] Or ERROR
^IPLISTEN=?	^IPLISTEN: (<support_socket_ID>),(<support_source_port>),(<support_protocol>)
^IPLISTEN?	^IPLISTEN: <socket_ID> Or when in the state of listening, and there is socket connection from remote, report ^IPLISTEN as follow:

	^IPLISTEN: <socket_ID_new>,<source_port_new>,<protocol>,<remote_IP>,<remote_port> Or when there is no connection to listen to: ^IPLISTEN: 0

Description

Extensible AT command, this command is used to listen the socket for connection requests.

This AT command is invalid when USIM card is not applied.

Defined Values

<socket_ID>: 1, 2, 3, 4

<source_port>: The range of this parameter is 1 to 65535. It's the local port

<remote_IP>: String type, the remote IP address

<remote_port>: The range of this parameter is 1 to 65535. It's the remote port

<protocol>:

1 UDP protocol

0 TCP protocol

<status>: the status of socket

1 active

0 not active

<socket_ID_new>: 1, 2, 3, 4. It's different from <socket_ID>

NOTE: We recommended the customer not to use the port below 1024, as they are reserved to the OS.

e.g.

```
AT^IPLISTEN=1,2300,0
OK


^IPLISTEN: 2,1,10.125.27.118,5000  //when other client connected, report ^IPLISTEN.
```

3.3.18.7 Close TCP/UDP Connection ^IPCLOSE

Syntax

Command	Possible response(s)
^IPCLOSE=<socket_ID>	^IPCLOSE: <socket_ID>,<close_type>
^IPCLOSE?	^IPCLOSE: [<socket_ID>] //Not activated socket Or ^IPCLOSE: 0 //There are no nonacivated sockets
^IPCLOSE=?	^IPCLOSE: (socket_IDs)

Description

This command is used to Close TCP/UDP connection.

This AT command is invalid when USIM card is not applied.

Defined Values

<socket_ID>:1, 2, 3, 4

<close_type>:

0 the connection is shut down in correctly way.

e.g.

```
AT^IPCLOSE=1
OK

^IPCLOSE: 1,0
AT^IPCLOSE=1
OK

^IPCLOSE: 1,1
AT^IPCLOSE=2
ERROR

AT^IPCLOSE?
^IPCLOSE: 3,4

OK
```

3.3.18.8 TCP/UDP Data Send ^IPSEND

Syntax

Command	Possible response(s)
^IPSEND=<socket_ID>,<data>	ERROR Or ^IPSEND: <socket_ID>,<size>
^IPSEND?	^IPSEND: <socket_ID>,<size> […] [^IPSEND: <socket_ID>,<size>] //All activated sockets
^IPSEND=?	ERROR

Description

This command is used to send data. It will report ^IPSTAT automatically. At this time, user can not send data until

the response of this received.

This AT command is invalid when USIM card is not applied.

Defined Values

<socket_ID>: 1, 2, 3, 4, the effective socket

<data>: It's the users data string encoded in hexadecimal, and is ended by <CR>

<size>: the bytes sent successfully. 0 to 1024,and it's 2048 bytes after encode. For example, "41424344" is stands for "ABCD"

e.g.

```
AT^IPSEND=4,"4444"

ERROR


AT^IPSEND=2,"4142"
^IPSEND: 2,2          //sent 2 bytes of 'AB' succeed


OK

AT^IPSEND=?

ERROR

AT^IPSEND?

^IPSEND: 1,0         //socket 1 doesn't send data

^IPSEND: 2,2       ////socket 2 sends 2 bytes data


OK
```

3.3.18.9 TCP/UDP Data Receive ^IPRECV

Syntax

Command	Possible response(s)
^IPRECV?	^IPRECV: <socket_ID>,<source_IP>,<source_port>,<left>,<data>

Description

This command is used to receive data. The data will be reported to TE automatically when module received data. The data length should less than 1024Bytes.

This AT command is invalid when USIM card is not applied.

Defined Values

<socket_ID>: 1, 2, 3, 4, the effective socket

<source_port>: The range of this parameter is 1 to 65535. It's the local port

<remote_IP>: String type, the local IP address

<left>: the size of data which is still remained in the protocol stack

<data>: It's the users data string encoded in hexadecimal, and is ended by <CR>

e.g.

```
^IPRECV: 2,10.86.77.143,2300,0,4342
//the received data is 4342 in hexadecimal, that is 'BC'.
```

3.3.18.10 Qurey Socket State ^IPSTAT

Syntax

Command	Possible response(s)
	^IPSTAT: <socket_ID>,<error_type>

Description

This command is used to query socket state. When the socket state changed, the new state will be reported automatically.

