HUAWEI MU509 HSDPA LGA Module

AT Command Interface Specification

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About This Document

Revision History

Document Version	Date	Chapter	Descriptions
01	2010-12-14		Creation
02	2011-11-23		Update
03	2012-08-03	3.23	Added command: ^CLSPWM
		3.24	Added command: ^CLSNM
		7.5	Added command: ^STRIPUSB
		10.5	Deleted the range description of the parameter <type> of +CCWA
		11.8	Updated ^ECHO command syntax
04	2013-01-28	All	Added the scope of HUAWEI MU509-1 for the document
		3.13.3	Updated description of the parameter <rst> of +CFUN
		3.15	Updated +CSCS command syntax
		3.20	Updated ^MSO command syntax
		3.25	Updated command: ^CLSNM
		3.26	Added command: ^WKMODE
		4.1	Added the parameter description <module info> of the command I.
		4.7	Updated command: +CCID
		6.14	Updated +CMGL command syntax
		6.15	Updated command: +CMGR
		8.1	Updated command: +CGDCONT
		9.17	Added the parameter description <end_status> of the command ^CEND

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Document Version	Date	Chapter	Descriptions
		11.1	Updated command: ^SWSPATH
		11.6	Updated command: +VTS
		11.11	Added command: ^ECHOPARA
		12.3	Updated command: +CPBR
		12.4	Added command:+CPBW
		12.5	Added command: ^CPBR
		17.8	Updated list of reference

Scope

MU509-b

MU509-g

HUAWEI MU509-1

Firmware Software

MU509TCPU-11.813.01.13.00

Please read the release note released with the firmware software before using MU509-b/MU509-g/HUAWEI MU509-1 module and this document.

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Summary

Keywords: UMTS, Module, WCDMA, GPRS, GSM

Abstract: This document describes the AT command interface between TE and MS of Huawei UMTS Module. The interface can implement the functions such as SMS, phonebook service, internet service, GPRS service and network setting.

This document includes:

Chapter	Details
1 Scope	Describes interface design principles and change principles
2 Interface Introduction	Describes interface simply
3 Configuration Commands	Describes AT command of configuration
4 Identification Commands	Describes AT command of identification
5 Serial Interface Control Commands	Describes AT command of serial interface control
6 Short Message Service Commands	Describes AT command of short message service
7 Security Commands	Describes AT command of security
8 GPRS Service Commands	Describes AT command of GPRS service
9 Call Control Commands	Describes AT command of call control
10 Supplementary Service Commands	Describes AT command of supplementary services
11 Audio Commands	Describes AT command of voice control
12 Phonebook Commands	Describes AT command of phonebook
13 Status Control Commands	Describes AT command of status control
14 Network Service Commands	Describes AT command of network service
15 Internet Service Commands	Describes AT command of internet service
16 Overall Design Constraints	Describes overall design constraints
17 Appendixes	Appendixes

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1 Scope

1.1 Terminal Display

This document describes the AT interface of Huawei UMTS Module MU509. The description on the AT interface is only limited to the interface packet itself, the usage and use procedure of TE and MS, and does not cover the contents which are not directly related to the interface.

1.1.1 Interface Overview

HUAWEI UMTS Module is a wireless terminal of UART or USB interface. It is used to provide data service, voice and SMS functions.

This document describes the AT interface.

In the subsequent AT command parameters, two formats are involved: <> and [], as described below:

<...>: Parameters enclosed in angle brackets must be completed. Brackets themselves do not appear in the command line.

[...]: Optional subparameter of a command is enclosed in square brackets. Brackets themselves do not appear in the command line or response.

<CR>: Carriage returns character, which value is specified with command S3.

<LF>: Linefeed character, which value is specified with command S4.

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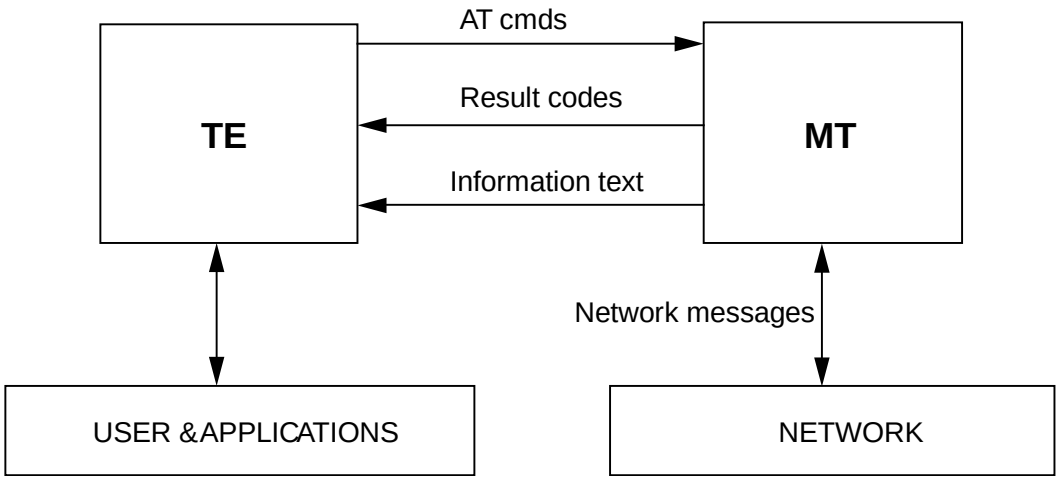
Figure 1-1 Block diagram of interaction between TE and MS



1.2 Interface Design Principles

1. Each interface should be functionally convergent.
2. Since the AT command is a packet transmitted via communication port, the packet size is limited. For the transmission of AT command, in addition to the two characters “AT”, a maximum of 1600 characters can be received (including the empty characters at the end). For the “response” message or URC reported by the board, the maximum length is limited to 1600 characters.
3. Each command line can include only one AT command. For the URC instruction or response reported from MS to TE, only one AT command is allowed in a command line.
4. In order to make the commands and response formats more readable and standard, except the original interfaces of Qualcomm, in all newly added interfaces, e.g. no space can be contained in the commands such as AT^XXX: <arg0>, <arg1>, or behind ^, colon or comma. No redundant space is allowed at the head or end.
5. After delivering each AT command, the TE cannot deliver the second AT command until the MS has made response to this AT command. Otherwise, the second AT command will not be executed.
6. For the AT command to which the response is given only after a long time, in order to prevent interference on other events, it is recommended to report the final execution result asynchronously. If the MS responds to the TE only after a long time of waiting, e.g. the “AT+COPS=?” command receives a response only after a long time after the command is delivered, the MS may have received the reported instruction of +CREG: XXX on this occasion. Namely, the reporting of +CREG: XXX may interrupt other responses, and other URCs will not interrupt the response of command, and the interrupted part of the response will continue being reported.
7. Unless otherwise specified, all default codes between TE and MS take on this format: GSM 7 bit Default Alphabet. See also Section 6 in protocol 23.038. The character @ is transmitted on the interface still according to 0x00 of 7bit coding. The board software and API should be able to process this character. The board

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uploads the carriage return character (<CR>) and linefeed character (<LF>) in the string in the form of space.

8. A sort of compounding between quotation and comma can not exist in the string in this current version. For the data format of UCS2 code, the code value should be reported in the string format (if the code value is 0x553a, 553a should be reported).
9. The “Possible response” sent from MS to TE is composed of “Information text” and “Result code”, where “Information text” is optional, and “Result code” is mandatory. The format of “Possible response” is controlled by the ATV command, as detailed in the ATV command description. All “Possible responses” listed in the tables in this documents are in the ATV1 format.
10. When module is power on, it returns OK that sends AT to UART1, MODEM or PCUI means module initializes successfully, could deal with AT command normally.

1.3 Interface Change Principles

For the extended interface, parameters can be added behind the AT command. If the interface fails to meet the new requirements as detected in the later stage of product development, new parameters can be added on the basis of the original interface. In addition, for all the currently available interfaces, if the command received by MS is not identifiable, the “result code” of ERROR will be reported; if there is one surplus command parameter, the MS will report the “result code” of the corresponding TOO MANY PARAMETERS. No equal mark itself is deemed a surplus command parameter.

All extended AT command interfaces of MU509 begin with “^”. It specifies that: In the AT command such as “AT^XXX”, the number of X cannot be more than 9 currently.

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2 Interface Introduction

All interfaces herein refer to the interfaces between TE and MS, and are used for guiding the implementation of the function requirements. The interface covers short message receiving and sending, phone book statistics, and MS network system information setting.

For the commands sent from TE to MS, see also the detailed description in Appendix 17 . Note that in the returned results of the TEST command, “,” and “-” are different. For example, the returned result of “+CMGD=?” is: +CMGD: (1,5),(0-4), which means that the first parameter value may be 1 or 5, and the second parameter value may range from 0 to 4.

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3 Configuration Commands

3.1 E–Enable Command Echo

3.1.1 Command Syntax

Command	Possible response(s)
E[<value>]	<CR><LF>OK<CR><LF>

3.1.2 Description

This command is used to set whether MS will echo the characters received from TE.

3.1.3 Defined Values

<value>:

0: MS does not echo the characters received from TE.

1: MS echoes the characters received from TE (default value).

If no <value> is included, it is equivalent to the effect that the <value> is 1.

Note:

After boot up, the value will be 1 by default.

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3.2 S3–Set Command Line Carriage Return Character

3.2.1 Command Syntax

Command	Possible response(s)
S3=<value>	<CR><LF>OK<CR><LF>
S3?	<CR><LF><value><CR><LF> <CR><LF>OK<CR><LF>

3.2.2 Description

This command is used to set the command line carriage return character S3. S3 saves the command line carriage return character in the form of ASCII code value. This character is sent by TE. It means the end of a command line, and is identified by the MS. This character is also sent by MS, and serves as a part of the header, tail and end mark of the “result code” and “information response”.

When using the “S3=<value>” command to set S3, the current S3 character can serve as carriage return character of this command line, and the “result code” of this command line will use the newly set S3 character immediately, rather than waiting until the next command line.

3.2.3 Defined Values

<value>:

000–127: The S3 character is set in the form of ASCII code value.

Default value is 013.

Note:

If you want to set <value>=1, you can input “ATS3=001”, or “ATS3=1”, the result is same.

3.3 S4–Set Response Formatting Character

3.3.1 Command Syntax

Command	Possible response(s)
S4=<value>	<CR><LF>OK<CR><LF>
S4?	<CR><LF><value><CR><LF> <CR><LF>OK<CR><LF>

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3.3.2 Description

This command is used to set the response format character S4. S4 saves the response format character in the form of ASCII code value. This character is sent by MS, and serves as a part of the header, tail and end mark of the “result code” and “information response”.

If the S4 character is changed in a command line, the “result code” of this command line will use the new S4 character immediately, rather than waiting until the next command line.

3.3.3 Defined Values

<value>:

000–127: The S4 character is set in the form of ASCII code value.

Default value is 010.

Note:

If you want to set <value>=1, you can input “ATS4=001”, or “ATS4=1”, the result is same.

3.4 S5–Set Backspace Character

3.4.1 Command Syntax

Command	Possible response(s)
S5=<value>	<CR><LF>OK<CR><LF>
S5?	<CR><LF><value><CR><LF> <CR><LF>OK<CR><LF>

3.4.2 Description

This command is used to set the backspace character S5. S5 saves the backspace character in the form of ASCII code value. This character is sent by TE, and means to delete the previous character. It is identified by MS.

3.4.3 Defined Values

<value>:

000–127: The S5 character is set in the form of ASCII code value.

Default value is 008.

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Note:

If you want to set <value>=1, you can input “ATS5=001”, or “ATS5=1”, the result is same.

3.5 V–Set ME Response Format

3.5.1 Command Syntax

Command	Possible response(s)
V[<value>]	<CR><LF>OK<CR><LF>

3.5.2 Description

This command is used to set the format of “result code” and “information response” of the AT command, including the composition of the header and tail, and the form of the result code contents. The result code contents may be in the form of numerals or detailed strings. The following table describes the influence of format setting on the format of “result code” and “information response”. <CR> means S3 character, and <LF> means S4 character.

Table 3-1 Influence of V parameter on the response format

	V0	V1
Information responses	<text><CR><LF>	<CR><LF><text><CR><LF>
Result codes	<numeric code><CR>	<cr><LF><verbose code><CR><LF>

3.5.3 Defined Values

<value>:

0: MS sends the abbreviated header and tail, and uses the result code in the numeral form.

1: MS sends the complete header and tail, and uses the result code in the form of detailed strings (default value).

If no <value> is included, it is equivalent to the effect that the <value> is 1.

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3.6 A/–Repeat Previous Command Line

3.6.1 Command Syntax

Command	Possible response(s)
A/	

3.6.2 Description

This command is used to repeat previous command line. <CR> is not needed.

3.6.3 Defined Values

NA

3.6.4 Examples

If the last command is:

AT+CGSN

351782030028946

OK

A/

351782030028946

OK

3.7 Q–Set Result Code Presentation Mode

3.7.1 Command Syntax

Command	Possible response(s)
Q[value]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF>

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3.7.2 Description

This command sets whether or not the TA transmits result code to the TE.

3.7.3 Defined Values

<value>:

0: DCE transmits result code (default value).

1: Result codes are suppressed and not transmitted.

Note:

ATQ will set value to 0.

3.8 Z–Resume User Settings

3.8.1 Command Syntax

Command	Possible response(s)
Z	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF>

3.8.2 Description

The SET command resumes the user settings which are stored by AT&W command.

The commands and parameters which can be resumed are as follows:

Table 3-2 The commands and parameters which can be resumed

Command	Parameter
E	<value>
V	<value>
Q	<value>
&C	<value>
&D	<value>
&S	<value>
+IFC	<DCE_by_DTE>,<DTE_by_DCE>
S0	<value>

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3.9 &W–Store User Settings

3.9.1 Command Syntax

Command	Possible response(s)
&W	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

3.9.2 Description

The SET command stores some user settings to the profile, which can be resumed by ATZ command.

The commands and parameters which can be stored are as follows:

Table 3-3 The commands and parameters which can be stored

Command	Parameter
E	<value>
V	<value>
Q	<value>
&C	<value>
&D	<value>
&S	<value>
+IPR	<rate>
+IFC	<DCE_by_DTE>,<DTE_by_DCE>
+ICF	<format>,<parity>
S0	<value>

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3.10 &F–Set to Factory Defined Configuration

3.10.1 Command Syntax

Command	Possible response(s)
&F	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

3.10.2 Description

The SET command sets to factory defined configuration.

The commands and parameters which can be set to factory configuration are as follows:

Table 3-4 The commands and parameters which can be set to factory configuration

Command	Parameter
E	1
V	1
Q	0
&C	1
&D	2
&S	0
S0	0
S3	13
S4	10
S5	8
+IFC	0,0
+ICF	3,3
+CNMI	0,0,0,0,0
+CRC	0
+CMMS	0
+CPMS	“SM”,”SM”,”SM”

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Note:

If the user profile's item is exist in this factory list, after execute this command, this user profile's item will be set to factory default too.

3.11 &V–Query Current Configuration

3.11.1 Command Syntax

Command	Possible response(s)
&V	<CR><LF>(list of stored setting)<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

3.11.2 Description

This command is used to query the current configuration.

Table 3-5 The commands and parameters which can be queried

Command	Parameter
E	<value>
V	<value>
Q	<value>
&C	<value>
&D	<value>
&S	<value>
S0	<value>
S3	<value>
S4	<value>
S5	<value>
+CRC	<mode>
+CMGF	<mode>
+CSDH	<show>
+CNMI	<mode>,<mt>,<bm>,<ds>,<bfr>
+IPR	<rate>
+CMEE	<n>

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Command	Parameter
+CSMS	<service>
+CREG	<n>
+COPS	<mode>,<format>,<oper>,<rat>
+CGSMS	<service>

Note:

The parameters of +COPS will be displayed depending on registration status of UE.

3.12 +CMEE–Set Terminal Error Reporting Format

3.12.1 Command Syntax

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

3.12.2 Description

This command is used to set whether to use result code: +CME ERROR: <err> indicates the error related to MS. When you set to use result code, the MS-related error will generate a result code: +CME ERROR: <err>, which will replace the ordinary ERROR result code. If the error reasons are not related to MS, the ordinary ERROR will still be returned.

3.12.3 Defined Values

<n>:

0: Do not use +CME ERROR : <err>result code, only ERROR is returned in case of error occurrence.

1: Use +CME ERROR : <err>result code, <err> adopts the error code value.

2: Use +CME ERROR : <err>result code, <err> adopts the detailed string value of the error (default value).

<err>: the value is given in the CME ERROR list in the Appendix 17.2 .

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The “AT+CMEE” will be set <n> to 0.

3.13 +CFUN–Set Operation Mode

3.13.1 Command Syntax

Command	Possible response(s)
+CFUN[=<fun>[,<rst>]]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CFUN?	<CR><LF>+CFUN: <fun><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CFUN=?	<CR><LF>+CFUN: (list of supported <fun>s), (list of supported <rst>s)<CR><LF> <CR><LF>OK<CR><LF>

3.13.2 Description

The SET command is used to set the MS mode or restart the MS.

The READ command is used to return the current mode.

The TEST command is used to return the supported parameter values.

3.13.3 Defined Values

<fun>:

0: Set as LPM (low power consumption) mode (previous mode must not be offline)

1: Set as online mode (default value) (previous mode must not be offline)

<rst>: whether to restart MT before setting.

0: Do not reset the MT before setting it to <fun> power level (default value).

1: Reset the MT before setting it, and <fun> must be set to 1.

Note:

AT+CFUN without value will set as LPM mode.

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3.14 +CCLK–Return Current Time of the Module

3.14.1 Command Syntax

Command	Possible response(s)
+CCLK=<time>	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF>
+CCLK?	<CR><LF>+CCLK: <time><CR><LF> <CR><LF>OK<CR><LF>
+CCLK=?	<CR><LF>OK<CR><LF>

3.14.2 Description

The SET command sets the real-time clock of the MS. If setting fails in an MS error, ERROR is returned.

The READ command returns the current setting of the clock.

3.14.3 Defined Values

<time>: string type value; format is "yyyy/MM/dd, hh:mm:ss±zz", where characters indicate year, 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 to +48). e.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "1994/05/06, 22:10:00+08"

Notes:

- If MS does not support time zone information, then the three last characters of <time> are not returned by +CCLK?.
- While MS camps on network, it shall update the <time> automatically.
- The time can be set only between 1980/01/06, 00:00:00 and 2100/01/01, 00:00:00.

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3.14.4 Examples

AT+CCLK?

+CCLK: 2009/09/14,14:58:16

OK

3.15 +CSCS–Select TE Character Set

3.15.1 Command Syntax

Command	Possible response(s)
+CSCS[=<chset>]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>
+CSCS?	<CR><LF>+CSCS: <chset><CR><LF> <CR><LF>OK<CR><LF>
+CSCS=?	<CR><LF>+CSCS: (list of supported <chset>s)<CR><LF> <CR><LF>OK<CR><LF>

3.15.2 Description

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

3.15.3 Defined Values

<chset>:

"GSM": GSM 7 bit default alphabet (3GPP TS 23.038); this setting causes easily software flow control (XON/XOFF) problems.

"IRA": International reference alphabet (ITU-T T.50) (default value).

"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.

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3.16 +CRSM–Restricted SIM Access

3.16.1 Command Syntax

Command	Possible response(s)
+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>]]]	<CR><LF>+CRSM: <sw1>,<sw2>[,<response>]<CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CRSM=?	<CR><LF>OK<CR><LF>

3.16.2 Description

This command offers easy access of the elementary files on the SIM in the restricted state.

3.16.3 Defined Values

<command>: SIM command number.

176: Read binary

178: Read record

192: Get response

214: Update binary

220: Update record

242: Get status

<fileid>: identifier of EF file (Elementary data File) on SIM. Integer value, it is necessary for the non-query commands.

<P1>, <P2>, <P3>: necessary for the commands except the get-response commands and query commands. The value information refers to GSM 11.11 or 3GPP 31.101, 31.102.

<data>: information with hexadecimal character format.

<sw1>, <sw2>: the response from SIM after the execute command completed.

<response>: response data in case of a successful completion of the previously issued command. It is empty after “update binary” and “update record” commands.

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3.17 ^HS–Handshake Between MS and TE

3.17.1 Command Syntax

Command	Possible response(s)
^HS=<id>,<action>	<CR><LF>^HS:<id>,<protocol>,<is_offline>,<product_class>,<product_id>,[<software_id>]<CR><LF> <CR><LF>OK<CR><LF>

3.17.2 Description

This command is used to shake hand between MS and TE.

3.17.3 Defined Values

<id>: 8 digits, used to recognize MS.

<action>: represent the action type of TE.

0: TE is living

1: TE is stopped

<protocol>:indicate the protocol state of the module.

0: Module is running at APP.

1: Module is running at BOOT.

<is_offline>:

0: Online

1: Offline (reserved, not supported currently)

2: LPM

<product_class>: product class

0: GSM/WCDMA

<product_id>: product id

6: MU509

<software_id>: reserved

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3.17.4 Examples

AT^HS=0,0

^HS: 46500001,0,0,0,6

OK

3.18 ^RESET–Delay the Module Reset Function

3.18.1 Command Syntax

Command	Possible response(s)
^RESET[=<delay_time>]	<CR><LF>OK<CR><LF>
^RESET?	<CR><LF>^RESET:<delay_time><CR><LF> <CR><LF>OK<CR><LF>
^RESET=?	<CR><LF>^RESET:(list of supported <delay_time>s)<CR><LF><CR><LF>OK<CR><LF>

3.18.2 Description

This command is used to delay the module reset by user.

3.18.3 Defined Values

<delay_time>: delay time.

0: Module reset immediately.

1–65535: Delay time, indicates in second.

Notes:

- “AT^RESET” has same function with “AT^RESET=0”;
- Delay time out and start to reset. But the reset action would spend some time to complete.

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3.19 ^CURC–Control Unsolicited Report

3.19.1 Command Syntax

Command	Possible response(s)
^CURC=<mode>	<CR><LF>OK<CR><LF>
^CURC?	<CR><LF>^CURC:<mode><CR><LF> <CR><LF>OK<CR><LF>
^CURC=?	<CR><LF>^CURC:(list of supported <mode>s)<CR><LF> <CR><LF>OK<CR><LF>

3.19.2 Description

The SET command is used to set mode value to open or close unsolicited reports. The unsolicited reports it can control are listed below: ^RSSI, ^MODE, ^SRVST, ^MODE, ^SMMEMFULL. The unsolicited reports are closed if the mode value is set to 0 and the unsolicited reports are open if the mode value is set to 1. The default value of mode is set to 0. So, “^CURC=1” should be executed if all the unsolicited reports need to be open.

The READ command returns the current mode value.

The TEST command returns the value range it supports.

Unsolicited report is disabled after reset. In sleep mode, unsolicited reports will be ignored, since the ports are closed.

3.19.3 Defined Values

<mode>:

0: The unsolicited reports closed (default value).

1: The unsolicited reports open.

3.20 ^MSO–Power Off Module

3.20.1 Command Syntax

Command	Possible response(s)
^MSO	<CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF>

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3.20.2 Description

This command is used to power off the module.

3.21 ^IOC–Set GPIO Pin Output Level

3.21.1 Command Syntax

Command	Possible response(s)
^IOC=<Pin selection>,<Data vector>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>
^IOC?	<CR><LF>^IOC:<data vector><CR><LF><CR><LF>OK<CR><LF>
^IOC=?	<CR><LF>^IOC:(list of supported <pin selection>s),(list of supported <data vector>s)<CR><LF><CR><LF>OK<CR><LF>

3.21.2 Description

This command defines values of eight GPIO pins.

3.21.3 Defined Values

<pin selection>: defines the GPIO which are chosen. 8 bits string with character ‘0’ or ‘1’, every bit is associated with one GPIO pin.

0: Not operate the GPIO pin.

1: Operate the GPIO pin.

<data vector>: describe the physical level of every GPIO pin.8.bits string with character ‘0’ or ‘1’, only GPIO chosen in <pin selection> takes effect.

0: Physical low level

1: Physical high level

3.22 ^IOCTRL–Control the GPIO

3.22.1 Command Syntax

Command	Possible response(s)
^IOCTRL=<sel>,<options>,<value>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>

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Command	Possible response(s)
^IOCTRL?	<CR><LF>^IOCTRL:<options>,<value><CR><LF> <CR><LF>OK<CR><LF>
^IOCTRL=?	<CR><LF>^IOCTRL:(list of supported <sel>s),(list of supported <options>s),(list of supported <value>s)<CR><LF><CR><LF>OK<CR><LF>

3.22.2 Description

The interface is provided to the GPIO pins on the AT command to the guest operating.

The TEST command is used to return the parameters and the range of the AT commands supported.

This command controls 8 GPIO pins, set the command for each parameter (from left to right) corresponding to the LGA pins are as follows:

GPIO PIN: 8 7 6 5 4 3 2 1

LGA PIN: 109 105 113 46 44 45 51 55

3.22.3 Defined Values

<sel>: enable GPIOs.

00000000: Disable any GPIO.

00000001: Enable GPIO1

00000010: Enable GPIO2

... …: Enable or disable some GPIO.

11111111: Enable ALL GPIO.

<options>: set the GPIO's mode

00000000: All GPIO input mode.

00000001: GPIO1 output mode, others are input mode

00000010: GPIO2 output mode, others are input mode

... …: Set some GPIO's mode.

11111111: All GPIO output mode.

<value>: if the GPIO mode is output, the value can be set.

00000000: All GPIO are set LOW.

00000001: GPIO1 is set HIGH, others are LOW

00000010: GPIO2 is set HIGH, others are LOW

… …: Set some GPIO's value.

11111111: All GPIO are set HIGH.

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Resetting the module will reset the value to default value.

3.23 ^CLSPWM–Write Or Delete Password

3.23.1 Command Syntax

Command	Possible response(s)
^CLSPWM=<password>[,<newpassword>]	<CR><LF>OK<CR><LF> In case of MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>

3.23.2 Description

The SET command is used to set and verify the password, <password> and <newpassword> must be added quotation marks, otherwise return ERROR.

<password> is the current password, <newpassword> is new password to be set.

- If the password has not been set yet, and there is only <password> in the command, which is used to set password.
- If the password has been set, there are two parameters in the command, If <newpassword> quotation marks, delete the current password, otherwise modify current password.
- If there is only <password> field, this command is used to check the password.

3.23.3 Defined Values

<password>, <newpassword>: string type, and the length is between 8 and 32. Legal characters include ‘0’–‘9’ and English characters, a–z or A–Z, and there is case sensitive.

3.23.4 Implementation

When modify the password, the password is incorrect, +CME ERROR: incorrect password (+CME ERROR: 16) are returned.

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3.24 ^CLSNM–Manipulate Special Call Numbers

3.24.1 Command Syntax

Command	Possible response(s)
^CLSNM=<password>[,<index>[,<number>]]	In case of write or delete: <CR><LF>OK<CR><LF> In case of read: [<CR><LF>^CLSNM:<index>,<number>[<CR><LF>^CLSNM:<index>,<number>[...]]<CR><LF>]<CR><LF>OK<CR><LF> In case of MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>
^CLSNM=?	^CLSNM: (list of supported<index>s) <CR><LF><CR><LF>OK<CR><LF>

3.24.2 Description

<password>: field can't be ignored when write, read, modify and delete.

Correct password should be submitted first (quotation marks must be added), operations are not allowed if wrong password was submitted. If there are three parameters, both <index> and <number> fields are not empty (<number> must added quotation marks), this command is used to write special numbers into NV specified by <index>.

- If there are three parameters, the <number> is empty quotation marks, delete the special number specified by <index>.
- If the <password> field and <index> field are not empty, and the field following the comma is blank, ERROR is returned.
- If there are two parameters, <password> field and <index> field, read the special number specified by <index>; If there is only <password> field, read all the special numbers.

The TEST command returns the position range of the currently selected NV memory.

3.24.3 Defined Values

<password>: string type, set by ^CLSPWM command , the length is between 8 and 32. Legal characters include 0–9 and English characters, a–z or A–Z, and there is case sensitive.

<index>: integer value. It indicates the position in NV memory. The value of index is between 0 and 19.

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<number>: string type, telephone number (legal characters only include: ’0–9’,’#’,’*’,’+’ ,’)’,’(’,’-’). The maximum length is 24 byte. And if ’+’ exist; it should be at the beginning of number.

3.24.4 Implementation

If the password is incorrect, +CME ERROR: incorrect password (+CME ERROR: 16) are returned.

3.24.5 Examples

1. write special call number 1111111111 at index 0:

AT^CLSNM="12345678",0,"1111111111"

OK

2. read special call number at index 0:

AT^CLSNM="12345678",0

^CLSNM: 0, "1111111111"

OK

3. delete the special call number at index 0:

AT^CLSNM="12345678",0, ""

OK

4. read all the special call numbers:

AT^CLSNM="12345678"

^CLSNM: 0, "1111111111"

^CLSNM: 1, "222222222"

OK

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3.25 ^WKMODE–Switch Between WAKEUP_OUT Pin Voltage Level Modes

3.25.1 Command Syntax

Command	Possible Response(s)
^WKMODE=<wakeup_type>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^WKMODE=?	<CR><LF>^WKMODE: (list of supported <wakeup_type>s)<CR><LF><CR><LF>OK<CR><LF>
^WKMODE?	<CR><LF>^WKMODE: <wakeup_type> <CR><LF><CR><LF>OK<CR><LF>

3.25.2 Description

This command is used to set switch WAKEUP_OUT pin between voltage level modes.

