



HUAWEI ME909u-521 LTE LGA Module
V100R002

AT Command Interface Specification

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About This Document

Revision History

Document Version	Date	Chapter	Descriptions
01	2014-10-21		Creation
02	2015-03-28	2.7	Updated the default value of <mode> for ATE command
		4.3	Added section 4.3: AT+CEUS–UE's Usage Setting for EPS
		4.7	Added section 4.7: AT+CLIR–Calling Line Identification Restriction
		4.11	Added section 4.11: AT+CCFC–Call Forwarding
		4.12	Added section 4.12: AT+CCWA–Call Waiting
		4.13	Added section 4.13: +CCWA–Call Waiting Notifications
		4.14	Added section 4.14: AT+CHLD–Call Hold
		4.15	Added section 4.15: AT+CSSN–Set Supplementary Service Notification Presentation
		4.16	Added section 4.16: +CSSI–Supplementary Service Notifications
		4.17	Added section 4.17: +CSSU–Supplementary Service Notifications
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Document Version	Date	Chapter	Descriptions
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		8.2	Updated default value of <mode> for AT+CMGF command
		9.3	Added section 9.3: AT+CMGS–Send Message (PDU Mode)
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		9.10	Added section 9.10: AT+CMSS–Send Message from Storage (Text Mode)
		10.1	Updated section 10.1: AT^WAKEUPCFG–Configure Module's Remote Wakeup Function by Host
		10.10	Added section 10.10: AT^SLEEPCFG–Configure Sleep Parameter
		12.4	Added section 12.4: ^THERMEX–Unsolicitedly Report Thermal Protection State Change
		13.6	Updated section 13.6: AT^HCSQ–Query and Report Signal Strength
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		17.11	Added section 17.11: AT^FOTASMSCFG-SMS Automatic Download Enable or Disable
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		19.1	Updated section 19.1: List of URC Commands



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1 Introduction

1.1 Scope

This document describes AT command interface specifications that is supported by Huawei terminal product ME909u-521 module.

Please read the Release Notes released with the firmware before using ME909u-521 module and this document.

1.2 Overview

This document describes certain AT commands (implemented by terminal devices) of international standards, according to the requirements of terminal devices. In addition, this document describes the proprietary AT command interfaces that are implemented by terminal devices. These proprietary AT command interfaces help implement a certain function.

This document does not describe the interfaces that have been defined by standards or implemented by the mobile terminal (MT) but are not required by the Huawei terminal product. The description of AT command interfaces covers only the data packets of interfaces, the methods and processes for the Terminal Equipment (TE) and the MT to use interfaces, excluding the contents that are not directly related to interfaces. In addition, this document describes only the AT command interfaces falling within the range of Rm interfaces between the TE and MT, excluding the AT command interfaces falling within the range of Um interfaces between the MT and IWF.

AT commands are communication command protocols between TEs and MTs. If a new MT is to interconnect with an existing TE implemented based on this AT specification, the MT must comply with the specification. For example, to interconnect with the unified background of an existing personal computer (PC), a new module must comply with this specification. A PC application or tool must comply with this specification to interconnect with existing terminal devices. If a TE or MT does not communicate by using AT commands, this specification does not apply.

1.3 Organization

Chapter 2 "General Commands" to chapter 9 "SMS Service Interface (WCDMA)" describe AT interfaces defined in international standards such as 3GPP and ITU-T.

Chapter 10 "Huawei Proprietary Interface: Mobile Termination Control and Status Interface" to chapter 18 "Huawei Proprietary Interface: CMUX Interface" describe Huawei proprietary interfaces.

1.4 Document Conventions

Throughout the document, the module are referred to as ME (Mobile Equipment), MS (Mobile Station), TA(Terminal Adapter) or DCE (Data Circuit-terminating Equipment). To control your module you can simply send AT Commands via its serial interface. The controlling device at the other end of the serial line is referred to as TE (Terminal Equipment), DTE (Data Terminal Equipment) or plainly 'the application' (probably running on an embedded system).

Section "Property Description" of each command marks the property of each AT command. Where, **N** means No, **Y** means Yes and **NA** means Not Applicable.

For example:

Saving upon Power-off	PIN
N	Y

The settings are described as follows:

- Parameter settings in the command are not saved after the MT is powered off.
- This command is controlled by personal identity numbers (PINs).

1.5 AT Command Syntax

1.5.1 AT Command Types

Table 1-1 Types of AT commands

AT command type	Sub-type	Syntax	Function
General command	Set command	• Contains one parameter: AT<name>[=<value>] • Contains multiple parameters: AT<name>=[<compound_value>]	A set command is executed to set parameters.

AT command type	Sub-type	Syntax	Function
	Execution command	- Contains no parameter: AT<name> - Contains one parameter: AT<name>[=<value>] - Contains multiple parameters: AT<name>[=<compound_value>]	An execution command performs a specific action in addition to interacting with the local parameters of the MS.
	Read command	AT<name>?	A read command is executed to read the current value of a parameter.
	Test command	AT<name>=?	A test command is executed to return the available value range of each parameter supported by the command.
Basic command	Basic command	AT<command>[<number>]	In the command format, <command> indicates a single letter (A–Z) or the & symbol plus a single letter. In the command format, <number> indicates a decimal number with one digit or multiple digits. The digit 0 at the start of <number> can be ignored.
S register command	Read command	ATS<parameter number>?	Returns the ASCII code of characters currently saved in the S register. The ASCII code is expressed by a 3-digit decimal number. The digit 0 is added in the front of the number in case of insufficient digits.
	Set command	ATS<parameter number>=<value>	Replaces the characters saved in the S register with the characters related to the value of <value>.

1.5.2 AT Command Parameter

You are not advised to use various parameter values that are not described in this document or not supported currently as described in this document.

The AT command parameters described in the following chapters are in two formats: <> and [], which are described as follows:

- <...>: The parameter inside these angle brackets is mandatory. The <> does not exist in a command.
- [...]: The parameter inside these square brackets is optional. The [] does not exist in a command or a response.
- <CR>: Carriage return character, which value is specified with command S3.
- <LF>: Line feed character, which value is specified with command S4.

According to the AT command specifications for GSM and WCDMA in 3GPP TS 27.007, there is a component named TA between TE and MT. Physically, TA can be integrated with either TE or MT. In this document, TA is integrated with MT. In TIA/EIA IS 707-A, TA is not specified. To simplify the description in this document, TA is ignored. The client on a computer is treated as TE, and MT is treated as TA+MT.


NOTE

If all parameters are not specified, "=" is not required.

1.5.3 AT Command Description

An AT command controls the rules for interaction between the TE such as PC and MT such as MS. Figure 1-1 shows the interaction between the TE and MT.

Figure 1-1 Interaction between the TE and MT

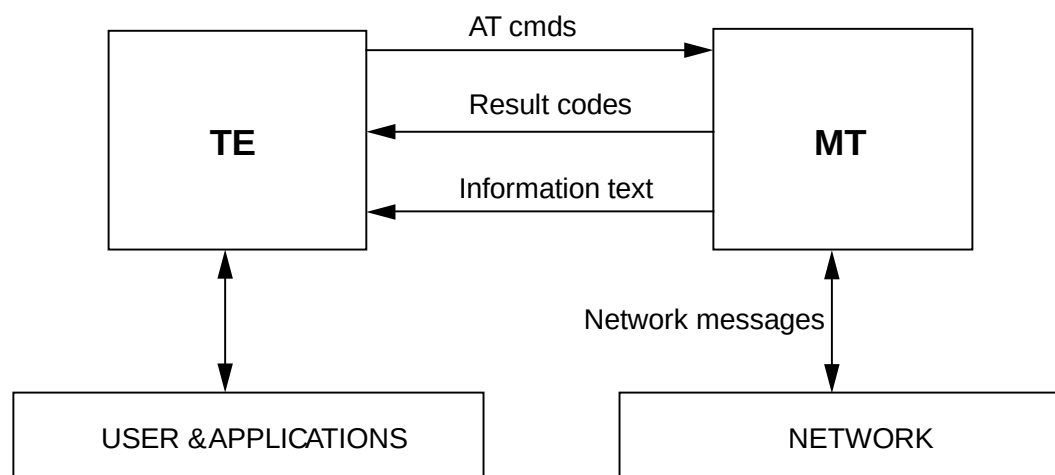
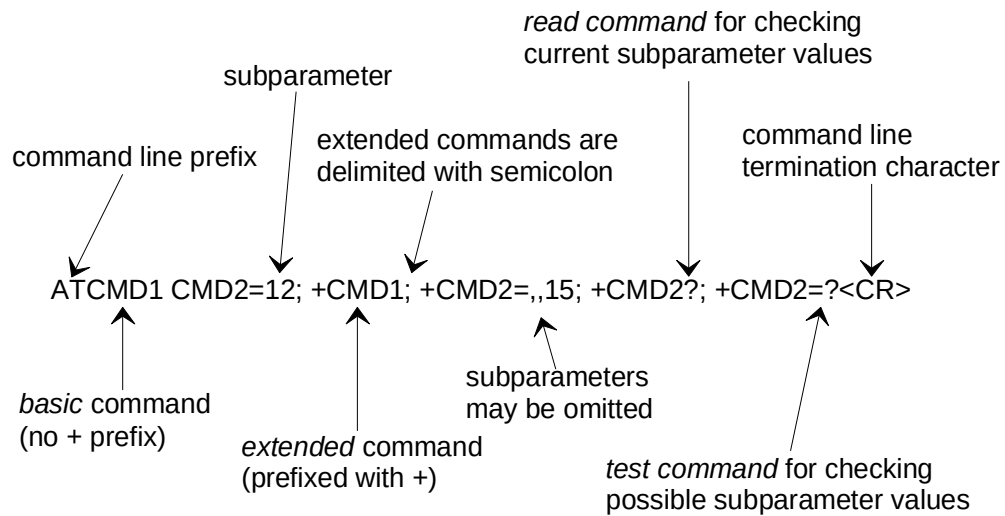


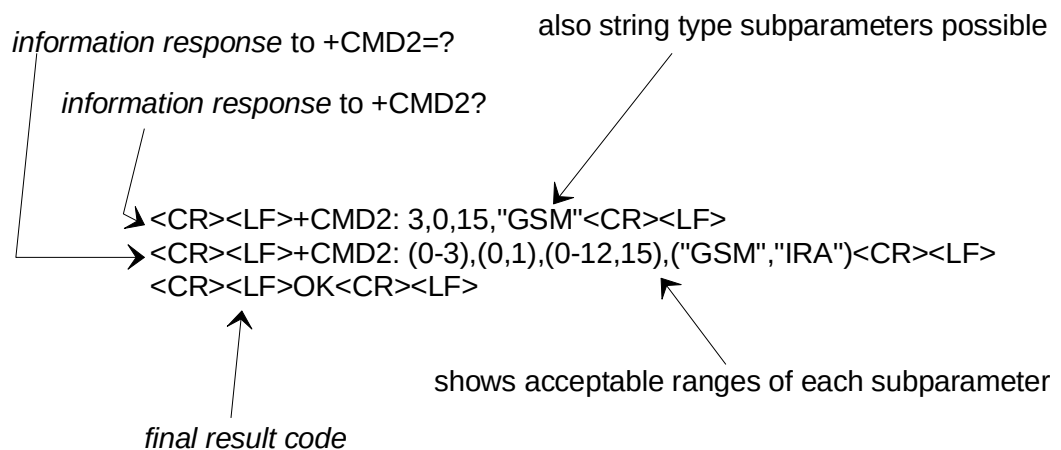
Figure 1-2 shows the basic organization format of the AT command line.

Figure 1-2 Basic organization format of the AT command line



The returned value of the AT command consists of two parts: response message and result codes. Figure 1-3 shows an example of returned value of the AT command.

Figure 1-3 An example of returned value of the AT command



For the errors returned by all AT commands in this document, `<CR><LF>ERROR<CR><LF>` may be returned except errors defined by the AT command. Therefore, the error of `<CR><LF>ERROR<CR><LF>` will not be described in every command.

1.6 Abort Attributes of AT Commands

Some action commands that require time to execute may be aborted while in progress. Aborting of commands is accomplished by the transmission from the DTE to the DCE of any character. A single character shall be sufficient to abort the command in progress; however, characters transmitted during the first 125 milliseconds after transmission of the termination character shall be ignored (to allow for the DTE to

append additional control characters such as line feed after the command line termination character). To insure that the aborting character is recognized by the DCE, it should be sent at the same rate as the preceding command line; the DCE may ignore characters sent at other rates. When such an aborting event is recognized by the DCE, it shall terminate the command in progress and return an appropriate result code to the DTE, as specified for the particular command.

The following commands can be aborted.

ATD	Can be aborted
AT+CLK	Can be aborted
AT+COPS	Can be aborted except "AT+COPS=?"

1.7 Rules for Running AT Commands

1. Each interface should be functionally convergent.
2. Each command line contains only one AT command and ends with a carriage return character. For the URC instruction or response reported from MT to TE, only one AT command is allowed in a command line. In principle, users are not allowed to run S3/S4 format modification commands. This rule is applicable to the communication between the MT and TE programs.
3. For an AT command that cannot be interrupted, after sending the AT command, the TE must wait until the MT responds to the AT command before sending the second AT command.
4. 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 ME responds to the TE only after a long time of waiting, the response of command may be interrupted by URC. There are two kinds of interruption:
 - Case 1: A URC is presented when the TE is waiting for response after sending a command. This command will be kept in waiting state until the TE finishes receiving the URC, and then the response to this command is presented.
 - Case 2: A URC is presented when the TE is waiting for response after sending a command. The command continues to be executed. Therefore, response to the command may be mixed with the URC.
5. A string refers to a byte stream (excluding the quotation marks or commas) that is placed inside double quotation marks. Special note should be specified if the byte stream need not be enclosed in double quotation marks.
6. The current version does not support escape character. The code value of a data format in the UCS2 coding is reported as characters. For example, if the UCS2 code of a Chinese character is 0x553a, the 553a is reported.
7. A possible response sent by the MT to the TE consists of Information text and Result code, in which Information text is optional and Result code is mandatory. The format of a possible response is controlled by the ATV command. For details, see the description of the ATV Command. In this document, all possible responses listed in tables follow the ATV1 format.
8. For the AT command that is controlled by PIN, if it is sent in PIN restricted mode, MT will response with "+CME ERROR: SIM PIN required".

2 General Commands

2.1 ATV-Set the Response Format

2.1.1 Command Syntax

ATV[<value>]

Possible Response(s)

If setting <value> to 0 and sending successfully:

0

If setting <value> to 1 and sending successfully:

<CR><LF>OK<CR><LF>

2.1.2 Interface Description

This command sets the format of the result code and information field in response to an AT command, including the composition of the header and the tail and the form of the returned result code content. The returned result code content has two formats, namely, digit, and detailed string.

The following table describes the impact of the format setting on the format of the result code and the response information field. <CR> indicates the S3 character and <LF> indicates the S4 character.

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

2.1.3 Parameter Description

<value>:

- | | |
|---|---|
| 0 | The MT sends an abbreviated header and tail and adopts the result code in the digit format. |
| 1 | The MT sends a complete header and tail and adopts the result code in the detailed string format. (default value) |



NOTE

If <value> is not specified, it is equivalent to set <value> to 1.

2.1.4 Property Description

Saving upon Power-off	PIN
N	N

2.1.5 Example

Run: ATV1

Response: OK

2.2 ATI-Request Identification

2.2.1 Command Syntax

ATI[<value>]

Possible Response(s)

<CR><LF><list of MS ID info><CR><LF><CR><LF>OK<CR><LF>

2.2.2 Interface Description

The ATI command queries the ID information about the MS, including:

Manufacturer (AT+GMI)

Product model (AT+GMM)

Software version (AT+GMR)

ESN/IMEI (AT+GSN)

Capability list (AT+GCAP)

2.2.3 Parameter Description

<value>:

0–255 Query the previously described MS ID information.



NOTE

If <value> is not specified, it is equivalent to set <value> to 0.

2.2.4 Property Description

Saving upon Power-off	PIN
N	N

2.2.5 Example

Run: ATI

Response: Manufacturer: Huawei Technologies Co., Ltd.
 Model: ME909u-521
 Revision: 11.234.61.00.00
 IMEI: 111111111111110
 +GCAP: +CGSM,+DS,+ES

OK

2.3 AT+CGMI/AT+GMI-Request Manufacturer Identification

2.3.1 Command Syntax

AT+CGMI
Possible Response(s)
<CR><LF><manufacturer><CR><LF><CR><LF>OK<CR><LF>
AT+CGMI=?
Possible Response(s)
<CR><LF>OK<CR><LF>

2.3.2 Interface Description

This command queries the MT's manufacturer information. Both AT+GMI and AT+CGMI have the same function and syntax.

2.3.3 Parameter Description

<manufacturer>: a string indicating the manufacturer information.

Unless otherwise specified, "Huawei Technologies Co., Ltd." is returned.

2.3.4 Property Description

Saving upon Power-off	PIN
NA	N

2.3.5 Example

Run: AT+CGMI

Response: Huawei Technologies Co., Ltd.

OK

2.4 AT+CGMM/AT+GMM-Request Model Identification

2.4.1 Command Syntax

AT+CGMM
Possible Response(s)
<CR><LF><production_name><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CGMM=?
Possible Response(s)
<CR><LF>OK<CR><LF>

2.4.2 Interface Description

This command queries the MT's model identification. Both `AT+CGMM` and `AT+GMM` have the same function and syntax. The model ID's value can be one or more lines of text, determined by the MT's manufacturer. The model ID is used to identify the product model and can contain the product name and information that the manufacturer want to provide. The number of characters, including line terminators, in the response to this command cannot exceed 2048. The sequence `0<CR>` or `OK<CR>` is not allowed in the response.

2.4.3 Parameter Description

`<production_name>`: product name.

2.4.4 Property Description

Saving upon Power-off	PIN
NA	N

2.4.5 Example

Product name: ME909u-521

Run: `AT+CGMM`

Response: `ME909u-521`

`OK`

2.5 AT+CGMR/AT+GMR-Request Software Version

2.5.1 Command Syntax

AT+CGMR
Possible Response(s)
<code><CR><LF><softversion><CR><LF><CR><LF>OK<CR><LF></code>
AT+CGMR=?
Possible Response(s)
<code><CR><LF>OK<CR><LF></code>

2.5.2 Interface Description

This command causes the ME to return its software version. Both AT+GMR and AT+CGMR have the same function and syntax.

2.5.3 Parameter Description

<softversion>: software version, a string with up to 31 characters. The sequence 0<CR> or OK<CR> is not allowed in the response.

2.5.4 Property Description

Saving upon Power-off	PIN
NA	N

2.5.5 Example

Run: AT+CGMR
Response: 11.234.61.00.00

OK

2.6 AT+CGSN/AT+GSN-Request Product IMEI

2.6.1 Command Syntax

AT+CGSN
Possible Response(s)
<CR><LF><IMEI><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CGSN=?
Possible Response(s)
<CR><LF>OK<CR><LF>

2.6.2 Interface Description

This command queries the MT's International Mobile station Equipment Identity (IMEI). Both AT+GSN and AT+CGSN have the same function and syntax.

2.6.3 Parameter Description

<IMEI>: the MT's IMEI. The returned IMEI is a string consisting of 15 digits described in the following table.

8 char	6 char	1 char
TAC	SNR	Spare

TAC: the type approval code assigned to the MT

SNR: the MT's serial number

Spare: spare digit

2.6.4 Property Description

Saving upon Power-off	PIN
NA	N

2.6.5 Example

If the TAC is "35154800", the SNR is "022544", and the spare digit is 4, then:

Run: AT+CGSN

Response: 351548000225444

OK

2.7 ATE-Echo Command

2.7.1 Command Syntax

ATE[<value>]
Possible Response(s)
<CR><LF>OK<CR><LF>

2.7.2 Interface Description

The ATE command sets whether the MT echoes the characters received from the TE.

**NOTE**

The dial-up network, especially the automatic processing software automatically sends the `ATE0` command to disable the echo mode.

2.7.3 Parameter Description

<value>:

- | | |
|---|---|
| 0 | The MT does not echo the characters received from the TE. (default value) |
| 1 | The MT echoes the characters received from the TE. |

**NOTE**

If <value> is not specified, it is equivalent to set <value> to 1.

2.7.4 Property Description

Saving upon Power-off	PIN
N	N

2.7.5 Example

Run: `ATE0`
Response: `OK`

2.8 ATZ-Restore Factory Settings

2.8.1 Command Syntax

`ATZ[<value>]`

Possible Response(s)

`<CR><LF>OK<CR><LF>`

2.8.2 Interface Description

This command restores the parameters of the AT command to the user values, but will not change the DCE's baud rate.

After the command is executed, all data connections and calls will be disconnected, which is different from the `AT&F` command.

For the restored parameters of the AT command, see Table 2-1 . In addition to restoring the parameters of the AT command to their default values, the `AT&W`

command can set the user values. If the user value is not set, the parameters are restored to the factory default values.

2.8.3 Parameter Description

<value>:

0 Set all AT commands' parameters to their default values.



NOTE

If <value> is not specified, it is equivalent to set <value> to 0.

2.8.4 Property Description

Saving upon Power-off	PIN
NA	N

2.8.5 Example

Run: ATZ0

Response: OK

2.9 ATQ-Set Result Code Presentation Mode

2.9.1 Command Syntax

ATQ[<value>]

Possible Response(s)

<CR><LF>OK<CR><LF>

2.9.2 Interface Description

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

2.9.3 Parameter Description

<value>:

0 DCE transmits result code. (default value)

1 Result codes are suppressed and not transmitted.



NOTE

If <value> is not specified, it is equivalent to set <value> to 0.

2.9.4 Property Description

Saving upon Power-off	PIN
N	N

2.9.5 Example

Run: ATQ0

Response: OK

2.10 ATS3-Command Line Termination Character

2.10.1 Command Syntax

ATS3=<value>
Possible Response(s)
<CR><LF>OK<CR><LF>
ATS3?
Possible Response(s)
<CR><LF><value><CR><LF><CR><LF>OK<CR><LF>

2.10.2 Interface Description

This command sets the command line termination character S3. S3 saves the command line termination character in the ASCII code format. The character is sent by the TE to indicate the termination of a command line, which is identified and confirmed by the MT. The character is sent by the MT to compose the headers, tails, and end flags of the result code and response information.

When running ATS3=<value> to set S3, use the current S3 as the termination character. The new S3 will be immediately returned with the result code.

2.10.3 Parameter Description

<value>: the default value is 13.

0–127 Set S3 in ASCII code

2.10.4 Property Description

Saving upon Power-off	PIN
N	N

2.10.5 Example

Run: ATS3=13

Response: OK

2.11 ATS4-Response Format Character

2.11.1 Command Syntax

ATS4=<value>
Possible Response(s)
<CR><LF>OK<CR><LF>
ATS4?
Possible Response(s)
<CR><LF><value><CR><LF><CR><LF>OK<CR><LF>

2.11.2 Interface Description

This command sets the response format character *S4*. *S4* saves the response format character in the ASCII code format. The character is sent by the MT to compose the headers, tails, and end flags of the result code and response information.

If the *S4* character is changed by the command, the new *S4* will be immediately returned with the result code of the command.

2.11.3 Parameter Description

<value>: the default value is 10.

0–127 Set *S4* in ASCII code.

2.11.4 Property Description

Saving upon Power-off	PIN
N	N

2.11.5 Example

Run: ATS4=10

Response: OK

2.12 AT+CSCS-Select TE Character Set

2.12.1 Command Syntax

AT+CSCS[=<chset>]
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CSCS?
Possible Response(s)
<CR><LF>+CSCS: <chset><CR><LF><CR><LF>OK<CR><LF>
AT+CSCS=?
Possible Response(s)
<CR><LF>+CSCS: (list of supported <chset>s) <CR><LF><CR><LF>OK<CR><LF>

2.12.2 Interface Description

The set command notifies TA of the TE's current character set so that TA can correctly convert TE's and MT's character sets. If TA uses an 8-bit interface but TE uses a 7-bit character set, the most significant bit of a character sent by the TE is set to 0.

2.12.3 Parameter Description

<chset>: at present, the default character set used by MS is "IRA". If AT+CSCS does not contain any parameter, that means set the current character as the default

character. Other character sets are listed below (only the "IRA", "GSM" and "UCS2" character sets are supported at present):

"GSM"	GSM 7 bit default alphabet (3GPP TS 23.038); this setting causes easily software flow control (XON/XOFF) problems.
"HEX"	Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "032FE6" equals three 8-bit characters with decimal values 3, 47 and 230; no conversions to the original MT character set shall be done.
"IRA"	International reference alphabet (ITU-T T.50)
"PCCPxxx"	PC character set Code Page xxx
"PCDN"	PC Danish/Norwegian character set
"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
"8859-n"	ISO 8859 Latin n (1–6) character set
"8859-C"	ISO 8859 Latin/Cyrillic character set
"8859-A"	ISO 8859 Latin/Arabic character set
"8859-G"	ISO 8859 Latin/Greek character set
"8859-H"	ISO 8859 Latin/Hebrew character set


NOTE

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

2.12.4 Property Description

Saving upon Power-off	PIN
N	N

2.12.5 Example

```

Run:      AT+CSCS="IRA"
Response: OK

Run:      AT+CSCS?
Response: +CSCS: "IRA"

                OK

Run:      AT+CSCS=?

```

Response: +CSCS: ("IRA", "GSM", "UCS2")

OK

2.13 AT+CIMI-Request IMSI

2.13.1 Command Syntax

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

2.13.2 Interface Description

This command requests the USIM or SIM card's IMSI.

2.13.3 Parameter Description

<IMSI>: the IMSI stored on the USIM or SIM card. It is a string consisting of decimal digits, as described in the following table.

Up to 15 Digits		
3 Digits	2 or 3 Digits	
MCC	MNC	MSIN

MCC: Mobile Country Code

MNC: Mobile Network Code

MSIN: Mobile Subscriber Identification Number

2.13.4 Property Description

Saving upon Power-off	PIN
NA	Y

2.13.5 Example

If the MCC is 123, the MNC is 45, and the MSIN is 1234567890, then:

Run: AT+CIMI

Response: 123451234567890

OK

2.14 AT&F-Restore Default AT Command Settings

2.14.1 Command Syntax

AT&F[<value>]

Possible Response(s)

<CR><LF>OK<CR><LF>

2.14.2 Interface Description

This command restores the parameters of the AT command in Table 2-1 to their default values.

Table 2-1 The commands that can be set to factory configuration

Command
E
V
Q
X
&C
&D
&S
S0
S3
S4
S5
S7

Command
S10

**NOTE**

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

2.14.3 Parameter Description

<value>:

- | | |
|--------------|---|
| 0 | Restore the parameters of all the AT commands described in Table 2-1 to their default settings. |
| Other values | Used by the manufacturer for function expansion (not supported currently). |

**NOTE**

If <value> is not specified, it is equivalent to set <value> to 0.

2.14.4 Property Description

Saving upon Power-off	PIN
N	N

2.14.5 Example

Run: AT&F0

Response: OK

2.15 AT&W-Store User Settings

2.15.1 Command Syntax

AT&W
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>

2.15.2 Interface Description

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

2.15.3 Parameter Description

None

2.15.4 Property Description

Saving upon Power-off	PIN
NA	N

2.15.5 Example

Run: AT&W

Response: OK

2.16 AT&V-Query Current Configuration

2.16.1 Command Syntax

AT&V
Possible Response(s)
<CR><LF> (list of stored setting) <CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>

2.16.2 Interface Description

This command queries the current configuration.

The commands and parameters which can be queried are followed in AT&F.

2.16.3 Parameter Description

None

2.16.4 Property Description

Saving upon Power-off	PIN
NA	N

2.16.5 Example

Run: AT&V

Response: &C: 1; &D: 2; &S: 0; E: 0; Q: 0; V: 1; X: 1; S0: 0;
S3: 13; S4: 10;
S5: 8; S7: 0; S10: 14; +ICF: 3,3; +IFC: 2,2

OK

2.17 A/-Repeat Previous Command Line

2.17.1 Command Syntax

A/
Possible Response(s)
The response depends on the previous command line.

2.17.2 Interface Description

This command repeats previous command line. <CR> is not needed.

2.17.3 Parameter Description

NA

2.17.4 Property Description

Saving upon Power-off	PIN
NA	N

2.17.5 Example

If the last command is AT+CGSN:

```

Run:          AT+CGSN
Response:     351782030028946

              OK

Run:          A/
Response:     351782030028946

              OK

```

2.18 AT+CMEE–Report Mobile Termination Error

2.18.1 Command Syntax

AT+CMEE=<n>
Possible Response(s)
<CR><LF>OK<CR><LF>
AT+CMEE?
Possible Response(s)
<CR><LF>+CMEE: <n><CR><LF><CR><LF>OK<CR><LF>
AT+CMEE=?
Possible Response(s)
<CR><LF>+CMEE: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

2.18.2 Interface Description

The set command disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the MT. When enabled, MT related errors cause the +CME ERROR: <err> final result code instead of the regular ERROR final result code. Regular ERROR is returned when the error is not MT-related.

2.18.3 Parameter Description

<n>: an integer type value indicating the format of the error result code.

- | | |
|---|--|
| 0 | Disable the +CME ERROR: <err> result code and use ERROR instead |
| 1 | Enable the +CME ERROR: <err> result code and use numeric <err> values. |

- 2 Enable the +CME ERROR: <err> result code and use verbose <err> values. (default value)

**NOTE**

If <n> is not specified, it is equivalent to set <n> to 2.

<err>: see 19.3 CMS Error List.

2.18.4 Property Description

Saving upon Power-off	PIN
N	N

2.18.5 Example

```
Run:          AT+CMEE=?
Response:     +CMEE: (0,1,2)

OK

Run:          AT+CMEE?
Response:     +CMEE: 2

OK

Run:          AT+CMEE=1
Response:     OK

Run:          AT+CMEE?
Response:     +CMEE: 1

OK
```

3 Call Control Commands and Methods

3.1 ATD-Dial Command

3.1.1 Command Syntax

```
ATD<digits>[I/i][:]
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

About the responses, see "Final Result Code" in the 19.4

3.1.2 Interface Description

This command is used to initiate a voice or data service call.

3.1.3 Parameter Description

<digits>: the called phone number, ASCII characters. Valid characters are '0'–'9', '*', '#', and '+'. '+' is only allowed before a phone number, otherwise it will be ignored. The maximum length of the number for a 3GPP product cannot exceed 40 characters (excluding '+'). Invalid characters of the number are dealt allowing for platform differences.

[I/i]: flag of CLIR services (if this flag is not specified, the network's default value is used, or the value of this flag is dependent on whether the network has assigned permanent CLIR services). This flag only support voice service.

I Enable CLIR

i Disable CLIR

Exceptions:

- If the network has not assigned CLIR services and the user enables the CLIR service, the network side determines whether the call initiated by the user can continue. If the call is rejected, the reason for rejecting the call is presented in the call ending indication `AT^CEND`.

- If the network assigns permanent CLIR services, the call initiated by the user can continue after the user disables the CLIR service.

[;]: call type indication. When ';' is contained in this command, a voice call is initiated. When ';' is not contained in this command, a data service call is initiated.


NOTE

PCUI port does not support connection operation and data transmission of data service, and it need to verified PIN when it is not an emergency call.

3.1.4 Property Description

Saving upon Power-off	PIN
NA	N

3.1.5 Example

- Dial a valid number at normal case:

Run: ATD13903711825;

Initiate a voice call.

Response: OK

- Dial a number when the SIM pin is required:

Run: ATD13903711825;

Initiate a voice call.

Response: ERROR

3.2 ATA-Answering Command

3.2.1 Command Syntax

ATA
Possible Response(s)
<CR><LF>OK<CR><LF>
About the responses, see "Final Result Code" in the 19.4 .

3.2.2 Interface Description

When MT has an incoming call, TE uses this command to notify MT of the incoming call.


NOTE

This command cannot be sent to receive CS data service call at the PCUI port.

3.2.3 Parameter Description

None

3.2.4 Property Description

Saving upon Power-off	PIN
NA	Y

3.2.5 Example

Answer a normal voice call:

Run: ATA

Response: OK

3.3 RING-Call Indication

3.3.1 Command Syntax

URC
Possible Response(s)
RING

3.3.2 Interface Description

When a call is originated to the MT, the MT periodically (T=5s) reports this indication to the TE.

3.3.3 Parameter Description

None

3.3.4 Property Description

Saving upon Power-off	PIN
NA	NA

3.3.5 Example

Ring notification:

Response: RING

If the CRC is disabled, the ring will be reported several times.

RING

RING

RING

3.4 +CRING–Indicate Incoming Call

3.4.1 Command Syntax

URC
Possible Response(s)
<CR><LF>+CRING: <type><CR><LF>

3.4.2 Interface Description

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

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

3.4.3 Parameter Description

<type>: the details refer to 3.6 AT+CRC–Cellular Result Codes.

3.4.4 Property Description

Saving upon Power-off	PIN
NA	NA

3.4.5 Example

When a new call comes, the following unsolicited report will be returned:

Response: +CRING: VOICE

3.5 AT+CHUP-Call Hangup

3.5.1 Command Syntax

AT+CHUP
Possible Response(s)
<CR><LF>OK<CR><LF>
AT+CHUP=?
Possible Response(s)
<CR><LF>OK<CR><LF>

3.5.2 Interface Description

This command is used to end a call when the conversation is over and to reject an incoming call. When multiple calls are connected, this command hangs up all hold, active, and waiting calls. To meet the need of end a specified call, AT+CHLD command can be used to end a hold, active or waiting call.

3.5.3 Parameter Description

None

3.5.4 Property Description

Saving upon Power-off	PIN
NA	N

3.5.5 Example

Disconnect a voice call:

Run: AT+CHUP

Response: OK

3.6 AT+CRC–Cellular Result Codes

3.6.1 Command Syntax

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

3.6.2 Interface Description

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

The test command returns values supported as a compound value.



NOTE

Similar command may be found in TIA IS–99 and TIA IS–135.

3.6.3 Parameter Description

<mode>: integer type

- | | |
|---|---|
| 0 | Disables extended format. (default value) |
| 1 | Enables extended format. |

<type>:

- | | |
|---|--------------------------|
| ASYNCRING[,<priority>,<subaddr>,<satype>] | Asynchronous transparent |
| SYNCRING[,<priority>,<subaddr>,<satype>] | Synchronous transparent |

REL ASYNC [,<priority>[,<subaddr>,<satype>]]	Asynchronous non-transparent
REL SYNC [,<priority>[,<subaddr>,<satype>]]	Synchronous non-transparent
FAX [,<priority>[,<subaddr>,<satype>]]	Facsimile (TS 62)
VOICE [,<priority>[,<subaddr>,<satype>]]	Normal voice (TS 11)
VOICE/XXX [,<priority>[,<subaddr>,<satype>]]	Voice followed by data (BS 81) (XXX is ASYNC, SYNC, REL ASYNC or REL SYNC)
ALT VOICE/XXX [,<priority>[,<subaddr>,<satype>]]	Alternating voice/data, voice first (BS 61)
ALT XXX/VOICE [,<priority>[,<subaddr>,<satype>]]	Alternating voice/data, data first (BS 61)
ALT VOICE/FAX [,<priority>[,<subaddr>,<satype>]]	Alternating voice/fax, voice first (TS 61)
ALT FAX/VOICE [,<priority>[,<subaddr>,<satype>]]	Alternating voice/fax, fax first (TS 61)
GPRS <PDP_type>, <PDP_addr>[, [<L2P>][,<APN>]]	GPRS network request for PDP context activation
VGC <GCA>, <GId>, <ackflag> [,<priority>]	Voice group call (TS 91)
VBC <GCA>, <GId>, <ackflag> [,<priority>]	Voice broadcast call (TS 92)

<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 subaddress of format specified by <satype>.

<satype>: type of subaddress octet in integer format (refer 3GPP TS 24.008 subclause 10.5.4.8).

<PDP_type>, <PDP_addr> and <APN> are as defined in 7.1 the Define PDP Context (AT+CGDCONT) command. If the MT is unable to announce to the TE the network's request (for example it is in V.250 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.

<GCA> is a part of the group call reference as specified in 3GPP TS 23.003 and indicates group call area.

<GId> is a part of the group call reference as specified in 3GPP TS 23.003 and indicates group call identification. The <ackflag>=1 proposes that a predefined



confirmation procedure is to be used after the call is ended. For <ackflag>=0, no confirmation procedure is required.

3.6.4 Property Description

Saving upon Power-off	PIN
N	N

3.6.5 Example

Run: AT+CRC=0

Response: OK

Run: AT+CRC?

Response: +CRC : 0

OK

Run: AT+CRC=?

Response: +CRC : (0,1)

OK

4 Network Service Related Commands

4.1 AT+COPS–Select Operator

4.1.1 Command Syntax

AT+COPS=[<mode>[, <format>[, <oper>[, <Act>]]]]

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+COPS?

Possible Response(s)

<CR><LF>+COPS:
<mode>[, <format>[, <oper>[, <rat>]]<CR><LF><CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+COPS=?

Possible Response(s)

<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 an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

4.1.2 Interface Description

This interface enables to query the network state and network selection mode currently registered by the MS.

The set command sets the current network with which the MT registers and the current network mode. The command can be used to automatically or manually select a GSM/UMTS/EPS network. When `<rat>` is not specified in the command, the `<rat>` setting on the MT is not changed.

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.

4.1.3 Parameter Description

`<mode>`: network selection mode

- | | |
|---|--|
| 0 | Automatic selection. When <code><mode></code> is set to 0, do not specify the parameters following <code><mode></code> . |
| 1 | Manual selection |
| 2 | Network deregistration |
| 3 | Set only <code><format></code> (for the format of the response to the read command <code>AT+COPS?</code>) |
| 4 | Manual/automatic selection; if manual selection fails, automatic mode (<code><mode>=0</code>) is used. |

`<format>`: format of the operator information `<oper>`.

- | | |
|---|--|
| 0 | Long format alphanumeric <code><oper></code> (default value) |
| 1 | Short format alphanumeric <code><oper></code> |
| 2 | Numeric <code><oper></code> |

`<oper>`: operator information.

`<stat>`: network state.

- | | |
|---|-----------|
| 0 | Unknown |
| 1 | Available |
| 2 | Current |
| 3 | Forbidden |

`<rat>`: wireless access technology.

- | | |
|---|---------------------------------------|
| 0 | GSM |
| 1 | GSM Compact (not supported currently) |
| 2 | UTRAN |

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

4.1.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.1.5 Example

- Obtaining available operator list:

Run: AT+COPS=?

Obtain available
operator list.

Response: +COPS:
(2,"","","46007",2),(3,"CHN-UNICOM","UNICOM","46001",0),(3,"CHINA
MOBILE","CMCC","46000",0),,(0,1,2,3,4),(0,1,2)
OK

- Automatic selection:

Run: AT+COPS=0

Response: OK

NOTE

- In automatic selection mode, only <mode> is valid. Do not specify other parameters in the command.
- When register LTE network manually through AT+COPS command with the parameter <rat>, CSFB voice is unavailable

- Manual selection:

Run: AT+COPS=1,2,"46000",0

Response: OK

NOTE

- CME ERROR will be returned when logging in to a nonexistent network or a network that cannot be logged in to (unless in the situation that services are restricted or services are restricted for the current zone).
- The current network state can be queried using the AT+CREG? or AT+CGREG? command.
- Requesting network state:

Run: AT+COPS?

Response: +COPS: 1,0,"CHINA MOBILE",0

OK

Return the current network selection mode, information about the operator with which the MT registers, and the wireless access technology.

4.2 AT+CREG-Register Network

4.2.1 Command Syntax

AT+CREG=[<n>]
Possible Response(s)
<CR><LF>OK<CR><LF>
AT+CREG?
Possible Response(s)
<CR><LF>+CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]]<CR><LF><CR><LF>OK<CR><LF>
AT+CREG=?
Possible Response(s)
<CR><LF>+CREG: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

4.2.2 Interface Description

The set command controls the presentation of an unsolicited result code +CREG.

The read command returns the current registration status <stat>. Location information elements <lac>, <ci> and <AcT> are returned only when <n>=2.

The test command returns the supported values of <n>.

4.2.3 Parameter Description

<n>:

- | | |
|---|---|
| 0 | Disable network registration unsolicited result code +CREG. (default value) |
| 1 | Enable network registration unsolicited result code +CREG: <stat>. |

- 2 Enable network registration and location information unsolicited result code +CREG: <stat>[, <lac>, <ci>[, <AcT>]].

<stat>:

- | | |
|---|--|
| 0 | Not registered, MS is not currently searching for a new operator to register with. |
| 1 | Registered, home network |
| 2 | Not registered, but MS is currently searching for a new operator to register with. |
| 3 | Registration denied |
| 4 | Unknown |
| 5 | Registered, roaming |

<lac>: string type; four-character location area code in hexadecimal format (for example, "00C3" equals 195 in decimal).

<ci>: a string type value that indicates four byte serving cell ID in hexadecimal format.

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

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



NOTE

- [1] 3GPP TS 44.060 specifies the system information messages which give the information about whether the serving cell supports EGPRS.
- [2] 3GPP TS 25.331 specifies the system information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

4.2.4 Property Description

Saving upon Power-off	PIN
N	Y

4.2.5 Example