Defined Values

<socket_ID>: 1, 2, 3, 4, the effective socket

<error_type>:

0,2 reserved

1 connection is close

e.g.

```
^IPSTAT: 1,1    //The connection is close because socket is shut down by the remote
```

3.3.18.11 Enable a Socket Enter into Transfer Mode ^IPENTRS

Syntax

Command	Possible response(s)
^IPENTRS=<socket_ID>	
^IPENTRS=?	^IPENTRS: <support_socket_ID>

Description

This command can specify an activated socket enter into transfer mode to receive and send data.

NOTE: Transfer mode allows the customer to send primary data between network and module. The flow control of hardware plays a role only when using a serial port connection.

Each socket will be allocated a 1372 bytes buffer. when the length of send-data is less than this buffer, the data will be restored in the buffer and send in 200ms. If the length of data is more than the buffer's, the data will be sent to

network right now.

There is only one socket allowed to enter into transfer mode.

The precondition to set the socket to enter into transfer mode is that the socket is in the state of activation (the connection has already set up, or in the state of listening).

When quit the transfer mode using +++, it will report command ^IPRECV automatically when this socket receives data, and report ^IPSEND when sends data.

When there are more than one sockets opened by ^IPOPEN and then one socket enteres into transfer mode, the data received by other sockets will be restored in cache(Cacheable at most 16 k). And when this socket quit transfer mode, the data in cache will be print at TE by the command ^IPRECV.

When a socket quit transfer mode,other activated socket can enter into transfer mode by the command ^IPENTRS.

This AT command is invalid when USIM card is not applied.

Defined Values

<socket_ID>: 1, 2, 3, 4, the effective socket

e.g.

```
AT^IPOPEN=1,2400,"10.125.27.118",5060,0        //TCP
OK

^IPOPEN:1,1
at^ipentrs=1                                   //Socket 1 enters into transfer mode.
BADFDFEtestTTTTTAB+++                          //+++ quit transfer mode
OK
AT^IPOPEN=3,2500,"10.125.27.118",6000,1
OK
AT^IPLISTEN =1,1100, 0                         //Listen all the IP connection
OK
AT^IPENTRS=1                                   //Socket 1 enters into transfer mode.
OK
^IPLISTEN: 1,1,122.221.32.64,1200              //The remote connected to the listened port and
                                                entered into transfer mode.
```

3.3.18.12 Setting TCP/UDP Firewall ^IPCFF

Syntax

Command	Possible response(s)
^IPCFF=<cmd_type>,[“<IP>”]	
^IPCFF=?	^IPCFF: (<support_cmd_types>),(“<IP>”)
^IPCFF?	^IPCFF: <state>,<IP1.1>,<IP1.2….<IP1.n>

Description

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, an IP subnet mask and the firewall support at most 12 IP CIDR in 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.

This AT command is invalid when USIM card is not applied.

Defined Values

<cmd_type>:

0 Close the function of IP address filter (firewall)

1 Open the function of IP address filter (firewall)

2 Add IP address to the visit list

3 Delete IP address from the visit list

4 Initialize the visit list as empty

<IP>: IP address to add or delete

It can be any valid IP address, the format is in CIDR

<state>:firewall state

0 firewall is in the close state

1 firewall is in the open state

e.g.

```
AT^IPCFF?
^IPCFF: 0

OK
AT^IPCFF=?
^IPCFF:(0-4),(" <ipcidr>")

OK
AT^IPCFF=2,"10.125.23.43/16"      // Add IP address to the visit list, and the connections which
                                     the IP begins with 10.125.*.* are allowed to setup
OK
AT^IPCFF=1                       //Open the function of IP address filter
OK
AT^IPCFF?
^IPCFF:1,10.125.23.43/16

OK
AT^IPCFF=2,"10.125.23.43/32"        // Add IP address of 10.125.23.43 to the visit list
OK
AT^IPCFF=0                         // Close the function of IP address filter
OK
AT^IPCLOSE=1                      // Close the socket connection
```



```
^IPCLOSE:1,0

OK
AT^IPCFF=3,"10.125.23.43/16"       // Remove IP address from the visit list
OK
AT^IPCFF?
^IPCFF:0

OK
```

3.3.18.13 Get ICCID of (U)SIM +ZGETICCID

Syntax

Command	Possible response(s)
+ZGETICCID	+ZGETICCID: <iccid>
+ZGETICCID=?	

Description

This command is used to request the ICCID of (U)SIM.

This AT command is invalid when USIM card is not applied.

Defined Values

<iccid> ICCID of (U)SIM

e.g.

```
AT+ZGETICCID=?
OK
AT+ZGETICCID
+ZGETICCID: 89860310907553557614
OK
```


4 Customize AT commands

You can refer to the document of "*国家电网通信模块定制AT 指令规范 DW 376.3—2012*" for details.

4.1 Extended AT commands

4.1.1 Modem Power off $MYPOWEROFF

This command can be used to turn off the modem.