The SET command is used to set the voltage level mode for the WAKEUP_OUT pin.

The READ command is used to query the current voltage level mode of the WAKEUP_OUT pin.

The TEST command is used to return the voltage level modes supported by the WAKEUP_OUT pin.

3.25.3 Defined Values

<wakeup_type>: specifies the voltage level mode for the WAKEUP_OUT pin. The settings take effect immediately. The available values are:

0: The voltage level of the WAKEUP_OUT pin is used to set the sleep mode. If the voltage level is pulled up high, the module is woken up. If the voltage level is pulled down low, the module is placed in sleep mode.

1: The voltage level of the WAKEUP_OUT pin is pulled up for 1 second when a call or text message comes in. The WAKEUP_OUT pin remains at low level during other time periods.

The default value is 1.

3.25.4 Implementation

Huawei proprietary interface

Optional

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3.25.5 Actions Performed by the Client

After you run the command to set the WAKEUP_OUT pin voltage level mode, the settings take effect immediately and remain effective even if the module is restarted. If the module is upgraded, the WAKEUP_OUT pin voltage level mode is restored to its default value 1.

3.25.6 Examples

AT^WKMODE=?

^WKMODE: (0-1)

OK

AT^WKMODE?

^WKMODE: 1

OK

AT^WKMODE=0

OK

AT^WKMODE?

^WKMODE: 0

OK

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4 Identification Commands

4.1 I–Display Product Identification Information

4.1.1 Command Syntax

Command	Possible response(s)
I[value]	<CR><LF><module info><CR><LF> <CR><LF>OK<CR><LF>

4.1.2 Description

This command delivers a product information text.

4.1.3 Defined Values

<value>: 0–255, it's for internal use, you can set any value between 0–255, or without value followed.

<module info>: it is the ID information about the MS, including:

Manufacturer (+GMI)

Product model (+GMM)

Software version (+GMR)

ESN/IMEI (+GSN)

4.1.4 Examples

ATI

Manufacturer: huawei

Model: MU509

Revision: 11.810.04.00.00

IMEI: 352340010000564

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OK

4.2 +CGMM/+GMM–Query Product Model ID

4.2.1 Command Syntax

Command	Possible response(s)
+CGMM or +GMM	<CR><LF><model><CR><LF> <CR><LF>OK<CR><LF>
+CGMM=? or +GMM=?	<CR><LF>OK<CR><LF>

4.2.2 Description

This command is used to get product model ID, the function of +CGMM and +GMM are identical. But the command +CGMM can be used when module have not SIM/USIM card. Product mode ID is composed of character string, the max length can not beyond 2048 byte, including the end character '\0'.

4.2.3 Defined Values

<model>: at present, the value of model ID including: MU509.

4.2.4 Examples

AT+CGMM

MU509

OK

AT+GMM

MU509

OK

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4.3 +CGMI/+GMI–Query Manufacturer Information

4.3.1 Command Syntax

Command	Possible response(s)
+CGMI or +GMI	<CR><LF><manufacturer><CR><LF> <CR><LF>OK<CR><LF>
+CGMI=? or +GMI=?	<CR><LF>OK<CR><LF>

4.3.2 Description

This command is used to query the manufacturer information.

4.3.3 Defined Values

<manufacturer>: manufacturer information. Its value is a string with out double quotation marks.

4.3.4 Examples

AT+CGMI

huawei

OK

AT+GMI

huawei

OK

4.4 +CGMR/+GMR–Query Software Version Number

4.4.1 Command Syntax

Command	Possible response(s)
+CGMR or +GMR	<CR><LF><softversion><CR><LF> <CR><LF>OK<CR><LF>
+CGMR=? or +GMR=?	<CR><LF>OK<CR><LF>

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4.4.2 Description

The SET command returns the software version number of ME.

4.4.3 Defined Values

<softversion>: software version number. It is a string composed of 31 characters at most.

4.4.4 Examples

AT+CGMR

11.810.03.00.00

OK

AT+GMR

11.810.03.00.00

OK

4.5 +CGSN/+GSN–Query IMEI

4.5.1 Command Syntax

Command	Possible response(s)
+CGSN or +GSN	<CR><LF><IMEI><CR><LF> <CR><LF>OK<CR><LF>
+CGSN=? or +GSN=?	<CR><LF>OK<CR><LF>

4.5.2 Description

This command is used to query the International Mobile Equipment Identity (IMEI) of board.

4.5.3 Defined Values

<IMEI>: the IMEI value of the board is returned directly. The returned value is a string composed of:

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Table 4-1 The structure of IMEI

8 char	6 char	1 char
TAC	SNR	Spare

TAC: Type code allocated for device

SNR: Sequence number of the device

Spare: For standby purpose

4.5.4 Examples

If TAC is "35178203", SNR is "002894", and Spare is "6", then

AT+CGSN

351782030028946

OK

4.6 +CIMI–Request IMSI

4.6.1 Command Syntax

Command	Possible response(s)
+CIMI	<CR><LF><IMSI><CR><LF> <CR><LF>OK<CR><LF> In case of MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CIMI=?	<CR><LF>OK<CR><LF>

4.6.2 Description

This command is used to query International Mobile Subscriber Identity (IMSI) of SIM/USIM.

4.6.3 Defined Values

<IMSI>: string values without quote, the IMSI stored in the SIM/USIM. The digits are decimal numbers that range from 0 to 9.

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Table 4-2 The structure of IMSI

3 char	2 char or 3 char	
The length is less than 15 characters.		
MCC	MNC	MSIN

MCC: country ID

MNC: network ID

MSIN: MT ID, used to identify the mobile user.

4.6.4 Examples

If the value of MCC is "123", the value of MNC is "45"; the value of MSIN is "12345678",

AT+CIMI

1234512345678

OK

4.7 +CCID–Query Card Identification

4.7.1 Command Syntax

Command	Possible response(s)
+CCID	<CR><LF>+CCID: <ccid> <CR><LF> <CR><LF>OK<CR> <LF>
+CCID?	<CR><LF>+CCID: <ccid> <CR><LF> <CR><LF>OK<CR> <LF>
+CCID=?	<CR><LF>OK<CR><LF>

4.7.2 Description

This command instructs the module to query the integrated circuit card identity (ICCID) of a SIM card.

4.7.3 Defined Values

<ccid>: ICCID, a unique identification number for the SIM card. It is encoded hex code.

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4.8 ^HWVER–Query Hardware Version Number

4.8.1 Command Syntax

Command	Possible response(s)
^HWVER	<CR><LF>^HWVER:<hardversion><CR><LF> <CR><LF>OK<CR><LF>

4.8.2 Description

The SET command returns the hardware version number of ME.

4.8.3 Defined Values

<hardversion>: hardware version number. It is a string composed of 31 characters at most.

4.8.4 Examples

AT^HWVER

^HWVER:"MD1MU509M"

OK

4.9 ^SPN–Get Service Provider Name

4.9.1 Command Syntax

Command	Possible response(s)
^SPN=<spn_type>	<CR><LF>^SPN:<disp_rplmn>,<coding>,<spn_name><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF> or <CR><LF>ERROR<CR><LF>
^SPN=?	<CR><LF>^SPN:(list of supported <spn_type>s)<CR><LF> <CR><LF>OK<CR><LF>

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4.9.2 Description

This command is used for TE to query the SPN file of 2G/3G currently stored on the SIM/USIM card through the ME.

4.9.3 Defined Values

<spn_type>:

0: GSM_SPN

1: UMTS_SPN

<disp_rplmn>:

0: Do not display RPLMN

1: Display RPLMN

99: This field is invalid, and it is not necessary to read the spn_name field any longer.

<coding>: coding scheme. It means the character code of the spn_name field, and specifies the language.

0: GSM 7 bit Default Alphabet

1: UCS2 (namely, upload the spn_name in the format of original data).

<spn_name>: a string. In case of GSM7bit code, the string is composed of 16 characters at most. When the coding scheme is 1, and the contents of the string are data described by “hexadecimal text value”, the string will not be greater than 32. When the coding mode reported on the board is “UCS2”, this parameter should be completed as a hexadecimal numeral with 0x removed.

4.9.4 Examples

For example: When the 7 bit coding format of SPN is read as "China Mobile", the following will be fed back after the read result is reported: ^SPN:0,0, China Mobile; if it is "China Mobile" in the USC2 coding format, the following will be fed back: ^SPN:1,1, "804E2D56FD79FB52A8".

4.10 ^CARDMODE–Query SIM/USIM Type

4.10.1 Command Syntax

Command	Possible response(s)
^CARDMODE	<CR><LF>^CARDMODE: <sim_type><CR><LF><CR><LF>OK<CR><LF>

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4.10.2 Description

This command is used for TE to query the type of SIM card. If the SIM card isn't present or the operation fails, the command returns CME ERROR, which refers to Appendix 17.2 ..

4.10.3 Defined Values

<sim_type>: the type of SIM card

0: Unknown

1: SIM card

2: USIM card

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5 Serial Interface Control Commands

5.1 &C–Set DCD Line Mode

5.1.1 Command Syntax

Command	Possible response(s)
&C[value]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF>

5.1.2 Description

The command determines how ITU-T V.25 circuit 109 (or equivalent) relates to the detection of received line signal from remote end (recommended default 1 i.e. 109 operation relates to detection of received signal).

5.1.3 Defined Values

<value>:

0: Carrier Detection (DCD) line always is ON.

1: DCD line is in ON in the presence of data carrier only (default value).

Note:

AT&C will set value to 0.

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5.2 &D–Set DTE Ready (DTR) Line Mode

5.2.1 Command Syntax

Command	Possible response(s)
&D[value]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF>

5.2.2 Description

The command determines how DCE responds when ITU-T V.25 circuit 108/2 (or equivalent) is changed from ON to OFF condition during online data state.

5.2.3 Defined Values

<value>:

0: DCE ignores status of DTR.

1: Change to command mode and retain the connected call when DTR changes from ON to OFF (reserved, not supported currently).

2: Disconnect data call (CSD, PS data service), change to command mode when DTR changes from ON to OFF (default value).

Note:

AT&D will set value to 0.

5.3 &S–Set Data Set Ready (DSR) Line Mode

5.3.1 Command Syntax

Command	Possible response(s)
&S<value>	<CR><LF>OK<CR><LF>

5.3.2 Description

The command determines how ITU-T V.25 circuit 107 (or equivalent) relates to the detection of received line signal from remote end (recommended default 0 i.e. 109 operation relates to detection of received signal).

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5.3.3 Defined Values

<value>:

0: DSR line always is ON.

1: DSR line is ON when connected (reserved, not supported currently).

5.4 +ICF–Set Character Framing

5.4.1 Command Syntax

Command	Possible response(s)
+ICF[=<format>[,<parity>]]	<CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF>
+ICF?	<CR><LF>+ICF: <format>[,<parity>]<CR><LF> <CR><LF>OK<CR><LF>
+ICF=?	<CR><LF>+ICF: (list of supported <format>s),(list of supported <parity>s)<CR><LF> <CR><LF>OK<CR><LF>

5.4.2 Description

This extended-format compound parameter is used to determine the local serial port start-stop (asynchronous) character framing that the DCE shall use while accepting DTE command set and while transmitting information text and result codes to the DTE, if this is not automatically determined (see +IPR).

We only support the setting AT+ICF=3, 3.

5.4.3 Defined Values

<format>: valid numeric value

3: 8Data 1Stop (default value)

<parity>: defined numeric value

0: Odd (reserved, not supported currently)

1: Even (reserved, not supported currently)

2: Mark (reserved, not supported currently)

3: Space (default value)

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5.5 +IPR–Set Fixed Data Rate

5.5.1 Command Syntax

Command	Possible response(s)
+IPR[=<rate>]	<CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF>
+IPR?	<CR><LF>+IPR: <rate><CR><LF> <CR><LF>OK<CR><LF>
+IPR=?	<CR><LF>+IPR: (list of supported auto detectable <rate>s),(list of supported fixed-only <rate>s))<CR><LF> <CR><LF>OK<CR><LF>

5.5.2 Description

This numeric extended-format parameter specifies the data rate at which the DCE will accept command set. 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. The default value is 115200 bps.

If <rate> is not included in the command, the baud rate will be set to 115200bps.

The settings will be stored in NV automatically, and will be restored from NV when power on.

Notes:

- The auto detectable rates are not support currently, the interface is reserved for extended use, so the first parameters of the TEST command will return brackets without value.
- If the UART baud rate is higher than the radio bearer rate, and the transmit data rate is high, the data may be lost.

5.5.3 Defined Values

<rate>: valid numeric values, bps

600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400

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5.6 +IFC–Control Local Flow

5.6.1 Command Syntax

Command	Possible response(s)
+IFC[=<DCE_by_DTE>[,<DTE_by_DCE>]]	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>
+IFC?	<CR><LF>+IFC: <DCE_by_DTE>,<DTE_by_DCE><CR><LF> <CR><LF>OK<CR><LF>
+IFC=?	<CR><LF>+ICF: (list of supported <DCE_by_DTE>s),(list of supported <DTE_by_DCE>s)<CR><LF> <CR><LF>OK<CR><LF>

5.6.2 Description

The command AT+IFC can be used to set or query the data flow control for both data directions.

5.6.3 Defined Values

<DCE_by_DTE>: specifies the method used by the DTE when receiving data from the TA.

0: None (default value)

1: XON/XOFF, terminate flow control in the Cellular Engine (reserved, not supported currently)

2: RTS line

3: XON/XOFF, evaluate flow control in the Cellular Engine and pass it (over the air) to the opposite TE (Reserved, not supported currently)

<DTE_by_DCE>: specifies the method used by the TA when receiving data from the TE.

0: None (default value)

1: XON/XOFF (reserved, not supported currently)

2: CTS line

Note:

AT+IFC will set value to 0, 0.

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6 Short Message Service Commands

6.1 +CSMS–Select the SMS Type

6.1.1 Command Syntax

Command	Possible response(s)
+CSMS=<service>	<CR><LF>+CSMS: <mt>,<mo>,<bm><CR><LF> <CR><LF>OK<CR><LF>
+CSMS?	<CR><LF>+CSMS: <service>,<mt>,<mo>,<bm><CR><LF> <CR><LF>OK<CR><LF>
+CSMS=?	<CR><LF>+CSMS: (list of supported <service>s)<CR><LF> <CR><LF>OK<CR><LF>

6.1.2 Description

The SET command is used to set the message service type. The returned <mt>, <mo> and <bm> mean whether this service type is supported for the messages received by the terminal, messages sent by the terminal.

6.1.3 Defined Values

<service>: message service type.

0: 3G TS 23.040, 3G TS 23.041 (the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2 version 4.7.0) (default value)

1: 3G TS 23.040, 3G TS 23.041 (the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2+ version.)

<mt>, <mo>, <bm>: <mt> for mobile terminated messages, <mo> for mobile originated messages and <bm> for broadcast type messages.

0: Reserved, not supported currently.

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1: Supported (default value).

Note:

Command AT+CNMA requires <service> is set to 1.

6.2 +CMGF– Set Message Format

6.2.1 Command Syntax

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

6.2.2 Description

The SET command is used to set the format of the short message. The format has two modes, and depends on the <mode> parameter. The two modes are: PDU mode and TEXT mode. The TEXT mode is unable to display Chinese. The format of message in PDU mode, refers to +CMGS command.

The READ command is used to return the current mode selection.

The TEST command returns the applicable <mode> values.

6.2.3 Defined Values

<mode>:

0: PDU modes (default value)

1: TEXT mode

If no <mode> is included, it is equivalent to the effect that the <mode> is 0.

Note:

In TEXT mode, when choose GSM 7 bit coding mode, only support GSM 7 bit basic characters, not support GSM 7 bit extended characters.

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6.3 +CNMI–Set New Message Notification

6.3.1 Command Syntax

Command	Possible response(s)
+CNMI[=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	<CR><LF>OK<CR><LF> In case of SMS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
+CNMI?	<CR><LF>+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr><CR><LF> <CR><LF>OK<CR><LF>
+CNMI=?	<CR><LF>+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)<CR><LF> <CR><LF>OK<CR><LF>

6.3.2 Description

The SET command is used to set the program of reporting new message to TE.

<mode> and <bfr> are used to set the mode of reporting the new message notification (including four types: +CMT, +CMTI, +CDSI, +CDS) to the TE.

<mt> is used to set whether reporting the new message to the TE, or storing the new message in the MS and reporting the storage position when a new message is received.

<bm> is not in use currently.

<ds> is used to set whether to report the message state report (+CDSI, +CDS).

The TEST command returns the supported parameter values.

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 allowed to use direct message routing (<mt>=2 or 3, or <ds>=1) with <mode> value 0 or 2.

If ME does not get acknowledgement within required time (network timeout), both <mt> and <ds> values of +CNMI will be cleared to 0.

Notes:

- The set value of this command will be cleared to 0 after the MS is restarted. In this case, no new message will be reported. The “AT+CNMI=0, 0, 0, 0, 0” mode is not recommended.
- The “AT+CNMI” command will set all parameters to 0.
- If AT+CSMS <service> is set to 1, it should be set before AT+CNMI.

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6.3.3 Defined Values

<mode>: set the message notification mode.

0: Buffer the message in the ME. If the buffer of ME is full, the new notification will overwrite the old notification (default value).

1: Send the message notification to the TE directly. When it is impossible to send the notification (e.g. when in the online data mode), the notification will be discarded.

2: Report the message notification and message state report to the TE directly. When it is impossible to send them (e.g. when in the online data mode), the message notification will be buffered in the ME, and will be sent to the TE at a time later (reserved, not supported currently).

Note:

The message notifications are buffered in the volatile storage. If the MS is powered off before sending the message, the message will probably be lost. Therefore, in case of <mode>=0 or 2, it is not allowed to use direct forwarding of message (<mt>=2 and 3).

<mt>: set the rules of storing and notifying the received messages. New messages can be stored and notified in the following four modes:

0: No SMS-DELIVER indications are routed to the TE (default value).

1: If SMS-DELIVER is stored into MS, indication of the memory location is routed to the TE.

+CMTI: <mem>,<index>

2: If SMS-DELIVER is not stored into MS, SMS-DELIVERs are routed directly to TE.

<CR><LF>+CMT: [<reserved>], <length><CR><LF><pdu>

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.

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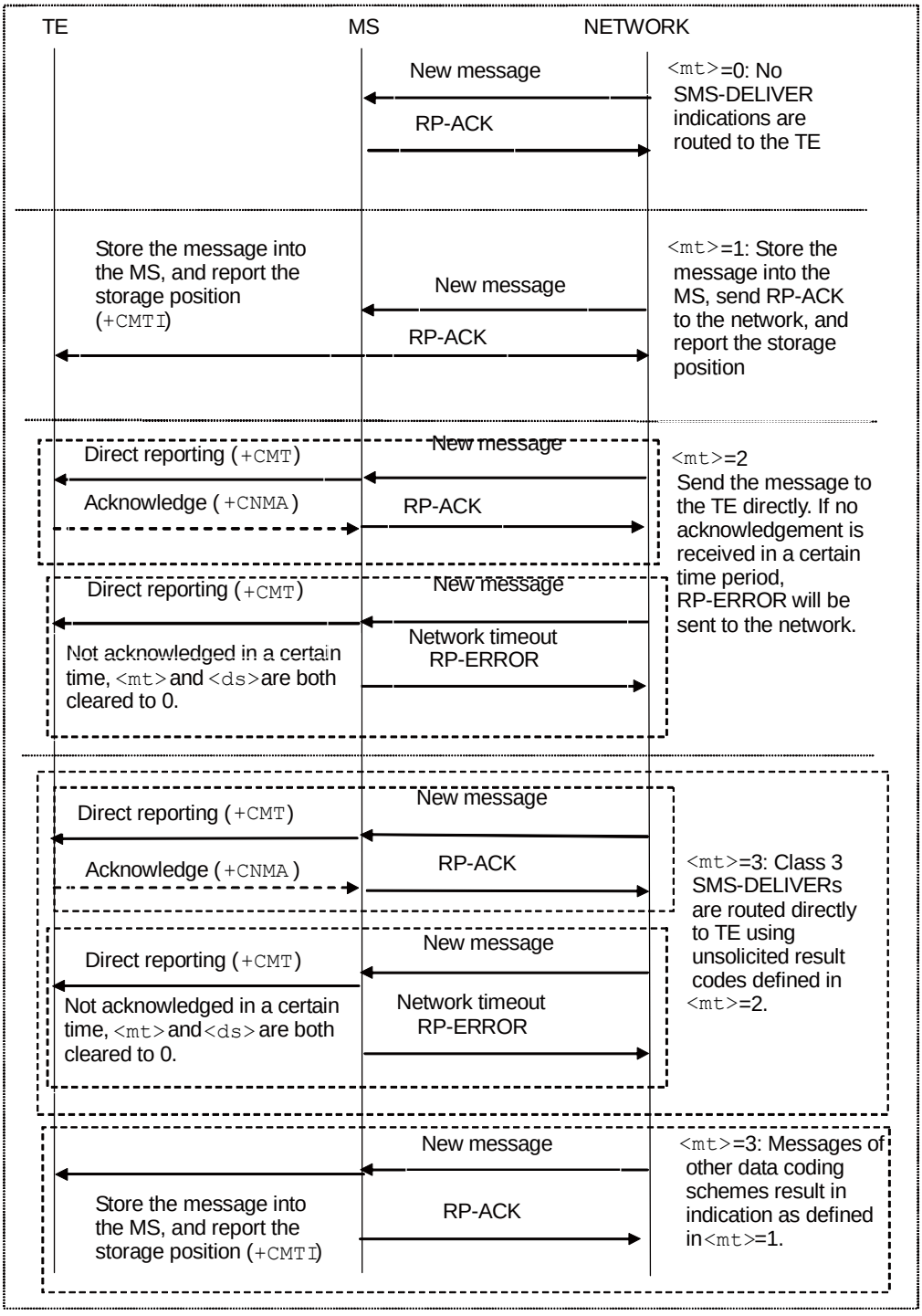
Figure 6-1 The function of <mt> parameter



The relationship between the parameter value of <mt> and the mode of storing and notifying various messages is shown in the following table.

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Table 6-1 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]	+CMTI	+CMTI
2	+CMT & +CNMA	+CMT [& +CNMA]	+CMTI	+CMT & +CNMA
3	+CMTI	[+CMTI]	+CMTI	+CMT & +CNMA

Notes:

- The class of message is given by the TP-DCS domain of the message. For details, see the DCS parameter description of the “+CMGS” command.
- +CMT & +CNMA means requiring TE to send a confirmation (+CNMA).

<bm>: for use of setting the cell broadcast information. It is reserved, not supported currently. The default value is 0.

<ds>: for use of setting the message acknowledgement.

0: Do not send message acknowledgement to the TE (default value)

1: Do not store message acknowledgement in MS, route message acknowledgement directly to TE.

When mode = 0 or 2, <ds> can’t be set to 1.

+CDS: <length><CR><LF><pdu>

2: If the message acknowledgement is stored in the MS, a storage position notification will be sent to the TE via “+CDSI”.

+CDSI: <mem>,<index>

Note:

Because “SR” is not supported, +CDSI can be sent out, but new message state report will be lost.

<bfr>: for use of setting buffer processing after transition from <mode>=0 to <mode>=1, 2. It is reserved, not supported currently.

0: If <mode>=1 or 2, the buffered unsolicited result codes will be sent to the TE at a time (default value).

1: If <mode> = 1 or 2, the buffered unsolicited result codes will be emptied.

6.3.4 Examples

AT+CNMI=1,1,0,1,0.

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OK

It indicates that the new class1 messages will be stored in the MS first, and the storage position will be reported (+CMTI: "ME", 1); the message state reports will be reported directly (+CDS:).

When it is impossible to report the message notification (e.g. when in the online data mode), the message notification will be discarded.

6.4 +CMTI–Indicate Message Arrival

6.4.1 Command Syntax

Command	Possible response(s)
	<CR><LF>+CMTI: <mem>,<index><CR><LF>

6.4.2 Description

Indicate that a new message is received.

6.4.3 Defined Values

<mem>: currently, “SM”, “ME” are supported.

"BM": Broadcast message storage (reserved, not supported currently)

"ME": ME message storage

"MT": ME-associated storage (reserved, not supported currently)

"SM": (U)SIM message storage

"TA": TA message storage (reserved, not supported currently)

"SR": State report storage (reserved, not supported currently)

<index>: integer value, which indicates the position in the storage.

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6.5 +CMT–Report New Message Indication Directly

6.5.1 Command Syntax

Command	Possible response(s)
	If PDU mode (+CMGF=0): <CR><LF>+CMT: [<reserved>],<length><CR><LF><pdu><CR><LF> If TEXT mode (+CMGF=1): <CR><LF>+CMT: <oa>,[<reserved>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><message in text><CR><LF>

6.5.2 Description

Received new messages are not stored, but reported to TE directly.

6.5.3 Defined Values

<reserved>: reserved.

- PDU mode:

  <length>: integer value, which indicates the number of bytes of PDU data.

  <pdu>: protocol data unit. Its format is the same as defined in section “Message list command”.

- TEXT mode:

  <oa>: Originating-Address.

  <scts>: Service-Centre-Time-Stamp.

  <tooa>: Type-of-Originating-Address.

  <fo>: First-Octet.

  <pid>: Protocol-Identifier.

  <dcs>: Data-Coding-Scheme.

  <sca>: Service-Center-Address.

  <tosca>: Type-of- Service-Center-Address.

  <length>: length of user data.

  <message in text>: user data.

The details about this parameters refer to the +CMGS command.

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6.6 +CDSI–Report New Message State Report

6.6.1 Command Syntax

Command	Possible response(s)
	<CR><LF>+CDSI: <mem>,<index><CR><LF>

6.6.2 Description

This command indicates that a new message state report is received, and specify the storage position.

Note:

Because “SR” is not supported, +CDSI can be received, but new message state report in “SR” can’t be read, will be lost.

6.6.3 Defined Values

<mem>: currently, only "SR" is supported.

"SR": U(SIM) message storage

<index>: integer value, which indicates the position in the storage.

6.7 +CDS–Report New Message State Report Indication Directly

6.7.1 Command Syntax

Command	Possible response(s)
	If PDU mode (+CMGF=0): <CR><LF>+CDS: <length><CR><LF><pdu><CR><LF> If TEXT mode (+CMGF=1): <CR><LF>+CDS: <fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st><CR><LF>

6.7.2 Description

This command indicates that received new message state reports are not stored, but reported to TE directly.

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6.7.3 Defined Values

<length>: integer value, which indicates the number of bytes of PDU data.

<pdu>: protocol data unit. The data structure is as follows:

Table 6-2 The data structure of PDU

[<SCA>]			
<sc_len>	<type_addr>	<numbers>	TPDU

Where, the <SCA>, <sc_len>, <type_addr>, and <numbers> fields are defined in the same way as in the section “Message sending command”.

The data structure of TPDU is as follows:

Table 6-3 The data structure of TPDU

Abbr.	Reference	P1)	R2)
TP-MTI	TP-Message-Type-Indicator	M	2b
TP-UDHI	TP-User-Data-Header-Indication	O	b
TP-MMS	TP-More-Messages-to-Send	M	b
TP-SRQ	TP-Status-Report-Qualifier	M	b
TP-MR	TP-Message-Reference	M	I
TP-RA	TP-Recipient-Address	M	2–12o
TP-SCTS	TP-Service-Centre-Time-Stamp	M	7o
TP-DT	TP-Discharge-Time	M	7o
TP-ST	TP-Status	M	o
TP-PI	TP-Parameter-Indicator	O	o
TP-PID	TP-Protocol-Identifier	O	o
TP-DCS	TP-Data-Coding-Scheme	O	o
TP-UDL	TP-User-Data-Length	O	o
TP-UD	TP-User-Data	O	

1) Mandatory (M) or Optional (O).

2) Integer (I), bit (b), 2 bits (2b), Octet (o), 7 octets (7o), 2–12 octets (2–12o).

<fo>:depending on the command or result code: first octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (the default value is 17), SMS-STATUS-REPORT, or SMS-COMMAND (the default value is 2) in integer format

<mr>: message-reference.

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<ra>: recipient-address

<tora>: receive-address type

<scts>: service-centre-time-stamp.

<dt>: discharge-time.

<st>: status.

6.8 +CMGD–Delete Message

6.8.1 Command Syntax

Command	Possible response(s)
If delflag value is 0: +CMGD=<index>[,<delflag>] If delflag value isn't 0: +CMGD=[<index>],<delflag>	<CR><LF>OK<CR><LF> In case of SMS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
+CMGD=?	<CR><LF>+CMGD: (list of supported <index>s) ,(list of supported <delflag>s)<CR><LF> <CR><LF>OK<CR><LF>

6.8.2 Description

The SET command deletes message from memory <mem1> location <index>. For the setting of <mem1> and description, see the "+CPMS command". If the second parameter <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, +CMS ERROR: <err> is returned.

The TEST command returns the storage position where the message is currently stored, and the supported <delflag> values.

6.8.3 Defined Values

<index>: storage position of message

<delflag>:

0: Delete the messages specified by <index> (default value).