```

Run:      AT+CREG?
Response: +CREG: 2,1,"2513","E01F4",2

          OK

Run:      AT+CREG=1
Response: OK

Run:      AT+CREG=?
Response: +CREG: (0-2)

          OK

```

4.3 AT+CEUS–UE's Usage Setting for EPS

4.3.1 Command Syntax

AT+CEUS=<setting>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CEUS?
Possible Response(s)
<CR><LF>+CEUS: <setting><CR><LF><CR><LF>OK<CR><LF>
AT+CEUS=?
Possible Response(s)
<CR><LF>+CEUS: (list of supported <setting>s) <CR><LF><CR><LF>OK<CR><LF>

4.3.2 Interface Description

The set command sets the MT to operate according to the specified UE's usage setting for EPS (Evolved Packet System). For the details, please refer to 3GPP TS 24.301.

The read command queries the usage setting set by the TE.

The test command requests information on the supported MT setting(s) as a compound value.

4.3.3 Parameter Description

<setting>: an integer type value indicates the usage setting of the UE.

- | | |
|---|------------------------------|
| 0 | Voice centric |
| 1 | Data centric (default value) |

**NOTE**

- The definition for usage settings of the UE can be found in 3GPP TS 24.301.
- You'd be better restart the module if UE's usage setting for EPS needs to take effect immediately.

4.3.4 Property Description

Saving upon Power-off	PIN
Y	N

4.3.5 Example

```
Run:      AT+CEUS=?
Response:  +CEUS: (0,1)

          OK

Run:      AT+CEUS=1
Response:  OK

Run:      AT+CEUS?
Response:  +CEUS: 1

          OK
```

4.4 AT+CLCK-Lock Facility

4.4.1 Command Syntax

```
AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]
```

```
Possible Response(s)
```

When `<mode>=2` and the command is executed successfully:
`<CR><LF>+CLCK: <status><CR><LF><CR><LF>OK<CR><LF>`

When `<mode>≠2` and the command is executed successfully:
`<CR><LF>OK<CR><LF>`

In case of an MT-related error:
`<CR><LF>+CME ERROR: <err><CR><LF>`

AT+CLCK=?

Possible Response(s)

`<CR><LF>+CLCK: (list of supported
<fac>s) <CR><LF><CR><LF>OK<CR><LF>`

4.4.2 Interface Description

The set command locks, unlocks or interrogates an MT or a network facility `<fac>`.

The test command returns the facilities supported.

4.4.3 Parameter Description

`<fac>`: specifies the target of this command.

"SC"	SIM card (if this parameter is set, MT will request the password during startup.)
"AB"	All barring services (applicable only for <code><mode>=0</code>)
"AC"	All incoming barring services (applicable only for <code><mode>=0</code>)
"AG"	All outgoing barring services (applicable only for <code><mode>=0</code>)
"AI"	Bar all incoming calls
"AO"	Bar all outgoing calls
"IR"	BIC-Roam (bar incoming calls when roaming outside the home country)
"OI"	Bar outgoing international calls
"OX"	Bar outgoing international calls except to home country
"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 (PH-FSIM) (if this parameter is set, you need to enter the password when changing an SIM/UICC card.) (reserved, not supported currently)


NOTE

The password for "SC" is stored on the SIM card; other passwords are set on the network side.

<mode>: integer type; operating mode.

0	Unlock
1	Lock
2	Query status

<status>: integer type; current status.

0	Not active
1	Active

<passwd>: string type; shall be enclosed in quotation marks when specified in the command and be the same as the password specified using the AT+CPWD command. When <mode>=0 or 1, <passwd> is mandatory. When <mode>=2, <passwd> is not required. The characters in <passwd> must range from '0' to '9'.

<classx>:

1	Voice (telephony)
2	Data
4	Fax
8	Short message service

4.4.4 Property Description

Saving upon Power-off	PIN
Y	Y

4.4.5 Example

```

Run:      AT+CLCK=?
Response: +CLCK:
          ("AB", "AC", "AG", "AI", "AO", "IR", "OI", "OX", "SC")

          OK

Run:      AT+CLCK="SC", 2

```

```

Response:  +CLCK: 0

           OK

Run:       AT+CLCK="SC",1,"1234"

Response:  OK

```

4.5 AT+CPWD-Change Password

4.5.1 Command Syntax

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

4.5.2 Interface Description

The set command sets a new password for the facility lock function.

The test command returns a list of MTs supported by this command and the maximum length of their passwords.

4.5.3 Parameter Description

<fac>: specifies the target of this command.

"P2"	SIM PIN2
"SC"	SIM card (if this parameter is set, MT will request the password during startup.)
"AB"	All barring services (applicable only for <mode>=0)
"AC"	All incoming barring services
"AG"	All outgoing barring services

"AI"	Bar all incoming calls
"AO"	Bar all outgoing calls
"IR"	BIC-Roam (bar incoming calls when roaming outside the home country)
"OI"	Bar outgoing international calls
"OX"	Bar outgoing international calls except to home country

<oldpwd>, <newpwd>: string type; old password and new password whose maximum lengths are specified by <pwdlength>. The characters allowed in <oldpwd> and <newpwd> must range from '0' to '9'.

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

4.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.5.5 Example

```

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

          OK

Run:      AT+CPWD="SC", "1234", "1111"
Response:  OK

```

4.6 AT+CNUM-Subscriber Number

4.6.1 Command Syntax

AT+CNUM
Possible Response(s)
<pre> <CR><LF>+CNUM: [<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]]<CR><LF> +CNUM: [<alpha2>],<number2>,<type2>[,<speed>,<service>[,<itc>]][...]<CR><LF> <CR><LF>OK<CR><LF> </pre>

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT+CNUM=?
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

4.6.2 Interface Description

The execution command returns the MSISDNs related to the subscriber (this information can be stored in the EF_{MSISDN} folder on the SIM/USIM). For a SIM card, the information is stored in the EF_{MSISDN} under DF_{Telecom}. For a USIM card, the information is stored in the EF_{MSISDN} under ADF_{USIM}. If the subscriber has different MSISDNs for different services, each MSISDN is returned in a separate line.

4.6.3 Parameter Description

<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 the phone number; address octet in integer format. When <numberx> contains the plus sign ('+'), the value of <typex> is 145, indicating that the phone number is an international number. When <numberx> does not contain the plus sign ('+'), the value of <typex> is 129, indicating that the phone number is a national number.

<speed>: refer 3GPP TS 27.007 subclause 6.7 .(not supported currently)

<service>: integer type (service related to the phone number) .(not supported currently)

0	Asynchronous modem
1	Synchronous modem
2	PAD Access (asynchronous)
3	Packet Access (synchronous)
4	Voice
5	Fax

All other values below 128 are reserved.

<itc>: integer type (information transfer capability).(not supported currently)

0	3.1 kHz
1	UDI

4.6.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.6.5 Example

```
Run:      AT+CPBS="ON"
Response: OK

Run:      AT+CPBW=1,"+8613987654321",145,"CC"
Response: OK

Run:      AT+CPBW=2,"123",129,"USER"
Response: OK

Run:      AT+CNUM
Response:  +CNUM: "CC","+8613987654321",145
           +CNUM: "USER","123",129

           OK

Run:      AT+CPBS="ON"
Response: OK

Run:      AT+CPBW=1
Response: OK

Run:      AT+CPBW=2
Response: OK

Run:      AT+CNUM
Response: OK
```

4.7 AT+CLIR–Calling Line Identification Restriction

4.7.1 Command Syntax

AT+CLIR=[<n>]
Possible Response(s)
<CR><LF>OK<CR><LF>

AT+CLIR?
Possible Response(s)
<code><CR><LF>+CLIR: <n>,<m><CR><LF><CR><LF>OK<CR><LF></code> In case of an MT-related error: <code><CR><LF>+CME ERROR: <err><CR><LF></code>
AT+CLIR=?
Possible Response(s)
<code><CR><LF>+CLIR: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF></code>

4.7.2 Interface Description

This command allows a caller to enable or disable the presentation of the calling line identification (CLI). If the calling line identification restriction (CLIR) is enabled, the CLI is not displayed to the called party.

When `<n>` is not specified, the execution command is equivalent to the set command:
`AT+CLIR=0`.

The read command returns actual subscription.

4.7.3 Parameter Description

`<n>`: disables or enables the presentation of the unsolicited result code (URC).

- | | |
|---|--|
| 0 | Used according to the subscription of the CLIR service (default value) |
| 1 | Enable |
| 2 | Disable |

`<m>`: specifies CLIR service status.

- | | |
|---|---|
| 0 | CLIR not provided |
| 1 | CLIR provided in permanent mode |
| 2 | Unknown (e.g. no network, etc.) |
| 3 | CLIR temporary mode presentation restricted |
| 4 | CLIR temporary mode presentation allowed |

4.7.4 Property Description

Saving upon Power-off	PIN
N	Y

4.7.5 Example

- Query the status of calling line identification restriction:

Run: AT+CLIR?

Response: +CLIR: 0,0

OK

- Enable calling line identification restriction:

Run: AT+CLIR=1

Response: OK

- Query the list of supported <n>s:

Run: AT+CLIR=?

Response: +CLIR: (0-2)

OK

4.8 AT+CLIP–Calling Line Identification Presentation

4.8.1 Command Syntax

AT+CLIP=[<n>]

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CLIP?

Possible Response(s)

<CR><LF>+CLIP: <n>[, <m>]<CR><LF><CR><LF>OK<CR><LF>

AT+CLIP=?

Possible Response(s)

<CR><LF>+CLIP: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

4.8.2 Interface Description

This command allows a called party to get the CLI of the caller. If the calling line identification presentation (CLIP) is enabled, +CLIP is presented following the ring

indication. (For the definition of the interface, see section 4.9 +CLIP–CLIP Notifications.)

**NOTE**

When $\langle n \rangle$ is not specified, the execution command is equivalent to set command: AT+CLIP=0.

4.8.3 Parameter Description

$\langle n \rangle$: integer type; disables or enables the presentation of URC +CLIP.

0	Disable (default value)
1	Enable

$\langle m \rangle$: integer type; specifies the subscription status of CLIP services.

0	CLIP not provided
1	CLIP provided
2	Unknown (network problems)

4.8.4 Property Description

Saving upon Power-off	PIN
N	Y

4.8.5 Example

- Query the status of calling line identification presentation:

Run: AT+CLIP?

Response: +CLIP: 0,1

OK

- Enable calling line identification presentation:

Run: AT+CLIP=1

Response: OK

- Query the list of supported $\langle n \rangle$ s:

Run: AT+CLIP=?

Response: +CLIP: (0-1)

OK

4.9 +CLIP-CLIP Notifications

4.9.1 Command Syntax

URC
Possible Response(s)
<CR><LF>+CLIP: <number>,<type>,,,,<CLI validity><CR><LF>

4.9.2 Interface Description

The set command sets whether reporting of the caller ID unsolicited result code (URC) is allowed. If the caller ID URC is allowed to be reported, when there is an incoming call, the caller ID indication is provided following the RING indication and periodically (every five seconds) reported to the TE.

4.9.3 Parameter Description

<number>: specifies a calling number with ASCII character. Allowed characters are '0'-'9', '*', '#', and '+'.

<type>: specifies the number type. "145" indicates an international number. For details about the values of <type>, see the value definitions of <type_addr> in section 9.3 AT+CMGS-Send Message (PDU Mode).

<CLI validity>:

- | | |
|---|---|
| 0 | The call line identity (CLI) is valid. |
| 1 | The CLI is rejected by the call originator. |
| 2 | The CLI is unavailable because of the limitation of the originating network or a network problem. |

Three fields are reserved between <type> and <CLI validity>.

4.9.4 Property Description

Saving upon Power-off	PIN
NA	NA

4.9.5 Example

- If the CLI is presented, a message similar to the following is displayed:
Response: +CLIP: "82882690",129,,,,0
- If the counter party enables the CLIR, the CLI cannot be presented and a message similar to the following is displayed:

Response: +CLIP: "",129,,,,,1

- If the CLI cannot be presented due to network problems, a message similar to the following is displayed:

Response: +CLIP: "",129,,,,,2

4.10 AT+CLCC-List Current Calls

4.10.1 Command Syntax

AT+CLCC
Possible Response(s)
<pre>[<CR><LF>+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>[,<p riority>]]][<CR><LF>+CLCC: <id2>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>[,<p riority>]]][...]]<CR><LF>]<CR><LF>OK<CR><LF></pre>
AT+CLCC=?
Possible Response(s)
<CR><LF>OK<CR><LF>

4.10.2 Interface Description

This command queries the number of current calls and call state.

4.10.3 Parameter Description

<idx>: specifies the call ID.

<dir>: specifies the call direction.

- | | |
|---|-----------------------------|
| 0 | Mobile originated (MO) call |
| 1 | Mobile terminated (MT) call |

<stat>: specifies the call state.

- | | |
|---|----------|
| 0 | Active |
| 1 | Hold |
| 2 | Dialing |
| 3 | Alerting |
| 4 | Incoming |

5 Waiting

<mode>: specifies the call mode.

0 Voice

1 Data

2 Fax

<mpty>: specifies whether the call involves multiple parties or not.

0 Non-multiparty call

1 Multiparty call

<number>: specifies a calling number with ASCII character. Valid characters are '0'-'9', '*', '#', and '+'. '+' is only allowed before a phone number.

<type>: type of address octet in integer format (refer to 3GPP TS 24.008 subclause 10.5.4.7)

<alpha>: specifies text information corresponding to the entry in the phonebook. Used character set is the one selected with command 2.12 AT+CSCS–Select TE Character Set. (reserved, not supported currently)

<priority>: not supported currently.

4.10.4 Property Description

Saving upon Power-off	PIN
NA	N

4.10.5 Example

An MT has set up an active call and enabled call waiting, and a call is waiting. Run the AT+CLCC command. The following information is displayed:

Run: AT+CLCC

Response: +CLCC: 1,0,0,0,0,"13987654321",129
 +CLCC: 2,1,5,0,0,"13987654321",129

OK

4.11 AT+CCFC–Call Forwarding

4.11.1 Command Syntax

```
AT+CCFC=<reason>,<mode>[,<number>,<type>,<class>,<reserved1>
[,<reserved2>,<time>]]]]]]
```

Possible Response(s)

When <mode>=2 and the command is executed successfully:

```
<CR><LF>+CCFC:
<status>,<class1>,<number>,<type>,<reserved1>,<reserved2>,<
time>]]][<CR><LF>+CCFC:
<status>,<class2>,<number>,<type>,<reserved1>,<reserved2>,<
time>]]][...]]<CR><LF><CR><LF>OK<CR><LF>
```

When <mode>≠2 and the command is executed successfully:

```
<CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT+CCFC=?
```

Possible Response(s)

```
<CR><LF>+CCFC: (list of supported
<reason>s) <CR><LF><CR><LF>OK<CR><LF>
```

4.11.2 Interface Description

This command allows control of the call forwarding supplementary service, including registration, erasure, activation, deactivation, and status query.

Responses are returned one by one. See Command Syntax. This command is set according to the sum of bits.

The test command returns supported reason values.

4.11.3 Parameter Description

<reason>: specifies the call forwarding type.

- | | |
|---|---|
| 0 | Unconditional |
| 1 | Mobile busy |
| 2 | No reply |
| 3 | Unreachable (no network or phone power-off) |
| 4 | All call forwarding |
| 5 | All conditional call forwarding |

<mode>: specifies the operation mode of call forwarding.

- | | |
|---|--------------|
| 0 | Deactivated |
| 1 | Activated |
| 2 | Query status |
| 3 | Registration |
| 4 | Erasure |

<number>: string type phone number of forwarding address in format specified by <type>.

<type>: specifies the number type. "145" indicates an international number. For details about the values of <type>, see the value definitions of <type_addr> in AT+CMGS—Send Message (PDU Mode).

<reserved1>: reserved

<reserved2>: reserved

<classx>: specifies service type. The default value is 1. Currently, only voice services are supported. Therefore, the value is 1.

- | | |
|-----|-------------------------|
| 1 | Voice |
| 2 | Data |
| 4 | Fax |
| 8 | Short message |
| 16 | Synchronous CS data |
| 32 | Asynchronous CS data |
| 64 | Dedicated packet access |
| 128 | Dedicated PAD access |

<time>: when "no reply" is enabled or queried, this gives the time in seconds to wait before call is forwarded. The value ranges from 1 to 30 seconds and the default value is 20. Only allow set 5\10\15\20\25\30 seconds by increasing each 5 seconds (see 3GPP TS 22.082 3.3.3).

<status>:

- | | |
|---|------------|
| 0 | Not active |
| 1 | Active |

4.11.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.11.5 Example

Register the current number with unconditional call transfer to 13987654321:

Run: AT+CCFC=0,3,"13987654321",,1

Response: OK

4.12 AT+CCWA–Call Waiting

4.12.1 Command Syntax

AT+CCWA=[<n>[, <mode>[, <class>]]]

Possible Response(s)

When <mode>=2 and the command is executed successfully:

<CR><LF>+CCWA: <status>,<class1>[<CR><LF>+CCWA:
<status>,<class2>[...]]<CR><LF><CR><LF>OK<CR><LF>

When <mode>≠2 and the command is executed successfully:

<CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CCWA?

Possible Response(s)

<CR><LF>+CCWA: <n><CR><LF><CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CCWA=?

Possible Response(s)

<CR><LF>+CCWA: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

4.12.2 Interface Description

This command allows control of the call waiting supplementary service, including activation, deactivation, and status query.

<n> is used to disable/enable the presentation of a URC.

The test command returns supported values.

4.12.3 Parameter Description

<n>: disables or enables the presentation of a URC.

0 Disable (default value)

1 Enable



NOTE

The value of <n> is unchanged when <n> is not specified.

<mode>:

0 Disable

1 Enable (default value)

2 Query status



NOTE

When the number of parameters is greater than 1, mode is set to 1 by default

<classx>: specifies service type. The default value is 1. Currently, only voice services are supported. Therefore, the value is 1.

1 Voice

2 Data

4 Fax

8 Short message

16 Synchronous CS data

32 Asynchronous CS data

64 Dedicated packet access

128 Dedicated PAD access

<status>:

0 Not Activated

1 Activated



NOTE

When the number of parameters is greater than 1, class is set to 1 by default.

4.12.4 Property Description

Saving upon Power-off	PIN
N	Y

4.12.5 Example

Run:	AT+CCWA=1,1,1	Enable the voice call waiting function and enable the presentation of call waiting information.
Response:	OK	
Run:	AT+CCWA=1	Enable the presentation of call waiting information.
Response:	OK	
Run:	AT+CCWA=,1	Enable the call waiting function (with <class> set to the default value 1 and the value of <n> unchanged).
Response:	OK	Currently, only voice services are supported. Therefore, the default value 1 for <class> is supported by the network.
Run:	AT+CCWA=1,,	Enable the call waiting function (with <mode> and <class> set to the default values) and enable the presentation of call waiting information.
Response:	OK	Currently, only voice services are supported. Therefore, the default value 1 for <class> is supported by the network.

4.13 +CCWA-Call Waiting Notifications

4.13.1 Command Syntax

URC
Possible Response(s)
<CR><LF>+CCWA: <number>,<type>,<class>,[<alpha>],[<CLI validity>],[<subaddr>,<satype>,[<priority>]]<CR><LF>

4.13.2 Interface Description

When call waiting is enabled, call waiting information is presented automatically in a period consistent with that of ring presentation.



NOTE

The incoming call may be reported even during the processing of AT commands.

4.13.3 Parameter Description

<number>: specifies the waiting number.

<type>: specifies the number type. For detailed value, see the definition of the <type_addr> parameter in an SC number in AT+CMGS–Send Message (PDU Mode). If CLIP is not enabled, the value of <type> is set to 128 by default.

<class>: same as <class> in the CCWA setting command

<alpha>: specifies the name corresponding to the calling number in the phonebook. Used character set is the one selected with command AT+CSCS–Select TE Character Set. (not supported currently)

<CLI validity>:

- | | |
|---|--|
| 0 | The CLI is valid. |
| 1 | The CLI is reserved by the call originator. |
| 2 | The CLI is unavailable because of the limitation of the originating network. |

When the CLI is invalid (<CLI validity>=2), the value of <number> is null and the value of <type> is also invalid.

<subaddr>: not supported currently

<satype>: not supported currently

<priority>: not supported currently

4.13.4 Property Description

Saving upon Power-off	PIN
NA	NA

4.13.5 Example

If the call waiting function is enabled, call waiting information is presented automatically as follows:

Response: +CCWA: "13901000460",129,1

4.14 AT+CHLD–Call Hold

4.14.1 Command Syntax

AT+CHLD=[<n>]
Possible Response(s)
<CR><LF>OK<CR><LF>

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT+CHLD=?
```

Possible Response(s)

```
<CR><LF>+CHLD: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>
```

4.14.2 Interface Description

This command allows operations related to call hold.



NOTE

- When <n> is not specified, the execution command is equivalent to set command:
AT+CHLD=2.
- AT+CHLD=2 cannot hold the emergency call (see 3GPP TS 22.173 8.2.9.1).

The test command returns the list of supported commands. The calling number required by some operations is indicated by x, which ranges from 1 to 9.

4.14.3 Parameter Description

<n>:

0	Releases all calls on hold or sets User Determined User Busy (UDUB) for incoming or waiting calls.
1	Releases all activated calls and activates other calls (in incoming, held or waiting status).
1x	Releases a specified call.
2	Holds all activated calls and accepts another call (in incoming, held or waiting status).
2x	Holds all activated calls except the specified call.
3	Adds a held call to the conversation.

4.14.4 Property Description

Saving upon Power-off	PIN
NA	N

4.14.5 Example

In standby mode, perform the following operations to initiate a three-party conference call:

- Run the following command to set up a call (by initiating a call actively or connecting a called party):

Run: ATD13987654321;
 or ATA

Response: OK

- Run the following command to hold the call:

Run: AT+CHLD=2

Response: OK

- Run the following command to initiate and set up the second call:

Run: ATD13987654320;

Response: OK

- Run the following command to set up the three-party conference call:

Run: AT+CHLD=3

Response: OK

- Run the following the test commands:

Run: AT+CHLD=?

Response: +CHLD: (0,1,1x,2,2x,3)

OK

4.15 AT+CSSN-Set Supplementary Service Notification Presentation

4.15.1 Command Syntax

AT+CSSN=[<n>[, <m>]]
Possible Response(s)
<CR><LF>OK<CR><LF>
AT+CSSN?
Possible Response(s)
<CR><LF>+CSSN: <n>, <m><CR><LF><CR><LF>OK<CR><LF>
AT+CSSN=?
Possible Response(s)
<CR><LF>+CSSN: (list of supported <n>s) , (list of supported <m>s) <CR><LF><CR><LF>OK<CR><LF>

4.15.2 Interface Description

The set command enables or disables the presentation of supplementary services.



NOTE

When $\langle n \rangle$ or $\langle m \rangle$ is not specified, the execution command is equivalent to the set command:
`AT+CSSN=0,0`.

4.15.3 Parameter Description

$\langle n \rangle$: sets the presentation of +CSSI.

0	Disable
1	Enable

$\langle m \rangle$: sets the presentation of +CSSU.

0	Disable
1	Enable

4.15.4 Property Description

Saving upon Power-off	PIN
NA	N

4.15.5 Example

- Query the status of supplementary service notification presentation:

Run: `AT+CSSN?`
Response: `+CSSN: 0,0`

OK

- Enable CSSI and CSSU report:

Run: `AT+CSSN=1,1`
Response: `OK`

- Query the list of supported $\langle n \rangle$ s and $\langle m \rangle$ s:

Run: `AT+CSSN=?`
Response: `+CSSN: (0-1), (0-1)`

OK

4.16 +CSSI-Supplementary Service Notifications

4.16.1 Command Syntax

URC
Possible Response(s)
<CR><LF>+CSSI: <code1><CR><LF>

4.16.2 Interface Description

If the AT+CSSN command is executed to enable +CSSI (<n>=1), +CSSI is presented to the TE when a supplementary service notification is received from a network during MO call setup.

4.16.3 Parameter Description

<code1>: the value ranges from 0 to 8.

0	Unconditional call forwarding is active
1	Some of the conditional call forwarding are active
2	Call has been forwarded
3	Call is waiting
4	This is a CUG call (not supported currently)
5	Outgoing calls are barred
6	Incoming calls are barred (not supported currently)
7	CLIR suppression rejected (not supported currently)
8	Call has been deflected (not supported currently)

4.16.4 Property Description

Saving upon Power-off	PIN
NA	NA

4.16.5 Example

If A enables the supplementary service notification presentation +CSSI (<n>=1) and B has been set call forwarding unconditional to C, A automatically presents supplementary service presentations when A calls B.

Response: +CSSI: 2

4.17 +CSSU-Supplementary Service Notifications

4.17.1 Command Syntax

URC
Possible Response(s)
<CR><LF>+CSSU: <code2><CR><LF>

4.17.2 Interface Description

If the AT+CSSN command is executed to enable +CSSU (<m>=1), +CSSU is presented to the TE when a supplementary service notification is received from a network.

4.17.3 Parameter Description

<code2>: the value ranges from 0 to 10. Value 2 and 3 are related to HOLD/RETRIEVE notifications.

0	This is a forwarded call (MT call setup).
1	This is a CUG call (MT call setup). (not supported currently)
2	Call has been put on hold (during a voice call).
3	Call has been retrieved (during a voice call).
4	Multiparty call entered (during a voice call). (not supported currently)
5	Call on hold has been released. (during a voice call)
6	Forward check SS message received. (not supported currently)
7	Call is being connected with the remote party in alerting state. (during a voice call) (not supported currently)
8	Call has been connected (during a voice call or MT call setup). (not supported currently)
9	This is a deflected call (MT call setup). (not supported currently)
10	This is another forwarded call.

4.17.4 Property Description

Saving upon Power-off	PIN
NA	NA



4.17.5 Example

If A enables the supplementary service notification presentation +CSSU (<m>=1) and the call between A and B is activated, A automatically presents supplementary service presentations when A is held by B.

Response: +CSSU: 2

5 Serial Interface Control Commands

5.1 AT+IPR–Set Fixed Data Rate

5.1.1 Command Syntax

AT+IPR[=<rate>]
Possible Response(s)
<CR><LF>OK<CR><LF>
AT+IPR?
Possible Response(s)
<CR><LF>+IPR: <rate><CR><LF><CR><LF>OK<CR><LF>
AT+IPR=?
Possible Response(s)
<CR><LF>+IPR: (list of supported autodetectable <rate>s) [, (list of supported fixed-only <rates>)]<CR><LF><CR><LF>OK<CR><LF>

5.1.2 Interface Description

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

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

5.1.3 Parameter Description

The <rate> value specified shall be the rate in bits per second at which the DTE-DCE interface should operate, e.g. "19200" or "115200". The rates supported by

a particular DCE are manufacturer-specific; however, the `AT+IPR` parameter should permit the setting of any rate supported by the DCE during online operation.

It is recommended that the default for this parameter be 115200.

`AT+IPR` is equivalent to `AT+IPR=115200`.

If the command is sent from the USB interface, `OK` is returned. However, the command is invalidated.

If the command is sent from the UART port, the command is processed on the port and does not affect other ports. The command is validated.

5.1.4 Property Description

Saving upon Power-off	PIN
Y	N

5.1.5 Example

- Set the baudrate as 115200:

Run: `AT+IPR=115200`

Response: `OK`

- Query current baudrate:

Run: `AT+IPR?`

Response: `+IPR: 115200`

`OK`

- List of supported fixed-only rates:

Run: `AT+IPR=?`

Response: `+IPR:`
`( ), (600,1200,2400,4800,9600,19200,38400,57600,115200,230400,460800,921600,1000000,1500000,2500000,3000000,3500000,4000000)`

`OK`

5.2 AT+IFC-Control Local Flow

5.2.1 Command Syntax

AT+IFC[=<DCE_by_DTE>[,<DTE_by_DCE>]]
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+IFC=?
Possible Response(s)
<CR><LF>+IFC : <DCE_by_DTE>,<DTE_by_DCE><CR><LF><CR><LF>OK<CR><LF>

5.2.2 Interface Description

This extended-format compound parameter is used to control the operation of local flow control between the DTE and DCE during the data state when V.42 error control is being used, or when fallback to non-error control mode is specified to include buffering and flow control. It accepts two numeric subparameters:

- <DCE_by_DTE>: specifies the method to be used by the DTE to control the flow of received data from the DCE;
- <DTE_by_DCE>: specifies the method to be used by the DCE to control the flow of transmitted data from the DTE.

If the command is sent from the USB interface or 2-pin serial port, OK is returned. However, the command is invalidated.

If the command is sent from the UART port, the command is validated.

5.2.3 Parameter Description

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

0	None
1	DC1/DC3 on circuit 103; do not pass DC1/DC3 characters to the remote DCE (reserved, not supported currently).
2	Circuit 133 (Ready for Receiving)
3	DC1/DC3 on circuit 103 with DC1/DC3 characters being passed through to the remote DCE in addition to being acted upon for local flow control (reserved, not supported currently)
4–127	Reserved for future standardization

Other reserved for manufacturer-specific use.

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

- | | |
|-------|---|
| 0 | None |
| 1 | DC1/DC3 on circuit 104 (reserved, not supported currently). |
| 2 | Circuit 106 (Clear to Send/Ready for Sending) |
| 3–127 | Reserved for future standardization |

Other reserved for manufacturer-specific use.



NOTE

- DC1 is IA5 1/1; DC3 is IA5 1/3.
- Both AT+IFC=0,2 and AT+IFC=2,0 are not supported.

Recommended default settings:

For <DCE_by_DTE>: 0

For <DTE_by_DCE>: 0

AT+IFC is equivalent to AT+IFC=0, 0

5.2.4 Property Description

Saving upon Power-off	PIN
N	N

5.2.5 Example

- None flow control:

Run: AT+IFC=0, 0

Response: OK

- Query current control state:

Run: AT+IFC?

Response: +IFC: 0, 0

OK

- List of supported parameters:

Run: AT+IFC=?

Response: +IFC: (0, 2), (0, 2)

OK



- Enable flow control:

Run: AT+IFC=2,2

Response: OK

6 Mobile Termination Control and Status Commands

6.1 AT+CFUN–Set Operation Mode

6.1.1 Command Syntax

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

6.1.2 Interface Description

The set command sets the MT mode or restarts the MT.

The read command returns the current mode.

The test command returns the supported parameter values.

6.1.3 Parameter Description

<fun>:

- | | |
|---|---|
| 0 | Minimum functionality (disable RF but reserve SIM card power supply, previous mode must not be offline) |
| 1 | Set as online mode (default value) (previous mode must not be offline) |
| 4 | Set as offline mode (previous mode must not be FTM) |
| 5 | Set as FTM mode (previous mode must be online) |
| 6 | Restart MT (previous mode must be offline) |
| 7 | Disable RF (previous mode must not be offline) |
| 8 | Power off |

<rst>: MT whether to restart MT or not before setting.

- | | |
|---|---|
| 0 | Do not restart MT before setting (default value) |
| 1 | Restart the MT before setting (<fun> is set to 1) |

6.1.4 Property Description

Saving upon Power-off	PIN
NA	N

6.1.5 Example

Run: AT+CFUN?

Response: +CFUN: 0

OK

Run: AT+CFUN=1

Response: OK

6.2 AT+CPIN-Enter PIN

6.2.1 Command Syntax

AT+CPIN=<pin>[, <newpin>]

Possible Response(s)

<code><CR><LF>OK<CR><LF></code>
In case of an MT-related error: <code><CR><LF>+CME ERROR: <err><CR><LF></code>
AT+CPIN?
Possible Response(s)
<code><CR><LF>+CPIN: <code><CR><LF><CR><LF>OK<CR><LF></code>
AT+CPIN=?
Possible Response(s)
<code><CR><LF>OK<CR><LF></code>

6.2.2 Interface Description

The read command returns a string indicating whether a password is required or not.

The set command verifies and unblocks PIN and PIN2.

- If the current password required is PIN or PIN2, run `AT+CPIN=<pin>` to verify PIN or PIN2.
- If the current password required is PUK or PUK2, run `AT+CPIN=<pin>, <newpin>` to unblock the PIN. In "`AT+CPIN=<pin>, <newpin>`", `<pin>` is the SIM PUK or SIM PUK2, and `<newpin>` is the new PIN or PIN2.
- If the set command is executed when PIN is not requested, `+CME ERROR: <err>` is returned.

The read command returns a string indicating whether a password is required or not.



NOTE

Verifying PIN or PUK while a call or other services are ongoing may cause the call or services to be terminated.

6.2.3 Parameter Description

`<pin>`, `<newpin>`: string type values of the 4–8 digits. The character allowed in `<pin>` and `<newpin>` must range from 0 to 9, otherwise, an error message is returned.

`<code>`: string type, without quotation marks.

READY	MT is not pending for any password.
SIM PIN	MT is waiting for UICC/SIM PIN to be given.
SIM PUK	MT is waiting for UICC/SIM PUK to be given to unblock the blocked SIM PIN.
SIM PIN2	MT is waiting for SIM PIN2 to be given.
SIM PUK2	MT is waiting for UICC/SIM PUK2 to be given to unblock the blocked SIM PIN2.

