HUAWEI ME909u-521 LTE LGA Module

AT Command Interface Specification

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About This Document

Revision History

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01	2013-07-17		Creation
02	2013-12-06	5.1	Updated section 5.1 AT+CGDCONT–Define PDP Context
		9.1	Updated Command Syntax of AT^NDISDUP
		12	Added chapter 12 Huawei Proprietary Interface: GPS Service Interfaces

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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 7 "SMS Service Interface (WCDMA)" describe AT interfaces defined in international standards such as 3GPP and ITU-T.

Chapter 8 "Huawei Proprietary Interface: Mobile Termination Control and Status Interface" to chapter 12 "Huawei Proprietary Interface: GPS Service Interfaces" 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

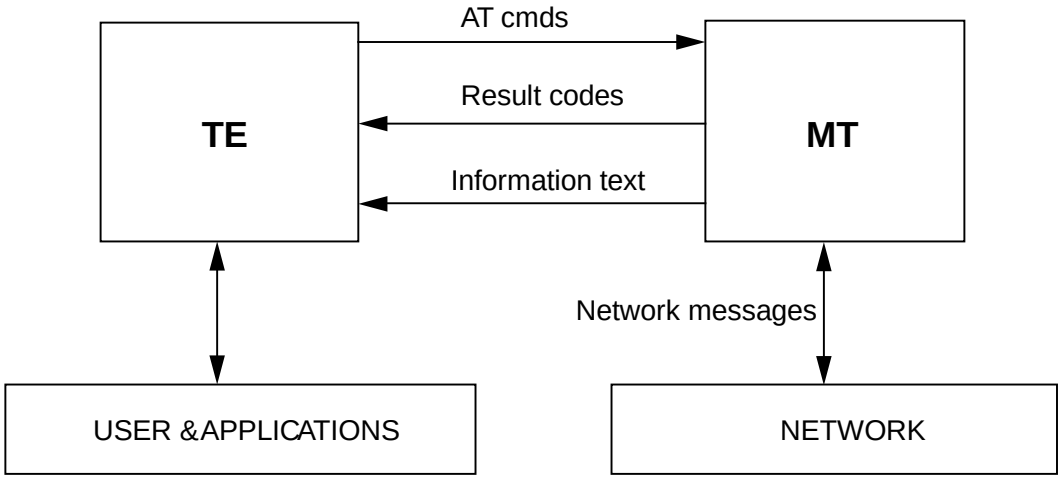
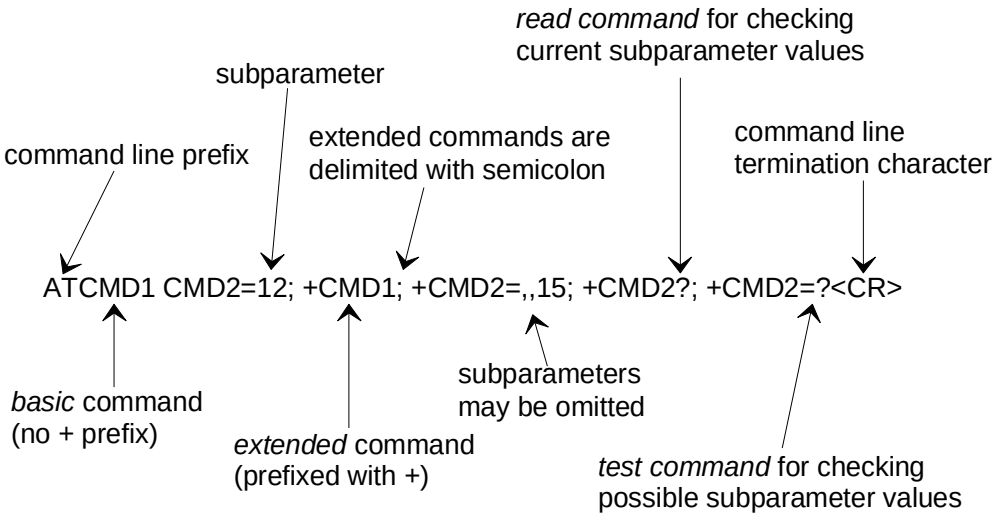


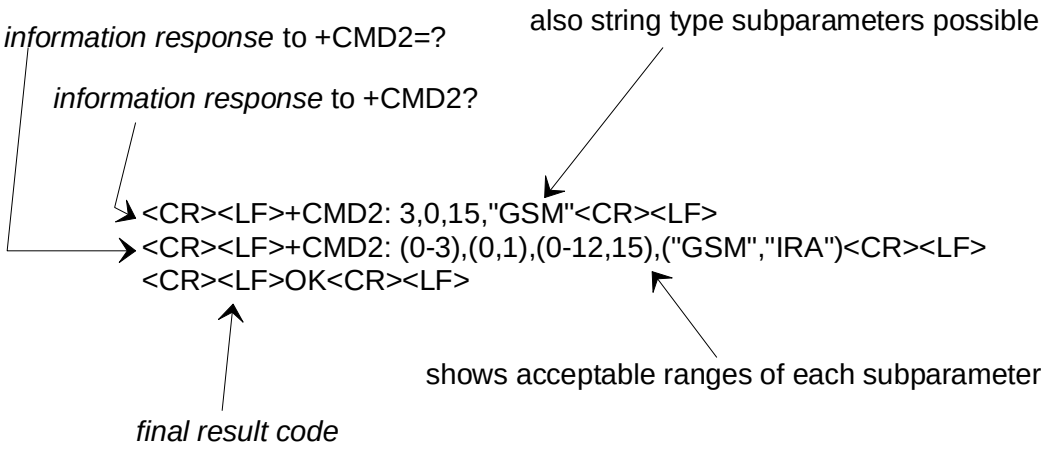
Figure 1-2 shows the basic organization format of the AT command line.

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+CLCK	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 set <value> to 0 and sending successful: 0 If set <value> to 1 and sending successful: <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)

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.

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

2.2.4 Property Description

Saving upon Power-off	PIN
NA	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

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. 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 query the MT's model ID. 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)
<CR><LF><softversion><CR><LF><CR><LF>OK<CR><LF>
AT+CGMR=?
Possible Response(s)
<CR><LF>OK<CR><LF>

2.5.2 Interface Description

This command causes the ME to return its software version. 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). 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 "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.
1	The MT echoes the characters received from the TE (default value).

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 value. 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
N	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 12345678, then:

Run: `AT+CIMI`

Response:
```
1234512345678

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, and also restores the baud rate between TE and MS to the default value.

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

Command
E
V
Q

Command
X
&C
&D
&S
S0
S3
S4
S5
S7
S10
+IFC
+ICF
+IPR

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, 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

NA

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 followed AT&F.

2.16.3 Parameter Description

NA

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:

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

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

<err>: see 13.3 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 Network Service Related Commands

3.1 AT+COPS–Select Operator

3.1.1 Command Syntax

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

3.1.2 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.

3.1.3 Parameter Description

<mode>: network selection mode

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

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

0	Long format alphanumeric <oper> (default value)
1	Short format alphanumeric <oper>
2	Numeric <oper>

<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

3.1.4 Property Description

Saving upon Power-off	PIN
NA	Y

3.1.5 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.

- Manual selection:

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

Response: `OK`

Notes:

- 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?	Return the current network selection mode, information about the operator with which the MT registers, and the wireless access technology.
Response:	+COPS: 1,0,"CHINA MOBILE",0 OK	

3.2 AT+CREG–Register Network

3.2.1 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>

3.2.2 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>.

3.2.3 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>: string type; four-character (GSM network) or eight-character (WCDMA network) cell ID.

<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

Notes:

- [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.

3.2.4 Property Description

Saving upon Power-off	PIN
N	Y

3.2.5 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`

3.3 AT+CLCK–Lock Facility

3.3.1 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>

3.3.2 Interface Description

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

The test command returns the facilities supported.

3.3.3 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 <mode>=0)
"AC"	All incoming barring services (applicable only for <mode>=0)
"AG"	All outgoing barring services (applicable only for <mode>=0)
"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 passwords for "SC" and "P2" are 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

3.3.4 Property Description

Saving upon Power-off	PIN
Y	Y

3.3.5 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

3.4 AT+CPWD–Change Password

3.4.1 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>

3.4.2 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.

3.4.3 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.

3.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

3.4.5 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

3.5 AT+CNUM–Subscriber Number

3.5.1 Command Syntax

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

3.5.2 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.

3.5.3 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>: reference 27007-b10 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

3.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

3.5.5 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 Mobile Termination Control and Status Commands

4.1 AT+CFUN–Set Operation Mode

4.1.1 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>

4.1.2 Interface Description

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

The read command returns the current mode.

The test command returns the supported parameter values.

4.1.3 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)

<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)

4.1.4 Property Description

Saving upon Power-off	PIN
NA	N

4.1.5 Example

```
Run:        AT+CFUN?
Response:   +CFUN: 0

            OK
Run:        AT+CFUN=1
Response:   OK
```

4.2 AT+CPIN–Enter PIN

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

4.2.2 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.

4.2.3 Parameter Description

<pin>, <newpin>: string type values of the 4–8 digits ; must be enclosed in quotation. 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.

4.2.4 Property Description

Saving upon Power-off	PIN
N	N

4.2.5 Example

Run: `AT+CPIN?`

Response:
```
+CPIN: SIM PIN

OK
```

Run: `AT+CPIN="1234"`

Response: `OK`

4.3 AT+CPBS–Select Phonebook Memory Storage

4.3.1 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>

4.3.2 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.

4.3.3 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.

4.3.4 Property Description

Saving upon Power-off	PIN
N	Y

4.3.5 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

4.4 AT+CPBR–Read Phonebook Entries

4.4.1 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><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>][,<elength>][,<siplength>][,<tellength>]<CR><LF><CR><LF>OK<CR><LF>

4.4.2 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.

4.4.3 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 7.3 AT+CMGS–Send Short Message.

<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

Notes:

- 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.

4.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.4.5 Example

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

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

            OK
```

4.5 AT+CPBW–Write Phonebook Entry

4.5.1 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)
<CR><LF>+CPBW: <written_index><CR><LF><CR><LF>OK<CR><LF>
AT+CPBW=?
Possible Response(s)
<CR><LF>+CPBW: (list of supported <index>s),[<nlength>],(list of supported <type>s),[<tlength>]<CR><LF><CR><LF>OK<CR><LF>

4.5.2 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.

4.5.3 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

Notes:

- 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.