1: Delete all read messages from preferred message storage, leaving unread messages 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.

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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.

Note:

If the message doesn't exist, the READ command will return OK.

6.9 +CNMA–Acknowledge New Message

6.9.1 Command Syntax

Command	Possible response(s)
If +CMGF=0: +CNMA[=<n>[,<length>[<CR> PDU is given<ctrl-Z/ESC>]]] If +CMGF=1: +CNMA<CR>	<CR><LF>OK<CR><LF> In case of SMS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
+CNMA=?	If +CMGF=0: <CR><LF>+CNMA: (list of supported <n>s)<CR><LF> <CR><LF>OK<CR><LF> If +CMGF=1: <CR><LF> OK<CR><LF>

6.9.2 Description

The SET command confirms reception of a new message which is routed directly to the TE. This acknowledgement command shall be used when +CSMS parameter <service> equals 1. For the usage of this command, see also description of "+CNMI" command.

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, 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>. PDU shall not be bounded by double quotes.

MS shall not send another +CMT or +CDS result code to TE before previous one is acknowledged.

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If ME does not get acknowledgement within required time (network timeout), ME should send RP-ERROR to network, and should shall automatically disable routing to TE by setting both <mt> and <ds> values of +CNMI to zero.

To make the MS report the message notification again, you need to set <mt> and <ds> again.

If the command is executed but no message is available for confirmation, the “+CMS ERROR: <err>” will be returned

The TEST command returns the supported <n> values. If only 0 is supported, it indicates that the command does not support TPDU sending.

6.9.3 Defined Values

<n>:

0: This option is not supported currently.

1: If the sending is successful, acknowledge with “RP-ACK (or receiving buffered result code successfully).

2: If the sending is unsuccessful, acknowledge with “RP-ERROR”.

<ackpdu> description:

Table 6-4 Basic elements

Abbr.	Reference	P1)	P2)	Description
TP-MTI	TP-Message Type Indicator	M	2b	TP-message type
TP-UDHI	TP-User-Data-Header-Indication	O	b	Indicate that TP-UD has a header
TP-PI	TP-Parameter-Indicator	M	o	Indicate which optional parameters exist
TP-PID	TP-Protocol-Identifier	O	o	Protocol ID
TP-DCS	TP-Data-Coding-Scheme	O	o	Data coding scheme
TP-UDL	TP-User-Data-Length	O	o	User data length
TP-UD	TP-User-Data	O	3)	User data

Notes:

- 1) Whether it is mandatory or optional: Mandatory (M) or Optional (O).
- 2) Indicates: Integer (I), Bit (b), 2 bits (2b), octet (o).
- 3) Depends on TP-DCS.

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Table 6-5 Bit number

Number of Octets	7	6	5	4	3	2	1	0	
1									TP-MTI, TP-UDHI
1									TP-PI
0,1									TP-PID
0,1									TP-DCS
0,1									TP-UDL
0 to 159									TP-UD

The 7th bit and bits 2–5 of the first byte are not used in SMS-DELIVER-REPORT, and the sender should set them to 0. If any bit of them is not 0, the receiver should ignore them.

Description:

<TP-MTI>: TP-message type. Bits 0 and 1 in the first byte.

bit1	bit0	Message type
0	0	SMS-DELIVER (in the direction SC to MS)
0	0	SMS-DELIVER REPORT (in the direction MS to SC)
1	0	SMS-STATUS-REPORT (in the direction SC to MS)
1	0	SMS-COMMAND (in the direction MS to SC)
0	1	SMS-SUBMIT (in the direction MS to SC)
0	1	SMS-SUBMIT-REPORT (in the direction SC to MS)
1	1	Reserved

<TP-UDHI>: indicates that TP-UD has a header. It is located in bit 6 in the first byte.

0: TP–UD domain contains only messages.

1: The beginning of TP–UD domain has a header.

<TP–PI>: indicates which optional parameters exist. If the bit is set as 1, it means no corresponding parameter exists.

Table 6-6 The contents of bit number

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Extension bit	Reserved	Reserved	Reserved	Reserved	TP-UDL	TP-DCS	TP-PID

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<TP-PID>: protocol ID. The default value set by TE when sending the message is 00000000. If the transmitting address is an E-mail, the TE should fill in 00110010=0x32.

<TP-DCS>: while sending the message, the TE selects the TP-DCS mode.

Table 6-7 The description of setting the bit number

bit7~bit6(while sending the message, the TE selects the TP-DCS mode)	00, while sending the message, the TE selects this value.	bit5	0	If TE sets bit5 to be 0, it indicates no message is compressed.
			1	If bit5 is 1, it indicates the sent message is compressed, and TE does not select this value.
		bit4	0	If TE sets bit4 to be 0, it indicates that bit1 and bit0 are reserved, and the value is 00.
			1	If bit4 is 1, it indicates that bit1 and bit0 have the meaning of message type (The message type depends on the user's settings. If the message type is set by the user, TE sets bit4 to be 1, e.g. set class 1 or class 2).
		bit3~2 (message code format)	00	GSM 7 bit default code
			01	8bit data
			10	UCS2 code mode. When the user inputs Chinese characters, the TE will select this value.
		bit1~0 (message type, its value is selected by TE according to the user's options)	00	Class 0, provided to the interface to display and reply that the SC has received but not stored it.
			01	Class 1, stored to the MS (i.e., NV), or stored to the SIM card when the MS is full
			10	Class 2, for special use of SIM. After the message is stored, the storage state will be replied to the SC. If the SIM card is full, the SC failure and the reasons will be reported.
			11	Class 3, stored to the TE. When the MS receives the message, but has not transmitted it to the TE, it will give a response to the SC.
bit7~4 (while sending the message, the TE does not	1100 and 1101 (GSM 7 bit code), 1110 (uncompressed	bit3	0	The message wait prompt function is invalid. Currently, the functions that require prompting, e.g. enforcement message, E-mail and voice mail, are not supported.
			1	Activate the message waiting prompt function
		bit2	0	Reserved bits, which make no sense.

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select this TP-DCS mode)	UCS2 code)	bit1~0 (message waiting type)	00	With voice message waiting.
			01	With fax message waiting.
			10	With E-mail message waiting.
			11	Message waiting of other unknown types
	1111 (TE does not select this value either)	bit3	0	Reserved bits, which make no sense.
		bit2	0	7bit code
			1	8bit data
		bit1~0	00	Class 0, providing display and reply to SC that the message is received but not stored.
			01	Class 1, stored to the MS (i.e., NV), or stored to the SIM card
			10	Class 2, for use of SIM only. After storing it, the storage state is returned to the SC.
			11	Class 3, stored to the TE. When the MS receives the message, but has not transmitted it to the TE, it will give a response to the SC.

<TP-UDL>: number of bytes occupied by the “user data” domain. If the value is 0, the “User data” domain does not exist.

<TP-UD>: the “user data” domain may include “user data header”. If it includes the header (namely, the value of bit6 in byte0 is 1), the value of TP-UDL is equal to the length filled in the “User-Data-Header” plus the length of “User-Data”. The value of TP-UDL depends on the specific coding mode. If it is a 7-bit default code, it indicates that there are a total of how many septets; if it is a 8-bit code, it indicates there are a total of how many Octets; if it is a UCS2 code, the TP-UDL still means a total of how many Octets; if there are compressed 7-bit or 8bit or UCS2 codes, the TP-UDL indicates there are a total of how many Octets after compression. The specific representation structure in the “User data” domain is shown in the following diagram:

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Figure 6-2 Format of User data of the default 7bit code

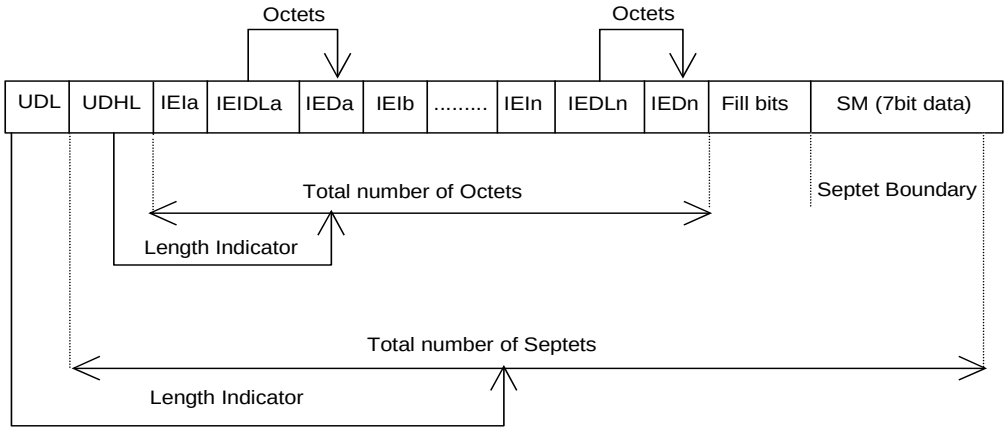
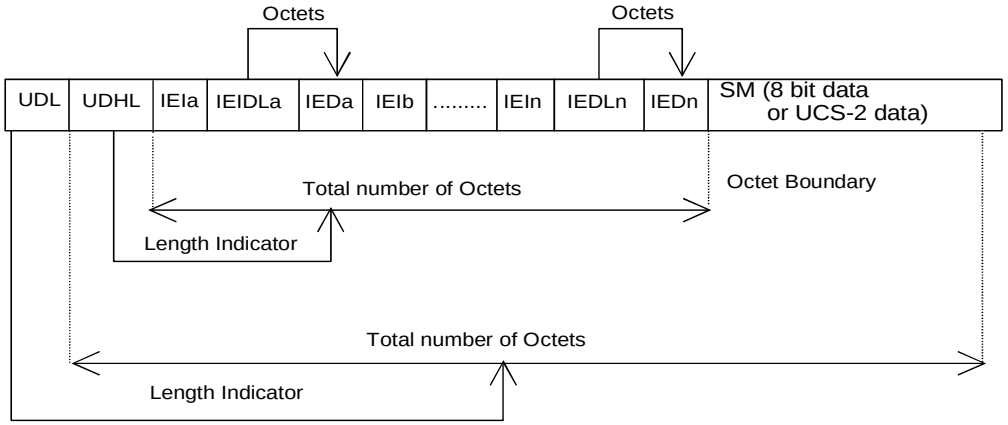


Figure 6-3 Format of User data of 8bit code or UCS2 code



The above two diagrams show the format of filling in the user data, where IEI means "Information Element Identifier".

6.10 +CPMS–Select Message Storage

6.10.1 Command Syntax

Command	Possible response(s)
+CPMS=<mem1>[,<mem2>[,<mem3>]]	<CR><LF>+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>

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Command	Possible response(s)
+CPMS?	<CR><LF>+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>, <mem3>,<used3>,<total3><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
+CPMS=?	<CR><LF>+CPMS: (list of supported <mem1>s),(list of supported <mem2>s),(list of supported <mem3>s) <CR><LF> <CR><LF>OK<CR><LF>

6.10.2 Description

The SET command is used to set the message storage media corresponding to the message read/write operations, and return the current use state of the selected media. The READ command returns the name and use state of the currently selected media. The TEST command returns all the media types supported by the MS.

Note:

The third parameter of +CPMS command is stored in NV automatically when +CPMS command executes, the other two are not. So after module resets, only the third value is the same as user set.

6.10.3 Defined Values

<mem1>: string value. It indicates the media for use of reading and deleting messages. Optional values are:

“SM”: Which means the (U)SIM card (default value).

“ME”: Which means NV.

“SR”: Indicates the status report storage place in (U)SIM card (reserved, not supported currently).

<mem2>: string value. It indicates the media for use of writing and sending messages. Optional values are:

“SM”: Which means the (U)SIM card (default value).

“ME”: Which means NV.

<mem3>: string value. It indicates the media for use of storing the received message. The optional values are the same as those of <mem2>.

<total1>: integer value. It indicates the total number of messages that can be saved in <mem1>.

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<total2>: integer value. It indicates the total number of messages that can be saved in <mem2>.

<total3>: integer value. It indicates the total number of messages that can be saved in <mem3>.

<used1>: integer value. It indicates the total number of messages currently stored in <mem1>.

<used2>: integer value. It indicates the total number of messages currently stored in <mem2>.

<used3>: integer value. It indicates the total number of messages currently stored in <mem3>.

6.11 +CSCA–Set SMSC Number

6.11.1 Command Syntax

Command	Possible response(s)
+CSCA=<sca>[,<tosca>]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
+CSCA?	<CR><LF>+CSCA: <sca>,<tosca><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
+CSCA=?	<CR><LF>OK<CR><LF>

6.11.2 Description

The SET command is used to set the SMSC number. For the message in the PDU mode, the setting of this command can be used only if the SMSC-related parameter sc_len has the value of 0 (for the PDU format, see the “+CMGS” command) in the PDU.

6.11.3 Defined 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”.

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If no <tosca> parameter is included, it is equivalent to the effect that the <tosca> parameter is not modified.

6.11.4 Examples

AT+CSCA?

+CSCA: "+8613902900", 145

OK

6.12 +CMGS–Send Message

6.12.1 Command Syntax

Command	Possible response(s)
If PDU mode (+CMGF=0): +CMGS=<length><CR> PDU is given<ctrl-Z/ESC> If TEXT mode (+CMGF=1): +CMGS=<da>[,<toda>]<CR> text is entered<ctrl-Z/ESC>	If PDU mode (+CMGF=0): <CR><LF>+CMGS: <mr>[,<ackpdu>]<CR><LF> <CR><LF>OK<CR><LF> If TEXT mode (+CMGF=1): <CR><LF>+CMGS: <mr><CR> <LF><CR><LF>OK<CR><LF> In case of SMS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
+CMGS=?	<CR><LF>OK<CR><LF>

6.12.2 Description

Send a message to the network side. The process of sending a message includes two steps:

- PDU mode:

  First, deliver “AT+CMGS=<length>” ended with (CR).

  After MS returns <CR><LF><greater_than><space> (IRA 13, 10, 62, 32), the TE delivers the PDU packet, which is ended with <ctrl-Z> (IRA 26).

- TEXT mode:

  First, deliver “AT+CMGS=<da>[,<toda>]” ended with (CR).

  After MS returns <CR><LF><greater_than><space> (IRA 13, 10, 62, 32), the TE delivers the text, which is ended with <ctrl-Z> (IRA 26).

In TEXT mode, it only supports 0–0x00FF with UCS2. When choose GSM 7 bit coding mode, only support GSM 7 bit basic characters, not support GSM 7 bit extended characters.

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The maximum length of message is 160 characters with 7bit codec, and 70 characters with UCS2.

6.12.3 Defined Values

<length>: the number of actually sent TPDU characters/2. The digits are decimal numbers that range from 0 to 9. The maximum value is 178.

<da>: destination address.

<mr>: message ID. The digits are decimal numbers that range from 0 to 9. The value ranges from 0 to 255.

<ackpdu>: when the value of <service> in “+CSMS” is 1, which is supported by the network, this field will be returned. Unless no SCA exists, the format is the same as the format of PDU. This field is not supported currently.

<ctrl-Z>: identifies the end of a PDU data. The characters are: '0x1A'

<ESC>: cancel the sending of this message. The characters are: '0x1B'

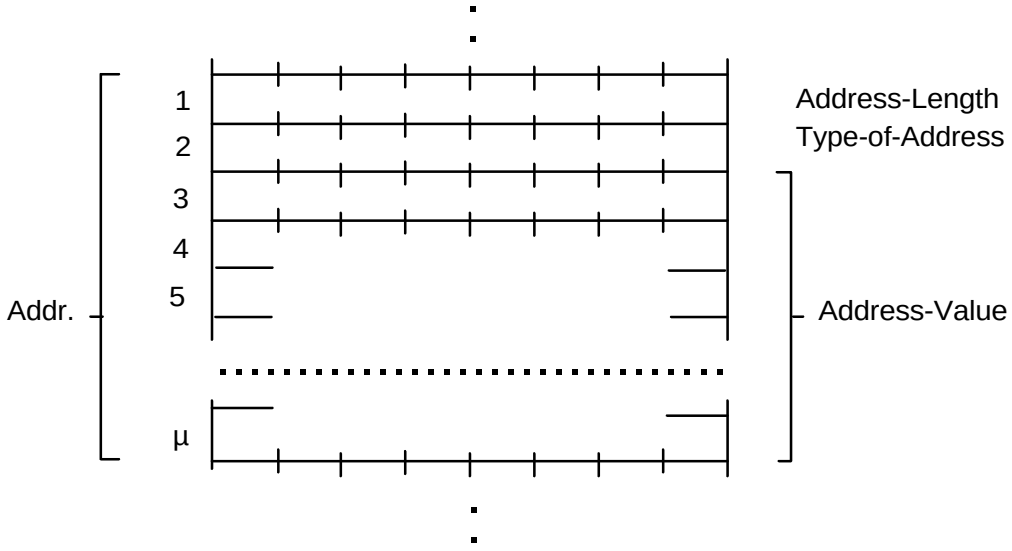
The structure of the PDU packet is as follows: (The values of the characters described in the packet are: 0–9, A–F, a–f. Two characters make up one Octet value. For example: ’23’=0x23, ‘2a’=0x2a, all are hexadecimal).

Table 6-8 The structure of the PDU packet

[<SCA>]			
<sc_len>	<type_addr>	<numbers>	TPDU

<SCA>: SMSC address. Its structure is as follows:

Figure 6-4 The structure of SMSC address



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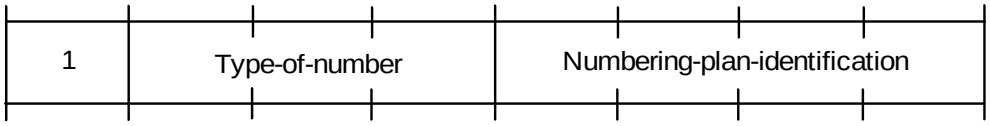
<sc_len>: length of the SCA (short message service centre number). It is composed of two characters. It indicates the number of characters occupied by <type_addr> and <numbers>/2.

<type_addr>: number address type. It is composed of two characters. Its structure is as follows:

Figure 6-5 The structure of type_addr



Type-of-Number (bit6…bit4). The values are as follows:

0 0 0 This value is written when the user does not know the authentication information of the target address number. In this case, the address number is organized at the network side.

0 0 1 This value is selected if the user knows that it is an international number, or believes that it falls in the domestic range.

0 1 0 Domestic number. No prefix or suffix is allowed. This value is selected when the user sends a message to a domestic telephone set.

0 1 1 A specific number in this network. It is used for management or service and cannot be selected by the user.

1 0 1 The number type is the default 7bit code mode of GSM. It is not in use currently.

1 1 0 Short number. It is not in use currently.

1 1 1 Reserved for extension. It is not in use currently.

Numbering-plan-identification(bit3…bit0). The values are as follows:

Note:

It is valid only when the values of bit6…bit4 are 000, 001, 010. In other circumstances, bit3…bit0 are not valid

0 0 0 0 The number is determined by the numbering plan at the network side.

0 0 0 1 ISDN/telephone numbering plan.

0 0 1 1 Data numbering plan, not in use currently.

0 1 0 0 Telex numbering plan, not in use currently.

1 0 0 0 National numbering plan, not in use currently.

1 0 0 1 Private numbering plan, not in use currently.

1 0 1 0 ERMES numbering plan, not in use currently.

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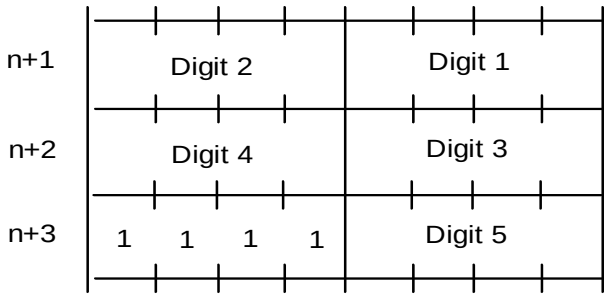
<numbers>: address number. One byte contains two digits. Bit3–bit0 contain the first digit, and bit7–bit4 contain the second digit. Coding sequence of half bytes, as shown in the following example:

Figure 6-6 Half byte coding with a total of 5 digits



Note:

If the number length is an odd number, the highest four digits of this octet should be filled with 1111.

'*': 1010 '#': 1011

'a': 1100 b': 1101 'c': 1110

For example:

If the number of SCA is 13902900, then the <numbers> is: 31099200

If the number length of SCA is an odd number: 139029001, then <numbers> is: 31099200F1

If the number type is: 'A1', the corresponding <SCA> will be 05a131099200.

If the type is indicated as an international number 'A1', while the number 13902900 is a domestic number, it is necessary to additionally dial 86 before the number, hence the corresponding <SCA> in this case is 06a16831099200.

The data structure of TPDU is as follows:

Table 6-9 The data structure of TPDU

1Octet								1Oct	2Oct~12Oct	1Oct	1Oct	1Oct	1Oct	
RP	UDHI	SRR	VPF		RD	MTI		MR	DA	PID	DCS	VP	UDL	UD
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0							

<MTI>: message type. The values are as follows:

bit1 bit0 Message Type

0 0 SMS-DELIVER (in the direction SC to MS)

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0 0 SMS-DELIVER REPORT (in the direction MS to SC)

1 0 SMS-STATUS-REPORT (in the direction SC to MS)

1 0 SMS-COMMAND (in the direction MS to SC)

0 1 SMS-SUBMIT (in the direction MS to SC)

0 1 SMS-SUBMIT-REPORT (in the direction SC to MS)

1 1 Reserved

<RD>: it indicates whether the SC needs to receive the short message that is still stored in the SC and has the MR and DA identical with those of the message sent previously from the same OA. The values are as follows:

0: To receive

1: Not to receive

<VPF>: it indicates the validity of the VP field and the format. The values are as follows:

bit4 bit3

0 0 The VP field is invalid

1 0 The VP field is valid and the format is “relative”. Only this format is available currently.

0 1 The VP field is valid, and the format is “enhanced”.

1 1 The VP field is valid, and the format is “absolute”.

<RP>: indicates the setting of the path of the message reply. The values are as follows:

0: No setting.

1: Settings are available. It indicates that the reply has the SC number settings identical with those of the message, and the return path is the same.

<UDHI>: indicates the user data header. The values are as follows:

0: The user data segment contains only contents of the message.

1: In addition to the message, the user data segment contains a data header.

<SRR>: state report request indication

0: State report information about successful sending of a message is not required.

1: State report information about successful sending of a message is required.

<MR>: message ID. The value ranges from 0 to 255.

<DA>: DA (destination address), same as defined in SCA. There are a total of 2–12Otects. Therefore, the longest address in the DA segment contains 20 digits.

<PID>: protocol indication. The values are as follows:

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Table 6-10 The structure of <PID>

PID							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0

Bit7 bit6 (here we assume bit 7 = 0 and bit 6 = 0)

0 0 Allocate bits 0..5. The values are defined below.

1 0 Allocate bits 0…5. The values are defined below.

0 1 Reserved.

1 1 Allocate bits 0...5, for special purpose of SC.

The values of Bit5 are as follows:

0: No interworking, but SME-to-SME protocol

1: Telematic interworking (in this case, the values of bits 4...0 are valid)

Bit4...bit0 telematic devices type indication:

If the values are 1 0 0 1 0, it indicates Email. Other values are not supported currently.

<DCS>: coding mode of user data. The values are as follows:

Table 6-11 The <DCS> parameter

Bit7…bit4			Bit3…..bit0
00xx	Bit5	0: Message is not compressed	Bit1 bit0 indicate message type 0 0 : Class 0, providing display and reply to the SC that the message is received but not stored. 0 1 : Class 1, stored to the NV (or SIM card if the NV is full) 1 0 : Class 2, for use of SIM only. After the message is stored, the storage state will be
		1: Message is compressed. Not supported currently.	
	Bit4	0: Bit1 and bit0 are reserved	

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Bit7…bit4			Bit3…..bit0
		1: Bit1 and bit0 indicate message type	replied to the SC. If the SIM card is full, the SC failure and the reasons will be reported. 1 1 : Class 3, stored to the TE. When the MS receives the message, but has not transmitted it to the TE, it will give a response to the SC. Bit3 bit2 message type indication 0 0 : GSM 7 bit default code 0 1 : 8bit data 1 0 : UCS2 code mode. When the user inputs Chinese characters, this value will be selected. 1 1 : Reserved.
0100 … 1011	Reserved.		
1100	The message contents are discarded. The message waiting prompt is given, and the user data adopts GSM 7 bit coding		The settings of Bit3…0 are identical with the settings made in case of bit7…4=1101
1101	The message is stored. The message waiting prompt is given, and the user data adopts GSM 7 bit coding		Bit3 Prompt indication. The values are as follows: 0: The message waiting prompt function is invalid 1: Activate the message waiting prompt function Bit2 Reserved. The value is 0. Bit1 bit0 message type indication 0 0 : With voice message waiting. 0 1 : With fax message waiting. 1 0 : With E-mail message waiting. 1 1 : Message waiting of other unknown types
1110	The message is stored. The message waiting prompt is given, and the user data adopts uncompressed UCS2 coding		The settings of Bit3…0 are identical with the settings made in case of bit7…4=1101

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Bit7…bit4		Bit3…..bit0
1111	Data coding/message class	Bit2 Reserved. The value is 0. Bit2 Coding mode of message. The values are as follows: 0: GSM 7 bit default code 1: 8bit data Bit1 bit0 message type indication 0 0 : Class 0, providing display and reply to the SC that the message is received but not stored. 0 1 : Class 1, stored to the NV (or SIM card if the NV is full) 1 0 : Class 2, for use of SIM only. After the message is stored, the storage state will be replied to the SC. If the SIM card is full, the SC failure and the reasons will be reported. 1 1 : Class 3, stored to the TE. When the MS receives the message, but has not transmitted it to the TE, it will give a response to the SC.

<VP>: indicates the validity period, which starts from the message being received by the SC. If VPF=00, this field is lacking. The duration is expressed as follows:

Table 6-12 The description of <VP>

VP value	Description
0 to 143	(VP + 1) x 5 minutes
144 to 167	12 hours + ((VP–143) x 30 minutes)
168 to 196	(VP–166) x 1 day
197 to 255	(VP–192) x 1 week

<UDL>: length of user data. The value of UDL depends on the specific coding mode.

- In case of default 7-bit coding, it indicates there are a total of how many septets.
- In case of 8bit coding, it indicates there are a total of how many Octets.
- In case of UCS2 coding, UDL indicates there are a total of how many Octets.
- In case of compressed 7-bit or 8bit or UCS2 coding, UDL indicates there are a total of how many Octets after compression.

For the compressed message codes, the data length of <UD> should not be more than 160septets; for the message of uncompressed codes, the <UD> length should not be more than 140Octets.

<UD>: user data. The data validity depends on the parameter UDL.

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6.12.4 Examples

The SMSC number is: 13902900, and the message is sent to the number: 13901000453, and the contents are: 0x53 0x4E 0x4E 0x3A ("华为" for UCS2 encode), then:

If "+CSCA" has set SCA, then

a) When sending the message, the <SCA> field can be left uncompleted. The <SCA> value is obtained through the value set via “+CSCA” command.

AT+CMGS=17(CR)

>81000B813109010054F3001804534E4E3A\x1A

Note:

Data interpretation, 81(<RP-MTI>)00(<MR>)0B(<DA-len>)81(<DA-type>) 3109010054F3(<DA-numbers>)00(<PID>)18(<DCS>)04(<UDL>)534E4E3A (<UD>)\x1A(<ctrl-Z>)

b) When sending the message, the <SCA> field can also be completed, and the <SCA> value can be obtained directly from the PDU packet.

AT+CMGS=17

>05a13109920081000B813109010054F3001804534E4E3A\x1A

or

AT+CMGS=17

>0081000B813109010054F3001804534E4E3A\x1A

(In this case, since <sc_len>=0, when sending the message, the <SCA> can be obtained through the value set via the "+CSCA" command)

PDU Format:

DATA:81000B813109010054F3001804534E4E3A

Field	Information	Comment
81	RP-MTI	RP-Message Type Indicator(send SMS)
00	TP-MR	0
0B	DA Address length	Total 11 code
81	DA-type	Unknown type
3109010054F3	TP-DA	13901000453, last extra F is filled for full information string.
00	TP-PID	GSM, point to point
18	TP-DCS	UCS2
04	TP-UDL	Send data length is 4

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Field	Information	Comment
534E4E3A	TP-UD	send data
\x1A	ctrl-Z	

If "+CSCA" has not set SCA, then

When sending the message, the <SCA> field must be completed, and the <SCA> value can be obtained directly from the PDU packet.

AT+CMGS=17

>05a13109920081000B913109010054F3001804534E4E3A\x1A

PDU Format:

DATA:05a13109920081000B913109010054F3001804534E4E3A

Field	Information	Comment
05	SMSC address length	05
a1	TON	Domestic number
31099200	SMSC address	13902900
81	RP-MTI	RP-Message Type Indicator(send SMS)
00	TP-MR	0
0B	DA Address length	Total 11 codes
91	DA-type	International code
3109010054F3	TP-DA	13901000453, last extra F is filled for full information string.
00	TP-PID	GSM, point to point
18	TP-DCS	UCS2
04	TP-UDL	Send data length is 4
534E4E3A	TP-UD	send data
\x1A	ctrl-Z	

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6.13 +CMGW–Store Message to Memory

6.13.1 Command Syntax

Command	Possible response(s)
If PDU mode (+CMGF=0): +CMGW=<length>[,<stat>]<CR>PDU is given<ctrl-Z/ESC> If TEXT mode (+CMGF=1): +CMGW[=<oa/da>[,<tooa/toda>[,<stat>]]]<CR> text is entered<ctrl-Z/ESC>	<CR><LF>+CMGW: <index><CR><LF><CR><LF>OK<CR><LF> In case of SMS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
+CMGW=?	<CR><LF>OK<CR><LF>

6.13.2 Description

Store a message to the <mem2> storage set via the “+CPMS” command.