6.2.4 Property Description

Saving upon Power-off	PIN
NA	N

6.2.5 Example

Run: AT+CPIN?
Response: +CPIN: SIM PIN

OK
Run: AT+CPIN="1234"
Response: OK

6.3 AT+CPBS–Select Phonebook Memory Storage

6.3.1 Command Syntax

AT+CPBS=<storage>[,<reserved>]
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT+CPBS?
Possible Response(s)
<CR><LF>+CPBS : <storage>[,<used>,<total>]<CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT+CPBS=?
Possible Response(s)
<CR><LF>+CPBS : (list of supported <storage>s) <CR><LF><CR><LF>OK<CR><LF>

6.3.2 Interface Description

The set command selects phonebook memory storage `<storage>`, which is used by other phonebook commands. After the MT is restarted, the value of `<storage>` is restored to its default value "SM".

The read command returns currently selected memory and, optionally, the number of used locations and total number of locations in the memory.

The test command returns supported phonebook storages.

6.3.3 Parameter Description

`<storage>`: phonebook storage type.

"SM"	SIM/UICC phonebook (default value)
"ME"	NV phonebook (not supported by WCDMA module, supported by CDMA module and telephone) (not supported currently)
"ON"	Phone number in (U)SIM/UICC card
"EN"	Emergency number in (U)SIM/UICC card
"FD"	SIM/USIM fixdialing-phonebook. In the currently selected card slot, if a SIM card is present or if a UICC with an active GSM application is present, the information in EFFDN under DFTelecom is selected. If a UICC with an active USIM application is present, the information in EFFDN under ADFUSIM is selected. (not supported currently)

`<reserved>`: reserved.

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

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

6.3.4 Property Description

Saving upon Power-off	PIN
N	Y

6.3.5 Example

```
Run:      AT+CPBS?
Response: +CPBS: "SM",250,250

          OK

Run:      AT+CPBS="ON"
```

```

Response:    OK

Run:         AT+CPBS=?

Response:    +CPBS: ("SM", "EN", "ON")

                OK

```

6.4 AT+CPBR-Read Phonebook Entries

6.4.1 Command Syntax

```
AT+CPBR=<index1>[,<index2>]
```

Possible Response(s)

```

<CR><LF>[+CPBR:
<index1>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>][,<sip_uri>][,<tel_uri>]]][...]<CR>
<CR><LF>+CPBR:
<index2>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>][,<sip_uri>][,<tel_uri>]]<CR>
><LF><CR><LF>OK<CR><LF>

```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT+CPBR=?
```

Possible Response(s)

```

<CR><LF>+CPBR: (list of supported
<index>S)[,<nlength>][,<tlength>][,<glength>][,<slength>][,<elengt
h>][,<siplength>][,<tellength>]<CR><LF><CR><LF>OK<CR><LF>

```

6.4.2 Interface Description

The set command returns phonebook entries in location number range <index1>, <index2> from the currently selected phonebook memory storage. The values of <index2> must be greater than the value of <index1>.

If <index2> is left out, only the phonebook entry at location <index1> is returned.

The test command returns the location range supported by the current storage and the maximum lengths of the <number>, <text>, <group>, <secondtext>, <email>, <sip_uri> and <tel_uri> fields.

6.4.3 Parameter Description

<index1>, <index2>, <index>: integer type values that indicate the locations in the phonebook memory. The values of <index1> and <index2> must be smaller than or equal to the value of <total> returned in the response to the AT+CPBS? Command; and the values of <index2> must be greater than the value of <index1>.

<number>: string type field of maximum length <nlength>, indicating the phone number.

<type>: specifies the number type. "145" indicates an international number. For details about the values of <type>, see the value definitions of <type_addr> in section 9.3 AT+CMGS—Send Message (PDU Mode).

<text>: string type field of maximum length <tlength>; character set as specified by command 2.12 AT+CSCS—Select TE Character Set.

<group>: string type field of maximum length <glength>, indicating the group name; character set as specified by command 2.12 AT+CSCS—Select TE Character Set.

<adnumber>: string type field indicates additional phone number.

<adtype>: type of additional phone number starts with "+", the value is 145 (refer 3GPP TS 24.008 subclause 10.5.4.7).

<secondtext>: string type field of maximum length <slength>, indicating the second name of a phone number entry; character set as specified by command 2.12 AT+CSCS—Select TE Character Set.

<email>: string type field of maximum length <elength>; character set as specified by command 2.12 AT+CSCS—Select TE Character Set.

<sip_uri>: string type field of maximum length <siplength>, indicating the SIP address; character set as specified by command 2.12 AT+CSCS—Select TE Character Set.

<tel_uri>: string type of maximum length <tellength>, indicating the session initiation protocol (SIP) address; character set as specified by command 2.12 AT+CSCS—Select TE Character Set.

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

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

<glength>: an integer type value indicating the maximum length of field <group>.

<slength>: an integer type value indicating the maximum length of field <secondtext>.

<elength>: an integer type value indicating the maximum length of field <email>.

<siplength>: an integer type value indicating the maximum length of field <sip_uri>.

<tellength>: an integer type value indicating the maximum length of field <tel_uri>.

<hidden>: an integer type value indicating whether the phonebook entry is hidden.

- 0 Phonebook entry not hidden
- 1 Phonebook entry hidden


NOTE

- The following fields are not supported currently: <hidden>, <group>, <adnumber>, <adtype>, <secondtext>, <email>, <sip_uri>, <tel_uri>, <glength>, <slength>, <elength>, <siplength>, and <tellength>.
- The definition of 2.12 AT+CSCS–Select TE Character Set can see 3GPP TS 27.007.

6.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

6.4.5 Example

```
Run: AT+CPBR=?
Response: +CPBR: (1-250),24,14

OK

Run: AT+CPBR=1
Response: +CPBR: 1,"12323",129,"qwewqe"

OK
```

6.5 AT+CPBW–Write Phonebook Entry

6.5.1 Command Syntax

```
AT+CPBW=[<index>][,<number>[,<type>[,<text>[,<group>[,<adnumber>[
,<adtype>[,<secondtext>[,<email>[,<sip_uri>[,<tel_uri>[,<hidden
>]]]]]]]]]
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT+CPBW?
```

Possible Response(s)

<pre><CR><LF>+CPBW: <written_index><CR><LF><CR><LF>OK<CR><LF></pre>
<pre>AT+CPBW=?</pre>
Possible Response(s)
<pre><CR><LF>+CPBW: (list of supported <index>s), [<nlength>], (list of supported <type>s), [<tlength>]<CR><LF><CR><LF>OK<CR><LF></pre>

6.5.2 Interface Description

The set command writes a phonebook entry in location number *<index>* in the currently selected phonebook memory storage.

- If the set command contains only the *<index>* parameter, the phonebook entry at the location specified by *<index>* will be deleted.
- If *<index>* is left out, but *<number>* is given, the entry is written to the first free location in the phonebook.
- If an entry is written successfully and *<index>* is not provided, AT+CPBW: *<written_index>* is returned, indicating the location of the entry. The *<number>* field cannot be null and the *<text>* field can be null.
- If the phonebook supports hidden entries, *<hidden>* shall be specified in the command.
- If no location is free, +CME ERROR: memory full is returned.

Phonebook entries can be written only when the phonebook storage type *<storage>* of the selected phonebook memory storage is "SM" or "ON".

If the phonebook storage is of any other type, an error message will be returned, indicating that the write operation is not allowed.

- If the UE is unable to display the full text or email, they are cut from the tail end.

The read command returns the latest value of *<written_index>* or returns -1 when the value of *<written_index>* is invalid.

NOTE

After running the AT+CPBS command to change the current phonebook storage, you need to set *<written_index>* to an invalid value.

The test command returns:

- the location range supported by the current storage;
- the list of supported *<type>*s;
- the maximum lengths of the *<number>*(excluding '+'), *<text>*, *<group>*, *<secondtext>*, *<sip_uri>* and *<tel_uri>* fields.

When writing a phonebook entry, ensure that the lengths of all fields do not exceed their maximum lengths.

6.5.3 Parameter Description

<index>: an integer type value that indicates the locations in the phonebook memory. The values of <index> must be smaller than or equal to the value of <total> returned in the response to the AT+CPBS? Command.

<number>: string type field of maximum length <nlength>, indicating the phone number.

<type>: specifies the number type. If the phone number starts with '+', the value of <type> is 145 (refer 3GPP TS 24.008).

<text>: string type field of maximum length <tlength>, indicating the name of a phone number entry; character set as specified by command 2.12 AT+CSCS–Select TE Character Set.

<group>: string type field of maximum length <glength>, indicating the group name; character set as specified by command 2.12 AT+CSCS–Select TE Character Set.

<adnumber>: string type field indicates additional phone number.

<adtype>: type of additional phone number. If the phone number starts with '+', the value of <adtype> is 145 (refer to 3GPP TS 24.008)

<secondtext>: string type field of maximum length <slength>, indicating the second name of a phone number entry; character set as specified by command 2.12 AT+CSCS–Select TE Character Set.

<email>: string type field of maximum length <elength>; character set as specified by command 2.12 AT+CSCS–Select TE Character Set.

<sip_uri>: string type field of maximum length <siplength>, indicating the SIP address; character set as specified by command 2.12 AT+CSCS–Select TE Character Set.

<tel_uri>: string type of maximum length <tellength>, indicating the session initiation protocol (SIP) address; character set as specified by command 2.12 AT+CSCS–Select TE Character Set.

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

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

<glength>: an integer type value indicating the maximum length of field <group>.

<slength>: an integer type value indicating the maximum length of field <secondtext>.

<elength>: an integer type value indicating the maximum length of field <email>.

<siplength>: an integer type value indicating the maximum length of field <sip_uri>.

<tellength>: an integer type value indicating the maximum length of field <tel_uri>.

<hidden>: an integer type value indicating whether the entry is hidden.

0 Phonebook entry not hidden

1 Phonebook entry hidden



NOTE

- The following fields are not supported currently: <hidden>, <group>, <adnumber>, <adtype>, <secondtext>, <email>, <sip_uri>, <tel_uri>, <glength>, <slength>, <elength>, <siplength>, and <tellength>.
- The definition of 2.12 AT+CSCS–Select TE Character Set can see 3GPP TS 27.007.

6.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

6.5.5 Example

```

Run:      AT+CPBW=?
Response: +CPBW: (1-250),24,(128-255),14

          OK

Run:      AT+CPBW=1,"13903711757",129,"MyNumber"
Response: OK

Run:      AT+CPBW=1
Response: OK

Run:      AT+CPBW?
Response: +CPBW: 1

          OK

```

6.6 AT+CRSM–Restricted SIM Access

6.6.1 Command Syntax

```
AT+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>[,<pathid>]]]]
```

Possible Response(s)

```
<CR><LF>+CRSM:
<sw1>,<sw2>[,<response>]<CR><LF><CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

AT+CRSM=?
Possible Response(s)
<CR><LF>OK<CR><LF>

6.6.2 Interface Description

Using this command, TE applications have limited access to the SIM card.

The set command accesses the SIM card through restricted permissions.

6.6.3 Parameter Description

<command>: command passed on by the MT to the SIM.

176 READ BINARY

178 READ RECORD

192 GET RESPONSE

214 UPDATE BINARY

220 UPDATE RECORD

242 STATUS

<fileid>: integer type; identifier of an EF file on SIM; mandatory for every command except STATUS.

<P1>, <P2>, <P3>: integer type; these parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in GSM 51.011.

<data>: information in hexadecimal format

<pathid>: string type; contains the path of an elementary file on the SIM/UICC in hexadecimal format (for example, "7F205F70"), and shall only be used in the mode "select by path from MF" as defined in ETSI TS 102.221.

<sw1>, <sw2>: integer type; information from the SIM about the execution of the actual command.

<response>: string type; response of a successful completion of the command previously issued. For UPDATE BINARY and UPDATE RECORD, no response is returned.

6.6.4 Property Description

Saving upon Power-off	PIN
NA	N

6.6.5 Example

```

Run:          AT+CRSM=192,28483
Response:     +CRSM: 144,0,"621B8202412183026F43A5039201008A0107
              8B036F0604800200028800"

              OK

Run:          AT+CRSM=176,12258,0,0,10
Response:     +CRSM: 144,0,"98684006905725103076"

              OK

```

6.7 AT+CCLK-Return Current Time of the Module

6.7.1 Command Syntax

AT+CCLK=<time>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CCLK?
Possible Response(s)
<CR><LF>+CCLK: <time><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CCLK=?
Possible Response(s)
<CR><LF>OK<CR><LF>

6.7.2 Interface Description

The set command sets the real-time clock of the MT. If setting fails in an MT error, +CME ERROR: <err> is returned. Refer to subclause 9.2 in 3GPP 27.007 for <err> values.

The read command returns the current setting of the clock.

6.7.3 Parameter Description

<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 -96...+96). E.g. 6th of May 2013, 22:10:00 GMT+2 hours equals to "2013/05/06,22:10:00+08".



NOTE

If MT does not support time zone information then the three last characters of <time> are not returned by AT+CCLK? For yyyy, the valid years set is 2000-2100.

6.7.4 Property Description

Saving upon Power-off	PIN
NA	N

6.7.5 Example

Run: AT+CCLK="2013/01/06,01:14:09"

Response: OK

Run: AT+CCLK?

Response: +CCLK: "2013/01/06,01:14:34"

OK

Run: AT+CCLK=?

Response: OK

6.8 AT+CLVL-Tune Loudspeaker Volume Level

6.8.1 Command Syntax

AT+CLVL=<level>

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CLVL?

Possible Response(s)


```
<CR><LF>+CLVL: <level><CR><LF><CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT+CLVL=?
```

Possible Response(s)

```
<CR><LF>+CLVL: (list of supported  
<level>s) <CR><LF><CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

6.8.2 Interface Description

This command selects the volume of the internal loudspeaker of the MT.

The test command returns supported values as compound value.

6.8.3 Parameter Description

<level>:

1–5 Integer type value with manufacturer specific range (smallest value represents the lowest sound level). Default value is 2. Firmware updating will reset the value to the default value.

6.8.4 Property Description

Saving upon Power-off	PIN
Y	N

6.8.5 Example

```
Run:      AT+CLVL=5           Set the loudspeaker volume level to 5.
Response:  OK

Run:      AT+CLVL?
Response:  +CLVL: 5

          OK
```

6.9 AT+CMIC-Tune Microphone Gain Level

6.9.1 Command Syntax

AT+CMIC=<level>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CMIC?
Possible Response(s)
<CR><LF>+CMIC: <level><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CMIC=?
Possible Response(s)
<CR><LF>+CMIC: (list of supported <level>s)<CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>

6.9.2 Interface Description

This command adjusts the microphone gain of the MT before a voice call.

The test command returns supported values as compound value.

6.9.3 Parameter Description

<level>:

1–12 Integer type value with manufacturer specific range (smallest value represents the lowest gain). Default value is 5. Firmware updating will reset the value to the default value.

6.9.4 Property Description

Saving upon Power-off	PIN
Y	N

6.9.5 Example

```
Run:          AT+CMIC=5          Set the microphone gain level to 5.
Response:     OK
Run:          AT+CMIC?
Response:     +CMIC: 5

                OK
```

6.10 AT+CMUT-Switch Mute Status

6.10.1 Command Syntax

AT+CMUT=<n>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CMUT?
Possible Response(s)
<CR><LF>+CMUT: <n><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CMUT=?
Possible Response(s)
<CR><LF>+CMUT: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>

6.10.2 Interface Description

This command is used to enable and disable the uplink voice muting during a voice call.

The read command returns the current value of the uplink voice mute status.

The test command returns the supported value of the uplink voice mute setting.

The mute state is switched off when the call is over.



6.10.3 Parameter Description

<n>: mute switch

0	Mute off (default value)
1	Mute on

6.10.4 Property Description

Saving upon Power-off	PIN
N	N

6.10.5 Example

Run: AT+CMUT=1

This command can be used during a voice call, otherwise it will return ERROR.

Response: ERROR

Run: AT+CMUT?

Response: +CMUT: 0

OK

Run: AT+CMUT=?

Response: +CMUT: (0-1)

OK

7 UMTS Packet Domain Commands

7.1 AT+CGDCONT-Define PDP Context

See the AT+CGDCONT command described in 3GPP TS 27.007. The following description is for reference only. Observe the 3GPP specifications if the following description conflicts with the 3GPP specifications.

7.1.1 Command Syntax

```
AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_c
omp>]]]]]
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

```
AT+CGDCONT?
```

Possible Response(s)

```
<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>
```

```
AT+CGDCONT=?
```

Possible Response(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>+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>
```

7.1.2 Interface Description

The MT locally saves a group of PDP contexts with <cid> as the index. Each record of the saved setting environment contains a group of PDP-related parameters.

The set command saves the group of PDP-related parameters in the PDP contexts that use <cid> as the index. Each PDP context is initially undefined. After the set

command saves a group of parameters in a PDP context, the PDP context is defined. The number of defined PDP contexts that can be saved at the same time is determined by the value range of `<cid>`.

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



NOTE

Because the LTE module needs a default PDP context (profile 16) to register on the LTE network, the default PDP context should not be removed. And the corresponding `<cid>` is 16, so you cannot execute `AT+CGDCONT=16`.

The read command queries the current settings for each defined context displayed in a separate line.



NOTE

If all PDP contexts are undefined, the default parameters of PDP context are returned. In which, the default value of `<cid>` is 1, and it will be saved when MT is powered off.

The test command returns all the values supported for each context. In the response, the `<PDP_type>` value supported by the MT is taken as the index and displayed in a separate line. Each context has a confirmed `<PDP_type>` value and includes the supported value ranges of other parameters with the specified `<PDP_type>` value. Each context is displayed in a separate line.

7.1.3 Parameter Description

`<cid>`:

1 –16	Index of a PDP context. Other PDP-related commands can use this index to use the defined PDP context.
-------	---

`<PDP_type>`: a string parameter that specifies the type of packet data protocol.

"IP"	Internet Protocol
"PPP"	Point to Point Protocol
"IPV6"	IPV6 Protocol
"IPV4V6"	IPV4V6 Dual Stack

`<APN>`: a string parameter that specifies the access point for accessing the GGSN or the external packet data network. The maximum length of `<APN>` is 100 characters. If the value is null or omitted, the subscription value will be requested.

`<PDP_addr>`: a string parameter that identifies the MT in the IPv4 address space applicable to the PDP. If the values of `<PDP_addr>` is got dynamically, the read command returns "" or "0.0.0.0".

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

0	Off
1	On
2	V.42bis

3 V.44 (not supported currently)

<h_comp>: a numeric parameter that controls PDP header compression.

0 Off

1 On

2 RFC1144 (applicable for SDCP only)

3 RFC2507

4 RFC3095 (applicable for PDCP only)



NOTE

- If <h_comp> is not specified, it is equivalent to set <h_comp> to 0.
- If <d_comp> is not specified, it is equivalent to set <d_comp> to 0.

7.1.4 Property Description

Saving upon Power-off	PIN
Y	N

7.1.5 Example

Run: AT+CGDCONT=?

Response: +CGDCONT: (1-16),"IP",,,(0-2),(0-4)
+CGDCONT: (1-16),"PPP",,,(0-2),(0-4)
+CGDCONT: (1-16),"IPV6",,,(0-2),(0-4)
+CGDCONT: (1-16),"IPV4V6",,,(0-2),(0-4)

OK

Run: AT+CGDCONT?

Response: +CGDCONT: 1,"IP","vcol.com","0.0.0.0",0,0
+CGDCONT: 16,"IP","xyz.com","0.0.0.0",0,0

OK



NOTE

The MT saves one PDP context, and the <cid> value of this context is 1.

Run: AT+CGDCONT=15,"IP","abc.com"

Response: OK



NOTE

This command saves one PDP context to the MT and the <cid> value is 15.

Run: AT+CGDCONT?

Response: +CGDCONT: 1,"IP","vcol.com","0.0.0.0",0,0
+CGDCONT: 15,"IP","abc.com","0.0.0.0",0,0
+CGDCONT: 16,"IP","xyz.com","0.0.0.0",0,0

OK


NOTE

The response shows that the PDP context has been successfully saved to the MT at the previous step.

Run: AT+CGDCONT=15

Response: OK


NOTE

This command removes the PDP context with <cid>=15.

Run: AT+CGDCONT?

Response: +CGDCONT: 1,"IP","vcol.com","0.0.0.0",0,0
+CGDCONT: 16,"IP","xyz.com","0.0.0.0",0,0

OK


NOTE

The response shows that the PDP context with <cid>=15 has been removed.

7.2 AT+CGACT-Activate or Deactivate PDP Context

7.2.1 Command Syntax

AT+CGACT=[<state>[,<cid>[,<cid>[,...]]]]

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CGACT?

Possible Response(s)

<CR><LF>+CGACT: <cid>,<state>[<CR><LF>+CGACT:
<cid>,<state>[...]]<CR><LF><CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CGACT=?

Possible Response(s)

<CR><LF>+CGACT: (list of supported
<state>s) <CR><LF><CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

7.2.2 Interface Description

The set command activates or deactivates the specified PDP context(s). If <cid> is not specified, all PDP contexts are activated or deactivated.

The read command returns the defined PDP Activation state.

The test command returns the supported values of <state>.

7.2.3 Parameter Description

<state>: integer type, indicates the state of PDP context activation.

0	Deactivated
1	Activated

<cid>: the index of a PDP context; specifies a particular PDP context definition, see AT+CGDCONT–Define PDP Context.

7.2.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.2.5 Example

Run:	AT+CGACT=1,1	Activate PDP contexts
Response:	OK	
Run:	AT+CGACT=0,1	Deactivate PDP contexts
Response:	OK	
Response:	AT+CGACT?	Query the state of PDP context activation

Response: +CGACT: 1,0

OK

7.3 AT+CGATT-Attach or Detach PS Domain

7.3.1 Command Syntax

AT+CGATT=[<state>]
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CGATT?
Possible Response(s)
<CR><LF>+CGATT: <state><CR><LF><CR><LF>OK<CR><LF>
AT+CGATT=?
Possible Response(s)
<CR><LF>+CGATT: (list of supported <state>s) <CR><LF><CR><LF>OK<CR><LF>

7.3.2 Interface Description

The set command attaches the MT to, or detaches the MT from, the packet-switched (PS) domain service. After the command has been completed, the MT remains in V.25ter command state. If the MT is already in the requested state, the command is ignored and OK is returned. If the requested state cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the AT+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.

The test command requests information about the supported PS domain service states

7.3.3 Parameter Description

<state>: indicates the state of PS domain service.

0	Detached
1	Attached

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

7.3.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.3.5 Example

```
Run:      AT+CGATT?
Response:  +CGATT: 1

          OK

Run:      AT+CGATT=0
Response:  OK
```

7.4 AT+CGREG-PS Domain Registration Status

7.4.1 Command Syntax

AT+CGREG[=<n>]
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CGREG?
Possible Response(s)
<CR><LF>+CGREG: <n>,<stat>[,<lac>,<ci>[,<AcT>,<rac>]]<CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>

AT+CGREG=?

Possible Response(s)

<CR><LF>+CGREG: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

7.4.2 Interface Description

The set command controls the presentation of an unsolicited result code +CGREG.

- when <n>=1 and there is a change in the MT's network registration status, +CGREG: <stat> is presented.
- When <n>=2 and there is a change in the network cell, +CGREG: <stat>[, <lac>, <ci>, [, <AcT>, <rac>]] is presented. In this case <AcT>, <lac>, <rac> and <ci> are sent only if available.

The read command returns the current registration state <stat>. Location information elements <lac> and <ci> are returned only when <n>=2.

The test command returns the <n> values supported by the UE.

7.4.3 Parameter Description

<n>:

- | | |
|---|---|
| 0 | Disable unsolicited result code +CGREG. (default value). |
| 1 | Enable unsolicited result code +CGREG: <stat>. |
| 2 | Enable network registration and location information unsolicited result code +CGREG: <stat>[, <lac>, <ci>[, <AcT>, <rac>]]. |

<stat>:

- | | |
|---|--|
| 0 | Not registered, MT is not currently searching for a new operator to register with. |
| 1 | Registered, home network |
| 2 | Not registered, but MT is currently searching a new operator to register with. |
| 3 | Registration denied |
| 4 | Unknown |
| 5 | Registered, roaming |

<lac>: string type; four-character location area code in hexadecimal format (for example, "00C3" equals 195 in decimal).

<ci>: string type; four-character cell ID in hexadecimal format.

<AcT>: a numeric parameter that indicates the access technology of the serving cell.

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

 NOTE

- [1] 3GPP TS 44.060 specifies the system information messages which give the information about whether the serving cell supports EGPRS.
- [2] 3GPP TS 25.331 specifies the system information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

<rac>: string type, one byte routing area code in hexadecimal format.

7.4.4 Property Description

Saving upon Power-off	PIN
N	Y

7.4.5 Example

Run: AT+CGREG?

Response: +CGREG: 0,1

OK

Run: AT+CGREG=?

Response: +CGREG: (0-2)

OK

7.5 AT+CGSMS–SMS Bearer Domain

7.5.1 Command Syntax

AT+CGSMS=<service>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CGSMS?
Possible Response(s)
<CR><LF>+CGSMS: <service><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT+CGSMS=?
Possible Response(s)
<CR><LF>+CGSMS: (list of supported <service>s) <CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>

7.5.2 Interface Description

The set command sets the SMS bear domain, that is, the selection of the CS/PS domain.

The read command returns the current SMS bearer domain.

The test command returns the supported parameter values.

7.5.3 Parameter Description

<service>:

- | | |
|---|-------------------------------------|
| 0 | PS domain |
| 1 | CS domain |
| 2 | PS domain preferred |
| 3 | CS domain preferred (default value) |

7.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.5.5 Example

Run: AT+CGSMS?

Response: +CGSMS: 1

OK

Run: AT+CGSMS=?

Response: +CGSMS: (0-3)

OK

Run: AT+CGSMS=2

Response: OK

Run: AT+CGSMS?

Response: +CGSMS: 2

OK

7.6 AT+CGEQREQ-3G Requested QoS Profile

7.6.1 Command Syntax

AT+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>]|||||||

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CGEQREQ?

Possible Response(s)

<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>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CGEQREQ=?

Possible Response(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>+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>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

7.6.2 Interface Description

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

A special form of the set command, AT+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.

7.6.3 Parameter Description

`<cid>`: a numeric parameter which specifies a particular PDP context definition (see 7.1 AT+CGDCONT–Define PDP Context).

The following parameters are defined in 3GPP TS 23.107. If a value is omitted for a particular class then the value is considered to be unspecified.

`<Traffic class>`: application type of the UMTS bearer service.

0	Conversational
1	Streaming
2	Interactive
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>`: maximum uplink rate in kbit/s.

`<Maximum bitrate DL>`: maximum downlink rate in kbit/s.

`<Guaranteed bitrate UL>`: guaranteed uplink rate in kbit/s.

`<Guaranteed bitrate DL>`: guaranteed downlink rate in kbit/s.

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

0	No
1	Yes
2	Subscribed value

`<Maximum SDU size>`: indicates the maximum allowed SDU size in octets.

`<SDU error ratio>`: indicates the target SDU error ratio.

`<Residual bit error ratio>`: indicates the target value for the undetected bit error ratio in the delivered SDUs. The format of this field is the same as that of the `<SDU error ratio>` field.

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

0	No
1	Yes
2	No detect
3	Subscribed value

`<Transfer delay>`: indicates the targeted transmission delay in milliseconds.

<Traffic handling priority>: a numeric parameter (0–3) that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers.

<PDP_type>: see 7.1 AT+CGDCONT–Define PDP Context.

7.6.4 Property Description

Saving upon Power-off	PIN
N	Y

7.6.5 Example

```

Run:      AT+CGEQREQ=1,0
Response: OK

Run:      AT+CGEQREQ?
Response: +CGEQREQ: 1,0,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 2,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 3,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 4,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 5,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 6,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 7,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 8,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 9,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 10,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 11,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 12,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 13,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 14,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 15,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0
          +CGEQREQ: 16,2,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0

          OK

Run:      AT+CGEQREQ=?

```

Response: +CGEQREQ:
"IP", (0-4), (0-5760), (0-42200), (0-5760), (0-42200), (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), (0,1), (0,1)

+CGEQREQ:
"PPP", (0-4), (0-5760), (0-42200), (0-5760), (0-42200), (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), (0,1), (0,1)

+CGEQREQ:
"IPV6", (0-4), (0-5760), (0-42200), (0-5760), (0-42200), (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), (0,1), (0,1)

+CGEQREQ:
"IPV4V6", (0-4), (0-5760), (0-42200), (0-5760), (0-42200), (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), (0,1), (0,1)

OK

7.7 AT+CGQMIN-Quality of Service Profile (Minimum Acceptable)

7.7.1 Command Syntax

AT+CGQMIN=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CGQMIN?

Possible Response(s)

```
[<CR><LF>+CGQMIN:
<cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>][<CR><LF>+CGQMIN:
<cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>[...]]<CR>
<LF><CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT+CGQMIN=?
```

Possible Response(s)

```
<CR><LF>+CGQMIN: <PDP_type>, (list of supported <precedence>s) , (list of
supported <delay>s) , (list of supported <reliability>s) , (list of supported
<peak>s) , (list of supported <mean>s)[<CR><LF>+CGQMIN: <PDP_type>, (list
of supported <precedence>s) , (list of supported <delay>s) , (list of supported
<reliability>s) , (list of supported <peak>s) , (list of supported
<mean>s)[...]]<CR><LF><CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

7.7.2 Interface Description

This command allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile when the PDP context is activated.

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 AT+CGDCONT and AT+CGDSCONT commands, the +CGQMIN command is effectively an extension to these commands. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

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

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

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

7.7.3 Parameter Description

<cid>: a numeric parameter which specifies a particular PDP context definition (see 7.1 AT+CGDCONT—Define PDP Context).

The following parameters are defined in 3GPP TS 23.107:

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

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

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

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

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

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

7.7.4 Property Description

Saving upon Power-off	PIN
Y	Y

7.7.5 Example

Run: AT+CGQMIN=1,0,0,0

Response: OK

Run: AT+CGQMIN?

Response: +CGQMIN: 1,0,0,0,0,0

OK

Run: AT+CGQMIN=?

Response: +CGQMIN: "IP", (0-3), (0-4), (0-5), (0-9), (0-18, 31)
+CGQMIN: "PPP", (0-3), (0-4), (0-5), (0-9), (0-18, 31)
+CGQMIN: "IPV6", (0-3), (0-4), (0-5), (0-9), (0-18, 31)
+CGQMIN: "IPV4V6", (0-3), (0-4), (0-5), (0-9), (0-18, 31)

OK

8 Normal Commands for SMS

8.1 AT+CPMS-Select Message Storage

8.1.1 Command Syntax

AT+CPMS=<mem1>[, <mem2>[, <mem3>]]

Possible Response(s)

<CR><LF>+CPMS :
<used1>,<total1>,<used2>,<total2>,<used3>,<total3><CR><LF><C
R><LF>OK<CR><LF>

In case of an MS-related error:

<CR><LF>+CMS ERROR: <err><CR><LF>

AT+CPMS?

Possible Response(s)

<CR><LF>+CPMS :
<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3
>,<total3><CR><LF><CR><LF>OK<CR><LF>

In case of an MS-related error:

<CR><LF>+CMS ERROR: <err><CR><LF>

AT+CPMS=?

Possible Response(s)

<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>

In case of an MS-related error:

<CR><LF>+CMS ERROR: <err><CR><LF>

8.1.2 Interface Description

The set command selects memory storages `<mem1>`, `<mem2>` and `<mem3>` to be used for reading, writing, etc. The set command also returns the usage of the currently selected memory storages.

The read command returns the names and the usage of the selected memory storages.

The test command returns lists of memory storages supported by the MT.

8.1.3 Parameter Description

`<mem1>`: a string type value that specifies the memory storage used for reading and deleting messages.

"SM"	(U)SIM card (default value)
"ME"	NV (not supported currently)
"BM"	Broadcast message storage (not supported currently)
"MT"	Any of the storages associated with ME (not supported currently)
"TA"	TA message storage (not supported currently)
"SR"	Status report storage (not supported currently)

The value of `<mem1>` is related to the specification supported by the MT. You cannot set `<mem1>` to a memory storage that is not supported. Otherwise, an error message is returned.

`<mem2>`: a string type value that specifies the memory storage used for writing and sending messages. Available values of this field are the same as those of the `<mem1>` field.

`<mem3>`: a string type value that specifies the memory storage used for receiving messages. Available values of this field are the same as those of the `<mem1>` field. The default value is the same with `<mem1>`.

`<total1>`: an integer type value that indicates the capacity of `<mem1>` for storing messages.

`<total2>`: an integer type value that indicates the capacity of `<mem2>` for storing messages.

`<total3>`: an integer type value that indicates the capacity of `<mem3>` for storing messages.

`<used1>`: an integer type value that indicates the number of messages currently saved in the memory storage specified by `<mem1>`.

`<used2>`: an integer type value that indicates the number of messages currently saved in the memory storage specified by `<mem2>`.

`<used3>`: an integer type value that indicates the number of messages currently saved in the memory storage specified by `<mem3>`.

**NOTE**

The settings of <mem3> are not saved when the MT is powered off. The values of <mem1> and <mem2> are consistent with that of <mem3> when the MT is powered on again.

8.1.4 Property Description

Saving upon Power-off	PIN
N	Y

8.1.5 Example

Run: AT+CPMS=?

Response: +CPMS: ("SM"), ("SM"), ("SM")

OK

Run: AT+CPMS="SM"

Response: +CPMS: 2,40,2,40,2,40

OK

Run: AT+CPMS?

Response: +CPMS: "SM",2,40,"SM",2,40,"SM",2,40

OK

8.2 AT+CMGF-Set Message Format

8.2.1 Command Syntax

AT+CMGF=[<mode>]

Possible Response(s)

<CR><LF>OK<CR><LF>

AT+CMGF?

Possible Response(s)

<CR><LF>+CMGF: <mode><CR><LF><CR><LF>OK<CR><LF>

AT+CMGF=?

Possible Response(s)


```
<CR><LF>+CMGF: (list of supported
<mode>s) <CR><LF><CR><LF>OK<CR><LF>
```

8.2.2 Interface Description

The set command sets the message format. The format is specified by `<mode>`, which can be either PDU mode or text mode.

The read command returns the currently selected mode.

The test command returns available values of `<mode>`.

8.2.3 Parameter Description

`<mode>`:

0 PDU mode (default value)

1 TEXT mode



NOTE

If `<mode>` is not specified, it is equivalent to `<mode>=0`.

8.2.4 Property Description

Saving upon Power-off	PIN
N	N

8.2.5 Example

Run: AT+CMGF=0

Response: OK

Run: AT+CMGF?

Response: +CMGF: 0

OK

8.3 AT+CNMI-Indicate New Message to TE

8.3.1 Command Syntax

```
AT+CNMI[=<mode>[, <mt>[, <bm>[, <ds>[, <bfr>]]]]
```

Possible Response(s)

<pre><CR><LF>OK<CR><LF></pre> In case of an MS-related error: <pre><CR><LF>+CMS ERROR: <err><CR><LF></pre>
AT+CNMI?
Possible Response(s)
<pre><CR><LF>+CNMI : <mode>,<mt>,<bm>,<ds>,<bfr><CR><LF><CR><LF>OK<CR><LF></pre>
AT+CNMI=?
Possible Response(s)
<pre><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></pre>

8.3.2 Interface Description

The set command selects the procedure of receiving new messages from the network.

The read command queries the current parameter values.

The test command returns the supported parameter values.

NOTE

- The values set in this command are reset to 0 after the MT is restarted. In this case, no messages are sent to the TE. AT+CNMI=0,0,0,0,0 is not recommended.
- AT+CNMI is equivalent to AT+CNMI=0,0,0,0,0.

8.3.3 Parameter Description

<mode>: controls how new message indications are sent.