4.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.5.5 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
```

4.6 AT+CRSM–Restricted SIM Access

4.6.1 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>

4.6.2 Interface Description

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

The set command accesses the SIM card through restricted permissions.

4.6.3 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.

4.6.4 Property Description

Saving upon Power-off	PIN
NA	N

4.6.5 Example

Run: AT+CRSM=192,28483

Response: +CRSM: 144,0,"621B8202412183026F43A5039201008A01078B036F0604800200028800"

OK

Run: AT+CRSM=176,12258,0,0,10

Response: +CRSM: 144,0,"98684006905725103076"

OK

4.7 AT+CCLK–Return Current Time of the Module

4.7.1 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>

4.7.2 Interface Description

The set command sets the real–time clock of the MT. If setting fails in an MT error, +CMEE RROR: <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.

4.7.3 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.

4.7.4 Property Description

Saving upon Power-off	PIN
NA	N

4.7.5 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

5 UMTS Packet Domain Commands

5.1 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.

5.1.1 Command Syntax

AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]]
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>

5.1.2 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:

AT+CGDCONT=16 is not allowed to execute, or error information will be returned.

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

Note:

If all PDP contexts are undefined in the MDM6600 platform, 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.

5.1.3 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 <PDP_addr> is got dynamically, the read command AT+CGDCONT? will return "" 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)

If <d_comp> is not specified in the command, it is equivalent to <d_comp>=0.

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

0	Off
1	On
2	RFC1144 (applicable for SNDCP only)
3	RFC2507
4	RFC3095 (applicable for PDCP only)

If <h_comp> is not specified in the command, it is equivalent to <h_comp>=0.

5.1.4 Property Description

Saving upon Power-off	PIN
Y	N

5.1.5 Example

- Step 1

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
```

This command supports "IP" and "PPP" Protocol. The test command lists the supported values of other parameters supported by "IP" and "PPP" Protocol.

- Step 2

Run:
```
AT+CGDCONT?
```

Response:	+CGDCONT: 1, "IP","vcol.com", "",0,0 OK	The MT saves one PDP context, and the <cid> value of this context is 1.

- Step 3

Run:	AT+CGDCONT=16,"PPP","abc.com ","10.111.145.233",1,1	Save one PDP context to the MT and the <cid> value is 16.
Response:	OK	

- Step 4

Run:	AT+CGDCONT?	
Response:	+CGDCONT: 1,"IP","vcol.com", "",0,0 +CGDCONT: 16,"PPP","abc.com", "10.111.145.233",1,1 OK	The response shows that the PDP context has been successfully saved to the MT at the previous step.

- Step 5

Run:	AT+CGDCONT=16	Remove the PDP context with <cid> 16.
Response:	ERROR	

5.2 AT+CGACT–Activate or Deactivate PDP Context

5.2.1 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>

5.2.2 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>.

5.2.3 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 the AT+CGDCONT command.

5.2.4 Property Description

Saving upon Power-off	PIN
NA	Y

5.2.5 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`

5.3 AT+CGATT–Attach or Detach PS Domain

5.3.1 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>

5.3.2 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.25 ter 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

5.3.3 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.

5.3.4 Property Description

Saving upon Power-off	PIN
NA	Y

5.3.5 Example

Run: AT+CGATT?

Response: +CGATT: 1

OK

Run: AT+CGATT=0

Response: OK

5.4 AT+CGREG–PS Domain Registration Status

5.4.1 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>

5.4.2 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.

5.4.3 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

Notes:

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

5.4.4 Property Description

Saving upon Power-off	PIN
N	Y

5.4.5 Example

Run: `AT+CGREG?`

Response: `+CGREG: 0,1`

`OK`

Run: `AT+CGREG=?`

Response: `+CGREG: (0-2)`

`OK`

5.5 AT+CGSMS–SMS Bearer Domain

5.5.1 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>

5.5.2 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.

5.5.3 Parameter Description

<service>:

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

5.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

5.5.5 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

5.6 AT+CGEQREQ–3G Requested QoS Profile

5.6.1 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>

5.6.2 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.

5.6.3 Parameter Description

<cid>: a numeric parameter which specifies a particular PDP context definition (see 5.1 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 5.1 AT+CGDCONT–Define PDP Context.

5.6.4 Property Description

Saving upon Power-off	PIN
N	Y

5.6.5 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
```

5.7 AT+CGQMIN–Quality of Service Profile (Minimum Acceptable)

5.7.1 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>

5.7.2 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 +CGDCONT and +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.

5.7.3 Parameter Description

<cid>: a numeric parameter which specifies a particular PDP context definition (see 5.1 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.

5.7.4 Property Description

Saving upon Power-off	PIN
Y	Y

5.7.5 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
```

6 Normal Commands for SMS

6.1 AT+CPMS–Select Message Storage

6.1.1 Command Syntax

AT+CPMS=<mem1>[,<mem2>[,<mem3>]]
Possible Response(s)
<CR><LF>+CPMS: <used1>,<total1>,<used2>,<total2>,<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: <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>

6.1.2 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.

6.1.3 Parameter Description

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

"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.

6.1.4 Property Description

Saving upon Power-off	PIN
N	Y

6.1.5 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

6.2 AT+CMGF–Set Message Format

6.2.1 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>

6.2.2 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>.

6.2.3 Parameter Description

<mode>:

0	PDU mode (default value)
1	TEXT mode (not supported currently)

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

6.2.4 Property Description

Saving upon Power-off	PIN
N	N

6.2.5 Example

Run: AT+CMGF=0

Response: OK

Run: AT+CMGF?

Response: +CMGF: 0

OK

6.3 AT+CNMI–Indicate New Message to TE

6.3.1 Command Syntax

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

AT+CNMI?
Possible Response(s)
<CR><LF>+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr><CR><LF><CR><LF>OK<CR><LF>
AT+CNMI=?
Possible Response(s)
<CR><LF>+CNMI: (list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s)<CR><LF><CR><LF>OK<CR><LF>

6.3.2 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.

Notes:

- 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.

6.3.3 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:

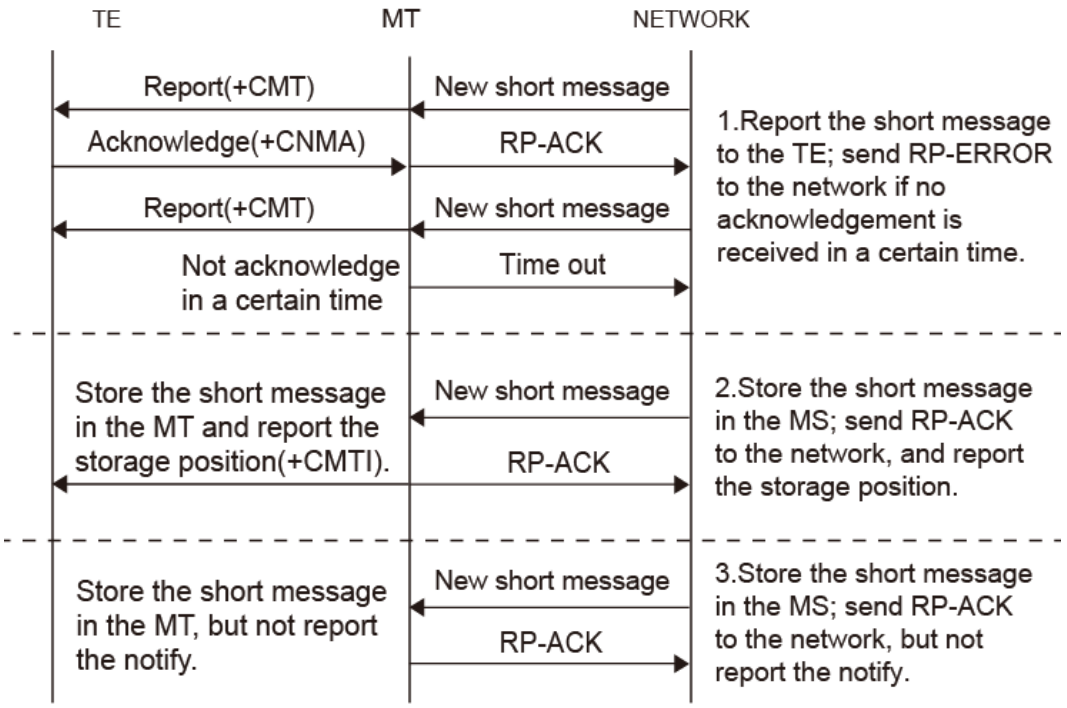
```
+CMT: [<reserved>],<length><CR><LF><pdu>
```

- 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

Notes:

- The SMS class is defined by the TP-DCS domain of the SMS. For details, see the description of <DCS> in section 7.3 AT+CMGS–Send Short Message.
- "+CMT & +CNMA" indicates that the TE is required to send the confirmation (+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>,<dcs>,<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 6-1 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.

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

<ds>: 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.

- 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.

6.3.4 Property Description

Saving upon Power-off	PIN
N	N

6.3.5 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.

6.4 AT+CMGD–Delete Message

6.4.1 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>

6.4.2 Interface Description

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

For details about <mem1>, see section 6.1 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 <deflag> values.

6.4.3 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.

6.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

6.4.5 Example

Run: AT+CMGD=?

Response: +CMGD: (0,3),(0-4)

OK

Run: AT+CMGD=0

Response: OK

6.5 +CMTI–Unsolicitedly Present of Message Arrival Indication

6.5.1 Command Syntax

URC
<CR><LF>+CMTI: <mem>,<index><CR><LF>

6.5.2 Interface Description

This command allows indications that a new message is received.

6.5.3 Parameter Description

<mem>:

"SM" (U)SIM message storage

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

6.5.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.5.5 Example

Response: +CMTI: "SM",1

6.6 +CDSI–Unsolicitedly Present of Newly Received Message Status Report

6.6.1 Command Syntax

URC
<CR><LF>+CDSI: <mem>,<index><CR><LF>

6.6.2 Interface Description

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

6.6.3 Parameter Description

<mem>:

"SM" (U)SIM message storage

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

6.6.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.6.5 Example

Response: `+CDSI: "SM",48`

6.7 AT+CNMA–New Message Acknowledgement

6.7.1 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>

6.7.2 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 6.3 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.

6.7.3 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
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 exits.

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 6-1 and Figure 6-2 illustrate the formats of the user data encoded using different schemes.

