HUAWEI MU736 HSPA+ M.2 Module

AT Command Interface Specification

Issue 04

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About This Document

Revision History

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02	2013-12-24	1	Updated the description of Introduction
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		15.1	Added the command of AT^IPV6CAP–Query IPv6 Capability
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		16.1	Added the command of AT^ANTENCFG–Set Tunable Antenna
		17	Added the chapter of Huawei Proprietary Interface: Main And AUX Switch Interface
		17.1	Added the command of AT^ANTMODE–Set Operation Mode of Main and AUX Antennas

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1 Introduction

1.1 Scope

This document describes AT command interface specifications that is supported by Huawei terminal product MU736 module.

Please read the release notes released with the firmware before using MU736 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.

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1.3 Organization

Chapter 2 "General Commands" to chapter 9 "Commands for Standard STK Interface" describe AT interfaces defined in international standards such as 3GPP and ITU-T.

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

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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:

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<...>: 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

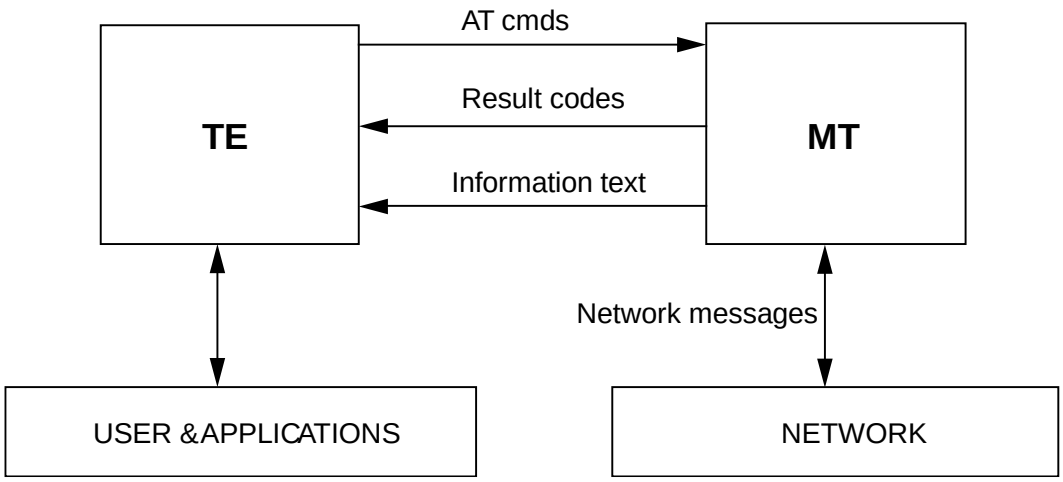

Figure 1-2 shows the basic organization format of the AT command line.

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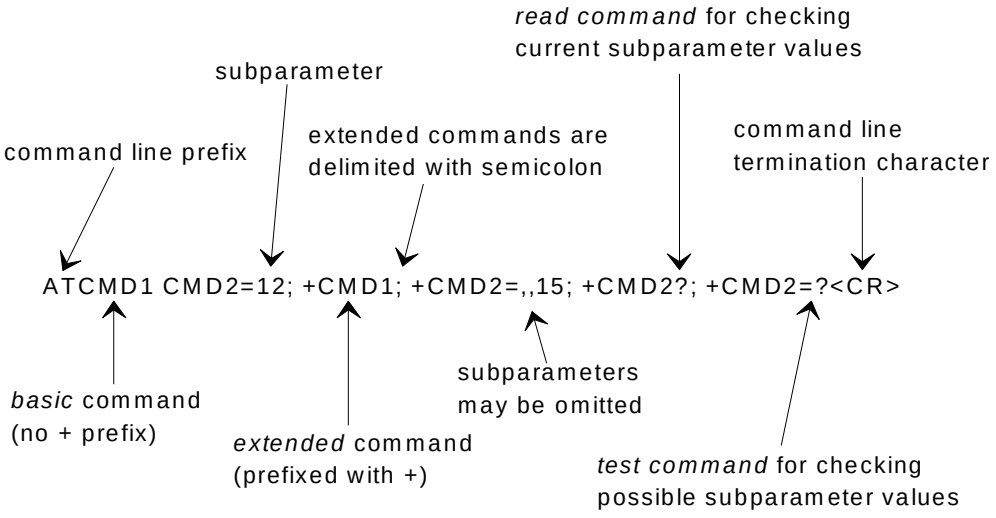
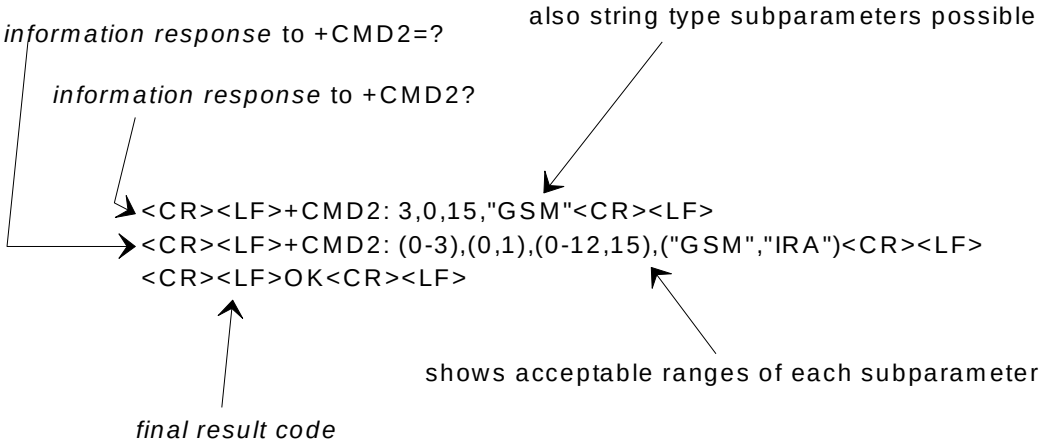
Figure 1-2 Basic organization format of the AT command line



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



1.6 Abort Attributes of AT Command

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

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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 Command

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.

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2 General Commands

2.1 ATV–Set the Response Format

2.1.1 Command Syntax

ATV[<value>]
Possible Response(s)
<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.

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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 0.

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>: an integer type value and the valid value set is 0–1.

0 Query the previously described MS ID information.

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

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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: MU736
Revision: 12.103.12.00.00
IMEI: 492100022000114
+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

The execution command queries the MT's manufacturer information. `AT+GMI` and `AT+CGMI` have the same function and syntax.

The test command returns "`OK`".

2.3.3 Parameter Description

`<manufacturer>`: a string indicating the manufacturer information.

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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

The execution 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 wants 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.

The test command returns "`OK`".

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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: MU736

Run: AT+CGMM

Response: MU736

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

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

The test command returns "OK".

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.

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2.5.4 Property Description

Saving upon Power-off	PIN
NA	N

2.5.5 Example

Run: `AT+CGMR`

Response:

```
12.103.13.00.00

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

The execution command requests the MT's IMEI. `AT+GSN` and `AT+CGSN` have the same function and syntax.

The test command returns "`OK`".

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.

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8 char	6 char	1 char
TAC	SNR	Spare

TAC : the type approval code assigned to the MT.

SNR : the MT's serial number.

Spare: spare digit.

2.6.4 Property Description

Saving upon Power-off	PIN
NA	N

2.6.5 Example

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

Run: `AT+CGSN`

Response:
```
351548000225444

OK
```

2.7 AT+CSCS–Set the TE Character Set

2.7.1 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)

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```
<CR><LF>+CSCS: (list of supported
<chset>s)<CR><LF><CR><LF>OK<CR><LF>
```

2.7.2 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 and TE use 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.

The read command queries the current TE character set.

The test command queries the character set supported by the TE.

2.7.3 Parameter Description

<chset>: at present, the default character set used by MS is "IRA". Other character sets are listed below (only the "IRA", "GSM" and "UCS2" character sets are supported currently).

"GSM"	GSM 7 bit default alphabet (3GPP TS 23.038); this setting causes easily software flow control (XON/XOFF) problems.
"IRA"	International reference alphabet (ITU–T T.50) (default value)
"UCS2"	16-bit universal multiple-octet coded character set (ISO/IEC10646); UCS2 character strings are converted to hexadecimal numbers from 0000 to FFFF; for example, "004100620063" equals three 16-bit characters with decimal values 65, 98 and 99.

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).

2.7.4 Property Description

Saving upon Power-off	PIN
N	N

2.7.5 Example

Run: `AT+CSCS=?`

Response:

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

OK
```


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Run: `AT+CSCS?`

Response: `+CSCS: "IRA"`

`OK`

Run: `AT+CSCS="GSM"`

Response: `OK`

2.8 AT+CIMI–Request IMSI

2.8.1 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>

2.8.2 Interface Description

The execution command requests the USIM or SIM card's IMSI.

2.8.3 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

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2.8.4 Property Description

Saving upon Power-off	PIN
NA	Y

2.8.5 Example

If the MCC is 460, the MNC is 09, and the MSIN is 7552011825, then

Run: `AT+CIMI`

Response:

```
460097552011825

OK
```


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3 Call Control Commands and Methods

3.1 ATD–Originate a Data Service Call

3.1.1 Command Syntax

ATD[<digits>]
Possible Response(s)
<CR><LF>OK<CR><LF>

3.1.2 Interface Description

This command initiates a data service call.

3.1.3 Parameter Description

<digits>: the called phone number, ASCII characters. Valid characters are '0'–'9', '*', '#', and '+'. '+' is only allowed before a phone number. The maximum length of a phone number is 24 characters (excluding '+'). <digits> should be specified.

3.1.4 Property Description

Saving upon Power-off	PIN
NA	Y

3.1.5 Example

Run: ATD*99#

Response: CONNECT 21600000

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4 Network Service Related Commands

4.1 AT+COPS–Select Operator

4.1.1 Command Syntax

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

4.1.2 Interface Description

The set command automatically or manually selects a GSM or UMTS network. When <Act> is not specified in the command, the <Act> setting on the MT is not changed.

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The read command returns the current network selection mode. If the registration is successful, the current operator information will be returned.

The test command returns the list of (up to 20) operators existent in the current network.

Note:

When <mode>=1, the command is aborted, and it will return OK for aborting.

4.1.3 Parameter Description

<mode>: network selection mode, saved upon Power-off.

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

<Act>: access technology selected.

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

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4.1.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.1.5 Example

1. 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
```

2. 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.

3. Manual selection

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

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.

4. Requesting network state

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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" OK	

4.2 AT+CREG–Register Network

4.2.1 Command Syntax

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

4.2.2 Interface Description

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

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

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

4.2.3 Parameter Description

<n>:

0	Disable network registration unsolicited result code +CREG.
1	Enable network registration unsolicited result code +CREG: <stat>.

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2	Enable network registration and location information unsolicited result code `+CREG: <stat>[,<lac>,<ci>[,<AcT>]]`. (default value)

`<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; two byte location area code or tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal, and means two bytes of "0x00" and "0xC3").

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

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

0	GSM
1	GSM Compact (not supported currently)
2	UTRAN
3	GSM w/EGPRS (see Note 1)
4	UTRAN w/HSDPA (see Note 2)
5	UTRAN w/HSUPA (see Note 2)
6	UTRAN w/HSDPA and HSUPA (see Note 2)
7	E-UTRAN (not supported currently)

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.

4.2.4 Property Description

Saving upon Power-off	PIN
N	Y

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4.2.5 Example

Run: `AT+CREG?`

Response:
```
+CREG: 2,1,"2513","000E01F4",6

OK
```

Run: `AT+CREG=1`

Response: `OK`

Run: `AT+CREG=?`

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

OK
```

4.3 AT+CLCK–Lock Facility

4.3.1 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>

4.3.2 Interface Description

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

The test command returns the supported facilities.

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4.3.3 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
"AG"	All outGoing barring services
"AI"	Bar all incoming calls
"AO"	Bar all outgoing calls
"OI"	Bar outgoing international calls
"OX"	Bar outgoing international calls except to home country
"PN"	Network Personalization
"IR"	BIC-Roam (Bar incoming calls when roaming outside the home country) (refer to GSM 02.88 clause 2)
"FD"	SIM fixed dialing memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as <passwd>.)

Note:

The passwords for "SC" and "FD" 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'.

<class>: not supported currently.

1	Voice (telephony)

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2	Data
4	Fax
8	Short message service

4.3.4 Property Description

Saving upon Power-off	PIN
Y	Y

4.3.5 Example

Run: `AT+CLCK=?`

Response:
```
+CLCK: ("AO","OI","AI","IR","OX","AB","AG","AC",
"PS","PN","PU","PP","PC","SC","FD")

OK
```

Run: `AT+CLCK="SC",2`

Response:
```
+CLCK: 0

OK
```

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

Response: `OK`

4.4 AT+CPWD–Change Password

4.4.1 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>

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In case of an MT-related error:

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

4.4.2 Interface Description

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

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

4.4.3 Parameter Description

<fac>: specifies the target of this command. For details about the parameter values, refer to the AT+CLCK command.

"P2" SIM PIN2

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

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

4.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.4.5 Example

Run: AT+CPWD=?

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

OK
```

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

Response: OK

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4.5 AT+CUSD–USSD Command

4.5.1 Command Syntax

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

4.5.2 Interface Description

The set command sends the USSD (Unstructured Supplementary Service Data) message to the network.

The read command queries the USSD mode.

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

4.5.3 Parameter Description

<n>: integer type (sets/shows the result code presentation status to the TE).

