HUAWEI ME906J LTE M.2 Module

AT Command Interface Specification

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Huawei Technologies Co., Ltd.

Huawei Industrial Base, Bantian, Longgang, Shenzhen 518129, People's Republic of China
Tel: +86-755-28780808 Global Hotline: +86-755-28560808 Website: www.huawei.com
E-mail: mobile@huawei.com

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About This Document

Revision History

Doument Version	Date	Chapter	Descriptions
01	2013-10-23		Creation
02	2013-12-06	5.1	Updated Interface Description and Example of AT+CGDCONT–Define PDP Context

Contents

1 Introduction

1.1 Scope

This document describes AT command interface specifications that is supported by Huawei terminal product ME906J module.

Please read the Release Notes released with the firmware before using ME906J module and this document.

1.2 Overview

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

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

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

1.3 Organization

Chapter 2 "General Commands" to chapter 7 "Call Control Commands Interfaces" describe AT interfaces defined in international standards such as 3GPP and ITU-T.

Chapter 8 "Huawei Proprietary Interface: Mobile Termination Control and Status Interface" to chapter 12 "Huawei Proprietary Interface: M.2 Interface" describe Huawei proprietary interfaces.

1.4 Document Conventions

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

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

For example:

Saving upon Power-off	PIN
N	Y

The settings are described as follows:

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

1.5 AT Command Syntax

1.5.1 AT Command Types

Table 1-1 Types of AT commands

AT command type	Syntax		Function

General command	Set command	Contains one parameter:
		`AT<name>[=<value>]`
		Contains multiple parameters:
		`AT<name>[=<compound_value>]`
			A set command is executed to set parameters.

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

1.5.2 AT Command Parameter

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

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

<...>: The parameter inside these angle brackets is mandatory. The <> does not exist in a command.

[...]: The parameter inside these square brackets is optional. The [] does not exist in a command or a response.

<CR>: Carriage return character. For details, see the description in S3.

<LF>: Line feed character. For details, see the description in S4.

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

Note:

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

1.5.3 AT Command Description

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

Figure 1-1 Interaction between the TE and MT

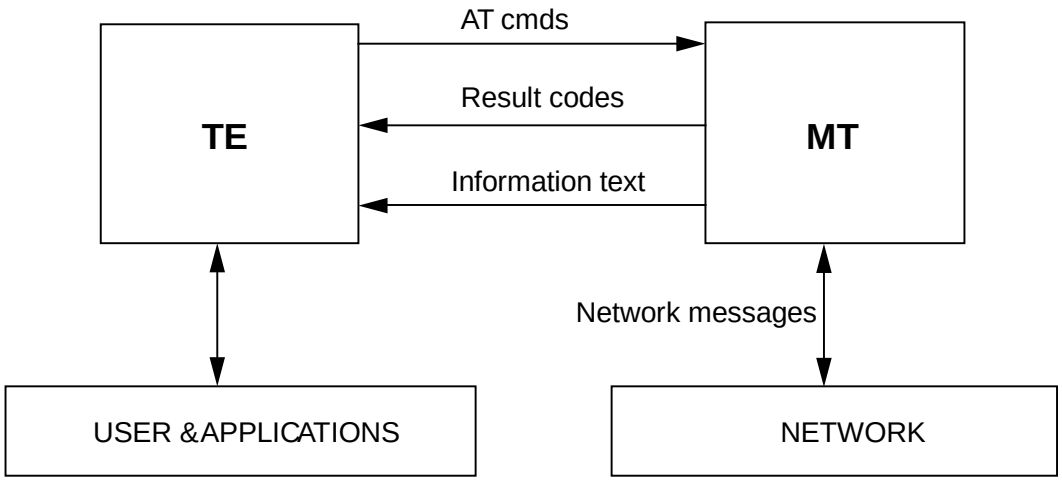
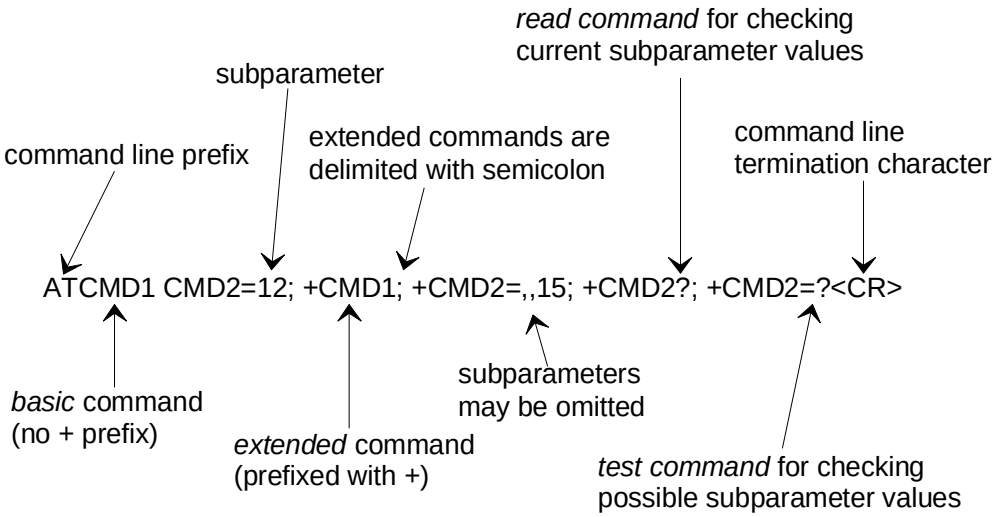


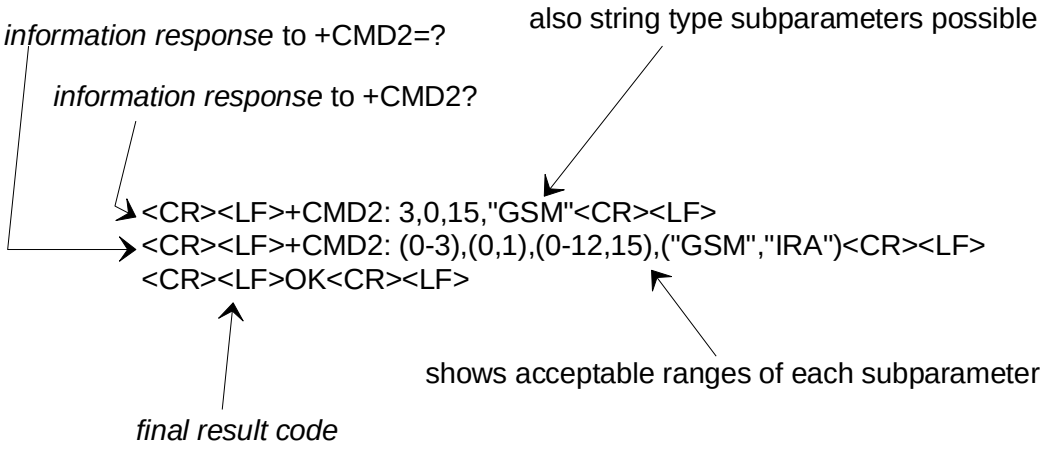
Figure 1-2 shows the basic organization format of the AT command line.

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



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

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



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

the DCE, it shall terminate the command in progress and return an appropriate result code to the DTE, as specified for the particular command.

The following commands can be aborted.

`ATD`	Can be aborted
`AT+CLCK`	Can be aborted
`AT+COPS`	Can be aborted except "`AT+COPS=?`"

1.7 Rules for Running AT Commands

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

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.

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 <value>=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>: queries the previously described MS ID information. The value ranges from 0 to 255 (these values are meaningless).

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

2.2.4 Property Description

Saving upon Power-off	PIN
NA	N

2.2.5 Example

Run: `ATI`

Response:

```
Manufacturer: Huawei Technologies Co., Ltd.
Model: ME906J
Revision: 12.430.07.00.00
IMEI: 111111111111110
+GCAP: +CGSM

OK
```

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

2.3.1 Command Syntax

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

2.3.2 Interface Description

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.

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 want to provide. The number of characters, including line terminators, in the response to this command cannot exceed 2048. The sequence `0`<CR> or `OK`<CR> is not allowed in the response.

The test command returns `OK`.

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: ME906J

Run: AT+CGMM

Response: ME906J

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.

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.

8 char	6 char	1 char
TAC	SNR	Spare

TAC: the type approval code assigned to the MT

SNR: the MT's serial number

Spare: spare digit

2.6.4 Property Description

Saving upon Power-off	PIN
NA	N

2.6.5 Example

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

Run: `AT+CGSN`

Response:
```
351548000225444

OK
```

2.7 AT^MEID–Query the MEID

2.7.1 Command Syntax

AT^MEID
Possible Response(s)
<CR><LF>^MEID:<meid><CR><LF><CR><LF>OK<CR><LF>
AT^MEID=?
Possible Response(s)
<CR><LF>OK<CR><LF>

2.7.2 Interface Description

The execution command queries the mobile equipment identifier (MEID) of the R-UIM card. If the R-UIM card is unavailable, the MEID of the MT is returned.