Figure 6-1 User data encoded using the default 7-bit encoding scheme

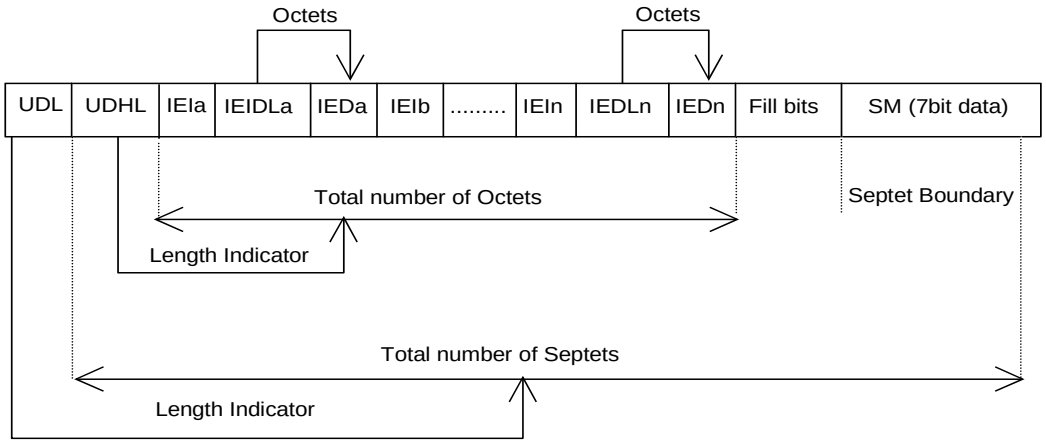
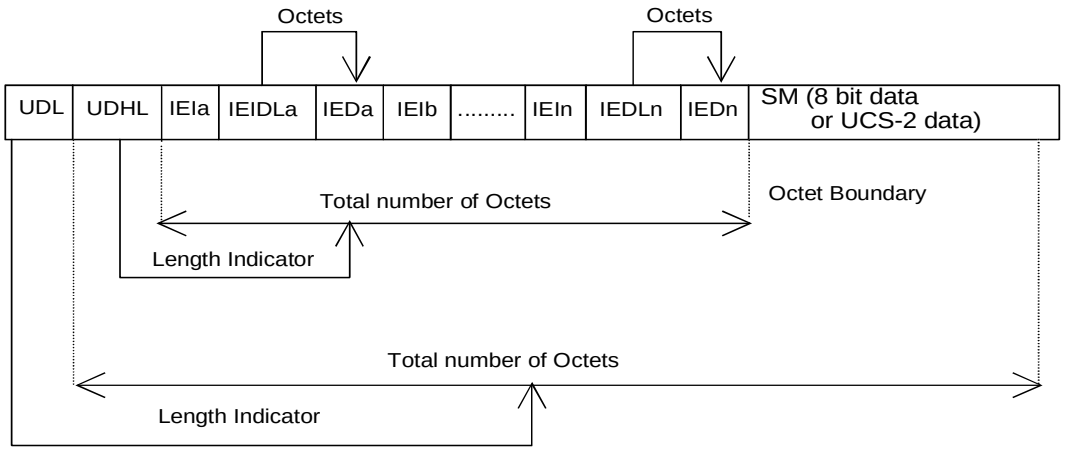


Figure 6-2 User data encoded using the 8-bit or UCS2 encoding scheme



In Figure 6-1 and Figure 6-2 , IEI is short for Information Element Identifier.

6.7.4 Property Description

Saving upon Power-off	PIN
NA	Y

6.7.5 Example

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

Response: `OK`

Run: `AT+CNMA=?`

Response: `+CNMA:(0-2)`

`OK`

6.8 ^SMMEMFULL–Message Memory Full

6.8.1 Command Syntax

URC
<CR><LF>^SMMEMFULL: <mem_type><CR><LF>

6.8.2 Interface Description

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

6.8.3 Parameter Description

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

"SM" (U)SIM card

6.8.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.8.5 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.

7 SMS Service Interface (WCDMA)

7.1 AT+CSMS–Select Messaging Service

7.1.1 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>

7.1.2 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.

7.1.3 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)

7.1.4 Property Description

Saving upon Power-off	PIN
N	N

7.1.5 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

7.2 AT+CSCA–Service Center Address

7.2.1 Command Syntax

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

7.2.2 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 7.3 AT+CMGS–Send Short Message.

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

7.2.3 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 7.3 AT+CMGS–Send Short Message.

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.

7.2.4 Property Description

Saving upon Power-off	PIN
Y	Y

7.2.5 Example

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

Response: OK

Run: AT+CSCA?

Response: +CSCA: "+8613800688509",145

OK

7.3 AT+CMGS–Send Short Message

7.3.1 Command Syntax

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>

7.3.2 Interface Description

This 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).

7.3.3 Parameter Description

<length>: the number of actually sent TPDU characters/2. It is a decimal value not greater than 178.

<mr>: 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.

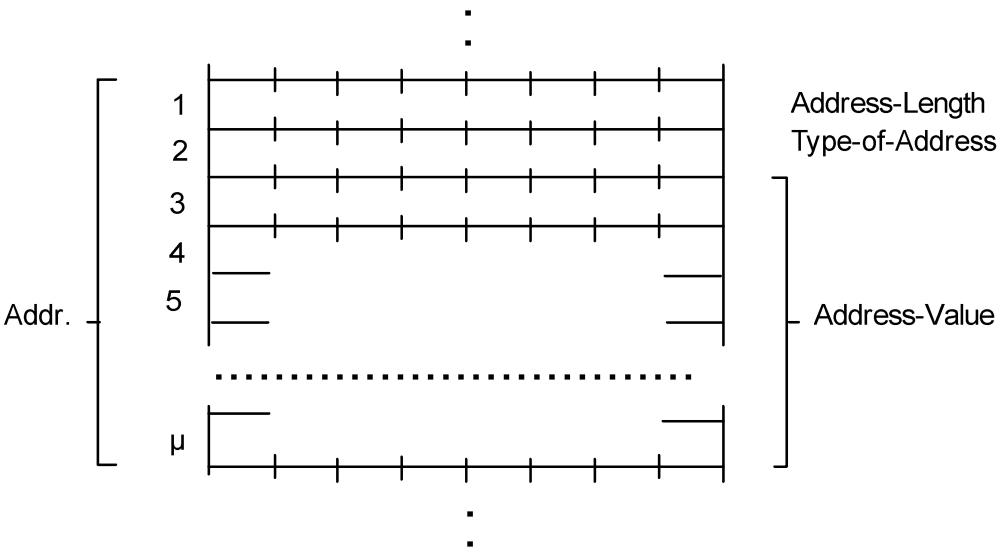
<ctrl-Z>: indicates the end of a PDU. The characters are "0x1A".

<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.)

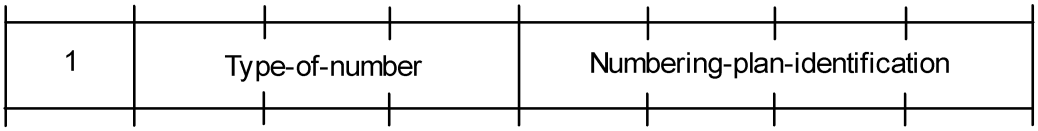
[<SCA>]			
<sc_len>	<type_addr>	<numbers>	TPDU

<SCA>: service center address (SCA). Its structure is illustrated in the following figure.



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

<type_addr>: 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.

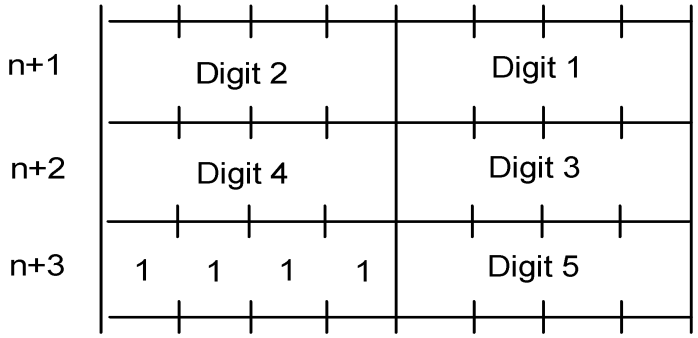
Values of Numbering-plan-identification (bits 3–0) are defined as follows:

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.

Note:

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

<numbers>: 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								2 Oct~ 12 Oct	1 Oct	1 Oct	1 Oct	1 Oct		2 Oct~12 Oct
RP	DA	PID	DCS		VP	UDL		DA	PID	DCS	VP	UDL	UD	DA
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0							

<MTI>: message type. Its values(Bit 1-0) are defined as follows:

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

<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. Its values are defined as follows:

0	Yes
1	No

<VPF>: indicates the validity and format of the VP field. Its values(Bit 4-3) are defined as follows:

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. Its values are defined as follows:

0	No
1	Yes. The message reply uses the same SC number and path for sending the message.

<UDHI>: user data header indication. Its values are defined as follows:

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

<SRR>: 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>: message ID ranging from 0 to 255.

<DA>: 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>: protocol identifier. Its values are defined as follows:

PID							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0

The values of bit 7-6 are defined as follows:

0 0 Allocate bits 0–5(at present, bit 7=0 and bit 6=0)

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>: user data coding scheme. Its values are defined as follows:

<table>
<tr><th colspan="3">Bits 7…4</th><th>Bits 3…0</th></tr>
<tr><td rowspan="4">00xx</td><td rowspan="2">Bit 5</td><td>0: Message is not compressed.</td><td rowspan="4">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 value.
0 1 8-bit encoding scheme
1 0 UCS2 encoding scheme. TE uses this value when the user inputs Chinese characters.
1 1 Reserved</td></tr>
<tr><td>1: Message is compressed. This is not supported currently.</td></tr>
<tr><td rowspan="2">Bit 4</td><td>0: Indicates that bit 1 and bit 0 are reserved.</td></tr>
<tr><td>1: Indicates that bit 1 and bit 0 serve as the message type indication.</td></tr>
<tr><td>0100
…</td><td colspan="2">Reserved</td><td></td></tr>
</table>

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 value. 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>: 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>: user data. Its data validity depends on <UDL>.

7.3.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.3.5 Example

Run: `AT+CMGS=18`

Response: `>`

Run: `0891683108608805F931000B813109731147F40000FF04F4F29C0E`

Response: `+CMGS: 135`

`OK`

7.4 AT+CMGL–List Messages

7.4.1 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>

7.4.2 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.

7.4.3 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 7.3 AT+CMGS–Send Short Message.

For the TPDU format of messages to be sent, see section 7.3 AT+CMGS–Send Short Message. 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 7.3 AT+CMGS–Send Short Message.

<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 7.3 AT+CMGS–Send Short Message.

<RP>: see the definition in section 7.3 AT+CMGS–Send Short Message.

<OA>: originating address. Its definition is the same as <sca>. 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 7.3 AT+CMGS–Send Short Message.

<DCS>: use data coding scheme. See the definition in section 7.3 AT+CMGS–Send Short Message.

<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 7.3 AT+CMGS–Send Short Message.

<UD>: user data whose length is determined by <UDL>.

7.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.4.5 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

7.5 AT+CMGR–Read Message

7.5.1 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>

7.5.2 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.

7.5.3 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 7.4.3 .

7.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.5.5 Example

Run: AT+CMGR=0

Response:

```
+CMGR: 1,,160
0891683108608805F9040D91683109730163F7001231308241
126500A0B11C0C16B3C982B51A8D16C4098D37DB9026ABCD88
B11C0C16B3C982B51A8D16C4098D37DB9026ABCD88B11C0C16
B3C982B51A8D16C4098D37DB9026ABCD88B11C0C16B3C982B5
1A8D16C4098D37DB9026ABCD88B11C0C16B3C982B51A8D16C4
098DB7783C1E8FC7E3F172B95C2E97CBE572B95C2E97CBE572
B94C97C3CBEE739E5E47BB77EC73180D2FBBCF
```

```
OK
```

7.6 +CMT–Unsolicitedly Present of New Message Reported Directly

7.6.1 Command Syntax

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

7.6.2 Interface Description

This command allows the indication of new messages to the TE without storing them.