- | | |
|---|---|
| 0 | Buffer SMS-DELIVER indications in the ME. If the ME buffer is full, then the oldest indication is overwritten by the latest indication. (default value) |
| 1 | Directly send SMS-DELIVER indications to the TE. When a SMS-DELIVER indication cannot be sent (for example, when in online data mode), it will be discarded. |
| 2 | Directly send SMS-DELIVER indications and message status reports to the TE. When a SMS-DELIVER indication and message status report cannot be sent (for example, when in online data mode), they are buffered in the ME and sent to the TE when they can be sent. |

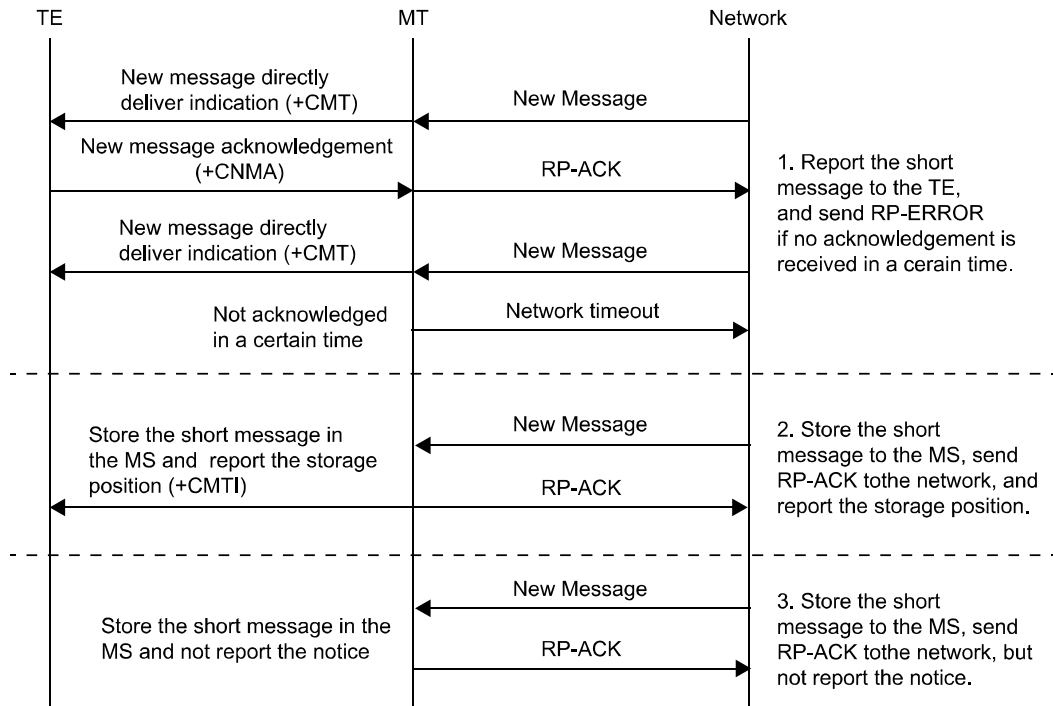
NOTE

SMS-DELIVER indications are buffered in the MT's volatile memory. If the MT is powered off before the indications are sent, messages may be lost. Therefore, when <mode> is set to 0 or 2, messages cannot be set to be directly sent to the TE (that is, <mt> cannot be set to 2 or 3).

<mt>: set the rules for saving messages and sending SMS-DELIVER indications.

- 0 No SMS-DELIVER indications are routed to the TE. (default value)
- 1 Stores SMS-DELIVER indications on the MT and sends storage location indication to the TE.
 +CMTI: <mem>,<index>
- 2 Does not store SMS-DELIVER indications on the MT but directly sends them to the TE.
 - If PDU mode enabled:
 +CMT: [<reserved>],<length><CR><LF><pdu>
 - If TEXT mode enabled:
 +CMT: <oa>,<alpha>,<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>
- 3 Stores SMS-DELIVER indications on the MT, but does not send SMS-DELIVER indications to the TE.

The following figure illustrates the interaction between the TE and the MT for the previous three modes.



The following table describes the <mt> values and the corresponding indications.

<mt>	no class or class 1	class 0 or message waiting indication group (discard)	class 2 or message waiting indication group (store)	class 3
0				

<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

NOTE

- The SMS class is defined by the TP-DCS domain of the SMS. For details, see the description of <DCS> in section 9.3 AT+CMGS–Send Message (PDU Mode).
- " +CMT & +CNMA" indicates that the TE is required to send the confirmation (AT+CNMA).

<bm>: set the rules for saving CBMs and sending CBM indications.

- 0 No CBM indications are routed to the TE. (default value)
- 1 If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:
+CBMI: <mem>, <index> (not supported currently)
- 2 New CBMs are routed directly to the TE using unsolicited result code:
 - If PDU mode enabled:
+CBM: <length><CR><LF><pdu>
 - If TEXT mode enabled:
+CBM: <sn>, <mid>, <dc>, <page>, <pages><CR><LF><data>
- 3 Class 3 CBMs are routed directly to TE using unsolicited result codes defined in <bm>=2. If CBM storage is supported, messages of other classes result in indication as defined in <bm>=1 (not supported currently).

If ME supports data coding groups which define special routing also for messages other than class 3 (e.g. (U)SIM specific messages), ME may choose not to route messages of such data coding schemes into TE (indication of a stored CBM may be given as defined in <bm>=1).

Table 8-1 Parameters of <bm>

<bm>	Receiving procedure for different message data coding schemes (refer 3GPP TS 23.038)
0	All schemes: as in 3GPP TS 23.038; if CBM storage is supported, store message to "BM" (or some manufacturer or data coding scheme specific memory).
1	All schemes: as <bm>=0 but send indication if message stored successfully.
2	All schemes: route message to TE unless ME has detected a special

<bm>	Receiving procedure for different message data coding schemes (refer 3GPP TS 23.038)
	routing to somewhere else (e.g. to (U)SIM; an indication may be sent if message stored successfully).
3	Class 3: route message to TE others: as <bm>=1 (if CBM memory storage is supported)

<ds>: set whether to send message status reports.

- | | |
|---|---|
| 0 | Do not send message status reports. (default value) |
| 1 | Do not store message status reports to the MT and directly send the reports to the TE. <ul style="list-style-type: none"> If PDU mode enabled:
+CDS: <length><CR><LF><pdu> If TEXT mode enabled:
+CDS: <fo>, <mr>, [<ra>], [<tora>], <scts>, <dt>, <st> |
| 2 | Store message status reports to the MT and send the storage location to the TE using +CDSI.
+CDSI: <mem>, <index> |

<bfr>: specifies how the buffer is handled after the MT switches from <mode>=0 to <mode>=1 or <mode>=2.

- | | |
|---|---|
| 0 | After switching from <mode>=0 to <mode>=1 or <mode>=2, the MT sends all the unsolicited result code in its buffer to the TE. (default value) |
| 1 | After switching from <mode>=0 to <mode>=1 or <mode>=2, the MT clears the buffer and all unsolicited result codes in the buffer are discarded. |



NOTE

The definition of +CBMI, +CBM can see 3GPP TS 27.005. The definition of +CNMA can see 3GPP TS 27.005.

8.3.4 Property Description

Saving upon Power-off	PIN
N	N

8.3.5 Example

- AT+CNMI=1,1,0,1,0
Class 1 messages are stored to the SIM, and then storage locations are reported (+CMTI: "SM", 1). Message status reports are directly sent (+CDS).

If SMS-DELIVER indications cannot be sent (for example, when in online data state), they will be discarded.

- `AT+CNMI=1,1,0,2,0`

Class 1 messages are stored to the SIM, and then storage locations are reported (`+CMTI: "SM", 1`). Message status reports are stored to the MS, and then storage locations are reported (`+CDSI: "SM", 2`).

If SMS-DELIVER indications cannot be sent (for example, when in online data state), they will be discarded. (The SMS messages and SMS-DELIVER indications are stored in the MS and can be read using the `AT+CMGL` command; however, the TE cannot receive the indications.)

- Other commonly-used settings include:

`AT+CNMI=1,1,0,0,0`: store the messages, and then send the storage locations to the TE; do not send the message status reports.

`AT+CNMI=1,2,0,0,0`: do not store the messages but directly send them to the TE; do not send the message status reports.

8.4 AT+CMGD-Delete Message

8.4.1 Command Syntax

```
AT+CMGD=<index>[,<delflag>]
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an MS-related error:

```
<CR><LF>+CMS ERROR: <err><CR><LF>
```

```
AT+CMGD=?
```

Possible Response(s)

```
<CR><LF>+CMGD: (list of supported <index>s) [, (list of supported  
<delflag>s)]<CR><LF><CR><LF>OK<CR><LF>
```

8.4.2 Interface Description

The set command deletes the message at location `<index>` in the storage `<mem1>`.

For details about `<mem1>`, see section 8.1 AT+CPMS-Select Message Storage. If `<delflag>` is set to a value other than 0, the MT ignores `<index>` and executes the command as specified by `<delflag>`. If the deletion fails, `+CMS ERROR: <err>` is returned.

The test command returns storage locations that have messages and supported `<delflag>` values.

8.4.3 Parameter Description

<index>: the storage location where the message is stored.

<delflag>:

- | | |
|---|--|
| 0 | Delete the message stored at the location specified by <index>. (default value) |
| 1 | Delete all the read messages saved in the preferred storage, and keep the unread, sent, and unsent ones. |
| 2 | Delete all the read and sent messages saved in the preferred storage, and keep the unread and unsent ones. |
| 3 | Delete all the read, sent, and unsent messages saved in the preferred storage, and keep the unread ones. |
| 4 | Delete all messages saved in the preferred storage, including the unread ones. |

8.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

8.4.5 Example

Run: AT+CMGD=?
Response: +CMGD: (0,3),(0-4)

OK
Run: AT+CMGD=0
Response: OK

8.5 +CMTI-Unsolicitedly Present of Message Arrival Indication

8.5.1 Command Syntax

URC
Possible Response(s)
<CR><LF>+CMTI: <mem>,<index><CR><LF>

8.5.2 Interface Description

This command allows indications that a new message is received.

8.5.3 Parameter Description

<mem>:

"SM" (U)SIM message storage

<index>: integer type value indicating the memory location.

8.5.4 Property Description

Saving upon Power-off	PIN
NA	NA

8.5.5 Example

Response: +CMTI: "SM",1

8.6 +CDSI-Unsolicitedly Present of Newly Received Message Status Report

8.6.1 Command Syntax

URC
Possible Response(s)
<CR><LF>+CDSI: <mem>,<index><CR><LF>

8.6.2 Interface Description

This command allows indication that a new message status report is received and reservation of the memory location.

8.6.3 Parameter Description

<mem>:

"SM" (U)SIM message storage

<index>: integer type value indicating the memory location.

8.6.4 Property Description

Saving upon Power-off	PIN
NA	NA

8.6.5 Example

Response: +CDSI: "SM", 48

8.7 AT+CNMA–New Message Acknowledgement

8.7.1 Command Syntax

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

8.7.2 Interface Description

The execution command acknowledges the reception of a new message that is routed directly to the TE. This acknowledgement command shall be used when +CSMS parameter <service> equals 1. For the use of this command, see section 8.3 AT+CNMI–Indicate New Message to TE.



NOTE

Set AT+CSMS=1 before AT+CNMI settings.

In PDU mode, either positive (RP-ACK) or negative (RP-ERROR) acknowledgement can be sent to the network. The parameter <n> defines which acknowledgement to be send.

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 quotation marks.

Before the previous message is acknowledged, the MT will not send another +CMT or +CDS result code to the TE.

If the MT does not receive acknowledgement within required time (network timeout), the MT will send RP-ERROR to the network and automatically set both <mt> and <ds> values of +CNMI to zero to prevent SMS-DELIVER indications and message status reports from being sent to the TE. To enable the MT to send SMS-DELIVER indications and message status reports to the TE, <mt> and <ds> must be reset.

If the command is executed when no acknowledgement is expected, +CMS ERROR: <err> is returned.

The test command returns a list of supported <n> values. If the value supported is 0 only, sending of TPDU is not supported.

8.7.3 Parameter Description

<n>:

- 0 Command operates similarly as defined for the text mode
- 1 Send RP-ACK (or buffered result code received correctly)
- 2 Send RP-ERROR

<ackpdu>: 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	Indicates that the TP-UD has one header.
TP-PI	TP-Parameter-Indicator	M	o	Indicates the optional parameters.
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



NOTE

Mandatory (M) or Optional (O).

Integer (I), Bit (b), 2 bits (2b), octet (o).

Depending on TP-DCS.

Number of Octets	7	6	5	4	3	2	1	0	
1									TP-MTI, TP-UDHI

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

Bits 7 and 2–5 of the first byte are not used in SMS-DELIVER-REPORT. The sender should set them to zero. If any of those bits is not zero, it will be omitted by the recipient.

Description of the basic elements:

<TP-MTI>: TP-message type; bit 0 and bit 1 of the first byte.

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

<TP-UDHI>: indicates that the TP-UD has one header; bit 6 of the first byte.

0	The TP-UD field contains SMS message only
1	There is a header at the beginning of the TP-UD field

<TP-PI>: indicates the optional parameters. Setting the bit to 1 indicates that the corresponding parameter exists.

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

<TP-PID>: protocol ID. When sending a message, the TE sets <TP-PID> to the default value 00000000. When sending an email, the TE sets <TP-PID> to 00110010=0x32.

<TP-DCS>: the TE adopts the TP-DSC mode to send a message.

Bit 7–bit 6 (TE uses this TP-DCS mode)	00: used by TE when sending a message.	Bit 5	0	TE sets bit 5 to zero, indicating the message is not compressed.
			1	If bit 5 is set to 1, the message is compressed. TE does not use this value.
		Bit 4	0	When TE sets bit 4 to 0, bit 1 and bit 0 are reserved and set to 00.
			1	When bit 4 is set to 1, bit 1 and bit 0 indicate the message type. A message's type is dependent on user settings. If the user specifies a message type (for example, class 1 or class 2), TE sets bit 4 to 1.
		Bit 3–2: message encoding scheme	00	GSM 7-bit encoding scheme; default.
			01	8-bit encoding scheme
			10	UCS2 encoding scheme. TE uses this value when the user inputs Chinese characters.
		Bit 1–0: message type; set by TE according to users' selection	00	Class 0. Messages are displayed on the user interface but not stored. A response is sent to the SC to acknowledge the reception of the message.
			01	Class 1. Messages are stored to the MT, or to the SIM card when the message storage on the MT is used up.
			10	Class 2. Messages are stored to the SIM card only. After a class 2 message is stored, the storage state will be sent to the SC. If the SIM card is full, a response is sent to the SC to notify it of the occurrence and cause of message storage failure.
			11	Class 3. Messages are stored to the TE. When the MT receives the message, it sends a response to the SC before routing the message to the TE.
Bit 7–bit 4 (TE does not use this TP-DCS mode)	1100 and 1101: GSM 7 bit encoding 1110: uncompressed UCS2 encoding scheme)	Bit 3	0	Disable the message waiting indication feature. At present, the message waiting indication feature is not supported for enhanced messages, email messages and voicemail messages.
			1	Enable the message waiting indication feature.
		Bit 2	0	Reserved
		Bit 1–0: message waiting type	00	Voice message waiting
			01	Fax message waiting
			10	Email message waiting
			11	Message of unknown type waiting
	1111: not used	Bit 3	0	Reserved

	by TE	Bit 2	0	7-bit encoding
			1	8-bit encoding scheme
		Bit 1–0	00	Class 0. Messages are displayed on the user interface but not stored. A response is sent to the SC to acknowledge the reception of the message.
			01	Class 1. Messages are stored to the MT (NV memory) or the SIM card.
			10	Class 2. Messages are stored to the SIM card only. After a class 2 message is stored, the storage state will be sent to the SC.
			11	Class 3. Messages are stored to the TE. When the MT receives the message, it sends a response to the SC before routing the message to the TE.

<TP-UDL>: the number of bytes that the user data field occupies. If <TP-UDL> is 0, the user data field does not exist.

<TP-UD>: the user data field may contain a user data header. If the header is contained (that is, the value of bit 6 in byte 0 is 1), the value of TP-UDL equals to the length of the User-Data-Header plus the length of the User-Data. The value of <TP-UDL> depends on the encoding scheme:

If the default encoding scheme (7-bit encoding) is used, <TP-UDL> indicates the number of septets contained in the user data.

If the 8-bit encoding scheme is used, <TP-UDL> indicates the number of octets contained in the user data.

If the UCS2 encoding scheme is used, <TP-UDL> also indicates the number of octets contained in the user data.

If 7-bit, 8-bit or UCS2 compression encoding is used, <TP-UDL> indicates the number of octets contained in the compressed user data.

Figure 8-1 and Figure 8-2 illustrate the formats of the user data encoded using different schemes.

Figure 8-1 User data encoded using the default 7-bit encoding scheme

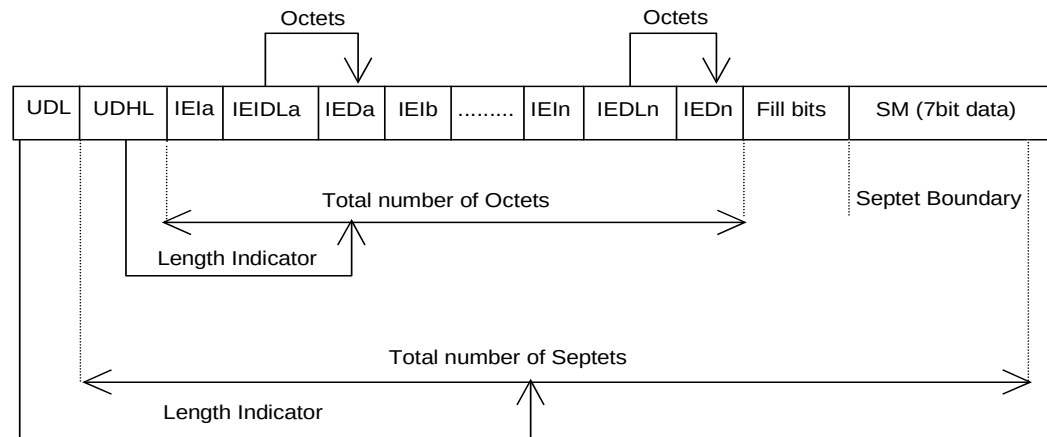
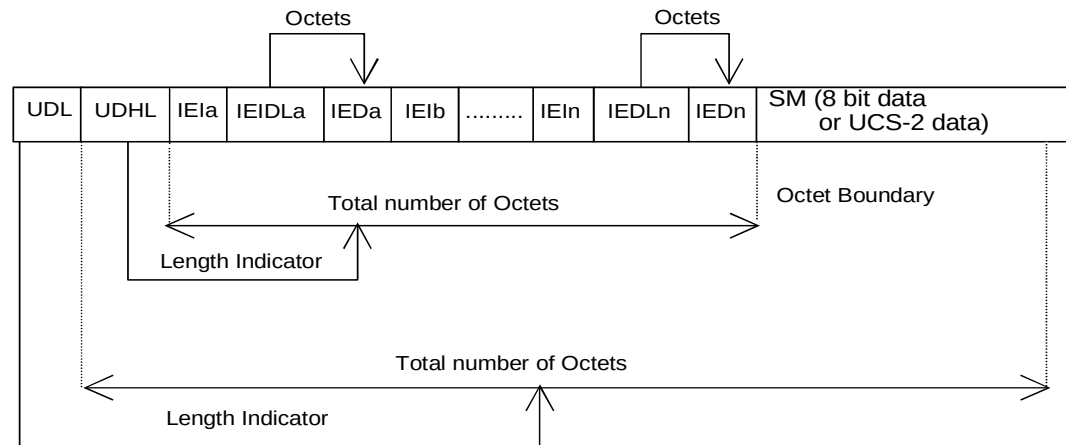


Figure 8-2 User data encoded using the 8-bit or UCS2 encoding scheme



In Figure 8-1 and Figure 8-2 , IEI is short for Information Element Identifier.

8.7.4 Property Description

Saving upon Power-off	PIN
NA	Y

8.7.5 Example

Run: AT+CNMA=2,7
>0116410300D000<ctrl-z>

Response: OK

Run: AT+CNMA=?

Response: +CNMA: (0-2)

OK

8.8 ^SMMEMFULL-Message Memory Full

8.8.1 Command Syntax

URC
Possible Response(s)
<CR><LF>^SMMEMFULL: <mem_type><CR><LF>

8.8.2 Interface Description

When the message storage is full, this unsolicited indication is sent.

8.8.3 Parameter Description

<mem_type>: a string type value that indicates the type of the storage that is full.

"SM" (U)SIM card

8.8.4 Property Description

Saving upon Power-off	PIN
NA	NA

8.8.5 Example

If the SMS received and directly presents the message instead of storing it, a message similar to the following is displayed:

Response:	+CMT: "+8613312345678",, "12/05/05,18:10: 36+00" huawei ^SMMEMFULL: "SM"	Present an indication, without solicitation, when the message storage is full.
-----------	--	--



NOTE

In this example, the message is in Text mode. In PDU mode, PDU packets are presented.

9 SMS Service Interface (WCDMA)

9.1 AT+CSMS-Select Messaging Service

9.1.1 Command Syntax

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

9.1.2 Interface Description

The set command selects messaging service <service>. It returns the types of messages supported by the ME: <mt> for mobile terminated messages, <mo> for mobile originated messages and <bm> for broadcast type messages.

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

The test command returns a list of all services supported by the ME.

9.1.3 Parameter Description

<service>: messaging service type.

- 0 3GPP TS 23.040, 3GPP TS 23.041 (Messaging AT command syntax is compatible with GSM 07.05 Phase 2.) (default value)
- 1 3GPP TS 23.040, 3GPP TS 23.041 (Messaging AT command syntax is compatible with GSM 07.05 Phase 2+.) (<service>=1 is required for AT+CNMA and the default value is related to the product.)

<mt>, <mo>, <bm>: integer type values, which respectively indicate whether the MT supports mobile terminated messages, mobile originated messages and broadcast type messages.

- 0 Type not supported
- 1 Type supported (default value)

9.1.4 Property Description

Saving upon Power-off	PIN
N	N

9.1.5 Example

```

Run:      AT+CSMS=?
Response: +CSMS: (0-1)

OK

Run:      AT+CSMS?
Response: +CSMS: 0,1,1,1

OK

Run:      AT+CSMS=1
Response: +CSMS: 1,1,1

OK

Run:      AT+CSMS?
Response: +CSMS: 1,1,1,1

OK

```

9.2 AT+CSCA–Service Center Address

9.2.1 Command Syntax

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

9.2.2 Interface Description

The set command sets the SMSC address. For SMS messages in PDU mode, this command can be used only when the <sc_len> parameter in the PDU is set to 0 (for details about the PDU format, see section 9.3 AT+CMGS–Send Message (PDU Mode)).

The read command queries the current values of the SMSC address.

9.2.3 Parameter Description

<sca>: a string type value that specifies the SMSC address. '*', '#', '+' and 0–9 are allowed in the SMSC address. The maximum length of the SMSC address is 20 characters (excluding '+').

<tosca>: an integer type value that specifies the address type. If the value of <tosca> is 145, the address is an international phone number. For details about the values of <tosca>, see the value definitions of <type_addr> in section 9.3 AT+CMGS–Send Message (PDU Mode).

If the command does not contain <tosca>, the value of <tosca> remains unchanged.

NOTE

If the command does not contain <tosca>, the value of <tosca> is 145 when the character "+" is present; the value is 129 when the character "+" is not present. This command is controlled by AT+CSCS.

9.2.4 Property Description

Saving upon Power-off	PIN
Y	Y

9.2.5 Example

Run: AT+CSCA="+8613800688509",145

Response: OK

Run: AT+CSCA?

Response: +CSCA: "+8613800688509",145

OK

9.3 AT+CMGS-Send Message (PDU Mode)

9.3.1 Command Syntax

If PDU mode enabled (AT+CMGF=0):

```
AT+CMGS=<length><CR>PDU is given<ctrl-Z/ESC>
```

Possible Response(s)

```
<CR><LF>+CMGS: <mr>[,<ackpdu>]<CR><LF><CR><LF>OK<CR><LF>
```

In case of an MS-related error:

```
<CR><LF>+CMS ERROR: <err><CR><LF>
```

```
AT+CMGS=?
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an MS-related error:

```
<CR><LF>+CMS ERROR: <err><CR><LF>
```

9.3.2 Interface Description

The execution command sends a message to the network in the following procedure:

First, the TE sends AT+CMGS=<length><CR> to the MT.

After the MT responds to the TE with <CR><LF><greater_than><space> (IRA 13, 10, 62, 32), the TE sends the PDU packets ending with <ctrl-Z> (IRA26).

9.3.3 Parameter Description

<length>: indicates number of actually sent TPDU characters/2 in decimal format ranging from 0 to 9, and maximum length is 178.

<mr>: indicates message ID; a decimal number ranging from 0 to 255.

<ackpdu>: when <value> of AT+CSMS is 1 and supported by the network, this field will be returned. Except that there is no <SCA>, the format of <ackpdu> is the same as that of the PDU. This field is not supported currently.

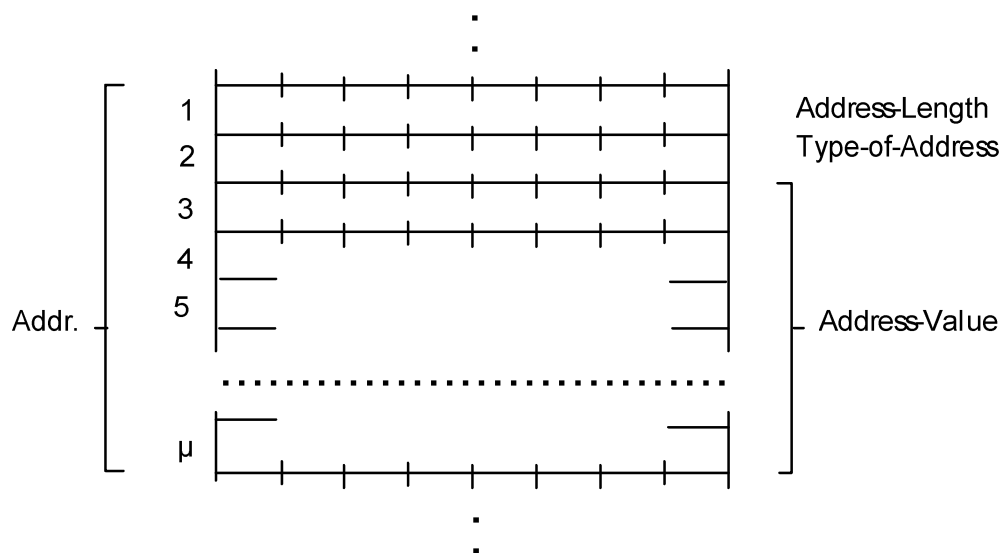
<ctrl-Z>: indicates the end of a PDU. The characters are "0x1A".

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

The format of a PDU is as follows: (The characters allowed in a PDU are '0'-'9', 'A'-'F', and 'a'-'f'. Two characters forms one octet. For example, '23'=0x23, '2a'=0x2a, all are hexadecimal.)

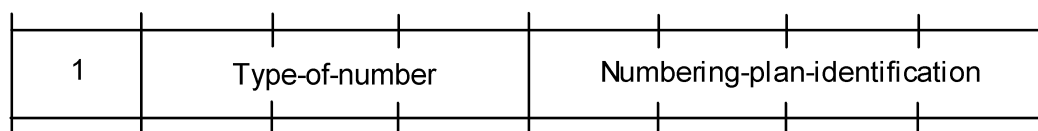
[<SCA>]			
<sc_len>	<type_addr>	<numbers>	TPDU

<SCA>: indicates SCA. Its structure is illustrated in the following figure.



<sc_len>: indicates length of <SCA>. It is composed of two characters. It indicates the number of characters occupied by <type_addr> and <numbers>/2.

<type_addr>: indicates number address type; consisting of two characters in the following format:



Values of Type-of-Number (bit 6–4) are defined as follows:

- | | |
|-------|--|
| 0 0 0 | This value is written when the user does not know the destination address type. In this case, the address type is determined by the network. |
| 0 0 1 | This value is selected if the user knows that it is an international number, or the user believes that it falls in the national range. |
| 0 1 0 | National number. No prefix or suffix is added. This value is selected when the user sends a message to a national number. |
| 0 1 1 | A special number in this network. It is used for management or service. The user cannot select this value. |
| 1 0 1 | GSM number using the default 7-bit encoding scheme. |
| 1 1 0 | Short number. It is not in use currently. |
| 1 1 1 | Reserved. It is not in use currently. |

Values of Numbering-plan-identification (bits 3–0) are defined as follows:

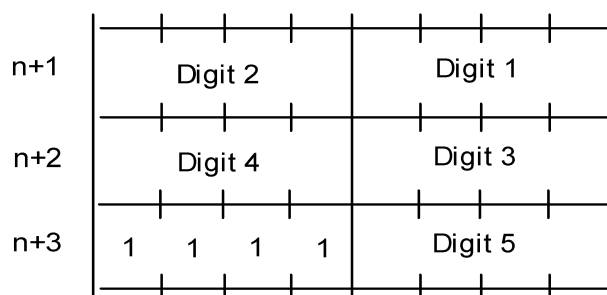


NOTE

bits 3–0 are valid only when bits 6–4 are 000, 001, or 010.

- | | |
|---------|--|
| 0 0 0 0 | The number is determined by the numbering plan at the network. |
| 0 0 0 1 | ISDN/telephone numbering plan. |
| 0 0 1 1 | Data numbering plan. It is not in use currently. |
| 0 1 0 0 | Telex numbering plan. It is not in use currently. |
| 1 0 0 0 | National numbering plan. It is not in use currently. |
| 1 0 0 1 | Private numbering plan. It is not in use currently. |
| 1 0 1 0 | ERMES numbering plan. It is not in use currently. |

<numbers>: indicates address number. One byte stores two digits. Bits 3–0 store the first digit, and bits 7–4 store the second digit. As an example, the following figure illustrates the encoding sequence of half bytes.


NOTE

If the number's length is an odd value, the four high-order bits of this octet is filled with 1111.

'*': 1010

'#': 1011

'a': 1100

'b': 1101

'c': 1110

For example: If <SCA> is 13902900, then <number> is 31099200.

If the length of <SCA> is an odd value, for example, 139029001, then <numbers> is 31099200F1.

If the number type is 'A1', then <SCA> is 05a131099200.

If the number type indicates that it is an international number 'A1', but the number 13902900 is a national number in China, it is necessary to add 86 before the number. In this case, <SCA> is 06a16831099200.

The TPDU format is described in the following table.

1 Octet								1 Oct	2 Oct ~ 12 Oct	1 Oct	1 Oct	1 Oct	1 Oct	0~140 Oct
RP	UD HI	SR R	VPF		RD	MTI		MR	DA	PID	DCS	VP	UDL	UD
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	-	-	-	-	-	-	-

<MTI>: indicates message type.

bit1	bit0	
0	0	SMS-DELIVER (in the direction SC to MT)
0	0	SMS-DELIVER-REPORT (in the direction MT to SC)
1	0	SMS-STATUS-REPORT (in the direction SC to MT)
1	0	SMS-COMMAND (in the direction MT to SC)
0	1	SMS-SUBMIT (in the direction MT to SC)
0	1	SMS-SUBMIT-REPORT (in the direction SC to MT)

bit1	bit0	
1	1	Reserved

<RD>: indicates whether the SC needs to receive a message that is still stored in the SC and has the MR and DA identical with those of the messages sent previously from the same OA.

0 Yes

1 No

<VPF>: indicates the validity and format of the VP field.

Bit1	Bit0	
0	0	The VP field is invalid.
1	0	The VP field is valid, and the format is "relative".
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 whether the reply to a message uses the same settings as those for the sent message.

0 No

1 Yes. The message reply uses the same SC number and path for sending the message.

<UDHI>: indicates user data header indication.

0 The user data segment contains message content only.

1 The user data segment contains message content and a data header.

<SRR>: indicates status report request indication.

0 No status report is required when a message is sent successfully.

1 A status report is required when a message is sent successfully.

<MR>: indicates message ID ranging from 0 to 255.

<DA>: indicates destination address. Its definition is the same as <SCA>. There are a total of 2–12 octets. Therefore, the longest address in the <DA> field contains 20 digits.

<PID>: indicates protocol identifier.

PID							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0

Bit7	Bit6	(At present, Bit 7=0 and Bit 6=0.)
0	0	Allocate bits 0–5.
1	0	Allocate bits 0–5.
0	1	reserved
1	1	Allocate bits 0–5 for special purpose of the SC.

The values of bit 5 are defined as follows:

- 0 No interworking, but SME-to-SME protocol
- 1 Telematic interworking (in this case, the values of bit 4–0 are valid.)

Bit 4...bit 0: telematic devices type indication

If bit4...bit 0 are 10010, it indicates email. Other values are not supported currently.

<DCS>: indicates user data coding scheme.

Bits 7...4			Bits 3...0
00xx	Bit 5	0: Message is not compressed.	Bit 1 Bit 0 message type indication. 0 0 Class 0, displayed on the user interface but not stored. A response is sent to the SC to acknowledge the reception of the message. 0 1 Class 1, stored to NV (or SIM card if the NV is full) 1 0 Class 2. Messages are stored to the SIM card only. After a class 2 message is stored, the storage state will be sent to the SC. If the SIM card is full, a response is sent to the SC to notify it of the occurrence and cause of message storage failure. 1 1 Class3, stored to the TE. When the MT receives the message, it sends a response to the SC before routing the message to the TE. Bit 3 Bit 2 message type indication 0 0 GSM 7-bit encoding scheme; default. 0 1 8-bit encoding scheme 1 0 UCS2 encoding scheme. TE uses this value when the user inputs Chinese characters. 1 1 reserved
		1: Message is compressed. This is not supported currently.	
	Bit 4	0: indicates that bit 1 and bit 0 are reserved.	
		1: indicates that bit 1 and bit 0 serve as the message type indication.	
0100	reserved		
...			

Bits 7...4		Bits 3...0
1011		
1100	The message content is discarded. The message waiting indication is presented, and the user data is encoded using the GSM 7-bit encoding scheme.	The settings of bits 3...0 are the same as those when bits 7...4=1101.
1101	The message is stored. The message waiting indication is presented, and the user data is encoded using the GSM 7-bit encoding scheme.	Bit 3 enables or disables message waiting indication. 0 disables message waiting indication 1 enables message waiting indication Bit 2 reserved. The value is 0. Bit 1 Bit 0 message type indication. 0 0 voice message waiting 0 1 fax message waiting 1 0 email message waiting 1 1 message of unknown type waiting
1110	The message is stored. The message waiting indication appears, and the user data is encoded using uncompressed UCS2 encoding scheme.	The settings of bits 3...0 are the same as those when bits 7...4=1101.
1111	Data coding/message class	Bit 3 reserved. The value is 0. Bit 2 message encoding scheme. Its values are defined as follows: 0 GSM 7-bit encoding scheme; default. 1 8-bit encoding scheme Bit 1 Bit 0 message type indication. 0 0 Class 0, displayed on the user interface but not stored. A response is sent to the SC to acknowledge the reception of the message. 0 1 Class 1, stored to NV (or SIM card if the NV is full) 1 0 Class 2. Messages are stored to the SIM card only. After a class 2 message is stored, the storage state will be sent to the SC. If the SIM card is full, a response is sent to the SC to notify it of the occurrence and cause of message storage failure. 1 1 Class3, stored to the TE. When the MT receives the message, it sends a response to the SC before routing the message to the TE.

<VP>: indicates the validity period, which starts from the time when the message is received by the SC. If <VPF>=00, this field is omitted. The following table lists the validity periods.

VP Value	Validity Period
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>: indicates user data length, depending on the specific encoding scheme.

Default 7-bit encoding scheme: <UDL> indicates the total number of septets.

8-bit encoding scheme: <UDL> indicates the total number of octets.

UCS2 encoding scheme: <UDL> indicates the total number of octets.

Compressed 7-bit, 8-bit or UCS2 encoding scheme: <UDL> indicates the total number of octets after compression.

For messages encoded using a compressed encoding scheme, the length of <UD> should not be greater than 160 septets. For messages encoded using an uncompressed encoding scheme, the length of <UD> should not be greater than 140 octets.

<UD>: indicates user data. Its data validity depends on <UDL>.

<oa>: 3GPP TS 23.040 TP-Originating-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 <tooa>.

<alpha>: a string type value that indicates alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook; implementation of this feature is manufacturer specific; used character set should be the one selected with command Select TE Character Set +CSCS (see definition of this command in 3GPP TS 27.007).

<scts>: indicates time stamp of the SMSC, consisting of year, month, date, hour, minute, second and time difference. Time difference is the difference between the local time and the Greenwich standard time.

<tooa>: 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>).

<tosca>: an integer type value that specifies the address type. If the value of <tosca> is 145, the address is an international phone number. For details about the values of <tosca>, see the value definitions of <type_addr> in AT+CMGS–Send Message (PDU Mode).

<fo>: depending on the command or result code: first octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) 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>: 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>).

<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.

9.3.4 Property Description

Saving upon Power-off	PIN
NA	Y

9.3.5 Example

The SMS center number is 13902900. The target number is 13901000453. The content is 0x53 0x4E 0x4E 0x3A (the UCS2 codes for the Chinese characters "华为").

If the AT+CSCA contains <SCA>, you can perform as follows:

- Do not fill in <SCA> when you send the SMS. (The value of <SCA> was set with the AT+CSCA command.)

```
AT+CMGS=17 (CR)
```

```
>81000B813109010054F3001804534E4E3A \x1A
```

Where, 81 is the value of <RP-MTI>, 00 is the value of <MR>, 0B is the value of <DA-len>, 81 is the value of <DA-type>, 3109010054F3 is the value of <DA-numbers>, 00 is the value of <PID>, 18 is the value of <DCS>, 04 is the value of <UDL>, 534E4E3A is the value of <UD>, and \x1A is the value of <ctrl-Z>.

- Fill in <SCA> when you send the SMS. (The value of <SCA> is obtained from the PDU packet.)

```
AT+CMGS=17
```

```
>05a13109920081000B813109010054F3001804534E4E3A \x1A
```

Or

```
AT+CMGS=17
```

```
>0081000B813109010054F3001804534E4E3A \x1A
```

(In this case, the value of <sc_len> is 0. The value of <SCA> was set with the AT+CSCA command.)