6.13.3 Defined Values

PDU mode:

<length>: number of actually sent TPDU characters/2.

<mr>: message ID. The digits are decimal numbers that range from 0 to 9. The value range is: 0–255.

<ctrl-Z>: identifies the end of a PDU data. The characters are: '0x1A'

<ESC>: cancels the sending of this message. The characters are: '0x1B'

<stat>: storage state of the message. The values are as follows: (In the PDU mode, the default value is 2)

0 "REC UNREAD" received unread message

1 "REC READ" received read message

2 "STO UNSENT" stored unsent message

3 "STO SENT" stored sent message

4 "ALL" all messages (This value is only applicable to the “+CMGL” command)

<index>: position number in the storage. The digits are decimal numbers that range from 0 to 9. The value range is 0~maximum capacity of storage-1.

The PDU packet structure is consistent with the description of the “+CMGS” command.

TEXT mode:

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<oa/da>: originating address/Destination address. Same as defined in SCA. Total 2–12 Otects. Therefore, the longest address in the OA segment contains 20 digits.

<tooa>: Type-of-Originating-Address.

<toda>:Type-of-Destination-Address.

<stat>, <ctrl-Z>, <ESC>: please refer to the defined values of PDU mode.

6.14 +CMGL–List Message List

6.14.1 Command Syntax

Command	Possible response(s)
+CMGL[=<stat>]	In case of PDU mode and successful execution of command: [<CR><LF>+CMGL: <index>,<stat>,[<reserved>],<length><CR><LF><pdu> [<CR><LF>+CMGL: <index>,<stat>,[<reserved>],<length><CR><LF><pdu> [...]]<CR><LF>]<CR><LF>OK<CR><LF> If text mode, command successful and SMS-SUBMITs and/or SMS-DELIVERs: [<CR><LF>+CMGL: <index>,<stat>,<oa/da>,<reserved>[,<scts>]<CR><LF><data>][<CR><LF>+CMGL: <index>,<stat>,<oa/da>,<reserved>[,<scts>]<CR><LF><data>][...]<CR><LF>]<CR><LF>OK<CR><LF> If text mode, command successful and SMS-STATUS-REPORTs: [<CR><LF>+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> [<CR><LF>+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[...] <CR><LF>]<CR><LF>]]<CR><LF>OK<CR><LF> Otherwise: <CR><LF>+CMS ERROR: <err><CR><LF>
+CMGL=?	<CR><LF>+CMGL: (list of supported <stat>s)<CR><LF> <CR><LF>OK<CR><LF>

6.14.2 Description

The SET command returns all messages from <mem1>, which are in the state specified by the parameter <stat>. If the message state is “Unread message that has been received”, the state of the message in the storage will be converted to “Read message that has been received” after the command is executed successfully.

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When the <stat> takes on the default value, the SET command is equivalent to the SET command:

PDU: AT+CMGL=0

TEXT: AT+CMGL="REC UNREAD"

The TEST command returns all the supported stat values.

6.14.3 Defined Values

PDU mode:

<stat>:message type. The default value is 0:

0: Unread messages that has been received

1: Read message that has been received

2: Unsent message that has been stored

3: Sent message that has been stored

4: Any message

<index>: integer value, which indicates the position in the storage.

<reserved>: reserved.

<length>: integer value, which indicates the number of bytes of TPDU data.

<pdu>: protocol data unit. The data structure is as follows:

Table 6-13 The data structure of PDU

[<SCA>]			
<sc_len>	<type_addr>	<numbers>	TPDU

Where, the <SCA>, <sc_len>, <type_addr>, and <numbers> fields are defined in the same way as in the section “Message sending command”.

For sent message, the data structure of TPDU is the same as defined in “Message sending command”. For the received message, the data structure of TPDU is as follows:

Table 6-14 The data structure of TPDU

1 Oct								2 Oct~12 Oct	1 Oct	1 Oct	7 Oct	1Oct	
TP-MTI		MMS	0	0	SRI	UDHI	RP	OA	PID	DCS	SCTS	UDL	UD
Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7						

<MTI>: same as defined in the section “Message sending command”.

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<MMS>: indicates whether there are more messages to be sent.

0: Nonexistent

1: Existent

<SRI>: indicates whether the SME (short message entity) has requested a state report.

0: Nonexistent

1: Existent

<UDHI>: same as defined in the section “Message sending command”.

<RP>: same as defined in the section “Message sending command”.

<OA>: source address. Same as defined in SCA. Total 2–12Otects. Therefore, the longest address in the OA segment contains 20 digits.

<PID>: protocol indication. Same as defined in the section “Message sending command”.

<DCS>: coding mode of user data. Same as defined in the section “Message sending command”.

<SCTS>: time chop of SMC, including year, month, day, hour, minute, second and time difference. Time difference refers to the difference of time between the local time and the Greenwich standard time.

<UDL>: user data length. Same as defined in the section “Message sending command”.

<UD>: The length of a specific user data depends on the UDL.

TEXT mode:

<stat>: message type. The default value is "REC UNREAD":

"REC UNREAD": unread SMS

"REC READ": read SMS

"STO UNSENT": stored and unsent SMS

"STO SENT": stored and sent SMS

"ALL": all SMS

<fo>: depending on the command or result code: first octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (default value is 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format.

<mr>: 3GPP TS 23.040 TP-Message-Reference in integer format.

<ra>: 3GPP TS 23.040 TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in 3GPP TS 27.007); type of address given by <tora>.

<tora>: TP-Recipient-Address Type-of-Address octet in integer format (when first character of <ra> is + (IRA 43) the default value is 145, otherwise default is 129)<dt>
3GPP TS 23.040 TP-Discharge-Time in time-string format:

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"yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"

<OA/DA>: source address. Same as defined in SCA. Total 2~12Otects. Therefore, the longest address in the OA segment contains 20 digits.

<SCTS>: time chop of SMC, including year, month, day, hour, minute, second and time difference. Time difference refers to the difference of time between the local time and the Greenwich standard time.

<dt>: 3GPP TS 23.040 TP-Discharge-Time in time-string format:
"yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"

<st>: 3GPP TS 23.040 TP-Status in integer format

<data>: data unit to send.

Note:

If the <stat> message doesn't exist, the READ command will return OK.

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6.15 +CMGR–Read A Message

6.15.1 Command Syntax

Command	Possible response(s)
+CMGR=<index>	In case of PDU mode and successful execution of command: <CR><LF>+CMGR: <stat>,[<reserved>],<length><CR><LF><pdu><CR><LF><CR><LF>OK<CR><LF> In case of TEXT mode and successful execution of command: If text mode (+CMGF=1), command successful and SMS-DELIVER: <CR><LF>+CMGR: <stat>,<oa>,[<alpha>],<scts>[,<toda>,<fo>,<pid>,<dcs>, <sca>,<tosca>,<length>]<CR><LF><data><CR><LF><CR><LF>OK<CR><LF> If text mode (+CMGF=1), command successful and SMS-SUBMIT: <CR><LF>+CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>], <sca>,<tosca>,<length>]<CR><LF><data><CR><LF><CR><LF>OK<CR><LF> If text mode (+CMGF=1), command successful and SMS-STATUS-REPORT: <CR><LF>+CMGR: <stat>,<fo>,<mr>,[<ra>],[<toda>],<scts>,<dt>,<st><CR><LF><CR><LF>OK<CR><LF> If text mode (+CMGF=1), command successful and SMS-COMMAND: <CR><LF>+CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length> <CR><LF><data>]<CR><LF><CR><LF>OK<CR><LF> Otherwise: <CR><LF>+CMS ERROR: <err><CR><LF>
+CMGR=?	<CR><LF>OK<CR><LF>

6.15.2 Description

The SET command returns the messages whose storage position is “index” from <mem1>. If the message state is “Unread message that has been received”, the state of the message in the storage will be converted to “Read message that has been received” after the command is executed successfully.

The TEST command returns OK.

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6.15.3 Defined Values

<index>: integer value, which indicates the position in the storage.

<stat>: message type:

0 "REC UNREAD" received unread message (i.e. new message)

1 "REC READ" received read message

2 "STO UNSENT" stored unsent message (only applicable to SMS)

3 "STO SENT" stored sent message (only applicable to SMS)

4 "ALL" all messages (only applicable to +CMGL command)

<fo>: depending on the command or result code: first octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (the default value is 17), SMS-STATUS-REPORT, or SMS-COMMAND (the default value is 2) in integer format.

<mr>: message-reference.

<toda>: Type-of-Destination-Address.

<length>: integer value, which indicates the number of bytes of PDU data.

<pdu>: protocol data unit. Its format is the same as defined in section “Message list command”.

<oa./da>: originating address/Destination address. Same as defined in SCA. Total 2–12Otects. Therefore, the longest address in the OA segment contains 20 digits.

<scts>: Service-Centre-Time-Stamp.

<data>: data unit to send.

The other parameters can be found in GSM 07.05.

Note:

If the message doesn’t exist, the READ command will return OK.

6.16 +CGSMS–Set Message Bearer Domain

6.16.1 Command Syntax

Command	Possible response(s)
+CGSMS=<service>	<CR><LF>OK<CR><LF>
+CGSMS?	<CR><LF>+CGSMS: <service><CR><LF><CR><LF>OK<CR><LF>
+CGSMS=?	<CR><LF>+CGSMS: (list of supported <service>s) <CR><LF><CR><LF>OK<CR><LF>

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6.16.2 Description

The SET command is used to set the message bearer domain, namely, selection of CS/PS domain.

The READ command returns the current message bearer domain.

The TEST command returns the supported parameter values.

<service> is stored in NV when the command executed, and is restored from NV when power on.

6.16.3 Defined Values

<service>:

0: PS domain only

1: CS domain only (default value)

2: Prefer the PS domain

3: Prefer the CS domain

6.17 +CMMS–Send More Messages

6.17.1 Command Syntax

Command	Possible response(s)
+CMMS[=<n>]	<CR><LF>OK<CR><LF>
+CMMS?	<CR><LF>+CMMS: <n><CR><LF><CR><LF>OK<CR><LF>
+CMMS=?	<CR><LF>+CMMS: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

6.17.2 Description

The 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.

The TEST command returns supported values as a compound value.

6.17.3 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

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(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).

6.18 +CSMP–Set SMS TEXT Mode Parameters

6.18.1 Command Syntax

Command	Possible response(s)
+CSMP=[<fo>],[[<vp>],[[<pid>],[<dcs>]]]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CSMP?	<CR><LF>+CSMP: [<fo>],[<vp>],<pid>,<dcs><CR><LF><CR><LF>OK<CR><LF>
+CSMP=?	<CR><LF>OK<CR><LF>

6.18.2 Description

The SET command is used to set external parameters when sending or storing SMS, such as period of validity, etc. (It is effective only when the current mode is TEXT mode.)

The READ command returns the supported parameters.

The TEST command returns OK.

6.18.3 Defined Values

<fo>: first Octet

<vp>: integer value, range from 0 to 255.

<pid>: integer value, protocol indication, 0 is default.

<dcs>: integer value, data coding scheme, 0 is default.

Note:

In TEXT mode, when choose GSM 7 bit coding mode, only support GSM 7 bit basic characters, not support GSM 7 bit extended characters.

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6.19 +CSDH–Show SMS TEXT Mode Parameters

6.19.1 Command Syntax

Command	Possible response(s)
+CSDH[=<show>]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CSDH?	<CR><LF>+CSDH: <show><CR><LF><CR><LF>OK<CR><LF>
+CSDH=?	<CR><LF>+CSDH: (list of supported <show>s)<CR><LF><CR><LF>OK<CR><LF>

6.19.2 Description

The SET command is used to control whether the header details are shown in the TEXT mode return code. (It is only effective when the current mode is TEXT mode.)

The READ command is used to return the current status.

The TEST command is used to list the supported values.

6.19.3 Defined Values

<show>:

0: Not show the header details in the return code (default value).

1: Show the header details in the return code.

6.20 +CMSS–Send Message from Storage

6.20.1 Command Syntax

Command	Possible response(s)
+CMSS=<index>[,<da>[,<toda>]]	If TEXT mode (+CMGF=1) and sending successful: <CR><LF>+CMSS: <mr>[,<scts>]<CR><LF> <CR><LF>OK<CR><LF> If pdu mode (+CMGF=0) and sending successful: <CR><LF>+CMSS: <mr>[,<ackpdu>]<CR><LF> <CR><LF>OK<CR><LF> If sending fails: <CR><LF>+CMS ERROR: <err><CR><LF>

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Command	Possible response(s)
+CMSS=?	<CR><LF>OK<CR><LF>

6.20.2 Description

The SET 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 aborted.

6.21 ^SMMEMFULL–Report Message Storage Media Being Full

6.21.1 Command Syntax

Command	Possible response(s)
	<CR><LF>^SMMEMFULL:<mem_type><CR><LF>

6.21.2 Description

When the message storage media overflow, the event will be reported automatically.

6.21.3 Defined Values

<mem_type>: string value. It indicates the type of the overflowing media.

“SM”: Which means the (U)SIM card.

“ME”: Which means NV.

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7 Security Commands

7.1 +CPWD–Modify PIN Password

7.1.1 Command Syntax

Command	Possible response(s)
+CPWD=<fac>,<oldpwd>,<newpwd>	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CPWD=?	<CR><LF>+CPWD: (list of supported <fac>s),(list of supported <pwdlength>s)<CR><LF><CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

7.1.2 Description

The SET command is used to modify the equipment lock function (e.g. PIN).

The TEST command returns the supported device, and the maximum length of the password corresponding to this equipment.

If the pin verification was enabled, you must input the valid pin before using this command.

Note:

If you want to change password, the mode of CLCK must be 1.

7.1.3 Defined Values

<fac>: specify the object of operation of this command (only supporting SIM card, the value is "SC").

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"SC": SIM card PIN

"P2": SIM card PIN2

“AB”: Reserved, not supported currently

"AC": Reserved, not supported currently

"AG": Reserved, not supported currently

"AI": Reserved, not supported currently

"AO": Reserved, not supported currently

"IR": Reserved, not supported currently

"OI": Reserved, not supported currently

"OX": Reserved, not supported currently

<oldpwd>,<newpwd>: old password, new password, string type, and maximum length are specified by the parameter <pwdlength>. Legal characters only include ‘0’– ‘9’.

<pwdlength>: maximum length of the equipment lock password.

7.2 +CLCK–Enable and Query PIN

7.2.1 Command Syntax

Command	Possible response(s)
+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	In case of <mode>=2 and successful execution of command: <CR><LF>+CLCK: <status><CR><LF><CR><LF>OK<CR><LF> In case of <mode>≠2 and successful execution of command: <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CLCK=?	<CR><LF>+CLCK: (list of supported <fac>s)<CR><LF> <CR><LF>OK<CR><LF>

7.2.2 Description

The SET 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 aborted when network facilities are set or interrogated.

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Call barring facilities are based on GSM/UMTS supplementary services (refer 3GPP TS 22.088 [6]). The interaction of these with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standard.

The TEST command returns facility values supported as a compound value.

Note:

When <fac> has been locked, it will return "operation not supported" if lock <fac>. And when <fac> has been unlocked, it also will return "operation not supported" if unlock <fac>.

7.2.3 Defined Values

<fac>: specify the object of operation of this command (only supporting SIM card, the value is "SC").

"AB": All Barring services (reserved, not supported currently)

"AC": All in Coming barring services (reserved, not supported currently)

"AG": All out Going barring services (reserved, not supported currently)

"AI": BAIC(barr all incoming calls) (reserved, not supported currently)

"AO": BAOC(barr all outgoing calls) (reserved, not supported currently)

"IR": BIC-Roam(barr incoming calls when roaming outside the home country) (Reserved, not supported currently)

"OI": BOIC(barr outgoing international calls) (reserved, not supported currently)

"OX": BOIC-exHC(barr outgoing international calls except to home country) (reserved, not supported currently)

"SC": SIM card (if this command is configured, the password must be input when powering on the MS)

"FD": SIM card or active application in the UICC (GSM or USIM) fixed dialing memory feature (Reserved, not supported currently)

"PN": Network personalization (reserved, not supported currently)

"PU": Network sUbset personalization (reserved, not supported currently)

"PP": Service provider personalization (reserved, not supported currently)

"PC": Corporate personalization (reserved, not supported currently)

"PF": Lock phone to the very first inserted SIM/UICC card (reserved, not supported currently)

<mode>:

0: Unblock

1: Lock

2: Query state

<status>:

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0: Inactivated

1: Activated

<passwd>: string type; same as the password set via “modify password +CPWD”.

<classx>: reserved, not supported currently.

7.2.4 Examples

AT+CPIN=1111

OK

AT+CLCK="SC", 0,"1111"

OK

AT+CLCK="SC", 1,"1111",2

OK

7.3 +CPIN–Manage PIN

7.3.1 Command Syntax

Command	Possible response(s)
+CPIN=<pin>[,<newpin>]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CPIN?	<CR><LF>+CPIN: <code><CR><LF><CR><LF>OK<CR><LF>
+CPIN=?	<CR><LF>OK<CR><LF>

7.3.2 Description

The READ command is used to indicate whether password input request exists.

The SET command is used to check and unlock the PIN and PIN2.

If the current password input request is PIN or PIN2, input “+CPIN=<pin>” to check.

If the current password input request is PUK or PUK2, input “+CPIN=<pin>,<newpin>” to unlock. The first parameter is SIM PUK or SIM PUK2, and the second parameter is <newpin>, which is a new PIN or PIN2.

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When using the SET command, if the no PIN input request exists currently, an error message “+CME ERROR” will be returned.

Note:

Verifying PIN or PUK during an emergency call may make the call disconnected.

7.3.3 Defined Values

<pin>, <newpin>: string. Legal characters only include ‘0’–‘9’.

<code>: string (without quotation marks)

READY: MT without password input request

SIM PIN: UICC/SIM PIN password request

SIM PUK: UICC/SIM PUK password request, to unblock the SIM PIN which was blocked for 3 verification failure.

SIM PIN2: PIN2 password request

SIM PUK2: PUK2 password request, to unblock the SIM PIN2 which was blocked for 3 verification failure.

7.4 ^CPIN–Manage PIN (Indicate Remaining Password Input Times)

7.4.1 Command Syntax

Command	Possible response(s)
^CPIN=<pin>[,<newpin>]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^CPIN?	<CR><LF>^CPIN: <code>[,<times>],<puk_times>,<pin_times>,<puk2_times>,<pin2_times><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^CPIN=?	<CR><LF>OK<CR><LF>

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7.4.2 Description

The READ command is used to indicate whether password input request exists. The remaining password input times will be given.

The SET command is used to verify and unlock the PIN.

If the current password input request is PIN, input “+CPIN=<pin>” to verify.

If the current password input request is PUK, input “+CPIN=<pin>, <newpin>” to unlock. The first parameter is SIM PUK, and the second parameter is <newpin>, which is a new PIN.

When using the SET command, if the no PIN input request exists currently, an error message “+CME ERROR: <err>” will be returned.

Note:

Verifying PIN or PUK during an emergency call may make the call disconnected.

7.4.3 Defined Values

<pin>, <newpin>: string. Legal characters only include ’0’–‘9’.

<code>: string (without quotation marks)

READY: MT without password input request.

SIM PIN: UICC/SIM PIN password request

SIM PUK: UICC/SIM PUK password request to unblock the SIM PIN which was blocked for 3 verification failure.

SIM PIN2: PIN2 password request

SIM PUK2: PUK2 password request to unblock the SIM PIN2 which was blocked for 3 verification failure

<times>: in terms of the remaining input times, for PIN and PIN2, the maximum input times is 3 times; for PUK and PUK2, the maximum input times are 10 times.

Note:

If there is password verify request, <times> will be the remaining retry times. Otherwise, <times> will be empty.

<puk_times>: remaining PUK verify times, the maximum verify times is 10 times.

<pin_times>: remaining PIN verify times, the maximum verify times is 3 times.

<puk2_times>: remaining PUK2 verify times, the maximum verify times is 10 times.

<pin2_times>: remaining PIN2 verify times, the maximum verify times is 3 times.

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7.5 ^STRIPUSB–Shield USB Communication

7.5.1 Command Syntax

Command	Possible response(s)
^STRIPUSB[=<stripusb_status>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^STRIPUSB?	<CR><LF>^STRIPUSB:<stripusb_status><CR><LF> <CR><LF>OK<CR><LF>
^STRIPUSB=?	<CR><LF>^STRIPUSB:(list of supported <stripusb_status>s)<CR><LF> <CR><LF>OK<CR><LF>

7.5.2 Description

The SET command is used to shield the USB communication. The command is supported only in UART port. If the parameter is omitted, the default value is 1. If the value is 0, restore the USB communication (Reserved, not supported currently). Only support restoring the USB communication through resetting module.

The READ command returns the parameters value.

The TEST command returns the value range it supports.

Note:

If this command is sent before the asynchronous command processing is complete, the command could not be sent.

7.5.3 Defined Values

<stripusb_status>:

0: Restore USB communication (reserved, not supported currently).

1: Shield USB communication.

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8 GPRS Service Commands

8.1 +CGDCONT–Set PDP Environment

8.1.1 Command Syntax

Command	Possible response(s)
+CGDCONT[=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]]]	<CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF>
+CGDCONT?	<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp> [<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[...]]<CR><LF> <CR><LF>OK<CR><LF>
+CGDCONT=?	<CR><LF>+CGDCONT: (list of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s) [<CR><LF>+CGDCONT: (list of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s)[...]]<CR><LF> <CR><LF>OK<CR><LF>

8.1.2 Description

The SET command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command.

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A special SET command “+CGDCONT= <cid>” will clear all parameters in the setting environment indicated by <cid>.

The READ command returns all the parameter values of the defined setting environments. The setting environments are displayed by means of linefeed.

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.

8.1.3 Defined Values

<cid>:

1–16: Index value of PDP setting environment. Other PDP-related commands can be used for invoking the storage position through this index value.

<PDP_type>: string value. It indicates the type of the packet switching protocol.

“IP”: IP protocol

“PPP”: Point-to-Point protocol

<APN>: string value. It indicates the access point domain name of the connected GGSN or external network. The max len is 100.

<PDP_addr>: string value. It indicates the address of MSI.

<d_comp>: a numerical value, controlling the compression of PDP data.

0: No compression

1: Compression.

2: V.42bi (reserved, not supported currently)

If no <d_comp> is included, it is equivalent to the effect that the <d_comp> is 0.

<h_comp>: a numerical value, controlling the compression of PDP header.

0: No compression

1: Compression

2: RFC1144 (applicable for SNDCP only) (not supported currently)

3: RFC2507 (reserved, not supported currently)

Other values are reserved.

If no <h_comp> is included, it is equivalent to the effect that the <h_comp> is 0.

8.1.4 Examples

After executing the following commands consecutively, the results are as follows:

1. Command 1: AT+CGDCONT=?
   Result 1:
   +CGDCONT: (1-16),"IP",,,(0-2),(0-3)
   +CGDCONT: (1-16),"PPP",,,(0-2),(0-3)

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OK

Note:

This command supports two kinds of packet switching protocols: “IP” and “PPP”. The TEST command lists the values of other parameters supportable by each protocol.

2. Command 2: AT+CGDCONT=16,"PPP","abc.com","10.111.145.233",1,1

   Result 2:

   OK

Note:

This command stores 1 new BDP setting environment in the MS. The <cid> is 16.

3. Command 3: AT+CGDCONT?

   Result 3: +CGDCONT: 1,"IP","vcol.com","",0,0

   +CGDCONT: 16,"PPP","abc.com","10.111.145.233", 1, 1

   OK

Note:

Now the MS has an additional PDP setting environment whose <cid> is 16.

4. Command 4: AT+CGDCONT=16

   Result 4:

   OK

Note:

Clear the PDP setting environment whose <cid>=16

8.2 +CGQREQ–Quality of Service Profile (Requested)

8.2.1 Command Syntax

Command	Possible Response(s)
+CGQREQ[=<cid>[,<precedence > [,<delay> [,<reliability.> [,<peak> [,<mean>]]]]]]	<CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF>
+CGQREQ?	<CR><LF>+CGQREQ: <cid>,<precedence>, <delay>,<reliability>,<peak>,<mean>[<CR><LF>+C

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Command	Possible Response(s)
	GQREQ: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[…]]<CR><LF><CR><LF>OK<CR><LF>
+CGQREQ=?	<CR><LF>+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)[<CR><LF>+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)[…]]<CR><LF><CR><LF>OK<CR><LF>

8.2.2 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 command, the +CGQREQ command is effectively an extension to this command. 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.

Note:

It suggests to set the QoS profile as default values.

8.2.3 Defined Values

<cid>:

1–16: Index value of PDP setting environment. Other PDP-related commands can be used for invoking the storage position through this index value.

<PDP_type>: packet Data Protocol, string type.

“IP”: IP protocol

“PPP”: Point-to-Point protocol (currently not supported)

The following parameters are defined in GSM 03.60:

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

0: Subscribed value (default value)

1: High priority

2: Normal priority

3: Low priority

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

0: Subscribed delay class (default value)

1: Delay class 1

2: Delay class 2

3: Delay class 3

4: Delay class 4 (best effort)

If the size of SDU is128 octets:

Delay class	Average transmit delay	95 percentile
1 (Predictive)	<0.5	<1.5
2 (Predictive)	<5	<25
3 (Predictive)	<50	<250
4 (Best Effort)	Unspecified	

If the size of SDU is 1024 octets;

Delay class	Average transmit delay	95 percentile
1 (Predictive)	<0.5	<1.5
2 (Predictive)	<5	<25
3 (Predictive)	<50	<250
4 (Best Effort)	Unspecified	

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

0: Subscribed reliability class (default value)

1: Unused. If received, it shall be interpreted as '010'

2: Unacknowledged GTP; Acknowledged LLC and RLC, Protected data

3: Unacknowledged GTP and LLC; Acknowledged RLC, Protected data

4: Unacknowledged GTP, LLC, and RLC, Protected data

5: Unacknowledged GTP, LLC, and RLC, Unprotected data

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

0: Subscribed peak throughput (default value)

1: Up to 1 000 octet/s (8 kbit/s)

2: Up to 2000 octet/s (16 kbit/s)

3: Up to 4000 octet/s (32 kbit/s)

4: Up to 8000 octet/s (64 kbit/s)

5: Up to 16000 octet/s (128 kbit/s)

6: Up to 32000 octet/s (256 kbit/s)

7: Up to 64000 octet/s (512 kbit/s)

8: Up to 128000 octet/s (1024 kbit/s)

9: Up to 256000 octet/s (2048 kbit/s)

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

0: Subscribed mean throughput (default value)

1: 100 octet/h (–0.22 bit/s)

2: 200 octet/h (–0.44 bit/s)

3: 500 octet/h (–1.11 bit/s)

4: 1000 octet/h (–2.2 bit/s)

5: 2000 octet/h (–4.4 bit/s)

6: 5000 octet/h (–11.1 bit/s)

7: 10000 octet/h (–22 bit/s)

8: 20000 octet/h (–44 bit/s)

9: 50000 octet/h (–111 bit/s)

10: 100000 octet/h (–0.22 kbit/s)

11: 200000 octet/h (–0.44 kbit/s)

12: 500000 octet/h (–1.11 kbit/s)

13: 1000000 octet/h (–2.2 kbit/s)

14: 2000000 octet/h (–4.4 kbit/s)

15: 5000000 octet/h (–11.1 kbit/s)

16: 10000000 octet/h (–22 kbit/s)

17: 20000000 octet/h (–44 kbit/s)

18: 50000000 octet/h (–111 kbit/s)

31: best effort

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8.2.4 Examples

AT+CGQREQ=?

+CGQREQ: "IP",(0-3),(0-4),(0-5),(0-9),(0-18,31)

+CGQREQ: "PPP",(0-3),(0-4),(0-5),(0-9),(0-18,31)

OK

AT+CGQREQ?

+CGQREQ:

OK

AT+CGQREQ=1,0,0,0,0,0

OK

AT+CGQREQ?
+CGQREQ: 1,0,0,0,0,0

OK

8.3 +CGEQREQ–3G Quality of Service Profile (Requested)

8.3.1 Command Syntax

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

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Command	Possible Response(s)
	delay>,<Traffic handling priority> <CR><LF>+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> …<CR><LF><CR><LF>OK<CR><LF>
+CGEQREQ=?	<CR><LF>+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) [<CR><LF>+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)) […]]<CR><LF><CR><LF>OK<CR><LF>

8.3.2 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. Since this is the same parameter that is used in the +CGDCONT, the +CGEQREQ command is effectively an extension to this command. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

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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.

8.3.3 Defined Values

<cid>:

1–16: Index value of PDP setting environment. Other PDP-related commands can be used for invoking the storage position through this index value.