0	Disable the result code presentation to the TE.
1	Enable the result code presentation to the TE.
2	Cancel session (not applicable to the read command response)

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

- If <dcs> indicates that 3GPP TS 23.038 7 bit default alphabet is used.
  - If TE character set other than "HEX" (refer section 2.7 AT+CSCS–Set the TE Character Set): MT/TA converts GSM alphabet into current TE character set according to rules of 3GPP TS 27.005.
  - If TE character set is "HEX": MT/TA converts each 7-bit character of GSM alphabet into two IRA character long hexadecimal number (e.g. character Π (GSM 23) is presented as 17 (IRA 49 and 55)).

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- If <dcs> indicates that 8-bit data coding scheme is used: MT/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
- If <dcs> indicates that 16-bit data coding scheme (UCS2) is used: MT/TA splits the 16 bits into two 8-bit octets. Each of those octets are converted as per the 8-bit data coding scheme, with the most significant octet first (e.g. decimal value 4906 is presented to TE as four characters 132A (IRA 49, 51, 50 and 65)).
- If <str> is null, then the module will treat the command as AT+CUSD=<n>.

<dcs>: integer type (shows Cell Broadcast Data Coding Scheme, see 3GPP TS 23.038).

When the AT command AT^USSDMODE=0, the UE only can support the GSM 7bit and 8bit data coding scheme, not support the UCS2 data coding scheme.

<m>: integer type (shows the USSD response from the network or the network initiated operation).

0	No further user action required (network initiated USSD–Notify, or no further information needed after mobile initiated operation)
1	Further user action required (network initiated USSD–Request, or further information needed after mobile initiated operation)
2	USSD terminated by network
3	Other local client has responded
4	Operation not supported
5	Network time out

4.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.5.5 Example

Run: AT+CUSD=1,"AAD808",15

Response: OK

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4.6 +CUSD–Unsolicitedly Present USSD of Network

4.6.1 Command Syntax

URC
<CR><LF>+CUSD: [<m>[,<str>[,<dcs>]]]<CR><LF>

4.6.2 Interface Description

When the network responses to USSD originated by MT, or it requests USSD, MT will unsolicitedly report "+CUSD: [<m>[,<str>[,<dcs>]]]" to TE.

4.6.3 Parameter Description

The definition of its parameters and the use of this command see section 4.5 AT+CUSD–USSD Command.

4.6.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.6.5 Example

Response:

```
+CUSD: 0,"CD69724A74EA1A385B6C9683CD6E30182C5703"
,15

+CUSD: 2
```


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5 Mobile Termination Control and Status Commands

5.1 AT+CFUN–Set Operation Mode

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

5.1.2 Interface Description

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

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The read command returns the current mode.

The test command returns the supported parameter values.

5.1.3 Parameter Description

`<fun>`:

0	Set as LPM (low power consumption) mode.
1	Set as online mode. (default value)
4	Mode to disable phone both transmit and receive RF circuits. Airplane mode
16	Mode to simulate reset (this will reset MS including SIM)

`<rst>`: whether to restart MS before setting.

0	Do not restart MT before setting (`<fun>` is set to 1, 4).
1	Restart the MT before setting (`<fun>` is set to 1, 4).

5.1.4 Property Description

Saving upon Power-off	PIN
NA	N

5.1.5 Example

Run: `AT+CFUN?`

Response: `+CFUN: 0`

`OK`

Run: `AT+CFUN=1`

Response: `OK`

5.2 AT+CPIN–Enter PIN

5.2.1 Command Syntax

`AT+CPIN=<pin>[,<newpin>]`
Possible Response(s)
<CR><LF>`OK`<CR><LF>

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

5.2.2 Interface Description

The set command verifies and unblocks PIN.

If the current password required is PIN, run AT+CPIN=<pin> to verify PIN.

If the current password required is PUK, run AT+CPIN=<pin>,<newpin> to unblock the PIN. In "AT+CPIN=<pin>[,<newpin>]", <pin> is the SIM PUK, and <newpin> is the new PIN.

If 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.

The test command returns "OK".

Note:

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

5.2.3 Parameter Description

<pin>, <newpin>: string type values; must be enclosed in quotation marks. The character allowed in <pin> and <newpin> must range from '0' to '9'.

<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.

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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. (not supported currently)
PH-NET PIN	MT is waiting for network personalization password to be given. (AT&T customization)
PH-NET PUK	MT is not allowed network personalization password verification. (AT&T customization)

5.2.4 Property Description

Saving upon Power-off	PIN
N	N

5.2.5 Example

Run: `AT+CPIN?`

Response: `+CPIN: SIM PIN`

`OK`

Run: `AT+CPIN="1234"`

Response: `OK`

5.3 AT+CPBS–Select Phonebook Memory Storage

5.3.1 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>

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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>

5.3.2 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.

5.3.3 Parameter Description

<storage>: phonebook storage type (currently support "SM" and "ON").

"FD"	SIM/USIM fixdialing-phonebook
"LD"	SIM/UICC last-dialing phonebook (LD phonebook can't be deleted.)
"ON"	SIM (or MT) own numbers (MSISDNs) list (reading of this storage may be available through +CNUM also.)
"SM"	SIM/UICC phonebook (default value)
"BL"	Blacklist phonebook (delete only)
"EC"	SIM emergency-call-codes phonebook (read only)
"AP"	Selected application phonebook
"BN"	SIM barred-dialing-number phonebook (only valid with PIN2)
"SN"	SIM service-dialing-number phonebook

<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.

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5.3.4 Property Description

Saving upon Power-off	PIN
N	Y

5.3.5 Example

Run: `AT+CPBS?`

Response:
```
+CPBS: "SM",250,250

OK
```

Run: `AT+CPBS="ON"`

Response: `OK`

Run: `AT+CPBS=?`

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

OK
```

5.4 AT+CPBR–Read Phonebook Entries

5.4.1 Command Syntax

AT+CPBR=<index1>[,<index2>]
Possible Response(s)
<CR><LF>[+CPBR: <index1>,<number>,<type>,<text>[,<hidden>][[...]<CR><LF>+CPBR: <index2>,<number>,<type>,<text>[,<hidden>]]]<CR><LF><CR><LF>OK<CR><LF> In case of 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>]<CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>

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5.4.2 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> and <text> fields.

5.4.3 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 phone number of format <type>.(allowed characters are '0'–'9', '#', '*', '+', '(', ')', and '-'.) '(', ')', and '-' in a phone number will be ignored. '+' is only allowed in the beginning of a phone number.

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

Notes:

- Set command

If <number> starts with the plus sign (+), the value of <type> is 145. If <number> does not start with the plus sign (+), the value of <type> is specified by the set command.

If <number> does not start with the plus sign (+) and <type> is not specified in the set command, the value of <type> is 129.

- Test command

If the value of <type> is 145, the plus sign (+) is added before <number>. If the value of <type> is not 145, the plus sign (+) is not added before <number>.

<text>: string type field of maximum length <tlength>; character set as specified in section 2.7 AT+CSCS–Set the TE Character Set.

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

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

<hidden>: indicates whether the entry is hidden or not.

0	Phonebook entry not hidden
1	Phonebook entry hidden

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5.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

5.4.5 Example

Run: `AT+CPBR=?`

Response:
```
+CPBR: (1-2),80,14

OK
```

Run: `AT+CPBR=1`

Response:
```
+CPBR: 1,"12513648410061025586",129,"BGTPGWDPPTNJYX",0

OK
```

5.5 AT+CPBW–Write Phonebook Entry

5.5.1 Command Syntax

`AT+CPBW=[<index>][,<number>[,<type>[,<text>[,<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: (`list of supported `<index>`s),`[<nlength>]`,`(list of supported `<type>`s),`[<tlength>]<CR><LF><CR><LF>`OK`<CR><LF>

5.5.2 Interface Description

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

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- If the command contains only the <index> parameter, the phonebook 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 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", "FD", "LD", "ON", or "BL".

- If the phonebook storage is of any other type, an error message will be returned, indicating that the write operation is not allowed. (At present, Huawei's terminals support only "SM" and "ON" storage types.)
- If phonebook memory storage is "ON", the <hidden> parameter is not supported.

The test command returns the location range supported by the current storage and the maximum lengths of the <number> and <text> fields. When writing a phonebook entry, ensure that the lengths of all fields do not exceed their maximum lengths.

5.5.3 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 phone number of format <type>. (allowed characters are '0'–'9', '#', '*', '+', '(', ')', and '-'.) '(', ')', and '-' in a phone number will be ignored. '+' is only allowed in the beginning of a phone number.

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

Notes:

- Set command

If <number> starts with the plus sign (+), the value of <type> is 145. If <number> does not start with the plus sign (+), the value of <type> is specified by the Set command.

If <number> does not start with the plus sign (+) and <type> is not specified in the Set command, the value of <type> is 129.

- Test command

If the value of <type> is 145, the plus sign (+) is added before <number>. If the value of <type> is not 145, the plus sign (+) is not added before <number>.

<text>: string type field of maximum length <tlength>; character set as specified in section 2.7 AT+CSCS–Set the TE Character Set.

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

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

<hidden>: indicates if the entry is hidden or not.

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0	Phonebook entry not hidden
1	Phonebook entry hidden

5.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

5.5.5 Example

Run: `AT+CPBW=?`

Response:
```
+CPBW: (1-250),80,(128-255),14

OK
```

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

Response: `OK`

Run: `AT+CPBR=1`

Response:
```
+CPBR: 1,"13903711757",129,"MyNumber",0

OK
```

5.6 AT+CRSM–Restrict SIM Access

5.6.1 Command Syntax

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

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5.6.2 Interface Description

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

The set command accesses the SIM card through restricted permissions.

The test command returns "OK".

5.6.3 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>: 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.

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

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

5.6.4 Property Description

Saving upon Power-off	PIN
NA	Y

5.6.5 Example

Run: `AT+CRSM=192,28483`

Response:
```
+CRSM: 144,0,000000026F43040011F05501020000

OK
```

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

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Response: `+CRSM: 144,0,980000000000000000F3`

`OK`

5.7 AT+CSQ–Query the Signal Quality

5.7.1 Command Syntax

AT+CSQ
Possible Response(s)
<CR><LF>+CSQ: <rssi>,<ber><CR><LF><CR><LF>OK<CR><LF>
AT+CSQ=?
Possible Response(s)
<CR><LF>+CSQ: (list of supported <rssi>s),(list of supported <ber>s)<CR><LF><CR><LF>OK<CR><LF>

5.7.2 Interface Description

The execution command returns received signal strength indication <rssi> and channel bit error rate <ber> from the MS.

The test command returns supported RSSI and BER values.

5.7.3 Parameter Description

<rssi>: received signal strength indication.

Network	<rssi>	GSM or UTRAN Cell Signal Strength
GSM & WCDMA	0	≤ –113 dBm
	1	–111 dBm
	2–30	–109 dBm to –53 dBm
	31	≥ –51 dBm
	99	Unknown or undetectable
TD-SCDMA	100	≤ –116 dBm
	101	–115 dBm
	102–191	–114 dBm to –26 dBm
	191	≥ –25 dBm

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Network	<rssi>	GSM or UTRAN Cell Signal Strength
	199	Unknown or undetectable

<ber>: bit error rate.

0–7	As RXQUAL values in the table in 3GPP TS 45.008 subclause 8.2.4. (AT&T customization)
99	Not known or not detectable

5.7.4 Property Description

Saving upon Power-off	PIN
NA	Y

5.7.5 Example

Run: `AT+CSQ`

Response:

```
+CSQ: 19,1

OK
```


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6 Mobile Termination Errors

6.1 AT+CMEE–Report Mobile Termination Error

6.1.1 Command Syntax

AT+CMEE=<n>
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<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>

6.1.2 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.

The read command queries the current format of the error result code.

The test command returns supported values of <n>.

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6.1.3 Parameter Description

<n>: an integer type value indicating the format of the error result code. If <n> is not specified, it is equivalent to set <n> to 0.

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

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 section 19.2 General CME Error List.

6.1.4 Property Description

Saving upon Power-off	PIN
N	N

6.1.5 Example

- Example 1:

Run: AT+CMEE?

Response: +CMEE: 2

OK

- Example 2:

Run: AT+CMEE=1

Response: OK

- Example 3:

Run: AT+CMEE=?

Response: +CMEE: (0,1,2)

OK

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7 Commands for UMTS Packet Domain

7.1 AT+CGDCONT–Define PDP Context

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

7.1.1 Command Syntax

AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]]
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><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>[<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>

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7.1.2 Interface Description

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

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

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

Note:

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

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

7.1.3 Parameter Description

<cid>:

1–11	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
IPV6	Internet Protocol, version 6
IPV4V6	Dual stacks of Internet Protocol, version 4 and Internet Protocol, version 6

<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.

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

0	Off

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

Note:

It is not supported to set <d_comp> on.

<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.

7.1.4 Property Description

Saving upon Power-off	PIN
Y	Y

7.1.5 Example

Run: `AT+CGDCONT=?` Query the supported values of the parameters

Response:

```
+CGDCONT: (1-11),"IP",,,(0),(0,1,2,3,4)

+CGDCONT: (1-11),"IPV6",,,(0),(0,1,2,3,4)

+CGDCONT: (1-11),"IPV4V6",,,(0),(0,1,2,3,4)