If the AT+CSCA command does not contain <SCA>, you must perform as follows:

- Fill in <SCA> when you send the SMS. (The value of <SCA> is obtained from the PDU packet.)

```
AT+CMGS=17
```

>05a13109920081000B813109010054F3001804534E4E3A \x1A

9.4 AT+CMGS-Send Message (Text Mode)

9.4.1 Command Syntax

If text mode enabled (AT+CMGF=1):

AT+CMGS=<da>[,<toda>]<CR>text is entered<ctrl-Z/ESC>
Possible Response(s)
<CR><LF>+CMGS: <mr><CR><LF><CR><LF>OK<CR><LF>
In case of an MS-related error:
<CR><LF>+CMS ERROR: <err><CR><LF>
AT+CMGS=?
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MS-related error:
<CR><LF>+CMS ERROR: <err><CR><LF>

9.4.2 Interface Description

The execution command sends a message to the network in the following procedure:

First, the TE sends AT+CMGS=<da>[,<toda>]<CR> to the MT.

After the MT responds to the TE with <CR><LF><greater_than><space> (IRA 13, 10, 62, 32), the TE sends the message content ending with <ctrl-Z> (IRA26)

9.4.3 Parameter Description

<da>: indicates phone number of the message recipient. Characters allowed in this field are '0'-'9', '*' and '#'. The maximum length of this field is 20 characters. Characters are the values set by AT+CSCS (3GPP TS 27.005 subclause 3.1).

<toda>: indicates type of destination address; an octet in integer format. This parameter is valid when the address is 8 bits long. The default value of this parameter is 0.

The four high-order bits indicate the number type:

- | | |
|---|---------------|
| 0 | Unknown |
| 1 | International |

The four low-order bits indicate the number plan:

- 0 Unknown
- 1 Telephony

<mr>: indicates message ID; a decimal number ranging from 0 to 255.

<ctrl-z>: indicates the ending of the message body. The characters corresponding to <ctrl-z> are "0x1A".

<ESC>: cancels the sending of the message. The characters corresponding to <ESC> are "0x1B".

9.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

9.4.5 Example

- Set the message format to text format.

Run: AT+CMGF=1

Response: OK

- Set the data coding scheme to UCS2.

Run: AT+CSMP=, , 0, 8

Response: OK

- Set the service center number.

Run: AT+CSCA="8613800688509",145

Response: OK

- Set the TE's character set to UCS2 encoding.

Run: AT+CSCS="UCS2"

Response: OK

- End the message to the destination address "13312345678" that must be enclosed in double quotation marks.

Run: AT+CMGS="0031003300330031
0032003300340035003600370
038"
>534E4E3A
\0x1A

The message content is the UCS2 codes for the Chinese characters "华为".
Press <ctrl-z> (0x1A) to stop entering message content and send the message.

Response: +CMGS: 6

The message is successfully sent.

OK

9.5 AT+CMGL–List Messages

9.5.1 Command Syntax

AT+CMGL[=<stat>]
Possible Response(s)
If in PDU mode and the command is executed successfully: [<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> In case of an MS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
AT+CMGL=?
Possible Response(s)
<CR><LF>+CMGL: (list of supported <stat>s) <CR><LF><CR><LF>OK<CR><LF>

9.5.2 Interface Description

The set command returns messages with status value <stat> from message storage <mem1> to the TE. If the status of the message is "received unread", status in the storage changes to "received read" after the set command is executed successfully.

When <stat> is not specified, the set command is equivalent to the command AT+CMGL=0.

The test command returns a list of supported <stat> values.

9.5.3 Parameter Description

<stat>: message status.

- | | |
|---|--|
| 0 | Received unread messages (default value) |
| 1 | Received read messages |
| 2 | Stored unsent messages |

3 Stored sent messages

4 All messages

<index>: an integer type value that indicates the storage location of the message.

<reserved>: reserved.

<length>: an integer type value that indicates the number of bytes of TPDU data.

<pdu>: protocol data unit in the following format.

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

For the definitions of <SCA>, <sc_len>, <type_addr>, <number> in the previous table, see section 9.3 AT+CMGS–Send Message (PDU Mode).

For the TPDU format of messages to be sent, see section 9.3 AT+CMGS–Send Message (PDU Mode).

The TPDU format for received messages is described in the following table.

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

<MTI>: see the definition in section 9.3 AT+CMGS–Send Message (PDU Mode).

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

0 No

1 Yes

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

0 No

1 Yes

<UDHI>: see the definition in section 9.3 AT+CMGS–Send Message (PDU Mode).

<RP>: see the definition in section 9.3 AT+CMGS–Send Message (PDU Mode).

<OA>: originating address. Its definition is the same as <sc_a>. There are a total of 2–12 octets. Therefore, the longest address in the <oa> field contains 20 digits.

<PID>: protocol identifier. See the definition in section 9.3 AT+CMGS–Send Message (PDU Mode).

<DCS>: use data coding scheme. See the definition in section 9.3 AT+CMGS–Send Message (PDU Mode).

<SCTS>: time stamp of the SMSC, consisting of year, month, date, hour, minute, second and time difference. Time difference is the difference between the local time and the Greenwich standard time.

<UDL>: user data length. See the definition in section 9.3 AT+CMGS–Send Message (PDU Mode).

<UD>: user data whose length is determined by <UDL>.

9.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

9.5.5 Example

Run: AT+CMGL=?

Response: +CMGL: (0-4)

OK

Run: AT+CMGL=4

Response: +CMGL: 0,0,,160

0891683108608805F9040D91683109730163F7001231308241
126500A0B11C0C16B3C982B51A8D16C4098D37DB9026ABCD88
B11C0C16B3C982B51A8D16C4098D37DB9026ABCD88B11C0C16
B3C982B51A8D16C4098D37DB9026ABCD88B11C0C16B3C982B5
1A8D16C4098D37DB9026ABCD88B11C0C16B3C982B51A8D16C4
098DB7783C1E8FC7E3F172B95C2E97CBE572B95C2E97CBE572
B94C97C3CBEE739E5E47BB77EC73180D2FBBCF

OK

9.6 AT+CMGR–Read Message

9.6.1 Command Syntax

AT+CMGR=<index>

Possible Response(s)

If in PDU mode and the command is executed successfully:

<CR><LF>+CMGR:

<stat>[, <reserved>], <length><CR><LF><pdu><CR><LF><CR><LF>OK<CR><LF>

In case of an MS-related error:

<CR><LF>+CMS ERROR: <err><CR><LF>

AT+CMGR=?

Possible Response(s)

<CR><LF>OK<CR><LF>

9.6.2 Interface Description

The set command returns the message with location value <index> from message storage <mem1>. If the status of the message is "received unread", status in the storage changes to "received read" after the set command is executed successfully.

9.6.3 Parameter Description

<index>: an integer type value that indicates the location in the storage.

<stat>: message status.

- | | |
|---|--------------------------|
| 0 | Received unread messages |
| 1 | Received read messages |
| 2 | Stored unsent messages |
| 3 | Stored sent messages |

<reserved>: reserved.

<length>: an integer type value that indicates the number of bytes of PDU data

<pdu>: protocol data unit. For details about the PDU format, see section 9.5.3 .

9.6.4 Property Description

Saving upon Power-off	PIN
NA	Y

9.6.5 Example

Run: AT+CMGR=0

Response: +CMGR: 1,,160

```
0891683108608805F9040D91683109730163F7001231308241
126500A0B11C0C16B3C982B51A8D16C4098D37DB9026ABCD88
B11C0C16B3C982B51A8D16C4098D37DB9026ABCD88B11C0C16
B3C982B51A8D16C4098D37DB9026ABCD88B11C0C16B3C982B5
1A8D16C4098D37DB9026ABCD88B11C0C16B3C982B51A8D16C4
098DB7783C1E8FC7E3F172B95C2E97CBE572B95C2E97CBE572
B94C97C3CBEE739E5E47BB77EC73180D2FBBCF
```

OK

9.7 +CMT-Unsolicitedly Present of New Message Reported Directly

9.7.1 Command Syntax

URC
Possible Response(s)
<CR><LF>+CMT: [<reserved>], <length><CR><LF><pdu><CR><LF>

9.7.2 Interface Description

This command allows the indication of new messages to the TE without storing them.

9.7.3 Parameter Description

<reserved>: reserved.

<length>: integer type value indicating the number of bytes of PDU data.

<pdu>: protocol data unit, whose format is the same as that defined in section 9.3 AT+CMGS–Send Message (PDU Mode).

9.7.4 Property Description

Saving upon Power-off	PIN
NA	NA

9.7.5 Example

Response: +CMT: , 24
0891683108608805F9240D91683109731147F4000031305051
52430004F4F29C0E

9.8 +CDS–Unsolicitedly Present of New Message Status Report Reported Directly

9.8.1 Command Syntax

URC
Possible Response(s)
<CR><LF>+CDS: <length><CR><LF><pdu><CR><LF> (PDU mode enabled)

9.8.2 Interface Description

This command allows the direct indication of new messages received to the TE without storing the new message status report.

9.8.3 Parameter Description

<length>: integer type value indicating the number of bytes of PDU data.

<pdu>: protocol data unit.

9.8.4 Property Description

Saving upon Power-off	PIN
NA	NA

9.8.5 Example

Response: +CDS: 26
0891683108608805F906750D91683109731147F43130509134
92003130509134430000

9.9 AT+CMSS–Send Message from Storage (PDU Mode)

9.9.1 Command Syntax

If PDU mode enabled (AT+CMGF=0):

AT+CMSS=<index>[, <da>[, <toda>]]
Possible Response(s)

If sending successful:
`<CR><LF>+CMSS: <mr>[, <ackpdu>]<CR><LF><CR><LF>OK<CR><LF>`

If sending fails:
`<CR><LF>+CMS ERROR: <err><CR><LF>`

AT+CMSS=?

Possible Response(s)

`<CR><LF>OK<CR><LF>`

In case of an MS-related error:
`<CR><LF>+CMS ERROR: <err><CR><LF>`

9.9.2 Interface Description

The execution command sends message with location value `<index>` from message storage `<mem2>` to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address `<da>` is given for SMS-SUBMIT, it shall be used instead of the one stored with the message. Reference value `<mr>` is returned to the TE on successful message delivery. Optionally (when `+CSMS <service>` value is 1 and network supports) `<ackpdu>` is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code `+CMS ERROR: <err>` is returned. This command should be aborted.

`<da>` is limited by AT+CSMS.

9.9.3 Parameter Description

`<index>`: an integer type; value in the range of location numbers supported by the associated memory.

`<da>`: 3GPP TS 23.040 TP-Destination-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 `+CSMS` in 3GPP TS 27.007); type of address given by `<toda>`.

`<toda>`: 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format (when first character of `<da>` is '+' (IRA 43), the default value is 145, otherwise the default value is 129).

For the response parameter description of this command, see AT+CMGS–Send Message (PDU Mode).

9.9.4 Property Description

Saving upon Power-off	PIN
NA	Y

9.9.5 Example

Send a stored short message in PDU mode.

Run: AT+CMGF=0

Response: OK

Run: AT+CMSS=8 A short message at the location whose index is 8.

Response: +CMSS: 21

OK

9.10 AT+CMSS-Send Message from Storage (Text Mode)

9.10.1 Command Syntax

If text mode enabled (AT+CMGF=1):

```
AT+CMSS=<index>[, <da>[, <toda>]]
```

Possible Response(s)

If sending successfully:

```
<CR><LF>+CMSS: <mr>[, <scts>]<CR><LF><CR><LF>OK<CR><LF>
```

If sending fails:

```
<CR><LF>+CMS ERROR: <err><CR><LF>
```

```
AT+CMSS=?
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an MS-related error:

```
<CR><LF>+CMS ERROR: <err><CR><LF>
```

9.10.2 Interface Description

The execution command sends message with location value <index> from preferred message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address <da> is given for SMS-SUBMIT, it shall be used instead of the one stored with the message. Reference value <mr> is returned to the TE on successful message delivery. Optionally (when AT+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. This command should be aborted.

<da> is controlled by AT+CSCS.

9.10.3 Parameter Description

<scs>: indicates time stamp of the SMSC, consisting of year, month, date, hour, minute, second and time difference. Time difference is the difference between the local time and the Greenwich standard time.

For other parameters description of this command, see AT+CMGS–Send Message (Text Mode).

9.10.4 Property Description

Saving upon Power-off	PIN
NA	Y

9.10.5 Example

Send a stored short message in text mode.

Run: AT+CMGF=1

Response: OK

Run: AT+CMSS=8 A short message at the location whose index is 8.

Response: +CMSS: 21

OK

9.11 AT+CMGW–Write Message to Memory

9.11.1 Command Syntax

If PDU mode (AT+CMGF=0):

AT+CMGW=<length>[,<stat>]<CR>PDU is given<ctrl-Z/ESC>

Possible Response(s)

<CR><LF>+CMGW: <index><CR><LF><CR><LF>OK<CR><LF>

In case of an MS-related error:

<CR><LF>+CMS ERROR: <err><CR><LF>

AT+CMGW=?

Possible Response(s)

<CR><LF>OK<CR><LF>

9.11.2 Interface Description

The execution command stores a message to the memory storage <mem2> selected using the AT+CPMS command.

9.11.3 Parameter Description

<index>: an integer type value that indicates the location in the storage.

<stat>: message status.

0	Received unread messages
1	Received read messages
2	Stored unsent messages
3	Stored sent messages

<length>: an integer type value that indicates the number of bytes of PDU data.

<ctrl-z>: indicates the end of a PDU. The characters are "0x1A".

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

9.11.4 Property Description

Saving upon Power-off	PIN
NA	Y

9.11.5 Example

```
Run:      AT+CMGW=18
          >0015660B813109120090F60004FF0461626364<ctrl-z>

Response: +CMGW: 3

          OK

Run:      AT+CMGW=?
Response:  OK
```

10 Huawei Proprietary Interface: Mobile Termination Control and Status Interface

10.1 AT^WAKEUPCFG—Configure Module's Remote Wakeup Function by Host

10.1.1 Command Syntax

```
AT^WAKEUPCFG=<n>[,<channel>[,<source>]]
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

```
AT^WAKEUPCFG?
```

Possible Response(s)

```
<CR><LF>^WAKEUPCFG:
<n>,<channel>,<source><CR><LF><CR><LF>OK<CR><LF>
```

```
AT^WAKEUPCFG=?
```

Possible Response(s)

```
<CR><LF>^WAKEUPCFG: (list of supported <n>s) , (list of supported
<channel>s) , (list of supported
<source>s) <CR><LF><CR><LF>OK<CR><LF>
```

10.1.2 Interface Description

This command is used to enable and disable the module's Remote Wake-up feature, and to set the wake-up channels and sources for the feature.

10.1.3 Parameter Description

<n>: enables or disables the Remote Wake-up feature.

- 0 Disables the module's Remote Wake-up feature.
- 1 Enables the module's Remote Wake-up feature. (default value)

<channel>: sets Remote Wake-up channels.

The length of this parameter is 1 byte (8 bits). Eight Remote Wake-up channels can be controlled by this parameter. This parameter is entered in decimal format. Each bit of this parameter controls one channel, where:

- 0 Disables the channel controlled by the bit.
- 1 Enables the channel controlled by the bit.

Bit[2-7]	Bit[1]	Bit[0]
Undefined	USB	Wake up PIN

- 0x01 PIN Wake-up
- 0x02 USB Remote Wakeup
- 0x04-0x80 Reserved

The default value of <channel> is 0x03 (Wake up PIN + USB).

<source>: sets Remote Wake-up sources. The length of this parameter is 2 bytes (16 bits). This parameter is entered in decimal format. Each bit of this parameter controls one source, where:

- 0 Disables the source controlled by the bit.
- 1 Enables the source controlled by the bit.

Bit[5-15]	Bit[4]	Bit[3]	Bit[2]	Bit[1]	Bit[0]
Undefined	GPS	UR	DATA	SMS	VOICE

- 0x0001 Voice (Voice-related, including RING/^ORIG/^CONF/^CONN/^CEND/+CLIP/+CCWA/+CSSI/+CSSU/^ECLSTAT)
- 0x0002 SMS (SMS-related, including +CMT/+CMTI/+CBM/+CBMI/+CDS/+CDSI)
- 0x0004 Data (TCP/IP data)
- 0x0008 UR (unsolicited report)
- 0x0010 GPS (NEMA data and ^POSEND/+XCELLINFO)



0x0020–0x8000 Reserved

The default value of <source> is 0x000F(VOICE+SMS+DATA+UR).

10.1.4 Property Description

Saving upon Power-off	PIN
Y	N

10.1.5 Example

If only support USB Remote Wakeup

Run: AT^WAKEUPCFG=1,2,7

Response: OK

Run: AT^WAKEUPCFG?

Response: ^WAKEUPCFG: 1,2,7

OK

Run: AT^WAKEUPCFG=?

Response: ^WAKEUPCFG: (0-1),(0-3),(0-31)

OK

10.2 AT^CURC-Set Presentation of Unsolicited Results

10.2.1 Command Syntax

AT^CURC=<mode>
Possible Response(s)
<CR><LF>OK<CR><LF>
AT^CURC?
Possible Response(s)
<CR><LF>^CURC: <mode><CR><LF><CR><LF>OK<CR><LF>
AT^CURC=?
Possible Response(s)

```
<CR><LF>^CURC: (list of supported
<mode>s) <CR><LF><CR><LF>OK<CR><LF>
```

10.2.2 Interface Description

The set command selects the control mode for the presentation of unsolicited results.

The read command queries the current control mode for the presentation of unsolicited results.

The test command lists the supported control mode for the presentation of unsolicited results.

10.2.3 Parameter Description

<mode>: control mode for the presentation of unsolicited results.

- 0 The presentation of the unsolicited indications in Table 10-1 is disabled.
- 1 Enables the presentation of the unsolicited indications. (default value)

Table 10-1 List for the presentation of unsolicited results when AT^CURC=0

COMMAND
^MODE
^RSSI
^CSNR
^DSFLOWRPT
^EARST
^ACTIVEBAND
^RSSILVL
^HRSSILVL
^HRRSSI
^CRSSI
^ANLEVEL
^BOOT
^HCSQ

10.2.4 Property Description

Saving upon Power-off	PIN
N	N

10.2.5 Example

```

Run:          AT^CURC=0                      Set <mode> to 0.
Response:     OK

Run:          AT^CURC=1                      Set <mode> to 1.
Response:     OK

Run:          AT^CURC?
Response:     ^CURC: 1

                OK

```

10.3 AT^MSO-Shutdown Command

10.3.1 Command Syntax

AT^MSO[=<value>]
Possible Response(s)
<CR><LF>OK<CR><LF>
AT^MSO=?
Possible Response(s)
<CR><LF>^MSO: (list of supported <value>s) <CR><LF><CR><LF>OK<CR><LF>

10.3.2 Interface Description

This command powers off the MT. When the command is executed, the MT will wait for a few seconds which the <value> figured out, and then logs out of the network, saves subscriber data, and finally shut down. If the command is AT^MSO only, the MT will not wait. These actions can be cancelled when it is waiting.



NOTE

On ME909u-521, after the command is received, the module will firstly deregister, and then shut down.

10.3.3 Property Description

Saving upon Power-off	PIN
NA	N

10.3.4 Parameter Description

<value>: integer, indicates the time in the unit of 1 second which the MT will wait.
When the <value> is 65535, and the MT is waiting, it will cancel the AT^MSO actions.

10.3.5 Example

```
Run:      AT^MSO
Response:  OK

Run:      AT^MSO=15
Response:  OK

Run:      AT^MSO=?
Response:  ^MSO: (0-60,65535)

          OK
```

10.4 AT^CPIN-Manage PIN

10.4.1 Command Syntax

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

AT^CPIN=?
Possible Response(s)
<CR><LF>OK<CR><LF>

10.4.2 Interface Description

The read command returns a string indicating whether a password is required and how many password entry attempts are remaining.

The set command is used for verifying and unblocking PIN and PIN2.

If the current password required is PIN or PIN2, run `AT^CPIN=<pin>` to verify PIN or PIN2.

If the current password required is PUK or PUK2, run `AT^CPIN=<pin>,<newpin>` to unblock the PIN. In "`AT^CPIN=<pin>,<newpin>`", `<pin>` is the SIM PUK or SIM PUK2, and `<newpin>` is the new PIN or PIN2.

If the set command is executed when PIN is not requested, `+CME ERROR: <err>` is returned.



NOTE

Verifying PIN or PUK while a call or other services are ongoing may cause the call or services to be terminated.

10.4.3 Parameter Description

`<pin>`, `<newpin>`: string type values of the 4–8 digits. The character allowed in `<pin>` and `<newpin>` must range from 0 to 9, otherwise, an error message is returned.

`<code>`: a string type value (without quotation marks).

READY	MT is not pending for any password
SIM PIN	MT is waiting for UICC/SIM PIN to be given
SIM PUK	MT is waiting for UICC/SIM PUK to be given to unblock the blocked SIM PIN
SIM PIN2	MT is waiting for SIM PIN2 to be given
SIM PUK2	MT is waiting for UICC/SIM PUK2 to be given to unblock the blocked SIM PIN2

`<times>`: indicates the remaining number of entry attempts. For PIN and PIN2, the maximum number of entry attempts is 3. For PUK and PUK2, the maximum number of entry attempts is 10.



NOTE

If there is a password request, the remaining number of entry attempts of the currently requested password is indicated by the `<times>` field. If no password is requested, `<times>` is left blank.

<puk_times>: remaining number of PUK entry attempts. The maximum number of PUK entry attempts is 10.

<pin_times>: remaining number of PIN entry attempts. The maximum number of PIN entry attempts is 3.

<puk2_times>: remaining number of PUK2 entry attempts. The maximum number of PUK2 entry attempts is 10.

<pin2_times>: remaining number of PIN2 entry attempts. The maximum number of PIN2 entry attempts is 3.

10.4.4 Property Description

Saving upon Power-off	PIN
N	N

10.4.5 Example

- The read command returns a string indicating a password is required:

Run: AT^CPIN?

Response: ^CPIN: SIM PIN,3,10,3,10,0

OK

- The set command is used for verifying and unblocking PIN:

Run: AT^CPIN="1234"

Response: OK

- The read command returns a string indicating a password is not required:

Run: AT^CPIN?

Response: ^CPIN: READY,,10,3,10,0

OK

- The test command returns ok:

Run: AT^CPIN=?

Response: OK

10.5 AT^CARDMODE-Query SIM/USIM Card Type

10.5.1 Command Syntax

AT^CARDMODE

Possible Response(s)

<CR><LF>^CARDMODE: <sim_type><CR><LF><CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

10.5.2 Interface Description

This command queries the type of the currently installed SIM/USIM card. If the SIM/USIM card does not exist, or an error occurs during the query, **CME Error** is returned. For details about the CME errors, see 19.3 CMS Error List.

10.5.3 Parameter Description

<sim_type>: SIM/USIM card type.

0	No card is found
1	SIM card
2	USIM card
3	CSIM card (only for dual-mode datacards)
4	UIM card (only for dual-mode datacards)

10.5.4 Property Description

Saving upon Power-off	PIN
NA	N

10.5.5 Example

Run: AT^CARDMODE

Response: ^CARDMODE: 2

OK

10.6 AT^ICCID-Query the ICCID

10.6.1 Command Syntax

AT^ICCID?
Possible Response(s)
<CR><LF>^ICCID: <iccid><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^ICCID=?
Possible Response(s)
<CR><LF>OK<CR><LF>

10.6.2 Interface Description

This command is used to query the integrated circuit card identity (ICCID) of a SIM card no matter the PIN is entered or not.

10.6.3 Parameter Description

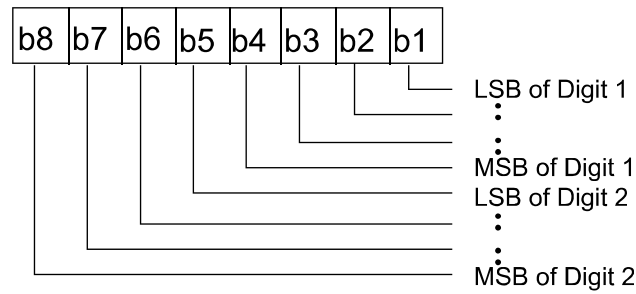
<iccid>: ICCID, which is a string containing up to 20 characters.



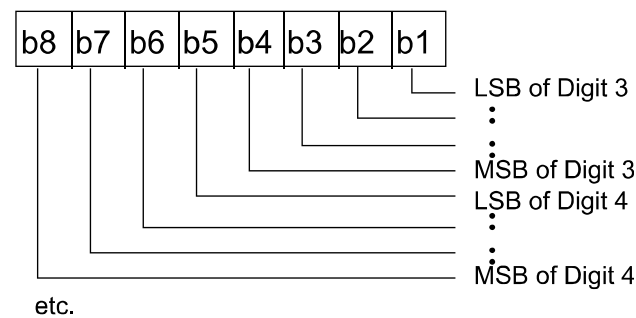
NOTE

The ICCID uniquely identifies an integrated circuit (IC) card. The ICCID is saved in the EF_{ICCID} file and consists of 10 bytes. The following figure shows the relationship between the ICCID and information in the EF_{ICCID} file (for details, see the GSM11.11 protocol).

Byte 1:



Byte 2:



The bit sequence of the information obtained from the EF_{ICCID} file must be converted.

10.6.4 Property Description

Saving upon Power-off	PIN
NA	N

10.6.5 Example

```

Run:      AT^ICCID?
Response: ^ICCID: 89860460097552010773

          OK

Run:      AT^ICCID=?
Response:  OK
  
```

10.7 AT^RESET-Reset the Module

10.7.1 Command Syntax

AT^RESET
Possible Response(s)
<CR><LF>OK<CR><LF>

10.7.2 Interface Description

This command is used to reset the module by user.

10.7.3 Parameter Description

None

10.7.4 Property Description

Saving upon Power-off	PIN
N	N

10.7.5 Example

Run: AT^RESET

Response: OK

10.8 AT^IOCTRL-Control the GPIO

10.8.1 Command Syntax

AT^IOCTRL=<sel>,<options>,<value>
Possible Response(s)
<CR><LF>OK<CR><LF>
AT^IOCTRL?
Possible Response(s)
<CR><LF>^IOCTRL: <options>,<value><CR><LF><CR><LF>OK<CR><LF>

```
AT^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>
```

10.8.2 Interface Description

This command is used to control the GPIO's actions. The command can set the GPIO to high voltage or low voltage, and can query the GPIO current state. By default, the GPIO is set to input GPIO, and voltage is low.

The test command returns supported values as compound value.

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

GPIO Number:	5	4	3	2	1
LGA PIN:	105	55	51	109	113

10.8.3 Parameter Description

<sel>: enable GPIOs.

...00000	Disable any GPIO.
...00001	Enable GPIO1.
...00010	Enable GPIO2
...	Enable or disable some GPIO
...11111	Enable ALL GPIO

<options>: set the GPIO's mode.

...00000	All GPIO input mode.
...00001	GPIO1 output mode, others are input mode.
...00010	GPIO2 output mode, others are input mode
...	Set some GPIO's mode
...11111	All GPIO output mode

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

...00000	All GPIO are set LOW.
...00001	GPIO1 is set HIGH, others are LOW.
...00010	GPIO2 is set HIGH, others are LOW
...	Set some GPIO's value
...11111	All GPIO are set HIGH

All GPIOs are input mode, and the value is 0 by default.

10.8.4 Property Description

Saving upon Power-off	PIN
N	N

10.8.5 Example

```
Run:      AT^IOCTRL?
Response: ^IOCTRL: 00000,11111

OK

Run:      AT^IOCTRL=11111,11110,00111
Response: OK
```

10.9 AT^ADCREADEX-Query the ADC Value

10.9.1 Command Syntax

AT^ADCREADEX=<id>
Possible Response(s)
<CR><LF>^ADCREADEX: <adc_value><CR><LF><CR><LF>OK<CR><LF>
AT^ADCREADEX=?
Possible Response(s)
<CR><LF>^ADCREADEX: (list of supported <id>s)<CR><LF><CR><LF>OK<CR><LF>

10.9.2 Interface Description

This command is used to query the analog to digital converter (ADC) value of the ADC pin. The obtained value is the raw data without unit conversion. The number of ADC pins varies with products.

10.9.3 Parameter Description

<id>: the query ID. The meanings is followings:

- | | |
|---|---------------------------|
| 1 | The ADC value of ADC1 pin |
|---|---------------------------|

2 The ADC value of ADC2 pin

<adc_value>: integer, indicating the ADC value, the unit is in millivolt.

10.9.4 Property Description

Saving upon Power-off	PIN
N	N

10.9.5 Example

- Query the ADC value of the input voltage:

Run: AT^ADCREADEX=1

Response: ^ADCREADEX: 42

OK

- The test command:

Run: AT^ADCREADEX=?

Response: ^ADCREADEX: (1-2)

OK

10.10 AT^SLEEPCFG-Configure Sleep Parameter

10.10.1 Command Syntax

AT^SLEEPCFG=<para>,<value>

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT^SLEEPCFG?

Possible Response(s)

<CR><LF>^SLEEPCFG: <para>,<value>[<CR><LF>^SLEEPCFG:
<para1>,<value1>[...]]<CR><LF><CR><LF>OK<CR><LF>

AT^SLEEPCFG=?

Possible Response(s)

<CR><LF>^SLEEPCFG: (list of supported
<para>s) <CR><LF><CR><LF>OK<CR><LF>

10.10.2 Interface Description

This command sets sleep parameters to ensure that the module can respond and report event to host.

The set command configures the sleep parameters.

The read command queries the current settings of the sleep parameters.

The test command queries all the configurable sleep parameters.

10.10.3 Parameter Description

<para>: the sleep parameter. The value range is from 0 to 9.

- | | |
|-----|---|
| 0 | Delay settings to report the data to the host when the host is waked up by PIN. |
| 1 | Delay settings to allow UART to sleep when UART have no data. |
| 2-9 | These parameters are not supported currently. |

<value>: specifies the value for the sleep parameter to set.

- If <para> is set to 0, the available values for <value> are an integer ranging from 1 to 5000. The unit is ms and the default value is 0.
- If <para> is set to 1, the available values for <value> are an integer ranging from 1 to 3600. The unit is second and the default value is 10.

10.10.4 Property Description

Saving upon Power-off	PIN
Y	NA

10.10.5 Example

- The test command:

Run: AT^SLEEPCFG=?

Response: ^SLEEPCFG: (0-1)

OK



- The set command:

Run: AT^SLEEPCFG=0,2000

Response: OK

Run: AT^SLEEPCFG=1,10

Response: OK

- The read command:

Run: AT^SLEEPCFG?

Response: ^SLEEPCFG: 0,2000

^SLEEPCFG: 1,10

OK

11 Huawei Proprietary Interface: ECM Interfaces

11.1 AT^NDISDUP-NDIS-Based Dialing

11.1.1 Command Syntax

```
AT^NDISDUP=<cid>,<connect>[,<APN>[,<username>[,<passwd>[,<auth_type>]]]]
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT^NDISDUP?
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

```
AT^NDISDUP=?
```

Possible Response(s)

```
<CR><LF>^NDISDUP: (list of supported <cid>s) , (list of supported  
<connect>s) <CR><LF><CR><LF>OK<CR><LF>
```

11.1.2 Interface Description

This command implements NDIS-based dialing. `AT^NDISDUP=1,1` indicates that other parameters are not required. `AT^NDISDUP=1,0` indicates that the network connection must be disabled. This command can be used only when an NDIS port is available.

11.1.3 Parameter Description

The following IP address is in the hexadecimal format and is arranged in reverse order. For example, 192.168.50.32 is expressed as 0x2032A8C0, in which 0x20 represents 32, 0x32 represents 50, 0xA8 represents 168, and 0xC0 represents 192.

<cid>:

- | | |
|---|---|
| 1 | Call ID. It can be set only to 1 at present. (It may be increased to 16 later.) |
|---|---|

<connect>:

- | | |
|---|-----------------------------|
| 0 | The connection is disabled. |
| 1 | The connection is set up. |

<APN>: access point name (0 to 99 bytes).

<username>: user name in the format of character strings (0 to 255 bytes).

<passwd>: password in the format of character strings (0 to 255 bytes).

<auth_type>: authentication reference.

- | | |
|---|------------------------------------|
| 0 | No authentication |
| 1 | PAP authentication |
| 2 | CHAP authentication |
| 3 | MsChapV2 (not supported currently) |

11.1.4 Property Description

Saving upon Power-off	PIN
NA	Y

11.1.5 Example

Run: AT^NDISDUP=1,1,"1234"

Response: OK

Run: AT^NDISDUP?

Response: OK

Run: AT^NDISDUP=?

Response: ^NDISDUP: (1-16),(0-1)

OK

11.2 ^NDISSTAT-Unsolicited Report of Connection Status

11.2.1 Command Syntax

URC
Possible Response(s)
<code><CR><LF>^NDISSTAT: <stat>[,<err_code>[,<wx_state>[,<PDP_type>]]]<CR><LF></code>

11.2.2 Interface Description

When the device connection status changes, the MT proactively indicates this to the TE.

11.2.3 Parameter Description

`<stat>`: connection status. Its values are as follows.

- | | |
|---|--|
| 0 | Disconnected |
| 1 | Connected |
| 2 | In connection (reported only when the device is automatically connected) |
| 3 | Disconnected (reported only when the device is automatically connected) |

`<err_code>`:

- | | |
|---|------------------------------------|
| 0 | Unknown error or unspecified error |
|---|------------------------------------|

The values of other error codes are defined in accordance with section 10.5.6.6 "SM Cause" in the 3GPP TS 24.008 V5.5.0 (2002-09) and later versions.

`<wx_state>`: sub-state of the WiMAX data card. It is applicable only to the WiMAX data card (not supported currently).

- | | |
|---|--------------------------|
| 1 | DL synchronization |
| 2 | Handover DL acquisition |
| 3 | UL acquisition |
| 4 | Ranging |
| 5 | Handover ranging |
| 6 | Capabilities negotiation |
| 7 | Authorization |

8 Registration

<PDP_type>: character string value.

"IPV4"

"IPV6"

11.2.4 Property Description

Saving upon Power-off	PIN
NA	Y

11.2.5 Example

- IPv4 changes from the connected state to the disconnected state:

Response: ^NDISSTAT: 0,33,, "IPV4"

- IPv4 changes from the disconnected state to the connected state:

Response: ^NDISSTAT: 1,,, "IPV4"

11.3 AT^NDISSTATQRY-Query the Connection Status

11.3.1 Command Syntax

AT^NDISSTATQRY?

Possible Response(s)