<PDP_type>: string value. It indicates the type of the packet switching protocol.

“IP”: IP protocol

“PPP”: Point-to-Point protocol

<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 (default value)

3: Background

4: Subscribed value

If the Traffic class is specified as conversational or streaming, then the Guaranteed and Maximum bitrate parameters should also be provided. Other values are reserved.

<Maximum bitrate UL>: a numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…,32, …). This parameter should be provided if the Traffic class is specified as conversational or streaming. The default value is 0.

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

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

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

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requested. This parameter should be provided if the Traffic class is specified as conversational or streaming. The default value is 0.

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

0: No

1: Yes

2: Subscribed value. (default 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. The default value is 0.

<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+CGEQREQ=…,”5E3”,…). '0E0' (default value) 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'. As an example a target residual bit error ratio of 5•10-3 would be specified as '5E3' (e.g. AT+CGEQREQ=…,”5E3”,…). '0E0' (default value) means subscribed value.

<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 (default 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' (default value) 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' (default value) the subscribed value will be requested.

0: Subscribed traffic handling priority (default value)

1: Priority level 1

2: Priority level 2

3: Priority level 3

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8.3.4 Examples

AT+CGEQREQ=?
+CGEQREQ:
"IP",(0-4),(0-384),(0-7168),(0-384),(0-7168),(0-2),(0-1520),("0E0","1E1","1E2","7E3","1E3","1E4","1E5","1E6"),("0E0","5E2","1E2","5E3","4E3","1E3","1E4","1E5","1E6","6E8"),(0-3),(0,100-4000),(0-3)

+CGEQREQ:
"PPP",(0-4),(0-384),(0-7168),(0-384),(0-7168),(0-2),(0-1520),("0E0","1E1","1E2","7E3","1E3","1E4","1E5","1E6"),("0E0","5E2","1E2","5E3","4E3","1E3","1E4","1E5","1E6","6E8"),(0-3),(0,100-4000),(0-3)

OK

AT+CGEQREQ?
+CGEQREQ: 1,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 2,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 3,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 4,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 5,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 6,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 7,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 8,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 9,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 10,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 11,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 12,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 13,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 14,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 15,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 16,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

OK

AT+CGEQREQ=1,4,0,0,0,0,2,0,"0E0","0E0",3,0,0

OK

AT+CGEQREQ?
+CGEQREQ: 1,4,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 2,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

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+CGEQREQ: 3,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 4,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 5,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 6,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 7,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 8,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 9,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 10,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 11,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 12,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 13,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 14,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 15,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

+CGEQREQ: 16,2,0,0,0,0,2,0,"0E0","0E0",3,0,0

OK

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8.4 +CGEQNEG–Request 3G Quality of Service Profile (Negotiated)

8.4.1 Command Syntax

Command	Possible Response(s)
+CGEQNEG=<cid>[,<cid>[,…]]	<CR><LF>+CGEQNEG: <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><CR><LF> [<CR><LF>+CGEQNEG: <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><CR><LF> […]] <CR><LF>OK<CR><LF> In case of error: <CR><LF>+CME ERROR:<err><CR><LF>
+CGEQNEG=?	If the connection has not been set up: <CR><LF>OK<CR><LF> If the connection has been set up; <CR><LF>+CGEQNEG: (list of <cid>s associated with active contexts)<CR><LF> <CR><LF>OK<CR><LF>

8.4.2 Description

This command allows the TE to retrieve the negotiated QoS profiles returned in the Activate PDP Context Accept message.

The SET command returns the negotiated QoS profile for the specified context identifiers, <cid>s. The QoS profile consists of a number of parameters, each of which may have a separate value.

The TEST command returns a list of <cid>s associated with active contexts.

Note:

The SET command can only be used when the connection has been set up.

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8.4.3 Defined Values

<cid>: a numeric parameter which specifies a particular PDP context definition (see +CGDCONT commands), the value range is 1 to 16.

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

0: Conversational

1: Streaming

2: Interactive

3: Background

Other values are reserved.

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

<Maximum bitrate DL>: a numeric parameter that indicates the maximum number of Kbits/s delivered by UMTS (down-link traffic) at a SAP As an example a bitrate of 32kbit/s would be specified as '32' (e.g. +CGEQNEG:…,32, …).

<Guaranteed bitrate UL>: a numeric parameter that indicates the guaranteed number of Kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bit rate of 32kbit/s would be specified as '32' (e.g. +CGEQNEG:…, 32, …).

<Guaranteed bitrate DL>: a numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bit rate of 32kbit/s would be specified as “32” (e.g. +CGEQNEG:…,32, …).

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

0: No

1: Yes

Other values are reserved.

<Maximum SDU size>: a numeric parameter that (1, 2, 3,…) 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. +CGEQNEG:…,”5E3”,…).

<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'. As an example a target residual bit error ratio of $5•10^{-3}$ would be specified as '5E3' (e.g. +CGEQNEG:…,”5E3”,…).

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

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0: No

1: Yes

2: No detect

Other values are reserved.

<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

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

8.5 +CGACT–Activate or Deactivate PDP Context

8.5.1 Command Syntax

Command	Possible response(s)
+CGACT=<state>[,<cid>[,<cid>[,…]]]	<CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>
+CGACT?	<CR><LF>+CGACT: <cid>,<state> [<CR><LF>+CGACT: <cid>,<state>[...]]<CR><LF><CR><LF>OK<CR><LF>
+CGACT=?	<CR><LF>+CGACT: (list of supported <state>s)<CR><LF><CR><LF>OK<CR><LF>

8.5.2 Description

This command is used to activate or deactivate the PDP contexts indicated by <cid>s. If no <cid>s are specified the activation/deactivation form of the command, activate or deactivate all defined PDP contexts.

8.5.3 Defined Values

<state>: integer value, indicates the active state of the PDP context.

0: Deactivated

1: Activated

<cid>: the identifier of PDP context (referred to +CGDCONT)

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8.5.4 Examples

Example1: Activate/deactivate PDP context

AT+CGACT=1, 1

OK

AT+CGACT=0, 1

OK

Example2: Read command

AT+CGACT?

+CGACT: 1,0

OK

8.6 +CGATT–Attach or Detach PS Domain

8.6.1 Command Syntax

Command	Possible response(s)
+CGATT=<state>	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>
+CGATT?	<CR><LF>+CGATT: <state><CR><LF> <CR><LF>OK<CR><LF>
+CGATT=?	<CR><LF>+CGATT: (list of supported <state>s)<CR><LF> <CR><LF>OK<CR><LF>

8.6.2 Description

The SET command is used to attach the MT to, or detach the MT from the GPRS service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. If the request is not completed, the command returns ERROR or +CME ERROR. The external error response is enabled via +CMEE command.

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

The READ command returns the current GPRS service state.

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The TEST command is used to request the information related to supporting GPRS service state.

8.6.3 Defined Values

<state>: integer value, indicates the GPRS service state.

0: Detached

1: Attached

Other values are reserved, which will get error response.

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9 Call Control Commands

9.1 D–Originate Call

9.1.1 Command Syntax

Command	Possible response(s)
Voice call: D<digits>; Data call: D<digits>	Voice call: <CR><LF>OK<CR><LF> Data call: <CR><LF>NO CARRIER<CR><LF> <CR><LF>CONNECT <text><CR><LF> <CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>

9.1.2 Description

This command is used to originate a call which may be a voice call or a data call.

Note:

Voice call command needs the semicolon, but data call command couldn't have the semicolon.

9.1.3 Defined Values

<digits>: a string of 0 or more of the characters:

"0 1 2 3 4 5 6 7 8 9 * # +"

The length of the dial string cannot bigger than 24 (not including '+').

Remarks:

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(a)The modifiers “D T P W @ ! $ A B C” are not supported and will be ignored when appearing in the dial string.

(b)’+’ indicates a international call only when it is the first character of the dial string. Otherwise it will be ignored.

(c)Any other characters appearing in the dial string that can’t be recognized as a valid part of the call addressing information or as a valid modifier will be ignored.

<text>: indicator of interface speed.

UART: 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400

USB: 384000

9.2 A–Answer Call

9.2.1 Command Syntax

Command	Possible response(s)
A	Data call: <CR><LF>CONNECT [<text>]<CR><LF> Voice call: <CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>

9.2.2 Description

The EXECUTION command is used to answer a new incoming call. When there is an incoming voice call, only PS incoming call can be answered by this command. When in PS call, only voice incoming call can be answered. When voice call and PS call incoming at the same time, voice call can be answered first, and then the PS call will be answered.

Note:

Any additional commands on the same command line are ignored.

9.2.3 Defined Values

<text>: indicator of interface speed.

UART: 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400

USB: 384000

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9.3 O–Return to Data State

9.3.1 Command Syntax

Command	Possible response(s)
O<value>	<CR><LF> CONNECT [<text>]<CR><LF> <CR><LF> NO CARRIER<CR><LF> <CR><LF> ERROR <CR><LF> <CR><LF> +CME ERROR <err><CR><LF>

9.3.2 Description

This command causes the DCE to return to online data /PPP state and issue a CONNECT or CONNECT<text> result code.

9.3.3 Defined Values

<value>

0: Switch command mode to data state

<text>: indicator of interface speed.

UART: 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400

USB: 384000

Note:

"ATO" is the same as "ATO0" and not Support PCUI port.

When one port is in data /PPP state, other port is forbidden to send "ATO" or "ATO0".

9.4 +++–Switch Data Mode to Command Mode

9.4.1 Command Syntax

Command	Possible response(s)
+++	<CR><LF>OK<CR><LF> If <value> is not recognized or supported <CR><LF>+CME ERROR: <err><CR><LF>

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9.4.2 Interface Description

While the DCE is in data mode, this command enable DCE switch to command mode.

Or while the DCE is in transparent mode of Embedded TCP/IP function, +++ will make the DCE return to command mode. For Embedded TCP/IP function, +++ can be used in serial and USB ports, for the other case, +++ can only be used in serial port.

When executing this command, any character is forbidden in 900ms before and after inputting “+++”, and it must be less than 900ms between two ‘+’ input.

Note:

Not Support PCUI port.

9.5 +CRC–Set Cellular Result Codes

9.5.1 Command Syntax

Command	Possible response(s)
+CRC[=<mode>]	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CRC?	<CR><LF>+CRC: <mode><CR><LF> <CR><LF>OK<CR><LF>
+CRC=?	<CR><LF>+CRC: (list of supported <mode>s)<CR><LF> <CR><LF>OK<CR><LF>

9.5.2 Description

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

The READ command returns the current mode value.

The TEST command returns values supported as a compound value.

9.5.3 Defined Values

<mode>:

0: Disables extended format (default value)

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1: Enables extended format

<type>:

ASYNC [,<priority>[,<subaddr>,<satype>]]	asynchronous transparent
SYNC [,<priority>[,<subaddr>,<satype>]]	synchronous transparent
REL ASYNC [,<priority>[,<subaddr>,<satype>]]	asynchronous non-transparent
REL SYNC [,<priority>[,<subaddr>,<satype>]]	synchronous non-transparent
VOICE [,<priority>[,<subaddr>,<satype>]]	normal voice (TS 11)

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

The optional <priority> indicates the eMLPP priority level of the incoming call by paging, notification or setup message. The priority level values are as defined in eMLPP specification 3GPP TS 22.067.

<subaddr>: string type sub address of format specified by <satype>

<satype>: type of sub address octet in integer format (refer 3GPP TS 24.008 sub clause 10.5.4.8)

<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.

The “AT+CRC” will be set <mode> to 0.

9.6 +CHUP–Hangup Call

9.6.1 Command Syntax

Command	Possible response(s)
+CHUP	<CR><LF>OK<CR><LF>
+CHUP=?	<CR><LF>OK<CR><LF>

9.6.2 Description

The EXECUTION command causes the TE to hang up the voice call of the MS, including ACTIVE and HELD calls.

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Notes:

- This execution of the command will not affect data calls.
- For hanging up in the multi-party call , AT+CHLD is suggested.

9.7 +CSTA–Select Type of Address

9.7.1 Command Syntax

Command	Possible response(s)
+CSTA[=<type>]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF>or <CR><LF>+CME ERROR: <err><CR><LF>
+CSTA?	<CR><LF>+CSTA: <type><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF> ERROR<CR><LF>or <CR><LF>+CME ERROR: <err><CR><LF>
+CSTA=?	<CR><LF>+CSTA: (list of supported <type>s)<CR><LF> <CR><LF>OK<CR><LF>

9.7.2 Description

The SET command selects the type of number for further dialing commands (D) according to GSM/UMTS specifications. Test command returns values supported a compound value.

9.7.3 Defined Values

<type>: type of address octet in integer format (TS 24.008)

145: When dialing string includes international access code character "+".

129: Otherwise (default value)

Note:

AT+CSTA is the same as AT+CSTA=129.

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9.8 +CBST–Select Bearer Service Type

9.8.1 Command Syntax

Command	Possible response(s)
+CBST[=<speed>[,<name>[,<ce>]]]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>
+CBST?	<CR><LF>+CBST: <speed>,<name>,<ce><CR><LF> <CR><LF>OK<CR><LF>
+CBST=?	<CR><LF>+CBST: (list of supported <speed>s),(list of supported <name>s),(list of supported <ce>s) <CR><LF> <CR><LF>OK<CR><LF>

9.8.2 Description

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

The TEST command returns values supported as compound values.

9.8.3 Defined Values

<speed>:

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

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)

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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)

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) (default value)

1: Data circuit synchronous (UDI or 3.1 kHz modem) (reserved, not supported)

4: Data circuit asynchronous (RDI) (reserved, not supported)

<ce>:

0: Transparent

1: Non-transparent (default value)

Note:

AT+CBST is the same as AT+CBST=0,0,1.

9.9 +CLCC–List Current Calls

9.9.1 Command Syntax

Command	Possible response(s)
+CLCC	[<CR><LF>+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty>, <number>,<type><CR><LF> [<CR><LF>+CLCC: <id2>,<dir>,<stat>,<mode>,<mpty>, <number>,<type><CR><LF>[…]]] <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
+CLCC=?	<CR><LF>OK<CR><LF>

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9.9.2 Description

The EXECUTION command is used to return the list of current calls of MS.

9.9.3 Defined Values

<idx>: integer type; call identification number

<dir>:

0: Mobile originated (MO) call

1: Mobile terminated (MT) call

<stat> (state of the call):

0: Active

1: Held

2: Dialing (MO call)

3: Alerting (MO call)

4: Incoming (MT call)

5: Waiting (MT call)

<mode> (bearer/teleservice):

0: Voice

1: Data (not supported)

<mpty>:

0: Call is not one of multiparty (conference) call parties

1: Call is one of multiparty (conference) call parties

<number>: string type phone number in format specified by <type>. If receive a voice call with number withhold, only quotation will be displayed.

<type>: type of address octet in integer format

9.9.4 Examples

AT+CLCC

+CLCC: 1,0,3,0,0,"13801000841",129

OK

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9.10 H–Hook Control

9.10.1 Command Syntax

Command	Possible response(s)
H	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>

9.10.2 Description

The EXECUTION command is used to terminate data call in progress by default.

9.11 S0–Ring Before Automatic Answer

9.11.1 Command Syntax

Command	Possible response(s)
S0=<value>	<CR><LF>OK<CR><LF>
S0?	<CR><LF><value><CR><LF> <CR><LF>OK<CR><LF>

9.11.2 Description

The SET command is used to disable or enable the DCE automatic to answer the incoming call. If <value> was set to non-zero value, DCE will answer the incoming call after <value> rings.

The READ command is used to return the current value.

The return value comprises three octets, for example:

0–000

1–001

For CS incoming call:

Both S0 and ^AUTOANSWER equal 0, the incoming call will not be auto-answered.

Either S0 or ^AUTOANSWER not equal 0, the incoming call will be auto-answered after S0 or ^AUTOANSWER rings which not equal 0.

Both S0 or and ^AUTOANSWER not equal 0, the incoming call will be auto-answered after the smaller one of S0 and ^AUTOANSWER rings.

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9.11.3 Defined Values

<value>:

0: Disable automatic answering (default value).

1–255: Enable automatic answering after the specified number of rings

Note:

Value of S0 will restore to default when module was reset.

9.12 ^AUTOANSWER–Auto Answer

9.12.1 Command Syntax

Command	Possible response(s)
^AUTOANSWER=<n>	<CR><LF>OK<CR><LF>
^AUTOANSWER?	<CR><LF>^AUTOANSWER:<n><CR><LF><CR><LF>OK<CR><LF>

9.12.2 Description

Autoanswer only corresponds to CS call.

This command is used to

- MS can answer a call automatically.
- The function of auto-answer will be reserved after module reset.

The SET command is used to set whether MS can answer a call automatically or the number of rings before the incoming call is auto-answered.

The READ returns the current value of parameter <n>.

For CS incoming call:

- Both S0 and ^AUTOANSWER equal 0, the incoming call will not be auto-answered.
- Either S0 or ^AUTOANSWER not equal 0, the incoming call will be auto-answered after S0 or ^AUTOANSWER rings which not equal 0.
- Both S0 and ^AUTOANSWER not equal 0, the incoming call will be auto-answered after the smaller one of S0 and ^AUTOANSWER rings.

<n> is stored in NV when the command executed, and is restored from NV when booted up.

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9.12.3 Defined Values

<n>: 0–255

0: Disable the function of AUTOANSWER (default value).

1–255: MS will answer the call automatically after Ring n times.

9.13 ^DTMF–Send DTMF Key Value

9.13.1 Command Syntax

Command	Possible response(s)
^DTMF=<call_id>,<dtmf_digit>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>

9.13.2 Description

The EXECUTION command is used to send DTMF key value to network during voice call.

9.13.3 Defined Values

<call_id>: the ID of the current call.

1–9

<dtmf_digit>: DTMF key value. It just only includes 0–9 and *, #, every time only one character is supported.

Note:

The interval of two AT^DTMF commands must be more than 3.33 ms.

9.14 ^ORIG–Indicate Call Origination

9.14.1 Command Syntax

Command	Possible response(s)
	<CR><LF>^ORIG:<call_id>,<call_type><CR><LF>

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9.14.2 Description

This command indicates that MS is originating a voice call or an emergency call.

9.14.3 Defined Values

<call_id>: the ID of the current call. The value ranges from 1 to 9.

<call_type>: the type of the current call.

0: Voice call

9: Emergency call

9.15 ^CONF–Indicate Call Origination Accepted

9.15.1 Command Syntax

Command	Possible response(s)
	<CR><LF>^CONF:<call_id><CR><LF>

9.15.2 Description

MS originate a call, and if the call is accepted by network, MS will report ^CONF to TE.

9.15.3 Defined Values

<call_id>: the ID of the current call. The value ranges from 1 to 9.

9.16 ^CONN–Indicate Call Connection

9.16.1 Command Syntax

Command	Possible response(s)
	<CR><LF>^CONN:<call_id>,<call_type><CR><LF>

9.16.2 Description

This command indicates that the call is accepted by the target UE.

9.16.3 Defined Values

<call_id>: the ID of the current call. The value ranges from 1 to 9.

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<call_type>: the type of the current call.

0: Voice call

9.17 ^CEND–Indicate Call End

9.17.1 Command Syntax

Command	Possible response(s)
	<CR><LF>^CEND:<call_id>,<duration>,<end_status>[,<cc_cause>]<CR><LF>

9.17.2 Description

This command indicates that the call is hung up.

9.17.3 Defined Values

<call_id>: the ID of the current call. The value ranges from 1 to 9.

<duration>: call duration in seconds

<end_status>: call end cause

CM_CALL_END_OFFLINE=0,	The board is in offline mode.
CM_CALL_END_NO_SRV=21,	The board is out of service.
CM_CALL_END_FADE=22,	The call is ended normally.
CM_CALL_END_INTERCEPT=23,	The call is interrupted by the BS.
CM_CALL_END_REORDER=24,	A BS record is received during the call.
CM_CALL_END_REL_NORMAL=25,	The BS releases the call.
CM_CALL_END_REL_SO_REJ=26,	The BS rejects the current SO service.
CM_CALL_END_INCOM_CALL=27,	A call from the BS is received.
CM_CALL_END_ALERT_STOP=28,	A ringing stop signaling is received during the call.
CM_CALL_END_CLIENT_END=29,	The call is ended normally at the client.
CM_CALL_END_ACTIVATION=30,	The activation is ended during the OTASP call.
CM_CALL_END_MC_ABORT=31,	The MC stops initiating the call or stops the call.
CM_CALL_END_RUIM_NOT_PRESENT=34,	The RUIM does not exist.

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CM_CALL_END_LL_CAUSE=100, layer, and cc_cause must be queried.	The call is released from the bottom
CM_CALL_END_CONF_FAILED=101,	The network fails to respond.
CM_CALL_END_INCOM_REJ=102,	The MT rejects an incoming call.
CM_CALL_END_SETUP_REJ=103,	The call is rejected during setup.
CM_CALL_END_NETWORK_END=104, network, and cc_cause must be queried.	The call is released from the
CM_CALL_END_NO_FUNDS=105,	The fund runs out.
CM_CALL_END_NO_GW_SRV=106,	The MT is out of service.

<cc_cause>: call control information

UNASSIGNED_CAUSE	1
NO_ROUTE_TO_DEST	3
CHANNEL_UNACCEPTABLE	6
OPERATOR_DETERMINED_BARRING	8
NORMAL_CALL_CLEARING	16
USER_BUSY	17
NO_USER_RESPONDING	18
USER_ALERTING_NO_ANSWER	19
CALL_REJECTED	21
NUMBER_CHANGED	22
NON_SELECTED_USER_CLEARING	26
DESTINATION_OUT_OF_ORDER	27
INVALID_NUMBER_FORMAT	28
FACILITY_REJECTED	29
RESPONSE_TO_STATUS_ENQUIRY	30
NORMAL_UNSPECIFIED	31
NO_CIRCUIT_CHANNEL_AVAILABLE	34
NETWORK_OUT_OF_ORDER	38
TEMPORARY_FAILURE	41
SWITCHING_EQUIPMENT_CONGESTION	42
ACCESS_INFORMATION_DISCARDED	43
REQUESTED_CIRCUIT_CHANNEL_NOT_AVAILABLE	44
RESOURCES_UNAVAILABLE_UNSPECIFIED	47
QUALITY_OF_SERVICE_UNAVAILABLE	49

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REQUESTED_FACILITY_NOT_SUBSCRIBED	50
INCOMING_CALL_BARRED_WITHIN_CUG	55
BEARER_CAPABILITY_NOT_AUTHORISED	57
BEARER_CAPABILITY_NOT_PRESENTLY_AVAILABLE	58
SERVICE_OR_OPTION_NOT_AVAILABLE	63
BEARER_SERVICE_NOT_IMPLEMENTED	65
ACM_GEQ_ACMMAX	68
REQUESTED_FACILITY_NOT_IMPLEMENTED	69
ONLY_RESTRICTED_DIGITAL_INFO_BC_AVAILABLE	70
SERVICE_OR_OPTION_NOT_IMPLEMENTED	79
INVALID_TRANSACTION_ID_VALUE	81
USER_NOT_MEMBER_OF_CUG	87
INCOMPATIBLE_DESTINATION	88
INVALID_TRANSIT_NETWORK_SELECTION	91
SEMANTICALLY_INCORRECT_MESSAGE	95
INVALID_MANDATORY_INFORMATION	96
MESSAGE_TYPE_NON_EXISTENT	97
MESSAGE_TYPE_NOT_COMPATIBLE_WITH_PROT_STATE	98
IE_NON_EXISTENT_OR_NOT_IMPLEMENTED	99
CONDITIONAL_IE_ERROR	100
MESSAGE_NOT_COMPATIBLE_WITH_PROTOCOL_STATE	101
RECOVERY_ON_TIMER_EXPIRY	102
PROTOCOL_ERROR_UNSPECIFIED	111
INTERWORKING_UNSPECIFIED	127
REJ_UNSPECIFIED	160
AS_REJ_RR_REL_IND	161
AS_REJ_RR_RANDOM_ACCESS_FAILURE	162
AS_REJ_RRC_REL_IND	163
AS_REJ_RRC_CLOSE_SESSION_IND	164
AS_REJ_RRC_OPEN_SESSION_FAILURE	165
AS_REJ_LOW_LEVEL_FAIL	166
AS_REJ_LOW_LEVEL_FAIL_REDIAL_NOT_ALLOWED	167
MM_REJ_INVALID_SIM	168

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MM_REJ_NO_SERVICE	169
MM_REJ_TIMER_T3230_EXP	170
MM_REJ_NO_CELL_AVAILABLE	171
MM_REJ_WRONG_STATE	172
MM_REJ_ACCESS_CLASS_BLOCKED	173
ABORT_MSG_RECEIVED	174
OTHER_CAUSE	175
CNM_REJ_TIMER_T303_EXP	176
CNM_REJ_NO_RESOURCES	177
CNM_MM_REL_PENDING	178
CNM_INVALID_USER_DATA	179

Note:

If a call is terminated due to network problems, <cc_cause> is presented. If a call is terminated before response from the network side is received, <cc_cause> is not presented.

9.18 RING–Indicate Incoming Call

9.18.1 Command Syntax

Command	Possible response(s)
	<CR><LF>RING<CR><LF>

9.18.2 Description

An unsolicited report will be sent to TE periodically (PS incoming call: cycle=3s; Voice incoming call: cycle=5s). It will be reported when +CRC=0.

When there is a PS incoming call, the maximum number of rings is 13.

9.19 +CRING–Indicate Incoming Call

9.19.1 Command Syntax

Command	Possible response(s)
	<CR><LF>+CRING: <type><CR><LF>

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9.19.2 Description

An unsolicited report will be sent to TE periodically (PS incoming call: cycle=3s; Voice incoming call: cycle=5s). It will be reported when +CRC=1.

When there is a PS incoming call, the maximum number of rings is 13.

<type>: the details refer to +CRC.

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10 Supplementary Service Commands

10.1 +CHLD–Set Call Related Supplementary Services

10.1.1 Command Syntax

Command	Possible response(s)
+CHLD[=<n>]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
+CHLD=?	<CR><LF>+CHLD: (list of supported <n>s)<CR><LF> <CR><LF>OK<CR><LF>

10.1.2 Description

The SET command supplies operation for call related supplementary services.

The TEST command returns a list of operations which are supported. The call number required by some operations shall be denoted by ‘x’. The range of x is 1–9.

10.1.3 Defined Values

<n>

0: Releases all held calls or sets User Determined User Busy (UDUB) for a waiting call.

1: Releases all active calls (if any exist) and accepts the other (being held or waiting) call.

1X: Releases a specific active call X in originate connecting status, hold or active status. For example, when <n> is 12, it means release call 2.

2: Places all active calls (if any exist) on hold and accepts the other (being held or waiting) call (default value).

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2X: Places all active calls on hold except call X, with which communication shall be supported. For example, when <n> is 22, it means place all active calls on hold except call 2.

Notes:

- X is the id of current active call, we can get it via AT+CLCC.
- The "AT+CHLD" is the same as "AT+CHLD=2".

10.2 +CCFC–Set Call Forwarding Number and Conditions

10.2.1 Command Syntax

Command	Possible response(s)
+CCFC=<reason>,<mode> [,<number>[,<type> [,<class> [,<subaddr>[,<satype> [,<time>]]]]]]	when <mode>=2 and command successful: <CR><LF>+CCFC: <status>,<class1>[,<number>,<type> [,<subaddr>,<satype>[,<time>]][<CR><LF>+CCFC: <status>,<class2>[,<number>,<type> [,<subaddr>,<satype>[,<time>]]] [...]] <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
+CCFC=?	<CR><LF>+CCFC: (list of supported <reason>s)<CR><LF> <CR><LF>OK<CR><LF>

10.2.2 Description

This command allows control of the call forwarding supplementary service according to 3GPP TS 22.082 [4]. Registration, erasure, activation, deactivation, and status query are supported. 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>.

The TEST command returns reason values supported as a compound value.

10.2.3 Defined Values

<reason>:

0: Unconditional

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1: Mobile busy

2: No reply

3: Not reachable

4: All call forwarding (refer 3GPP TS 22.030)

5: All conditional call forwarding (refer 3GPP TS 22.030)

<mode>:

0: Disable call forwarding

1: Enable call forwarding

2: Query status of call forwarding

3: Register and activate call forwarding

4: Erase and deactivate call forwarding

<number>: string type phone number of forwarding address in format specified by <type>.

<type>: type of address octet in integer format (refer TS 24.008 subclause 10.5.4.7); the default value is 145 when dialing string includes international access code character "+", otherwise 129.

<subaddr>: string type subaddress of format specified by <satype>.

<satype>: type of subaddress octet in integer format (refer TS 24.008 subclause 10.5.4.8); the default value is 128.

<class> is a sum of integers each representing a class of information (the default value is 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

1–255: Combination of some of the above classes. For example, the default setting 7 represents the sum of the integers 1, 2 and 4 (CF for voice, data and fax). The value 255 covers all classes. If the <class> parameter is omitted, the default value 7 is used.

<classx>: same as parameter <class>.

<time>:

1–30: When "no reply" is enabled or queried, this gives the time in seconds to wait before call is forwarded, the default value is 20.