The test command returns `OK`.

2.7.3 Parameter Description

<meid>: a string without double quotation marks, consisting of 14 hex digits. If the MEID does not exist, "00000000000000" is displayed.

2.7.4 Property Description

Saving upon Power-off	PIN
NA	Y

2.7.5 Example

Run: `AT^MEID`

Response: `^MEID:A0C72311111111`

`OK`

2.8 AT^MDN–Set the MDN

2.8.1 Command Syntax

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

2.8.2 Interface Description

The execution command queries the mobile directory number (MDN) of the R-UIM card. If no R-UIM card is available, the MDN of the MT is returned.

2.8.3 Parameter Description

<MDN_num>: a string without double quotation marks, consisting of a maximum of 15 decimal digits, valid character including the '0'–'9', '*', '#', '+'.

2.8.4 Property Description

Saving upon Power-off	PIN
NA	N

2.8.5 Example

Run: `AT^MDN`

Response:

```
^MDN: 123

OK
```

3 Network Service Related Commands

3.1 AT+COPS–Select Operator

3.1.1 Command Syntax

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

3.1.2 Interface Description

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

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

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

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

Note:

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

3.1.3 Parameter Description

<mode>: network selection mode

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

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

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

<oper>: operator information.

<stat>: network state.

0	Unknown
1	Available
2	Current
3	Forbidden

<rat>: wireless access technology.

0	GSM

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

3.1.4 Property Description

Saving upon Power-off	PIN
NA	Y

3.1.5 Example

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",0`

Response: `OK`

Notes:

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

4. Requesting network state

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

3.2 AT+CREG–Register Network

3.2.1 Command Syntax

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

3.2.2 Interface Description

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

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

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

3.2.3 Parameter Description

<n>:

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

<stat>:

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

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

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

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

0	GSM
1	GSM Compact
2	UTRAN
3	GSM w/EGPRS (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

Notes:

1. 3GPP TS 44.060 specifies the system information messages which give the information about whether the serving cell supports EGPRS.

2. 3GPP TS 25.331 specifies the system information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

3.2.4 Property Description

Saving upon Power-off	PIN
N	Y

3.2.5 Example

Run: `AT+CREG?`

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

`OK`

Run: `AT+CREG=1`

Response: `OK`

Run: `AT+CREG=?`

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

`OK`

3.3 AT+CLCK–Lock Facility

3.3.1 Command Syntax

AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]
Possible Response(s)
When <mode>=2 and the command is executed successfully: <CR><LF>+CLCK: <status><CR><LF><CR><LF>OK<CR><LF> When <mode>≠2 and the command is executed successfully: <CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT+CLCK=?
Possible Response(s)

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

3.3.2 Interface Description

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

The test command returns the facilities supported.

3.3.3 Parameter Description

<fac>: specifies the target of this command.

"SC"	SIM card (if this parameter is set, MT will request the password during startup.)
"AB"	All barring services (applicable only for <mode>=0)
"AC"	All incoming barring services (applicable only for <mode>=0)
"AG"	All outgoing barring services (applicable only for <mode>=0)
"AI"	Bar all incoming calls
"AO"	Bar all outgoing calls
"IR"	BIC-Roam (bar incoming calls when roaming outside the home country)
"OI"	Bar outgoing international calls
"OX"	Bar outgoing international calls except to home country
“FD”	SIM card or active application in the UICC(GSM or USIM) fixed dialing memory feature (reserved, not supported currently)
"PN"	Network personalization (reserved, not supported currently)
"PU"	Network subset personalization (reserved, not supported currently)
"PP"	Service provider personalization (reserved, not supported currently)
"PC"	Corporate personalization (reserved, not supported currently)
"PF"	Lock phone to the very first inserted SIM/UICC card (PH-FSIM) (if this parameter is set, you need to enter the password when changing an SIM/UICC card.) (reserved, not supported currently)

Note:

The passwords for "SC" and "P2" are stored on the SIM card; other passwords are set on the network side.

<mode>: integer type; operating mode.

0	Unlock

1	Lock
2	Query status

<status>: integer type; current status.

0	Not active
1	Active

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

<classx>:

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

3.3.4 Property Description

Saving upon Power-off	PIN
Y	Y

3.3.5 Example

Run: AT+CLCK=?

Response:
```
+CLCK: ("AB","AC","AG","AI","AO","IR","OI","OX","
SC")

OK
```

Run: AT+CLCK="SC",2

Response:
```
+CLCK: 0

OK
```

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

Response: OK

3.4 AT+CPWD–Change Password

3.4.1 Command Syntax

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

3.4.2 Interface Description

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

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

3.4.3 Parameter Description

<fac>: specifies the target of this command.

"P2"	SIM PIN2
"SC"	SIM card (if this parameter is set, MT will request the password during startup.)
"AB"	All barring services (applicable only for <mode>=0)
"AC"	All incoming barring services
"AG"	All outgoing barring services
"AI"	Bar all incoming calls
"AO"	Bar all outgoing calls
"IR"	BIC-Roam (bar incoming calls when roaming outside the home country)
"OI"	Bar outgoing international calls
"OX"	Bar outgoing international calls except to home country

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

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

3.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

3.4.5 Example

Run: AT+CPWD=?

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

OK
```

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

Response: OK

3.5 AT+CUSD–USSD Command

Users can run Unstructured Supplementary Service Data (USSD) commands using mobile devices to request specific services from the network, and the network also can send USSD commands to devices to implement specific services. Unlike SMS, USSD allows real-time bidirectional data exchange so that it can be used in services, such as stock information query. Currently, many value-added services, such as stock, lottery, weather forecast, and flight information query, are provided using USSD.

3.5.1 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>

3.5.2 Interface Description

This command provides control on the supplementary service USSD. It supports the operation originated from the network side or the terminal side.

<n> is used to disable/enable proactive reporting of URC. This reporting may be response to the terminal-originated service at the network side, or service request originated at the network side:

+CUSD: <m>[,<str>,<dcs>]

If the <str> field is provided in the command, the message sent to the network side may the USSD request originated at the terminal side, or the response to the network-side request from the terminal. The response (USSD string) from the network will be included in the subsequent AT+CUSD result code.

Besides, <n>=2 is used to exit the current USSD session.

When the <n> takes on the default value, the execution command is equivalent to the set command AT+CUSD=0.

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

3.5.3 Parameter Description

<n>:

0	Disable the result code presentation to the TE (default value)
1	Enable the result code presentation to the TE
2	Cancel session

<str>: string type, USSD-string. Valid USSD characters are '0'–'9', '*', '#', and '+'.

- When USSD is transmitted in coding mode (non-transparent mode), the value of <str> is set by running AT+CSCS. The MT will encode the value to the data that complies with the requirement specified by <dcs> and send the data to network side.
- When USSD is transmitted in transparent mode using Huawei's proprietary scheme, the value of <str> is not controlled by AT+CSCS and not encoded by the MT.

The MT can send USSD data that contains a maximum 160 bytes to the network side.

Note:

The definition of AT+CSCS can see 3GPP TS 27.007.

<dcs>: integer type, USSD coding. The default value is 0 (see 3GPP TS 23.038 Cell Broadcast Data Coding Scheme).

When USSD is transmitted in coding mode, the MT supports GSM 7-bit and GSM 8-bit, but not UCS2.

<m>:

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

3.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

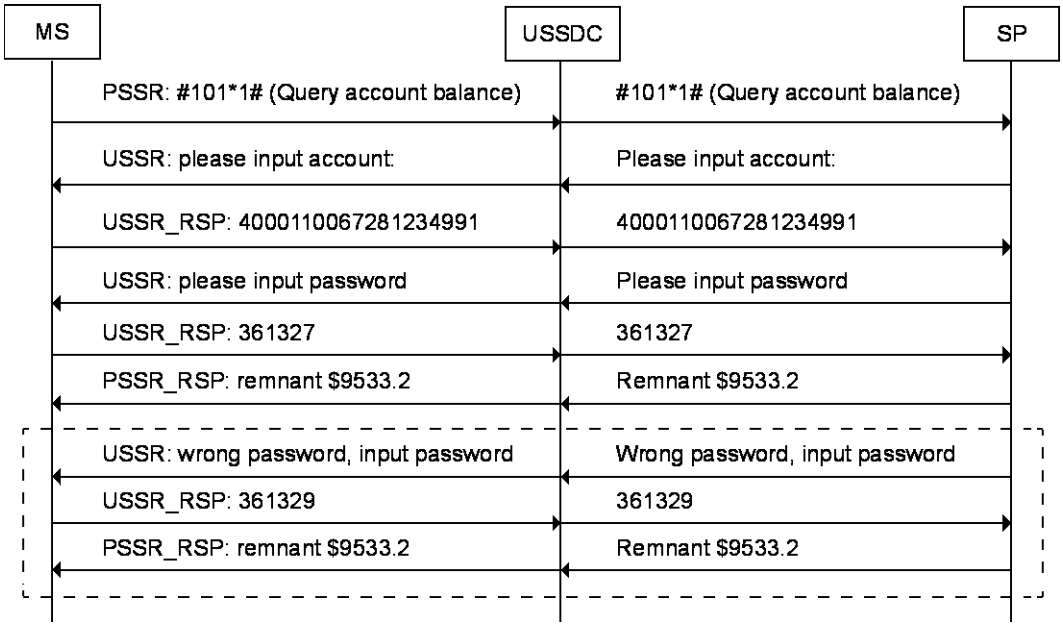
3.5.5 Example

To set the character set on a terminal to IRA in non-transparent transmission mode by running AT+CSCS:

1. Use USSD to query the phone number (given that the query code is 99):

Run:	AT+CUSD=1,"99",15	
Response:	OK	
Network Response	+CUSD: 0,"139037601",15	If the phone number is 86139037601

2. The following figure illustrates the process of USSD service (the process of querying bank account balance is used as an example).



Notes:

- For intuitive description, the strings in the previous figure are not converted to codes.
- MT: mobile terminal
- USSDC: USSD center
- SP: the server that provides the service

3.6 +CUSD–Unsolicitedly Present USSD of Network

3.6.1 Command Syntax

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

3.6.2 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.

3.6.3 Parameter Description

The definition of its parameters and the use of this command see section 3.5 AT+CUSD–USSD Command.

3.6.4 Property Description

Saving upon Power-off	PIN
NA	Y

3.6.5 Example

Response: `+CUSD: 0,"CD69724A74EA1A385B6C9683CD6E31D8CC7603", 15`

4 Mobile Termination Control and Status Commands

4.1 AT+CFUN–Set Operation Mode

4.1.1 Command Syntax

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

4.1.2 Interface Description

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

The read command returns the current mode.

The test command returns the supported parameter values.

4.1.3 Parameter Description

<fun>:

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

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

0	Not restart MT before setting (default value)
1	Restart the MT before setting (<fun> is set to 1)

4.1.4 Property Description

Saving upon Power-off	PIN
NA	N

4.1.5 Example

Run: AT+CFUN?

Response: +CFUN: 0

OK

Run: AT+CFUN=1

Response: OK

4.2 AT+CPIN–Enter PIN

4.2.1 Command Syntax

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

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

4.2.2 Interface Description

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

The set command verifies and unblocks PIN and PIN2.

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

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

Note:

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

The test command returns OK.

4.2.3 Parameter Description

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

<code>: string type, without quotation marks.

READY	MT is not pending for any password.
SIM PIN	MT is waiting for UICC/SIM PIN to be given.

SIM PUK	MT is waiting for UICC/SIM PUK to be given to unblock the blocked SIM PIN.
SIM PIN2	MT is waiting for SIM PIN2 to be given.
SIM PUK2	MT is waiting for UICC/SIM PUK2 to be given to unblock the blocked SIM PIN2.

4.2.4 Property Description

Saving upon Power-off	PIN
N	N

4.2.5 Example

Run: `AT+CPIN?`

Response:

```
+CPIN: SIM PIN

OK
```

Run: `AT+CPIN="1234"`

Response: `OK`

4.3 AT+CPBS–Select Phonebook Memory Storage

4.3.1 Command Syntax

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

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

4.3.2 Interface Description

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

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

The test command returns supported phonebook storages.

4.3.3 Parameter Description

<storage>: phonebook storage type.

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

<reserved>: reserved.

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

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

4.3.4 Property Description

Saving upon Power-off	PIN
N	Y

4.3.5 Example

Run: `AT+CPBS?`

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

`OK`

Run: `AT+CPBS="ON"`

Response: `OK`

Run: `AT+CPBS=?`

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

`OK`

4.4 AT+CPBR–Read Phonebook Entries

4.4.1 Command Syntax

AT+CPBR=<index1>[,<index2>]
Possible Response(s)
<CR><LF>[+CPBR: <index1>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>][,<sip_uri>][,<tel_uri>]][[...][<CR><LF>+CPBR: <index2>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>][,<sip_uri>][,<tel_uri>]]]<CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT+CPBR=?
Possible Response(s)
<CR><LF>+CPBR: (list of supported <index>s)[,<nlength>][,<tlength>][,<glength>][,<slength>][,<elength>][,<siplength>][,<tellength>]<CR><LF><CR><LF>OK<CR><LF>

4.4.2 Interface Description

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

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

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

4.4.3 Parameter Description

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

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

<type>: specifies the number type. "145" indicates an international number. For details about the values of <type>, see the value definitions of <type_addr> in section 6.6 AT+CMGS–Send Short Message.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

0	Phonebook entry not hidden
1	Phonebook entry hidden

Notes:

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

4.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.4.5 Example

Run: AT+CPBR=?

Response: +CPBR: (1-250),24,14

OK

Run: AT+CPBR=1

Response: +CPBR: 1,"12323",129,"qwewqe"

OK

4.5 AT+CPBW–Write Phonebook Entry

4.5.1 Command Syntax

AT+CPBW=[<index>][,<number>[,<type>[,<text>[,<group>[,<adnumber>[,<adtype>[,<secondtext>[,<email>[,<sip_uri>[,<tel_uri>[,<hidden>]]]]]]]]]]
Possible Response(s)

<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>+CME ERROR: <err><CR><LF>
AT+CPBW?
Possible Response(s)
<CR><LF>+CPBW: <written_index><CR><LF><CR><LF>OK<CR><LF>
AT+CPBW=?
Possible Response(s)
<CR><LF>+CPBW: (list of supported <index>s),[<nlength>],(list of supported <type>s),[<tlength>]<CR><LF><CR><LF>OK<CR><LF>

4.5.2 Interface Description

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

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

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

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

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

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

Note:

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

The test command returns:

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

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

4.5.3 Parameter Description

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

0	Phonebook entry not hidden
1	Phonebook entry hidden

Notes:

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

4.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

4.5.5 Example

Run: AT+CPBW=?

Response: +CPBW: (1-250),24,(128-255),14

OK

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

Response: OK

Run: AT+CPBW=1

Response: OK

Run: AT+CPBW?

Response: +CPBW: 1

OK

4.6 AT+CRSM–Restricted SIM Access

4.6.1 Command Syntax

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

4.6.2 Interface Description

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

The set command accesses the SIM card through restricted permissions.

The test command returns OK.

4.6.3 Parameter Description

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

176	READ BINARY
178	READ RECORD
192	GET RESPONSE
214	UPDATE BINARY
220	UPDATE RECORD
242	STATUS

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

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

<data>: information in hexadecimal format

<pathid>: string type; contains the path of an elementary file on the SIM/UICC in hexadecimal format (for example, "7F205F70"), and shall only be used in the mode "select by path from MF" as defined in ETSI TS 102 221.

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

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

4.6.4 Property Description

Saving upon Power-off	PIN
NA	N

4.6.5 Example

Run: AT+CRSM=192,28483

Response:
```
+CRSM: 144,0,"621B8202412183026F43A5039201008A0107
8B036F0604800200028800"

OK
```

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

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

OK
```

5 Commands for UMTS Packet Domain

5.1 AT+CGDCONT–Define PDP Context

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

5.1.1 Command Syntax

AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]]
Possible Response(s)
<CR><LF>OK<CR><LF>
AT+CGDCONT?
Possible Response(s)
<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[...]]<CR><LF><CR><LF>OK<CR><LF>
AT+CGDCONT=?
Possible Response(s)
<CR><LF>+CGDCONT: (list of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s)[<CR><LF>+CGDCONT: (list of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s)[...]]<CR><LF><CR><LF>OK<CR><LF>

5.1.2 Interface Description

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

The set command saves the group of PDP-related parameters in the PDP contexts that use <cid> as the index. Each PDP context is initially undefined. After the set command saves a group of parameters in a PDP context, the PDP context is defined. The number of defined PDP contexts that can be saved at the same time is determined by the value range of <cid>.

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

Note:

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

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

Note:

If all PDP contexts are undefined in the MDM9x15 platform, the default parameters of PDP context are returned. In which, the default values of <cid> are 1 and 16, and they will be saved when MT is powered off.

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

5.1.3 Parameter Description

<cid>:

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

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

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

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

<PDP_addr>: a string parameter that identifies the MT in the IPv4 address space applicable to the PDP. If <PDP_addr> is got dynamically, the read command AT+CGDCONT? will return "0.0.0.0".

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

0	Off
1	On
2	V.42bis
3	V.44 (not supported currently)

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

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

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

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

5.1.4 Property Description

Saving upon Power-off	PIN
Y	N

5.1.5 Example

Run: AT+CGDCONT=?