```
<CR><LF>^NDISSTATQRY:<stat>[,<err_code>[,<wx_state>[,<PDP_type>]]],<stat>,<err_code>,<wx_state>,<PDP_type>]<CR><LF><CR><LF>OK<CR><LF>
```

11.3.2 Interface Description

The TE delivers this command to query the ECM (NDIS/WWAN) connection status of the MT.

11.3.3 Parameter Description

<stat>: connection status. Its values are as follows:

0 Disconnected

1 Connected

- 2 In connection (reported only when the device is automatically connected)
- 3 Disconnected (reported only when the device is automatically connected)

<err_code>:

- 0 Unknown error/unspecified error
- other error codes Defined in accordance with section 10.5.6.6 "SM Cause" in the 3GPP TS 24.008 V5.5.0 (2002-09) and later versions

<wx_state>: sub-state of the WiMAX data card. It is applicable only to the WiMAX data card (not supported currently).

- 1 DL synchronization
- 2 Handover DL acquisition
- 3 UL acquisition
- 4 Ranging
- 5 Handover ranging
- 6 Capabilities negotiation
- 7 Authorization
- 8 Registration

<PDP_type>: character string value.

"IPV4"

"IPV6"

11.3.4 Property Description

Saving upon Power-off	PIN
NA	NA

11.3.5 Example

Report one or two group of connection status based on the IPv6 capability of the MT:

- If the MT supports IPv4 only, the IPv4 connection is in the connected state. In this case, only one group of connection status is reported:

Run: AT^NDISSTATQRY?



Response: ^NDISSTATQRY:1,,,"IPV4"

OK

- If the MT supports both IPv6 and IPv4, and IPv6 is in the disconnected state and IPv4 is in the connected state, two groups of connection status (regardless of before or after the dialing) are reported:

Run: AT^NDISSTATQRY?

Response: ^NDISSTATQRY:1,,,"IPV4",0,0,,,"IPV6"

OK

12 Huawei Proprietary Interface: Temperature Protection

12.1 AT^CHIPTEMP-Query the Temperature of the PA/SIM/Battery/Crystal Oscillator Command

12.1.1 Command Syntax

AT^CHIPTEMP?
Possible Response(s)
<CR><LF>^CHIPTEMP: <G PAtemp>,<W PAtemp>,<L PAtemp>,<SIMtemp>,<BATTERYtemp>,<CRYSTALtemp><CR><LF><CR><LF>>OK<CR><LF>
AT^CHIPTEMP=?
Possible Response(s)
<CR><LF>^CHIPTEMP: <G PAtemp Range>,<W PAtemp Range>,<L PAtemp Range>,<SIMtemp Range>,<BATTERYtemp Range>,<CRYSTALtemp Range><CR><LF><CR><LF>OK<CR><LF>

12.1.2 Interface Description

This command queries temperature on hardware spots, such as GSM PA, WCDMA PA, LTE PA, SIM card slot, battery, crystal oscillator.

12.1.3 Parameter Description

<G PAtemp>: an integer indicates the GSM PA chip's current temperature.

65535 Not supported currently

<W PAtemp>: an integer indicates the WCDMA PA chip's current temperature.

65535 Not supported currently

<L PAtemp>: an integer indicates the LTE PA chip's current temperature.

65535 Not supported currently

<SIMtemp>: an integer indicates the current temperature of the SIM card.

65535 Not supported currently

<BATTERYtemp>: an integer indicates the current temperature of the battery.

65535 Not supported currently

<CRYSTALtemp>: an integer indicates the crystal's current temperature. The crystal's current temperature in the unit of 0.1°C.

<G PAtemp Range>: integer, indicating the temperature range of the GSM PA chip in the unit of 0.1°C.

(65535-65535) Not supported currently

<W PAtemp Range>: integer, indicating the temperature range of the WCDMA PA chip in the unit of 0.1°C.

(65535-65535) Not supported currently

<L PAtemp Range>: integer, indicating the temperature range of the LTE PA chip in the unit of 0.1°C.

(65535-65535) Not supported currently

<SIMtemp Range>: integer, indicating the temperature range of the SIM card slot in the unit of 0.1°C.

(65535-65535) Not supported currently

<BATTERYtemp Range>: integer, indicating the temperature range of the battery in the unit of 0.1°C.

(65535-65535) Not supported currently

<CRYSTALtemp Range>: integer, indicating the temperature range of the crystal oscillator in the unit of 0.1°C.

(-400,1200) The crystal oscillator temperature range.


NOTE

- If the query of a component's temperature fails, 65535 is returned.
- The temperature unit is 0.1°C. For example, if the returned value range is (–200,1000), the temperature ranges from –20°C to 100°C.
- When actual temperature of the spots exceeds its range, the query command will not return the accurate temperature value. In this case, the queried temperature is not correct and physical protection must be adapted to avoid device damaged.

12.1.4 Property Description

Saving upon Power-off	PIN
NA	N

12.1.5 Example

Run: AT^CHIPTEMP?

Response: ^CHIPTEMP:
65535,65535,65535,65535,65535,300

The response indicates the current temperature on hardware spots.

OK

Run: AT^CHIPTEMP=?

Response: ^CHIPTEMP:
(65535–65535), (65535–65535), (65535–65535), (65535–65535), (65535–65535), (–400–1200)

The response indicates the temperature ranges on hardware spots.

OK

12.2 AT^THERMFUN–Enable or Disable the Temperature Protection Function Command

12.2.1 Command Syntax

AT^THERMFUN=<switch>

Possible Response(s)

<CR><LF>OK<CR><LF>

AT^THERMFUN?

Possible Response(s)

<CR><LF>^THERMFUN: <switch><CR><LF><CR><LF>OK<CR><LF>

AT^THERMFUN=?

Possible Response(s)

<CR><LF>^THERMFUN: (list of supported
<switch>s)<CR><LF><CR><LF>OK<CR><LF>

12.2.2 Interface Description

This command is used to enable or disable the temperature protection function.

- If the temperature protection function is enabled, the module performs the operation to disable the PA when the temperature reaches the threshold.
- If the temperature protection function is disabled, the module does not perform the operation to disable the PA when the temperature reaches the threshold.
- If the module is being in the state that the temperature protection function has been enabled, at this point, to disable the temperature protection function, the module performs the operation to enable the PA.

12.2.3 Parameter Description

<switch>: integer, indicating the switch for enabling or disabling the temperature protection function.

0 Disable the temperature protection function.

1 Enable the temperature protection function. (default value)

NOTE

- The default value is 1. The parameter value changes to 1 upon power-off.
- A parameter value takes effect immediately after setting.

12.2.4 Property Description

Saving upon Power-off	PIN
N	N

12.2.5 Example

Run: AT^THERMFUN=?

Response: ^THERMFUN: (0-1)

OK

Run: AT^THERMFUN?

Response: ^THERMFUN: 1

 OK

Run: AT^THERMFUN=1

Response: OK

12.3 ^THERM-Unsolicitedly Present of Thermal Protection Activated

12.3.1 Command Syntax

URC
Possible Response(s)
<CR><LF>^THERM: <ACTION><CR><LF>

12.3.2 Interface Description

This command sends an unsolicited report to the host when thermal protection is activated/inactivated according to the temperature..

12.3.3 Parameter Description

<ACTION>: indicates whether thermal protection takes effect. The possible values are defined as below:

- 0 Indicate that the thermal protection is inactive.
- 1 Indicate that the thermal protection is active.

12.3.4 Property Description

Saving upon Power-off	PIN
NA	NA

12.3.5 Example

Response: ^THERM: 0

12.4 ^THERMEX–Unsolicitedly Report Thermal Protection State Change

12.4.1 Command Syntax

URC
Possible Response(s)
<CR><LF>^THERMEX: <pre_state>,<cur_state><CR><LF>

12.4.2 Interface Description

This command sends an unsolicited report to the host when thermal protection state is changed according the temperature.

12.4.3 Parameter Description

<pre_state>: indicates thermal protection previous state.

<cur_state>: indicates thermal protection current state.

The possible values of <pre_state> and <cur_state> are defined as follows:

0	NORMAL
1	WARNING
2	EMERGENCY
3	MODULE_SHUTDOWN

12.4.4 Property Description

Saving upon Power-off	PIN
NA	NA

12.4.5 Example

- Indicate that the thermal protection is changed from NORMAL to WARNING:
Response: ^THERMEX: 0,1
- Indicate that the thermal protection is changed from WARNING to EMERGENCY:
Response: ^THERMEX: 1,2

13

Huawei Proprietary Interface: Network Service Interfaces

13.1 ^SRVST–Service State Change Indication

13.1.1 Command Syntax

URC
Possible Response(s)
<CR><LF>^SRVST: <srv_status><CR><LF>

13.1.2 Interface Description

When the state of a service is changed, the MT uses this command to unsolicited send the new service state to the TE.

13.1.3 Parameter Description

<srv_status>: indicates the system service status.

0	No services
1	Restricted services
2	Valid services
3	Restricted regional services
4	Power saving or hibernate state



13.1.4 Property Description

Saving upon Power-off	PIN
N	NA

13.1.5 Example

When sends `AT+COPS` set command to MT, the state of a service is changed, the MT unsolicited sends this indication to the TE.

Run: `AT+COPS=1,2,"46009",0`

Response: `^SRVST: 0`

`^MODE: 0,0`

`^RSSI: 99`

`^MODE: 3,3`

`^RSSI: 8`

`^SRVST: 1`

`^RSSI: 25`

`^SRVST: 2`

`OK`

13.2 ^HWNAT-Indicate Network Mode Change

13.2.1 Command Syntax

URC
Possible Response(s)
<code><CR><LF>^HWNAT: <cur_mode><CR><LF></code>



13.2.2 Interface Description

When the current network mode is changed, the MT uses this command to unsolicited send the new network mode to the TE.

13.2.3 Parameter Description

<cur_mode>: current network mode, the value range is 00–99.

00	Reserved
01	GSM
02	CDMA (including 1x and EVDO) (not supported currently)
03	WCDMA
04	TD-SCDMA
05	WiMAX
06	LTE
07	WiFi
.....	
99	

13.2.4 Property Description

Saving upon Power-off	PIN
NA	NA

13.2.5 Example

When sends AT+COPS set command to MT, the current network mode is changed, the MT unsolicited sends this indication to the TE.

Run: AT+COPS=1, 2, "46009", 7

Response: ^HWNAT:0 6

 ^SRVST:0

 ^MODE:0,0

 ^SRVST:0

 ^SRVST:1

 ^MODE:5,4

 ^SRVST:1

 ^SRVST:2

 OK

13.3 ^SIMST-SIM Card State Change Indication

13.3.1 Command Syntax

URC
Possible Response(s)
<CR><LF>^SIMST: <sim_state>[,<lock_state>]<CR><LF>

13.3.2 Interface Description

When the state of the SIM card is changed, the MT uses this command to unsolicited send the new state to the TE. Meanwhile, the indication also indicates whether the SIM card is locked.

13.3.3 Parameter Description

<sim_state>: indicates the state of the SIM card.

- | | |
|---|--------------------------------|
| 0 | Invalid SIM card. |
| 1 | Valid SIM card. |
| 2 | Invalid SIM card in CS domain. |
| 3 | Invalid SIM card in PS domain. |

- 4 Invalid SIM card in PS domain and CS domain.
- 240 ROMSIM version.
- 255 No SIM card is found. This value may be returned if the SIM card is not inserted or it is locked by the CardLock feature. In this case, the actual state of the SIM card is determined by `<lock_state>`.

`<lock_state>`: indicates whether the SIM card is locked by the CardLock feature.

- 0 SIM card is not locked by the CardLock feature.
- 1 SIM card is locked by the CardLock feature.

13.3.4 Property Description

Saving upon Power-off	PIN
NA	NA

13.3.5 Example

Run: AT+CPIN=1234

Response: OK

^SIMST: 1

13.4 AT^SYSINFOEX-Extended System Information Query Command

13.4.1 Command Syntax

AT^SYSINFOEX

Possible Response(s)

```
<CR><LF>^SYSINFOEX:
<srv_status>,<srv_domain>,<roam_status>,<sim_state>,<lock_state>,<sysmode>,<sysmode_name><submode>,<submode_name><CR><LF><CR><LF>OK<CR><LF>
```

13.4.2 Interface Description

This command queries the current system information, such as the system service status, domain, roaming status, system mode, and SIM card state.

13.4.3 Parameter Description

<srv_status>: indicates the system service status.

0	No services
1	Restricted services
2	Valid services
3	Restricted regional services
4	Power saving or hibernate state

<srv_domain>: indicates is the system service domain.

0	No services
1	CS service only
2	PS service only
3	PS+CS services
4	Not registered to CS or PS; searching now
255	CDMA (not supported currently)

<roam_status>: indicates the roaming status.

0	Not roaming
1	Roaming

<sim_state>: indicates the state of the SIM card.

0	Invalid SIM card
1	Valid SIM card
2	Invalid SIM card in CS
3	Invalid SIM card in PS
4	Invalid SIM card in PS and CS
240	ROM SIM version
255	No SIM card is found

<lock_state>: indicates whether the SIM card is locked by the CardLock feature.

0	SIM card is not locked by the CardLock feature.
1	SIM card is locked by the CardLock feature.

<sysmode>: indicates the system mode. Its values are defined as follows:

0	NO SERVICE
---	------------

- | | |
|---|--------------------------------|
| 1 | GSM |
| 2 | CDMA (not supported currently) |
| 3 | WCDMA |
| 4 | TD-SCDMA |
| 5 | WIMAX |
| 6 | LTE |


NOTE

If the returned `<sysmode>` value is not within the valid range (0–6), it will be deemed as `<sysmode>=3` (WCDMA).

`<sysmode_name>`: a string type value indicating the system mode name corresponding to `<sysmode>`. For example, if `<sysmode>=3`, `<sysmode_name>="WCDMA"`.

`<submode>`: indicates the system sub-mode. Its values are defined as follows:

- | | |
|------|--|
| 0 | NO SERVICE |
| 1 | GSM |
| 2 | GPRS |
| 3 | EDGE |
| 4-20 | No defined |
| 21 | IS95A (not supported currently) |
| 22 | IS95B (not supported currently) |
| 23 | CDMA2000 1X (not supported currently) |
| 24 | EVDO Rel0 (not supported currently) |
| 25 | EVDO RelA (not supported currently) |
| 26 | EVDO RelB (not supported currently) |
| 27 | HYBRID (CDMA2000 1X) (not supported currently) |
| 28 | HYBRID (EVDO Rel0) (not supported currently) |
| 29 | HYBRID (EVDO RelA) (not supported currently) |
| 30 | HYBRID (EVDO RelB) (not supported currently) |
| 31 | eHRPD Rel0 (not supported currently) |
| 32 | eHRPD RelA (not supported currently) |
| 33 | eHRPD RelB (not supported currently) |
| 34 | Hybrid (eHRPD Rel0) (not supported currently) |
| 35 | Hybrid(eHRPD RelA) (not supported currently) |
| 36 | Hybrid(eHRPD RelB) (not supported currently) |

.....

41	WCDMA
42	HSDPA
43	HSUPA
44	HSPA
45	HSPA+
46	DC-HSPA+

.....

61	TD-SCDMA (not supported currently)
62	HSDPA
63	HSUPA
64	HSPA
65	HSPA+

.....

81	802.16e
----	---------

.....

101	LTE
-----	-----

.....

<submode_name>: system sub-mode (value can be extended). This parameter returns the name of the current network sub-mode in character string. The value of <submode_name> is the character string corresponding to the value of <submode> in the command. For example, if the value of <submode> is 45, the value of <submode_name> is HSPA+.

13.4.4 Property Description

Saving upon Power-off	PIN
NA	N

13.4.5 Example

Run:	AT^SYSINFOEX	
Response:	^SYSINFOEX: 2,3,1,1,1,3,"WCDMA",46,"DC-HSPA+" OK	The response indicates that the UE is operating over a DC-HSPA+ network in WCDMA mode.

13.5 AT^SYSCFGEX-Extended System Configuration Command

13.5.1 Command Syntax

AT^SYSCFGEX=<acqorder>,<band>,<roam>,<srvdomain>,<lteband>,<reservel>,<reserve2>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^SYSCFGEX?
Possible Response(s)
<CR><LF>^SYSCFGEX: <acqorder>,<band>,<roam>,<srvdomain>,<lteband><CR><LF><CR><LF>OK<CR><LF>
AT^SYSCFGEX=?
Possible Response(s)
<CR><LF>^SYSCFGEX: (list of supported <acqorder>s) , (list of supported (<band>,<band_name>) s) , (list of supported <roam>s) , (list of supported <srvdomain>s) , (list of supported (<lteband>,<lteband_name>) s)<CR><LF><CR><LF>OK<CR><LF>

13.5.2 Interface Description

This command sets the system mode, network access order, frequency band, roaming support, domain, and other features.

The set command sets the system mode, G/W access order, frequency band, roaming support, domain, and other features.

The read command queries the current system configuration.

The test command returns values supported as a compound value.

13.5.3 Parameter Description

<acqorder>: a string type value that specifies the network access order. Its value can be 00, 99 or a combination of the following values:

"00"	Automatic
"01"	GSM
"02"	WCDMA

"03"	LTE
"04"	CDMA 1X (not supported currently)
"05"	TD-SCDMA (not supported currently)
"06"	Wimax (not supported currently)
"07"	CDMA EVDO (not supported currently)
"99"	Not change

For example:

- The 03 value indicates LTE only.
- The 030201 value indicates the order of LTE->WCDMA->GSM.
- The 0302 value indicates the order of LTE->WCDMA, without GSM.
- In specialty, the 99 value is not combined with other values, indicating no change of the network access order.
- The 00 value is not combined with other values, indicating automatic network access order that is determined by the board.



NOTE

If the `<acqorder>` is a combination list of multi-network mode, now ME909u-521 does not support the list that contains CDMA mode; that is, the list does not contain "04 CDMA 1X" and "07 CDMA EVDO".

`<band>`: a hexadecimal value that specifies the frequency band, which is related to the system mode and dependent on the board performance. The possible values of `<band>` are the following values and their combinations (excluding 0x3FFFFFFF and 0x40000000):

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
00100000 (CM_BAND_PREF_GSM_RGSM_900)	Railway GSM 900
00200000 (CM_BAND_PREF_GSM_PCS_1900)	GSM PCS
00400000 (CM_BAND_PREF_WCDMA_I_IMT_2000)	WCDMA IMT 2100
00800000 (CM_BAND_PREF_WCDMA_II_PCS_1900)	WCDMA_II_PCS_1900
04000000 (CM_BAND_PREF_WCDMA_V_850)	WCDMA_V_850
08000000 (CM_BAND_PREF_WCDMA_VI_800)	WCDMA_VI_800
3FFFFFFF (CM_BAND_PREF_ANY)	Any band
40000000 (CM_BAND_PREF_NO_CHANGE)	Band not changed
0004000000000000 (CM_BAND_PREF_WCDMA_IX_1700)	WCDMA_IX_1700
0002000000000000 (CM_BAND_PREF_WCDMA_VIII_900)	WCDMA_VIII_900

2000000 (CM_BAND_PREF_WCDMA_IX_1700)	AWS
00680380	Automatic

The following are definition of the CDMA band.

00000001(CM_BAND_PREF_BC0_A)	Band 0 A System
00000002(CM_BAND_PREF_BC0_B)	Band 0 B System
00000004(CM_BAND_PREF_BC1)	Band 1 1900
00000008(CM_BAND_PREF_BC2)	Band 2
00000010(CM_BAND_PREF_BC3)	Band 3
00000020(CM_BAND_PREF_BC4)	Band 4
00000040 (CM_BAND_PREF_BC5)	Band 5
00000400(CM_BAND_PREF_BC6)	Band 6
00000800(CM_BAND_PREF_BC7)	Band 7
00001000(CM_BAND_PREF_BC8)	Band 8
00002000(CM_BAND_PREF_BC9)	Band 9
00004000(CM_BAND_PREF_BC10)	Band 10
00008000(CM_BAND_PREF_BC11)	Band 11
10000000(CM_BAND_PREF_BC12)	Band 12
20000000(CM_BAND_PREF_BC14)	Band 14
80000000(CM_BAND_PREF_BC15)	Band 15

<band_name>: a string type value indicating the frequency band name.

- For WCDMA, it is named in WCDMA BCx format, in which, x indicates the actual Band Class (refer to 3GPP TS 25.101 Table 5.1).If multiple bands are simultaneously supported, it is separated by / (for example, WCDMA BC I/WCDMA BC II).
- For GSM, it is named in GSM850/GSM1800.... format.
- For TD-SCDMA, it is named in TD BCx format, in which, x indicates the actual Band Class (refer to 3GPP TS 36.101).

<roam>: indicates whether roaming is supported.

0	Not supported
1	Supported
2	No change

<srvdomain>: indicates the domain setting.

0	CS_ONLY
1	PS_ONLY



- 2 CS_PS
- 3 ANY
- 4 No change

<lteband>: a hexadecimal value that specifies the LTE frequency band. The value of <lteband> can be one of the following values and their combinations (excluding 0x7FFFFFFFFFFFFFFF):

7FFFFFFFFFFFFFFF(CM_BAND_PREF_ANY)	Any frequency band
1(CM_BAND_PREF_LTE_EUTRAN_BAND1)	LTE BC1
2(CM_BAND_PREF_LTE_EUTRAN_BAND2)	LTE BC2
4(CM_BAND_PREF_LTE_EUTRAN_BAND3)	LTE BC3
10(CM_BAND_PREF_LTE_EUTRAN_BAND5)	LTE BC5
40(CM_BAND_PREF_LTE_EUTRAN_BAND7)	LTE BC7
80(CM_BAND_PREF_LTE_EUTRAN_BAND8)	LTE BC8
80000(CM_BAND_PREF_LTE_EUTRAN_BAND20)	LTE BC20
40000000(CM_BAND_PREF_NO_CHANGE)	No band change

<lteband_name>: a string type value indicating the LTE frequency band name. It is displayed in LTE BCx format, in which, x indicates the actual Band Class. If multiple bands are simultaneously supported, it is separated by / (for example, LTE BC1/LTE BC2).

<reserve1>: reserved field 1.

<reserve2>: reserved field 2.

13.5.4 Property Description

Saving upon Power-off	PIN
NA	N

13.5.5 Example

Run: AT^SYSCFGEX=?

Response: ^SYSCFGEX:
("00","03","02","01","99"),((2000004e80380,"GSM850
/GSM900/GSM1800/GSM1900/WCDMA BCI/WCDMA BCII/WCDMA
BCV/WCDMA BCVIII"),(3fffffff,"All
Bands")), (0-2), (0-4), ((800d7,"LTE BC1/LTE BC2/LTE
BC3/LTE BC5/LTE BC7/LTE BC8/LTE
BC20"),(7fffffffffffffffffff,"All Bands"))

OK

Run: AT^SYSCFGEX?

Response: ^SYSCFGEX: "00",3FFFFFFF,1,2,7FFFFFFFFFFFFFFF

OK

Run: AT^SYSCFGEX="02",3FFFFFFF,1,2,7FFFFFFFFFFFFFFF,,

Response: OK

13.6 AT^HCSQ-Query and Report Signal Strength

13.6.1 Command Syntax

AT^HCSQ?
Possible Response(s)
<CR><LF>^HCSQ: <sysmode>[, <value1>[, <value2>[, <value3>[, <value4>]]]]<CR><LF><CR> ><LF>OK<CR><LF>
AT^HCSQ=?
Possible Response(s)
<CR><LF>^HCSQ: (list of supported <sysmode>s) <CR><LF><CR><LF>OK<CR><LF>
URC
Possible Response(s)
<CR><LF>^HCSQ: <sysmode>[, <value1>[, <value2>[, <value3>[, <value4>]]]]<CR><LF>

13.6.2 Interface Description

This command is used to query and report the signal strength of the current service network. If the MT is registered with multiple networks in different service modes, you can query the signal strength of networks in each mode.

No matter whether the MT is registered with a network or not, you can run this command to query the signal strength or allow the MT to unsolicitedly report the detected signal strength if the MT camps on the network. If the MT is not using any service network or the service mode is uncertain, "NOSERVICE" will be returned as the query result.

The read command queries the current network signal strength detected by the MT.

The test command returns the list of service modes supported by the MT.

The URC command allows the MT to unsolicitedly report the current signal strength when the strength changes.

13.6.3 Parameter Description

<sysmode>: a string type value indicating the service mode in which the MT will unsolicitedly report the signal strength.

"NOSERVICE"	NOSERVICE mode
"GSM"	GSM/GRPS/EDGE mode
"WCDMA"	WCDMA/HSDPA/HSPA mode
"LTE"	LTE mode

<value1>, <value2>, <value3>, <value4>: the following table lists the signal strength type corresponding to each service mode.

<sysmode>	<value1>	<value2>	<value3>	<value4>
"NOSERVICE"				
"GSM"	gsm_rssi			
"WCDMA"	wcdma_rssi	wcdma_rscp	wcdma_ecio	
"LTE"	lte_rssi	lte_rsrp	lte_sinr	lte_rsrq

<gsm_rssi>, <wcdma_rssi>, <lte_rssi>: an integer indicating the received signal strength. These parameters are available for GSM, WCDMA and LTE mode respectively.

0	rssi < -120 dBm
1	-120 dBm ≤ rssi < -119 dBm
2	-119 dBm ≤ rssi < -118 dBm
...	
94	-27 dBm ≤ rssi < -26 dBm
95	-26 dBm ≤ rssi < -25 dBm
96	-25 dBm ≤ rssi
255	Unknown or undetectable

<wcdma_rscp>: an integer indicating the received signal code power. This parameter is available for WCDMA mode.

0	$\text{rscp} < -120 \text{ dBm}$
1	$-120 \text{ dBm} \leq \text{rscp} < -119 \text{ dBm}$
2	$-119 \text{ dBm} \leq \text{rscp} < -118 \text{ dBm}$
...	
94	$-27 \text{ dBm} \leq \text{rscp} < -26 \text{ dBm}$
95	$-26 \text{ dBm} \leq \text{rscp} < -25 \text{ dBm}$
96	$-25 \text{ dBm} \leq \text{rscp}$
255	Unknown or undetectable

<wcdma_ecio>: an integer indicating the downlink carrier-to-interference ratio. These parameters are available for WCDMA mode respectively.

0	$\text{Ec/lo} < -32 \text{ dB}$
1	$-32 \text{ dB} \leq \text{Ec/lo} < -31.5 \text{ dB}$
2	$-31.5 \text{ dB} \leq \text{Ec/lo} < -31 \text{ dB}$
...	
63	$-1 \text{ dB} \leq \text{Ec/lo} < -0.5 \text{ dB}$
64	$-0.5 \text{ dB} \leq \text{Ec/lo} < 0 \text{ dB}$
65	$0 \text{ dB} \leq \text{Ec/lo}$
255	Unknown or undetectable

<lte_rsrp>: an integer indicating the reference signal received power (RSRP). This parameter is available for LTE mode.

0	$\text{rsrp} < -140 \text{ dBm}$
1	$-140 \text{ dBm} \leq \text{rsrp} < -139 \text{ dBm}$
2	$-139 \text{ dBm} \leq \text{rsrp} < -138 \text{ dBm}$
...	
95	$-46 \text{ dBm} \leq \text{rsrp} < -45 \text{ dBm}$
96	$-45 \text{ dBm} \leq \text{rsrp} < -44 \text{ dBm}$
97	$-44 \text{ dBm} \leq \text{rsrp}$
255	Unknown or undetectable

<lte_sinr>: an integer indicating the signal to interference plus noise ratio (SINR). This parameter is available for LTE mode.

0	$\text{sinr} < -20 \text{ dB}$
---	--------------------------------

1	$-20 \text{ dB} \leq \text{sinr} < -19.8 \text{ dB}$
2	$-19.8 \text{ dB} \leq \text{sinr} < -19.6 \text{ dB}$
...	
249	$29.6 \text{ dB} \leq \text{sinr} < 29.8 \text{ dB}$
250	$29.8 \text{ dB} \leq \text{sinr} < 30 \text{ dB}$
251	$30 \text{ dB} \leq \text{sinr}$
255	Unknown or undetectable

<lte_rsrq>: an integer indicating the reference signal received quality (RSRQ) in dB.

0	$\text{rsrq} < -19.5 \text{ dB}$
1	$-19.5 \text{ dB} \leq \text{rsrq} < -19 \text{ dB}$
2	$-19 \text{ dB} \leq \text{rsrq} < -18.5 \text{ dB}$
...	
32	$-4 \text{ dB} \leq \text{rsrq} < -3.5 \text{ dB}$
33	$-3.5 \text{ dB} \leq \text{rsrq} < -3 \text{ dB}$
34	$-3 \text{ dB} \leq \text{rsrq}$
255	Unknown or undetectable

13.6.4 Property Description

Saving upon Power-off	PIN
NA	NA

13.6.5 Example

```

Run:      AT^HCSQ=?
Response: ^HCSQ: "NOSERVICE", "GSM", "WCDMA", "LTE"

          OK

Run:      AT^HCSQ?
Response: ^HCSQ: "WCDMA", 30, 30, 58

          OK

```

13.7 AT^EONS-Query the Service Provider Name and the EFSPN Information of the SIM Card

13.7.1 Command Syntax

AT^EONS=<type>[,<plmn_id>]
Possible Response(s)
<CR><LF>^EONS: <type>,<plmn_id>,<plmn_long>,<plmn_short>[,<spn_cond>,<spn>]<CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^EONS=?
Possible Response(s)
<CR><LF>^EONS: (list of supported <type>s)<CR><LF><CR><LF>OK<CR><LF>

13.7.2 Interface Description

This command is used to query the service provider name and the information contained in the EFSPN file of the SIM card. The service provider name contains the network ID, long name, and short name. The EFSPN file of the SIM card contains the <Display Condition> and <Service Provider Name> fields.

The service provider name is a UCS2 string comprised of hexadecimal characters. If the <plmn_id> field is not specified in the execution command, the command queries the name of the currently registered network. Otherwise, the command queries the name of the network that maps to the PLMN ID.

If an EF_{SPN} file with valid information exists in the SIM card, the <spn_cond> and <spn> optional fields are reported. Otherwise, these fields are not reported.

The <plmn_long> and <plmn_short> fields are obtained from the following names in a descending priority order:

- Service provider name saved in the EF_{SPN} file that maps to the EF_{OPL} file
- Service provider name delivered by the network (delivered by the MM information signaling message)
- Service provider name obtained in the service provider name list that is defined in the module

When the operation type is set to 1, the <plmn_long> and <plmn_short> fields support a maximum of 96 hexadecimal characters (24 valid characters). If the name exceeds the maximum length, the first 96 characters of the name are retained. If the <plmn_long> and <plmn_short> fields cannot be obtained, the values of the two

fields are empty. According to the SIM card protocol, the service provider name supports a maximum of 64 hexadecimal characters (16 valid characters).

The UCS2 hexadecimal character string must be converted from the UCS2 characters in Big Endian mode. For example, the character A maps to the UCS2 code 0041 in Big Endian mode.

13.7.3 Parameter Description

`<type>`: operation type (it can be set only to 1 at present).

When the `<type>` parameter is set to 1, the command queries the name of the currently registered network or a specified network and information in the EFSPN file of the SIM card.

`<plmn_id>`: PLMN ID of the network. For detailed format, see the description of the numeric `<oper>` field in the +COPS command in the 3GPP TS 27.007 protocol.

`<plmn_long>`: string type, long name of the network.

`<plmn_short>`: string type, short name of the network.

`<spn_cond>`: integer, ranging from 0 to 255. The value of the `<spn_cond>` parameter is the first byte in the EFSPN file of the SIM card. For details, see the explanation of the `<Display Condition>` field in the definition of the EFSPN file in the 3GPP TS 31.102 protocol.

`<spn>`: string type, service provider name specified in the EFSPN file of the SIM card.

13.7.4 Property Description

Saving upon Power-off	PIN
NA	Y

13.7.5 Example

Assume that the long name of network 46009 is HUAWEI TEST W09 and the short name is HTW09 in the EF_{PNN} file of the current SIM card. The `<Display Condition>` field of the EF_{SPN} is set to 0x03 and the `<Service Provider Name>` field is set to HUAWEI.

Query the service provider name and EF_{SPN} file information of the currently registered network 46009:

Run: AT+EONS=1

Response: ^EONS:
1,46009,"00480055004100570045004900200054004500530
0540020005700300039","00480054005700300039",3,"004
800550041005700450049"

OK


NOTE

The mapping between the long name, short name, and SPN and related hexadecimal codes is as follows:

- HUAWEI TEST W09:
004800550041005700450049002000540045005300540020005700300039
- HTW09: 00480054005700300039

13.8 AT^IMEISV-Query the IMEISV

13.8.1 Command Syntax

AT^IMEISV?

Possible Response(s)

<CR><LF>^IMEISV: <imeisv><CR><LF><CR><LF>OK<CR><LF>

13.8.2 Interface Description

This command is used to query the international mobile equipment identity and software version (IMEISV) of the board.

13.8.3 Parameter Description

<imeisv>: IMEI and software version of a board. The returned value is a 16-character decimal value. The following table lists the value structure (for details, see the 3GPP TS 23.003 protocol).

16 digits IMEISV		
8 characters	6 characters	2 characters
TAC	SNR	SVN

TAC: type approval code

SNR: serial number

SVN: software version number

13.8.4 Property Description

Saving upon Power-off	PIN
NA	N

13.8.5 Example

Run: AT^IMEISV?

Response:	^IMEISV: 3545240400110917	35452404001109: the first 14 characters of the board IMEI
	OK	17: SVN

14

Huawei Proprietary Interface: GPS Service Interfaces

14.1 AT^WPDOM-Set Operation Mode

14.1.1 Command Syntax

AT^WPDOM=<mode>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^WPDOM?
Possible Response(s)
<CR><LF>^WPDOM: <mode><CR><LF><CR><LF>OK<CR><LF>
AT^WPDOM=?
Possible Response(s)
<CR><LF>^WPDOM: (list of supported <mode>s) <CR><LF><CR><LF>OK<CR><LF>

14.1.2 Interface Description

This command sets operation mode in the positioning process.

The set command is available before or after the session is positioned. Parameters cannot be modified during the positioning process. Otherwise, an error message is returned.

The read command reads the current operation mode.

The test command returns the value range of the operation mode.

14.1.3 Parameter Description

<mode>: operation mode. The default value is 0.

- | | |
|---|--|
| 0 | Standalone only. In this mode, no network assistance is required, and an MS can be in or not in the network coverage area. This mode can be used to position the session without SIM cards. And this mode can be used to start the XTRA position if there are XTRA data in the module. |
| 1 | Network only. The MS-assisted positioning mode, which is one of Assisted Global Positioning Systems (A-GPSs), is used here. The MS needs to communicate with PDE or PDM upon each positioning, and the PDE or PDM calculates position information. In this operation mode, the PDE or PDM needs to be accessed, and network coverage is required. When the GPS fails in this mode, this mode is automatically switched to the standalone mode for positioning. |
| 5 | MS-bases only. The network needs to provide positioning assistance information, and the MS calculates the position information. When the GPS fails in this mode, this mode is automatically switched to the standalone mode for positioning. |

14.1.4 Property Description

Saving upon Power-off	PIN
Y	N

14.1.5 Example

- Query the value range of operation mode:

Run: AT^WPDOM=?

Response: ^WPDOM: (0,1,5)

OK

- Query the current operation mode:

Run: AT^WPDOM?

Response: ^WPDOM: 0

OK

- Set the operation mode:

Run: AT^WPDOM=0

Response: OK

```
Run:          AT^WPDOM=1
Response:     OK

Run:          AT^WPDOM=5
Response:     OK
```

14.2 AT^WPDST-Set Session Type

14.2.1 Command Syntax

AT^WPDST=<type>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^WPDST?
Possible Response(s)
<CR><LF>^WPDST: <type><CR><LF><CR><LF>OK<CR><LF>
AT^WPDST=?
Possible Response(s)
<CR><LF>^WPDST: (list of supported <type>s) <CR><LF><CR><LF>OK<CR><LF>

14.2.2 Interface Description

This command sets the session type of the positioning operation.

The set command is available before or after the session is positioned. Parameters cannot be modified in the positioning process. Otherwise, an error message is returned.

The read command reads the current session type.

The test command returns the value range of the session type.

14.2.3 Parameter Description

<type>: session type. The default value is 1.

0 Provides a single positioning operation.

- 1 Provides tracing positioning. The positioning value is obtained using the designated frequency. The positioning frequency is set by running `AT^WPDFR`.
- 2 Provides the last positioning information, but does not execute the satellite searching operation.

**NOTE**

MSA does not support the tracing positioning session type.

14.2.4 Property Description

Saving upon Power-off	PIN
N	N

14.2.5 Example

- Query the value range of session type:

Run: `AT^WPDST=?`

Response: `^WPDST: (0-2)`

OK

- Query the current session type:

Run: `AT^WPDST?`

Response: `^WPDST: 0`

OK

- Set the session type:

Run: `AT^WPDST=0`

Response: OK

Run: `AT^WPDST=1`

Response: OK

Run: `AT^WPDST=3`

Response: `+CME ERROR: Invalid parameter`

14.3 AT^WPDFR–Set Positioning Frequency

14.3.1 Command Syntax

```
AT^WPDFR=<num>[, <time>]
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT^WPDFR?
```

Possible Response(s)

```
<CR><LF>^WPDFR: <num>[, <time>]<CR><LF><CR><LF>OK<CR><LF>
```

```
AT^WPDFR=?
```

Possible Response(s)