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<status>:

0: Not active

1: Active

10.3 +CLIP–Set Calling Line Identification Status

10.3.1 Command Syntax

Command	Possible response(s)
+CLIP[=<n>]	<CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
+CLIP?	<CR><LF>+CLIP: <n>,<m><CR><LF><CR><LF>OK<CR> <LF>
+CLIP=?	<CR><LF>+CLIP: (list of supported <n>s)<CR><LF><CR> <LF>OK<CR><LF>

10.3.2 Description

This command refers to the GSM/UMTS supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call.

The SET command enables or disables the presentation of the CLI at the TE. It has no effect on the execution of the supplementary service CLIP in the network.

The READ command is used to return the current value of parameter <n> and parameter <m>.

The TEST command is used to return the supported values as compound value.

10.3.3 Defined Values

<n> (parameter sets/shows presentation status to the TE):

0: Disable (default value)

1: Enable

<m> (parameter shows the subscriber CLIP service status in the network):

0: CLIP not provisioned

1: CLIP provisioned

2: Unknown (e.g. no network, etc.)

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Note:

The "AT+CLIP" is the same as "AT+CLIP=0".

10.4 +CLIP–Report of Calling Line Identification

10.4.1 Command Syntax

Command	Possible response(s)
	<CR><LF>+CLIP: <number>,<type>,,,,<CLI validity><CR><LF>

10.4.2 Description

An unsolicited report will be sent to TE every 5 seconds if +CLIP is enabled by the set command of CLIP.

10.4.3 Defined Values

<number>: ‘0’–‘9’, ‘*’, ‘#’,’+’ in the form of ASCII code value. If receive a voice call with number withhold, only quotation will be displayed.

<type>: type of address octet in integer format. 145 means international address. Refer to the detail instruction of <type_addr> at “+CMGS”.

<CLI validity>:

0: CLI valid

1: CLI has been withheld by the originator.

2: CLI is not available due to inter-working problems or limitations of originating network.

10.4.4 Examples

<CLI validity>=0 the unsolicited report will be

+CLIP: "82882690",129,,,,0

<CLI validity>=1 the unsolicited report will be

+CLIP: "",128,,,,1

<CLI validity>=2 the unsolicited report will be

+CLIP: "",128,,,,2

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10.5 +CCWA–Set Call Waiting Status

10.5.1 Command Syntax

Command	Possible response(s)
+CCWA[=<n>[,<mode>[,<class>]]]	When <mode>=2 <CR><LF>+CCWA: <status>,<class1> [<CR><LF>+CCWA: <status>,<class2> [...]]<CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF> When <mode>≠2 <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>
+CCWA?	<CR><LF>+CCWA: <n><CR><LF> <CR><LF>OK<CR><LF>
+CCWA=?	<CR><LF>+CCWA: (list of supported <n>s) <CR><LF> <CR><LF>OK<CR><LF>

10.5.2 Description

The SET command allows TE to control of the Call Waiting supplementary service. Activation, deactivation and status query are supported. <n> is used to disable/enable MS to show the result code presentation status to the TE.

The READ command returns the current value of <n>.

The TEST command returns the supported value of <n>.

10.5.3 Defined Values

<n>: sets/shows the result code presentation status to the TE.

0: Disable (default value)

1: Enable

<mode>: when <mode> parameter is not given, network is not interrogated.

0: Deactivation

1: Activation

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2: Query status

<classx> is a sum of integers each representing a class of information:

1: Voice (telephony)

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

4: Fax (facsimile services) (not supported)

8: Short message service (not supported)

16: Data circuit sync (not supported)

32: Data circuit async (not supported)

64: Dedicated packet access (not supported)

128: Dedicated PAD access (not supported)

1–255: combination of some of the above classes. For example, the default setting 1 represents that only voice is supported. The value 255 covers all classes, but it can't be used to set all classes active or inactive. If the <class> parameter is omitted, the default value 1 is used.

<status>:

0: Not active

1: Active

Note:

The "AT+CCWA" is the same as "AT+CCWA=0".

10.6 +CCWA–Report of Call Waiting

10.6.1 Command Syntax

Command	Possible response(s)
	<CR><LF>+CCWA: <number>,<type>,<class><CR><LF>

10.6.2 Description

An unsolicited report will be sent to TE every 5 seconds if +CCWA is enabled by the set command of CCWA.

10.6.3 Defined Values

<number>: string type phone number of forwarding address in format specified by <type>.

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<type>: type of address octet in integer format (refer TS 24.008 subclause 10.5.4.7);

<classx> is a sum of integers each representing a class of information (the default value is 7):

1: Voice (telephony)

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

4: Fax (facsimile services)(not supported)

8: Short message service

16: Data circuit sync

32: Data circuit async

64: Dedicated packet access

128: dedicated PAD access

1–255: Combination of some of the above classes. For example, the default setting 7 represents the sum of the integers 1, 2 and 4 (CF for voice, data and fax). The value 255 covers all classes. If the <class> parameter is omitted, the default value 7 is used.

10.7 ^USSDMODE–Set USSD Mode

10.7.1 Command Syntax

Command	Possible response(s)
^USSDMODE=<mode>	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^USSDMODE?	<CR><LF>^USSDMODE: <mode><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^USSDMODE=?	<CR><LF>^USSDMODE: (list of supported <mode>s)<CR><LF> <CR><LF>OK<CR><LF>

10.7.2 Description

The EXECUTE command is used to set the USSD mode. After the module resets, it will resume to default value.

The READ command is used to query current USSD mode.

The TEST command is used to query the list of all supported USSD mode.

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10.7.3 Defined Values

<mode>:

0: USSD non-transparent transfer mode (default value)

1: USSD transparent transfer mode

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11 Audio Commands

11.1 ^SWSPATH–Switch Sound Path

11.1.1 Command Syntax

Command	Possible response(s)
^SWSPATH=<n>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>
^SWSPATH?	<CR><LF>^SWSPATH: <n><CR><LF><CR><LF>OK<CR><LF>
^SWSPATH=?	<CR><LF>^SWSPATH: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>

11.1.2 Description

This command is used to set sound path in voice call. Resetting the module will not affect the value. Module updating will reset the value to default value.

The READ command is used to query the current sound path.

The TEST command is used to query the supported sound paths.

11.1.3 Defined Values

<n>:

0: Handset (default value)

1: Speaker

2: PCM

3: Ear 1 and MIC 2 (that is, the combination of handset ear and speaker MIC)

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11.2 ^CPCM–Configure PCM Audio

11.2.1 Command Syntax

Command	Possible response(s)
^CPCM=<mode>,<format>,<clock>,<frame>,<offset>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>
^CPCM?	<CR><LF>^CPCM: <mode>,<format>,<clock>,<frame>,<offset><CR><LF><CR><LF>OK<CR><LF>
^CPCM=?	<CR><LF>^CPCM: (list of supported <mode>s),(list of supported <format>s),(list of supported <clock>s),(list of supported <frame>s),(list of supported <offset>s)<CR><LF><CR><LF>OK<CR><LF>

11.2.2 Description

This command is used to configure the pcm audio before a voice call. Resetting the module will not affect the value. Module updating will reset the value to default value.

11.2.3 Defined Values

<mode>:

0: MASTER_PRIM (default value)

1: MASTER_AUX (reserved, not supported currently)

2: SLAVE (reserved, not supported currently)

<format>:

0: linear (default value)

1: u-law

2: a-law (reserved, not supported currently)

<clock>:

0: 2.048 MHz (default value)

1: 128 kHz (reserved, not supported currently)

<frame>:

0: Short frame (default value)

1: Long frame (reserved, not supported currently)

<offset>:

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0: Offset cleared: the sync launched is aligned to the rising edge of the PCM CLK (default value).

1: Short sync offset set: the short sync sent to the external world in Primary PCM master mode is launched 1/4 cycle after the rising edge of the PCM CLK.

2: Long sync offset set: the long sync sent to the external world in Aux PCM master mode is launched 1/4 cycle ahead of the rising edge of PCM CLK (reserved, not supported currently).

11.3 +CMIC–Tune Microphone Gain Level

11.3.1 Command Syntax

Command	Possible response(s)
+CMIC=<level>	<CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
+CMIC?	<CR><LF>+CMIC: <level> <CR><LF><CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
+CMIC=?	<CR><LF>+CMIC: (list of supported <level>s)<CR><LF><CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>

11.3.2 Description

This command is used to adjust the microphone gain of the MT.

The TEST command returns supported values as compound value.

11.3.3 Defined Values

<level>: 1–12, integer type value with manufacturer specific range (smallest value represents the lowest gain). Default value is 5. Resetting the module will not affect the value. Firmware updating will reset the value to default value.

11.4 +CLVL–Tune Loudspeaker Volume Level

11.4.1 Command Syntax

Command	Possible response(s)
+CLVL=<level>	<CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>

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Command	Possible response(s)
+CLVL?	<CR><LF>+CLVL: <level><CR><LF><CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
+CLVL=?	<CR><LF>+CLVL: (list of supported <level>s)<CR><LF><CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>

11.4.2 Description

This command is used to select the volume of the internal loudspeaker of the MT.

The TEST command returns supported values as compound value.

11.4.3 Defined Values

<level>: 0–5: integer type value with manufacturer specific range (smallest value represents the lowest sound level). 0 means mute. Default value is 2. Resetting the module will not affect the value. Module updating will reset the value to default value.

11.5 +CMUT–Switch Mute Status

11.5.1 Command Syntax

Command	Possible response(s)
+CMUT=<n>	<CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF> <CR><LF>ERROR<CR><LF>
+CMUT?	<CR><LF>+CMUT: <n><CR><LF> <CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
+CMUT=?	<CR><LF>+CMUT: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>

11.5.2 Description

This command is used to enable and disable the uplink voice muting during a voice call.

The TEST command returns supported values as compound value.

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11.5.3 Defined Values

<n>:

0: Mute off (default value)

1: Mute on

This value is restored to 0 when voice call is ended.

11.6 +VTS–Generate DTMF and Tone

11.6.1 Command Syntax

Command	Possible response(s)
+VTS=<DTMF_CHAR> +VTS=<DTMF_CHAR>[,<duration>]	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF>
+VTS=?	<CR><LF>+ VTS: (list of supported <dtmf>s)<CR><LF><CR><LF>OK<CR><LF>

11.6.2 Description

This command is intended to send ASCII character which causes the Mobile Switching Center (MSC) to transmit DTMF tone to a remote subscriber. The command can only be used during active voice calls and offers the following rules:

AT+VTS=<DTMF_CHAR> allows to send a single DTMF tone-with a default duration of 100 ms.

AT+VTS=<DTMF_CHAR>[,<duration>] allows to send a single DTMF tone. In this case, the duration can be individually determined during the call.

11.6.3 Defined Values

<DTMF_CHAR>: a single ASCII character in the set 0–9, #, *, A, B, C, D.

<duration>: tone duration in 1/10 seconds with tolerance. The minimum duration of DTMF signals is 100 ms. DTMF tone below 100ms cannot be generated.

1–255: The unit is 1/10 second.

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11.7 ^STN–Switch Sidetone Status

11.7.1 Command Syntax

Command	Possible response(s)
^STN=<vol>	<CR><LF>OK<CR><LF> <CR><LF>+CME ERROR: <err><CR><LF> <CR><LF>ERROR<CR><LF>
^STN?	<CR><LF>STN:<vol><CR><LF> <CR><LF>OK<CR><LF>
^STN=?	<CR><LF>^STN:(list of supported <vol>s)<CR><LF><CR><LF>OK<CR><LF>

11.7.2 Description

This command is used to enable and disable the sidetone before a voice call.

The TEST command returns supported values as compound value.

11.7.3 Defined Values

<vol>:

0: Sidetone off

1: Sidetone on (default value)

Resetting the module will not affect the value. Module updating will reset the value to default value.

11.8 ^ECHO–Switch Echo Canceller Mode

11.8.1 Command Syntax

Command	Possible response(s)
^ECHO=<n>	<CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF>
^ECHO?	<CR><LF>^ECHO: <n><CR><LF> <CR><LF>OK<CR><LF>
^ECHO=?	<CR><LF>^ECHO: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>

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11.8.2 Description

This command is used to switch the echo canceller mode before a voice call.

The TEST command returns supported values as compound value.

11.8.3 Defined Values

<n>:

0: Close the echo canceller

1: Handset mode, mild echo, short delay (less than 16ms dispersion)

2: Headset mode, moderate echo, short delay (less than 16ms dispersion)

3: Carkit mode, loud echo, long delay (up to 64 ms dispersion)

4: Speakerphone mode, loud echo, long delay (default value)

5: Bluetooth headset mode, there is a lot of delay in the Bluetooth air interface, definitely can't be used for non-Bluetooth modes.

Resetting the module will not affect the value. Module updating will reset the value to default value.

11.9 ^KEYTONE–Play Local DTMF Key Tone

11.9.1 Command Syntax

Command	Possible response(s)
^KEYTONE=<key>[,<duration>]	<CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF>
^KEYTONE=?	<CR><LF>^KEYTONE: (list of supported <key>s)<CR><LF><CR><LF>OK<CR><LF>

11.9.2 Description

This command is used to play the DTMF key tone local.

The TEST command returns supported values as compound value.

11.9.3 Defined Values

<key>: ASCII character in the set 0–9, #, *, A, B, C, D.

<duration>: 0 ms–1000 ms. Integer type value with manufacturer specific range. Time of the tone wil play. 0 means no stop (input this command with none 0 duration can abort).

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11.10 ^AUDIOCFG–Set Tone Volume Level

11.10.1 Command Syntax

Command	Possible response(s)
^AUDIOCFG=<tone_type>,<tone_volume>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>
^AUDIOCFG?	<CR><LF>^AUDIOCFG: <tone_type>,<tone_volume> [<CR><LF>^AUDIOCFG: <tone_type1>,<tone_volume1> [<CR><LF>^AUDIOCFG: <tone_type2>,<tone_volume2> …]] <CR><LF><CR><LF>OK<CR><LF>
^AUDIOCFG=?	<CR><LF>^AUDIOCFG: (list of supported <tone_type>s)<CR><LF><CR><LF>OK<CR><LF>

11.10.2 Description

This command is used to set the volume of specific type tone.

The TEST command returns supported values as compound value.

11.10.3 Defined Values

<tone_type>: 0–2. Integer type value with manufacturer specific range.

0: Incoming call ring

1: Local dtmf tone

2: Busy tone

<tone_volume>:

Incoming call ring:

0–1: Integer type value with manufacturer specific range. 0 means turning off the Incoming call ring function. Default value is 1, means turning on the function. Resetting the module will not affect the value. Module updating will reset the value to default value.

Local dtmf tone:

0–7: Integer type value with manufacturer specific range(smallest value represents the lowest sound level). 0 means mute. Default value is 2. Resetting the module will not affect the value. Module updating will reset the value to default value.

Busy tone:

0–1: Integer type value with manufacturer specific range. 0 means turning off the Busy tone function. Default value is 1, means turning on the function. Resetting the module will not affect the value. Module updating will reset the value to default value.

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11.11 ^ECHOPARA–Set Echo Suppression Parameters

11.11.1 Command Syntax

Command	Possible Response(s)
^ECHOPARA=<para>,<value>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^ECHOPARA?	<CR><LF>^ECHOPARA: <para>,<value> [<CR><LF>^ECHOPARA: <para1>,<value1> [<CR><LF>^ECHOPARA: <para2>,<value2> …]] <CR><LF><CR><LF>OK<CR><LF>
^ECHOPARA=?	<CR><LF>^ECHOPARA: (list of supported <para>s)<CR><LF><CR><LF>OK<CR><LF>

11.11.2 Description

This command adjusts echo suppression parameters.

The SET command is used to set the echo suppression parameters.

The READ command is used to query the settings of the echo suppression parameters.

The TEST command is used to return all configurable echo suppression parameters.

11.11.3 Defined Values

<para>: specifies the echo suppression parameter to set.

0: Gain of the first microphone amplifier

1: Gain of the codec during the sending process

<value>: specifies the value for the echo suppression parameter to set.

If <para> is set to 0, the available values for <value> are:

0: 0 dB

1: 24 dB (1 is the default value)

If <para> is set to 1, the available values for <value> are an integer ranging from 1 to 12. The gain increases with the value. The default value is 6.

This command can be executed only before calls. The parameters are restored to their default values after the module is upgraded, but not after the module is restarted.

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11.11.4 Implementation

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Optional

11.11.5 Examples

Test command:

AT^ECHOPARA=?

^ECHOPARA: (0-1)

OK

Read command:

AT^ECHOPARA?

^ECHOPARA: 0,1

^ECHOPARA: 1,6

OK

Write command:

AT^ECHOPARA=0,0

OK

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12 Phonebook Commands

12.1 +CPBS–Select Phonebook Memory

12.1.1 Command Syntax

Command	Possible response(s)
+CPBS=<storage>[,<reserved>]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CPBS?	<CR><LF>+CPBS: <storage>,<used>,<total><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CPBS=?	<CR><LF>+CPBS: (list of supported <storage>s) <CR><LF> <CR><LF>OK<CR><LF>

12.1.2 Description

The SET command is used to select a phonebook memory. The initial value after restarting the MS is “SM”. Other phonebook-related commands will be operated by using the memory selected via this command.

The READ command returns the currently selected phonebook memory. Optionally, the number of entries in use and the maximum number of entries should also be returned.

The TEST command returns the supported phonebook memory types.

12.1.3 Defined Values

<storage>: phonebook memory type. Currently, only “SM” and “ON” are supported.

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“SM”: SIM/UICC phonebook

“DC”: MT dialed calls list (reserved, not supported currently)

“FD”: SIM/USIM fix-dialing phonebook (reserved, not supported currently)

“LD”: SIM/UICC last-dialing-phonebook (reserved, not supported currently)

“MC”: MT missed (unanswered received) calls list (reserved, not supported currently)

“ME”: MT phonebook (reserved, not supported currently)

“RC”: MT received calls list (reserved, not supported currently)

“ON”: SIM/USIM own numbers (MSISDNs) list

“EN”: SIM/USIM emergency number (reserved, not supported currently)

<reserved>: reserved.

<used>: integer value. It indicates the number of entries in use in the currently selected memory.

<total>: integer value. It indicates the maximum number of entries in the currently selected memory.

12.2 +CPBF–Query Phonebook Query

12.2.1 Command Syntax

Command	Possible response(s)
+CPBF=<findtext>	<CR><LF> [+CPBF: <index1>,<number>,<type>,<text> [[...] <CR><LF>+CBPF: <index2>,<number>,<type>,<text>]]<CR><LF> <CR><LF>OK<CR><LF> In case of MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CPBF=?	<CR><LF>+CPBF: <nlength>,<tlength><CR><LF> <CR><LF>OK<CR><LF>

12.2.2 Description

The SET command is used to search and list all the records whose name begins with the specified characters. If there is no match record, returns as follows:

+CME ERROR: not found

12.2.3 Defined Values

<index1>, <index2>: integer values, the location within phonebook memory. There values are less than or equal to the total returned via +CPBS?.

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<number>: string value, phone number

<type>: phone number type. It is 145 if the number begins with “+”, otherwise it is 129.

<findtext>,<text>: string values, name

<nlength>: integer value, the maximum length of the phone number

<tlength>: integer value, the maximum length of the name

12.3 +CPBR–Read Phonebook Entries

12.3.1 Command Syntax

Command	Possible response(s)
+CPBR=<index1>[,<index2>]	[<CR><LF>+CPBR: <index1>,<number>,<type>,<text>[,<hidden>][[...] <CR><LF>+CPBR: <index2>,<number>,<type>,<text>[,<hidden>]]<CR><LF>] <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CPBR=?	<CR><LF>+CPBR: (list of supported <index>s),[<nlength>],[<tlength>]<CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

12.3.2 Description

The EXECUTION command returns phonebook entries in location number range <index1>... <index2> from the current phonebook memory storage selected with +CPBS. If <index2> is left out, only location <index1> is returned. Entry fields returned are location number <indexn>, phone number stored there <number> (of format <type>), text <text> associated with the number and, if the selected phonebook supports hidden entries, <hidden> indicating if the entry is hidden. 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 (refer 3GPP 27007 subclause 9.2 for <err> values).

The 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 storage, the lengths may not be available. If MT is not currently reachable, +CME ERROR: <err> is returned (refer 3GPP 27007 subclause 9.2 for <err> values).

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12.3.3 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 TS 24.008 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>.

<hidden>: indicates if the entry is hidden or not.

0: Phonebook entry not hidden

1: Phonebook entry hidden

12.4 +CPBW–Write Phonebook Entry

12.4.1 command Syntax

Command	Possible response(s)
+CPBW=[<index>][,<number>[,<type>[,<text>[,<hidden>]]]]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+CPBW=?	<CR><LF>+CPBW: (list of supported <index>s),[<nlength>],(list of supported <type>s),[<tlength>]<CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

12.4.2 Description

The EXECUTION command writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS. The <number> field cannot be null and the <text> field can be null. Entry fields written are phone number <number> (in the format <type>), text <text> associated with the number and, if the selected phonebook supports hidden entries, <hidden> parameter, which indicates if the entry is hidden or not. 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 (refer 3GPP 27007 subclause 9.2 for <err> values).

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The 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 storage, the lengths may not be available. If MT is not currently reachable, +CME ERROR: <err> is returned (refer 3GPP 27007 subclause 9.2 for <err> values). If storage does not offer format information, the format list should be empty parenthesis.

12.4.3 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 TS 24.008 subclause 10.5.4.7) ; default 145 when dialling 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>.

<hidden>: indicates if the entry is hidden or not.

0: Phonebook entry not hidden

1: Phonebook entry hidden

12.5 ^CPBR–Read Phonebook

12.5.1 Command Syntax

Command	Possible response(s)
^CPBR=<index1>[,<index2>]	[<CR><LF>^CPBR: <index1>,<number>,<type>,<text>,<coding> [[...] <CR><LF>^CPBR: <index2>,<number>,<type>,<text>,<coding>]<CR><LF>] <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^CPBR=?	<CR><LF>^CPBR:(list of supported <index>s), <nlength>,<tlength><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

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12.5.2 Description

This command returns the phonebook entries between positions index1 and index2 in the currently selected phonebook memory. If no entry exists between index1 and index2, the following will be returned:

+CME ERROR: not found

Alternatively, you can input index1 only, and only the phonebook entries in the position index1 will be returned.

The TEST command returns the position range of the currently selected phonebook memory, and the maximum length of <number>, <text> and <email>.

12.5.3 Defined Values

<index1>, <index2>, <index>: integer value. It indicates the position in the phonebook memory. The values of index1 and index2 are less than or equal to the “total” field returned by the “+CPBS?” command.

<number>: string type, telephone number.

<type>: number type: “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”.

<text>: string type. It indicates a name. In case coding=1, it indicates that the <text> is a hexadecimal text value of the original data.

<coding>: coding scheme. It means the character code of the <text> field, and specifies the language.

0: GSM 7 bit Default Alphabet

1: UCS2 (namely, upload the <text>in the format of original data).

<nlength>: integer value. It indicates the maximum length of the telephone number.

<tlength>: integer value. It indicates the maximum length of the name.

12.6 ^CPBW–Write Phonebook

12.6.1 Command Syntax

Command	Possible response(s)
^CPBW=<index>[,<number>[,<type>[,<text>,<coding>]]]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

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Command	Possible response(s)
^CPBW=?	<CR><LF>^CPBW:(list of supported <index>s) ,<nlength>,(list of supported <type>s) ,<tlength><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

12.6.2 Description

This command writes the phonebook entries into the position specified by “index” in the currently selected phonebook memory. If only “index” is included in the command parameter, the phonebook entry at the position corresponding to “index” will be deleted. If the “index” field is omitted, but the “number” field is included in the parameter, this phonebook entry will be written to the first empty position. If no empty position is available in this case, the following will be reported:

+CME ERROR: memory full

The TEST command returns the position range of the currently selected phonebook memory, the maximum length of the “number” field, all values of the “type” field, maximum length of the “text” field, and maximum length of the “email” field. When storing the phonebook, all input lengths must fall within the maximum length range.

12.6.3 Defined Values

<index>: integer value. It indicates the position in the phonebook memory.

<number>: string type, telephone number. (legal characters only include: ’0’–‘9’, ‘*’, ‘#’, ‘+’, ’(‘, ’)’, ’-‘.But ’(‘, ’)’, ’-‘ will be ignored).

<type>: number type: “145” means 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”.

<text>: string type. It indicates a name (no support character ’enter ’, ‘”’).

<coding>: coding scheme. It means the character code of the <text> field, and specifies the language.

0: GSM 7 bit Default Alphabet

1: UCS2 (namely, upload the <text> in the format of original data).

<nlength>: integer value. It indicates the maximum length of the telephone number.

<tlength>: integer value. It indicates the maximum length of the name.

12.6.4 Examples

AT^CPBW=1,"28780808",129,"80534E4E3A",1

OK

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Notes:

- data explain 1(the location of this record int the memory);
- "28780808”(telephone number);
- 129(number style);
- ”80534E4E3A”(name Huawei);
- 1(encode format of UCS2)

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13 Status Control Commands

13.1 +CEER–Report Extended Error

13.1.1 Command Syntax

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

13.1.2 Description

The SET command causes the MS 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.

13.1.3 Defined Values

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

Note:

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

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13.2 ^RSSI–Indicate RSSI Change

13.2.1 Command Syntax

Command	Possible response(s)
^RSSI	<CR><LF>^RSSI: <rssi><CR><LF> <CR><LF>OK<CR><LF>
	<CR><LF>^RSSI:<rssi><CR><LF>

13.2.2 Description

This command returns received signal strength indication. The unit is dBm.

Unsolicited Result Code:

When the change of RSSI is more than 5dBm, the MS will report this indication to the TE.

13.2.3 Defined Values

<rssi>: strength of the receiving signal. The values are defined as follows:

0: Equals to or less than –113 dBm

1: –111 dBm

2–30: –109 to –53 dBm

31: Equals to or higher than -–51 dBm

99: Unknown or immeasurable.

13.3 ^BAR–Query RSSI Level

13.3.1 Command Syntax

Command	Possible response(s)
^BAR	<CR><LF>^BAR: <uiPercent><CR><LF> <CR><LF>OK<CR><LF>
^BAR=?	<CR><LF>^BAR:(list of supported <uiPercent>s)<CR><LF> <CR><LF>OK<CR><LF>

13.3.2 Description

This command is used to query the signal intensity.

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13.3.3 Defined Values

<uiPercent>: the grid of the signal.

0–5: Indicate the signal intensity, definition as below

0: RSCP ≤ –109 dBm

1: –109 dBm < RSCP ≤–97 dBm

2: –97 dBm < RSCP ≤–85 dBm

3: –85 dBm < RSCP ≤–73 dBm

4: –73 dBm < RSCP ≤–61 dBm

5: RSCP > –61 dBm

13.4 ^SRVST–Indicate Service State Change

13.4.1 Command Syntax

Command	Possible response(s)
	<CR><LF>^SRVST:<srv_status><CR><LF>

13.4.2 Description

When the service state changes, the MS will report the new service state to the TE.

In sleep mode, unsolicited reports will be ignored, since the ports are closed.

13.4.3 Defined Values

<srv_status>: system service state. The values are as follows:

0: No service

1: Restricted service

2: Valid service

3: Restricted regional service

4: Power-saving and deep sleep state

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13.5 ^MODE–Indicate System Mode Change Event

13.5.1 Command Syntax

Command	Possible response(s)
	<CR><LF>^MODE:<sys_mode>,<sys_submode><CR><LF>

13.5.2 Description

When the system mode or sub-mode changes, the MS will report this indication to the TE.

In sleep mode, unsolicited reports will be ignored, since the ports are closed.

13.5.3 Defined Values

<sys_mode>: system mode. The values are as follows:

0: No service

3: GSM/GPRS mode

5: WCDMA mode

<sys_submode>: system sub mode. The values are as follows:

0: No service

1: GSM mode

2: GPRS mode

3: EDGE mode

4: WCDMA mode

5: HSDPA mode

13.6 ^SYSINFO–Query System Information

13.6.1 Command Syntax

Command	Possible response(s)
^SYSINFO	<CR><LF>^SYSINFO:<srv_status>,<srv_domain>,<roam_status>,<sys_mode>,<sim_state> [,<lock_state>,<sys_submode>]<CR><LF> <CR><LF>OK<CR><LF>

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13.6.2 Description

This command is used to query the current system information, e.g. system service state, domain, roaming or not.

13.6.3 Defined Values

<srv_status>: system service state. The values are as follows:

0: No service

1: Restricted service

2: Valid service

3: Restricted regional service

4: Power-saving and deep sleep state

<srv_domain>: system service domain. The values are as follows:

0: No service

1: Only CS service

2: Only PS service

3: PS+CS service

4: CS and PS not registered, searching

<roam_status>: roaming status. The values are as follows:

0: Non roaming state

1: Roaming state

<sys_mode>: system mode. The values are as follows:

0: No service

1: AMPS mode (not in use currently)

2: CDMA mode (not in use currently)

3: GSM/GPRS mode

5: WCDMA mode

<sim_state>: SIM card state. The values are as follows:

0: Invalid USIM card state or pin code locked

1: Valid USIM card state

2: USIM is invalid in case of CS

3: USIM is invalid in case of PS

4: USIM is invalid in case of either CS or PS

255: USIM card is not existent

<lock_state>: simlock state (reserved, not supported currently)

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<sys_submode>: system sub mode, the values are as follows:

0: No service

1: GSM mode

2: GPRS mode

3: EDGE mode

4: WCDMA mode

5: HSDPA mode

Note:

In 2G network sys_submode indicates the capability of the current cell.