7.6.3 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 7.4 AT+CMGL–List Messages.

7.6.4 Property Description

Saving upon Power-off	PIN
NA	NA

7.6.5 Example

Response:

```
+CMT: ,24
0891683108608805F9240D91683109731147F4000031305051
52430004F4F29C0E
```

7.7 +CDS–Unsolicitedly Present of New Message Status Report Reported Directly

7.7.1 Command Syntax

URC
<CR><LF>+CDS: <length><CR><LF><pdu><CR><LF> (PDU mode enabled)

7.7.2 Interface Description

This command allows the direct indication of new messages received to the TE without storing the new message status report.

7.7.3 Parameter Description

<length>: integer type value indicating the number of bytes of PDU data.

<pdu>: protocol data unit.

7.7.4 Property Description

Saving upon Power-off	PIN
NA	NA

7.7.5 Example

Response: +CDS: 26
089168310860880 5F906750D91683109731147F43130509134
92003130509134430000

7.8 AT+CMSS–Send Message from Storage

7.8.1 Command Syntax

AT+CMSS=<index>[,<da>[,<toda>]]
Possible Response(s)
If PDU mode (AT+CMGF=0) and sending successful: <CR><LF>+CMSS: <mr>[,<ackpdu>]<CR><LF><CR><LF>OK<CR><LF>

If sending fails: <CR><LF>+CMS ERROR: <err><CR><LF>
AT+CMSS=?
Possible Response(s)
<CR><LF>OK<CR><LF>

7.8.2 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 +CSMS <service> value is 1 and network supports) <scts> is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values. This command should be abortable.

<da> is controlled by AT+CSCS.

7.8.3 Parameter Description

<index>: 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 +CSCS in 3GPP TS 27.007 [9]); 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) default is 145, otherwise default is 129).

For the response parameter description of this command, see section 7.3 AT+CMGS–Send Short Message.

7.8.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.8.5 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	

7.9 AT+CMGW–Write Message to Memory

7.9.1 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>

7.9.2 Interface Description

The execution command stores a message to the memory storage <mem2> selected using the AT+CPMS command.

7.9.3 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".

7.9.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.9.5 Example

Run: AT+CMGW=18
>0015660B813109120090F60004FF0461626364<ctrl-Z>

Response: +CMGW: 3

OK

Run: AT+CMGW=?

Response: OK

8 Huawei Proprietary Interface: Mobile Termination Control and Status Interface

8.1 AT^WAKEUPCFG–Configure Module's Remote Wakeup Function by Host

8.1.1 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>

8.1.2 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.

8.1.3 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 this parameter 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[4-15]	Bit[3]	Bit[2]	Bit[1]	Bit[0]
Undefined	UR	DATA	SMS	VOICE

0x0001	Voice
0x0002	SMS
0x0004	Data
0x0008	UR (unsolicited report)
0x0010–0x8000	Reserved

The default value of this parameter is 0x000F (VOICE+SMS+DATA+UR).

8.1.4 Property Description

Saving upon Power-off	PIN
Y	N

8.1.5 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),(0-15)

OK

8.2 AT^CURC–Set Presentation of Unsolicited Results

8.2.1 Command Syntax

AT^CURC=<mode>[,<sleeping_UR_cfg>,<working_UR_cfg>]
Possible Response(s)
<CR><LF>OK<CR><LF>
AT^CURC?
Possible Response(s)
<CR><LF>^CURC: <mode>[,<sleeping_UR_cfg>,<working_UR_cfg>[,<sleeping_UR_cfg>,<working_UR_cfg>[,<sleeping_UR_cfg>,<working_UR_cfg>]]]<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>

8.2.2 Interface Description

The set command selects the control mode for the presentation of unsolicited results. When <mode>=2, the specific types of unsolicited results can be specified.

The read command queries the current control mode for the presentation of unsolicited results. When <mode>=2, the specific types of unsolicited results can be queried.

The test command lists the supported control mode for the presentation of unsolicited results.

8.2.3 Parameter Description

<mode>: control mode for the presentation of unsolicited results.

0	The presentation of the unsolicited indications in Table 8-1 is disabled.
1	Enables the presentation of the unsolicited indications. (default value)
2	According to <sleeping_UR_cfg> and <working_UR_cfg>, customer can configure the parameter mode for the presentation of unsolicited results and decide whether report for all UR in Table 8-2 .

Table 8-1 List for the presentation of unsolicited results when <mode>=0/1

COMMAND	COMMENT
^MODE	
^RSSI	
^CSNR	
^DSFLOWRPT	
^EARST	
^ACTIVEBAND	
^RSSILVL	
^HRSSILVL	
^HDRRSSI	
^CRSSI	
^ANLEVEL	
^BOOT	

Table 8-2 The control mode when <mode>=2.

Control Parameters in Sleeping Status	Control Parameters in Working Status	Suspend Status	Normal Status
1	1	Directly report	Directly report
1	0	Directly report	Discard
0	1	Cache	Directly report
0	0	Discard	Discard

Cache: the unsolicited AT will be store when the host is in the suspend status. The unsolicited AT result will be reported to the host when the host exit suspend status to reduce the wakeup times.

<sleeping_UR_cfg>: specifies the types of unsolicited results to be presented when in sleep mode. The length is 64-bits and the value must be entered in hexadecimal format.

- Bit [63-61] is reserved for page, it defines the page number of unsolicited results to be presented (which is used to expansion for the presentation of unsolicited results); Up to eight pages can be specified.
- Bit [60-0] is sleeping_UR_mask that defines the types of unsolicited results to be presented; each bit specifies whether the presentation of the corresponding type of unsolicited results is enabled or disabled. If the value of a bit is 1, the presentation is enabled. If the value of a bit is 0, the presentation is disabled. The detail information for each bit can be seen in Table 8-3 .

The following table describes the definitions of bit [63-61] and bit [60-0] for <sleeping_UR_cfg>.

Bit[63-61]	Bit[60-0]
Page	sleeping_UR_mask

<working_UR_cfg>: specifies the types of unsolicited results to be presented when in operating mode. The length is 64-bits and the value must be entered in hexadecimal format.

Bit [63-61] is reserved for page, it defines the page types of unsolicited results to be presented (which is used to expansion for the presentation of unsolicited results); Up to eight pages can be specified.

Bit [60-0] is working_UR_mask that defines the types of unsolicited results to be presented; each bit specifies whether the presentation of the corresponding type of unsolicited results is enabled or disabled. If the value of a bit is 1, the presentation is enabled. If the value of a bit is 0, the presentation is disabled. The detail information for each bit can be seen in Table 8-3 .

The following table describes the definitions of bit [63-61] and bit [60-0] for <working_UR_cfg>.

Bit[63-61]	Bit[60-0]
Page	working_UR_mask

Table 8-3 Definitions of Page 0 Bit [60–0] for the presentation of unsolicited results

Bit 0	Bit 1	Bit 2	Bit 3
^MODE	^RSSI	^CSNR	^SRVST
Bit 4	**Bit 5**	**Bit 6**	**Bit 7**
+CREG/+CGREG	^SIMST	^NWTIME	^ACTIVEBAND
Bit 8	**Bit 9**	**Bit 10**	**Bit 11**
^ANLEVEL	^LOCCHD	^SIMFILEREFRESH	^SMMEMFULL
Bit 12	**Bit 13**	**Bit 14**	**Bit 15**
^POSITION	^TIMESETRULT /^DATASETRULT /^DATAVALIDITY	^WNINV	^POSEND
Bit 16	**Bit 17**	**Bit 18**	**Bit 19**
^WPDCP	^WPDDL	^WPDOP	+CTZV
Bit 20	**Bit 21**	**Bit 22**	**Bit 23**
^NDISEND	^BOOT	^DSFLOWRPT	^EARST
Bit 24	**Bit 25**	**Bit 26**	**Bit 27**
^ORIG	^CONF	^CONN	^CEND
Bit 28	**Bit 29**	**Bit 30**	**Bit 31**
^RFSWITCH	^STIN	+CUSD	+CDS/+CMT /+CDSI/+CMTI /+CBM
Bit 32	**Bit 33**	**Bit 34**	**Bit 35**
^RSSILVL	^HRSSILVL	^HDRRSSI	^CRSSI
Bit 36	**Bit 37**	**Bit 38**	**Bit 39**
^OTACMSG	^DSDORMANT	^IPDATA	^THERM
Bit 40	**Bit 41**	**Bit 42**	**Bit 43**
^XDSTATUS	+CLIP	+CCWA	+CSSI

Bit 44	Bit 45	Bit 46	Bit 47
+CSSU	^IPSTATE	+CUSATP	+CUSATEND
Bit 48	**Bit 49**	**Bit 50**	**Bit 51**
^NDISSTAT	^ECLSTAT	^ECCLIST	^HCSQ
Bit 52	**Bit 53**	**Bit 54**	**Bit 55**
+XADPCLKFREQINFO	^HWNAT	Reserved	Reserved
Bit 56	**Bit 57**	**Bit 58**	**Bit 59**
Reserved	Reserved	Reserved	Reserved
Bit 60			
Reserved			

Notes:

- When <mode>=0 or 1, <sleeping_UR_cfg> and <working_UR_cfg> must not be contained in the command. When <mode>=2, both of <sleeping_UR_cfg> and <working_UR_cfg> are contained in the command or both are not contained in the command, otherwise, ERROE will be returned. The initial default value of <sleeping_UR_cfg> is 0x870; and the initial default value of <working_UR_cfg> is 0x872. The <sleeping_UR_cfg> and <working_UR_cfg> configured when <mode>=2 are not saved when the product is powered off.Up to 8*61=488 of the presentation of unsolicited results supported (including ones added by Huawei and standard) can be configured by customer. The strong related presentation of unsolicited results are controlled by the same bit, such as ^TIMESETRULT and ^DATASETRULT. For the presentation of unsolicited results added later, you must add the illustration for the bit.
- Undefined bits and currently-not-supported unsolicited results cannot be configured using the ^CURC command. The AT commands of each unsolicited results may vary with the specific products.

8.2.4 Property Description

Saving upon Power-off	PIN
N	N

8.2.5 Example

Run:	AT^CURC=0	Set <mode> to 0.
Response:	OK	
Run:	AT^CURC=1	Set <mode> to 1.
Response:	OK	

Run:	AT^CURC=2,FF,F	Set <mode> to 2.
Response:	OK	
Run:	AT^CURC?	
Response:	^CURC: 2,0xff,0xf OK	

8.3 AT^MSO–Shutdown Command

8.3.1 Command Syntax

AT^MSO
Possible Response(s)
<CR><LF>OK<CR><LF>
AT^MSO=?
Possible Response(s)
<CR><LF>OK<CR><LF>

8.3.2 Interface Description

This command powers off the MT. When the command is executed, the MT logs out of the network, saves subscriber data, and then shut down.

Note:

On ME909u-521, after the command is received, the module will firstly deregister, and then shut down.