Response:

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

OK
```

This command supports "IP", "PPP", "IPV6" and "IPV4V6" Protocol. The test command lists the supported values of other parameters supported by "IP", "PPP", "IPV6" and "IPV4V6" Protocol.

Run: AT+CGDCONT?

Response:	`+CGDCONT: 1,"IP","vcol.com",`
	`"0.0.0.0",0,0`
	`+CGDCONT: 16,"IP","xyz.com",`
	`"0.0.0.0",0,0`
	
	`OK`
		The MT saves two PDP contexts, and the `<cid>` value of these contexts are 1 and 16.

Run:	`AT+CGDCONT=15,"PPP","abc.com",` `"10.111.145.233",1,1`	Save one PDP context to the MT and the `<cid>` value is 15.
Response:	`OK`	
Run:	`AT+CGDCONT?`	

Response:	`+CGDCONT: 1,"IP","vcol.com",`
	`"0.0.0.0",0,0`
	`+CGDCONT: 15,"PPP","abc.com",`
	`"10.111.145.233",1,1`
	`+CGDCONT: 16,"IP","xyz.com",`
	`"0.0.0.0",0,0`
	
	`OK`
		The response shows that the PDP context has been successfully saved to the MT at the previous step.

Run:	`AT+CGDCONT=15`	Remove the PDP context with `<cid>`=15.
Response:	`OK`	
Run:	`AT+CGDCONT?`	

Response:	`+CGDCONT: 1,"IP","vcol.com",`
	`"0.0.0.0",0,0`
	`+CGDCONT: 16,"IP","xyz.com",`
	`"0.0.0.0",0,0`
	
	`OK`
		The response shows that the PDP context with `<cid>`=15 has been removed.

Run:	`AT+CGDCONT=16`	The PDP context with `<cid>`=16 can't be removed.
Response:	`ERROR`	

5.2 AT+CGACT–Activate or Deactivate PDP Context

5.2.1 Command Syntax

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

5.2.2 Interface Description

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

The read command returns the defined PDP Activation state.

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

5.2.3 Parameter Description

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

0	Deactivated
1	Activated

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

5.2.4 Property Description

Saving upon Power-off	PIN
NA	Y

5.2.5 Example

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

5.3 AT+CGATT–Attach or Detach PS Domain

5.3.1 Command Syntax

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

5.3.2 Interface Description

The set command attaches the MT to, or detaches the MT from, the packet-switched (PS) domain service. After the command has been completed, the MT remains in V.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

5.3.3 Parameter Description

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

0	Detached
1	Attached

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

5.3.4 Property Description

Saving upon Power-off	PIN
NA	Y

5.3.5 Example

Run: `AT+CGATT?`

Response: `+CGATT: 1`

`OK`

Run: `AT+CGATT=0`

Response: `OK`

5.4 AT+CGREG–PS Domain Registration Status

5.4.1 Command Syntax

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

5.4.2 Interface Description

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

- when <n>=1 and there is a change in the MT's network registration status, +CGREG: <stat> is presented.
- When <n>=2 and there is a change in the network cell, +CGREG: <stat>[,<lac>,<ci>] is presented.

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

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

5.4.3 Parameter Description

<n>:

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

<stat>:

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

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

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

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

0	GSM
1	GSM Compact
2	UTRAN
3	GSM w/EGPRS (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

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

5.4.4 Property Description

Saving upon Power-off	PIN
N	Y

5.4.5 Example

Run: `AT+CGREG?`

Response:
```
+CGREG: 0,1

OK
```

Run: `AT+CGREG=?`

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

OK
```

5.5 AT+CGSMS–SMS Bearer Domain

5.5.1 Command Syntax

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

5.5.2 Interface Description

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

The read command returns the current SMS bearer domain.

The test command returns the supported parameter values.

5.5.3 Parameter Description

<service>:

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

5.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

Note:

The value of <service> is specified depending on the network registration status.

5.5.5 Example

Run: `AT+CGSMS?`

Response:
```
+CGSMS: 1

OK
```

Run: `AT+CGSMS=?`

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

OK
```

Run: `AT+CGSMS=2`

Response: `OK`

Run: `AT+CGSMS?`

Response:
```
+CGSMS: 2

OK
```

6 PDU Mode Commands for SMS

6.1 AT+CSMS–Select Messaging Service

6.1.1 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>

6.1.2 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.

6.1.3 Parameter Description

<service>: messaging service type.

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

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

0	Type not supported
1	Type supported (default value)

6.1.4 Property Description

Saving upon Power-off	PIN
N	N

6.1.5 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

6.2 AT+CPMS–Select Message Storage

6.2.1 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>

6.2.2 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.

6.2.3 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 in 3GPP)
"ME"	NV (default value in 3GPP2, not supported currently in 3GPP)

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

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

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

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

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

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

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

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

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

Note:

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

6.2.4 Property Description

Saving upon Power-off	PIN
N	Y

6.2.5 Example

Run: `AT+CPMS=?`

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

OK
```

Run: `AT+CPMS="SM"`

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

`OK`

Run: `AT+CPMS?`

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

`OK`

6.3 AT+CMGF–Set Message Format

6.3.1 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>

6.3.2 Interface Description

The set command sets the message format. The format is specified by <mode>, which can be either PDU mode or text mode. At present, the PDU mode is both used in 3GPP and 3GPP2. For details about the message format in PDU mode, see section 6.6 AT+CMGS–Send Short Message for 3GPP and section 6.16 AT^HCMGS–Send a Short Message for 3GPP2.

The read command returns the currently selected mode.

The test command returns available values of <mode>.

6.3.3 Parameter Description

<mode>:

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

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

6.3.4 Property Description

Saving upon Power-off	PIN
N	N

6.3.5 Example

Run: AT+CMGF=0

Response: OK

Run: AT+CMGF?

Response: +CMGF: 0

OK

6.4 AT+CSCA–Service Center Address

6.4.1 Command Syntax

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

6.4.2 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 6.6 AT+CMGS–Send Short Message.

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

The test command returns `OK`.

6.4.3 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 '+').

`<tosca>`: an integer type value that specifies the address type. If the value of `<tosca>` is 145, the address is an international phone number. For details about the values of `<tosca>`, see the value definitions of `<type_addr>` in section 6.6 AT+CMGS–Send Short Message.

Notes:

- If the command does not contain `<tosca>`, the value of `<tosca>` remains unchanged.
- If the command does not contain `<tosca>`, the value of `<tosca>` is 145 when the character '+' is present; the value is 129 when the character '+' is not present. This command is controlled by `AT+CSCS`–Select TE character set.

6.4.4 Property Description

Saving upon Power-off	PIN
Y	Y

6.4.5 Example

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

Response: `OK`

Run: `AT+CSCA?`

Response: `+CSCA: "+8613800688509",145`

`OK`

6.5 AT+CNMI–Indicate New Message to TE

6.5.1 Command Syntax

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

6.5.2 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:

- In 3GPP, 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.
- In 3GPP2, the values set in this command are reset to +CNMI: 1,1,0,2,0 after the MT is restarted.
- In 3GPP, AT+CNMI is equivalent to AT+CNMI=0,0,0,0,0.
- In 3GPP2, AT+CNMI is equivalent to AT+CNMI=1,1,0,2,0.

6.5.3 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 in 3GPP)
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. (default value in 3GPP2)
2	Directly send SMS-DELIVER indications and message status reports to the TE. When a SMS-DELIVER indication and message status report cannot be sent (for example, when in online data mode), they are buffered in the ME and sent to the TE when they can be sent.

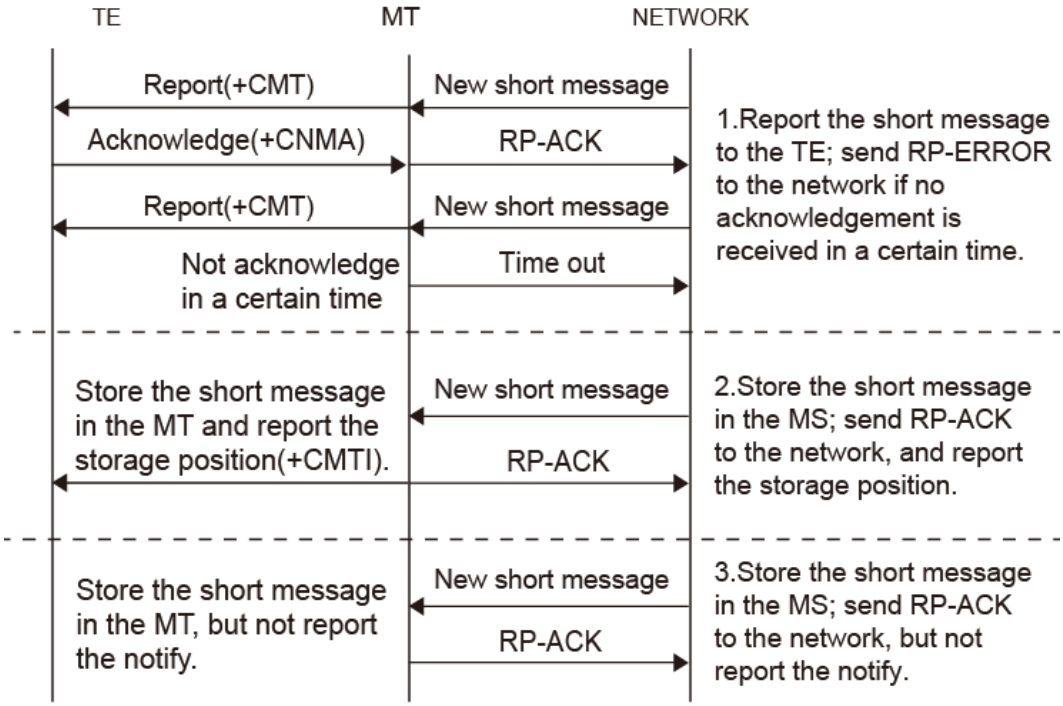
Note:

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

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

0	No SMS-DELIVER indications are routed to the TE. (default value in 3GPP)
1	Stores SMS-DELIVER indications on the MT and sends storage location indication to the TE.`+CMTI: <mem>,<index>` (default value in 3GPP2)
2	Does not store SMS-DELIVER indications on the MT but directly sends them to the TE. If PDU mode enabled: `+CMT: [<reserved>],<length>`<CR><LF>`<pdu>`
3	Stores SMS-DELIVER indications on the MT, but does not send SMS-DELIVER indications to the TE.