OK
```

Run: `AT+CGDCONT?`

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Response:	`+CGDCONT: 1,"IP","vcol.com","0.0.0.0",0,0`
	
	`OK`
		The MT saves one PDP context, and the `<cid>` value of this context is 1.

Run:	`AT+CGDCONT=3,"IP","abc.com","10.111.145.233",0,1`	Save one PDP context to the MT and set `<cid>`=3
Response:	`OK`	
Run:	`AT+CGDCONT?`	

Response:	`+CGDCONT: 1,"IP","vcol.com","0.0.0.0",0,0`
	`+CGDCONT: 3,"IP","abc.com","10.111.145.233",0,1`
	
	`OK`
		The PDP context has been successfully saved to the MT at the previous step.

Run:	`AT+CGDCONT=3`	Remove the PDP context with `<cid>`=3
Response:	`OK`	
Run:	`AT+CGDCONT?`	

Response:	`+CGDCONT: 1,"IP","vcol.com","0.0.0.0",0,0`
	
	`OK`
		The PDP context with `<cid>`=3 has been removed.

7.2 AT+CGACT–Activate or Deactivate PDP Context

7.2.1 Command Syntax

`AT+CGACT=[<state>[,<cid>[,<cid>[...]]]]`
Possible Response(s)
<CR><LF>`OK`<CR><LF> In case of an MT-related error: <CR><LF>`+CME ERROR: <err>`<CR><LF>
`AT+CGACT?`
Possible Response(s)
<CR><LF>`+CGACT: <cid>,<state>`<CR><LF>[<CR><LF>`+CGACT: <cid>,<state>`<CR><LF>[...]]<CR><LF>`OK`<CR><LF>

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

7.2.2 Interface Description

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

The read command returns the defined PDP Activation state.

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

7.2.3 Parameter Description

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

0	Deactivated
1	Activated

<cid>: the index of a PDP context; specifies a particular PDP context definition.

7.2.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.2.5 Example

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

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7.3 AT+CGATT–Attach or Detach PS Domain

7.3.1 Command Syntax

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

7.3.2 Interface Description

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

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

The read command returns the current GPRS service state.

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

7.3.3 Parameter Description

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

0	Detached
1	Attached

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

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7.3.4 Property Description

Saving upon Power-off	PIN
NA	Y

7.3.5 Example

Run: `AT+CGATT?`

Response: `+CGATT: 1`

`OK`

Run: `AT+CGATT=0`

Response: `OK`

7.4 AT+CGREG–PS Domain Registration Status

7.4.1 Command Syntax

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

7.4.2 Interface Description

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

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when <n>=1 and there is a change in the MT's network registration status, +CGREG: <stat> is presented.

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

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

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

7.4.3 Parameter Description

<n>:

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

<stat>:

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

<lac>: string type; two byte location area code or tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal, and means two bytes of "0x00" and "0xC3").

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

<AcT>: access to technology.

0	GSM
1	GSM Compact (not supported currently)
2	UTRAN
3	GSM w/EGPRS (see Note 1)
4	UTRAN w/HSDPA (see Note 2)
5	UTRAN w/HSUPA (see Note 2)
6	UTRAN w/HSDPA and HSUPA (see Note 2)

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7 E-UTRAN (not supported currently)

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.

`<rac>`: routing area code; two hexadecimal characters. (not supported currently, always returns "00").

7.4.4 Property Description

Saving upon Power-off	PIN
N	Y

7.4.5 Example

Run: `AT+CGREG?`

Response:
```
+CGREG: 0,1

OK
```

Run: `AT+CGREG=?`

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

OK
```

Run: `AT+CGREG?`

Response:
```
+CGREG: 2,1,"2513","000E01F4",6,"00"

OK
```

7.5 AT+CGSMS–SMS Bearer Domain

7.5.1 Command Syntax

AT+CGSMS=<service>
Possible Response(s)

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

7.5.2 Interface Description

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

The read command returns the current SMS bearer domain.

The test command returns the supported parameter values.

7.5.3 Parameter Description

<service>:

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

7.5.4 Property Description

Saving upon Power-off	PIN
N	N

7.5.5 Example

Run: AT+CGSMS?

Response: +CGSMS: 1

OK

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Run: `AT+CGSMS=?`

Response: `+CGSMS: (0-3)`

`OK`

Run: `AT+CGSMS=2`

Response: `OK`

Run: `AT+CGSMS?`

Response: `+CGSMS: 2`

`OK`

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8 PDU Mode Commands for SMS

8.1 AT+CSMS–Select Message Service

8.1.1 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>

8.1.2 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.

8.1.3 Parameter Description

<service>: messaging service type.

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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+. Note that `<service>`=1 is required for `+CNMA`.)

`<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

8.1.4 Property Description

Saving upon Power-off	PIN
N	N

8.1.5 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
```


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8.2 AT+CPMS–Select Message Storage

8.2.1 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>

8.2.2 Interface Description

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

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

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

8.2.3 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)
"BM"	Broadcast message storage

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<mem2>: a string type value that specifies the memory storage used for writing and sending messages. Available value is:

"SM" (U)SIM card

<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>.

8.2.4 Property Description

Saving upon Power-off	PIN
N	Y

8.2.5 Example

Run: `AT+CPMS=?`

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

OK
```

Run: `AT+CPMS="SM"`

Response:
```
+CPMS: 6,50,6,50,6,50

OK
```

Run: `AT+CPMS?`

Response:
```
+CPMS: "SM",6,50,"SM",6,50,"SM",6,50

OK
```


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8.3 AT+CMGF–Set Message Format

8.3.1 Command Syntax

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

8.3.2 Interface Description

The set command sets the message format. The format is specified by <mode>, which can be either PDU mode or TEXT mode. For details about the message format in PDU mode, see section 8.9 AT+CMGS–Send Short Message.

The read command returns the currently selected mode.

The test command returns supported values of <mode>.

8.3.3 Parameter Description

<mode>:

0	PDU mode (default value)
1	TEXT mode (the MU736 module only supports PDU mode)

8.3.4 Property Description

Saving upon Power-off	PIN
N	N

8.3.5 Example

Run: AT+CMGF=0

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Response: OK

Run: AT+CMGF?

Response: +CMGF: 0

OK

8.4 AT+CSCA–Service Center Address

8.4.1 Command Syntax

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

8.4.2 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 8.9 AT+CMGS–Send Short Message.

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

The test command returns "OK".

8.4.3 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 '+').

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<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 8.9 AT+CMGS–Send Short Message.

Notes:

- Set command

If <sca> starts with the plus sign (+), the value of <tosca> is 145. If <sca> does not start with the plus sign (+), the value of <tosca> is specified by the Set command.

If <sca> does not start with the plus sign (+) and <tosca> is not specified in the Set command, the value of <tosca> is 129.

- Read command

If the value of <tosca> is 145, the plus sign (+) is added before <sca>. If the value of <tosca> is not 145, the plus sign (+) is not added before <sca>.

<sca> is stored in the EFsmsp file on the SIM card, so no default value is defined for <sca>. The value of <sca> contained in the response to the AT+CSCA? command is the value stored on the SIM card.

8.4.4 Property Description

Saving upon Power-off	PIN
Y	Y

8.4.5 Example

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

Response: OK

Run: AT+CSCA?

Response: +CSCA: "+8613800688509",145

OK

8.5 AT+CNMI–Indicate New Message to TE

8.5.1 Command Syntax

AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]
Possible Response(s)

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<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>

8.5.2 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.

8.5.3 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.

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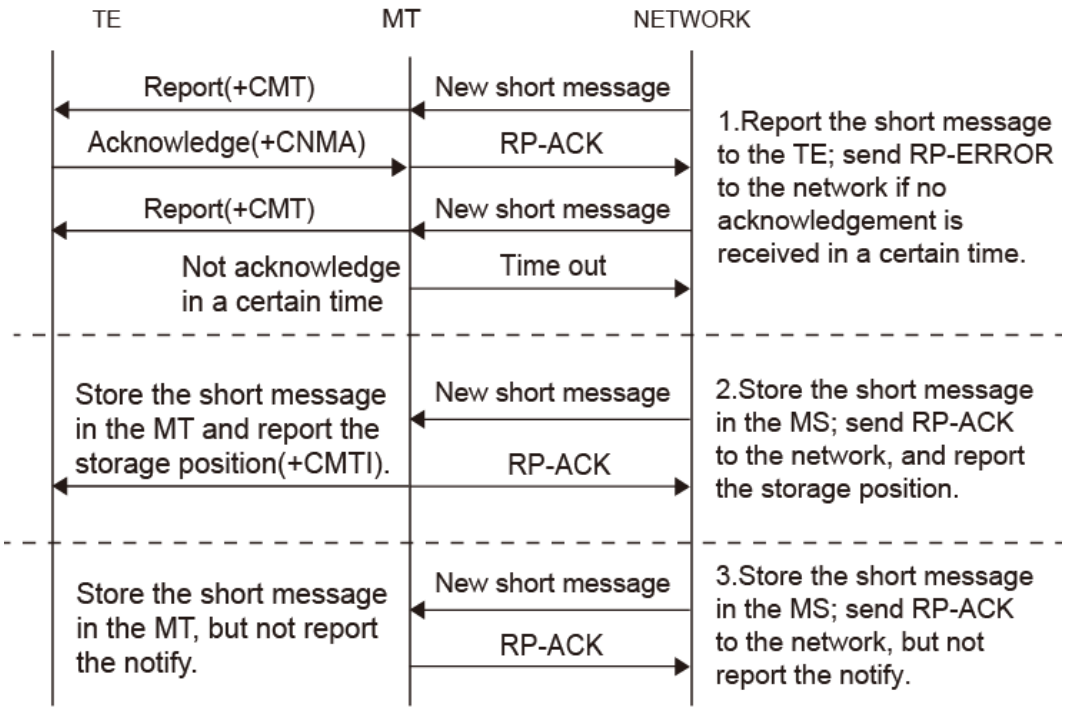
Note:

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	Store SMS-DELIVER indications on the MT and sends storage location indication to the TE. `+CMTI: <mem>,<index>`
2	Do 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>`
3	Store 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.

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<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				
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 8.9 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>

2 New CBMs are routed directly to the TE using unsolicited result code:

If PDU mode enabled:

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

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.

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

Table 8-1 Parameters of <bm>

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

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<bm>	Receiving procedure for different message data coding schemes (refer 3GPP TS 23.038)
	routing to somewhere else (for example, to (U)SIM; an indication may be sent if message stored successfully).
3	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).

<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>

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.

8.5.4 Property Description

Saving upon Power-off	PIN
N	N

8.5.5 Example

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

   Class 1 messages are stored to the MT, and then storage locations are reported (+CMTI: "ME",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.

2. AT+CNMI=1,1,0,2,0

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

3. Other commonly-used settings include:

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

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

8.6 AT+CMGD–Delete Message

8.6.1 Command Syntax

AT+CMGD=<index>[,<delflag>]
Possible Response(s)
<CR><LF>OK<CR><LF>
In case of an MS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
AT+CMGD=?
Possible Response(s)
<CR><LF>+CMGD: (list of supported <index>s)[,(list of supported <delflag>s)]<CR><LF><CR><LF>OK<CR><LF>

8.6.2 Interface Description

The set command deletes the message at location <index> in the storage <mem1>. If the deletion fails, +CMS ERROR: <err> is returned.

For details about <mem1>, see section 8.2 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>.

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

8.6.3 Parameter Description

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

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<delflag>:

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

8.6.4 Property Description

Saving upon Power-off	PIN
NA	Y

8.6.5 Example

Run: AT+CMGD=?

Response: +CMGD: (1,2,3,4,5,6),(0,1,2,3,4)

OK

Run: AT+CMGD=4

Response: OK

8.7 AT+CMGL–List Messages

8.7.1 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>

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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>

8.7.2 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 command AT+CMGL=0.

The test command returns a list of supported <stat> values.

8.7.3 Parameter Description

<stat>: message status; default value is 0.

0	Received unread messages
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 8.9 AT+CMGS–Send Short Message.

For the TPDU format of messages to be sent, see section 8.9 AT+CMGS–Send Short Message. The TPDU format for received messages is described in the following table.

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

<MTI>: see the definition in section 8.9 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 8.9 AT+CMGS–Send Short Message.

<RP>: see the definition in section 8.9 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 8.9 AT+CMGS–Send Short Message.

<DCS>: use data coding scheme. See the definition in section 8.9 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 8.9 AT+CMGS–Send Short Message.

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

8.7.4 Property Description

Saving upon Power-off	PIN
NA	Y

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8.7.5 Example

Run: `AT+CMGL=?`

Response:

```
+CMGL: (0-4)

OK
```

Run: `AT+CMGL=4`

Response:

```
+CMGL: 1,1,,24
0891683108608805F9040D91683109731147F4000031100151
64020004E139D90C
+CMGL: 2,1,,40
0891683108608805F9040E916831097390127400003110511 1
5211001661FA6ADC3ECF7BA2D82C079BDD62B15BED266A00
+CMGL: 3,1,,26
0891683108608805F9040D91683109731157F7000031105111
72550006F770D97C2F03
+CMGL: 4,1,,20
0891683108608805F9040D91683109731157F7000031105111
82250000
+CMGL: 5,1,,28
0891683108608805F9040D91683109731157F7000031105111
0393000931D92C26A3C56434
+CMGL: 6,1,,30
0891683108608805F9040D91683109731157F7000031105111
3373000B31D92C26A3C564B3980C

OK
```

8.8 AT+CMGR–Read Message

8.8.1 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>

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

8.8.2 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.

The test command returns "OK".

8.8.3 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 8.7.3 .

8.8.4 Property Description

Saving upon Power-off	PIN
NA	Y

8.8.5 Example

Run: AT+CMGR=1

Response:

```
+CMGR: 1,,24
0891683108608805F9040D91683109731147F4000031100151
64020004E139D90C

OK
```


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8.9 AT+CMGS–Send Short Message

8.9.1 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>

8.9.2 Interface Description

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

First, the TE sends +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).