13.6.4 Examples

AT^SYSINFO

^SYSINFO:2,1,0,3,1,,2

OK

13.7 ^SYSCFG–Set System Configuration Reference

13.7.1 Command Syntax

Command	Possible response(s)
^SYSCFG=<mode>,<acqorder>,<band>,<roam>,<srvdomain>	<CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF>
^SYSCFG?	<CR><LF>^SYSCFG:<mode>,<acqorder>,<band>,<roam>,<srvdomain><CR><LF> <CR><LF>OK<CR><LF>
^SYSCFG=?	<CR><LF>^SYSCFG:(list of supported <mode>s), (list of supported <acqorder>s), (list of supported(<band>,<band_name>)s), (list of supported <roam>s), (list of supported <srvdomain>s)<CR><LF> <CR><LF>OK<CR><LF>

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13.7.2 Description

This command is used to set the characteristics such as system mode, GW access sequence, band, roaming support and domain.

13.7.3 Defined Values

<mode>:system mode reference:

2: Automatic search (default value)

13: GSM ONLY

14: WCDMA ONLY

16: No change

<acqorder>: network access sequence reference:

0: Automatic search

1: GSM first, WCDMA later

2: WCDMA first, GSM later (default value)

3: No change

<band>: the band of frequency relate to selection of mode, which is actually up to the performance of MS. The parameter is HEX string, whose value is as follows or with the exception of 0x3FFFFFFF and 0x40000000 parameter as combination:

00080000 (CM_BAND_PREF_GSM_850) GSM 850

00000080 (CM_BAND_PREF_GSM_DCS_1800) GSM DCS systems

00000100 (CM_BAND_PREF_GSM_EGSM_900) Extended GSM 900

00000200 (CM_BAND_PREF_GSM_PGSM_900) Primary GSM 900

00200000 (CM_BAND_PREF_GSM_PCS_1900) GSM PCS

00400000 (CM_BAND_PREF_WCDMA_I_IMT_2000) WCDMA IMT 2000

04000000 (CM_BAND_PREF_WCDMA_V_850) WCDMA_V_850

08000000 (CM_BAND_PREF_WCDMA_VI_800) WCDMA 800

3FFFFFFF (All bands) All Bands (default value)

40000000 (Not change bands) Not change bands

0000000000800000 WCDMA US PCS 1900 band

0000000001000000 WCDMA EUROPE & CHINA DCS 1800 band

0000000002000000 WCDMA US 1700 band

0002000000000000 WCDMA EUROPE & JAPAN 900 band

0004000000000000 WCDMA_1X_1700

<roam>: roaming support: (This parameter is not supported, any value entered will be igonred, and roaming is supported by default).

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0: Not supported

1: Roaming is supported (default value)

2: No change

<srvdomain>: domain setting

0: CS_ONLY

1: PS_ONLY

2: CS_PS (default value)

4: No change

Notes:

- Module cannot register NW if the <band> value not support.
- The <band>s that module supports please refer to module's Release Notes.

13.8 ^RESETCNT–Query Reset Counter

13.8.1 Command Syntax

Command	Possible response(s)
^RESETCNT	<CR><LF>^RESETCNT:<pwroff_rst>,<at_rst>,<dog_rst><CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF>
^RESETCNT=<clear_flag>	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>

13.8.2 Description

This command used to query the times of resetting which caused by POWER_ON_OFF pin or at command etc.

13.8.3 Defined Values

<pwroff_rst>: times of resetting which caused by POWER_ON_OFF pin.

<at_rst>: times of resetting which caused by at command, such as ^RESET.

<dog_rst>: times of resetting which caused by watchdog timer expired.

<clear_flag>: this value only can be 0. It is used to clear the record of resetting times.

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13.9 ^ANTDTCT–Query the Status of ANTDET

13.9.1 Command Syntax

Command	Possible response(s)
^ANTDTCT?	<CR><LF>^ANTDTCT: <stat><CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>ERROR<CR><LF>

13.9.2 Description

This command used to query the status of ANTDET which is connected to the antenna.

13.9.3 Defined Values

<stat>: the logic value of ANTDET.

0: The antenna is connected.

1: The antenna is disconnected.

13.10 ^ANTDTCT–Indicate the Status of ANTDET When It Changes

13.10.1 Command Syntax

Command	Possible response(s)
	<CR><LF>^ANTDTCT:<stat><CR><LF>

13.10.2 Description

This command is used to report the status of ANTDET when the status changes.

13.10.3 Defined Values

<stat>: the logic value of ANTDET

0: The antenna is connected.

1: The antenna is disconnected.

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14 Network Service Commands

14.1 +CREG–Register Network

14.1.1 Command Syntax

Command	Possible response(s)
+CREG[=<n>]	<CR><LF>OK<CR><LF>
+CREG?	<CR><LF>+CREG: <n>,<stat>[,<lac>,<ci>]<CR><LF> <CR><LF>OK<CR><LF>
+CREG=?	<CR><LF>+CREG: (list of supported <n>s)<CR><LF> <CR><LF>OK<CR><LF>

14.1.2 Description

The SET command is used to control “+CREG” to report event proactively.

When <n>=1, and the state of network registration changes, the following will be reported: +CREG :<stat>.

When <n>=2, and the cell information changes, the following will be reported: +CREG: <stat>[,<lac>,<ci>].

When <n> is ignored, the command is treated as <n>=0, and return OK.

The READ command returns the current registration state <stat>. The position information <lac> and <ci> is reported only when <n>=2.

14.1.3 Defined Values

<n>:

0: Disable proactive reporting of “CREG” (default value)

1: Enable proactive reporting of “+CREG: <stat>”

2: Enable proactive reporting of “+CREG: <stat>[,<lac>,<ci>]”

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<stat>:

0: Not registered. The MS is not searching the new operators to be registered.

1: Local network is registered

2: Not registered. But the MS is searching the new operators to be registered.

3: Registration rejected

4: Unknown reasons

5: Roaming network is registered

<lac>: position code information, composed of four characters and expressed in hexadecimal. (Example: “00C3”=“195” in decimal).

<ci>: cell information, composed of four characters and expressed in hexadecimal.

(Extended Information: according to 3GPP Rel7, four characters are requested, but if before Rel7, for example the currently network is Rel6 mostly, only the last two characters is valid, the other characters is invalid and should be ignored. For example, if the <ciI> return 3B3DE1C, only DE1C is valid and could be used as DE1C is the last two characters.)

14.2 +CGREG–Control GPRS Network Registration Status

14.2.1 Command Syntax

Command	Possible response(s)
+CGREG[=<n>]	<CR><LF>OK<CR><LF>
+CGREG?	<CR><LF>+CGREG: <n>,<stat>[,<lac>,<ci>]<CR><LF> <CR><LF>OK<CR><LF>
+CGREG=?	<CR><LF>+CGREG: (list of supported <n>s)<CR><LF> <CR><LF>OK<CR><LF>

14.2.2 Description

The SET command is used to control “+CGREG” to report event proactively.

When <n>=1, and the state of network registration changes, the following will be reported: +CGREG: <stat>

When <n>=2, and the cell information changes, the following will be reported: +CGREG: <stat>[,<lac>,<ci>].

The READ command returns the current registration state <stat>. The position information <lac> and <ci> is reported only when <n>=2.

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14.2.3 Defined Values

<n>:

0: Disable proactive reporting of “CGREG” (default value)

1: Enable proactive reporting of “+CGREG: <stat>”

2: Enable proactive reporting of “+CGREG: <stat>[,<lac>,<ci>]”

<stat>:

0: Not registered. The MS is not searching the new operators to be registered.

1: Local network is registered (default value)

2: Not registered. But the MS is searching the new operators to be registered.

3: Registration rejected

4: Unknown reasons

5: Roaming network is registered

<lac>: position code information, composed of four characters and expressed in hexadecimal. (Example: “00C3”= “195” in decimal).

<ci>: cell information, composed of four characters and expressed in hexadecimal.

(Extended Information: according to 3GPP Rel7, four characters are requested, but if before Rel7, for example the currently network is Rel6 mostly, only the last two characters is valid, the other characters is invalid and should be ignored. For example, if the <ci> return 3B3DE1C, only DE1C is valid and could be used as DE1C is the last two characters.)

14.3 +COPS–Select Operator

14.3.1 Command Syntax

Command	Possible response(s)
+COPS[=<mode>[,<format>[,<oper>[,<rat>]]]]	<CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>
+COPS?	<CR><LF>+COPS: <mode>[,<format>,<oper>[,<rat>]]<CR><LF> <CR><LF>OK<CR><LF> In case of MS-related error: <CR><LF>+CME ERROR: <err><CR><LF>

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Command	Possible response(s)
+COPS=?	<CR><LF>+COPS: [list of supported (<stat>,long alphanumeric <oper>,short alphanumeric <oper>, numeric <oper>[,<rat>])s][,,(list of supported <mode>s),(list of supported <format>s)]<CR><LF> <CR><LF>OK<CR><LF> In case of CME error: <CR><LF>+CME ERROR: <err><CR><LF>

14.3.2 Description

This interface enables to query the network state and network selection mode currently registered by the MS. The Execution command enables to select the GSM/UMTS network automatically or manually. The READ command returns the current network selection mode. If the registration is successful, the current operator information will be returned. The TEST command returns the list of (up to 20) operators existent in the current network.

Note:

When <mode>=1, the command is aborted, and it will return OK for aborting.

Only when SIM is unlocked, module can select network via this command.

14.3.3 Defined Values

<mode>:

0: Automatic (<oper> field is ignored) (default value)

1: Manual (<oper> field shall be present, and <rat> optionally)

2: Deregister from network (Reserved, not supported currently)

3: Set only <format> (for read command +COPS?), do not attempt registration/deregistration (<oper> and < rat> fields are 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>: if <format> is omitted, the value of <format> is default value.

0: Long format alphanumeric <oper> (default value)

1: Short format alphanumeric <oper>

2: Numeric <oper>

<oper>:

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string type; <format> indicates if the format is alphanumeric or numeric; long alphanumeric format can be up to 16 characters long and short format up to 8 characters (refer GSM MoU SE.13); numeric format is the GSM Location Area Identification number (refer TS 24.008 sub clause 10.5.1.3) which consists of a three BCD digit country code coded as in ITU-T E.212 Annex A, plus a two BCD digit network code, which is administration specific; returned <oper> shall not be in BCD format, but in IRA characters converted from BCD; hence the number has structure: (country code digit 3) (country code digit 2) (country code digit 1) (network code digit 3) (network code digit 2) (network code digit 1).

<stat>:

0: Unknown

1: Available

2: Current

3: Forbidden

<rat>: access technology selected (Reserved, not supported currently).

0: GSM (default value)

2: WCDMA

14.3.4 Examples

(1) Query the present status of ME's network registration using the test command:

AT+COPS=?

+COPS: (2,"","","46008",2),(3,"China Unicom","UNICOM","46001",0),(3,"China Mobile Com","CMCC","46000",0),,(0,1,3,4),(0,1,2)

OK

(2) Automatic search of network

AT+COPS=0

OK

Note:

In SET command, that mode equals to 0 makes other parameters invalid.

(3) Manual search of network

AT+COPS=1,2,46000 (+CREG=1, +CGREG=1, enable URC reporting)

OK

(If the selected operator was not allowed, the ME is now unregistered. The

READ command will return only the mode, but no operator:

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AT+COPS?

+COPS: 1

OK

Please use the AT+CREG? command to verify the registration status.)

Notes:

- We cannot manually search the UTRAN network when current setting is GSM ONLY(mode=13) mode which set by ^SYSCFG.
- We cannot manually search the GSM network when current setting is WCDMA ONLY(mode=14) mode which set by ^SYSCFG.
- ERROR will be returned in this situation.

(4) Query the status of the ME's network registration using the read command:

AT+COPS? (query the information of the network currently logged in)

+COPS: 1,2,46000 (command returns mode, format, registered operator)

OK

14.4 +CSQ–Query RSSI

14.4.1 Command Syntax

Command	Possible response(s)
+CSQ	<CR><LF>+CSQ: <rssi>,<ber><CR><LF> <CR><LF>OK<CR><LF>
+CSQ=?	<CR><LF>+CSQ: (list of supported <rssi>s),(list of supported <ber>s)<CR><LF> <CR><LF>OK<CR><LF>

14.4.2 Description

The SET command returns the RSSI and BER of ME.

The TEST command returns the supported RSSI and BER values.

14.4.3 Defined Values

<rssi>: Indication of the receiving signal strength

0: Equals to or less than –113 dBm

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1: –111 dBm

2–30: –109 to –53 dBm

31: Equals to or higher than –51 dBm

99: Unknown or unmeasurable.

<ber> (bit error rate,in percent):

0–7: As RXQUAL values in the table in TS 45.008 [20] subclause 8.2.4

99: Not known or not detectable

14.5 +CCED–Query Cell Environment

14.5.1 Command Syntax

Command	Possible response(s)
+CCED=<mode>[,<requested dump>]	<CR><LF>+CCED:[<mcc>],[<mnc>],[<lac>],[<ci>],[<bsic>],[<bcch_freq>],[<rxlvel>]<[<rxlevel_full>],[<rxlevel_sub>],[<rxqual>],[<rxqual_full>],[<rxqual_sub>],[<idle_ts>]><CR><LF> <CR><LF>OK<CR><LF> In case of error: <CR><LF>ERROR<CR><LF>
+CCED?	<CR><LF>OK<CR><LF>
+CCED=?	<CR><LF>OK<CR><LF>

14.5.2 Description

This command can be used by the application to retrieve the parameters of the main cell and of up to six neighbouring cells.

This command is only able to query the information of GSM. It will return OK for WCDMA.

14.5.3 Defined Values

<mode>: return mode

0: Only return once.

<requested dump>: which cell to show.

1: Main cell

<mcc>: mobile country code

<mnc>: mobile network code

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<lac>: location area code

<ci>: cell id

<bsic>: base station Identify Code

<bcch_freq>: absolute bcch channel number.

<rxlevel>: rx signal level

<rxlevel_full>,<rxlevel_full>,<rxlevel_sub>,<rxqual>,<rxqual_full>,<rxqual_sub>,<idle_ts>: to reserved. 0 or space.

Note:

The response from <requested dump>=1 should be:

<CR><LF>+CCED:[<mcc>],[<mnc>],[<lac>],[<ci>],[<bsic>],[<bcch_freq>],[<rxlvel>]<[<rxlevel_full>],[<rxlevel_sub>],[<rxqual>],[<rxqual_full>],[<rxqual_sub>],[<idle_ts>]><CR><LF>

<CR><LF>OK<CR><LF>

14.6 +CNUM–Query Subscriber Number

14.6.1 Command Syntax

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

14.6.2 Description

Action command returns the MSISDNs related to the subscriber (this information can be stored in the SIM/UICC or in the MT). When storing information in the SIM/UICC, if a SIM card is present or if a UICC with an active GSM application is present, the information is stored in the EFMSISDN under DFTelecom. If a UICC with an active USIM application is present, the information is stored in the EFMSISDN under ADFUSIM). If subscriber has different MSISDN for different services, each MSISDN is returned in a separate line. Refer subclause14.2 for possible <err> values.

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14.6.3 Defined Values

<alphax>: optional alphanumeric string associated with <numberx>; used character set should be the one selected with command Select TE Character Set +CSCS.

<numberx>: string type phone number of format specified by <typex>.

<typex>: type of address octet in integer format (refer TS 24.008 subclause 10.5.4.7).

<speed>:

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

1: 300 bps (V.21)

2: 1200 bps (V.22)

3: 1200/75 bps (V.23)

4: 2400 bps (V.22bis)

5: 2400 bps (V.26ter)

6: 4800 bps (V.32)

7: 9600 bps (V.32)

12: 9600 bps (V.34)

14: 14400 bps (V.34)

15: 19200 bps (V.34)

16: 28800 bps (V.34)

17: 33600 bps (V.34)

34: 1200 bps (V.120)

36: 2400 bps (V.120)

38: 4800 bps (V.120)

39: 9600 bps (V.120)

43: 14400 bps (V.120)

47: 19200 bps (V.120)

48: 28800 bps (V.120)

49: 38400 bps (V.120)

50: 48000 bps (V.120)

51: 56000 bps (V.120)

65: 300 bps (V.110)

66: 1200 bps (V.110)

68: 2400 bps (V.110 or X.31 flag stuffing)

70: 4800 bps (V.110 or X.31 flag stuffing)

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

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

79: 19200 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)

82: 48000 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)

115: 56000 bps (bit transparent)

116: 64000 bps (bit transparent)

120: 32000 bps (PIAFS32k)

121: 64000 bps (PIAFS64k)

130: 28800 bps (multimedia)

131: 32000 bps (multimedia)

132: 33600 bps (multimedia)

133: 56000 bps (multimedia)

134: 64000 bps (multimedia)

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

0: Asynchronous modem

1: Synchronous modem

2: PAD Access (asynchronous)

3: Packet Access (synchronous)

4: Voice (reserved, not supported currently)

5: Fax (reserved, not supported currently)

Also all other values below 128 are reserved by the present document.

<itc> (information transfer capability):

0: 3.1 kHz

1: UDI

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14.7 ^NWINFO–Query Network Information

14.7.1 Command Syntax

Command	Possible response(s)
^NWINFO	<CR><LF>^NWINFO:<srv_band>,<srv_nodeB_PLMN>,<srv_nodeB_BS>,<srv_cell_stat >,<srv_psc>,<ecio>,<rscp>,<lac>,<cell_id>,<neighbor_cell_num>,<neig_psc1>,<neig_psc2>,<neig_psc3>,<neig_psc4>,<neig_psc5>,<neig_psc6><CR><LF><CR><LF>OK<CR><LF>

14.7.2 Description

This command is used to query the registered network information of the wireless module in the normal state, includes serving cell information, neighbour cells information of the active set, base station ID, frequency and so on.

14.7.3 Defined Values

<srv_band>: information of frequency the wireless module registered.

43 (SYS_BAND_GSM_850)	GSM 850
44 (SYS_BAND_GSM_EGSM_900)	Extended GSM 900
45 (SYS_BAND_GSM_PGSM_900)	Primary GSM 900
47 (SYS_BAND_GSM_DCS_1800)	GSM DCS systems
48 (SYS_BAND_GSM_PCS_1900)	GSM PCS
80 (SYS_BAND_WCDMA_I_IMT_2000)	WCDMA IMT 2000
87 (SYS_BAND_WCDMA_VIII_900)	WCDMA 900

<srv_nodeB_PLMN> and <srv_nodeB_BS>: information of base station the wireless module maintained.

0–255: Base station ID.

Note:

It only supports to query base station information at GSM mode now, and returns 0,0 at WCDMA mode.

<srv_cell_stat>: serving cell state.

0: Indicates not register on serving cell currently.

1: Indicates register on serving cell currently.

<srv_psc>: serving cell primary scrambling code.

0–65535: Serving cell primary scrambling code.

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Note:

It returns primary scrambling code at WCDMA mode but cell id at GSM mode.

<ecio>: the value ranges from –15 to 0. Returns the Ec/Io value. It is a negative.

Note:

It only supports to query base station information at WCDMA mode now, and returns 0 at GSM mode.

<rscp>: received Signal Code Power. Return the RSCP value. It is a negative. The unit is dBm.

Note:

It only supports to query base station information at WCDMA mode now, and returns 0 at GSM mode.

<lac>: location area code, the value displays hexadecimal.

<cell_id>: cell ID, the value displays hexadecimal.

<neighbour_cell_num>: number of neighbour cells. It equals 0 means cannot get any neighbour cell, maybe because of the network environment.

0–6: It supports to maintain six neighbour cells at most.

<neig_psc1>...<neig_psc6>: Primary scrambling code of neighbour cells.

0–65535: primary scrambling code of neighbour cells.

Note:

It returns primary scrambling code at WCDMA mode but cell id at GSM mode.

14.7.4 Examples

AT^NWINFO

^NWINFO: 84,0,0,1,405,-7,-113,0x2513,0xe0195,0,0,0,0,0,0,0

OK

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15 Internet Service Commands

15.1 ^IPINIT–Initialize a TCP/UDP Connection

15.1.1 Command Syntax

Command	Possible Response(s)
^IPINIT=<APN>[,<user_name>[,<password>[,<ip_addr>[,<auth_type>]]]]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^IPINIT?	If initialization is performed: <CR><LF>^IPINIT: <state>,<ip_address>,<APN>,<pri_dns_address>,<sec_dns_address><CR><LF> <CR><LF>OK<CR><LF> If initialization is not performed: <CR><LF>^IPINIT: 0<CR><LF> <CR><LF>OK<CR><LF>
^IPINIT=?	<CR><LF>^IPINIT: (list of supported <state>s)<CR><LF> <CR><LF>OK<CR><LF>

15.1.2 Description

This command initializes a TCP/UDP connection. After initialization is complete, a local IP address is obtained, enabling the next step to be performed, for example, enabling a TCP connection and transmitting UDP data.

In case of using the command without <user_name> and/or <password>, the user name and password that have been set by running the PPPCFG command are used.

During the execution command running, the command can be interrupted.

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15.1.3 Defined Values

<APN>: a string with double quotation marks, consisting of a maximum of 100 characters. Not used by the product. It does not need to be specified. For details, see "Example".

<user_name>: a string with double quotation marks, consisting of a maximum of 31 characters. It can be omitted.

<password>: a string with double quotation marks, consisting of a maximum of 31 characters. It can be omitted.

< ip_addr>: a string with double quotation marks, consisting of a maximum of 40 characters, specifying the local IP address in the read command. If this value is not be given, it will be set to “0.0.0.0”.

<auth_type>: an integer, specifying the authentication mode. The 3GPP2 not support this parameter, determined by the module and network consultation.

0: Non authentication

1: PAP authentication

2: CHAP authentication (default value)

<state>: an integer, specifying the initialization completion flag.

0: Non-initialized

1: Initialized

<pri_dns_address>: a string with double quotation marks, specifying the IP address of the primary DNS server.

<sec_dns_address>: a string with double quotation marks, specifying the IP address of the secondary DNS server.

15.1.4 Examples

AT^IPINIT="1234","card","card"

OK

AT^IPINIT?

^IPINIT: 1,"192.168.70.94","1234","172.22.44.200","172.22.44.201"

OK

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15.2 ^IPOPEN–Establish a TCP/UDP Connection

15.2.1 Command Syntax

Command	Possible Response(s)
^IPOPEN=<link_id>,<type>,<remote_addr>,<remote_port>[,<local_port>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^IPOPEN?	If a connection is established: <CR><LF>^IPOPEN: <link_id>,<type>,<local_port>,<remote_ip>,<remote_port>,<SIO_port>,< MSS> [<CR><LF>^IPOPEN: <link_id>,<type>,<local_port>,<remote_ip>,<remote_port>,<SIO_port>,<remote_MSS>] [...]]<CR><LF> <CR><LF>OK<CR><LF> If no connection is established: <CR><LF>OK<CR><LF>
^IPOPEN=?	<CR><LF>^IPOPEN: (list of supported <link_id>s),(list of supported <local_port>s),(list of supported <remote_port>s)<CR><LF> <CR><LF>OK<CR><LF>

15.2.2 Description

This command establishes a wireless connection with one or more remote servers to complete data exchange. TCP and UDP are supported.

During the execution command running, the command can be interrupted.

15.2.3 Defined Values

<link_id>: an integer, specifying the ID of a connection. The value ranges from 1 to 5.

<type>: a string with double quotation marks, specifying the connection type.

"TCP": a TCP connection is established.

"UDP": a UDP connection is established.

<remote_addr>: a string enclosed in double quotation marks, specifying the target IP address to be connected to, or the domain name to be resolved. The maximum value length is 255 characters.

<remote_ip>: a string with double quotation marks, specifying the target IP address to be connected to.

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<remote_port>: an integer, specifying the port of the peer server to be connected to. The value ranges from 1 to 65535.

<local_port>: an integer, specifying the local sending and receiving port. The value ranges from 1 to 65535. This parameter of the execution command parameter is optional, if the user does not enter the parameters, TE will be randomly assigned to the local port number.

<SIO_port>: an integer, specifying the link binding the physical port number. The value ranges from 0 to 10.

0: Reserved

1: UART

2: MODEM

3: PCUI

4-10: Reserved

<remote_MSS>: an integer, specifying maximum segment size in TCP protocol.

15.2.4 Examples

AT^IPOPEN=1,"TCP","129.11.18.8",10000,9000

OK

AT^IPOPEN=2,"TCP","129.11.18.8",10000,8000

OK

AT^IPOPEN=3,"UDP","129.11.18.8",7000,6000

OK

AT^IPOPEN?

^IPOPEN: 1,"TCP",9000,"129.11.18.8",10000,1,1460

^IPOPEN: 2,"TCP",8000,"129.11.18.8",10000,1,1460

^IPOPEN: 3,"UDP",6000,"129.11.18.8",7000,1,0

OK

AT^IPOPEN=1,"TCP","www.baidu.com",80,3081

OK

AT^IPOPEN?

^IPOPEN: 1,"TCP",3081,"220.181.111.147",80,1,1440

OK

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15.3 ^IPLISTEN–Enable Server Listening

15.3.1 Command Syntax

Command	Possible Response(s)
^IPLISTEN=<type>,<listen_port>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^IPLISTEN?	<CR><LF>^IPLISTEN: <type>,<listen_port>,<idle_num><CR><LF> <CR><LF>OK<CR><LF>
^IPLISTEN=?	<CR><LF>^IPLISTEN: (list of supported <type>s),(list of supported <listen_port>s),(list of supported <idle_num>s)<CR><LF> <CR><LF>OK<CR><LF>

15.3.2 Description

This command enables the server listening function. After a server is started, the server can be connected to a maximum of five clients.

15.3.3 Defined Values

<type>: a string with double quotation marks, specifying the connection type.

"TCP": A TCP connection is established.

"UDP": A UDP connection is established.

"": No connection is established. The value is returned only when the read command is executed. The value cannot be returned when the test command is executed. The value cannot be used in the execution command.

<listen_port>: an integer, specifying the local listening port. The value ranges from 1 to 65535.

Note:

If server listening is not enabled, 0 is returned when the query command is executed.

<idle_num>: an integer, specifying the number of currently idle connections. The value ranges from 0 to 5.

15.3.4 Examples

AT^IPLISTEN?

^IPLISTEN: "",0,2

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OK

AT^IPLISTEN=?

^IPLISTEN: ("TCP","UDP"),(1-65535),(0-5)

OK

AT^IPLISTEN="TCP",12000

OK

AT^IPLISTEN?

^IPLISTEN: "TCP",12000,2

OK

15.4 ^IPSEND–Transmit TCP/UDP Data

15.4.1 Command Syntax

Command	Possible Response(s)
^IPSEND=<link_id>,<data>	<CR><LF>^IPSEND: <link_id><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^IPSEND=?	<CR><LF>OK<CR><LF>

15.4.2 Description

This command is used to transmit subscriber data through an established connection.

During the execution command running, the command can be interrupted.

15.4.3 Defined Values

<link_id >: an integer, specifying the ID of an established connection. The value ranges from 1 to 5.

<data>: specifies subscriber data, enclosed in double quotation marks, with a maximum length of 1500 bytes.

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Note:

Only the subscriber data in the form of visible characters can be transmitted. To transmit invisible characters, they must first be converted into visible ones. In addition, subscriber data cannot contain quotation marks.

15.4.4 Examples

AT^IPSEND=3,"ASDF"

^IPSEND: 3

OK

15.5 ^IPSENDEX–Send TCP/UDP Data Extension Command

15.5.1 Command Syntax

Command	Possible response(s)
<mode>=0,1: ^IPSENDEX=<link_id>,<mode>,<data> <mode>=2: ^IPSENDEX=<link_id>,<mode>,<len><CR>entered data	<CR><LF>^IPSENDEX: <link_id><CR><LF> <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^IPSENDEX=?	<CR><LF>^IPSENDEX: (list of supported <link_id>s),(list of supported <mode>s)<CR><LF> <CR><LF>OK<CR><LF>

15.5.2 Description

This command is used to transmit user data through an established connection, supporting three data transmission modes.

The first mode is the ^IPSEND compatible mode, in which ^IPSENDEX functions as the old command ^IPSEND.

The second mode is the forced conversion mode. In this mode, a user must convert the original data from hexadecimal data to character strings before entering them to the MT. Then the MT converts the data back to hexadecimal data before sending the data to the receiving end. The receiving end can obtain the original data without additional processing. For example, if a user wants to send four bytes of data (0x00, 0x08, 0x1B, and 0x2C), the user enters the command ^IPSENDEX=1,1,"00081B2C". Then the receiving end receives 0x00, 0x08, 0x1B, and 0x2C.

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The third mode is the length-limited transparent transmission mode. In this mode, a user runs the command to send the data length to the MT. After the MT returns **OK**, the user enters the data to be sent until it reaches the length limit. For example, if a user wants to send four bytes of data, 0x00, 0x08, 0x1B, and 0x2C, the user runs the command ^IPSENDEX=1,2,4. After OK is returned, the user enters 0x00, 0x08, 0x1B, and 0x2C.

Note:

If the length of the entered data is shorter than the requested length, the MT will wait until the remaining data is entered. If the length of the entered data is longer than the requested length, it will return CME ERROR.