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



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

<mt>	no class or class 1	class 0 or message waiting indication group (discard)	class 2 or message waiting indication group (store)	class 3
0				
1	+CMTI	[+CMTI]	+CMTI	+CMTI
2	+CMT & +CNMA	+CMT [& +CNMA]	+CMTI	+CMT & +CNMA
3	+CMTI	[+CMTI]	+CMTI	+CMT & +CNMA

Notes:

- The SMS class is defined by the TP-DCS domain of the SMS. For details, see the description of <DCS> in section 6.6 AT+CMGS–Send Short Message .
- "+CMT & +CNMA" indicates that the TE is required to send the confirmation (+CNMA).

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

0 No CBM indications are routed to the TE. (default value)

1 If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:

+CBMI: <mem>,<index> (not supported currently in 3GPP)

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 (not supported currently in 3GPP).

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

Table 6-1 Parameters of `<bm>`

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

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

0 Do not send message status reports. (default value in 3GPP)

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>` (default value in 3GPP2)

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

0 After switching from `<mode>`=0 to `<mode>`=1 or `<mode>`=2, the MT sends all the unsolicited result code in its buffer to the TE. (default value)

1 After switching from <mode>=0 to <mode>=1 or <mode>=2, the MT clears the buffer and all unsolicited result codes in the buffer are discarded.

Note:

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

6.5.4 Property Description

Saving upon Power-off	PIN
N	N

6.5.5 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

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.

6.6 AT+CMGS–Send Short Message

6.6.1 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>

6.6.2 Interface Description

This command sends a message to the network in the following procedure:

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

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

The test command returns OK.

6.6.3 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.

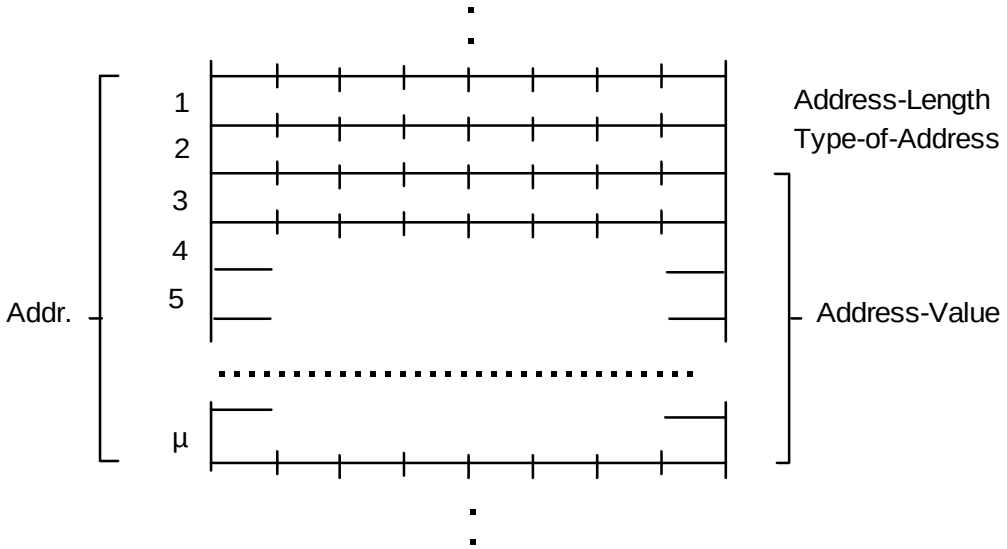
<ctrl-Z>: indicates the end of a PDU. The characters are "0x1A".

<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.)

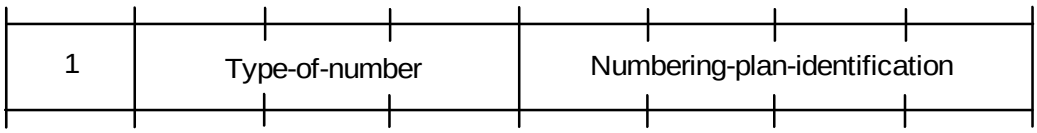
[<SCA>]			
<sc_len>	<type_addr>	<numbers>	TPDU

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



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

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



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

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

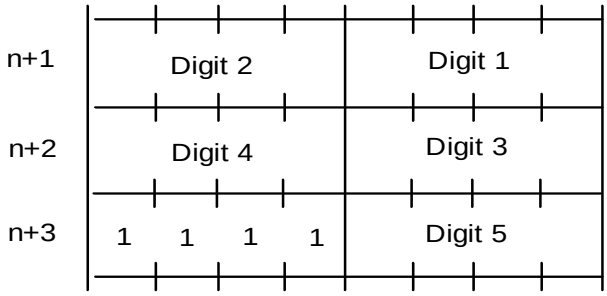
Values of Numbering-plan-identification (bits 3–0) are defined as follows:

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

Note:

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

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



Note:

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

'*'	1010
'#'	1011
'a'	1100
'b'	1101
'c'	1110

For example:

- If `<SCA>` is 13902900, then `<number>` is 31099200.
- If the length of `<SCA>` is an odd value, for example, 139029001, then `<numbers>` is 31099200F1.

- If the number type is 'A1', then <SCA> is 05a131099200.
- If the number type indicates that it is an international number 'A1', but the number 13902900 is a national number in China, it is necessary to add 86 before the number. In this case, <SCA> is 06a16831099200.

The TPDU format is described in the following table.

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

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

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

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

0	Yes
1	No

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

0 0	The VP field is invalid.
1 0	The VP field is valid, and the format is "relative".
0 1	The VP field is valid, and the format is "enhanced".
1 1	The VP field is valid, and the format is "absolute".

<RP>: indicates whether the reply to a message uses the same settings as those for the sent message. Its values are defined as follows:

0	No

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

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

0 The user data segment contains message content only.

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

<SRR>: status report request indication.

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

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

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

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

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

PID							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0

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

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

1 0 Allocate bits 0…5

0 1 Reserved

1 1 Allocate bits 0–5 for special purpose of the SC

The values of bit 5 are defined as follows:

0 No interworking, but SME-to-SME protocol

1 Telematic interworking (in this case, the values of bit 4–0 are valid)

Bit 4…bit 0: Telematic devices type indication.

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

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

Bits 7…4			Bits 3…0
00xx	Bit 5	0: Message is not compressed.	Bit 1 Bit 0: message type indication. 0 0 Class 0, displayed on the user interface but not stored. A response is sent to the SC to acknowledge the

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

Bits 7…4		Bits 3…0
		1 8-bit encoding scheme Bit 1 Bit 0: message type indication. 0 0 Class 0, displayed on the user interface but not stored. A response is sent to the SC to acknowledge the reception of the message. 0 1 Class 1, stored to NV (or SIM card if the NV is full) 1 0 Class 2. Messages are stored to the SIM card only. After a class 2 message is stored, the storage state will be sent to the SC. If the SIM card is full, a response is sent to the SC to notify it of the occurrence and cause of message storage failure. 1 1 Class3, stored to the TE. When the MT receives the message, it sends a response to the SC before routing the message to the TE.

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

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

<UDL>: user data length, depending on the specific encoding scheme.

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

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

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

6.6.4 Property Description

Saving upon Power-off	PIN
NA	Y

6.6.5 Example

Run: `AT+CMGS=18`

Response: `>`

Run: `0891683108608805F931000B813109731147F40000FF04F4F29C0E`

Response: `+CMGS: 135`

`OK`

6.7 AT+CMGD–Delete Message

6.7.1 Command Syntax

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

6.7.2 Interface Description

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

For details about `<mem1>`, see section 6.2 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>`. If the deletion fails, `+CMS ERROR: <err>` is returned.