The test command returns "OK".

8.9.3 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 +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

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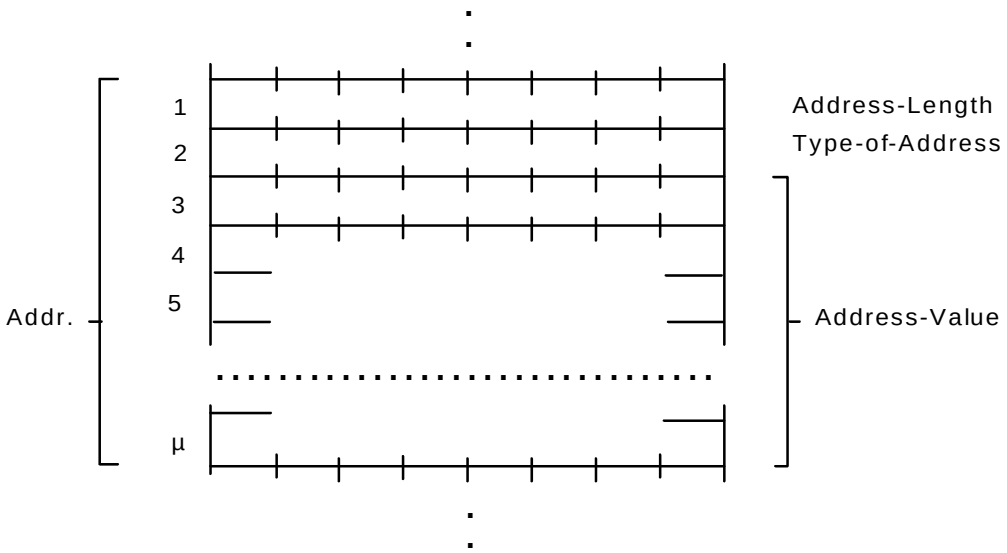
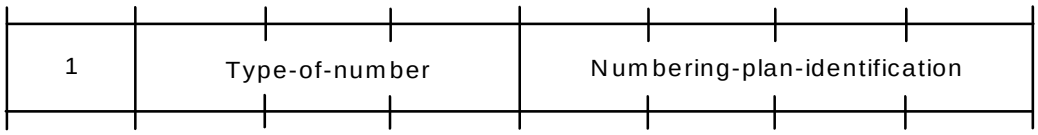
<SCA>: service center address (SCA). Its structure is illustrated in the following figure.



<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:

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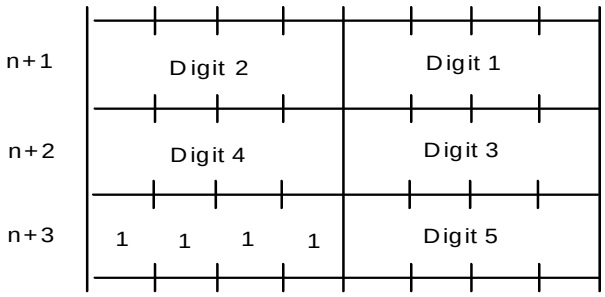
0 0 0 0	The number is determined by the numbering plan at the network.
0 0 0 1	ISDN/telephone numbering plan.
0 0 1 1	Data numbering plan. It is not in use currently.
0 1 0 0	Telex numbering plan. It is not in use currently.
1 0 0 0	National numbering plan. It is not in use currently.
1 0 0 1	Private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

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- 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.

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<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:

Bits 7…4			Bits 3…0
00xx	Bit 5	0: Message is not compressed. 1: Message is compressed. This is not supported currently.	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

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Bits 7…4			Bits 3…0
	Bit 4	0: Indicates that bit 1 and bit 0 are reserved. 1: Indicates that bit 1 and bit 0 serve as the message type indication.	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
0100 … 1011	Reserved		
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

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Bits 7…4		Bits 3…0
		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>.

8.9.4 Property Description

Saving upon Power-off	PIN
NA	Y

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8.9.5 Example

Run: `AT+CMGS=18`

Response: `>`

Run: `0891683108608805F931000B813109731147F40000FF04F4F29C0E`

Response: `+CMGS: 135`

`OK`

8.10 AT+CNMA–New Message Acknowledgement

8.10.1 Command Syntax

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

8.10.2 Interface Description

The set command acknowledges the reception of a new message that is routed directly to the TE. This acknowledgement command shall be used when `+CSMS` parameter `<service>` equals 1. For the use of this command, see section 8.5 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

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specified in command Send Message +CMGS, except that the format of <ackpdu> is used instead of <pdu>. PDU shall not be bounded by double quotation marks.

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

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

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

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

8.10.3 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

Notes:

- Mandatory (M) or Optional (O).
- Integer (I), Bit (b), 2 bits (2b), octet (o).
- Depending on TP-DCS.

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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.

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<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 value.
			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 UCS-2 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

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

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

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

- If the default encoding scheme (7-bit encoding) is used, `<TP-UDL>` indicates the number of septets contained in the user data.
- If the 8-bit encoding scheme is used, `<TP-UDL>` indicates the number of octets contained in the user data.
- If the UCS2 encoding scheme is used, `<TP-UDL>` also indicates the number of octets contained in the user data.
- If 7-bit, 8-bit or UCS2 compression encoding is used, `<TP-UDL>` indicates the number of octets contained in the compressed user data.

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

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

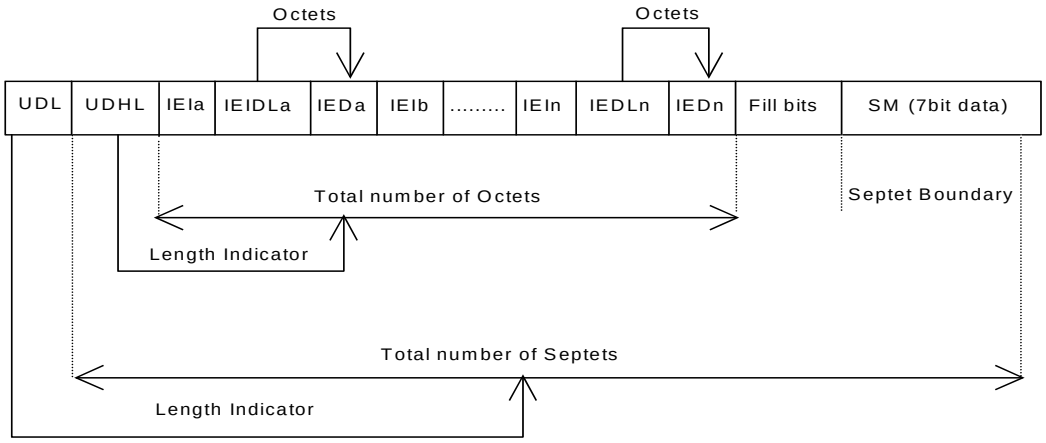
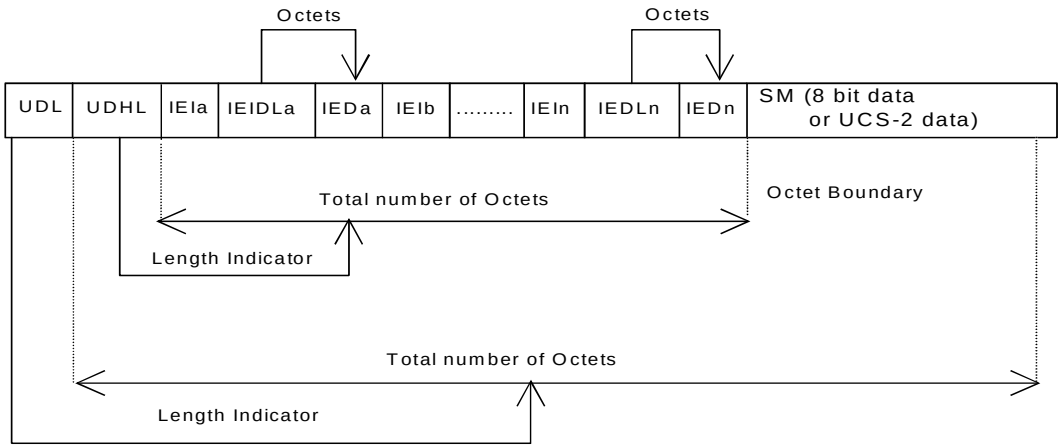


Figure 8-2 User data encoded using the 8-bit or UCS2 encoding scheme



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

8.10.4 Property Description

Saving upon Power-off	PIN
NA	N

8.10.5 Example

- Step 1

Run: `AT+CSMS=1`

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Response: `+CSMS: 1,1,1`

`OK`

- Step 2

Run: `AT+CNMI=2,2,0,1`

Response: `OK`

- Step 3

Run: `AT+CMGS=18`

Response: `>`

Run: `0891683108608805F931000B813109731147F40000FF04F4F29C0E`

Response: `+CMGS: 135`

`OK`

- Step 4

Response: `+CMT: ,24`
`0891683108608805F9240D91683109731147F4000031305012436000 04F4F29C0E`

Run: `AT+CNMA`

Response: `OK`

8.11 +CMTI–Unsolicitedly Present of Message Arrival Indication

8.11.1 Command Syntax

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

8.11.2 Interface Description

This command allows indications that a new message is received.

8.11.3 Parameter Description

<mem>:

"SM" (U)SIM message storage

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

8.11.4 Property Description

Saving upon Power-off	PIN
NA	NA

8.11.5 Example

Response: +CMTI: "SM",1

8.12 +CMT–Unsolicitedly Present of New Message Reported Directly

8.12.1 Command Syntax

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

8.12.2 Interface Description

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

8.12.3 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 8.7 AT+CMGL–List Messages.

8.12.4 Property Description

Saving upon Power-off	PIN
NA	NA

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8.12.5 Example

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

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

8.13.1 Command Syntax

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

8.13.2 Interface Description

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

8.13.3 Parameter Description

<mem>:

"SM" (U)SIM message storage

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

8.13.4 Property Description

Saving upon Power-off	PIN
NA	NA

8.13.5 Example

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

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

8.14.1 Command Syntax

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

8.14.2 Interface Description

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

8.14.3 Parameter Description

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

<pdu>: protocol data unit.

8.14.4 Property Description

Saving upon Power-off	PIN
NA	NA

8.14.5 Example

Response:

```
+CDS: 26
0891683108608805F906750D91683109731147F43130509134
92003130509134430000
```

8.15 +CBMI–Unsolicitedly Present of Newly Received Cell Broadcast Message

8.15.1 Command Syntax

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

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8.15.2 Interface Description

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

8.15.3 Parameter Description

`<mem>`:

"BM" Broadcast message storage

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

8.15.4 Property Description

Saving upon Power-off	PIN
NA	NA

8.15.5 Example

Response: `+CBMI: "BM",1`

8.16 +CBM–Unsolicitedly Present of New Cell Broadcast Message Directly

8.16.1 Command Syntax

URC
<CR><LF>`+CBM: <length>`<CR><LF>`<pdu>`<CR><LF>

8.16.2 Interface Description

This command presents cell messages to the TE upon reception without saving.

8.16.3 Parameter Description

`<length>`: integer type; length of PDU data.

`<pdu>`: protocol data unit of format specified in 3GPP TS 23.041.

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8.16.4 Property Description

Saving upon Power-off	PIN
NA	NA

8.16.5 Example

Response:

```
+CBM: 88
0000003201116432B9D168341A8D46A3D168341A8D46A3D168
341A8D46A3D168341A8D46A3D168341A8D46A3D168341A8D46
A3D168341A8D46A3D168341A8D46A3D168341A8D46A3D16834
1A8D46A3D168341A8D46A3D100
```


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9 Commands for Standard STK Interface

9.1 +CUSATP–Unsolicitedly Present of a UICC Proactive Command

9.1.1 Command Syntax

URC
<CR><LF>+CUSATP: <proactive_command><CR><LF>

9.1.2 Interface Description

The MT uses the unsolicited result code +CUSATP: <proactive_command> to notify TE that SIM card presents a proactive command.

9.1.3 Parameter Description

<proactive_command>: UICC proactive command, string type in hexadecimal character format, consisting of the full BER-TLV data object as defined in 3GPP TS 31.111, ETSI TS 102.221 and ETSI TS 102.223 protocols.

9.1.4 Property Description

Saving upon Power-off	PIN
NA	NA

9.1.5 Example

Response:	+CUSATP: "D01A81030123008202818 28D0B043C54494D452D4F55543E91020 00A"	Unsolicitedly report a proactive command "GET INPUT".

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9.2 AT+CUSATE–Send USAT Envelope

9.2.1 Command Syntax

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

9.2.2 Interface Description

The set command sends a USAT envelope command to UICC.

The test command returns "OK".

9.2.3 Parameter Description

<envelope_command>: an envelope command, string type in hexadecimal character format, consisting of the full BER-TLV data object as defined in 3GPP TS 31.111, ETSI TS 102.221 and ETSI TS 102.223 protocols.

<envelope_response>: the response to an envelope command, string type in hexadecimal character format, consisting of the full BER-TLV data object as defined in 3GPP TS 31.111, ETSI TS 102.221 and ETSI TS 102.223 protocols. Empty if the UICC does not provide response data.

<busy>: integer type.

0	Indicate normal ending of the envelope command.
1	UICC responded with USAT is busy, retry to send the envelope command by the MT.
2	UICC responded with USAT is busy even after one or more retries by the MT.

9.2.4 Property Description

Saving upon Power-off	PIN
NA	Y

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9.2.5 Example

Sent envelope command "MENU SELECTION" (MENU has been got by running the proactive command "SET UP MENU"); <busy> indicated '0' and envelope command perform successfully.