Command	Possible response(s)
$MYPOWEROFF	<CR><LF>OK<CR><LF>
e.g. AT$MYPOWEROFF OK	

4.1.2 Network Synchronization LED Control $MYSOCKETLED

This command is used to control the LED. When the socket of external protocol stack connects successful, the LED flashes.

Command	Possible response(s)
$MYSOCKETLED=<ONOFF>	<CR><LF>OK<CR><LF>
NOTE:<ONOFF>: 0:LED status when socket is not connect; 1: LED flashing when socket connected. e.g.: AT$MYSOCKETLED=1 OK	

4.1.3 Get the software & hardware version of module $MYGMR

This command is used toget the software&hardware version's information of module.

Command	Possible response(s)
$MYGMR	<CR><LF><module_manufacture> <CR><LF><module_model> <CR><LF><firmware_version>

	<CR><LF><firmware_release date> <CR><LF><module_hardware_version> <CR><LF><module_hardware_release_date> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
NOTE: a) <module_manufacture>:module's manufacture,ASCII,4 bytes; b) <module_model>:Module name,ASCII,8 bytes; c) <firmware_version>:firmware version,ASCII,4 bytes; d) <firmware_release_date>:firmware release date, the format is DDMMYY, 6 bytes; e) <module_hardware_version>:hardware version, ASCII, 4 bytes; f) <module_hardware_release date> :module's hardware release date, the format is the same as <firmware_release_date>; g) <err>:error code, refer to 4.8. e.g.: AT$MYGMR 1234 MX1234 1005 261112 1234 250910 OK	

4.1.4 Get the CCID of SIM card $MYCCID

This command is used to get the CCID information of SIM card.

Command	Possible response(s)
$MYCCID	<CR><LF>$MYCCID: <SIM_CCID> <CR><LF>OK<CR><LF>
NOTE:<SIM_CCID>:SIM card's CCID, String type. e.g.: AT$MYCCID $MYCCID: "89860112851013509643" OK	

4.1.5 Enable/Disabe Unsolicited report of Embedded protocol stack $MYNETURC

This command is used to enable/disabe unsolicited report of embedded protocol stack.

Command	Possible response(s)
$MYNETURC=<ONOFF>	<CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
$MYNETURC?	<CR><LF>$MYNETURC: <ONOFF> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
NOTE:<ONOFF>:int type, 0: Disable; 1: enable (default value) e.g.: AT$MYNETURC=0 OK // Disable unsolicited report of embedded protocol stack	

4.1.6 Read the information of wireless module $MYTYPE

This command is used to read the information of wireless module.

Command	Possible response(s)
$MYTYPE?	<CR><LF>$MYTYPE: <mode>,<network_type>,<extended_feature> <CR><LF>OK<CR><LF>
NOTE: a) <mode>: work mode 1) bit 0 is 1: stands for support transparent transmission 2) bit 1 is 1: stands for support AT command to transmit data. b) <network type>: network type 1) bit 0 is 1: GSM network supports GPRS; 2) bit 1 is 1: WCDMA network; 3) bit 2 is 1: TD-SCDMA network; 4) bit 3 is 1: CDMA 2000; 5) bit 4 is 1: CDMA EVDO; 6) bit 5 is 1: LTE; 7) bit 6 is 1: PSTN; 8) bit 7 is 1: extended one byte	

c) <extended feature>: extended feature, the extended byte are said in bit
   1) bit 0 is 1: Support GPS
   2) bit 1 is 1: Support BD
   3) bit 7 is 1: extended one byte

e.g.:

AT$MYTYPE?

$MYTYPE: 03,01,01 // Support both transparent transmission and AT command transmission

// The Module only supports GSM network of GPRS; Support GPS

OK

4.1.7 Set the parameter of network connection $MYNETCON

This command is used to set the parameter before network connection, you have to the execute this command before TCPIP operation.

Command	Possible response(s)
$MYNETCON=<channel>,<type>,<type_name>	<CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYNETCON?	<CR><LF>$MYNETCON: <Channel>,<Type>,<type_name><CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>

NOTE:

a) <channel>:Channel No. , 0-5;

b) The value of <type>, <type_name> is as follows:
   1) USERPWD: User name and password, the format is “user,passwd”;
   2) APN: string type;
   3) CFGT: is used for transparent transmission, Every packet’s waiting time when sending,1-65535, Unit is ms, default value is 100ms;
   4) CFGP:is used for transparent transmission , Packets transmitted threshold value, 1-1460, default value is 1024;
   5) AUTH: Authentication type, 0:NONE; 1: PAP(default value); 2: CHAP.

e.g.:

AT$MYNETCON=0,“USERPWD”,“user,passwd” // Set the username and password, when not used, it’s null

OK AT$MYNETCON=0,“CFGT”,2 // Set the time of transparent transmission OK AT$MYNETCON=0,“CFGP”,1000 // transmitted threshold setting of transparent transmission OK

4.1.8 Deactivated/ activated Network connection $MYNETACT

This command is used to deactivated/ activated network connection, you have to the execute this command before TCPIP operation.