During the execution command running, the command can be interrupted.

15.5.3 Defined Values

<link_id>: an integer, specifying the ID of an established connection. The value ranges from 1 to 5.

<mode>:

0: ^IPSEND compatible

1: Forced conversion mode

2: Length-limited transparent transmission mode

<data>: user data, only STRING type data supported. The maximum length of the user data is 1500 bytes.

<len>: data length user request to transfer, the maximum value is the 1500 bytes.

15.5.4 Examples

AT^IPSENDEX=1,1,"393830"

^IPSENDEX: 1

OK

AT^IPSENDEX=1,2,3

OK

input user data

^IPSENDEX: 1

OK

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15.6 ^IPDATA–Indicate the Arrival of TCP/UDP Data

15.6.1 Command Syntax

Command	Possible Response(s)
	<CR><LF>^IPDATA: <link_id>,<data_len>,<data><CR><LF>

15.6.2 Description

This command automatically reports the received data.

15.6.3 Defined Values

<link_id>: an integer, specifying the ID of an established connection. The value ranges from 1 to 5.

<data_len>: an integer, specifying the data length. The value ranges from 1 to 1500.

<data>: a string without double quotation marks, specifying the newly received data.

15.6.4 Examples

^IPDATA: 3,4,asdf

15.7 ^IPCLOSE–Disable a TCP/UDP Connection

15.7.1 Command Syntax

Command	Possible Response(s)
^IPCLOSE=<link_id>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^IPCLOSE?	<CR><LF>^IPCLOSE: <link1_state>,<link2_state>,<link3_state>,<link4_state>,<link5_state><CR><LF> <CR><LF>OK<CR><LF>
^IPCLOSE=?	<CR><LF>^IPCLOSE: (list of supported <link_id>s)<CR><LF> <CR><LF>OK<CR><LF>

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15.7.2 Description

This command disables a TCP/UDP connection or disables the TCP/UDP function.

If <link_id> is set to 1–5, it indicates that the corresponding established connection is disconnected. To disconnect a TCP connection, four handshaking operations are needed for both party. UDP connection can be disconnected directly.

Note:

This command will close the TCP link as soon as the AT command returns OK. In some rare contention case, when the server doesn't receive FIN ACK from the client, the server will remain in CLOSE_WAIT state. In that rare case, the server can't finish TCP release on time. But the server will close the link after some time. The waiting time depends on the server's implementation.

If <link_id> is set to 6, it indicates that the server listening function is disabled for the module.

If <link_id> is set to 7, it indicates that the module deregisters from the network, which is similar to dial-up disconnection.

During the execution command running, the command can be interrupted.

15.7.3 Defined Values

<link_id>: specifies the ID of a connection. The value ranges from 1 to 7.

1–5: Actual connection ID

6: Established connection and the local server

7: Disable all connections and PPP

<linkx_state>: specifies the state of connection x.

0: Connection x is disabled and can be used.

1: Connection x is enabled and is being used.

15.7.4 Examples

AT^IPCLOSE?

^IPCLOSE: 1,1,0,0,0

OK

AT^IPCLOSE=1

OK

AT^IPCLOSE?

^IPCLOSE: 0,1,0,0,0

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OK

15.8 ^IPENTRANS–Enable the Transparent Transmission Mode

15.8.1 Command Syntax

Command	Possible Response(s)
^IPENTRANS=<link_id>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^IPENTRANS?	<CR><LF>^IPENTRANS: <link_id ><CR><LF> <CR><LF>OK<CR><LF> If there is no link in the transparent transmission mode: <CR><LF>OK<CR><LF>

15.8.2 Description

This command enables the TCP/UDP transparent transmission mode.

After "OK" is returned, a subscriber can continuously enter data and transmit the data to the remote TE.

If a subscriber continuously enters +++, the transparent transmission mode is disabled.

Detection +++ rules:

- The interval between the user data and +++ must be greater than 900ms.
- The interval between two '+' can not exceed 900ms. And there are no other data input between two '+'.

Before link enters transparent transmission mode, the other links on the same physical port should be closed. Otherwise the command ^IPENTRANS will return CME ERROR.

The twelfth parameter of ^IPCFL command can set the transparent transmission mode.

MODE 0: In this mode, user can send any data, and the data will be sent to the remote TE without any treatment. The mode can be used in TCP link and UDP link.

According to fifth parameter of ^IPCFL, the module determine the packet delay. According to tenth parameter of ^IPCFL, the module determine data packet length.

Mode 0 data is sent as follows:

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- Step 1: When the data length is reached "data packet length", module will send such data to the remote TE. Then the module will continue to process remaining data.
- Step 2: When the length of the remaining data does not meet the "data packet length", the module will start or reset packet delay timer.
- Step 3: If the timer times out, the remaining data will be sent to the remote TE.
- Step 4: If the packet delay timer running process, the module receives new data, then repeat step 1 to 3.

MODE 1: In this mode, the user needs to add 0x7E in the end of each packet. The module detects "0x7E" as a packet end. Then the data packet will be sent to the remote TE. This mode just be used in UDP link.

The user sends data rules: if user data contains the 0x7E, 0x7E must convert to 0x7D 0x5E, and if user data contains the 0x7D, 0x7D must convert to 0x7D 0x5D.

The user receives data rules: the 0x7D 0x5E converted to 0x7E, the 0x7D 0x5D converted to 0x7D. 0x7E identifies a UDP message end, not the actual user data.

Notes:

- This command is only supported in UART port. If the user uses this command to enter into the transparence transmission mode in other ports, it may cause some uncertain issues.
- When the module in server listen state, this command only supports the link that created by the remote client to enter the transparence transmission mode. And the link which created by the module can't enter the transparence transmission mode.
- When the module is in transparence transmission mode, a TCP connection request is coming. The module will close the TCP link after accept it. And if there are some UDP data packets received and this UDP link is not the trans link, the module will discard those packets, and close the UDP link.

15.8.3 Defined Values

<link_id>: specifies the ID of an established connection. The value ranges from 1 to 5.

15.8.4 Examples

AT^IPENTRANS=1

OK

Now, the remote end will receive any characters (excluding consecutive three +) entered by a subscriber.

15.9 ^IPSTATE–Report TCP/UDP Connection State

15.9.1 Command Syntax

Command	Possible Response(s)
	<CR><LF>^IPSTATE: <link_id>,<state>,<errcode><CR><LF>

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15.9.2 Description

When a TCP/UDP link was closed by AT command IPCLOSE (linked is 1~5), the MT will not send this unsolicited report to TE. Otherwise, the MT will send this unsolicited report to TE.

When a TCP/UDP link was created by AT command IPOPEN, the MT will not send this unsolicited report to TE. Otherwise, the MT will send this unsolicited report to TE.

15.9.3 Defined Values

<link_id>: specifies the ID of an established connection. The value ranges from 0 to 7.

0: Illegal ID

1–5: the ID of an established connection

6: Local server

7: Network

<state>: link state

0: The link is closed

1: The remote TCP link is accepted.

Others are reserved

<errcode>: error information

0: Link has been closed by remote or ME

1: Remote link has been accepted by MT

2: Network error

3: No idle link

4: Reject the remote request link in the transparent transmission mode

Others are reserved

15.9.4 Examples

There has been a link 1 for TCP connection as client. After the TCP server close the connection, the ME will report:

^IPSTATE: 1,0,0

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15.10 ^IPCFL–Set IPSTACK Static Parameters

15.10.1 Command Syntax

Command	Possible response(s)
^IPCFL=<parameter_id>,<value>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^IPCFL?	<CR><LF>^IPCFL: <parameter_id>,<value> [<CR><LF>^IPCFL: <parameter_id>,<value>[…]]<CR><LF> <CR><LF>OK<CR><LF>
^IPCFL=?	<CR><LF>^IPCFL: <parameter_id>,(list of supported <value>s), <CR><LF>^IPCFL: <parameter_id>,(list of supported <value>s), … <CR><LF><CR><LF>OK<CR><LF>

15.10.2 Description

This command is used to set some parameters of the IPSTACK. It only support set the value items 5, 10 and 12 now. The other parameters are not supported in currently.

Note:

When used the query command. The response will not contain the unsupported items.

15.10.3 Defined Values

<parameter_id>: the item which the command will to set.

<value>: the value the command will set the item to.

parameter_id	value range (Unit)	Description
5	1–100 (unit: 0.1s, default value: 10)	The value of the transparent transmission timer
10	1–1472(unit: 1Byte, default value: 1024)	The transparent transmission length Trigger
12	0,1(default value: 0)	The transparent transmission mode, see the command ^IPENTRANS.

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15.10.4 Examples

The value of the transparent transmission timer is set to 0.2 seconds.

AT^IPCFL=5,2

OK

15.11 ^IPFLOWQ–TCP/UDP Flow Queries

15.11.1 Command Syntax

Command	Possible response(s)
^IPFLOWQ[=<link_id>]	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
^IPFLOWQ?	<CR><LF>^IPFLOWQ: <link1>,<TX_FROM_USER>,<TX_TO_SOCKET>,<TX_ACK_SUM>,<RX_FROM_SOCKET>,<RX_TO_USER> <CR><LF>^IPFLOWQ: <link2>,<TX_FROM_USER>,<TX_TO_SOCKET>,<TX_ACK_SUM>,<RX_FROM_SOCKET>,<RX_TO_USER> <CR><LF> …<CR><LF>OK<CR><LF>
^IPFLOWQ=?	<CR><LF>^IPFLOWQ: (list of supported <link_id>s)<CR><LF><CR><LF>OK<CR><LF>

15.11.2 Description

The EXECUTION command is used to clear the specified TCP / UDP link packet statistics.

The READ command is used to query the current TCP / UDP link packet statistics.

15.11.3 Defined Values

<link_id>: specifies the ID of the link. The value ranges from 0 to 5.

0: It's used to clear the statistics for all links in the execution command.

1–5: It specifies the link need to clear the statistical data.

<TX_FROM_USER>: an integer, specifying the amount of data received from user. The maximum value is the (2^{32}-1) bytes.

<TX_TO_SOCKET>: an integer, specifying the amount of data sent to socket. The maximum value is the (2^{32}-1) bytes.

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<TX_ACK_SUM>: an integer, specifying the amount of ACK received. The maximum value is the (2^{32}-1) bytes.

<RX_FROM_SOCKET>: an integer, specifying the amount of data received from socket. The maximum value is the (2^{32}-1) bytes.

<RX_TO_USER>: an integer, specifying the amount of data sent to user. The maximum value is the (2^{32}-1) bytes.

15.12 ^DVCFG–Set Priority of Voice Call and Data Service

15.12.1 Command Syntax

Command	Possible Response(s)
^DVCFG=<mode>	<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
^DVCFG?	<CR><LF>^DVCFG: <mode><CR><LF> <CR><LF>OK<CR><LF>
^DVCFG=?	<CR><LF>^DVCFG: (list of supported <mode>s)<CR><LF> <CR><LF>OK<CR><LF>

15.12.2 Description

This command sets and queries the priority of voice call and data service.

15.12.3 Defined Values

<mode>:

0: voice call prefer (default value)

In this state, an incoming voice call will suspend the data transmission. If data service is not in transparent transmission mode, all ports (PCUI port, MODEM port, and UART port) will report RING message. If data service is in transparent transmission mode, all ports will report RING message except the port which is processing data service, and the RING pin is dredged. The data transmission will keep on going after stopping the voice call. But there is one risk that the transmitted data maybe loss during the process of voice call, only the last packet(less than 1600 byte) can be sent successfully.

1: data service prefer

In this state, after using ^IPINIT command initial the IPSTACK, an incoming voice call will be hang up by the module automatically.

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To change the priority of voice call and data service by using AT^DVCFG=0 command, or using command AT^IPCLOSE=7 to close IPSTACK, which can return back to answer the voice call when it coming.

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16 Overall Design Constraints

16.1 Standards Compliance

AT command standards. For details, see the protocols 27.007, 27.005 and V0025-TE.

16.2 Hardware Limitations

16.3 Technology Limitations

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17 Appendixes

17.1 Appendix 1 AT Command Description

17.1.1 Basic Commands

The format of a basic command is:

<command>[<number>]

Where, <command> is a single letter (A–Z) or a “&” plus a single letter, and <number> is a decimal number composed of one or more digits. The 0s at the head of <number> will be ignored. If a basic command that can carry <number> carries no <number>, the <number> value is 0 by default. If a basic command that cannot carry <number> carries a <number>, the information “TOO MANY PARAMETERS” will be returned.

17.1.2 S Register Command

All commands that begin with “S” are collectively called “S register command”. Command format:

S<parameter number>?

S<parameter number>=<value>

The S register command name is composed of the letter “S” combined with a decimal number. This decimal number is called “register sequence number (parameter number)”. If the register is not identified, it indicates that this command does not exist, and the “ERROR” information will be returned. Each S register saves a character. If the command name is followed by “?”, it indicates a READ recommend. The ASCII code values currently saved in this S register expressed by a 3-digit decimal number, will be returned. Make up three digits by filling 0s at the end if there are less than 3 digits. If the command name is followed by “=”, the command is a SET command. In this case, replace the characters stored in this S register with the characters corresponding to the <value>.

17.1.3 Extended Commands and Manufacturer Defined Commands

The extended commands begin with “+”. The commands defined by the manufacturer also begin with a special character, e.g. “$”, “^”. For purpose of this document, all commands defined by manufacturers begin with “^”. All extended commands and

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manufacturer-defined commands are divided into two categories: Action command and parameter command.

1. Action commands

Action commands are the commands that carry out a specific action rather than only dealing with local parameters of the MS, e.g. AT+CMGS. An action command may carry parameters or not. Action commands include SET and TEST.

- SET command

Command format:

No parameter <name>

With 1 parameter <name> [=<value>]

With more parameters<name> [=<compound_value>]

<compound_value> indicates multiple parameters, separated by “,” in the middle. For the parameters that have a default value, they can be omitted and substitute the default value. If all the parameters are omitted, the “=” behind <name> should be omitted too. If <name> is not identified, it indicates that this command does not exist, and the information “ERROR” will be returned. If <name> is identifiable, and the command contains uncalled-for parameters, or the number of parameters goes beyond the defined range, the information “TOO MANY PARAMETERS” will be returned.

- TEST command

Command format:

<name>=?

If the MS cannot identify <name>, the information “ERROR” will be given. If the MS can identify <name>, and the command carries no parameter, the information “OK” will be returned. If the command carries parameters, the value range of each parameter will be returned first, then “OK” will be returned.

2. Parameter commands

Parameter commands refer to the commands that can only deal with the local parameters of MS. These parameters may affect the execution of the action commands. Parameter commands include SET, READ and TEST commands.

- SET command

Command format:

With 1 parameter: <name> [=<value>]

With more parameters<name> [=<compound_value>]

The SET command is used to set the parameters. <compound_value> means multiple parameters, separated by “,” in the middle. For the parameters that have a default value, they can be omitted and substitute the default value. If all the parameters are omitted, the “=” behind <name> should be omitted too. If <name> is not identified, it indicates that this command does not exist, and the “ERROR” information will be returned. If <name> is identifiable, and the command contains uncalled-for parameters, or the number of parameters goes beyond the defined range, the information “TOO MANY PARAMETERS” will be returned.

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- READ command

Command format:

<name>?

The READ command is used to read the current value of the parameter.

- TEST command

Command format:

<name>=?

If the MS cannot identify <name>, the information “ERROR” will be given. If the MS can identify <name>, and the command carries no parameter, the information “ok” will be returned. If the command carries parameters, the value range of each parameter will be returned first, then “OK” will be returned.

17.1.4 Abort Attribute

Abort means the TE sends an instruction to interrupt a command being executed. The “Abort” command must be issued before the command finishes execution, so it makes sense only to the commands that require a certain time period for executing. However, not all commands that require a certain time period for executing can be aborted, depending on the abort attribute of the command. Each AT command has the abort attribute. This attribute is a two-option choice. Namely, the command either supports abort or does not support abort. The commands that support abort include some basic commands and the SET command of action command. These commands do not accept any abort request within 125ms after being issued. After the command has been issued for 125ms but has not finish execution, if any character is received from the TE, it will interrupt the execution of the command immediately.

The commands that support abort are as follows:

AT+CLCK	Can be aborted
AT+COPS	Can be aborted except “AT+COPS=?”
AT^IPINIT	Can be aborted
AT^IPOPEN	Can be aborted
AT^IPSEND	Can be aborted
AT^IPSENDEX	Can be aborted
AT^IPCLOSE	Can be aborted

17.2 Appendix 2 CME Error List

Note:

The following table lists the possible CME errors and reasons for all the interface command. The code in the first row of the table represents the <err> value of CME ERROR. The numerals in the table represent the sequence number of reasons. The table of correspondence between CME ERROR and text string is attached later, together with detailed description on the reasons.

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For example: “7” is filled in the column whose <err> is 16 in the “+CPWD=” command. This indicates the “+CPWD=” may incur the CME ERROR whose <err> is 16. Its text string is “incorrect password”. The reason is that the sequence number is 7, and the detailed reason is “password incorrect”.

	0	3	4	5	10	11	12	13	14	16	17	18	20	21	22	23	24
+CPWD=							5	6		7							
+CPIN=		3					5 7										
+CPIN?								4	1								
+CGSN																8	
+COPS=	31														32		
+CSCA=						9	5	4	1								
+CSCA?						9	5	4	1								
+CPBS=						9	5	4	1								
^CPBR=						9	5	4	1					10			
^CPBW=						9	5	4	1				13	10			14
^SPN=						9	5	4	1								
+CNMI						9	5	4									
+CMGD						9	5	4									
+CNMA						9	5	4									
+CMGS						9	5	4									
+CMGW						9	5	4									
+CMGL						9	5	4									
+CMGR						9	5	4									
+CSQ						9	5	4									
+IFC						9	5	4									
^BAR						9	5	4									
+CEER						9	5	4									
H						9	5	4									
+CRC						9	5	4									

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	0	3	4	5	10	11	12	13	14	16	17	18	20	21	22	23	24
+CSCS						9	5	4									
O						9	5	4									
D						9	5	4									
A						9	5	4									
+CNUM						9	5	4									
+CLCK						9	5	4									
+CREG						9	5	4									
^IPINIT						9	5	4									
^IPOPEN						9	5	4									
^IPLISTEN						9	5	4									
^IPSEND						9	5	4									
^IPGETDATA						9	5	4									
^IPCLOSE						9	5	4									
^IPENTRANS						9	5	4									

	26	27	30	31	32	100	134	257	258	259	260	261	262	263	264
+COPS=			27												
^CPBW=	15	16													

	65280	65281	65282	65823	65284	65285	65286	65287
^SPN=					28	29	30	39

The reasons are described as follows:

1 SIM card busy

2 Operation not supported

3 Check performed without the check request

4 No SIM card

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5	PUK check request existent
6	SIM card failure
7	Password error
8	Failure in obtaining IMEI from NV or invalid IMEI
9	Requiring PH-SIM PIN code
10	Index number not correct
11	Corresponding phonebook storage entry not found
12	Unknown error
13	Phonebook storage is full
14	Too long text string
15	Too long number
16	Invalid characters included in the number
17	Network timeout
18	Temporary disorder of service options
19	Rejected by network
20	Retry operations caused by system error or operation busy
23	User unidentifiable
24	Service resources nonexistent
25	Unknown service type
26	Unknown network message
27	CM has no buffer to send command request
28	Incorrect SPN file contents in SIM card
29	Access to SPN file is rejected
30	SPN file nonexistent
31	MCC/MNC fails to construct PLMN
32	Long name/short name of the operator is not found
34	Operation mode is not in the online state
35	Service state is not a service valid state.
38	Corresponding call is not in an activated state.
39	Another SPN query operation is underway
40	Operation not allowed
41	SCA file does not exist in SIM card

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The correspondence between <err> value of CME ERROR and the text string is as follows:

0 phone failure

3 operations not allowed

4 operations not supported

10 SIM not inserted (not supported currently. If no SIM is inserted, return SIM failure)

11 SIM PIN required

12 SIM PUK required

13 SIM failure

14 SIM busy

15 SIM wrong

16 incorrect passwords

17 SIM PIN2 required

18 SIM PUK2 required

20 memories full

21 invalid index

22 not found

23 memory failure

24 text string too long

30 no network service

31 network timeout

32 networks not allowed - emergency calls only

100 unknown

134 service option temporarily out of order (#34)

257 network rejected request

258 retry operation

259 invalid deflected to number

260 deflected to own number

261 unknown subscribers

262 service not in use

263 unknown classes

264 unknown network messages

1001 Normal error

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1002	The link has not been established yet
1003	The link has been established already
1004	Fail to establish link
1005	Fail to bind the specified port
1006	Fail to connect to the specified address
1007	The server has not been established yet
1008	The server has been established already
1009	Fail to establish server
1010	Fail to bind the specified port with server
1011	Fail to establish listening
1012	The network has not been opened yet
1013	The network has been opened already
1014	Fail to open network
1015	Invalid domain name
1016	Fail to resolve DNS
1017	Port error
1018	Remain data is sending
1019	Previous command is not complete
1020	Too many data to be sent
1021	Forbidden operation in transparent mode
1022	Invalid port for transparent mode
1023	Fail to send data in transparent mode
1024	Fail to send data because it is too long
1025	Quit transparent mode because buffer is full
1026	More than one link in physical port
1027	The physical port is in listen state and has no client
1028	Quit transparent mode because link is down
65282	sys state error
65283	parameters error
65284	spn file wrong
65285	spn file accessed denied
65286	spn file not exist
65287	another SPN query operation still not finished

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17.3 Appendix 3 CMS Error List

The following table presents all <err> values of CMS Errors that may be returned by the AT command of SMS.

	0 … 127	128 … 255	301	302	303	304	305	310	311	312	316	320	321	322	330	331	332	340	500
+CNMI			3		4														
+CMGD			3										11						
+CNMA						5												16	
+CPMS			3																
+CSCA																			
+CMGS	1	2	3			5	18								19		15		17
+CMGW			3			5	18							12	19				
+CMGL			3																
+CMGR			3										11						
+CMSS	1	2	3			5	18						11		19		15		

1 RP layer error

2 TP layer error

3 Some other applications leave SMS interface reserved

4 Operation not supported.

5 In the PDU mode, the PDU parameter is incorrect (actual data length of PDU packet is inconsistent with the given <length>; or PDU format error is detected)

6 SIM card not inserted

7 PIN request of SIM card

8 PH-(U)SIM PIN request of SIM card

9 PUK request of SIM card

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10 Memory error (communication with database of SMS is faulty)

11 Invalid memory index number <index>

12 Memory is full

13 SMSC error (message contains no SCA, or the SCA set via the CSCA command is unavailable)

14 No network service is available

15 Network timeout

16 No status of new SM, error execute this command

17 Unknown error

18 invalid text mode parameter

19 SMSC address unknown

17.4 Appendix 4 Summary of Final Result Codes

Final result code	Code	Description
OK	0	It indicates a command line is executed correctly.
CONNECT	1	Connection established
RING	2	Incoming call
NO CARRIER	3	Connection terminated
ERROR	4	Ordinary error
BUSY	7	Opposite party busy
NO ANSWER	8	Connection completion timeout, no answer
+CME ERROR: <err>		Error type is specified by the parameter <err>
+CMS ERROR: <err>		SMS-related error
TOO MANY PARAMETERS	Numbering mode is not supported	Too many parameters in the issued command

17.5 Appendix 5 List of Initial Values of Command Parameter After MS First Powerup

The following table presents the initial values of interface parameters mentioned herein at the time of MS first startup (upgrade or factory initial value).

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	Description of initial value
E	<value> is 1
V	<value> is 1
S3	<value> is 013
S4	<value> is 010
S5	<value> is 008
Q	<value> is 0
+CPMS	<mem1> , <mem2> and <mem3> are “SM”, <mem3> will keep last setting.
+CMEE	<value> is 2
+CSCA	<sca> and <tosca> are empty, and the parameters are stored in SIM, and will keep the setting with the same SIM.
+CSMS	<service> is 0
+CMGF	<mode> is 0
+CNMI	<mode>,<mt>,<bm>,<ds> and <bfr> are 0
+COPS	<mode> is 0, <format> is 0, <rat> is 0
+CREG	<n> is 0
+CGREG	<n> is 0
+CMMS	<n> is 0
^CURC	<curc_status> is 0
&C	<value> is 1
&D	<value> is 2
S0	<value> is 0
+ICF	<format> is 3, <parity> is 3
+IFC	<DCE_by_DTE> is 0, <DTE_by_DCE> is 0
&S	<value> is 0
+IPR	<Rate> is 115200, after changed, and stored by &W, the baudrate will keep the last value.
^RESET	<delay_time> is 0
+CRC	<mode> is 0
+CSCS	<chset> is “IRA“
+CPBS	<storage> is “SM“
+CLVL	<level> is 2

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	Description of initial value
+CMIC	<level> is 2

17.6 Appendix 6 Examples of Show Mode

Query Mode: We can use “AT^SYSINFO” to acquire system server domain and system mode. According to the parameter <srv_domain> and the parameter <sys_mode>, host software will achieve the mode which would be shown to the user.

<srv_domain>	<sys_mode>	shown
1	3	GSM
2	3	GPRS
3	3	GPRS
1	5	3G CS
2	5	3G PS
3	5	3G

Report Mode: We can get the parameter <sys_mode> by the command “^MODE”, and then get the parameter <stat> by the command “+CREG” (or “+CGREG”).Finally, host software can use them to determine the mode which would be shown to the user.

<sys_mode>	creg: <stat>	cgreg: <stat>	shown
3	reg(1, 5)	unreg(0, 2, 3, 4)	GSM
3	any	reg(1, 5)	GPRS
5	reg(1, 5)	unreg(0, 2, 3, 4)	3G CS
5	unreg(0, 3, 4)	reg(1, 5)	3G PS
5	reg(1, 5)	reg(1, 5)	3G

17.7 Appendix 7 List of Command Allowed in PIN Restricted Mode

No.	Command	Comments
1	E	
2	S3	
3	S4	
4	S5	

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No.	Command	Comments
5	V	
6	I	
7	Q	
8	Z	
9	&W	
10	&F	
11	&V	
12	+CMEE	
13	+CFUN	
14	+CGMM/+GMM	
15	+CGMI/+GMI	
16	+CGMR/+GMR	
17	+CGSN/+GSN	
18	+CCLK	
19	+CCID	
20	+CRSM	
21	^HWVER	
22	^HS	
23	^RESET	
24	^RESETCNT	
25	^CURC	
26	&C	
27	&D	
28	&S	
29	+IPR	
30	+IFC	
31	+CSMS	
32	^ECHO	
33	+CPIN	
34	^CPIN	
35	+CGDCONT	

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No.	Command	Comments
36	+CHUP	
37	S0	
38	^SYSINFO	
39	^SYSCFG	
40	+CLVL	
41	^IOC	
42	^MSO	
43	^AUTOANSWER	
44	+CMIC	
45	^CPCM	
46	^STN	
47	D	
48	+CLCC	
49	^DTMF	

17.8 Appendix 8 List of Reference:

[1] 3GPP protocol 27.005-3d0

[2] 3GPP protocol 27.007-320

[3] ITU-T Recommendation V.25 ter V0025-TE.DOC

[4] 3GPP protocol TS 22.002

[5] 3GPP protocol TS 23.038

[6] 3GPP protocol TS 23.040

[7] 3GPP protocol TS 23.041

[8] 3GPP protocol GSM 03.60

[9] 3GPP protocol TS 24.011

[10] 3GPP protocol TS 24.008

[11] 3GPP protocol 31.102

[12] ITU-T T.50

[13] GSM 07.05

[14] 3GPP protocol GSM 11.11

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[14] ISO/IEC10646

[15] 3GPP TS 22.067

[16] TS 11

17.9 List of Abbreviations

Abbreviations	Full spelling
3GPP	Third Generation Partnership Project
APN	Access Point Name
BER	Bit Error Rate
CDMA	Code Division Multiple Access
CS	Circuit Switched (CS) domain
CUG	Closed User Group
DCE	Data Circuit Equipment
DCS	Data Coding Scheme
DTE	Data Terminal Equipment
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
ITU-T	International Telecommunication Union-Telecommunication Standardization Sector
MCC	Mobile Country Code
ME	Mobile Equipment
MNC	Mobile Network Code
MS	Mobile Station
MSIN	Mobile Station Identification Number
MSISDN	Mobile Station International ISDN Number
MT	Mobile Terminal
PD	Position Determination
PDP	Packet Data Protocol

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Abbreviations	Full spelling
PDU	Protocol Data Unit
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PPP	Point-to-Point Protocol
PUK	PIN Unblocking Key
PS	Packet Switched (PS) domain
QoS	Quality of Service
RPLMN	Registered PLMN
RSSI	Receive Signal Strength Indicator
SCA	Service Center Address
SDU	Service Data Unit
SIM	GSM Subscriber Identity Module
SM	Short Message
SMS	Short Message Service
SMSC	Short Message Service Center
TA	Terminal Adapter
TE	Terminal Equipment
TPDU	Transfer Protocol Data Unit
UIM	User Identity Module
URC	Unsolicited Result Code
USIM	Universal Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
VP	Validity Period
XCD	Carrier Detection Signal
XER	DTE Ready Signal
WCDMA	Wideband CDMA

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