Run: `AT+CUSATE="D30782020181900102"`

Response:
```
+CUSATE: "",0

OK
```

9.3 AT+CUSATT–Send USAT Terminal Response

9.3.1 Command Syntax

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

9.3.2 Interface Description

The set command sends a USAT terminal response to UICC.

The test command returns "OK".

9.3.3 Parameter Description

<terminal_response>: terminal response to a proactive command, string type in hexadecimal character format, consisting of the full BER-TLV data object as defined in 3GPP TS 31.111, ETSI TS 102.221 and ETSI TS 102.223 protocols.

9.3.4 Property Description

Saving upon Power-off	PIN
NA	Y

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9.3.5 Example

Sent the UICC proactive command "DISPLAY TEXT", and terminal response "Command Perform Successfully" is responded.

Response: `+CUSATP: "D015810301210082028102 8D0404434154"`

Run: `AT+CUSATT="810301218082028281830100"`

Response: `OK`

9.4 +CUSATEND–Unsolicitedly Present of Terminating a UICC Proactive Command Session

9.4.1 Command Syntax

URC
<CR><LF>+CUSATEND<CR><LF>

9.4.2 Interface Description

The MT uses the unsolicited result code `+CUSATEND` to notify TE that the proactive command session is terminated.

9.4.3 Parameter Description

None

9.4.4 Property Description

Saving upon Power-off	PIN
NA	NA

9.4.5 Example

Response: `+CUSATP: "D04B810301250082028182050D53494D2053657 27669636573FF8F0D8750686F6E65206E756D6265728F0B85 53656C662053657276658F10805370656369616C204E756D6 26572731803212421"`

Run: `AT+CUSATT="810301258082028281830100"`

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Response: `OK`

`+CUSATEND`

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10 Huawei Proprietary Interface: Mobile Termination Control and Status Interface

10.1 AT^RFSWITCH–Set the Flight Mode

10.1.1 Command Syntax

AT^RFSWITCH=<SW state>
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^RFSWITCH?
Possible Response(s)
<CR><LF>^RFSWITCH: <SW state>,<HW state><CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^RFSWITCH=?
Possible Response(s)
<CR><LF>^RFSWITCH: (0-1),(0-1)<CR><LF><CR><LF>OK<CR><LF>

10.1.2 Interface Description

The set command sets the Flight Mode.

The read command queries the current status of flight mode.

The test command checks the parameter range supported by this command.

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10.1.3 Parameter Description

<SW state>: state of RF software switch.

0	The state of RF software switch is set to off.
1	The state of RF software switch is set to on. (default value)

<HW state>: state of RF hardware switch.

0	The state of RF hardware switch is set to off.
1	The state of RF hardware switch is set to on. (default value)

10.1.4 Property Description

Saving upon Power-off	PIN
Y	N

10.1.5 Example

Run:	AT^RFSWITCH?	Query the current state of RF switch
Response:	^RFSWITCH: 0,1 OK	Return information for the current state of the hardware switch is open, the software switch is off

10.2 AT^CURC–Set Presentation of Unsolicited Results

10.2.1 Command Syntax

AT^CURC=<mode>[,<Sleep_UR_mask>,<working_UR_mask>]
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT^CURC?
Possible Response(s)
<CR><LF>^CURC: <mode>[,<Sleep_UR_mask>,<working_UR_mask>]<CR><LF><CR><LF>OK<CR><LF>

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

10.2.2 Interface Description

The set command selects the control mode for the presentation of unsolicited results. 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.

10.2.3 Parameter Description

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

0	The presentation of unsolicited indications added by Huawei in Table 10-1 is disabled.
1	Enables the presentation of unsolicited indications added by Huawei in Table 10-1 when not in sleep mode. (default value)
2	According to <Sleeping_UR_cfg> and <working_UR_cfg>, customer can configure control the parameter mode for the presentation of unsolicited results and decide whether report for all UR in Table 10-2 . When MT supports Wwan port, <mode>=2 is not supported.

Table 10-1 List for the presentation of unsolicited results when CURU=0/1

Command	REGISTER/DEREGISTER	Comment
^MODE	AT+CURC=0 or 1	-
^RSSI		-
^CSNR		-
^DSFLOWRPT		(not supported currently)
^EARST		(not supported currently)
^ACTIVEBAND		(not supported currently)
^RSSILVL		(not supported currently)
^HRSSILVL		(not supported currently)

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Command	REGISTER/DEREGISTER	Comment
^HDRRSSI		(not supported currently)
^CRSSI		(not supported currently)
^ANLEVEL		(not supported currently)
^BOOT		(not supported currently)

Table 10-2 The control mode when `<mode>`=2

Parameters in sleeping mode	Parameters in operating mode	Suspend status	Normal status
1	1	Directly report	Directly report
1	0	Directly report	Discard
0	1	Cache	Directly report
0	0	Discard	Discard

When `<mode>` is 0 or 1, the unsolicited AT is controlled in Table 10-3 and Table 10-4 .

Table 10-3 Situation when MT does not support Wwan port

Mode	Status	
	Suspend	Normal
0	Discard	Discard
1	Cache (report after module is waken-up)	Directly report

Table 10-4 Situation when MT supports Wwan port

Mode	Status	
	Suspend	Normal
0	Cache (just report to wwan port after module is waken-up)	Directly report(just report to wwan port)
1	Cache (report after module is waken-up)	Directly report

`<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.

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- 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 `<Sleep_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 1, the presentation is disabled. The detail information for each bit can be seen in Table 10-5 .

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	Sleep_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 `<work_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 1, the presentation is disabled. The detail information for each bit can be seen in Table 10-5 .

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

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

Table 10-5 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 (not supported)	^ACTIVEBAND (not supported)
Bit 8	**Bit 9**	**Bit 10**	**Bit 11**
^ANLEVEL (not supported)	^LOCCHD (not supported)	^SIMFILEREFRESH (not supported)	^SMMEMFULL

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Bit 12	Bit 13	Bit 14	Bit 15
^POSITION (not supported)	^TIMESETRULT /^DATASETRULT /^DATAVALIDITY (not supported)	^WNINV (not supported)	^POSEND (not supported)
Bit 16	**Bit 17**	**Bit 18**	**Bit 19**
^WPDCP (not supported)	^WPDDL (not supported)	^WPDOP (not supported)	+CTZV (not supported)
Bit 20	**Bit 21**	**Bit 22**	**Bit 23**
^NDISEND (not supported)	^BOOT (not supported)	^DSFLOWRPT (not supported)	^EARST (not supported)
Bit 24	**Bit 25**	**Bit 26**	**Bit 27**
^ORIG (not supported)	^CONF (not supported)	^CONN (not supported)	^CEND (not supported)
Bit 28	**Bit 29**	**Bit 30**	**Bit 31**
^RFSWITCH	^STIN (not supported)	+CUSD	+CMTI
Bit 32	**Bit 33**	**Bit 34**	**Bit 35**
^RSSILVL (not supported)	^HRSSILVL (not supported)	^HDRRSSI (not supported)	^CRSSI (not supported)
Bit 36	**Bit 37**	**Bit 38**	**Bit 39**
^OTACMSG (not supported)	^DSDORMANT (not supported)	^IPDATA (not supported)	^THERM
Bit 40	**Bit 41**	**Bit 42**	**Bit 43**
^XDSTATUS (not supported)	+CLIP (not supported)	+CCWA (not supported)	+CSSI (not supported)
Bit 44	**Bit 45**	**Bit 46**	**Bit 47**
+CSSU (not supported)	^IPSTATE (not supported)	+CUSATP (not supported)	+CUSATEND (not supported)
Bit 48	**Bit 49**	**Bit 50**	**Bit 51**
^NDISSTAT	Reserved	Reserved	Reserved
Bit 52	**Bit 53**	**Bit 54**	**Bit 55**
Reserved	Reserved	Reserved	Reserved

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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, <Sleeping_UR_cfg> and <working_UR_cfg> must be contained in the command, or ERROE will be returned. 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 by using the AT^CURC command.
- The AT commands of each unsolicited results may vary with the specific products.
- The unsolicited AT will be store when the host is in sleep status. And the unsolicited AT result will be reported to the host when the host exit sleep status to reduce the wakeup times.
- When connect to Windows 8 host, <mode>=0 or 1 is not supported and the Bit [0,3, 30,31,48] cannot be configured to 0.

10.2.4 Property Description

Saving upon Power-off	PIN
N	N

10.2.5 Example

Run:	AT^CURC=0	Set <mode> to 0
Response:	OK	
Run:	AT^CURC=1	Set <mode> to 1
Response:	OK	
Run:	AT^CURC=2,FF,F	Set <mode> to 2
Response:	OK	
Run:	AT^CURC?	

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Response: `^CURC: 2,0xff,0xf`

`OK`

10.3 AT^HGMR–Request Version Information

10.3.1 Command Syntax

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

10.3.2 Interface Description

This command queries the version information, including the baseline software version released by platform suppliers, the platform software version which the product bases on, the product software version and the software version of PC Vendor.

10.3.3 Parameter Description

`<type>`: integer type, indicating the query type.

1	Query the baseline software version. (not supported currently)
2	Query the platform software version .(not supported currently)
3	Query the product software version.
4	Query the software version of PC Vendor.

`<version>`: string type, indicating the specified software version information.

Note:

A blank character "" will be returned when a query type is not supported or does not exsit.

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10.3.4 Property Description

Saving upon Power-off	PIN
NA	N

10.3.5 Example

Run: `AT^HGMR=1`

Response: `^HGMR: ""`

`OK`

Run: `AT^HGMR=4`

Response: `^HGMR: "MU736CUST_B001SP01_OEM"`

`OK`

Run: `AT^HGMR=?`

Response: `^HGMR: (1-4)`

`OK`

10.4 AT^HWCUST–Enable Custom Hardware Function

10.4.1 Command Syntax

`AT^HWCUST=<func>,<action>`
Possible Response(s)
<CR><LF>`OK`<CR><LF> In case of an MT-related error: <CR><LF>`ERROR`<CR><LF>
`AT^HWCUST?`
Possible Response(s)
<CR><LF>`^HWCUST:` list of `(<func>,<action>)`s<CR><LF><CR><LF>`OK`<CR><LF>
`AT^HWCUST=?`
Possible Response(s)