```
<CR><LF>^WPDFR: (list of supported <num>s), (list of supported  
<time>s) <CR><LF><CR><LF>OK<CR><LF>
```

14.3.2 Interface Description

This command sets the positioning frequency in the tracing positioning session.

The set command is available before or after the session is positioned. Parameters cannot be modified in the positioning process. Otherwise, an error message is returned.

The read command reads the current positioning frequency.

The test command returns the value range of the positioning frequency.



NOTE

This command sets the positioning frequency only after the session type is set to tracing positioning by AT^WPDST.

14.3.3 Parameter Description

<num>: number of positioning operations triggered by the designated MS. The value ranges from 0 to 65535, and the default value is 0. 0 specified unlimited positioning.

<time>: valid positioning time interval. This parameter can be set only when the positioning number triggered by the designated MS is greater than 1. The valid positioning time interval of this parameter ranges from 1s to 1800s, and the default time interval is 1s.

**NOTE**

- <time> is used to set the interval time between two positioning requests, not the interval time reported by ^POSEND. When the current positioning is not ended, ME will not trigger a new positioning event even though the setting of <time> is arrival. When the positioning time is greater than the setting of <time>, ME will trigger a new positioning event immediately after ^POSEND is reported.
- On Linux system or systems like Linux, it is recommended to set <time> to be less than the SS (Selective Suspend) time which is set by the system. This is to avoid the following situation that may happen: because the system comes into the SS state, NEMA data cannot be reported to the host during the GPS position. About that how to set the SS time on Linux system, please refer to [Guide to Kernel Driver Integration in Linux for Huawei Modules V2.0](#) or later.

14.3.4 Property Description

Saving upon Power-off	PIN
N	N

14.3.5 Example

- Query the value range of positioning frequency:

Run: AT^WPDFR=?

Response: ^WPDFR: (0-65535), (1-1800)

OK

- Query the current positioning frequency:

Run: AT^WPDFR?

Response: ^WPDFR: 65535,1

OK

- Set the positioning frequency

- Failure

Run: AT^WPDST=0

Response: OK

Run: AT^WPDFR=20,2

Response: +CME ERROR: operation not supported

- Success

Run: AT^WPDST=1

Response: OK

Run: AT^WPDFR=20,2

Response: OK

Run: AT^WPDFR=1,1

Response: +CME ERROR: operation not supported

14.4 AT^WPQOS-Set QoS

14.4.1 Command Syntax

AT^WPQOS=<performance>,<accuracy>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^WPQOS?
Possible Response(s)
<CR><LF>^WPQOS : <performance>,<accuracy><CR><LF><CR><LF>OK<CR><LF>
AT^WPQOS=?
Possible Response(s)
<CR><LF>^WPQOS : (list of supported <performance>s) , (list of supported <accuracy>s)<CR><LF><CR><LF>OK<CR><LF>

14.4.2 Interface Description

This command sets the QoS value of the positioning request, including satellite searching time limit and accuracy threshold. This command is just valid for standalone only.

The set command is available before or after the session is positioned. Parameters cannot be modified in the positioning process. Otherwise, an error message is returned.

The read command reads the current satellite searching time limit and accuracy threshold.

The test command returns the value range of the satellite searching time limit and accuracy threshold.

14.4.3 Parameter Description

<performance>: indicates the response time during the measurement of the GPS pseudorange. The unit is second. The value ranges from 0 to 255.

- 0–255 The upper time limit of the GPS satellite searching. Note that this value range is not the time of the whole session. In addition to the time for satellite searching, the time of the whole session includes the time for demodulating the ephemeris data and calculating the position.

<accuracy>: GPS accuracy threshold. The unit is meter. The value ranges from 25 to 1000, and the default value is 50.

14.4.4 Property Description

Saving upon Power-off	PIN
N	N

14.4.5 Example

- Query the value range of QoS parameter:
Run: AT^WPQOS=?
Response: ^WPQOS: (0-255) , (25-1000)

 OK
- Query the current settings:
Run: AT^WPQOS?
Response: ^WPQOS: 255,50

 OK
- Set the QoS parameter:
Run: AT^WPQOS=255,50
Response: OK
Run: AT^WPQOS=255,20
Response: +CME ERROR: Invalid parameter

14.5 AT^WPDGL-Set GPS Session Lock

14.5.1 Command Syntax

AT^WPDGL=<option>
Possible Response(s)
<CR><LF>OK<CR><LF>

In case of an error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^WPDGL?
Possible Response(s)
<CR><LF>^WPDGL: <option><CR><LF> <CR><LF>OK<CR><LF>
AT^WPDGL=?
Possible Response(s)
<CR><LF>^WPDGL: (list of supported <option>s) <CR><LF><CR><LF>OK<CR><LF>

14.5.2 Interface Description

This command sets a GPS session lock.

The set command sets whether to disable the mobile-initiated (MI) session and the mobile-terminated (MT) session. The set command is available before or after the session is positioned. Parameters cannot be modified in the positioning process. Otherwise, an error message is returned.

The read command reads the current GPS session lock mode.

The test command returns the value range of the session lock type.

14.5.3 Parameter Description

<option>: GPS session lock type. The values are as follows:

0	Enable MI and MT
1	Disable MI and enable MT
2	Enable MI and disable MT
3	Disable MI and MT



NOTE

Even if MT session is disabled, the SUPL END message is returned when the module receives SUPL INIT message from the network, which may cause the flow fee.

14.5.4 Property Description

Saving upon Power-off	PIN
Y	N

14.5.5 Example

- Query the value range of the session lock's type:

Run: AT^WPDGL=?

Response: ^WPDGL: (0-3)

OK

- Query the current GPS session lock type:

Run: AT^WPDGL?

Response: ^WPDGL: 0

OK

- Set the GPS session lock type:

Run: AT^WPDGL=1

Response: OK

14.6 AT^WPURL-Set AGPS Server Address and Port on the 3GPP Network

14.6.1 Command Syntax

AT^WPURL=<url>

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT^WPURL?

Possible Response(s)

<CR><LF>^WPURL: <url><CR><LF><CR><LF>OK<CR><LF>

14.6.2 Interface Description

The set command sets the address of the AGPS server on the 3GPP network. The set command is available before or after the session is positioned. Parameters cannot be modified in the positioning process. Otherwise, an error message is returned.

The read command reads the address of the current AGPS server.

14.6.3 Parameter Description

<url>: address of the AGPS server in the 3GPP server. It is a DNS address or an IP address. (without quotation marks)

14.6.4 Property Description

Saving upon Power-off	PIN
Y	N

14.6.5 Example

Set the address of the AGPS server:

Run: AT^WPURL=XXX:XXX

Response: OK

14.7 AT^WPDGP-Start Positioning Session

14.7.1 Command Syntax

AT^WPDGP
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an error:
<CR><LF>+CME ERROR: <err><CR><LF>

14.7.2 Interface Description

This command enables the GPS function. Only one positioning operation is allowed within the same period. When the GPS function is enabled, an error message is returned if this command is run again.

14.7.3 Parameter Description

None

14.7.4 Property Description

Saving upon Power-off	PIN
NA	N

14.7.5 Example

- Set PD session failed:
Run: AT^WPDGL=1
Response: OK
Run: AT^WPDGP
Response: +CME ERROR: GPS locked
- Set PD session success:
Run: AT^WPDGL=0
Response: OK
Run: AT^WPDGP
Response: OK

14.8 AT^WPEND—Terminate Positioning Process

14.8.1 Command Syntax

AT^WPEND
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an error:
<CR><LF>+CME ERROR: <err><CR><LF>

14.8.2 Interface Description

This command ends the GPS session. When no positioning session is available or the positioning session is in off status, an error message is returned if this command is run.

14.8.3 Parameter Description

None

14.8.4 Property Description

Saving upon Power-off	PIN
NA	N

14.8.5 Example

- Terminate the PD session successfully:
Run: AT^WPEND
Response: OK
- PD Session is not on going, terminate Failure:
Run: AT^WPEND
Response: +CME ERROR: PD session is in off status

14.9 AT^WPDIM-Delete Auxiliary Data

14.9.1 Command Syntax

AT^WPDIM=<mode>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^WPDIM=?
Possible Response(s)
<CR><LF>^WPDIM: (list of supported <mode>s) <CR><LF><CR><LF>OK<CR><LF>

14.9.2 Interface Description

The set command deletes the auxiliary positioning data inside a board. This command is available after the MGP search engine is closed. The deletion operation cannot be performed when the MGP search engine is open.

The test command returns the supported deletion type.

14.9.3 Parameter Description

<mode>: deletion type.

- | | |
|---|---|
| 0 | Cold start, this option clears all data that is currently stored in the internal memory of the GPS receiver including position, almanac, ephemeris, and time. |
| 1 | Warm start, this option clears the ephemeris. The almanac is retained. |
| 2 | Hot start, this option does not clear anything. The almanac and ephemeris are retained. |
| 3 | GPSONeXTRA. If the module does not support the XTRA mode, this parameter is not supported. |



NOTE

After execute `AT^WPDIM=3`, only the XTRA file will be deleted. The ephemeris or almanac data will not be deleted.

14.9.4 Property Description

Saving upon Power-off	PIN
NA	N

14.9.5 Example

- Query the value range of delete auxiliary data mode:

Run: `AT^WPDIM=?`

Response: `^WPDIM: (0-3)`

OK

- Set the deletion mode:

Run: `AT^WPDIM=1`

Response: OK

14.10 AT^XTRATIME-Inject XTRA Time

14.10.1 Command Syntax

```
AT^XTRATIME=<timeMsecUpper>,<timeMsecLower>,<timeUncMsec>,<refToUtcTime>,<forceFlag>
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

14.10.2 Interface Description

This command injects time information into a board after the GPS tool obtains the time information from the SNTP server. The injected time is the accumulative time value from 00:00:00, January 6, 1980 to the current time, and the unit is millisecond. If the injection request is sent, OK is returned.

The set command is available before or after the session is positioned. Otherwise, an error message is returned.

14.10.3 Parameter Description

<timeMsecUpper>: high 32 bits of time value; at least greater than 235..

<timeMsecLower>: low 32 bits of time value

<timeUncMsec>: uncertainty of time. It indicates the time difference between sending a request to the SNTP server and receiving a response from the SNTP server.

<refToUtcTime>: reference time. The default value is 1. Available values as follows:

0 GPS time

1 UTC time

<forceFlag>: indicates whether to inject the time information into the board in a mandatory manner. The default value is 0 no matter whether the GPS time evaluation is improved. Available values as follows:

0 No

1 Yes

14.10.4 Property Description

Saving upon Power-off	PIN
N	N

14.10.5 Example

Inject XTRA time:

Run: AT^XTRATIME=235,250,0,0,1

Response: OK

14.11 AT^XTRADATA-Inject Auxiliary XTRA Data

14.11.1 Command Syntax

```
AT^XTRADATA=<total>,<index>,<item>
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT^XTRADATA?
```

Possible Response(s)

```
<CR><LF>^XTRADATA: <total>,<index><CR><LF><CR><LF>OK<CR><LF>
```

14.11.2 Interface Description

This command is used by the GPS tool to inject the auxiliary data file packets into the board after the GPS tool obtains the auxiliary data file from the XTRA server and packets them. OK is returned if the request for injecting the auxiliary XTRA data is sent.

The set command is available before or after the session is positioned. Otherwise, an error message is returned. The time information must be injected before the XTRA data.


NOTE

- The length of the data transmitted from the APP side to the board side cannot exceed 1024 bytes. The total length of the auxiliary data file cannot exceed 45*1024 bytes.
- For the set command, during the injecting process, OK indicate that only the current packet was injected successfully. If all the packet have been injected, OK indicate that the module have done the CRC checking for the XTRA data.

14.11.3 Parameter Description

<total>: the total number of the auxiliary data file packets, ranging from 10 to 1000

<index>: current packet index, ranging from 1 to the value of <total>

<item>: content of the auxiliary data file (without quotation marks). The length of the item must be 512. Only the last packet's length could have other value.

14.11.4 Property Description

Saving upon Power-off	PIN
Y	N

14.11.5 Example

The total number of the auxiliary data file packets is 155; the current packet index is 1; the content of the auxiliary data file is 011b.....1f00; the byte of the transmitted auxiliary data file is 512.

```
Run: AT^XTRADATA=155,1,011b060201100148f9d77800009af606
      8a2047e789068a202fbf00061c0100251407100f0e0d0c0b0a
      0c370810100f0e0d0c0a090e5308110f0e0e0c0c09080d9602
      0b05020303c21f010004bb240ba2fd5600a10cda001a4cc400
      25576fffbbe55ab00dc0003068b0200595724fdadfd4300a10c
      b50019d4d9ff8b41cb00021b9d018d0000068b03007b0b24f8
      55fd2700a10d1cffe7ed002fb1280007990d000a0001068b
      040051c824fd0efd4300a10de9001a86820021c5e2007fdb71
      00610003068b050016372405d7fd4500a10c6b004525c0000b
      dcc3004fd4a3fed8ffff068b0600396524fce3fd2e00a10d15
      ffed9544ffe727cc00564c87001f00
```

Response: OK

14.12 AT^XTRASTA-Query XTRA Data Status

14.12.1 Command Syntax

AT^XTRASTA

Possible Response(s)

```
<CR><LF>^XTRASTA:  
<year>,<month>,<day>,<hour><CR><LF><CR><LF>OK<CR><LF>  
  
In case of an error:  
<CR><LF>+CME ERROR: <err><CR><LF>
```

14.12.2 Interface Description

This command judges the XTRA data status on the board before the GPS tool obtains the auxiliary data file from the XTRA server. OK is returned after this command is run.

This command only supports set command. The set command is available before or after the session is positioned and when the time information is saved inside the board. Otherwise, an error message is returned.

14.12.3 Parameter Description

<year>,<month>,<day>,<hour>: specific start time of the XTRA data (UTC time); the time limit is accurate to hour. If the current day is beyond the seven days specified after the start time of the XTRA data, the XTRA data expires, and the XTRA data is invalid. If the board contains no valid XTRA data, 0,0,0,0 is returned.

14.12.4 Property Description

Saving upon Power-off	PIN
NA	N

14.12.5 Example

Query the XTRA data status:

Run: AT^XTRASTA

Response: ^XTRASTA: 2014,02,08,03

OK

14.13 ^POSEND-Report Positioning End Information

14.13.1 Command Syntax

URC

Possible Response(s)

```
<CR><LF>^POSEND: <reason>,<leftfixnum><CR><LF>
```

14.13.2 Interface Description

This command reports the ending reason and the left positioning times when the positioning ends and the positioning session is over.

14.13.3 Parameter Description

<reason>: positioning end reason

-1	Normal end
9	User ended the session
12	Session ended due to timeout (i.e., for GPS search)
15	Session ended due to an error in fix
18	Ending session due to E911 call
22	Session ended due to unknown system error

<leftfixnum>: left positioning times, When the positioning time set by AT^WPDEF is 0, the left positioning times returned by ^POSEND is 65535 all the time..

14.13.4 Property Description

Saving upon Power-off	PIN
NA	N

14.13.5 Example

If user ended the PD session:

Response: ^POSEND: 9,0

14.14 ^WNINV-Notify NI Positioning

14.14.1 Command Syntax

URC
Possible Response(s)
<CR><LF>^WNINV: <req_type><CR><LF>

14.14.2 Interface Description

This command is used by the board to notify the user of the positioning request from the network side.

14.14.3 Parameter Description

`<req_type>`: NI request type. The values are as follows:

- | | |
|---|--|
| 0 | Notify and Verify. In this type, the module notifies the user of the NI request and the user accepts or rejects the NI positioning. If the user does not respond within 20s, the system accepts or rejects the NI positioning based on the network policy. |
| 1 | Notify Only. In this type, the module notifies the user of the NI request, and the user accepts the NI positioning by default. |
| 2 | No Notify No Verify. In this type, the module does not notify the user of the NI request. The user does not accept or reject the NI positioning either. |
| 3 | Notify and Verify. Denied on no answer. In this type, the module notifies the user of the NI request and the user accepts or rejects the NI positioning. If the user does not respond within 40s, the system rejects the NI positioning based on the network policy. |
| 4 | Privacy override (is used for preventing notification and verification without leaving any traces of a performed position fix or position fix attempt in terms of log files etc. on the SET). |

14.14.4 Property Description

Saving upon Power-off	PIN
NA	N

14.14.5 Example

- Notify and verify NI positioning:
Response: `^WNINV: 0`
- Only notify NI positioning:
Response: `^WNINV: 1`
- No notify No verify:
Response: `^WNINV: 2`

14.15 AT^WNICT-Set NI Response

14.15.1 Command Syntax

AT^WNICT=<choice>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^WNICT=?
<CR><LF>^WNICT: (list of supported <choice>s) <CR><LF><CR><LF>OK<CR><LF>

14.15.2 Interface Description

The set command is used by the user to notify the board of the response to the NI positioning request so that the board can perform relevant operations when the NI positioning type is Notify and Verify. This command supports the set command. The user can accept or reject the NI positioning only when the NI positioning type is Notify and Verify and when the user receives the NI positioning report or WNINV. Otherwise, an error message is returned.

The test command returns all supported values.

14.15.3 Parameter Description

<choice>: indicates whether the user accepts the NI request. The values are as follows:

0	No
1	Yes

14.15.4 Property Description

Saving upon Power-off	PIN
NA	N

14.15.5 Example

- Query the range of supported values:

Run: AT^WNICT=?

Response: `^WNICT: (0-1)`

OK

- Set NI response:

Run: `AT^WNICT=0`

Response: OK

Run: `AT^WNICT=1`

Response: OK

14.16 AT^WPCAP-Disable or Enable GNSS System

14.16.1 Command Syntax

<code>AT^WPCAP=<system></code>
Possible Response(s)
<code><CR><LF>OK<CR><LF></code>
In case of an error:
<code><CR><LF>+CME ERROR: <err><CR><LF></code>
<code>AT^WPCAP?</code>
Possible Response(s)
<code><CR><LF>^WPCAP: <system><CR><LF><CR><LF>OK<CR><LF></code>
<code>AT^WPCAP=?</code>
Possible Response(s)
<code><CR><LF>^WPCAP: (list of supported <system>s) <CR><LF><CR><LF>OK<CR><LF></code>

14.16.2 Interface Description

This command enables or disables a Global Navigation Satellite System (GNSS).

The set command sets the GNSS system type. Parameters cannot be modified in the positioning process. Otherwise, an error message is returned. The settings will be saved at power-off.

When `AT^WPCAP=1` (GPS system type), the following NMEA sentences are reported during the positioning process: `$GPGGA`, `$GPGSA`, `$GPGSV`, `$GPRMC`, `$GPVTG` and `$GPHWBIAS`.

When `AT+WPCAP=3` (GNSS system type), the following NMEA sentences are reported during the positioning process: \$GPGGA, \$GPGSA, \$GPGSV, \$GPRMC, \$GPVTG, \$GNGNS, \$GNGSA \$GLGSV and \$GPHWBIAS.

The format of these NMEA sentences comply with NMEA0183 protocol.

The read command is used to read the current positioning system type.

The test command is used to return the value range of the positioning system type.

14.16.3 Parameter Description

`<system>`: GNSS system type. The value is a decimal integer, represented by one byte. Switching the positioning system type takes effective after the board is reset. The default value is 1.

- When the corresponding bit is 0, the related GNSS system is disabled.
- When the corresponding bit is 1, the related GNSS system is enabled.

The GALILEO and COMPASS systems are reserved because they are not supported currently.

Bit 0	GPS
Bit 1	GLONASS
Bit 2	COMPASS, namely BeiDou (reserved)
Bit 3	GALILEO (reserved)

14.16.4 Property Description

Saving upon Power-off	PIN
Y	N

14.16.5 Example

- Disable all the GNSS systems in a module:

Run: `AT+WPCAP=0`

Response: `OK`

- Query the current GNSS system type:

Run: `AT+WPCAP?`

Response: `^WPCAP: 3`

`OK`

- Query the supported GNSS system types:

Run: `AT+WPCAP=?`

Response: ^WPCAP: (0,1,3)

OK

14.17 AT^AGNSSCFG-Set an AGNSS System's Capabilities

14.17.1 Command Syntax

AT^AGNSSCFG=<asystem>,<value1>[,<value2>,<value3>,<value4>]]
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^AGNSSCFG?
Possible Response(s)
<CR><LF>^AGNSSCFG: <asystem>,<value1>,<value2>,<value3>,<value4>[<CR><LF>^AGNSSCFG: <asystem>,<value1>,<value2>,<value3>,<value4>[...]]<CR><LF><CR><LF>OK<CR><LF>
AT^AGNSSCFG=?
Possible Response(s)
<CR><LF>^AGNSSCFG: <asystem>,(list of supported <value1>s),(list of supported <value2>s),(list of supported <value3>s),(list of supported <value4>s)[<CR><LF>^AGNSSCFG: <asystem>,(list of supported <value1>s),(list of supported <value2>s),(list of supported <value3>s),(list of supported <value4>s)[...]]<CR><LF><CR><LF>OK<CR><LF>

14.17.2 Interface Description

This command sets an Assisted Global Navigation Satellite System's (AGNSS) capabilities. It cannot be used to configure the AGNSS system type.

The set command sets an AGNSS system's capabilities. Parameters cannot be modified in the positioning process. Otherwise, an error message is returned.

The read command queries the parameter settings of all the supported AGNSS systems. If a parameter is not supported, no value is returned for it.

14.17.3 Parameter Description

<asystem>: type of the AGNSS system you want to configure.

1 AGPS

<value1>, **<value2>**, **<value3>**, **<value4>**: an AGNSS system's capabilities. The capabilities you can set vary according to AGNSS system types. Currently, only the capabilities of the Assisted Global Positioning System (AGPS) can be set. The following table provides more details.

<asystem>	<value1>	<value2>	<value3>	<value4>
AGPS	transport_mode	supl_ver	sec_mode	fix_protocol
AGLONASS	Reserved	Reserved	Reserved	Reserved

NOTE

- If **<transport_mode>** is set to 0, there is no need to set **<supl_ver>**, **<sec_mode>** and **<fix_protocol>**. Otherwise, error will be returned.
- If **<transport_mode>** is set to 1, **<supl_ver>**, **<sec_mode>** and **<fix_protocol>** parameters must be filled in. Otherwise, error will be returned.

<transport_mode>: transport mode of the AGPS system. The values are listed in the following, and the default value is 1:

0 Control plane
1 User plane

<supl_ver>: SUPL version. The values are listed in the following, and the default value is 1:

1 SUPL 1.0
2 SUPL 2.0

<sec_mode>: whether to enable security mode. The values are listed in the following, and the default value is 0:

0 Disable security mode. No certificate is required.
1 Enable security mode. A certificate is required.

<fix_protocol>: sets the LPP or RRLP fix protocol in LTE network. In GSM or WCDMA network, this is no need to set this parameter, and RRLP is the default protocol. The parameter default value is 0.

0 LPP
1 RRLP

14.17.4 Property Description

Saving upon Power-off	PIN
Y	N

14.17.5 Example

- Set the AGPS system's capabilities:
Run: AT^AGNSSCFG=1,1,1,0,1
Response: OK
- Set the AGPS system's capabilities:
Run: AT^AGNSSCFG=1,0
Response: OK
- Set the AGPS system's capabilities:
Run: AT^AGNSSCFG=1,0,1,0,1
Response: +CME ERROR: Too many parameters
- Query the supported AGNSS system's parameter settings:
Run: AT^AGNSSCFG?
Response: ^AGNSSCFG: 1,1,1,0,1

OK
- Query the types of the supported AGNSS system's capabilities:
Run: AT^AGNSSCFG=?
Response: ^AGNSSCFG:
1,(0,1),(1,2),(0,1),(0,1)

OK

14.18 AT^WPTLS-Set TLS Certificate

14.18.1 Command Syntax

```
AT^WPTLS=<length>[,<index>,<tls>]
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an error:
<CR><LF>+CME ERROR: <err><CR><LF>

14.18.2 Interface Description

The set command injects/deletes/reads the TLS certificate data. When the length more than 0, the <tls> will be inject. If the TLS certificate length is greater than 300 characters, the entire text has to be split into 300 character segments and each segment sent sing one separate AT^WPTLS command. The <index> shall indicate the segment number of the TLS certificate being set. When the <length> equal to 0, the TLS certificate data will be delete. In this case, <index> and <tls> does not need to be set. The set command is available before or after the session is positioned. Parameters cannot be modified in the positioning process. Otherwise, an error message is returned.

14.18.3 Parameter Description

<length>: the total length of the TLS certificate.
<index>: current packet index, counting from 1.
<tls>: content of the TLS certificate file (with quotation marks).

14.18.4 Property Description

Saving upon Power-off	PIN
Y	NA

14.18.5 Example

- Inject the TLS certificate of the AGPS server:

Run: AT^WPTLS=304,1,"30820242308201ec020900d9f63efc3f85582c300d06092a864886f70d01010505003081a7311f301d060355040a131653706972656e7420436f6d6d756e696361746966f6e73310e300c060355040b130550412d57503125302306092a864886f70d0109011616737570706f72744073706972656e74636f6d2e636f6d31123010060355040713094561746f6e746f776e310b300906"

Response: OK

Run: AT^WPTLS=304,2,"f025"

Response: OK

- Delete the TLS certificate of the AGPS server:

Run: AT^WPTLS=0

Response: OK

14.19 AT^WPINFO-Get GNSS Engine Status

14.19.1 Command Syntax

AT^WPINFO?
Possible Response(s)
<CR><LF>^WPINFO: <System><CR><LF><CR><LF>OK<CR><LF>

14.19.2 Interface Description

This read command is used to read the current GNSS engine.

14.19.3 Parameter Description

<System>: GNSS system type. The value is a decimal integer, represented by one byte.

- When the corresponding bit is 1, the related GNSS system is in the positioning state.
- When the corresponding bit is 0, the related GNSS system is not in the positioning state.

For parameter values, see the ^WPCAP command.

14.19.4 Property Description

Saving upon Power-off	PIN
NA	N

14.19.5 Example

Query the current GPS engine state:

Run: AT^WPINFO?

Response: ^WPINFO:3

OK

The GPS and GLONASS systems cooperate to implement positioning.

14.20 AT^XTRALOCK-Enable or Disable the XTRA Feature

14.20.1 Command Syntax

AT^XTRALOCK=<lockstate>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^XTRALOCK?
Possible Response(s)
<CR><LF>^XTRALOCK: <lockstate><CR><LF><CR><LF>OK<CR><LF>
AT^XTRALOCK=?
Possible Response(s)
<CR><LF>^XTRALOCK: (list of supported <lockstate>s) <CR><LF><CR><LF>OK<CR><LF>

14.20.2 Interface Description

This command enables or disables the XTRA feature.

The set command enables or disables the XTRA feature.

The read command obtains the status (enabled or disabled) of the XTRA feature.

The test command obtains the preset value range.

The set command can be used only before or after a positioning session. Do not modify the parameters in the set command during the positioning.

The GpsOne XTRA feature is enabled by default. To disable the GpsOne XTRA feature on a client, deliver the AT^XTRALOCK=1 command before enabling the GPS positioning function. To enable the GpsOne XTRA feature on a client, deliver the AT^XTRALOCK=0 command before enabling the GPS positioning function.



NOTE

When the XTRA feature is disabled, the XTRA time and data will not be allowed to inject into the module.

14.20.3 Parameter Description

<lockstate>: lock state The values are listed in the following, and the default value is 0.

0 Enable the XTRA feature.

- 1 Disable the XTRA feature.

14.20.4 Property Description

Saving upon Power-off	PIN
Y	N

14.20.5 Example

Set the XTRA lock status:

Run: AT^XTRALOCK=1 Disable the XTRA feature.
Response: OK

14.21 AT^WPPORT-Set the NMEA Sentence and GPS URC Output Port

14.21.1 Command Syntax

AT^WPPORT=<port_id>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^WPPORT?
Possible Response(s)
<CR><LF>^WPPORT: <port_id><CR><LF><CR><LF>OK<CR><LF>
AT^WPPORT=?
Possible Response(s)
<CR><LF>^WPPORT: (list of supported <port_id>s) <CR><LF><CR><LF>OK<CR><LF>

14.21.2 Interface Description

This command is used to configure the NMEA sentence and other GPS URC output port.



The set command is available before or after the session is positioned.

14.21.3 Parameter Description

<port_id>: port number. The default value is 0. The values are as follows:

0	GPS port
1	Serial port 0
2	Serial port 1

14.21.4 Property Description

Saving upon Power-off	PIN
Y	N

14.21.5 Example

- Query the value range of port id:

Run: AT^WPPORT=?

Response: ^WPPORT: (0-2)

OK

- Query the current output port id:

Run: AT^WPPORT?

Response: ^WPPORT: 0

OK

- Set Physical serial as output port:

Run: AT^WPPORT=1

Response: OK

15

Huawei Proprietary Interface: Voice Call Interface

15.1 ^ORIG—Indicate the Origination of a Call

15.1.1 Command Syntax

URC
Possible Response(s)
<CR><LF>^ORIG: <call_x>,<call_type><CR><LF>

15.1.2 Interface Description

This command indicates that the MT is originating a call.

15.1.3 Parameter Description

<call_x>: specifies the call ID, uniquely identifying the call. Integer, with a product-specific value.

<call_type>: specifies the call type.

0	Voice call
9	Emergency call

15.1.4 Property Description

Saving upon Power-off	PIN
NA	NA

15.1.5 Example

Dial a normal number:

Response: ^ORIG: 1,0

15.2 ^CONF-Ringback Tone Indication

15.2.1 Command Syntax

URC
Possible Response(s)
<CR><LF>^CONF: <call_x><CR><LF>

15.2.2 Interface Description

If a MT receives a ringback tone after initiating a call, the MT presents this indication to the TE.

15.2.3 Parameter Description

<call_x>: call ID; integer type with a product-specific value range.

15.2.4 Property Description

Saving upon Power-off	PIN
NA	NA

15.2.5 Example

Dial a normal number:

Response: ^CONF: 1

15.3 ^CONN-Call Connection Indication

15.3.1 Command Syntax

URC
Possible Response(s)

```
<CR><LF>^CONN: <call_x>,<call_type><CR><LF>
```

15.3.2 Interface Description

When a call is connected, the MT presents this indication to the TE, indicating that a call starts.

15.3.3 Parameter Description

<call_x>: specifies the call ID, uniquely identifying the call. Integer, with a product-specific value..

<call_type>: specifies the call type.

0	Voice call
1	CS domain data call (GW)
2	PS domain data call (GW)
3	CDMA SMS call
7	OTA call (standard OTASP numbers)
8	OTA call (non-standard OTASP numbers)
9	Emergency call

15.3.4 Property Description

Saving upon Power-off	PIN
NA	NA

15.3.5 Example

Answer a normal number:

Response: ^CONN: 1,0

15.4 ^CEND–Call End Indication

15.4.1 Command Syntax

URC

Possible Response(s)

```
<CR><LF>^CEND:  
<call_x>,<duration>,<end_status>[,<cc_cause>]<CR><LF>
```

15.4.2 Interface Description

After a call is terminated, the MT reports this indication to the TE to notify the TE of the call end cause and the call duration.

15.4.3 Parameter Description

<call_x>: call ID; integer type with a product-specific value range.

<duration>: call duration in the unit of second.

<end_status>: call end cause.

<end_status>	Comments
0	The board is in offline mode.
21	The board is out of service.
22	The call is ended normally.
23	The call is interrupted by the BS.
24	A BS record is received during the call.
25	The BS releases the call.
26	The BS rejects the current SO service.
27	A call from the BS is received.
28	A ringing stop signaling is received during the call.
29	The call is ended normally at the client.
30	The activation is ended during the OTASP call.
31	The MC stops initiating the call or stops the call.
34	The RUIM does not exist.
99	The network directed system selection (NDSS) fails.
100	The call is released from the bottom layer, and cc_cause must be queried.
101	The network fails to respond.
102	The MT rejects an incoming call.
103	The call is rejected during setup.
104	The call is released from the network, and cc_cause must be queried.

<end_status>	Comments
105	The fund runs out.
106	The MT is out of service.

<cc_cause>: call control information

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

58	BEARER_CAPABILITY_NOT_PRESENTLY_AVAILABLE
63	SERVICE_OR_OPTION_NOT_AVAILABLE
65	BEARER_SERVICE_NOT_IMPLEMENTED
68	ACM_GEQ_ACMMAX
69	REQUESTED_FACILITY_NOT_IMPLEMENTED
70	ONLY_RESTRICTED_DIGITAL_INFO_BC_AVAILABLE
79	SERVICE_OR_OPTION_NOT_IMPLEMENTED
81	INVALID_TRANSACTION_ID_VALUE
87	USER_NOT_MEMBER_OF_CUG
88	INCOMPATIBLE_DESTINATION
91	INVALID_TRANSIT_NETWORK_SELECTION
95	SEMANTICALLY_INCORRECT_MESSAGE
96	INVALID_MANDATORY_INFORMATION
97	MESSAGE_TYPE_NON_EXISTENT
98	MESSAGE_TYPE_NOT_COMPATIBLE_WITH_PROT_STATE
99	IE_NON_EXISTENT_OR_NOT_IMPLEMENTED
100	CONDITIONAL_IE_ERROR
101	MESSAGE_NOT_COMPATIBLE_WITH_PROTOCOL_STATE
102	RECOVERY_ON_TIMER_EXPIRY
111	PROTOCOL_ERROR_UNSPECIFIED
127	INTERWORKING_UNSPECIFIED
160	REJ_UNSPECIFIED
161	AS_REJ_RR_REL_IND
162	AS_REJ_RR_RANDOM_ACCESS_FAILURE
163	AS_REJ_RRC_REL_IND
164	AS_REJ_RRC_CLOSE_SESSION_IND
165	AS_REJ_RRC_OPEN_SESSION_FAILURE
166	AS_REJ_LOW_LEVEL_FAIL
167	AS_REJ_LOW_LEVEL_FAIL_REDIAL_NOT_ALLOWED
168	MM_REJ_INVALID_SIM
169	MM_REJ_NO_SERVICE
170	MM_REJ_TIMER_T3230_EXP
171	MM_REJ_NO_CELL_AVAILABLE

172	MM_REJ_WRONG_STATE
173	MM_REJ_ACCESS_CLASS_BLOCKED
174	ABORT_MSG_RECEIVED
175	OTHER_CAUSE
176	CNM_REJ_TIMER_T303_EXP
177	CNM_REJ_NO_RESOURCES
178	CNM_MM_REL_PENDING
179	CNM_INVALID_USER_DATA


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.

15.4.4 Property Description

Saving upon Power-off	PIN
NA	NA

15.4.5 Example

The user disconnect the voice call normally:

Response: ^CEND: 1,2,29,16

Normally clear the voice call

15.5 AT^EMERGCFG-Set Emergency Call Parameters

15.5.1 Command Syntax

```
AT^EMERGCFG=<parameter_id>,<value>
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT^EMERGCFG?
```

Possible Response(s)

```
<CR><LF>^EMERGCFG: <parameter_id>,<value>[<CR><LF>^EMERGCFG:
<parameter_id>,<value>[...]]<CR><LF><CR><LF>OK<CR><LF>
```

AT^EMERGCFG=?

Possible Response(s)

<CR><LF>^EMERGCFG: (<parameter_id>, (list of supported
<value>s)) [<CR><LF>^EMERGCFG: (<parameter_id>, (list of supported
<value>s)) [...]]<CR><LF><CR><LF>OK<CR><LF>

15.5.2 Interface Description

This command sets emergency call parameters. The settings take effect immediately.

15.5.3 Parameter Description

<parameter_id>: parameter ID

0 Set whether emergency calling has impacts on the use of GNSS.

<value>: parameter value

0 Indicates emergency calling has impacts on the use of GNSS.

1 Indicates emergency calling has no impacts on the use of GNSS.

NOTE

The aforementioned impacts include but are not limited to:

- GPS unavailability during emergency calls
- Positioning exceptions caused by initiation of emergency calls

15.5.4 Property Description

Saving upon Power-off	PIN
Y	N

15.5.5 Example

- To set emergency calling not to affect GNSS:

Run: AT^EMERGCFG=0,1

Response: OK

- To query the parameter's range:

Run: AT^EMERGCFG=?

Response: ^EMERGCFG: 0, (0-1)

OK

16 Huawei Proprietary Interface: Audio Commands

16.1 AT^CPCM-Configure PCM Audio

16.1.1 Command Syntax

AT^CPCM=<mode>,<format>,<clock>,<frame>,<offset>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^CPCM?
Possible Response(s)
<CR><LF>^CPCM: <mode>,<format>,<clock>,<frame>,<offset><CR><LF><CR><LF>OK<CR><LF>
AT^CPCM=?
Possible Response(s)
<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>

16.1.2 Interface Description

This command is used to configure the PCM audio before a voice call. Module updating will reset the value to default value.

The read command returns the current value of
<mode>, <format>, <clock>, <frame> and <offset>.

The test command returns the list of <mode>, <format>, <clock>, <frame> and
<offset>.

16.1.3 Parameter Description

<mode>: PCM working mode

- | | |
|---|---|
| 0 | MASTER_PRIM mode. In this mode, the CLK and SYN signal clocks are generated by the module. The CLK signal clock is 2.048 MHz, and the SYN signal clock is 8 kHz. The frame format is short frame (default value). |
| 1 | MASTER_AUX mode. In this mode, the CLK and SYN signal clocks are generated by the module. The CLK signal clock is 128 MHz, and the SYN signal clock is 8 kHz. The frame format is long frame (not supported currently). |
| 2 | SLAVE mode. In this mode, the CLK and SYN signal clocks are generated by the external CODEC chip (not supported currently). |

<format>: data format

- | | |
|---|---------------------------------|
| 0 | linear (default value) |
| 1 | u-law (not supported currently) |
| 2 | A-law (not supported currently) |

<clock>: clock signal

- | | |
|---|-------------------------------------|
| 0 | 2.048 MHz (default value) |
| 1 | 1.024 MHz (not supported currently) |
| 2 | 512 kHz (not supported currently) |
| 3 | 256 kHz (not supported currently) |
| 4 | 4.096 MHz |

<frame>: the SYN frame format setting

- | | |
|---|--------------------------------------|
| 0 | Short frame (default value) |
| 1 | Long frame (not supported currently) |

<offset>: offset setting

- | | |
|---|---|
| 0 | Offset cleared (default value): the sync launched is aligned to the rising edge of the PCM CLK. |
| 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 (not supported currently). |

- 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 (not supported currently).

16.1.4 Property Description

Saving upon Power-off	PIN
Y	N

16.1.5 Example

- Set the PCM configuration:
Run: AT^CPCM=0,0,0,0,0
Response: OK
- Query PCM configuration:
Run: AT^CPCM?
Response: ^CPCM: 0,0,0,0,0

OK

16.2 AT^ECHO-Switch Echo Canceller Mode

16.2.1 Command Syntax

AT^ECHO=<n>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^ECHO?
Possible Response(s)
<CR><LF>^ECHO: <n><CR><LF><CR><LF>OK<CR><LF>
AT^ECHO=?
Possible Response(s)
<CR><LF>^ECHO: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

16.2.2 Interface Description

This command switches the echo canceller mode before a voice call. Module updating will reset the value to default value.

The read command queries the current echo canceller mode.

The test command returns the supported echo canceller modes.

16.2.3 Parameter Description

<n>:

0	Close the echo canceller.
1	Handset mode, mild echo, short delay
2	Headset mode, moderate echo, short delay
3	Carkit mode, loud echo, long delay
4	Speakerphone mode, loud echo, long delay (default value)
5	Bluetooth headset mode, there is a lot of delay in the Bluetooth air interface, and it definitely cannot be used for non-Bluetooth modes.

16.2.4 Property Description

Saving upon Power-off	PIN
Y	N

16.2.5 Example

Close the echo canceller:

Run: AT^ECHO=0

Response: OK

16.3 AT^SMUT-Mute Speaker

16.3.1 Command Syntax

AT^SMUT=<n>

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^SMUT?
Possible Response(s)
<CR><LF>^SMUT: <n><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^SMUT=?
Possible Response(s)
<CR><LF>^SMUT: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

16.3.2 Interface Description

This command is used to enable or disable the speaker mute function during a voice call.

The read command returns the current value of the speaker mute status.

The test command returns the supported value of the speaker mute setting.

The mute state is switched off when the call is over.

16.3.3 Parameter Description

<n>: mute switch.

0	Mute off (default value)
1	Mute on

16.3.4 Property Description

Saving upon Power-off	PIN
N	N

16.3.5 Example

Mute off:

Run: AT^SMUT=0

Response: OK

16.4 AT^AUDLFC-Control the Low Frequency of Audio

16.4.1 Command Syntax

AT^AUDLFC=<n>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^AUDLFC?
Possible Response(s)
<CR><LF>^AUDLFC: <n><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^AUDLFC=?
Possible Response(s)
<CR><LF>^AUDLFC: (list of supported <n>s) <CR><LF><CR><LF>OK<CR><LF>

16.4.2 Interface Description

This command is used to enable or disable the low frequency of audio. The low frequency of audio is 50 Hz to 300 Hz in this product.

The read command returns the current status of the low frequency.

The test command returns the supported status of the low frequency setting.

The new configuration will be available when the module restarts next time.

16.4.3 Parameter Description

<n>: enable or disable audio low frequency.

- | | |
|---|---|
| 0 | Disable the low frequency of audio. (default value) |
| 1 | Enable the low frequency of audio. |

16.4.4 Property Description

Saving upon Power-off	PIN
Y	N



16.4.5 Example

Run: AT^AUDLFC=0

Response: OK

17

Huawei Proprietary Interface: FOTA Interface

17.1 AT^FOTAMODE-Set Operation Mode

17.1.1 Command Syntax

```
AT^FOTAMODE=<detect_mode>,<download_mode>,<update_mode>,<en_resume>[,<period>]
```

Possible Response(s)

```
<CR><LF>OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

```
AT^FOTAMODE?
```

Possible Response(s)

```
<CR><LF>^FOTAMODE:
<detect_mode>,<download_mode>,<update_mode>,<en_resume>[,<period>]<CR><LF><CR><LF>OK<CR><LF>
```

```
AT^FOTAMODE=?
```

Possible Response(s)

```
<CR><LF>^FOTAMODE: (list of supported <detect_mode>s), (list of supported
<download_mode>s), (list of supported <update_mode>s), (list of supported
<en_resume>s), (list of supported
<period>s)<CR><LF><CR><LF>OK<CR><LF>
```

17.1.2 Interface Description

The set command is used to set the modes (manual or automatic) for version detection, download, and update, enable or disable resumable data transfer, and specify the interval between version detections.