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

6.7.3 Parameter Description

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

<delflag>:

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

6.7.4 Property Description

Saving upon Power-off	PIN
NA	Y

6.7.5 Example

Run: `AT+CMGD=?`

Response:

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

OK
```

Run: `AT+CMGD=0`

Response: `OK`

6.8 AT+CMGL–List Messages

6.8.1 Command Syntax

AT+CMGL[=<stat>]
Possible Response(s)

If in PDU mode and the command is executed successfully: [<CR><LF>+CMGL: <index>,<stat>,[<reserved>],<length><CR><LF><pdu>[<CR><LF>+CMGL: <index>,<stat>,[<reserved>],<length><CR><LF><pdu>[...]]<CR><LF>]<CR><LF>OK<CR><LF> In case of an MS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
AT+CMGL=?
Possible Response(s)
<CR><LF>+CMGL: (list of supported <stat>s) <CR><LF><CR><LF>OK<CR><LF>

6.8.2 Interface Description

The set command returns messages with status value <stat> from message storage <mem1> to the TE. If the status of the message is "received unread", status in the storage changes to "received read" after the set command is executed successfully.

When <stat> is not specified, the set command is equivalent to the command AT+CMGL=0.

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

6.8.3 Parameter Description

<stat>: message status.

0	Received unread messages (default value)
1	Received read messages
2	Stored unsent messages
3	Stored sent messages
4	All messages

<index>: an integer type value that indicates the storage location of the message.

<reserved>: reserved.

<length>: an integer type value that indicates the number of bytes of TPDU data.

<pdu>: protocol data unit in the following format.

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

For the definitions of <SCA>, <sc_len>, <type_addr>, <number> in the previous table, see section 6.6 AT+CMGS–Send Short Message.

For the TPDU format of messages to be sent, see section 6.6 AT+CMGS–Send Short Message. The TPDU format for received messages is described in the following table.

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

<MTI>: see the definition in section 6.6 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 6.6 AT+CMGS–Send Short Message.

<RP>: see the definition in section 6.6 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 6.6 AT+CMGS–Send Short Message.

<DCS>: use data coding scheme. See the definition in section 6.6 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 6.6 AT+CMGS–Send Short Message.

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

6.8.4 Property Description

Saving upon Power-off	PIN
NA	Y

6.8.5 Example

Run: `AT+CMGL=?`

Response:
```
+CMGL: (0-4)

OK
```

Run: `AT+CMGL=4`

Response:
```
+CMGL: 0,0,,160
0891683108608805F9040D91683109730163F7001231308241
126500A0B11C0C16B3C982B51A8D16C4098D37DB9026ABCD88
B11C0C16B3C982B51A8D16C4098D37DB9026ABCD88B11C0C16
B3C982B51A8D16C4098D37DB9026ABCD88B11C0C16B3C982B5
1A8D16C4098D37DB9026ABCD88B11C0C16B3C982B51A8D16C4
098DB7783C1E8FC7E3F172B95C2E97CBE572B95C2E97CBE572
B94C97C3CBEE739E5E47BB77EC73180D2FBBCF

OK
```

6.9 AT+CMGR–Read Message

6.9.1 Command Syntax

AT+CMGR=<index>
Possible Response(s)
If in PDU mode and the command is executed successfully: <CR><LF>+CMGR: <stat>[,<reserved>],<length><CR><LF><pdu><CR><LF><CR><LF>OK<CR><LF> In case of an MS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
AT+CMGR=?
Possible Response(s)
<CR><LF>OK<CR><LF>

6.9.2 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`.

6.9.3 Parameter Description

`<index>`: an integer type value that indicates the location in the storage.

`<stat>`: message status.

0	Received unread messages
1	Received read messages
2	Stored unsent messages
3	Stored sent messages

`<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 6.8.3 .

6.9.4 Property Description

Saving upon Power-off	PIN
NA	Y

6.9.5 Example

Run: `AT+CMGR=0`

Response:

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

OK
```

6.10 +CMTI–Unsolicitedly Present of Message Arrival Indication

6.10.1 Command Syntax

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

6.10.2 Interface Description

This command allows indications that a new message is received.

6.10.3 Parameter Description

<mem>:

ME	ME message storage
SM	(U)SIM message storage

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

6.10.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.10.5 Example

Response: +CMTI: "SM",1

6.11 +CMT–Unsolicitedly Present of New Message Reported Directly

6.11.1 Command Syntax

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

6.11.2 Interface Description

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

6.11.3 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 6.8 AT+CMGL–List Messages.

6.11.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.11.5 Example

Response:

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

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

6.12.1 Command Syntax

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

6.12.2 Interface Description

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

6.12.3 Parameter Description

`<mem>`:

ME	ME message storage
SM	(U)SIM message storage

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

6.12.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.12.5 Example

Response: +CDSI: "SM",48

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

6.13.1 Command Syntax

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

6.13.2 Interface Description

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

6.13.3 Parameter Description

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

<pdu>: protocol data unit.

6.13.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.13.5 Example

Response:

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

6.14 ^HCMT–Unsolicitedly Present of a New Short Message

6.14.1 Command Syntax

URC
If PDU mode enabled: <CR><LF>^HCMT: [<reserved>],<length><CR><LF><layer3 packet><CR><LF>

6.14.2 Interface Description

This command reports a new short message without storing it to the TE

6.14.3 Parameter Description

<Length>: specifies the length of a received short message.

<layer3 packet>: see 6.16 AT^HCMGS–Send a Short Message.

6.14.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.14.5 Example

Response:

```
^HCMT: ,41
00000210020208036184CC484A059C0601B808150003100020
0106102E8CBB36300306130330155524
```

6.15 ^HCDS–Unsolicitedly Present of a New Status Report Short Message

6.15.1 Command Syntax

URC
If PDU mode enabled: <CR><LF>^HCDS: [<reserved>],<length><CR><LF><layer3 packet><CR><LF>

6.15.2 Interface Description

This command reports a received new short message report without storing it to the TE.

6.15.3 Parameter Description

<length>: specifies the length of a received short message.

<layer3 packet>: see 6.16 AT^HCMGS–Send a Short Message.

6.15.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.15.5 Example

Response:

```
^HCDS: ,86
0000021002020803 61AA296662AAA80601B008420003400010
013311C54D19506DCBCF9E1CF95079DFD5073CBBBA20E9BD03
86CC1C306AE5CB860C1830419B0E9D997220E9BD064CBB34F6
CBC9700306130330154611
```

6.16 AT^HCMGS–Send a Short Message

6.16.1 Command Syntax

If PDU mode (AT+CMGF=0): AT^HCMGS=<length><CR>PDU is given<ctrl-Z/ESC>
Possible Response(s)

If PDU mode (AT+CMGF=0): <CR><LF>OK<CR><LF><CR><LF>^HCMGS:<mr>[,<ackpdu>]<CR><LF> In case of an MS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
AT^HCMGS=?
Possible Response(s)
<CR><LF>OK<CR><LF>

6.16.2 Interface Description

The execution command sends a short message to the network. The short message is sent in two steps:

In PDU mode:

Firstly, AT^HCMGS=<length> end with (CR),

Then, input the message content that end with<ctrl-Z> (IRA 26).

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

The test command returns OK.

6.16.3 Parameter Description

<length>: the length is bytes of layer3 packet.

<mr>: a decimal digit, specifying the identifier of a short message. The value ranges from 0 to 65535.

<ackpdu>: reserved.

<Layer3 packet>: the character is '0'–'9', 'A'–'F', two characters form an Octet.

Note:

Sending of a short message adopts the asynchronous command processing mode in the AT command. Currently, the asynchronous command processing process cannot process other AT commands. During the process, if the MT receives a short message-related command, such as the +CPMS, ^HCMGR, +CMGD, ^HCMGL, +CNMA, +CNMI, or ^HCMGW command, it returns "+CMS ERROR:302". That is, the operation is not allowed. If the MT receives the ^HCMGS command, it returns "^HCMGSF: 0". If the MT receives another command unrelated to a short message, it returns "+CME ERROR:40". That is, the operation is not allowed.

6.16.4 Property Description

Saving upon Power-off	PIN
NA	Y

6.16.5 Example

Run: `AT^HCMGS=43`

Response: `>`

Run: `0000021002040702C4CC484A059C06010008180003200000010610 2E8CBB36300306130330162349 0A0100`

Response: `OK`

`^HCMGS:0`

6.17 AT^HCMGW–Store a Short Message

6.17.1 Command Syntax

If PDU mode enabled: `AT^HCMGW=<length>,<tag>`<CR>`<Layer3 packet><ctrl-z/ESC>`
Possible Response(s)
<CR><LF>`^HCMGW: <index>`<CR><LF><CR><LF>`OK`<CR><LF> In case of an MS-related error: <CR><LF>`+CMS ERROR:<err>`<CR><LF>
`AT^HCMGW=?`
Possible Response(s)
<CR><LF>`OK`<CR><LF>

6.17.2 Interface Description

The execution command stores a short message to the storage location specified by `<mem2>` in the `AT+CPMS` command. The short message can be saved to the "SM" or "ME".