8.3.3 Property Description

Saving upon Power-off	PIN
NA	N

8.3.4 Parameter Description

None

8.3.5 Example

Run:	AT^MSO
Response:	OK
Run:	AT^MSO=?
Response:	OK

8.4 AT^CPIN–Manage PIN

8.4.1 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>

8.4.2 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.

8.4.3 Parameter Description

<pin>,<newpin>: string type values with length 4–8 that must be enclosed in double quotation marks. Characters allowed in these fields are 0–9, otherwise ERROR 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.

8.4.4 Property Description

Saving upon Power-off	PIN
N	N

8.4.5 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`

8.5 AT^CARDMODE–Query SIM/USIM Card Type

8.5.1 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>

8.5.2 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 13.3 CMS Error List.

8.5.3 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)

8.5.4 Property Description

Saving upon Power-off	PIN
NA	N

8.5.5 Example

Run: `AT^CARDMODE`

Response: `^CARDMODE: 2`

`OK`

8.6 AT^ICCID–Query the ICCID

8.6.1 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>

8.6.2 Interface Description

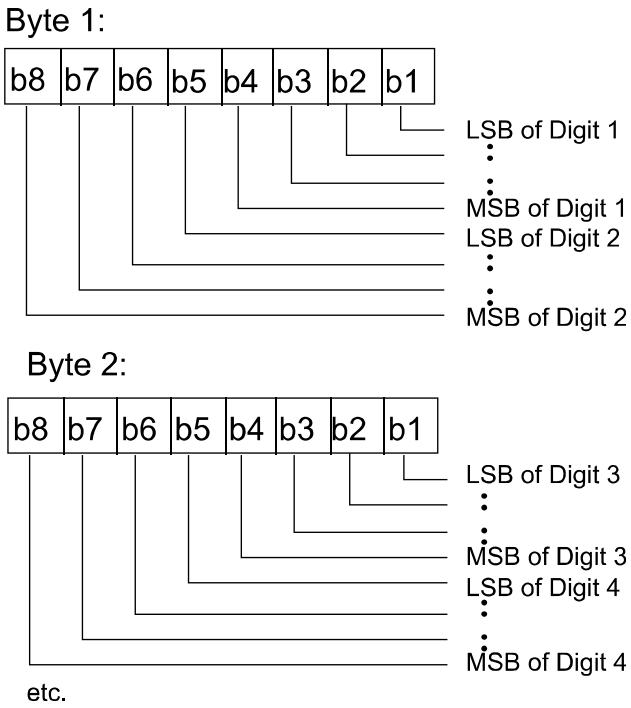
This command is used to query the integrated circuit card identity (ICCID) of a SIM card no matter the PIN is entered or not.

8.6.3 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).



The bit sequence of the information obtained from the EF_{ICCID} file must be converted.

8.6.4 Property Description

Saving upon Power-off	PIN
NA	N

8.6.5 Example

Run: AT^ICCID?

Response: `^ICCID: 89860460097552010773`

`OK`

Run: `AT^ICCID=?`

Response: `OK`

8.7 AT^RESET-Reset the Module

8.7.1 Command Syntax

AT^RESET
Possible Response(s)
<CR><LF>OK<CR><LF>

8.7.2 Interface Description

This command is used to reset the module by user.

8.7.3 Parameter Description

None

8.7.4 Property Description

Saving upon Power-off	PIN
N	N

8.7.5 Example

Run: `AT^RESET`

Response: `OK`

8.8 AT^IOCTRL-Control the GPIO

8.8.1 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>

8.8.2 Interface Description

This command is used to control the GPIO's actions.

The test command returns supported values as compound value.

8.8.3 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.

8.8.4 Property Description

Saving upon Power-off	PIN
N	N

8.8.5 Example

Run: `AT^IOCTRL?`

Response:
```
^IOCTRL: 00000,11111

OK
```

Run: `AT^IOCTRL=11111,11110,00111`

Response: `OK`

9 Huawei Proprietary Interface: ECM Interfaces

9.1 AT^NDISDUP–NDIS-Based Dialing

9.1.1 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>

9.1.2 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.

9.1.3 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).

<authpref>: authentication reference.

0	No authentication
1	PAP authentication
2	CHAP authentication
3	MsChapV2 (not supported currently)

9.1.4 Property Description

Saving upon Power-off	PIN
NA	Y

9.1.5 Example

Run: `AT^NDISDUP=1,1,"1234"`

Response: `OK`

Run: `AT^NDISDUP?`

Response: `OK`

Run: `AT^NDISDUP=?`

Response:
```
^NDISDUP: (1-16),(0-1)

OK
```

9.2 ^NDISSTAT–Unsolicited Report of Connection Status

9.2.1 Command Syntax

URC
<CR><LF>^NDISSTAT: <stat>[,<err_code>[,<wx_state>[,<PDP_type>]]]<CR><LF>

9.2.2 Interface Description

When the device connection status changes, the MT proactively indicates this to the TE.

9.2.3 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/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"

9.2.4 Property Description

Saving upon Power-off	PIN
NA	Y

9.2.5 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"`

9.3 AT^NDISSTATQRY–Query the Connection Status

9.3.1 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>

9.3.2 Interface Description

The TE delivers this command to query the ECM (NDIS/WWAN) connection status of the MT.

9.3.3 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"

9.3.4 Property Description

Saving upon Power-off	PIN
NA	NA

9.3.5 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
```

10 Huawei Proprietary Interface: Temperature Protection

10.1 AT^CHIPTEMP–Query the Temperature of the PA/SIM/Battery/Crystal Oscillator Command

10.1.1 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>

10.1.2 Interface Description

This command queries temperature on hardware spots, such as GSM PA, WCDMA PA, LTE PA, SIM card slot, battery, crystal oscillator.

10.1.3 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℃.

<G PAtemp Range>: integer, indicating the temperature range of the GSM PA chip in the unit of 0.1℃.

(65535-65535) Not supported currently

<W PAtemp Range>: integer, indicating the temperature range of the WCDMA PA chip in the unit of 0.1℃.

(65535-65535) Not supported currently

<L PAtemp Range>: integer, indicating the temperature range of the LTE PA chip in the unit of 0.1℃.

(65535-65535) Not supported currently

<SIMtemp Range>: integer, indicating the temperature range of the SIM card slot in the unit of 0.1℃.

(65535-65535) Not supported currently

<BATTERYtemp Range>: integer, indicating the temperature range of the battery in the unit of 0.1℃.

(65535-65535) Not supported currently

<CRYSTALtemp Range>: integer, indicating the temperature range of the crystal oscillator in the unit of 0.1℃.

(-300,1200) The crystal oscillator temperature range.

Notes:

- If the query of a component's temperature fails, 65535 is returned.
- The temperature unit is 0.1℃. For example, if the returned value range is (–200,1000), the temperature ranges from –20℃ to 100℃.
- 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.

10.1.4 Property Description

Saving upon Power-off	PIN
NA	N

10.1.5 Example

Run:	AT^CHIPTEMP?	
Response:	^CHIPTEMP: 65535,65535,65535,65535,65535,300 OK	The response indicates the current temperature on hardware spots.
Run:	AT^CHIPTEMP=?	
Response:	^CHIPTEMP: (65535-65535),(65535-65535),(65535-65535),(65535-65535),(-300-1200) OK	The response indicates the temperature ranges on hardware spots.

10.2 AT^THERMFUN–Enable or Disable the Temperature Protection Function Command

10.2.1 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>

10.2.2 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

10.2.3 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)

Notes:

- The default value is 1. The parameter value changes to 1 upon power-off.
- A parameter value takes effect immediately after setting.

10.2.4 Property Description

Saving upon Power-off	PIN
NA	N

10.2.5 Example

Run: AT^THERMFUN=?

Response: `^THERMFUN: (0-1)`

`OK`

Run: `AT^THERMFUN?`

Response: `^THERMFUN: 1`

`OK`

Run: `AT^THERMFUN=1`

Response: `OK`

10.3 ^THERM–Unsolicitedly Present of Thermal Protection Activated

10.3.1 Command Syntax

URC
<CR><LF>^THERM: <ACTION><CR><LF>

10.3.2 Interface Description

This command sends an unsolicited report to the host when thermal protection is activated/inactivated according to the temperature. This command is affected by AT command `AT^CURC` (if exists).

10.3.3 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.

10.3.4 Property Description

Saving upon Power-off	PIN
NA	NA

10.3.5 Example

Response: `^THERM: 0`

11 Huawei Proprietary Interface: Network Service Interfaces

11.1 ^SRVST–Service State Change Indication

11.1.1 Command Syntax

URC
<CR><LF>^SRVST: <srv_status><CR><LF>

11.1.2 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.

11.1.3 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

11.1.4 Property Description

Saving upon Power-off	PIN
N	NA

11.1.5 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
```

11.2 ^HWNAT– Indicate Network Mode Change

11.2.1 Command Syntax

URC
<CR><LF>^HWNAT: <cur_mode><CR><LF>

11.2.2 Interface Description

When the current network mode is changed, the MT uses this command to unsolicited send the new network mode to the TE.

11.2.3 Parameter Description

<cur_mode>: current network mode, the value range is 00–99.