Command	Possible response(s)
$MYNETACT=<channel> ,<action>	<CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYNETACT?	<CR><LF>$MYNETACT: <Channel>,<status>,<ip> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
$MYNETACT=?	<CR><LF>$MYNETACT: <status>,<Channel> <CR><LF>OK<CR><LF>
NOTE: a) <channel>:int type, channel No., 0-5; b) <action>:int type, 0: deactivated PDP; 1: activated PDP; c) <status>:int type, Network status, 0: network not active; 1: network active; d) <ip>:IP Address, in the condition of network activated, get the local IP address, Local IP,“0.0.0.0” stands for not activated e.g.: AT$MYNETACT=0,1 // Channel 0 activated PDP successfully OK AT$MYNETACT=0,1 // Channel 0 failed to activate PDP ERROR	

4.1.9 IP Filter set $MYIPFILTER

This command is used to set and read the IP information which allow to access. If the module is used as the socket

server, you can set the proper IP address list of the remote host. This is used to allow the module be connected with clients whose ip address are in the visit list. The visit list includes an IP address, an IP subnet mask and the firewall support at most 5 IP CIDR in visit list.

Command	**Possible response(s)**
$MYIPFILTER=<id>,<action>,<ip_address>,<net_mask>	<CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYIPFILTER?	<CR><LF>$MYIPFILTER: <id>,<ip_address>,<net_mask> <CR><LF>$MYIPFILTER: <id>,<ip_address>,<net_mask> … <CR><LF>OK<CR><LF>
$MYIPFILTER=?	<CR><LF>$MYIPFILTER: <id>,<ip_address>,<net_mask> <CR><LF>OK<CR><LF>
NOTE: a) <id>:0-4; b) <action>:0-2; 1) 0:Delete the specified IP 2) 1:Add the specified IP 3) 2: Delete all the IP c) <ip_address>:legal IP address of remote host, string type, the format is XXX.XXX.XXX.XXX; d) <net_mask>:IP subnet mask,string type, the format is XXX.XXX.XXX.XXX. e.g.: AT$MYIPFILTER=0,1,“192.168.0.23”,“255.255.255.255” OK AT$MYIPFILTER=0,0,“192.168.0.23”,“255.255.255.255” OK AT$MYIPFILTER=0,1,“192.168.0.23”,“255.255.255.0” // add the ip which is allowed to visit, from 192.168.0.0 to 192.168.0.255 OK	

4.2 Un-transparent transmission commands

4.2.1 Set TCP/IP Service's Parameters $MYNETSRV

This command is used to set the TCP/IP service's parameter. Each channel should distribute at least 2k Bytes of send buffer and 2K Bytes receiver buffer. And only one listener can be established by TCP Server.

Command	Possible response(s)
$MYNETSRV=<Channel>,<SocketID>,<nettype>,<viewMode>,<ip:port>	<CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYNETSRV?	<CR><LF>$MYNETSRV: <Channel>,<SocketID>,<nettype>,<viewMode>,<ip:port> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
$MYNETSRV=?	<CR><LF>OK<CR><LF>

NOTE:

a) <channel>:int type, Channel No. 0-5;

b) <SocketID>:0-5,SocketID;

c) <nettype>:Network type, support three types as TCP, TCPServer, UDP;

1) 0:TCP Client
2) 1:TCP Server
3) 2:UDP

d) <viewMode>:Data display mode;

1) 0:HEX（default）
2) 1:TEXT

At the time of TCPIP AT command (Un-transparent transmission),the defined value in the process of UDP, TCP data sending/receiving service:

1) The original data:0x01,0x34
2) the send/receive TCPIP Data on the serial port
3) HEX mode:0x01, 0x34
4) TEXT mode:0x30, 0x31, 0x33, 0x34

e) <ip:port>:IP address and port value, such as:218.108.43.26:8000,Address need to support domain name, when the IP address is 127.0.0.1, it means to use this socket to set the listen service.

e.g.:

AT$MYNETSRV=0,0,0,0,"172.22.33.2:5000" //Set the TCP Client's parameter of channel 0

OK

4.2.2 Open TCP/UDP connection $MYNETOPEN

This command is used to open the TCP/UDP connection.