In PDU mode:

Save a message to memory, there are two steps:

Firstly, `AT^HCMGW=<length>,<tag>` end with(CR)

Then, TE wait for <CR><LF>`<greater_than><space>`(IRA 13, 10, 62, 32) from the MT, and input the message content ,when the <format> is 1, then end with`<ctrl-Z>`, otherwise, when the `<format>` is 6, then end with 0x001A. The UNICODE should be input as an integrity, not two bytes separately (IRA 26).

The test command returns `OK`.

6.17.3 Parameter Description

`<length>`: the length of the bytes of layer3 packet.

`<Layer3 packet>`: the character is '0'–'9', 'A'–'F', two characters form a Octet.

`<tag>`: an integer, the value ranges from 0 to 3.

0	WMS_TAG_MT_NOT_READ
1	WMS_TAG_MT_READ
2	WMS_TAG_MO_NOT_SENT
3	WMS_TAG_MO_SENT

`<index>`: a number consisting of decimal digits (0–9), specifying the position number in the storage medium. The value ranges from 0 to the value of the maximum memory capacity minus one.

6.17.4 Property Description

Saving upon Power-off	PIN
NA	N

6.17.5 Example

Run: `AT^HCMGW=43,1`

Response: `>`

Run:
```
0000021002040702C4CC484A059C06010008180003200000001
06102E8CBB36300306130330162349 0A0100
```

Response:
```
^HCMGW: 4

OK
```

6.18 AT^HCMGL–List Short Message

6.18.1 Command Syntax

AT^HCMGL[=<stat>]
Possible Response(s) <CR><LF>^HCMGL:<index1>,<tag1><CR><LF><CR><LF>^HCMGL:<index2>,<tag2><CR><LF>[...]<CR><LF>OK<CR><LF> In case of an MS-related error: <CR><LF>+CMS ERROR:<err><CR><LF>
AT^HCMGL=?
Possible Response(s)
<CR><LF>^HCMGL: (list of supported <stat>s)<CR><LF><CR><LF>OK<CR><LF>

6.18.2 Interface Description

The execution command returns all short message indexes with the status value of <stat> from the storage medium specified by <mem1>.

Status report short messages are considered as received common short messages.

The test command returns all supported values of <stat>.

6.18.3 Parameter Description

<stat>: specifies the type of a short message. The values are as follows:

0	Received unread short messages
1	Received read short messages
2	Stored unsent short messages
3	Stored sent short messages
4	All short messages

Note:

In case of using the command without <stat>, <stat> is set to 4.

<index>: an integer, identifying the position in the storage medium.

<tag>: an integer, the value ranges from 0 to 3.

0	WMS_TAG_MT_NOT_READ
1	WMS_TAG_MT_READ
2	WMS_TAG_MO_NOT_SENT

3 WMS_TAG_MO_SENT

6.18.4 Property Description

Saving upon Power-off	PIN
NA	N

6.18.5 Example

Run: `AT^HCMGL=4`

Response:

```
^HCMGL:0,0

^HCMGL:1,0

^HCMGL:2,0

^HCMGL:3,0

^HCMGL:4,1

OK
```

6.19 AT^HCMGR–Read a Short Message

6.19.1 Command Syntax

AT^HCMGR=<index>[,<mode>]
Possible Response(s)
In PDU mode: <CR><LF>^HCMGR:<stat>,[<reserved>],<length><CR><LF><layer3 packet><CR><LF><CR><LF>OK<CR><LF> In case of an MS-related error: <CR><LF>+CMS ERROR: <err><CR><LF>
AT^HCMGR=?
Possible Response(s)
<CR><LF>OK<CR><LF>

6.19.2 Interface Description

The execution command returns short messages with the storage position of <index> from the storage medium specified by <mem1>. Whether to modify the short message status depends on the value of <mode>.

The test command returns OK.

6.19.3 Parameter Description

<index>: an integer, identifying the position in the storage medium.

<mode>: specifies the change mode of the short message status. The values are as follows:

0	The short message status is changed to read. (default value)
1	The short message status is not changed.

Note:

In case of using the command without <mode>, <mode> is set to 0.

<stat>: specifies the storage status of a short message. The values are as follows:

0	Received unread short messages
1	Received read short messages
2	Stored unsent short messages
3	Stored sent short messages

<Length>: specifies the length of a received short message.

<Layer3 packet>: the character is '0'–'9', 'A'–'F', two characters form a Octet.

6.19.4 Property Description

Saving upon Power-off	PIN
NA	N

6.19.5 Example

Run: `AT^HCMGR=4,1`

Response: ^HCMGR:1,,43

```
0000021002040702C4CC484A059C06010008180003200000001
06102E8CBB36300306130330162349 0A0100

OK
```

6.20 ^HCMGS–Unsolicitedly Present of Successfully Sending a Short Message

6.20.1 Command Syntax

URC
<CR><LF>^HCMGS:<mr><CR><LF>

6.20.2 Interface Description

This command notifies the TE of the successful sending of a short message.

Note:

This AT command is only effective in PDU mode.

6.20.3 Parameter Description

<mr>: a decimal digit, specifying the identifier of a short message. The value ranges from 0 to 65535.

6.20.4 Property Description

Saving upon Power-off	PIN
NA	NA

6.20.5 Example

Response: ^HCMGS:0

7 Call Control Commands Interfaces

7.1 AT+CTA–Set the Time to Enter into Dormancy

7.1.1 Command Syntax

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

7.1.2 Interface Description

The set command sets the time to enter into dormancy.

The read command reads the time to enter into dormancy.

The test command returns the range of time set to enter into dormancy.

7.1.3 Parameter Description

<cta>: the time to enter into dormancy. The default value is 30 seconds.

0	MS don't originate entering into dormancy. When the network originates entering into dormancy, the MS can enter into dormancy.
1–255	When the RLP data frame is not sent/received through the Um interface continuous <value>seconds, MT will release the service channel.

If <cta> is not specified, it is equivalent to <cta>=30.

7.1.4 Property Description

Saving upon Power-off	PIN
N	N

7.1.5 Example

Run: `AT+CTA=10`

Response: `OK`

Run: `AT+CTA?`

Response:
```
+CTA: 10

OK
```

Run: `AT+CTA=?`

Response:
```
+CTA: (0-255)

OK
```

7.2 ^DSDORMANT–Unsolicitedly Present of Instructions Into the Dormant

7.2.1 Command Syntax

URC
<CR><LF>^DSDORMANT:<dormant_state><CR><LF>

7.2.2 Interface Description

Data service connection, in the time data is not up or down no data transmission initiated by the network to the dormant.

7.2.3 Parameter Description

`<dormant_state>`: dormant state.

0	Not dormant state
1	Dormant state
2–255	Reservations

7.2.4 Property Description

Saving upon Power-off	PIN
NA	NA

7.2.5 Example

Response: `^DSDORMANT:1`

7.3 AT^PPPCFG–Set the PPP User Name and Password

7.3.1 Command Syntax

`AT^PPPCFG=<userid>,<password>,<auth>`
Possible Response(s)
<CR><LF>`OK`<CR><LF> In case of an MT-related error: <CR><LF>`+CME ERROR:<err>`<CR><LF>
`AT^PPPCFG or AT^PPPCFG?`
Possible Response(s)
<CR><LF>`^PPPCFG:<userid>,<password><auth>`<CR><LF><CR><LF>`OK`<CR><LF> In case of an MT-related error: <CR><LF>`+CME ERROR:<err>`<CR><LF>

7.3.2 Interface Description

The set command sets the Point to Point Protocol (PPP) user name and password before data service dial-up. After the dial-up connection is successful, the client can use the user name and password to establish a PPP connection.

The execution or read command queries the current Point to Point Protocol (PPP) user name and password.

7.3.3 Parameter Description

`<userid>`: specifies the PPP authentication user name. It is a string with double quotation marks. The maximum length is 127 characters excluding the double quotation marks.

`<password>`: specifies the PPP authentication password. It is a string with double quotation marks. The maximum length is 127 characters excluding the double quotation marks.

`<auth>`: specifies the PPP authentication type. It is a string with double quotation marks. The range is from "1" to "2". "1" is for "PAP" and "2" is for "CHAP".

7.3.4 Property Description

Saving upon Power-off	PIN
Y	N

7.3.5 Example

Run: `AT^PPPCFG="huawei","huawei","2"`

Response: `OK`

Run: `AT^PPPCFG?`

Response: `^PPPCFG:"huawei","huawei","2"`

`OK`

8 Huawei Proprietary Interface: Mobile Termination Control and Status Interface

8.1 ^THERM–Unsolicitedly Present of Thermal Protection Activated

8.1.1 Command Syntax

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

8.1.2 Interface Description

This command sends an unsolicited report to the host when thermal protection is activated/inactivated according to the temperature.

8.1.3 Parameter Description

<ACTION>: indicates whether thermal protection takes effect. The possible values are defined as below:

0	Indicates that the thermal protection is inactive.
1	Indicates that the thermal protection is active.

8.1.4 Property Description

Saving upon Power-off	PIN
NA	N

8.1.5 Example

Response: `^THERM: 0`

8.2 AT^MSO–Power Off Module

8.2.1 Command Syntax

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

8.2.2 Interface Description

This command is used to power off the module.