The read command is used to query the modes of version detection, download, and update, status of resumable data transfer, and interval between version detections.

The test command is used to return the supported parameter ranges.

17.1.3 Parameter Description

`<detect_mode>`: specifies the version detection mode. The default value is 1.
Available values are:

- | | |
|---|--|
| 0 | Manual detection. In this mode, the user manually checks whether a new version is available for the module. |
| 1 | Automatic detection. In this mode, the module checks whether a new version is available after the specified interval ends. |

`<download_mode>`: specifies the version download mode. The default value is 0.
Available values are:

- | | |
|---|--|
| 0 | Manual download. In this mode, the module starts to download the detected new version only after the user confirms the download operation. |
| 1 | Automatic download. In this mode, the module starts the download process upon detection of a new version. |

`<update_mode>`: specifies the update mode. The default value is 0. Available values are:

- | | |
|---|--|
| 0 | Manual update. In this mode, the module starts the update only after the user confirms the update operation. |
| 1 | Automatic update. In this mode, the module starts the update once the download is complete. |

`<en_resume>`: enables or disables resumable data transfer is supported. The default value is 1.

- | | |
|---|-----------------------------------|
| 0 | Disables resumable data transfer. |
| 1 | Enables resumable data transfer. |

`<period>`: integer; specifies the interval between version detections. Value unit: day. The value range is 1 to 65535. This parameter is available only when `<detect_mode>` is 1. The default value is 7. If `<detect_mode>` is 1, `<period>` must be specified.

**NOTE**

- When <detect_mode> is set to 1, the module will check for a new version when the time specified by <period> times out, regardless of whether the module is awake.
- There are two timing methods for <period>: local timing and network timing. If the module is able to obtain the network time, network timing will be used; otherwise, the local timing will be used. Yet there may be time errors when local timing is used.

17.1.4 Property Description

Saving upon Power-off	PIN
Y	N

17.1.5 Example

```
Run:          AT^FOTAMODE=1,0,1,1,22
Response:     OK

Run:          AT^FOTAMODE?
Response:     ^FOTAMODE: 1,0,1,1,22

                OK

Run:          AT^FOTAMODE=?
Response:     ^FOTAMODE: (0-1),(0-1),(0-1),(0-1),(1-65535)

                OK

Run:          AT^FOTAMODE=0,0,1,1
Response:     OK

Run:          AT^FOTAMODE?
Response:     ^FOTAMODE: 0,0,1,1,7

                OK

Run:          AT^FOTAMODE=0,0,1,1,22
Response:     ERROR
```

17.2 AT^FOTACFG-Set FOTA Connection Parameters

17.2.1 Command Syntax

AT^FOTACFG=<APN>,<username>,<password>,<auth_type>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^FOTACFG?
Possible Response(s)
<CR><LF>^FOTACFG: <APN>,<username>,<password>,<auth_type><CR><LF><CR><LF>OK<CR><LF>

17.2.2 Interface Description

This command is used to set the access point name (APN), user name, password, and authentication mode for dial-up connections.

17.2.3 Parameter Description

<APN>: specifies the APN. Its value is a string with double quotation marks, consisting of a maximum of 99 bytes. It can be omitted.

<username>: specifies the user name. Its value is a string with double quotation marks, consisting of a maximum of 31 bytes. This parameter can be omitted, but only when <password> is also omitted.

<password>: specifies the password. Its value is a string with double quotation marks, consisting of a maximum of 31 bytes. This parameter can be omitted, but only when <username> is also omitted.

<auth_type>: indicates the authentication mode. The default mode is Challenge Handshake Authentication Protocol (CHAP). This parameter is not supported when 3GPP2 is used. The authentication mode is determined based on the negotiation between the module and network. Available values are:

- | | |
|---|--|
| 0 | No authentication |
| 1 | Password Authentication Protocol (PAP) |
| 2 | CHAP |

17.2.4 Property Description

Saving upon Power-off	PIN
Y	N

17.2.5 Example

When the module is not detecting or downloading a new version or being updated, run `AT^FOTACFG` to set the APN, user name, password, and authentication mode for dial-up connections.

Run: `AT^FOTACFG="1234","12","12",1`

Response: OK

Run: `AT^FOTACFG?`

Response: `^FOTACFG: "1234","12","12",1`

OK

17.3 AT^FOTADET-Manually Detect a New Version

17.3.1 Command Syntax

`AT^FOTADET`

Possible Response(s)

`<CR><LF>OK<CR><LF>`

In case of an MT-related error:

`<CR><LF>+CME ERROR: <err><CR><LF>`

17.3.2 Interface Description

This command is used to detect a new version available for the module.



NOTE

In order to protect the FOTA server, if `AT^FOTADET` is repeatedly executed within three hours, only the version information detected for the first time is returned.

17.3.3 Parameter Description

None

17.3.4 Property Description

Saving upon Power-off	PIN
NA	Y

17.3.5 Example

When the module is not detecting or downloading a new version or being updated, run `AT^FOTADET` to initiate a new version detection.

Each detection attempt consumes 1 KB to 3 KB traffic.

- If the command is executed successfully, the following is returned:

Run: `AT^FOTADET`

Response: `OK`

- If the module detects a new version, the following is returned:

Response: `^FOTASTATE: 12,12.815.00.01.00,86763,"feature1: add fota future;feature2: repair some bugs of sms"`

- If the module detects no new version, the following is returned:

Response: `^FOTASTATE: 14`

- If the command fails to be executed because the module is processing other service or the Firmware Over-the-Air (FOTA) status is incorrect, the following is returned:

Run: `AT^FOTADET`

Response: `+CME ERROR: <err>`

- If the command fails to be executed because of failure to set up a network connection or connection to the server, the following is returned:

Response: `^FOTASTATE: 13,18`

17.4 AT^FOTADL-Manually Download a New Version

17.4.1 Command Syntax

`AT^FOTADL=<n>`

Possible Response(s)

`<CR><LF>OK<CR><LF>`

In case of an MT-related error:

`<CR><LF>+CME ERROR: <err><CR><LF>`

AT^FOTADL=?

Possible Response(s)

<CR><LF>^FOTADL: (list of supported
<n>s) <CR><LF><CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

17.4.2 Interface Description

The set command is used to start or stop a version download.

The test command is used to query the control mode available for version downloads.

17.4.3 Parameter Description

<n>: specifies the control mode for version downloads. Available values are:

- | | |
|---|--|
| 0 | Cancels a download, deletes the downloaded file, and restores the FOTA status to idle state. |
| 1 | Starts a download or resumes data transfer. |
| 2 | Runs this command to download Pause manually. |

17.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

17.4.5 Example

When the module is downloading a new version, run AT^FOTADL=0 to stop the download.

If no download or update is undergoing on the module, and the module has detected a new version available, run AT^FOTADL=1 to download the new version.

Run: AT^FOTADL=?

Response: ^FOTADL: (0-2)

OK

Run: AT^FOTADL=1

Response: OK

^FOTASTATE: 30

^FOTASTATE: 40

17.5 AT^FWUP—Start a FOTA Update

17.5.1 Command Syntax

AT^FWUP
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>

17.5.2 Interface Description

This command is used to start a firmware FOTA update.

17.5.3 Property Description

Saving upon Power-off	PIN
NA	N

17.5.4 Example

- If a new version has been downloaded to the module, run AT^FWUP to start the update. The module then reports an OK message and starts the update.

Run: AT^FWUP

Response: OK

^FOTASTATE: 50

- If the update succeeds:

Response: ^FOTASTATE: 90

- If the update fails:
Response: ^FOTASTATE: 80,155

17.6 AT^FOTASTATE-Report the FOTA Status

17.6.1 Command Syntax

AT^FOTASTATE?
Possible Response(s)
<CR><LF>^FOTASTATE: <status><CR><LF><CR><LF>OK<CR><LF>
URC
Possible Response(s)
If <status> is 12:
<CR><LF>^FOTASTATE:
<status>,<version>,<packet_size>,<description><CR><LF>
In other cases:
<CR><LF>^FOTASTATE: <state>[,<error_code>]<CR><LF>

17.6.2 Interface Description

During an update, the module reports the current update state after AT^FOTASTATE is executed.

17.6.3 Parameter Description

<status>: indicates the current status. Its value is an integer. Available values are:

10	Idle
11	Querying
12	New version found
13	New version query failed
14	No version found
20	Download failed
30	Download progressing
31	Download Pending. This value indicates that the module has a download task that is not yet complete after the module restarts. If resumable data transfer has been enabled, the module resumes the download

40	Download Complete
50	Ready to update
60	Update Progressing
80	Update failed
90	Update successful

<version>: indicates the software version number. Its value is a string containing a maximum of 31 characters, which exclude 0<CR> or OK<CR>.

<description>: indicates the software description. Its value is a string with a valid character in English and a maximum of five entries. The entries are separated by semicolon, and each contains 255 characters or less.

<packet_size>: indicates the number of bytes in the update package.

Valid values of **<version>**, **<description>**, and **<packet_size>** are unsolicitedly reported when **<status>** is 12. If **<status>** is not 12, empty values are returned.

<error_code>: indicates the reason for a version query failure. Its value is an integer. This parameter is available only when **<status>** is 13, 20, or 80.

<err> code	Description
01	Operation failed due to unknown error
02	Previous command is not complete
03	Error command parameters
04	Operation not supported
05	Operation failed due to system error
11	The network has not been opened yet
12	The network has been opened already
13	Fail to open network
14	The link has not been established yet
15	The link has been established already
16	Fail to establish link
17	Fail to bind the specified port
18	Fail to connect to the specified address
19	Invalid domain name
20	Fail to resolve DNS
21	Http server error
22	File type is not correct

<err> code	Description
23	File source is not correct
51	Fail to get filelist file
52	MD5 check failed
54	FOTA is in collision state
101	Fail to send data because TE cancel
102	Fail to send data because retry times are bigger than 10
103	Fail to send data because input file size is error
104	Fail to send data because packet number is error
105	Fail to send data because the protocol is not 1K-Xmodem
106	Fail to send data because invalid port
107	Fail to send data because file CRC or subfile CRC is error
108	Fail to send data because update type is error
109	Fail to send data because model product is error
110	Fail to send data because source version is error
111	Fail to send data because some tag length is error
112	Fail to send data because file num error
113	Fail to send data because open subfile failed
114	Fail to send data because write subfile to flash error
151	Fail to write flag
152	Fail to read flag
153	Fail to erase region
154	Fail to copy osbl
155	Fail to replace image
156	Fail to copy xnv
157	Fail to write xnv
158	Fail to backup nv
159	Fail to restore nv

17.6.4 Property Description

Saving upon Power-off	PIN
Y	N

17.6.5 Example

During an update, the module unsolicitedly reports the current update state whenever the status changes.

The module will not report <status> as 11 if the following conditions are met:

The module is forced to sleep.

The interval between version detections times out.

- If the download succeeds:

Run: AT^FOTADL=1

Response: OK

^FOTASTATE: 30

^FOTASTATE: 40

- If the download fails:

Run: AT^FOTADL=1

Response: OK

^FOTASTATE: 30

^FOTASTATE: 20,18

Run: AT^FOTASTATE?

Response: ^FOTASTATE: 10

OK

17.7 AT^FOTADLQ-Query Download Status of Update Files

17.7.1 Command Syntax

AT^FOTADLQ

Possible Response(s)

```
[<CR><LF>^FOTADLQ:
<index>,<file_name>,<dl_size>,<file_size>[<CR><LF>^FOTADLQ:
<index>,<file_name>,<dl_size>,<file_size>[...]]<CR><LF>]<CR><LF>
OK<CR><LF>
```

In case of an MT-related error:

```
<CR><LF>+CME ERROR: <err><CR><LF>
```

17.7.2 Interface Description

Run AT^FOTADLQ to query the download progress of update files.

17.7.3 Parameter Description

<index>: indicates the file sequence number. Its value ranges from 1 to 10.

<file_type>: indicates the file type. Its value is a string with double quotation marks.

"FIRMWARE1" Firmware differential file.

<dl_size>: indicates the number of downloaded bytes. Its value is an integer.

<file_size>: indicates the number of total bytes. Its value is an integer.

17.7.4 Property Description

Saving upon Power-off	PIN
NA	Y

17.7.5 Example

During an update (when <status> is 30 or 31), run AT^FOTADLQ to query the list of update files to download, the size of downloaded files, and the total size of update files to download.

Run: AT^FOTADLQ

Response: ^FOTADLQ: 1, "FIRMWARE1", 0, 255638

OK

17.8 AT^FWLOAD-Perform a Local Upgrade

17.8.1 Command Syntax

AT^FWLOAD=<update_type>

Possible Response(s)

<CR><LF>OK<CR><LF><CR><LF><CR><LF>(1K-Xmodem ctrl
character)<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

17.8.2 Interface Description

This command is used to specify the upgrade type, transmit the upgrade file into the module using 1K-Xmodem, and start the upgrade. The following table lists the ports supported by the full and differential upgrades.

Upgrade type	UART port	MODEM port	PCUI port
Full upgrade	√	√	√
Differential upgrade	√	√	√

You can run AT+IPR? to query the baud rates supported by the current module. To set the baud rates for a module, run the AT+IPR set command. When you do so, refer to the following baud rates supported by the full and differential upgrades.

If you use PCUI port to start local upgrade, ignore the baud rates setting.

During the upgrade, please use the baud rate when the AT^FWLOAD command is executed to start the upgrade.



NOTE

During a local update, if module restarts, the Host needs re-open the port to receive the data sent by the module. Meanwhile, in order to avoid some adverse impact, other ports cannot perform other operations, and the Host send AT in normal working state through PCUI port, please transmit data through PCUI in upgrading mode again. And it's same to UART. Despite this, if you choose UART port, select the same baud rate between normal working state and upgrading state.

17.8.3 Parameter Description

<update_type>: an integer, specifying the upgrade type.

- | | |
|---|----------------------|
| 0 | Full upgrade |
| 1 | Differential upgrade |

The 1K-Xmodem protocol is used to transmit update files.

17.8.4 Property Description

Saving upon Power-off	PIN
NA	NA

17.8.5 Example

- Local Differential upgrade:

Run: AT^FWLOAD=1

Response: OK

(The board restarts, and the upgrade starts.)

>

C

The board restarts, and the upgrade starts.

Response: ^FWLSTATE: 90

- Local full upgrade:

Run: AT^FWLOAD=0

Response: OK

(The board restarts, and the upgrade starts.)

>

C

The board restarts, and the upgrade starts.

Response: ^FWLSTATE: 90

**NOTE**

When the host sends "AT^FWLOAD=0" or "AT^FWLOAD=1" through PCUI port, the module will restart, then close it. After the module enumerates PCUI port, please re-open the PCUI port and wait for the '>' and 'C' report and start to transmit data. If the data is transmitted on the way, please do not cancel until transmitting completely, please close the PCUI port, and wait for PCUI port is enumerated, then re-open it, you will receive response "^FWLSTATE: 90".

17.9 ^FWLSTATE-Report the Upgrade Status

17.9.1 Command Syntax

URC

Possible Response(s)

<CR><LF>^FWLSTATE: <state>[, <error_code>]<CR><LF>

17.9.2 Interface Description

During an update, the board reports the current update status after ^FWLSTATE is executed.

17.9.3 Parameter Description

<state>: an integer, specifying the current upgrade status.

80 Update failed

90 Update succeeded

<error_code>: an integer, specifying the cause of the upgrade failure.

17.9.4 Property Description

Saving upon Power-off	PIN
NA	NA

17.9.5 Example

- Local full upgrade

Run: AT^FWLOAD=0

Response: OK

(The board restarts, and the upgrade starts.)

>

C

- The board restarts, and the upgrade starts.

Response: ^FWLSTATE: 90

17.10 ^FOTASMS–Unsolicitedly Reporting After Receiving a FOTA Message

17.10.1 Command Syntax

URC
Possible Response(s)
<CR><LF>^FOTASMS<CR><LF>

17.10.2 Interface Description

This command is used by the FOTA module to report to the host computer to decide whether to perform an update after receiving a forcible update request from the modem.

NOTE

- When the module receives a message querying SN, SN will be automatically returned to the sender, without reported and noticed to the host.
- When the module receives a message requesting upgrade, ^FOTASMS will be unsolicitedly reported once every 4s. If the host does not run AT^FOTAP to confirm or refuse the upgrade within 10s, FOTA will automatically initiate the upgrade.

17.10.3 Parameter Description

None

17.10.4 Property Description

Saving upon Power-off	PIN
NA	NA

17.10.5 Example

None

17.11 AT^FOTASMSCFG–SMS Automatic Download Enable or Disable

17.11.1 Command Syntax

AT^FOTASMSCFG=<operation>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^FOTASMSCFG?
Possible Response(s)
<CR><LF>^FOTASMSCFG: <operation><CR><LF><CR><LF>OK<CR><LF>
AT^FOTASMSCFG=?
Possible Response(s)
<CR><LF>^FOTASMSCFG: (list of supported <operation>s) <CR><LF><CR><LF>OK<CR><LF>

17.11.2 Interface Description

This command is used to control the FOTA SMS automatic download to enable or disable.

17.11.3 Parameter Description

<operation>: integer type value

- | | |
|---|---|
| 0 | Disable FOTA SMS download automatically. |
| 1 | Enable FOTA SMS download automatically. (default value) |

17.11.4 Property Description

Saving upon Power-off	PIN
NA	NA

17.11.5 Example

```
Run:          AT^FOTASMSCFG=1
Response:     OK

Run:          AT^FOTASMSCFG?
Response:     ^FOTASMSCFG: 1

                OK

Run:          AT^FOTASMSCFG=?
Response:     ^FOTASMSCFG: (0-1)

                OK
```

17.12 AT^FOTAP-Confirm FOTA Upgrade

17.12.1 Command Syntax

AT^FOTAP=<n>
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>
AT^FOTAP?
Possible Response(s)
<CR><LF>^FOTAP: <n><CR><LF><CR><LF>OK<CR><LF>
AT^FOTAP=?
Possible Response(s)
<CR><LF>^FOTAP: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error:
<CR><LF>+CME ERROR: <err><CR><LF>



17.12.2 Interface Description

Once FOTA SMS notification comes, users can confirm the FOTA upgrade using this command. If users do not give any confirmation by default, it will go for force upgrade.

17.12.3 Parameter Description

<n>:

- 0 Do not do FOTA upgrade.
- 1 Go for FOTA upgrade.

17.12.4 Property Description

Saving upon Power-off	PIN
N	Y

17.12.5 Example

```
Response: ^FOTASMS
Run: AT^FOTAP=1
Response: OK

^FOTASTATE: 11
Run: AT^FOTAP?
Response: ^FOTAP: 1

OK
```

18 Huawei Proprietary Interface: CMUX Interface

18.1 AT+CMUX-Enable CMUX Function

18.1.1 Command Syntax

AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]]

Possible Response(s)

<CR><LF>OK<CR><LF>

In case of an MT-related error:

<CR><LF>+CME ERROR: <err><CR><LF>

AT+CMUX?

Possible Response(s)

<CR><LF>+CMUX: values set for
<mode>,<subset>,<port_speed>,<N1>,<T1>,<N2>,<T2>,<T3>,<k><CR>
><LF><CR><LF>OK<CR><LF>

AT+CMUX=?

Possible Response(s)

<CR><LF>+CMUX: (list of supported
<mode>,<subset>,<port_speed>,<N1>,<T1>,<N2>,<T2>,<T3>,<k>) <C
R><LF><CR><LF>OK<CR><LF>

18.1.2 Interface Description

The CMUX mode is enabled by using AT+CMUX command over the serial interface.

This command enables the multiplexing protocol control channel as defined in GSM07.10. If parameters are left out the default values are used. If no auto-bauding is

supported, a customer related interface speed is pre-selected. The final response code OK or CME ERROR: <ERROR> is returned using the old interface speed; the parameters become active only after sending OK.

18.1.3 Parameter Description

<mode>: multiplexer transparency mechanism. Currently only basic mode is supported, hence this value always remains 0.

- | | |
|---|---|
| 0 | Basic option (default value) |
| 1 | Advanced option (not supported currently) |
| 2 | SLAVE mode. In this mode, the CLK and SYN signal clocks are generated by the external CODEC chip (not supported currently). |

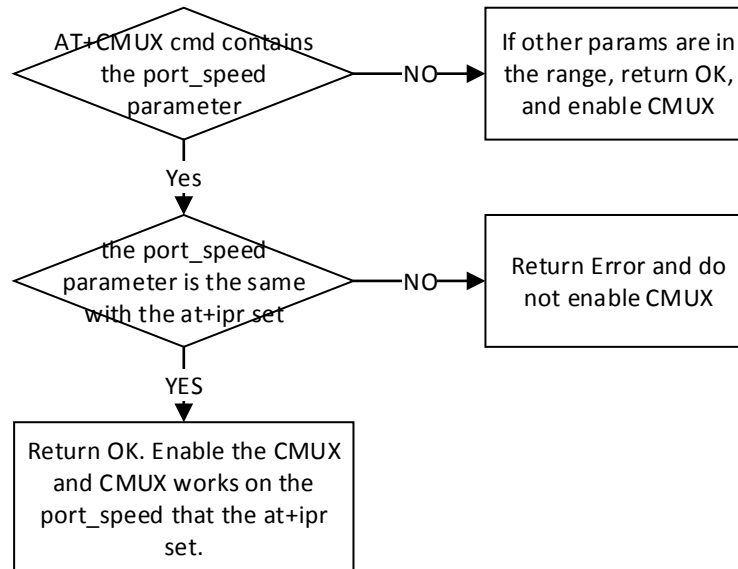
<subset>: settings to set up multiplexer control channel. Subsequent virtual channels shall be set up according to control channel <subset> settings if not defined. Currently only UIH is supported, hence this value always remains 0.

- | | |
|---|--|
| 0 | UIH frames used only (default value) |
| 1 | UI frames used only; value currently not supported |
| 2 | I frames used only; value currently not supported |

<port_speed>: transmission rate

- | | |
|----|-------------------------------|
| 1 | 9 600 bit/s |
| 2 | 19 200 bit/s |
| 3 | 38 400 bit/s |
| 4 | 57 600 bit/s |
| 5 | 115 200 bit/s (default value) |
| 6 | 230 400 bit/s |
| 7 | 460 800 bit/s |
| 8 | 921 600 bit/s |
| 9 | 1 000 000 bit/s |
| 10 | 1 500 000 bit/s |
| 11 | 2 500 000 bit/s |
| 12 | 3 000 000 bit/s |
| 13 | 3 500 000 bit/s |
| 14 | 4 000 000 bit/s |

The following flow chat shows that how the AT+CMUX checks the <port_speed>.



<N1>: maximum frame size. The value ranges from 31 to 1540. The default value is 31.

<T1>: acknowledgement timer in ten milliseconds units. The value ranges from 10 to 255. The default value is 10 (100 ms).

<N2>: maximum number of re-transmissions. The value ranges from 0 to 10. The default value is 3. Currently only the range with 0–5 is supported

<T2>: response timer for the multiplexer control channel in ten milliseconds units. The value ranges from 10 to 250. The default value is 90 (900 ms). T2 must be larger than T1.

NOTE

N2 and T2 only take effects for the commands FCON and FCOFF on the UE side. Otherwise do not take effect.

<T3>: integer type (wake up response timer in seconds). The value ranges from 1 to 255. The default value is 10.

<k>: integer type (window size, for Advanced operation with Error Recovery options). The value ranges from 1 to 7. The default value is 2.

NOTE

The parameters T3 and K have not been used in the CMUX, the value of T3 and K do not mean anything. So when checking the parameters T3 and K, just make sure that T3 and K are in the valid range.

18.1.4 Property Description

Saving upon Power-off	PIN
N	N

18.1.5 Example

- Set the CMUX configuration:

Run: AT+CMUX=0,0,5,31,10,3,90,10,2

Response: OK

- Query CMUX configuration:

Run: AT+CMUX?

Response: +CMUX: 0,0,5,31,10,3,90,10,2

OK

- Query CMUX parameters range

Run: AT+CMUX=?

Response: +CMUX:
(0),(0),(1-14),(31-1540),(10-250),(0-10),(10-250),
(1-255),(1-7)

OK

19 Appendix

19.1 List of URC Commands

**NOTE**

URC commands listed in the following table are provided only for your reference. Some URC commands may be not supported by the module.

URC	Function
+CLIP	CLIP notifications
+CCWA	Call waiting notifications
+CRING	Indicate incoming call
+CSSI	Supplementary service notifications
+CSSU	Supplementary service notifications
+CUSD	Unsolicitedly report USSD of network
+CMTI	New SMS-DELIVER indication
+CMT	New message directly deliver indication
+CDSI	New SMS status report indication
+CDS	SMS status report indication directly displayed
+CUSATP	Unsolicitedly report a UICC proactive command
+CUSATEND	Unsolicitedly report of terminating a UICC proactive command session
^ORIG	Indicate the origination of a call
^CONF	Ringback tone indication
^CONN	Call connection indication
^CEND	Call end indication
^SMEMFULL	Message memory full
^IPSTATE	Indicate TCP/UDP data link state

URC	Function
^TIMESETRULT	Notify XTRA time injection
^DATASETRULT	Notify XTRA data injection
^XDSTATUS	Notify XTRA data status
^POSITION	Notify positioning result
^POSEND	Report positioning end information
^WNINV	Notify NI positioning
+CREG	Notify the current registration status
+CGREG	Notify PS Domain Registration Status
^RFSWITCH	Report the RFSWITCH State
+XADPCLKFREQINFO	Unsolicitedly Present of Adaptive Clock Frequency Info
^SIMST	SIM Card State Change Indication
^DSDORMANT	Dormant State Indication (CDMA only)
^HWNAT	Indicate Network Mode Change
^IPDATA	Notificate Arrival Data
^SRVST	Service State Change Indication
^THERM	Thermal Protection Activated Unsolicited Report
^HCSQ	Report system mode and Signal Strength
^HCMT	Report a New Short Message(CDMA only)
^HCDS	Report a New Status Report Short Message(CDMA only)
^HCMGSS	Report Successful Short Message Sending (text mode)(CDMA only)
^HCMGSF	Report Short Message Sending Failure(CDMA only)
^HCMGS	Unsolicitedly Present of Successfully Sending a Short Message (PDU mode)(CDMA only)
^SYSSTART	Unsolicitedly report module startup(Only for the HUAWEI specified client)
^NWTIME	Unsolicitedly report network system time(Only for the HUAWEI specified client)
^RSSI	RSSI or System Mode Change Indication (be replaced by the URC "^HCSQ")
^MODE	RSSI or System Mode Change Indication (be replaced by the URC "^HCSQ")
^RSSILVL	RSSI or System Mode Change Indication (be replaced by the URC "^HCSQ")

URC	Function
^HRSSILVL	RSSI or System Mode Change Indication (be replaced by the URC "^HCSQ")
^HDRRSSI	RSSI or System Mode Change Indication (be replaced by the URC "^HCSQ")
^CRSSI	RSSI or System Mode Change Indication (be replaced by the URC "^HCSQ")
+CEREG	Notify the current LTE registration status
^ANLEVEL	(Only for the HUAWEI specified client)
^WPDCP	(Only for the HUAWEI specified client)
^NDISEND	(Only for the HUAWEI specified client)
^OTACMSG	(Only for the HUAWEI specified client)
^NDISSTAT	Unsolicited Report of Connection Status
^LOCCHD	Unsolicited Report of Connection Status(Only for the HUAWEI specified client)
^DATAVALIDITY	(Only for the HUAWEI specified client)
^WPDDL	(Only for the HUAWEI specified client)
^BOOT	(Only for the HUAWEI specified client)
^STIN	(Only for the HUAWEI specified client)
^ECLSTAT	(Only for the HUAWEI specified client)
^CSNR	(Only for the HUAWEI specified client)
^SIMFILEREFFRESH	(Only for the HUAWEI specified client)
^WPDOP	(Only for the HUAWEI specified client)
^DSFLOWRPT	(Only for the HUAWEI specified client)
^ECCLIST	(Only for the HUAWEI specified client)
^ACTIVEBAND	(Only for the HUAWEI specified client)
+CTZV	Notify the time zone is changed
^EARST	(Only for the HUAWEI specified client)
+CBMI	New CBM indication
+CBM	New CBM directly deliver indication
^ERRRPT	Specified error code indication(Only for the HUAWEI specified client)
^WAKEUPIN	WAKEUP_IN PIN Input Change Indication
^THERMEX	Unsolicitedly Report Thermal Protection State Change

19.2 General CME Error List

The following describes the mapping between numeric mode and verbose mode.

Table 19-1 General "CME ERROR" Codes

Numeric mode	Verbose mode
0	phone failure
1	no connection to phone
2	phone adaptor link reserved
3	operation not allowed
4	operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
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 password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout

Numeric mode	Verbose mode
32	network not allowed - emergency calls only
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
46	corporate personalization PIN required
47	corporate personalization PUK required
48	hidden key required
49	EAP method not supported
50	Incorrect parameters
51	Parameter length error for all Auth commands
52	Temporary error for all auth cmds
100	unknown
103	Illegal Mem_Store
106	Illegal ME
107	GPRS services not allowed
111	PLMN not allowed
112	Location area not allowed
113	Roaming not allowed in this location area
132	service option not supported
133	requested service option not subscribed
134	service option temporarily out of order (#34)
148	unspecified GPRS error
149	PDP authentication failure
150	invalid mobile class
257	network rejected request
258	retry operation
259	invalid deflected to number
260	deflected to own number

Numeric mode	Verbose mode
261	unknown subscriber
262	service not available
263	unknown class
264	unknown network message
273	Minimum TFT per PDP address error
274	Duplicate TFT eval prec index
275	Invalid TFT param combination
323	Parameters error

Table 19-2 General "CME ERROR" Codes (Huawei proprietary)

Numeric mode	Verbose mode
65280	call index error
68281	call state error
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
65289	input value is out of range

Table 19-3 GPS related "CME ERROR" Codes (Huawei proprietary)

Numeric mode	Verbose mode
276	GPS function disabled
277	Standalone disabled
278	AGPS disabled
279	gpsOneXTRA disabled
280	Cell-ID disabled
281	Invalid parameter
282	Unable to delete parameters

Numeric mode	Verbose mode
283	PD session is ongoing
284	PD session is in off status
285	too many parameters
286	invalid server address
287	GPS locked
288	GPS type not supported
289	MGP receiver is ongoing

Table 19-4 FOTA related CME ERROR Codes (Huawei proprietary)

<err> code	String Text
1502	Operation failed due to unknown error
1503	Previous command is not complete
1504	Error command parameters
1505	Operation not supported
1512	The network has not been opened yet
1513	The network has been opened already
1514	Fail to open network
1515	The link has not been established yet
1517	Fail to establish link
1518	Fail to bind the specified port
1519	Fail to connect to the specified address
1520	Invalid domain name
1521	Fail to resolve DNS
1523	File type is not correct
1524	File source is not correct
1555	FOTA is in collision state
1602	Fail to send data because TE cancel
1603	Fail to send data because retry times are bigger than 10
1604	Fail to send data because file tag is error
1605	Fail to send data because packet number is error

<err> code	String Text
1606	Fail to send data because the protocol is not 1K-Xmodem
1607	Invalid port for fwload mode
1608	Fail to send data because file crc or subfile crc is error
1609	Fail to send data because update type is error
1610	Fail to send data because model product is error
1611	Fail to send data because source version is error
1612	Fail to send data because some tag length is error
1613	Fail to send data because file num error
1614	Fail to send data because open subfile failed
1615	Fail to send data because write subfile to flash error

19.3 CMS Error List

The following lists the <err> value of CMS ERROR that may be returned by all AT commands of short messages.

<err> values used by common messaging commands:

Numeric mode	Verbose mode
0–127	3GPP TS 24.011 clause E.2 values
128–255	3GPP TS 23.040 clause 9.2.3.22 values.
300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	(U)SIM not inserted
311	(U)SIM PIN required
312	PH-(U)SIM PIN required
313	(U)SIM failure
314	(U)SIM busy

Numeric mode	Verbose mode
315	(U)SIM wrong
316	(U)SIM PUK required
317	(U)SIM PIN2 required
318	(U)SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network timeout
340	no +CNMA acknowledgement expected
500	unknown error
...511	other values in range 256...511 are reserved
512...	manufacturer specific

19.4 Final Result Code

Final Result Code	No.	Description
OK	0	A command is executed, and there is no error.
CONNECT	1	A connection is established.
RING	2	An incoming call is originated.
NO CARRIER	3	A connection is terminated.
ERROR	4	There is a common error.
NO DIALTONE	6	There is no dialing tone.
BUSY	7	The peer is busy.
NO ANSWER	8	Timeout occurs when the connection is complete, and there is no reply.
+CME ERROR: <err>		The error type is specified by <err>.
+CMS ERROR: <err>		It is a short message-related error.
COMMAND NOT SUPPORT	numeric is not supported	The command is not supported.

Final Result Code	No.	Description
TOO MANY PARAMETERS	numeric is not supported	Too many parameters in the issued command

**NOTE**

The final result code is the termination flag of an AT command.

19.5 References

The following list is most of the references for this document.

- [1] 3GPP TS 23.038
- [2] 3GPP TS 23.040
- [3] 3GPP TS 23.041
- [4] 3GPP TS 24.008
- [5] 3GPP TS 25.331
- [6] 3GPP TS 27.005
- [7] 3GPP TS 27.007
- [8] 3GPP TS 44.060
- [9] ETSI TS 102.221
- [10] GSM 07.05
- [11] GSM 51.011

19.6 Acronyms and Abbreviations

Acronym or Abbreviation	Full spelling
3GPP	Third Generation Partnership Project
AT	ATtention
APN	Access Point Name
CS	Circuit Switched (CS) domain
DCE	Data Circuit-terminating Equipment
DCS	Data Coding Scheme
DTE	Data Terminal Equipment
EDGE	Enhanced Data Rate for GSM Evolution
eHRPD	Evolved High Rate Packet Date
EVDO	Evolution Data Optimization

Acronym or Abbreviation	Full spelling
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
IMEI	International Mobile Equipment Identity
IP	Internet Protocol
ITU-T	International Telecommunication Union-Telecommunication Standardization Sector
IWF	Interworking Function
ME	Mobile Equipment
MS	Mobile Station
MT	Mobile Terminal
NMEA	National Marine Electronics Association
PDP	Packet Data Protocol
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
RSSI	Receive Signal Strength Indicator
SCA	Service Center Address
SIM	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



Acronym or Abbreviation	Full spelling
USIM	Universal Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
VP	Validity Period
WCDMA	Wideband CDMA