Command	Possible response(s)
$MYNETOPEN=<SocketID>	<CR><LF>$MYNETOPEN: <SocketID>[,<Remote_MSS>] <CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYNETOPEN?	<CR><LF>$MYNETOPEN:<SocketID>,<LocalIP>,<local_port>,<gate>,<DNS1>,<DNS2>,<type>,<dest_ip>,<dest_port> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
$MYNETOPEN=?	<CR><LF>OK<CR><LF>

NOTE:

a) <SocketID>:int type, the supported socket ID, 0-5

b) <Remote_MSS>:int type, the MSS value successfully negotiated by the client and server when the TCP connection is opened.

c) <LocalIP>:String type, Local IP address

d) <local_port>:Local port, each channel may be different.

e) <gate>:Gateway

f) <DNS1>:The preferred DNS server.

g) <DNS2>: Secondary DNS server;

h) <type>:TCP Client/TCP Server/UDP;

1) 0: TCP Client
2) 1: TCP Server
3) 2: UDP

i) <dest_ip>: the destination IP address (when type is tcp:server,ip is 0.0.0.0;when IP is others, it's the client address, and when the connection is done, the IP address will become 0.0.0.0);

j) <dest_port>:the destination port (when type is tcp:server,port is 0; when port is others, it's the client port, and when the connection is done, the port will become 0).

e.g.:

AT$MYNETOPEN=0 // Start SocketID_0

$MYNETOPEN: 0,1460 OK // Open success

4.2.3 Read the data $MYNETREAD

This command is used to read the data.

Command	Possible response(s)
$MYNETREAD=<SocketID>,<data_len>	<CR><LF>$MYNETREAD: <SocketID>,<data_length> <CR><LF><data> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYNETREAD=?	<CR><LF>OK<CR><LF>
NOTE: a) <SocketID>:0-5,the supported socket ID; b) <data_len>: The maximum length of data need to read 1-1460; c) <data_length>:Tthe length of the data Actually read 0-1460; d) <data>:data. When data_length=0, there is no data. e.g.: AT$MYNETREAD=0,1408 // Read 1408 bytes data from socket 0 $MYNETREAD: 0,0 // There is no data in this socket. OK AT$MYNETREAD=0,1408 // Read 1408 bytes data from socket 0 $MYNETREAD: 0,10 // There are ten bytes data when UDP connected. 1234567890 OK	

4.2.4 Send data $MYNETWRITE

This command is used to send the data.

Command	Possible response(s)
$MYNETWRITE=<SocketID>,<data_len>	<CR><LF>$MYNETWRITE: <SocketID>,<data_len> <CR><LF><input_data> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>

$MYNETWRITE=?	<CR><LF>OK<CR><LF>
NOTE: <SocketID>:0-5, the supported socket ID; <data_len>:The length of data need to send, 1-1460; <input_data>:The data content needed to write e.g.: AT$MYNETWRITE=0,10 // Send 10 bytes data to socket 0 $MYNETWRITE: 0,10 123456789 OK // Data send success	

4.2.5 Close the connection $MYNETCLOSE

This command is used to close one socket connection.

Command	Possible response(s)
$MYNETCLOSE=<SocketID>	<CR><LF>$MYNETCLOSE: <SocketID> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYNETCLOSE?	<CR><LF>OK<CR><LF>
$MYNETCLOSE=?	<CR><LF>OK<CR><LF>
NOTE:<SocketID>:0-5, the socket ID needed to close e.g.: AT$MYNETCLOSE=0 // Close socket 0 $MYNETCLOSE: 0 0K	

4.2.6 Set the TCP ACK inquiry $MYNETACK

This command is used to read the TCP sent data's numbers, which is not ACK by opposite terminal.

Command	Possible response(s)
AT$MYNETACK=<SocketID>	<CR><LF>$MYNETACK:<SocketID>,<unAcked_dataLen>,<rest_bufferLen> <CR><LF>OK<CR><LF>
NOTE:	

a) <SocketID>: TCP socket ID; b) <unAcked_dataLen>:The number of sent data which not receiving the ACK from opposite terminal, the max. value is 2^32-1; c) <rest_bufferLen>: The rest buffer of build-in protocol stack, the max. value is 2^32-1. e.g.: AT$MYNETACK=0 // Read data's numbers send by TCP SocketID_0, which is not ACK by opposite terminal $MYNETACK: 0,2456,1024 0K

4.2.7 Listen Request $MYNETACCEPT

This command is used to accept the requests for client's listens when the module is in the mode of TCP/UDP Server. After this command is success, enter command transfer mode when <transportMode>=0, while enter data transfer mode when <transportMode>=1.

In the server transparent transmission mode, after exit data mode and enter command mode, and when you need to close the server connection, send AT$MYNETCLOSE=socketid (socketid which is listened by server, not the socketid connected by client).