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```
<CR><LF>^HWCUST: list of supported (<func>,(list of supported
<action>s))s<CR><LF><CR><LF>OK<CR><LF>
```

10.4.2 Interface Description

This interface controls some pins of the module, and enables/disables these hardware functions.

10.4.3 Parameter Description

`<func>`: the hardware function.

0	GNSS reference clock
1-255	Reserved

`<action>`: enables or disables the hardware function. The values of `<action>` may be different among various hardware functions.

0	Disable the hardware function. (default value)
1	Enable the hardware function.
2-255	Reserved

10.4.4 Property Description

Saving upon Power-off	PIN
N	N

10.4.5 Example

If the module supports GNSS reference clock function.

Run:	`AT^HWCUST=?`	Query the supported states of GNSS reference clock.

Response:	`^HWCUST: (0,(0,1))`
	
	`OK`	

Run:	`AT^HWCUST?`	Query the current state of GNSS reference clock.

Response:	`^HWCUST: (0,1)`
	
	`OK`	

Run:	`AT^HWCUST=0,1`	Enable the GNSS reference clock.

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Response: `OK`

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11 Huawei Proprietary Interface: Network Service Interfaces

11.1 AT^SYSINFO–Query System Information

11.1.1 Command Syntax

AT^SYSINFO
Possible Response(s)
<CR><LF>^SYSINFO:<srv_status>,<srv_domain>,<roam_status>,<sys_mode>,<sim_state>[,<lock_state>,<sys_submode>]<CR><LF><CR><LF>OK<CR><LF>

11.1.2 Interface Description

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

11.1.3 Parameter Description

<srv_status>: indicates the system service status.

0	No services
1	Restricted services
2	Valid services
3	Restricted regional services (not supported currently)
4	Power saving or hibernate state (not supported currently)

<srv_domain>: indicates the system service domain.

0	No services

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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

`<sys_mode>`: indicates the system mode.

0	No services
3	GSM/GPRS mode
5	WCDMA mode
7	GSM/WCDMA mode

`<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.

`<sys_submode>`: indicates the system sub-mode.

0	No services
1	GSM mode
2	GPRS mode
3	EDGE mode
4	WCDMA mode
5	HSDPA mode

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6	HSUPA mode
7	HSUPA and HSDPA mode

Note:

According to AT command specifications, parameters value ranges of `^SYSINFO` will not be expanded any more. A new command `^SYSINFOEX` is added. To be compatible with Huawei's earlier-version client and third-party clients, when the value of `<sys_submode>` is invalid (at present, valid values are 0–18), one of the following default values will be used: 4 (for products that support WCDMA).

11.1.4 Property Description

Saving upon Power-off	PIN
NA	N

11.1.5 Example

Run: `AT^SYSINFO`

Response: `^SYSINFO:2,3,0,5,1,0,4`

`OK`

11.2 AT^SYSCFG–Configure System

11.2.1 Command Syntax

`AT^SYSCFG=<mode>,<acqorder>,<band>,<roam>,<srvdomain>`
Possible Response(s)
<CR><LF>`OK`<CR><LF> In case of an MT-related error: <CR><LF>`+CME ERROR: <err>`<CR><LF>
`AT^SYSCFG?`
Possible Response(s)
<CR><LF>`^SYSCFG: <mode>,<acqorder>,<band>,<roam>,<srvdomain>`<CR><LF><CR><LF>`OK`<CR><LF>

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AT^SYSCFG=?
Possible Response(s)
<CR><LF>^SYSCFG: (list of supported <mode>s),(list of supported <acqorder>s),list of supported (<band>,<band_name>)s,(list of supported <roam>s),(list of supported <srvdomain>s)<CR><LF><CR><LF>OK<CR><LF>

11.2.2 Interface Description

The set command sets the system mode, GW 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.

11.2.3 Parameter Description

<mode>: specifies the system mode.

2	Automatic
13	GSM only
14	WCDMA only
16	No change

<acqorder>: specifies the network access order.

0	Automatic
1	GSM > WCDMA
2	WCDMA > GSM
3	No change
255	Not supported

<band>: a hexadecimal value that specifies the frequency band, which is related to the system mode and dependent on the MT's performance. The value of <band> can be one of the following values and their combinations (excluding 0x3FFFFFFF and 0x40000000):

80 (CM_BAND_PREF_GSM_DCS_1800)	GSM DCS systems
100 (CM_BAND_PREF_GSM_EGSM_900)	Extended GSM 900
200000 (CM_BAND_PREF_GSM_PCS_1900)	GSM PCS
400000 (CM_BAND_PREF_WCDMA_I_IMT_2000)	WCDMA IMT 2000
3FFFFFFF (CM_BAND_PREF_ANY)	Any frequency band

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40000000 (CM_BAND_PREF_NO_CHANGE)	No change of the band
2000000 (CM_BAND_PREF_WCDMA_IX_1700)	AWS
0000000000400000 (CM_BAND_PREF_WCDMA_IMT)	WCDMA_IMT(2100)
0002000000000000	WCDMA 900
04000000	WCDMA 850
0000000000800000	WCDMA 1900
00680380	Automatic
00080000	GSM 850

`<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

`<srvdomain>`: indicates the domain setting.

0	CS_ONLY
1	PS_ONLY(not supported currently)
2	CS_PS
3	ANY
4	No change
255	Not supported

11.2.4 Property Description

Saving upon Power-off	PIN
Y	Y

Note:

In the AT&T version, `AT^SYSCFG` can not be saved upon power-off because of the AT&T ENS feature.

11.2.5 Example

Run: `AT^SYSCFG=?`

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Response: `^SYSCFG: (2,13,14,16),(0-3),((3fffffff,"All Bands"),(2000000400180,"GSM900/GSM1800/WCDMA900/WCDMA2100"),(6A80000,"GSM850/GSM1900/WCDMA850/AWS/WCDMA1900")),(0-2),(0-4)`

`OK`

Run: `AT^SYSCFG?`

Response: `^SYSCFG: 2,0,3fffffff,1,2`

`OK`

Run: `AT^SYSCFG=14,0,3fffffff,1,2`

Response: `OK`

11.3 AT^CSNR–Query RSCP and ECIO

11.3.1 Command Syntax

AT^CSNR?
Possible Response(s)
<CR><LF>^CSNR:<rscp>,<ecio><CR><LF><CR><LF>OK<CR><LF>
AT^CSNR=?
Possible Response(s)
<CR><LF>^CSNR: (list of supported <rscp>s),(list of supported <ecio>s)<CR><LF><CR><LF>OK<CR><LF>

11.3.2 Interface Description

The read command queries the RSCP/ECIO signal strength. The RSCP/ECIO signal strength depends on the change of the RSSI.

The relationship between RSCP, ECIO and RSSI is as follows: RSCP = ECIO + RSSI. In the equation, RSCP, ECIO and RSSI must be absolute values instead of relative values.

The test command queries the parameter range supported by this command.

11.3.3 Parameter Description

`<rscp>`: a value ranging from –145 dBm to –60 dBm. In the AT&T customized version, the void value is 255 in the Win8 system.

`<ecio>`: a value ranging from –32 dBm to 0 dBm.

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11.3.4 Property Description

Saving upon Power-off	PIN
NA	N

11.3.5 Example

Run: `AT^CSNR?`

Response:
```
^CSNR:-76,-3

OK
```

11.4 AT^USSDMODE–Set USSD Mode

11.4.1 Command Syntax

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

11.4.2 Interface Description

The set command sets the USSD mode.

The read command queries current USSD mode.

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The test command returns the list of all supported USSD mode.

11.4.3 Parameter Description

<mode>:

0	The UE will follow the 3GPP, and decode the data that UE sends to the network.
1	The UE will not decode the data that UE sends to the network.

11.4.4 Property Description

Saving upon Power-off	PIN
Y	N

11.4.5 Example

Run: `AT^USSDMODE?`

Response:
```
^USSDMODE: 1

OK
```

Run: `AT^USSDMODE=0`

Response: `OK`

Run: `AT^USSDMODE=?`

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

OK
```

11.5 ^SRVST–Service State Change Indication

11.5.1 Command Syntax

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

11.5.2 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.

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11.5.3 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

11.5.4 Property Description

Saving upon Power-off	PIN
N	N

11.5.5 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=2

Response:

```
^MODE: 5,4

OK

^MODE: 0,0

^SRVST: 0
```

11.6 ^SIMST–SIM Card State Change Indication

11.6.1 Command Syntax

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

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11.6.2 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.

11.6.3 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

11.6.4 Property Description

Saving upon Power-off	PIN
NA	N

11.6.5 Example

Once the module is powered up with PIN disabled and card lock disabled, it will reported as follow:

Response:

```
^SIMST: 1,0

^RSSI: 99

^CSNR:-145,-32
```


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12 Huawei Proprietary Interface: STK Interface

12.1 AT^CUSATM–Query the Main Menu

12.1.1 Command Syntax

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

12.1.2 Interface Description

This command queries STK main menu information. After UICC sends the proactive command "SETUP MENU" to MT, TE can use AT^CUSATM to query the content of the proactive command "SETUP MENU". If UICC does not send the proactive command "SET UP MENU" to MT, <setup_menu> is empty when TE query the content of the proactive command "SETUP MENU".

12.1.3 Parameter Description

<setup_menu>: UICC proactive command, string type in hexadecimal character format, consisting of the full BER-TLV data object (which is the proactive command "SETUP MENU" sent by UICC) as defined in 3GPP TS 31.111, ETSI TS 102.221 and ETSI TS 102.223 protocols.

12.1.4 Property Description

Saving upon Power-off	PIN
NA	Y

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12.1.5 Example

Run: `AT^CUSATM?`

Response:

```
^CUSATM:"D0818A810301250082028182851180516874039 01
A005500530049004D53618F0D01444953504C4159205445585
48F0A0247455420494E4B45598F0A0347455420494E5055548
F0A044D4F52452054494D458F0A05504C415920544F4E458F0
E06504F4C4C20494E54455256414C8F0807524546524553488
F130853454E442053484F5254204D455353414745"

OK
```


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13 Huawei Proprietary Interface: M.2 Interface

13.1 AT+XTSM–Set Thermal Sensor with the Threshold

13.1.1 Command Syntax

AT+XTSM=<temp_sensor_id>[,<AlarmID>[,[<TripPointTemp>,<Hysteresis>][,<sampling_period>]]]
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT+XTSM=?
Possible Response(s)
<CR><LF>+XTSM: (list of supported <temp_sensor_id>s),(list of supported <AlarmId>s),(list of supported <TripPointTemp>s),(list of supported <Hysteresis>s),(list of supported <sampling_period>s)<CR><LF><CR><LF>OK<CR><LF>

13.1.2 Interface Description

This command configures thermal sensors with the threshold break points.

The set command enables or disables the alarms for particular sensor.

The test command returns the possible values of thermal sensor monitoring option, alarm ID range for trip point, hysteresis and sampling period.

13.1.3 Parameter Description

<temp_sensor_id>: temperature sensor ID. Currently only RF sensor is supported.

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0	RF sensor

`<AlarmID>`: alarm ID value, ranging from 1 to 10.

`<TripPointTemp>`: minimum value 0 and maximum value 119000 in MilliDegC. The actual temperature is `<TripPointTemp>` minus 20000 MilliDegC.For example, when `<TripPointTemp>` is 0, the actual temperature is -20000 MilliDegC, and also the `<TripPointTemp>` 119000 is corresponding to 99000 MilliDegC.

`<Hysteresis>`: minimum value 100, maximum value 99000 in MiliDegC. `<Hysteresis>` can be used only with `<TripPointTemp>`.

`<sampling_period>`: polling interval in millisecond, Minimum value 1000, maximum value 4294967293.

13.1.4 Property Description

Saving upon Power-off	PIN
NA	N

13.1.5 Example

- Example 1:

Run: `AT+XTSM=0,1,50000,3000,2000` Set the alarm ID, tripPointTemp value, hysteresis value, and sampling period

Response: `OK`

Run: `AT+XTSM=?` Test the available value ranges of these parameters

Response:
```
+XTSM: 0,(1-10),(0-119000),
(100-99000),(1000-4294967293)

OK
```

- Example 2:

Run: `AT+XTSM=0,3,76000,5000` Set the alarm ID, tripPointTemp value, and hysteresis value

Response: `OK`

- Example 3:

Run: `AT+XTSM=0,10,,30000` Set the sampling period

Response: `OK`

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- Example 4:

Run: `AT+XTSM=0,10` Delete one alarm

Response: `OK`

- Example 5:

Run: `AT+XTSM=0` Delete all alarms

Response: `OK`

13.2 +XTS–Unsolicitedly Present of the Threshold Reached

13.2.1 Command Syntax

URC
<CR><LF>+XTS: <temp_sensor_id>,<AlarmId>,<OnOff>,<Temp><CR><LF>

13.2.2 Interface Description

The URC will be displayed if the threshold is crossed and it gets enabled if user has set any alarm.

13.2.3 Parameter Description

`<temp_sensor_id>`: temperature sensor ID. Currently only RF sensor is supported.

0 RF sensor

`<AlarmID>`: alarm ID value, ranging from 1 to 10.

`<OnOff>`:

1 When temperature is rising and it crosses trip point temperature.

0 When it goes below (trip point temperature minus hysteresis).

`<Temp>`: current temperature value in MiliDegC.

13.2.4 Property Description

Saving upon Power-off	PIN
NA	N

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13.2.5 Example

Run:	`AT+XTSM=0,1,50000,3000,2000`	Set the alarm ID, tripPointTemp value, hysteresis value, and sampling period
Response:	`OK`	
Response:	`+XTS: 0,1,1,31000`	MT will unsolicitedly report when the temperature rises to 31°C from the temperature that is lower than 30°C.
Response:	`+XTS: 0,1,0,26500`	MT will unsolicitedly report when the temperature drops to 26.5°C from the temperature that is higher than 30°C.

13.3 AT+XTAMR–Query the Current Temperature of a Thermal Sensor

13.3.1 Command Syntax

`AT+XTAMR=<temp_sensor_id>`
Possible Response(s)
<CR><LF>`+XTAMR: <temp_sensor_id>,<temp>`<CR><LF><CR><LF>`OK`<CR><LF> In case of an MT-related error: <CR><LF>`ERROR`<CR><LF>

13.3.2 Interface Description

The set command returns the current temperature value of particular thermal sensor.

13.3.3 Parameter Description

`<temp_sensor_id>`: temperature sensor ID. Currently only RF sensor is supported.

0	RF sensor

`<temp>`: current temperature value in MiliDegC.

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13.3.4 Property Description

Saving upon Power-off	PIN
NA	N

13.3.5 Example

Run:	`AT+XTAMR=0`	
Response:	`+XTAMR: 0,40000`	The current temperature of RF sensor is 40°C.
	`OK`	

13.4 AT+XADPCLKFREQINFO–Query Adaptive Clock Frequency Info

13.4.1 Command Syntax

`AT+XADPCLKFREQINFO=<n>`
Possible Response(s)
<CR><LF>`OK`<CR><LF> In case of an MT-related error: <CR><LF>`+CME ERROR: <err>`<CR><LF>
`AT+XADPCLKFREQINFO?`
Possible Response(s)
<CR><LF>`+XADPCLKFREQINFO: <n>`<CR><LF><CR><LF>`OK`<CR><LF>
`AT+XADPCLKFREQINFO=?`
Possible Response(s)
<CR><LF>`+XADPCLKFREQINFO: <centFreq>,<freqSpread>,<noisePower>`[[`;<centFreq>,<freqSpread>,<noisePower>`[...]]<CR><LF><CR><LF>`OK`<CR><LF>
In case of an MT-related error: <CR><LF>`+CME ERROR: <err>`<CR><LF>

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13.4.2 Interface Description

This command returns the list of frequency information structures. The frequency information includes the center frequency of the channel number, frequency spread of the channel number and the noise power referred at antenna.

The set command enables/disables the `+XADPCLKFREQINFO` URC.

The read command reads the status of enabling/disabling the `+XADPCLKFREQINFO` URC.

The test command returns the list of frequency information available, or returns `+CME ERROR: <err>` when ACT is disabled.

13.4.3 Parameter Description

`<n>`:

0	Disable the `+XADPCLKFREQINFO` URC. (default value)
1	Enable the `+XADPCLKFREQINFO` URC.

`<centFreq>`:the center frequency of the channel number in Hz. This is host receiver channel frequency.

`<freqSpread>`: the frequency spread of the channel number in Hz. This is host receiver channel frequency spread.

`<noisePower>`: the noise power referred at antenna in dBm, at the reported center frequency, and integrated over a bandwidth equal to reported frequency spread. This value shall be zeroed if not used.

13.4.4 Property Description

Saving upon Power-off	PIN
N	N

13.4.5 Example

Run:	`AT+XADPCLKFREQINFO?`	Read the status of enabling/disabling of the `+XADPCLKFREQINFO` URC.