00	Reserved
01	GSM

02	CDMA (including 1x and EVDO)
03	WCDMA
04	TD-SCDMA
05	WiMAX
06	LTE
07	WiFi
……	
99	

11.2.4 Property Description

Saving upon Power-off	PIN
NA	NA

11.2.5 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:06

^SRVST:0

^MODE:0,0

^SRVST:0

^SRVST:1

^MODE:5,4

^SRVST:1

^SRVST:2

OK
```

11.3 ^SIMST–SIM Card State Change Indication

11.3.1 Command Syntax

URC
<CR><LF>^SIMST: <sim_state>[,<lock_state>]<CR><LF>

11.3.2 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.

11.3.3 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.

11.3.4 Property Description

Saving upon Power-off	PIN
NA	NA

11.3.5 Example

Run: AT+CPIN=1234

Response: `OK`

`^SIMST: 1`

11.4 AT^SYSINFOEX–Extended System Information Query Command

11.4.1 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>

11.4.2 Interface Description

This command queries the current system information, such as the system service status, domain, roaming status, system mode, and SIM card state.

11.4.3 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
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
22	IS95B
23	CDMA2000 1X
24	EVDO Rel0
25	EVDO RelA
26	EVDO RelB
27	HYBRID (CDMA2000 1X)
28	HYBRID (EVDO Rel0)
29	HYBRID (EVDO RelA)
30	HYBRID (EVDO RelB)
31	eHRPD Rel0
32	eHRPD RelA
33	eHRPD RelB
34	Hybrid (eHRPD Rel0)
35	Hybrid(eHRPD RelA)
36	Hybrid(eHRPD RelB)
……	
41	WCDMA
42	HSDPA
43	HSUPA
44	HSPA
45	HSPA+
46	DC-HSPA+
……	
61	TD-SCDMA
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+.

11.4.4 Property Description

Saving upon Power-off	PIN
NA	N

11.4.5 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.

11.5 AT^SYSCFGEX–Extended System Configuration Command

11.5.1 Command Syntax

AT^SYSCFGEX=<acqorder>,<band>,<roam>,<srvdomain>,<lteband>,<reserve1>,<reserve2>
Possible Response(s)
<CR><LF>OK<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>

11.5.2 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.

11.5.3 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
"05"	TD-SCDMA
"06"	Wimax
"07"	CDMA EVDO
"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 muti-netwprk mode, now ME909u-521 does not support the list that contains CDMA mode; that is, the list does not contains "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 2000
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
0000000000400000 (CM_BAND_PREF_WCDMA_IMT)	WCDMA_IMT(2100)
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.

<roam>: indicates whether roaming is supported.

0	Not supported
1	Supported
2	No change
3	Roam only

Note:

<roam>=3 (Roam only) indicates the firmware can be only registered to the roam network.

<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

Note:

For MTs that do not support LTE, <lteband> and <lteband_name> are left out in the response. In the set command, <lteband> is left out. That is:

- In the response to AT^SYSCFGEX=?, <lteband> and <lteband_name> are left out

  ^SYSCFGEX: (list of supported <acqorder>s),(list of supported (<band>,<band_name>)s),(list of supported <roam>s),(list of supported <srvdomain>s),,

  OK

- In the response to AT^SYSCFGEX?, <lteband> is left out.

  ^SYSCFGEX: <acqorder>,<band>,<roam>,<srvdomain>,,

  OK

- When AT^SYSCFGEX= is executed, <lteband> is null or unchanged.

  AT^SYSCFGEX=<acqorder>,<band>,<roam>,<srvdomain>,,<reserve1>,<reserve2>

<lteband_name>: a string type value indicating the LTE frequency band name.

<reserve1>: reserved field 1.

<reserve2>: reserved field 2.

11.5.4 Property Description

Saving upon Power-off	PIN
NA	N

11.5.5 Example

Run: AT^SYSCFGEX=?

Response: `^SYSCFGEX: ("00","03","02","01","99"),((2000004e80380,"GSM850/GSM900/GSM1800/GSM1900/WCDMA850/WCDMA900/WCDMA1900/WCDMA2100"),(3fffffff,"All Bands")),(0-3),(0-4),((800d7,"LTE1900/LTE2100/LTE2600/LTE1800/LTE900/LTEDD800/LTE850"),(7fffffffffffffff,"All Bands"))`

`OK`

Run: `AT^SYSCFGEX?`

Response: `^SYSCFGEX: "00",3FFFFFFF,1,2,7FFFFFFFFFFFFFFF`

`OK`

Run: `AT^SYSCFGEX="02",3FFFFFFF,1,2,7FFFFFFFFFFFFFFF,,`

Response: `OK`

11.6 AT^HCSQ–Query and Report Signal Strength

11.6.1 Command Syntax

`AT^HCSQ?`
Possible Response(s)
<CR><LF>`^HCSQ:` `<sysmode>`[,`<value1>`[,`<value2>`[,`<value3>`[,`<value4>`[,`<value5>`]]]]]<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`
<CR><LF>`^HCSQ:` `<sysmode>`[,`<value1>`[,`<value2>`[,`<value3>`[,`<value4>`[,`<value5>`]]]]]<CR><LF>

11.6.2 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.

11.6.3 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
"CDMA"	CDMA mode
"EVDO"	EV-DO/eHRPD mode
"CDMA-EVDO"	CDMA/EV-DO(eHRPD) mode

Note:

The CDMA-EVDO mode is a new mode supported by the MT. This mode is required because a multi-mode MT may be connected to CDMA and EV-DO networks at the same time. In CDMA-EVDO mode, the MT reports the signal strength of both networks. The query result is in the same format as the unsolicited report. If the MT reports the signal strength several times, the application layer device, after receiving the first report, works out and refreshes the signal strength bars displayed to users based on the MT's calculation. The application layer device makes the second calculation after it receives the second report from the MT, and the number of signal strength bars displayed to users may change.

<value1>, <value2>, <value3>, <value4>, <value5>: the following table lists the signal strength type corresponding to each service mode.

<sysmode>	<value1>	<value2>	<value3>	<value4>	<value5>
"NOSERVICE"					
"GSM"	gsm_rssi				
"WCDMA"	wcdma_rssi	wcdma _rscp	wcdma_ecio		
"LTE"	lte_rssi	lte_rsrp	lte_sinr	lte_rsrq	
"CDMA"	cdma_rssi	cdma_ecio			

<sysmode>	<value1>	<value2>	<value3>	<value4>	<value5>
"EVDO"	evdo_rssi	evdo_ecio	evdo_sinr		
"CDMA-EVDO"	cdma_rssi	cdma_ecio	evdo_rssi	evdo_ecio	evdo_sinr

<gsm_rssi>, <wcdma_rssi>, <lte_rssi>, <cdma_rssi>, <evdo_rssi>: an integer indicating the received signal strength. These parameters are available for GSM, WCDMA, LTE, CDMA, and EV-DO 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	rscp < –120 dBm
1	–120 dBm ≤ rscp < –119 dBm
2	–119 dBm ≤ rscp < –118 dBm
…	
94	–27 dBm ≤ rscp < –26 dBm
95	–26 dBm ≤ rscp < –25 dBm
96	–25 dBm ≤ rscp
255	Unknown or undetectable

<wcdma_ecio>, <cdma_ecio>, <evdo_ecio>: an integer indicating the downlink carrier-to-interference ratio. These parameters are available for WCDMA, CDMA, and EV-DO mode respectively.

0	Ec/Io < –32 dB
1	–32 dB ≤ Ec/Io < –31.5 dB
2	–31.5 dB ≤ Ec/Io < –31 dB
…	
63	–1 dB ≤ Ec/Io < –0.5 dB
64	–0.5 dB ≤ Ec/Io < 0 dB

65	0 dB ≤ Ec/Io
255	Unknown or undetectable

<lte_rsrp>: an integer indicating the reference signal received power (RSRP). This parameter is available for LTE mode.

0	rsrp < –140 dBm
1	–140 dBm ≤ rsrp < – 139 dBm
2	–139 dBm ≤ rsrp < –138 dBm
…	
95	–46 dBm ≤ rsrp < –45 dBm
96	–45 dBm ≤ rsrp < –44 dBm
97	–44 dBm ≤ 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	sinr < –20 dB
1	–20 dB ≤ sinr < –19.8 dB
2	–19.8 dB ≤ sinr < –19.6 dB
…	
249	29.6 dB ≤ sinr < 29.8 dB
250	29.8 dB ≤ sinr < 30 dB
251	30 dB ≤ sinr
255	Unknown or undetectable

<lte_rsrq>: an integer indicating the reference signal received quality (RSRQ) in dB.

0	rsrq < –19.5 dB
1	–19.5 dB ≤ rsrq < –19 dB
2	–19 dB ≤ rsrq < –18.5 dB
…	
32	–4 dB ≤ rsrq < –3.5 dB
33	–3.5 dB ≤ rsrq < –3 dB
34	–3 dB ≤ rsrq
255	Unknown or undetectable

<evdo_sinr>: an integer indicating the signal to interference plus noise ratio. This parameter is available for EV-DO mode.

0	sinr < –9 dB
1	–9 dB ≤ sinr < –6 dB
2	–6 dB ≤ sinr < –4.5 dB
3	–4.5 dB ≤ sinr < –3 dB
4	–3 dB ≤ sinr < –2 dB
5	–2 dB ≤ sinr < 1 dB
6	1 dB ≤ sinr < 3 dB
7	3 dB ≤ sinr < 6 dB
8	6 dB ≤ sinr
255	Unknown or undetectable

11.6.4 Property Description

Saving upon Power-off	PIN
NA	NA

11.6.5 Example

Run:
```
AT^HCSQ=?
```
Response:
```
^HCSQ:
"NOSERVICE","GSM","WCDMA","LTE","CDMA","EVDO"

OK
```
Run:
```
AT^HCSQ?
```
Response:
```
^HCSQ: "WCDMA",30,30,58

OK
```

11.7 AT^EONS–Query the Service Provider Name and the EFSPN Information of the SIM Card

11.7.1 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>

11.7.2 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.

11.7.3 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.

11.7.4 Property Description

Saving upon Power-off	PIN
NA	Y

11.7.5 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,"004800550041005700450049002000540045005300540020005700300039","004800540057003000390",3,"004800550041005700450049"


OK
```

Note:

The mapping between the long name, short name, and SPN and related hexadecimal codes is as follows:

- HUAWEI TEST W09: 00480055004100570045004900200054004500530054002000570030003 9
- HTW09: 00480054005700300039

11.8 AT^IMEISV–Query the IMEISV

11.8.1 Command Syntax

AT^IMEISV?
Possible Response(s)
<CR><LF>^IMEISV: <imeisv><CR><LF><CR><LF>OK<CR><LF>

11.8.2 Interface Description

This command is used to query the international mobile equipment identity and software version (IMEISV) of the board.

11.8.3 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

11.8.4 Property Description

Saving upon Power-off	PIN
NA	N

11.8.5 Example

Run: `AT^IMEISV?`

Response: `^IMEISV: 3545240400110917`

`OK`

35452404001109: the first 14 characters of the board IMEI

17: SVN

12 Huawei Proprietary Interface: GPS Service Interfaces

12.1 AT^WPDOM–Set Operation Mode

12.1.1 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>

12.1.2 Interface Description

This command is used to set operation mode in the positioning process.

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 is used to read the current operation mode.

The test command is used to return the value range of the operation mode.

12.1.3 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.
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 not automatically switched to the standalone mode for positioning.
2	Speed optimal. The positioning data with the optimal speed is obtained, that is, the minimum TTF mode is used. The speed optimal mode is only MS-based in UMTS.
3	Accuracy optimal. The positioning data with the optimal accuracy is obtained. The accuracy optimal mode is only MS-assisted in UMTS.
4	Data optimal. The MS uses the minimum PDE data interaction mode with the network side. The data optimal mode is only standalone in UMTS.
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.
6	gpsOneXTRA, which is the enhanced mode of standalone. Before the GPS searches the satellite, the GPS downloads the ephemeris data from the Internet. The orbit equation contained in the ephemeris data can save the time during data demodulation.
7	Low Accuracy MSA. The terminal originates an MSA positioning session with extremely low positioning accuracy in bad weather. The server side determines the positioning mode. Some positioning modes are directly converted into cell ID for positioning. Some positioning modes are converted to cell id after the MSA positioning session fails. The other positioning modes are never converted into cell ID. (In this operation mode, a specified QoS positioning session is originated, and the user does not need to set the QoS parameters.)