Command	**Possible response(s)**
$MYNETACCEPT=<SocketID>,<action>,<transportMode>	<CR><LF>OK<CR><LF>
	<CR><LF>CONNECT<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYNETACCEPT?	<CR><LF>OK<CR><LF>
$MYNETACCEPT=?	<CR><LF>OK<CR><LF>
NOTE: a) <SocketID>:0-5,New access socket id, Provided by the active report $MYURCCLIENT b) <action>: Port monitor enable/disable 1) 0: Accept 2) 1: Reject c) <transportMode>: module's transfer mode after the success of listening; 1) 0: Command transmission mode 2) 1: Transparent transmission mode d) When <transportMode>=0, Return <CR><LF>OK<CR><LF>,which stands for connection is success, and the module is in the mode of command.	

e) When <transportMode>=1, Return <CR><LF>CONNECT<CR><LF>,which stands for connection is success, and the module is in the mode of data. e.g.: AT$MYNETSRV=0,2,1,0,“127.0.0.1:5100” // The server listen to the 5100 port OK AT$MYNETOPEN=2 // Use the socket 2 to listen $MYNETOPEN: 2 OK $MYURCCLIENT: 1,“172.16.23.100”,31256 AT$MYNETACCEPT=1,0,0 OK

4.3 Transparent transmission commands

The parameters initialization of transparent transmission network connection can use the command of un-transparent transmission network connection initialization parameter to set. Transparent transmission can start by the command below.

4.3.1 Start the service $MYNETCREATE

This command is used to start the transparent transmission.

When connect to the main station, the module start the transparent transmission. Command +++ can switch the mode from data mode to command mode; while command ATO can switch from command mode to data mode.

Close the transparent transmission can use the command of AT$MYNETCLOSE.

When set the parameter of <mode>= TCP server, the module will only listen to the socket, and the module will return OK; the module won’t enter data mode immediately

Command	**Possible response(s)**
$MYNETCREATE=<channel>,<mode>,<SocketID>,<ip>,<port>[,<local_port>]	<CR><LF>OK<CR><LF>
	<CR><LF>CONNECT<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYNETCREATE?	<CR><LF>OK<CR><LF>
$MYNETCREATE=?	<CR><LF>OK<CR><LF>
NOTE: a) <channel>:0-5, Channel No. b) <mode>:0-2;TCP Client/TCP Server/UDP; 1) 0:TCPClient	

2) 1:TCPServer 3) 2:UDP c) <SocketID>:0-5, Socket ID; d) <ip>: The IP needed to connect e) <port>: The port needed to connect f) <local_port>: Local port e.g.: AT$MYNETCREATE=1,2,2,“172.22.44.123”,5300,3000 // The established UDP transparent transmission channel CONNECT // Connect and start transparent transmission OK // Enter +++, the module will return OK to the mode of command

4.4 Unsolicited report commands (URC)

Unsolicited report commands is the report codes to the users when the errors occurs or there are data received (un-transparent transmission) in the process of TCP/UDP connection

4.4.1 Data arrival report $MYURCREAD

This command indicates that the module has received the data.

Command	Possible response(s)
$MYURCREAD	<CR><LF>$MYURCREAD: <SocketID><CR><LF>
NOTE:<SocketID>:0-5,Socket ID. e.g.: AT$MYNETOPEN=2 // Use the socket 2 to establish the connection $MYNETOPEN: 2 OK $MYURCREAD: 2 // Report when socket 2 receives data AT$MYNETREAD=2,1460 // Read 1460 bytes data from socket 2 $MYNETREAD: 2,10 // There is 10 bytes data 1234567890 OK	

4.4.2 Socket disconnected report $MYURCCLOSE

This URC indicates that the socket disconnected, and the buffer data corresponding to socket ID will be cleared.

Command	Possible response(s)
$MYURCCLOSE	<CR><LF>$MYURCCLOSE: <SocketID><CR><LF>
NOTE:<SocketID>:0-5, The socket ID of disconnected link. e.g.: AT$MYNETOPEN=2 // Use socket 2 to establish the connection $MYNETOPEN: 2 OK $MYURCCLOSE: 2 // Report when socket 2 disconnected.	

4.4.3 Network connection status report $MYURCACT

This command is used to report the network connection status.

Command	Possible response(s)
$MYURCACT	<CR><LF>$MYURCACT: <channel>,<type><CR><LF>
NOTE: a) <channel>:the used Channel No. b) <type>: Network connection status 1) 0: The connection is disconnected 2) 1: The connection is established c) <IP>: The IP address of this machine. e.g.: $MYURCACT: 1,0 // The network takes the initiative to disconnect network connection AT$MYNETACT? $MYNETACT: 1,0,“0,0,0,0” OK	

4.4.4 Once Client connected report $MYURCCLIENT

After open listening services, once the client connected, this AT command will report to PC client.

Command	Possible response(s)
$MYURCCLIENT	<CR><LF>$MYURCCLIENT: <SocketID>,<IP>,<port><CR><LF>
NOTE: a) <SocketID>:New Client socket id; b) <IP>: Client IP Address c) <port>: Client port e.g.: AT$MYNETSRV=0,2,1,0,“127.0.0.1:5100” //Listen to the port 5100 OK AT$MYNETOPEN=2 // Use socket 2 to listen $MYNETOPEN: 2 OK $MYURCCLIENT: 1,“172.16.23.100”,31256 // Once the client connected, report this command.	