Response:	`+XADPCLKFREQINFO: 0`
	
	`OK`	

Run:	`AT+XADPCLKFREQINFO=1`	Enable the `+XADPCLKFREQINFO` URC.
Response:	`OK`	

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Run:	`AT+XADPCLKFREQINFO=0`	Disable the `+XADPCLKFREQINFO` URC.
Response:	`OK`	
Run:	`AT+XADPCLKFREQINFO=?`	Query the list of frequency information available: centFreq, freqSpread, and noisePower.

Response:	`+XADPCLKFREQINFO: 21476000,5000000,0`
	
	`OK`	

13.5 +XADPCLKFREQINFO–Unsolicitedly Present of Adaptive Clock Frequency Info

13.5.1 Command Syntax

URC
<CR><LF>+XADPCLKFREQINFO: <centFreq>,<freqSpread>,<noisePower>[[;<centFreq>,<freqSpread>,<noisePower>][...]]<CR><LF>

13.5.2 Interface Description

The URC displays the adaptive clock frequency information.

13.5.3 Parameter Description

`<centFreq>`: the center frequency of the channel number in Hz. This is host receiver channel frequency.

`<freqSpread>`: the frequency spread of the channel number in Hz. This is host receiver channel frequency spread.

`<noisePower>`: the noise power referred at antenna in dBm, at the reported center frequency, and integrated over a bandwidth equal to reported frequency spread. This value shall be zeroed if not used.

13.5.4 Property Description

Saving upon Power-off	PIN
NA	NA

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13.5.5 Example

Response:	`+XADPCLKFREQINFO: 21476000,5000000,0`	Unsolicitedly report the frequency information: centFreq, freqSpread, and noisePower.

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14 Huawei Proprietary Interface: BodySAR Interface

14.1 AT^BODYSARON–Disable or Enable BodySAR

14.1.1 Command Syntax

AT^BODYSARON=<on>
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^BODYSARON?
Possible Response(s)
<CR><LF>^BODYSARON: <on><CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^BODYSARON=?
Possible Response(s)
<CR><LF>^BODYSARON: (0,1)<CR><LF><CR><LF>OK<CR><LF>

14.1.2 Interface Description

The set command enables or disables the BodySAR function.

The read command queries the current BodySAR function status.

The test command checks the parameter value range supported by this command.

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14.1.3 Parameter Description

<on>:

0	Disable BodySAR. (default value)
1	Enable BodySAR.

14.1.4 Property Description

Saving upon Power-off	PIN
N	N

14.1.5 Example

Run: AT^BODYSARON=1

Response: OK

14.2 AT^BODYSARWCDMA–Set the Max Tx Power Limit of WCDMA

14.2.1 Command Syntax

AT^BODYSARWCDMA=<power>[,<band>[,<power>,<band>]...]
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^BODYSARWCDMA?
Possible Response(s)
<CR><LF>^BODYSARWCDMA: list of (<power>,<band>)s<CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^BODYSARWCDMA=?
Possible Response(s)

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```
<CR><LF>^BODYSARWCDMA:
(12-24),<band><CR><LF><CR><LF>OK<CR><LF>
```

14.2.2 Interface Description

The set command sets the maximum Tx power limit of WCDMA for each band. Set the maximum Tx power limit of WCDMA for selected band according to the value of band bit field, and you can send this command for several times and set the different power limit when the values of bands are set differently.

The read command queries the maximum Tx power limit of WCDMA for each band. If the parameter values are not set, the default values are displayed after the query.

The test command checks the band range supported by WCDMA and the parameter values supported by the maximum Tx power limit for each band.

14.2.3 Parameter Description

<power>: the maximum Tx power limit, integers ranging from 12 to 24 in dBm.

<band>: band bit field, 32-bit digit with hexadecimal. A binary bit indicates a frequency band. The value of binary bit is shown in the following table (or parameter superimposed values except 3FFFFFFF).

Parameters	Band
00000001	WCDMA_I_IMT_2100
00000002	WCDMA_II_PCS_1900
00000004	WCDMA_III_1700
00000008	WCDMA_IV_1700
00000010	WCDMA_V_850
00000020	WCDMA_VI_800
00000040	WCDMA_VII_2600
00000080	WCDMA_VIII_900
00000100	WCDMA_IX_1700
3FFFFFFF	All supported bands

[,<band>[,<power>,<band>]...]: indicates that select all supported bands when all parameters are default. The parameter can set several groups (less or equal to eight groups) of power at one time. One <power> is set according to <band> in the same group.

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14.2.4 Property Description

Saving upon Power-off	PIN
Y	N

14.2.5 Example

Run:	`AT^BODYSARWCDMA=?`	

Response:	`^BODYSARWCDMA: (12-24),0000009B`
	
	`OK`
		Indicate that the firmware supports WCDMA Band I, Band II, Band IV, Band V and Band VIII; the power is from 12 to 24.

Run:	`AT^BODYSARWCDMA=20,00000001,18,0000000a`	Indicate that set the maximum WCDMA I Tx power limit to 20 and the maximum WCDMA II and WCDMA IV Tx power limit to 18.
Response:	`OK`	
Run:	`AT^BODYSARWCDMA?`	

Response:	`^BODYSARWCDMA: (20,00000001),(18,0000000a)`
	
	`OK`
		Indicate that the current maximum WCDMA I Tx power limit is set to 20 and the maximum WCDMA II and WCDMA IV Tx power limit is set to 18.

14.3 AT^BODYSARGSM–Set the Maximum Tx Power Limit of GSM

14.3.1 Command Syntax

`AT^BODYSARGSM=<power>[,<band>[,<power>,<band>]...]`
Possible Response(s)
<CR><LF>`OK`<CR><LF>

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In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^BODYSARGSM?
Possible Response(s)
<CR><LF>^BODYSARGSM: list of (<power>,<band>)s<CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^BODYSARGSM=?
Possible Response(s)
<CR><LF>^BODYSARGSM: (15-33),<band><CR><LF><CR><LF>OK<CR><LF>

14.3.2 Interface Description

The set command sets the maximum Tx power limit of GSM GPRS and EGPRS for each band single time-slot. Set the maximum Tx power limit of GSM for selected band according to the value of band bit field, and AP can send this command for several times and set the different power limit when the values of bands are set differently.

The read command queries the maximum Tx power limit of GSM for each band. If the parameter values are not set, the default values are displayed after the query.

The test command checks the band range supported by GSM and the parameter values supported by the maximum Tx power limit for each band.

Note:

The AT^BODYSARGSM command sets the maximum Tx power limit of GSM, GPRS and EGPRS for each band in single time-slot. When the module changes into multi-slot configuration, the maximum Tx power limit of each time-slot will be reduced. The power reduction in multi-slot configuration is as follow.

Number of timeslots in uplink assignment	Reduction of maximum Tx power (dB)
1	0
2	3
3	5
4	6
5	7
6	8

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Number of timeslots in uplink assignment	Reduction of maximum Tx power (dB)
7	8.5
8	9

14.3.3 Parameter Description

<power>: the maximum Tx power limit. Integer ranging from 15 to 33 in dBm.

<band>: band bit field, 32-bit digit with hexadecimal. A binary bit indicates a frequency band. The value of binary bit is shown in the following table (or parameter superimposed values except 3FFFFFFF).

Parameters(GPRS)	Parameters(EGPRS)	Band
00000001	00010000	GSM850
00000002	00020000	GSM900
00000004	00040000	GSM1800
00000008	00080000	GSM1900
3FFFFFFF		All supported bands

[,<band>[,<power>,<band>]…]: indicates that select all supported bands when all parameters are default. The parameter can set several groups (less or equal to eight groups) of power at one time. One <power> is set according to <band> in the same group.

14.3.4 Property Description

Saving upon Power-off	PIN
Y	N

14.3.5 Example

Run: `AT^BODYSARGSM=?`

Response:

```
^BODYSARGSM: (15-33),
000F000F

OK
```

Indicate that the firmware supports GSM850, GSM900, GSM1800 and GSM1900; the power is from 15 to 33.

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Run:	`AT^BODYSARGSM=20`	Indicate that set the maximum Tx power limit for the band supported by firmware to 20.
Response:	`OK`	
Run:	`AT^BODYSARGSM?`	
Response:	`^BODYSARGSM: (20,3FFFFFFF)` `OK`	Indicate that the maximum Tx power limit for the band supported by firmware is set to 20.

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15 Huawei Proprietary Interface: IPv6 Interface

15.1 AT^IPV6CAP–Query IPv6 Capability

15.1.1 Command Syntax

AT^IPV6CAP?
Possible Response(s)
<CR><LF>^IPV6CAP: <cfg_value><CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^IPV6CAP=?
Possible Response(s)
<CR><LF>^IPV6CAP: (list of supported <cfg_value>)<CR><LF><CR><LF>OK<CR><LF>

15.1.2 Interface Description

This interface can query the IPv6 capability of the MT.

The read command queries the current IPv6 capability of the MT.

The test command returns all supported IPv6 capability of the MT.

15.1.3 Parameter Description

<cfg_value>: configured value of the IPv6 capability.

0x01	IPv4 only
0x02	IPv6 only

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0x07	IPv4 only + IPv6 only + IPv4v6 (use the same APN)
Other values	Reserved

15.1.4 Property Description

Saving upon Power-off	PIN
NA	N

15.1.5 Example

- Example 1:

Run: `AT^IPV6CAP?` MT supports IPv4 only.

Response:
```
^IPV6CAP: 1

OK
```

- Example 2:

Run: `AT^IPV6CAP?` MT supports IPv6 only.

Response:
```
^IPV6CAP: 2

OK
```

- Example 3:

Run: `AT^IPV6CAP?` MT supports IPv4, IPv6, and IPv4v6.

Response:
```
^IPV6CAP: 7

OK
```

- Example 4:

Run: `AT^IPV6CAP=?` Query the supported IPv6 capability of the MT.

Response:
```
^IPV6CAP: (1,2,7)