<err>: error type prompts

Error code	Description
4	operation not supported
276	GPS function disabled
277	Standalone disabled

Error code	Description
278	AGPS disabled
279	gpsOneXTRA disabled
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

12.1.4 Property Description

Saving upon Power-off	PIN
N	N

12.1.5 Example

- Query the value range of operation mode:

Run: `AT^WPDOM=?`

Response:
```
^WPDOM: (0-7)

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=2`

Response: `OK`

12.2 AT^WPDST–Set Session Type

12.2.1 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>

12.2.2 Interface Description

This command is used to set 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 is used to read the current session type.

The test command is used to return the value range of the session type.

12.2.3 Parameter Description

<type>: session type. The default value is 0.

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. (not supported currently)
3	Downloads data. Allows the MS to download the ephemeris/almanac data and the coarse position a-priori data. This setting makes the MS ready for obtaining future positioning information, and is applicable only to the CDMA network. (not supported currently)

<err>: error type prompts

Error code	Description
4	operation not supported
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

12.2.4 Property Description

Saving upon Power-off	PIN
N	N

12.2.5 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`

12.3 AT^WPDFR–Set Positioning Frequency

12.3.1 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>

12.3.2 Interface Description

This command is used to set 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 is used to read the current positioning frequency.

The test command is used to return the value range of the positioning frequency.

Note:

This command can be used to set the positioning frequency only after the session type is set to tracing positioning by AT^WPDST.

12.3.3 Parameter Description

<num>: number of positioning operations triggered by the designated MS. The value ranges from 1 to 65535, and the default value is 65535.

<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.

<err>: error type prompts.

Error code	Description
4	operation not supported
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

12.3.4 Property Description

Saving upon Power-off	PIN
N	N

12.3.5 Example

- Query the value range of positioning frequency:

```
Run:        AT^WPDFR=?
Response:   ^WPDFR: (1-65535),(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

12.4 AT^WPQOS–Set QoS

12.4.1 Command Syntax

AT^WPQOS=<performance>,<accuracy>
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an 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>

12.4.2 Interface Description

This command is used to set the QoS value of the positioning request, including satellite searching time limit and accuracy threshold.

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 is used to read the current satellite searching time limit and accuracy threshold.

The test command is used to return the value range of the satellite searching time limit and accuracy threshold.

12.4.3 Parameter Description

<performance>: indicates the response time during the measurement of the GPS pseudorange. The unit is second. The value ranges from 1 to 255, and the default value is 255.

1–255	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.

<err>: error type prompts.

Error code	Description
4	operation not supported
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

12.4.4 Property Description

Saving upon Power-off	PIN
N	N

12.4.5 Example

- Query the value range of QoS parameter:

```
Run:        AT^WPQOS=?
Response:   ^WPQOS: (1-255),(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=0,50
Response:   +CME ERROR: Invalid parameter
```

Run: AT^WPQOS=255,20

Response: +CME ERROR: Invalid parameter

12.5 AT^WPDGL–Set GPS Session Lock

12.5.1 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>

12.5.2 Interface Description

This command is used to set a GPS session lock.

The set command is used to set 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 is used to read the current GPS session lock mode.

The test command is used to return the value range of the session lock type.

12.5.3 Parameter Description

<option>: GPS session lock type. The default value is 0. 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.

<err>: error type prompts.

Error code	Description
4	operation not supported
100	Unknown
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

12.5.4 Property Description

Saving upon Power-off	PIN
Y	N

12.5.5 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

12.6 AT^GPSTYPE–Query GPS Type

12.6.1 Command Syntax

AT^GPSTYPE?
Possible Response(s)
<CR><LF>^GPSTYPE: <type><CR><LF><CR><LF>OK<CR><LF>

12.6.2 Interface Description

The read command is used to query the GPS type supported by the board.

12.6.3 Parameter Description

<type>: an integer indicating GPS type that is described as bit. Bit 1 indicates support, and bit 0 indicates not support. The default value is 15.

Bit	Bit3	Bit2	Bit1	Bit0
GPS Type	gpsOneXTRA	User plane	Control plane	Standalone

Bit0 Whether to support standalone

Bit1 Whether to support control plane

Bit2 Whether to support user plane

Bit3 Whether to support gpsOneXTRA (XTRA and Standalone must be supported simultaneously)

<err>: error type prompts.

Error code	Description
4	operation not supported
100	unknown

12.6.4 Property Description

Saving upon Power-off	PIN
Y	N

12.6.5 Example

If the module supports all GPS types:

Run:	AT^GPSTYPE?	
Response:	^GPSTYPE: 15	The binary digit of 15 is 1111.
	OK	

12.7 AT^WGNSS–Set Positioning System

12.7.1 Command Syntax

AT^WGNSS=<pdsystem>
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^WGNSS?
Possible Response(s)
<CR><LF>^WGNSS: <pdsystem><CR><LF><CR><LF>OK<CR><LF>
AT^WGNSS=?
Possible Response(s)
<CR><LF>^WGNSS: (list of supported <pdsystem>s)<CR><LF><CR><LF>OK<CR><LF>

12.7.2 Interface Description

This command is used to set the positioning system in the positioning process.

The set command is used to set whether to adopt the GPS system or a global navigation satellite system (GNSS) system. 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.

When AT^WGNSS=0 (GPS system type), the following NMEA sentences are reported during the positioning process: $GPGGA, $GPGSA, $GPGSV, $GPRMC and $GPVTG.

When AT^WGNSS=1 (GNSS system type), the following NMEA sentences are reported during the positioning process: $GPGGA, $GPGSA, $GPGSV, $GPRMC, $GPVTG,

$GNGNS, $GNGSA and $GLGSV.

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.

12.7.3 Parameter Description

<pdsystem>: positioning system type. The default value is 0. Switching the positioning system type takes effective after the board is reset. The values are as follows:

0 GPS

1 GNSS

<err>: error type prompts

Error code	Description
4	operation not supported
100	Unknown
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

12.7.4 Property Description

Saving upon Power-off	PIN
Y	N

12.7.5 Example

- Query the value range of positioning system's type:

Run: `AT^WGNSS=?`

Response:
```
^WGNSS: (0-1)

OK
```

- Query the current positioning system type:

Run: `AT^WGNSS?`

Response: `^WGNSS: 0`

`OK`

- Set the positioning system type:

Run: `AT^WGNSS=1`

Response: `OK`

12.8 AT^WPURL–Set AGPS Server Address and Port on the WCDMA Network

12.8.1 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>

12.8.2 Interface Description

The set command is used to set the address of the AGPS server on the WCDMA 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 is used to read the address of the current AGPS server.

12.8.3 Parameter Description

`<url>`: address of the AGPS server in the WCDMA server. It is a DNS address or an IP address. (without quotation marks)

`<err>`: error type prompts

Error code	Description
4	operation not supported
100	Unknown

Error code	Description
278	AGPS disabled
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters

12.8.4 Property Description

Saving upon Power-off	PIN
Y	N

12.8.5 Example

Set the address and port number of the AGPS server:

Run:	`AT^WPURL=XXXXXX:XXXX`	Set the address and port number of the AGPS server.
Response:	`OK`	

12.9 AT^WPDGP–Start Positioning Session

12.9.1 Command Syntax

`AT^WPDGP`
Possible Response(s)
<CR><LF>`OK`<CR><LF> In case of an error: <CR><LF>`+CME ERROR: <err>`<CR><LF>

12.9.2 Interface Description

This command is used to enable 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.

12.9.3 Parameter Description

<err>: error type prompts

Error code	Description
4	operation not supported
276	GPS function disabled
277	Standalone disabled
278	AGPS disabled
279	gpsOneXTRA disabled
283	PD session is ongoing
287	GPS locked

12.9.4 Property Description

Saving upon Power-off	PIN
NA	N

12.9.5 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

12.10 AT^SOCKETCONT–Set the AGPS Socket Profile

12.10.1 Command Syntax

AT^SOCKETCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]]
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^SOCKETCONT?
Possible Response(s)
<CR><LF>^SOCKETCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[<CR><LF>^SOCKETCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[...]]<CR><LF><CR><LF>OK<CR><LF>
AT^SOCKETCONT=?
Possible Response(s)
<CR><LF>^SOCKETCONT: (list of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s)[<CR><LF>^SOCKETCONT: (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>

12.10.2 Interface Description

This command is used to set the AGPS PDP context.

The set command is used to save PDP context parameters into the profile of index 15. The set command is available only before or after a positioning session. Do not modify parameters during the positioning process. Otherwise, an error is returned.

The AT^SOCKETCONT=<cid> command is used to delete the PDP context of index 15 regardless of the value of the <cid> parameter.

The read command is used to obtain values of parameters that are defined in the PDP context.

The test command is used to return all supported values.

12.10.3 Parameter Description

<cid>: index of the PDP context, ranging from 1 to 16.

When the AT^SOCKETCONT command is executed, delivered PDP profile parameters are forcedly written into the PDP profile of index 15 regardless of the value of the <cid> parameter.

<PDP_type>: a character string indicating the type of the packet data protocol. Available values as follows:

IP	IP protocol
PPP	Point to point protocol(not support currently)

<apn>: a character string indicating the domain name of the access point.

<PDP_addr>: a character string indicating the MT address.

<d_comp>: integer, indicating the PDP data compression mode. (not supported currently)

Available values as follows:

0	Not compress (default value)
1	Compress
2	V.42bis

<h_comp>: integer, indicating the PDP header compression mode. (not supported currently)

0	Not compress (default value)
1	Compress
2	RFC1144 (applicable for SNDCP only)
3	RFC2507
4	RFC3095 (applicable for PDCP only)

12.10.4 Property Description

Saving upon Power-off	PIN
Y	N

12.10.5 Example

Run:	AT^SOCKETCONT=1,"IP","abc.com","10.111.145.233",1,1	Modify the PDP context of index 15 on the MT (regardless of the value of the <cid> parameter).
Response:	OK	

Run:	AT^SOCKETCONT=1	Delete the PDP context of index 15 (regardless of the value of the <cid> parameter).
Response:	OK	

12.11 AT^WPEND–Terminate Positioning Process

12.11.1 Command Syntax

AT^WPEND
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an error: <CR><LF>+CME ERROR: <err><CR><LF>

12.11.2 Interface Description

This command is used to end 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.

12.11.3 Parameter Description

<err>: error type prompts

Error code	Description
4	operation not supported
284	PD session is in off status

12.11.4 Property Description

Saving upon Power-off	PIN
NA	N

12.11.5 Example

- Terminate the PD session successfully:

Run: AT^WPEND

Response: OK

- PD Session is not on going, Terminate Failture:

Run: AT^WPEND

Response: +CME ERROR: PD session is in off status

12.12 AT^WPDIM–Delete Auxiliary Data

12.12.1 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>

12.12.2 Interface Description

The set command is used to delete 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 is used to return the supported deletion type.

12.12.3 Parameter Description

<mode>: deletion type.

0	Cold start
1	Warm start
2	Hot start (default value)
3	gpsOneXTRA. If the module does not support the XTRA mode, this parameter is not supported.