4.4.5 Connection disconnected report $MYURCFTP

This command is used to report the FTP connection is disconnected, and the buffer data corresponding to FTP will be cleared.

Command	Possible response(s)
$MYURCFTP	<CR><LF>$MYURCFTP: <Status><CR><LF>

NOTE:<Status>:int type, The status of FTP status
1) 0: FTP command socket is disconnected
2) 1: FTP data socket is disconnected
e.g.:
AT$MYFTPOPEN=1,“someftpsite.com”,“anonymous”,“qwerty@somemail.com”,1,30,1
OK // FTP connection is opened success.
// URC is coming
$MYURCFTP: 0 // Report of FTP command socket is disconnected
// If the FTP service need to be executed, you need to send AT$MYFTPOPEN	

4.5 FTP service commands

4.5.1 Start FTP Service $MYFTPOPEN

The module can establish only one FTP connection, which occupies 2 socket IDs. When FTP connection is established, any other transparent transmission mode can't use.

Command	Possible response(s)
$MYFTPOPEN=<Channel>,<destination_ip/url>,<username>,<password>,<mode>,<Tout>,<FTPtype>	<CR><LF>OK<CR><LF>
	<CR><LF>ERROR: <err><CR><LF>
$MYFTPOPEN?	<CR><LF>$MYFTPOPEN: <connection_status> <CR><LF>OK<CR><LF>
$MYFTPOPEN=?	<CR><LF>OK<CR><LF>
NOTE: a) <Channel>: Channel; b) <destination_ip/url> Remote FTP station's IP, the format is: XXX.XXX.XXX.XXX; c) <username>:FTP login username, ASCII, the max. length is 255 bytes; d) <password>: FTP login password, ASCII, the max. length is 255 bytes; e) <mode>: 0: active mode; 1: passive mode (default); f) <Tout>:5-180s, FTP command/data idle timeout. Unit is second, default value is 30 seconds; g) <FTPtype>: 0 : Binary mode (default value); 1: text mode; h) <connection_status>:1: Connect success; 0 : Connect fail. e.g.: AT$MYFTPOPEN=1,"someftpsite.com","anonymous","qwerty@somemail.com",1,30,1 OK // FTP connected AT$MYFTPOPEN=1,"anotherftpsite.com","anonymous","qwerty@somemail.com",1,30,1 ERROR	

4.5.2 Close FTP service $MYFTPCLOSE

This command is used to quit the FTP service.

Command	Possible response(s)
$MYFTPCLOSE	<CR><LF>OK<CR><LF>

	<CR><LF>ERROR<CR><LF>
e.g.: AT$MYFTPCLOSE OK	

4.5.3 Get the FTP file length $MYFTPSIZE

This command is used to get the FTP file length.

Command	Possible response(s)
$MYFTPSIZE=<File_Name>	<CR><LF>$MYFTPSIZE: <File_length> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
NOTE: a) <File_Name>: The file name (with file path) needed to upload or download, File path; b) <File_length>:The length of FTP file needed to be loaded, the range of length is 2^32-1; e.g.: AT$MYFTPSIZE="//myfile/ftp_file.txt" $MYFTPSIZE: 2048 OK	

4.5.4 File Download Command $MYFTPGET

This command is used to download FTP file,

Command	Possible response(s)
$MYFTPGET=<File_Name>[, <data_offset>,<data_Length>]	<CR><LF>CONNECT <CR><LF><file_content> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
	<CR><LF>CONNECT <CR><LF><file_content> <CR><LF>ERROR<CR><LF>
NOTE: a) <File_Name>:the name of the file you need to download;	

b) <data_offset>: The data offset in the file c) <data_length>:size of file ; d) <file_content>: The downloaded file content e) When you want to quit FTP PUT, you can use "+++". Command $MYFTPPUT doesn't support breakpoint continuing. e.g.: AT$MYFTPOPEN=1,"someftpsite.com","anonymous","qwerty@somemail.com",1,30,1 OK AT$MYFTPGET="//myfile/ftp_download.txt",0,18 CONNECT I like traveling OK

4.5.5 File PUT Command $MYFTPPUT

This command is used to upload files to FTP server (FILE PUT).

Command	Possible response(s)
$MYFTPPUT=<File_Name>, <data_length>,<EOF>	<CR><LF>CONNECT <CR><LF><file_content> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
NOTE: a) <File_Name>:the name of the file you need to upload; b) <data_length>:size of file, the range is 1-3072 bytes; c) <EOF>: End of the uploading files, int type; 1) 0: not the last file data package 2) 1: the last file data package d) <file_content>: The file content needed to upload, when the length of file equal to the <data_length>, the file content will be send to the FTP Server, and when the sending of all the file content is finished, it will return OK; while sending failed or timeout, it will return ERROR. e) When you want to quit FTP PUT, you can use "+++". Command $MYFTPPUT doesn't support breakpoint continuing. e.g.: AT$MYFTPOPEN=1,"someftpsite.com","anonymous","qwerty@somemail.com",1,30,1	

OK AT$MYFTPPUT="//myfile/ftp_upload.txt",18,1 CONNECT I like traveling OK

4.6 Band Lock Commands

4.6.1 Lock BCCH Channel $MYBCCH

This command is used to lock the BCCH channel. If a band has locked, you can't lock BCCH channel.