OK
```


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16 Huawei Proprietary Interface: Tunable Antenna Interface

16.1 AT^ANTENCFG–Set Tunable Antenna

16.1.1 Command Syntax

AT^ANTENCFG=<mode>,<pattern>[,<band>[,<pattern>,<band>[...]]]
Possible Response(s)
<CR><LF>OK<CR><LF>
AT^ANTENCFG?
Possible Response(s)
<CR><LF>^ANTENCFG: <CR><LF><mode>: <pattern>,<band>[,<pattern>,<band>[...]][[<CR><LF><mode>: <pattern>,<band>[,<pattern>,<band>[...]]][...]]<CR><LF><CR><LF>OK<CR><LF>
AT^ANTENCFG=?
Possible Response(s)
<CR><LF>^ANTENCFG: (list of supported <mode>s),(list of supported <pattern>s),(list of supported <band>s)<CR><LF><CR><LF>OK<CR><LF>

16.1.2 Interface Description

The set command sets the antenna tuner configuration for each band of every mode.

The read command queries the antenna tuner configuration of each band of all modes.

The test command queries the parameter values supported by the command.

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16.1.3 Parameter Description

<mode>: the mode of network.

0	GSM
1	WCDMA

<pattern>: the configuration of antenna tuner. Pattern bit field, 8-bit digit with hexadecimal. A binary bit indicates a ANTCTL pin.

Bit[4-7]	Bit[3]	Bit[2]	Bit[1]	Bit[0]
reserved	ANTCTL3	ANTCTL2	ANTCTL1	ANTCTL0

0	Low Level
1	High Level

<band>: band bit field, 64-bit digit with hexadecimal. A binary bit indicates a frequency band. The value of binary bit is shown in the following table

Table 16-1 The value of <band> when <mode>=0

Parameters	Band
0000000000000001	GSM850
0000000000000002	GSM900
0000000000000004	GSM1800
0000000000000008	GSM1900
…	…
FFFFFFFFFFFFFFFF	All supported bands

Table 16-2 The value of <band> when <mode>=1

Parameters	Band
0000000000000001	WCDMA_I_IMT_2100
0000000000000002	WCDMA_II_PCS_1900
0000000000000004	WCDMA_III_1700
0000000000000008	WCDMA_IV_1700
0000000000000010	WCDMA_V_850
0000000000000020	WCDMA_VI_800

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Parameters	Band
0000000000000040	WCDMA_VII_2600
0000000000000080	WCDMA_VIII_900
0000000000000100	WCDMA_IX_1700
0000000000000200	WCDMA_X
0000000000000400	WCDMA_XI
0000000000000800	WCDMA_XII
0000000000001000	WCDMA_XIII
0000000000002000	WCDMA_XIV
0000000000004000	WCDMA_XV
0000000000008000	WCDMA_XVI
0000000000010000	WCDMA_XVII
0000000000020000	WCDMA_XVIII
0000000000040000	WCDMA_XIX
…	…
FFFFFFFFFFFFFFFF	All supported bands

[,<band>[,<pattern>,<band>]…]: indicates that select all supported bands when all parameters are default. One <pattern> is set according to <band> in the same group.

Note:

On the MU736 module, the parameter can set several groups (less or equal to nine groups) of pattern at one time.

16.1.4 Property Description

Saving upon Power-off	PIN
Y	N

16.1.5 Example

Run: `AT^ANTENCFG=?`

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Response:	^ANTENCFG: (0-1),(0-15),(000000000000000F,0000000000000009B) OK	Indicate that the module supports GSM and WCDMA. The pattern is from 0 to 15.The module supports GSM 4 bands and WCDMA BC1,2,4,5,8.
Run:	AT^ANTENCFG=0,1,2	Set the antenna tuner configuration of GSM900 to be 1.
Response:	OK	
Run:	AT^ANTENCFG?	
Response:	^ANTENCFG: 0: 0,000000000000000D,1,0000000000000002 1: 0,000000000000009B OK	Indicate that the current configuration of GSM900 is 1,other all support bands are 0.

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17 Huawei Proprietary Interface: Main And AUX Switch Interface

17.1 AT^ANTMODE–Set Operation Mode of Main and AUX Antennas

17.1.1 Command Syntax

AT^ANTMODE=<ant_mode>[,<nw_mode>]
Possible Response(s)
<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^ANTMODE?
Possible Response(s)
<CR><LF>^ANTMODE: <ant_mode>,<nw_mode><CR><LF>[^ANTMODE: <ant_mode>,<nw_mode><CR><LF>][...]<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^ANTMODE=?
Possible Response(s)
<CR><LF>^ANTMODE: (list of <ant_mode>s),(list of <nw_mode>s)<CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

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17.1.2 Interface Description

The set command sets the operation mode of main and AUX antennas on different networks. The module will be reset after running the command and returning `OK`.

The read command queries the current operation mode of main and AUX antennas on different networks.

The test command returns the list of operation modes of main and AUX antennas supported by the module.

17.1.3 Parameter Description

`<ant_mode>`: the operation mode of main and AUX antennas.

0	The main and AUX antennas are all enabled. (default value)
1	The main antennas is enabled.
2	The AUX antennas is enabled.

`<nw_mode>`: the network. If the parameter is not specified, it equals to `<nw_mode>`=0.

0	All networks
2	WCDMA (default value)

17.1.4 Property Description

Saving upon Power-off	PIN
N	N

17.1.5 Example

Run:	`AT^ANTMODE?`	Query the current operation mode of the main and AUX antenna.

Response:	`^ANTMODE: 0,2`
	
	`OK`
		The response indicates that the main and AUX antennas are all enabled on the WCDMA network

Run:	`AT^ANTMODE=?`	Query the list of operation modes of main and AUX antennas supported by the module.

Response:	`^ANTMODE: (0,1,2),(0,2)`
	
	`OK`	

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Run:	`AT^ANTMODE=0`	Set the main and AUX antennas to be all enabled on all networks.
Response:	`OK`	
Run:	`AT^ANTMODE=1,2`	Set the main antennas to be enabled on the WCDMA network.
Response:	`OK`	

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18 Huawei Proprietary Interface: GPS Service Interfaces

18.1 AT^WPDOM–Set Operation Mode

18.1.1 Command Syntax

AT^WPDOM=<mode>
Possible Response(s)
<CR><LF>OK<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>

18.1.2 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 during the positioning process. Otherwise, an error message is returned.

The read command queries the current operation mode.

The test command returns the value range of the operation mode.

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18.1.3 Parameter Description

`<mode>`: operation mode.

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.

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. (not supported currently)

3 Accuracy optimal. The positioning data with the optimal accuracy is obtained. The accuracy optimal mode is only MS-assisted in UMTS. (not supported currently)

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. (not supported currently)

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. (default value)

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. (not supported currently)

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.) (not supported currently)

18.1.4 Property Description

Saving upon Power-off	PIN
Y	N

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18.1.5 Example

- Query the current operation mode:

Run: `AT^WPDOM?`

Response: `^WPDOM: 5`

`OK`

- Set the operation mode:

Run: `AT^WPDOM=0`

Response: `OK`

Run: `AT^WPDOM=1`

Response: `OK`

Run: `AT^WPDOM=5`

Response: `OK`

18.2 AT^WPDST–Set Session Type

18.2.1 Command Syntax

`AT^WPDST=<type>`
Possible Response(s)
<CR><LF>`OK`<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>

18.2.2 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.

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The read command queries the current session type.

The test command returns the value range of the session type.

18.2.3 Parameter Description

`<type>`: session type.

0	Provide a single positioning operation. (default value)
1	Provide tracing positioning. The positioning value is obtained using the designated frequency. The positioning frequency is set by running `AT^WPDFR`.
2	Provide the last positioning information, but does not execute the satellite searching operation. (not supported currently)

18.2.4 Property Description

Saving upon Power-off	PIN
N	N

18.2.5 Example

- Query the value range of session type:

Run: `AT^WPDST=?`

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

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`

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18.3 AT^WPDFR–Set Positioning Frequency

18.3.1 Command Syntax

AT^WPDFR=<num>,<time>
Possible Response(s)
<CR><LF>OK<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>

18.3.2 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 queries the current positioning frequency.

The test command returns 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.

18.3.3 Parameter Description

<num>: number of positioning operations triggered by the designated MS. The value ranges from 0 to 65535, and the default value is 65535. (It is not work currently.)

<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. (It is NMEA sentence reporting time interval currently.)

On Linux system or systems like Linux, it is recommended to set <time> to be less than the SS (Selective Suspend) time which is set by the system. This is to avoid the

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following situation that may happen: because the system comes into the SS state, NEMA data cannot be reported to the host during the GPS position. About that how to set the SS time on Linux system, please refer to *Guide to Kernel Driver Integration in Android for Huawei Modules* V1.2.9 or later.

18.3.4 Property Description

Saving upon Power-off	PIN
N	N

18.3.5 Example

- Query the value range of positioning frequency:

Run: `AT^WPDFR=?`

Response:
```
^WPDFR: (0-65535),(1-1800)

OK
```

- Query the current positioning frequency:

Run: `AT^WPDFR?`

Response:
```
^WPDFR: 65535,1

OK
```

- Set the positioning frequency

Run: `AT^WPDST=1`

Response: `OK`

Run: `AT^WPDFR=20,2`

Response: `OK`

18.4 AT^WPURL–Set AGPS Server Address and Port

18.4.1 Command Syntax

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

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```
<CR><LF>^WPURL: <url><CR><LF><CR><LF>OK<CR><LF>
```

18.4.2 Interface Description

The set command sets 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 queries the address of the current AGPS server.

18.4.3 Parameter Description

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

18.4.4 Property Description

Saving upon Power-off	PIN
Y	N

18.4.5 Example

Set the address of the AGPS server:

Run: `AT^WPURL=SUPL.GOOGLE.COM:7276`

Response: `OK`

18.5 AT^WPDIM–Delete Auxiliary Data

18.5.1 Command Syntax

AT^WPDIM=<mode>
Possible Response(s)
<CR><LF>OK<CR><LF>
AT^WPDIM=?
Possible Response(s)
<CR><LF>^WPDIM: (list of supported <mode>s) <CR><LF><CR><LF>OK<CR><LF>

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18.5.2 Interface Description

The set command deletes the auxiliary positioning data inside a board. This command is available after the MGP search engine is closed. The deletion operation cannot be performed when the MGP search engine is open.

The test command returns the supported deletion type.

18.5.3 Parameter Description

`<mode>`: deletion type.

0	Cold start
1	Warm start
2	Hot start

18.5.4 Property Description

Saving upon Power-off	PIN
NA	N

18.5.5 Example

- Query the value range of delete auxiliary data mode:

Run: `AT^WPDIM=?`

Response:
```
^WPDIM: (0-2)

OK
```

- Set the deletion mode:

Run: `AT^WPDIM=1`

Response: `OK`

18.6 AT^WPDGP–Start Positioning Session

18.6.1 Command Syntax

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

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In case of an error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>

18.6.2 Interface Description

This command enables the GPS function. Only one positioning operation is allowed within the same period. When the GPS function is enabled, an error message is returned if this command is run again.

18.6.3 Parameter Description

None

18.6.4 Property Description

Saving upon Power-off	PIN
NA	N

18.6.5 Example

Set PD session successfully:

Run: AT^WPDGP

Response: OK

18.7 AT^WPEND–Terminate Positioning Process

18.7.1 Command Syntax

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

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18.7.2 Interface Description

This command ends the GPS session. When no positioning session is available or the positioning session is in off status, an error message is returned if this command is run.

18.7.3 Parameter Description

None

18.7.4 Property Description

Saving upon Power-off	PIN
NA	N

18.7.5 Example

- Terminate the PD session successfully:

Run: `AT^WPEND`

Response: `OK`

- PD Session is not going on. Terminate Failture:

Run: `AT^WPEND`

Response: `ERROR`

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19 Appendix

19.1 List of URC Commands

URC	Function
+CBM	Present new cell broadcast message
+CBMI	Present newly received cell broadcast message
+CDS	Present new message status report reported
+CDSI	Present newly received message status report
+CMT	Present new message reported
+CMTI	Present message arrival indication
+CUSD	Report USSD of network
+CUSATP	Indicate a UICC proactive command
+CUSATEND	Indicate a terminated UICC proactive command session
^SIMST	Indicate SIM card state change
^SRVST	Indicate service state change
+XTS	Indicate the threshold reached
+XADPCLKFREQINFO	Report adaptive clock frequency info

19.2 General CME Error List

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

Table 19-1 General "CME ERROR" Codes

Numeric mode	Verbose mode
0	phone failure

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Numeric mode	Verbose mode
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
32	network not allowed - emergency calls only
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required

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Numeric mode	Verbose mode
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
261	unknown subscriber
262	service not available
263	unknown class
264	unknown network message

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Numeric mode	Verbose mode
273	Minimum TFT per PDP address error
274	Duplicate TFT eval prec index
275	Invalid TFT param combination

Table 19-2 General "CME ERROR" Codes (Huawei proprietary)

Numeric mode	Verbose mode
65280	call index error
65281	call state error
65282	sys state error
65283	parameters error
65284	spn file wrong
65285	spn file accessed denied
65286	spn file not exist
65287	another SPN query operation still not finished
65289	input value is out of range

Table 19-3 GPS related "CME ERROR" Codes (Huawei proprietary)

Numeric mode	Verbose mode
276	GPS function disabled
277	Standalone disabled
278	AGPS disabled
279	gpsOneXTRA disabled
280	Cell-ID disabled
281	Invalid parameter
282	Unable to delete parameters
283	PD session is ongoing
284	PD session is in off status
285	too many parameters
286	invalid server address
287	GPS locked

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Numeric mode	Verbose mode
288	GPS type not supported
289	MGP receiver is ongoing

19.3 CMS Error List

The following lists the <err> value of CMS ERROR that may be returned by all AT commands of short messages.

<err> values used by common messaging commands:

Numeric mode	Verbose mode
0–127	3GPP TS 24.011 clause E.2 values
128–255	3GPP TS 23.040 clause 9.2.3.22 values.
300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	(U)SIM not inserted
311	(U)SIM PIN required
312	PH-(U)SIM PIN required
313	(U)SIM failure
314	(U)SIM busy
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

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Numeric mode	Verbose mode
332	network timeout
340	no +CNMA acknowledgement expected
500	unknown error
...511	other values in range 256...511 are reserved
512...	manufacturer specific

19.4 Final Result Code

Final Result Code	No.	Description
OK	0	A command is executed, and there is no error.
CONNECT	1	A connection is established.
RING	2	An incoming call is originated.
NO CARRIER	3	A connection is terminated.
ERROR	4	There is a common error.
NO DIALTONE	6	There is no dialing tone.
BUSY	7	The peer is busy.
NO ANSWER	8	Timeout occurs when the connection is complete, and there is no reply.
+CME ERROR: <err>		The error type is specified by <err>.
+CMS ERROR: <err>		It is a short message-related error.
COMMAND NOT SUPPORT	numeric is not supported	The command is not supported.
TOO MANY PARAMETERS	numeric is not supported	Too many parameters in the issued command

Note:

The final result code is the termination flag of an AT command.

19.5 References

[1] 3GPP TS 23.038

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[2] 3GPP TS 23.040

[3]3GPP TS 23.041

[4] 3GPP TS 24.011

[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] 3GPP TS 45.008

[11] GSM 02.88

[12] GSM 03.40

[13] GSM 04.08

[14] GSM 07.05

[15] GSM 51.011

[16] ETSI TS 102.221

[17] ETSI TS 102.223

[18] HUAWEI Terminal AT Command Interface Specifications

[19] ITU-T Recommendation V.25 ter

19.6 Acronyms and Abbreviations

Abbreviations	Full spelling
3GPP	Third Generation Partnership Project
AGPS	Assisted Global Positioning System
AT	ATtention
APN	Access Point Name
BER	Bit Error Rate
CDMA	Code Division Multiple Access
CLIP	Call Line Identifier Presentation
CS	Circuit Switched (CS) Domain
DCE	Data Circuit-terminating Equipment
DCS	Data Coding Scheme
EGPRS	Enhanced GPRS

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Abbreviations	Full spelling
E-UTRAN	Evolved UTRAN
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile Communications
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
ITU-T	International Telecommunication Union-Telecommunication Standardization Sector
IWF	Interworking Function
ME	Mobile Equipment
MS	Mobile Station
MSISDN	Mobile Station International ISDN Number
MT	Mobile Terminal
NMEA	National Marine Electronics Association
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PUK	PIN Unblocking Key
PS	Packet Switched (PS) domain
QoS	Quality of Service
RP	Relay Protocol
RSSI	Receive Signal Strength Indicator
SCA	Service Center Address
SIM	GSM Subscriber Identity Module
SM	Short Message
SMS	Short Message Service
SMSC	Short Message Service Center

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Abbreviations	Full spelling
TA	Terminal Adapter
TE	Terminal Equipment
TPDU	Transfer Protocol Data Unit
URC	Unsolicited Result Code
USIM	Universal Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	Universal Terrestrial Radio Access Network
VP	Validity Period
WCDMA	Wideband CDMA

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