<err>: error type prompts

Error code	Description
4	operation not supported
279	gpsOneXTRA disabled
281	Invalid parameter
282	Unable to delete data
285	Too many parameters
289	MGP receiver is ongoing

12.12.4 Property Description

Saving upon Power-off	PIN
NA	N

12.12.5 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`

12.13 AT^XTRATIME–Inject XTRA Time

12.13.1 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>

12.13.2 Interface Description

This command is used to inject 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.

Note:

`OK` indicates that the injection request is sent, but does not indicate that the time information is injected into the board. The successful time injection information is reported by `^TIMESETRULT`.

The set command is available before or after the session is positioned. Otherwise, an error message is returned.

12.13.3 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

`<err>`: error type prompts

Error code	Description
4	operation not supported
100	Unknown
277	Standalone disabled
279	gpsOneXTRA disabled
281	Invalid parameter
283	PD session is ongoing

Error code	Description
285	Too many parameters

12.13.4 Property Description

Saving upon Power-off	PIN
N	N

12.13.5 Example

Inject XTRA time:

Run: `AT^XTRATIME=235,250,0,0,1`

Response: `OK`

12.14 ^TIMESETRULT–Notify XTRA Time Injection

12.14.1 Command Syntax

URC
<CR><LF>`^TIMESETRULT: <status>`<CR><LF>

12.14.2 Interface Description

This command is used by the board to notify the GPS tool of the time injection after the GPS tool injects the XTRA time into the board.

12.14.3 Parameter Description

`<status>`: indicates whether the XTRA time is successfully injected. The values are as follows:

0 Injection succeeds

1 Injection fails

12.14.4 Property Description

Saving upon Power-off	PIN
NA	N

12.14.5 Example

If XTRA time have been injected successfully:

Response: `^TIMESETRULT: 0`

12.15 AT^XTRADATA–Inject Auxiliary XTRA Data

12.15.1 Command Syntax

AT^XTRADATA=<total>,<index>,<item>,<length>,<xtra_dc_status>
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an error: <CR><LF>+CME ERROR: <err><CR><LF>

12.15.2 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.

Note:

OK indicates that the injection request is sent, but does not indicate that the auxiliary XRTA data is injected into the board. The successful XRTA data injection information is reported by AT^TIMESETRULT.

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 XRTA 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.

12.15.3 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)

<length>: byte of the transmitted auxiliary data file and the value must be the same as the length of item.

<xtra_dc_status>: indicates whether the downloading succeeds. The values are as follows:

0 Fails

1 Succeeds

<err>: error type prompts

Error code	Description
4	operation not supported
100	Unknown
277	Standalone disabled
279	gpsOneXTRA disabled
281	Invalid parameter
283	PD session is ongoing
285	Too many parameters
290	No time information

12.15.4 Property Description

Saving upon Power-off	PIN
Y	N

12.15.5 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; 1 indicates downloading succeeds.

Run:

```
AT^XTRADATA=155,1,011b060201100148f9d77800009af606
8a2047e789068a202fbf00061c0100251407100f0e0d0c0b0a
0c370810100f0e0d0c0a090e5308110f0e0e0c0c09080d9602
0b05020303c21f010004bb240ba2fd5600a10cda001a4cc400
25576fffbe55ab00dc0003068b0200595724fdadfd4300a10c
b50019d4d9ff8b41cb00021b9d018d0000068b03007b0b24f8
55fd2700a10d1cffea7edd002fb1280007990d000a0001068b
040051c824fd0efd4300a10de9001a86820021c5e2007fdb71
00610003068b050016372405d7fd4500a10c6b004525c0000b
dcc3004fd4a3fed8ffff068b0600396524fce3fd2e00a10d15
ffed9544ffe727cc00564c87001f00,512,1
```

Response:

```
OK
```

12.16 ^DATASETRULT–Notify XTRA Data Injection

12.16.1 Command Syntax

URC
<CR><LF>^DATASETRULT: <status><CR><LF>

12.16.2 Interface Description

This command is used by the board to notify the GPS tool of the XTRA data injection after the GPS tool injects the XTRA data into the board.

12.16.3 Parameter Description

<status>: indicates whether the XTRA data is successfully injected. The values are as follows:

0	XTRA data injection succeeds
1	The cyclic redundancy check (CRC) performed for the XTRA data CRC fails
2	Incorrect XTRA data length
3	Invalid time range
4	XTRA data injection fails
50	The number of the XTRA data file packets does not reach the total number, waiting for further injection

12.16.4 Property Description

Saving upon Power-off	PIN
NA	N

12.16.5 Example

If auxiliary XTRA data have been injected successfully:

Response: `^DATASETRULT: 0`

12.17 AT^XTRASTA–Query XTRA Data Status

12.17.1 Command Syntax

AT^XTRASTA
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an error: <CR><LF>+CME ERROR: <err><CR><LF>

12.17.2 Interface Description

This command is used to judge 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.

Note:

OK indicates that the request for judging the XTRA data status is sent. The XRTA data status information is reported by AT^XDSTATUS.

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.

12.17.3 Parameter Description

<err>: error type prompts

Error code	Description
4	operation not supported
100	Unknown
277	Standalone disabled
279	gpsOneXTRA disabled
283	PD session is ongoing
290	No time information

12.17.4 Property Description

Saving upon Power-off	PIN
NA	N

12.17.5 Example

Query the XTRA data status:

Run: `AT^XTRASTA`

Response: `OK`

12.18 ^XDSTATUS–Notify XTRA Data Status

12.18.1 Command Syntax

URC
<CR><LF>^XDSTATUS: <year>,<month>,<day>,<hour><CR><LF>

12.18.2 Interface Description

This command is used by the board to notify the GPS tool of the XTRA data status after the GPS tool sends the request for querying the XTRA data status to the board.

12.18.3 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.

12.18.4 Property Description

Saving upon Power-off	PIN
NA	N

12.18.5 Example

If `AT^XTRASTA` command have been executed successfully:

Response: `^XDSTATUS: 0,0,0,0`

12.19 ^POSEND–Report Positioning End Information

12.19.1 Command Syntax

URC
<CR><LF>`^POSEND: <reason>,<leftfixnum>`<CR><LF>

12.19.2 Interface Description

This command is used to report the ending reason and the left positioning times when the positioning ends and the positioning session is over.

12.19.3 Parameter Description

`<reason>`: positioning end reason

–1	Normal end
0	Session ended due to phone going offline
1	Session ended due to no service
2	Session ended due to no connection with PDE
7	Session ended due to connection failure with PDE
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
16	Session rejected from PDE

18	Ending session due to E911 call
20	Ending because BS information is stale
21	Session ended due to VX LCS agent authorization failure
22	Session ended due to unknown system error
23	Session ended due to unsupported service
24	Subscription violation
25	The desired fix method failed
28	Network indicated a normal ending of the session
29	No error specified by the network
31	Session ended due to position server not available
32	Network reported an unsupported version of protocol
33	Mapped to corresponding SS-MOLR-error error code
34	MO-LR unexpected error
35	MO-LR Data missing
36	MO-LR facility not supported
37	MO-LR subscription violation
38	MO-LR position method failure
39	MO-LR undefined error
43	Position response Nongood (NG) reception (LIS side system anomaly)
44	Position response NG reception (beyond the LSU maximum session count)
45	Position response NG reception (MS side setting information failure)
46	Session interruption NG reception (LIS side system anomaly)
47	Session interruption NG reception (MS side setting information failure)
48	Abnormal response reception
49	T04 timer timed out
50	T03 timer timed out
51	T02 timer timed out
52	IS-801 timer timed out
53	LR reject reception
54	AA reject reception
55	EPH reject reception
56	ALM reject reception

57	Seed reject reception
58	IS-801 sequence error
59	PPP establish trial failure
60	Network link disconnection after PPP established (MS-initiated)
61	Network link disconnection after PPP established (server-initiated)
62	GPS data request response NG reception (LIS side system anomaly)
63	GPS data request response NG reception (beyond LSU maximum session count)
64	GPS data request response NG reception (MS side setting information)
65	GPS data request interruption NG reception (LIS side system)
66	GPS data request interruption NG reception (MS side setting information)
67	T20 timer timed out
68	T21 timer timed out
901	No fix with download the data
911	MSA (MSB auto) – No fix with download the data

<leftfixnum>: left positioning times

12.19.4 Property Description

Saving upon Power-off	PIN
NA	N

12.19.5 Example

If user ended the PD session:

Response: ^POSEND: 9,0

12.20 ^WNINV–Notify NI Positioning

12.20.1 Command Syntax

URC
<CR><LF>^WNINV: <req_type><CR><LF>

12.20.2 Interface Description

This command is used by the board to notify the user of the positioning request from the network side.

12.20.3 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.

12.20.4 Property Description

Saving upon Power-off	PIN
NA	N

12.20.5 Example

- Notify and verify NI positioning:

Response: ^WNINV: 0

- Only notify NI positioning:

Response: ^WNINV: 1

- No notify No verify:

Response: ^WNINV: 2

12.21 AT^WNICT–Set NI Response

12.21.1 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>

12.21.2 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 is used to return all supported values.

12.21.3 Parameter Description

<choice>: indicates whether the user accepts the NI request. The values are as follows:

0 No

1 Yes

<err>: error type prompts

Error code	Description
4	operation not supported
281	Invalid parameter
285	Too many parameters

12.21.4 Property Description

Saving upon Power-off	PIN
NA	N

12.21.5 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`

13 Appendix

13.1 List of URC Commands

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
^SMMEMFULL	Message memory full
^IPSTATE	Indicate TCP/UDP data link state
^TIMESETRULT	Notify XTRA time injection
^DATASETRULT	Notify XTRA data injection

URC	Function
^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")
^HRSSILVL	RSSI or System Mode Change Indication (be replaced by the URC "^HCSQ")

URC	Function
^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)
^SIMFILEREFRESH	(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)

13.2 General CME Error List

The following describes the mapping between numeric mode and verbose mode.

Table 13-1 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

Table 13-2 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

13.3 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

Numeric mode	Verbose mode
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	(U)SIM not inserted
311	(U)SIM PIN required
312	PH-(U)SIM PIN required
313	(U)SIM failure
314	(U)SIM busy
315	(U)SIM wrong
316	(U)SIM PUK required
317	(U)SIM PIN2 required
318	(U)SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network timeout
340	no +CNMA acknowledgement expected
500	unknown error
...511	other values in range 256...511 are reserved
512...	manufacturer specific

13.4 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.

Final Result Code	No.	Description
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.
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.

13.5 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 31.111

[9] 3GPP TS 44.060

[10] ETSI TS 102.221

[11] ETSI TS 102.223

[12] GSM 07.05

[13] GSM 51.011

[14] ITU-T Recommendation V.25 ter

[15] HUAWEI Terminal AT Command Interface Specifications

13.6 Acronyms and Abbreviations

Acronym or Abbreviation	Full spelling
3GPP	Third Generation Partnership Project
AT	ATtention
APN	Access Point Name
CDMA	Code Division Multiple Access
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
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
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

Acronym or Abbreviation	Full spelling
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
USIM	Universal Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
VP	Validity Period
WCDMA	Wideband CDMA