Command	Possible response(s)
$MYBCCH=<mode>[, <bcch1>],[<bcch2>],[bcch3>]	<CR><LF>OK<CR><LF>
	<CR><LF>$MYBCCH: +BA(num): <CR><LF><bcch1>,<mcc1>,<mnc1>,<lac1>,<cell-id1> <CR><LF><bcch2>,<mcc2>,<mnc2>,<lac2>,<cell-id2> <CR><LF><bcch3>,<mcc3>,<mnc3>,<lac3>,<cell-id3> ... <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
$MYBCCH?	<CR><LF>$MYBCCH: <bcch1>,<mcc1>,<mnc1>,<lac1>,<cell-id1> <CR><LF><bcch2>, <CR><LF><bcch3>, <CR><LF>OK<CR><LF>
	<CR><LF>$MYBCCH: <bcch1>, <CR><LF><bcch2>, <CR><LF><bcch3>, <CR><LF>OK<CR><LF>
	<CR><LF>$MYBCCH: UNLOCKED <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
$MYBCCH=?	<CR><LF>$MYBCCH: <mode list>,<bcch1>,…<bcch3> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>

NOTE:

a) <mode>: int type,

1) 0:Unlock the current BCCH;

2) 1: Lock the specified BCCH

3) 2: List the 7 BCCH channel number with strongest signal in the current position

b) <bcch>: BCCH Channel No.

c) <num>:the number of BCCH returned in BA list. The max, is 7;

d) <mcc>: Mobile country code

e) <mnc>: Mobile network code

f) <lac>: Lac code, 4 bytes

g) <cell-id>: cell identity

e.g.:

AT$MYBCCH=?

$MYBCCH: (0,1,2),115,113,111

OK

AT$MYBCCH=1

OK

AT$MYBCCH?

$MYBCCH: 115,460,01,2540,79BB

OK

AT$MYBCCH=0

OK

AT$MYBCCH=1,111

OK

AT$MYBCCH?

$MYBCCH: 111,460,01,2540,79BA

OK

4.6.2 Lock the GSM Band $MYBAND

This command is used to lock the GSM Band.

Command	Possible response(s)
$MYBAND=<band>	<CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
$MYBAND?	<CR><LF>$MYBAND: <band>

	<CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
NOTE:<band>:this parameter will be stored after restart. 1) 0: Select the band automatically. 2) 1: GSM_EGSM_900 3) 2: GSM_DCS_1800 e.g.: AT$MYBAND=1 // Select GSM_EGSM_900 OK AT$MYBAND? $MYBAND: 1 OK	

4.7 GPS Commands

4.7.1 Get the GPS NMEA Data $MYGPSPOS

This command is used to get the GPS NMEA Data.(The module needs to support this GPS or BD function)

Command	Possible response(s)
$MYGPSPOS=<TYPE>	<CR><LF>$MYGPSPOS: <GPS data string> <CR><LF>OK<CR><LF>
	<CR><LF>ERROR<CR><LF>
NOTE: a) <TYPE>:GPS data type, int; 1) 0: NMEA $GPGGA syntax 2) 1: NMEA $GPGSA syntax 3) 2:NMEA $GPGSV syntax 4) 3: NMEA $GPRMC syntax 5) 4: NMEA $GPVTG syntax 6) 5: NMEA $GPGLL syntax b) <GPS data string>:The data syntax corresponding to GPS data type. Refer to NMEA-0183 standard. e.g.: AT$MYGPSPOS=0 // Read $GPGGA data $MYGPSPOS: $GPGGA,092204.999,4250.5589,S,14718.5084,E,1,04,24.4,19.7,M,,,,0000*1F	

OK

4.8 Error Code

The standard AT command's error code, you can refer to the 3GPP 27.007.

The error code of embedded TCP/IP protocol stack is the the errors which may appear in the process of TCP/IP connection.

Error code	Description
900	Dial was rejected by the network side(APN wrong, card arrears or the card doesn't support the network or service)
901	PDP is not activated
902	PDP is activated
……	Reserved
910	TCP connection is rejected
911	TCP connection timeout, IP or port may wrong.
912	Socket connection has already exist
913	Socket connection not exist
914	The buffer is full, you need to retry sending
915	Timeout of transmitting data
916	Domain not exist
917	Timeout of domain name resolution
918	Unknown errors of domain name resolution
……	Reserved
980	The parameters input is illegal
981	Other errors