The execution command returns `OK` before the module powers off.

The test command just returns `OK` without other operation.

Note:

On ME906J, after the command is received, the module will only do the preparative work of power-off such as deregister. The host should cut off the power in order to finish the power-off operation.

8.2.3 Parameter Description

None

8.2.4 Property Description

Saving upon Power-off	PIN
NA	N

8.2.5 Example

Run: `AT^MSO`

Response: `OK`

Run: `AT^MSO=?`

Response: `OK`

9 Huawei Proprietary Interface: Network Service Interfaces

9.1 AT^SYSINFOEX–Extended System Information Query Command

9.1.1 Command Syntax

AT^SYSINFOEX
Possible Response(s)
<CR><LF>^SYSINFOEX: <srv_status>,<srv_domain>,<roam_status>,<sim_state>,<lock_state>,<sysmode>,<sysmode_name><submode>,<submode_name><CR><LF><CR><LF>OK<CR><LF>

9.1.2 Interface Description

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

9.1.3 Parameter Description

<srv_status>: indicates the system service status.

0	No services
1	Restricted services
2	Valid services
3	Restricted regional services
4	Power saving or hibernate state

<srv_domain>: indicates is the system service domain.

0	No services
1	CS service only
2	PS service only
3	PS+CS services
4	Not registered to CS or PS; searching now
255	CDMA

`<roam_status>`: indicates the roaming status.

0	Not roaming
1	Roaming

`<sim_state>`: indicates the state of the SIM card.

0	Invalid SIM card
1	Valid SIM card
2	Invalid SIM card in CS
3	Invalid SIM card in PS
4	Invalid SIM card in PS and CS
240	ROM SIM version
255	No SIM card is found

`<lock_state>`: indicates whether the SIM card is locked by the CardLock feature.

0	SIM card is not locked by the CardLock feature.
1	SIM card is locked by the CardLock feature.

`<sysmode>`: indicates the system mode. Its values are defined as follows:

0	NO SERVICE
1	GSM
2	CDMA
3	WCDMA
4	TD-SCDMA (not supported currently)
5	WIMAX
6	LTE

Note:

If the returned `<sysmode>` value is not within the valid range (0–6), it will be deemed as `<sysmode>`=3 (WCDMA).

<sysmode_name>: a string type value indicating the system mode name corresponding to <sysmode>. For example, if <sysmode>=3, <sysmode_name>="WCDMA".

<submode>: indicates the system sub-mode. Its values are defined as follows:

0	NO SERVICE
1	GSM
2	GPRS
3	EDGE
4-20	(No defined)
21	IS95A
22	IS95B
23	CDMA2000 1X
24	EVDO Rel0
25	EVDO RelA
26	EVDO RelB
27	HYBRID (CDMA2000 1X)
28	HYBRID (EVDO Rel0)
29	HYBRID (EVDO RelA)
30	HYBRID (EVDO RelB)
31	eHRPD Rel0
32	eHRPD RelA
33	eHRPD RelB
34	Hybrid (eHRPD Rel0)
35	Hybrid(eHRPD RelA)
36	Hybrid(eHRPD RelB)
……	
41	WCDMA
42	HSDPA
43	HSUPA
44	HSPA
45	HSPA+
46	DC-HSPA+
……	
61	TD-SCDMA (not supported currently)

62	HSDPA
63	HSUPA
64	HSPA
65	HSPA+
……	
81	802.16e
……	
101	LTE
……	

`<submode_name>`: system sub-mode (value can be extended). This parameter returns the name of the current network sub-mode in character string. The value of `<submode_name>` is the character string corresponding to the value of `<submode>` in the command. For example, if the value of `<submode>` is 45, the value of `<submode_name>` is HSPA+.

9.1.4 Property Description

Saving upon Power-off	PIN
NA	N

9.1.5 Example

Run: `AT^SYSINFOEX`

Response:

```
^SYSINFOEX: 2,3,1,1,1,3,"WCDMA"
,46,"DC-HSPA+"

OK
```

The response indicates that the UE is operating over a DC-HSPA+ network in WCDMA mode.

9.2 AT^SYSCFGEX–Extended System Configuration Command

9.2.1 Command Syntax

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

Possible Response(s)

<CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^SYSCFGEX?
Possible Response(s)
<CR><LF>^SYSCFGEX: <acqorder>,<band>,<roam>,<srvdomain>,<lteband><CR><LF><CR><LF>OK<CR><LF>
AT^SYSCFGEX=?
Possible Response(s)
<CR><LF>^SYSCFGEX: (list of supported <acqorder>s),(list of supported (<band>,<band_name>)s),(list of supported <roam>s),(list of supported <srvdomain>s),(list of supported (<lteband>,<lteband_name>)s)<CR><LF><CR><LF>OK<CR><LF>

9.2.2 Interface Description

This command sets the system mode, network access order, frequency band, roaming support, domain, and other features.

The set command sets the system mode, G/W access order, frequency band, roaming support, domain, and other features.

The read command queries the current system configuration.

The test command returns values supported as a compound value.

9.2.3 Parameter Description

<acqorder>: a string type value that specifies the network access order. Its value can be 00, 99 or a combination of the following values:

"00"	Automatic
"01"	GSM
"02"	WCDMA
"03"	LTE
"04"	CDMA 1X
"05"	TD-SCDMA (not supported currently)
"06"	Wimax
"07"	CDMA EVDO
"99"	Not change

For example:

- The 03 value indicates LTE only.
- The 030201 value indicates the order of LTE->WCDMA->GSM.
- The 0302 value indicates the order of LTE->WCDMA, without GSM.
- In specialty, the 99 value is not combined with other values, indicating no change of the network access order.
- The 00 value is not combined with other values, indicating automatic network access order that is determined by the board.

Note:

If the <acqorder> is a combination list of muti-netwprk mode, now ME906J does not support the list that contains CDMA mode and WCDMA mode; that is, the list does not contains "04 CDMA 1X", "07 CDMA EVDO" and "02 WCDMA".

<band>: a hexadecimal value that specifies the frequency band, which is related to the system mode and dependent on the board performance. The possible values of <band> are the following values and their combinations (excluding 0x3FFFFFFF and 0x40000000):

00080000 (CM_BAND_PREF_GSM_850)	GSM 850
00000080 (CM_BAND_PREF_GSM_DCS_1800)	GSM DCS systems
00000100 (CM_BAND_PREF_GSM_EGSM_900)	Extended GSM 900
00000200 (CM_BAND_PREF_GSM_PGSM_900)	Primary GSM 900
00100000 (CM_BAND_PREF_GSM_RGSM_900)	Railway GSM 900
00200000 (CM_BAND_PREF_GSM_PCS_1900)	GSM PCS
00400000 (CM_BAND_PREF_WCDMA_I_IMT_2000)	WCDMA IMT 2000
00800000 (CM_BAND_PREF_WCDMA_II_PCS_1900)	WCDMA_II_PCS_1900
04000000 (CM_BAND_PREF_WCDMA_V_850)	WCDMA_V_850
08000000(CM_BAND_PREF_WCDMA_VI_800)	WCDMA_VI_800
3FFFFFFF (CM_BAND_PREF_ANY)	Any band
40000000 (CM_BAND_PREF_NO_CHANGE)	Band not changed
0004000000000000 (CM_BAND_PREF_WCDMA_IX_1700)	WCDMA_IX_1700
0000000000400000 (CM_BAND_PREF_WCDMA_IMT)	WCDMA_IMT(2100)
0002000000000000 (CM_BAND_PREF_WCDMA_VIII_900)	WCDMA_VIII_900
1000000000000000 (CM_BAND_PREF_WCDMA_XIX_850)	WCDMA_XIX_850
2000000 (CM_BAND_PREF_WCDMA_IX_1700)	AWS
00680380	Automatic

The following are definition of the CDMA band.

00000001(CM_BAND_PREF_BC0_A)	Band 0 A System
00000002(CM_BAND_PREF_BC0_B)	Band 0 B System
00000004(CM_BAND_PREF_BC1)	Band 1 1900
00000008(CM_BAND_PREF_BC2)	Band 2
00000010(CM_BAND_PREF_BC3)	Band 3
00000020(CM_BAND_PREF_BC4)	Band 4
00000040 (CM_BAND_PREF_BC5)	Band 5
00000400(CM_BAND_PREF_BC6)	BAND 6
00000800(CM_BAND_PREF_BC7)	BAND 7
00001000(CM_BAND_PREF_BC8)	BAND 8
00002000(CM_BAND_PREF_BC9)	BAND 9
00004000(CM_BAND_PREF_BC10)	BAND 10
00008000(CM_BAND_PREF_BC11)	BAND 11
10000000(CM_BAND_PREF_BC12)	Band 12
20000000(CM_BAND_PREF_BC14)	Band 14
80000000(CM_BAND_PREF_BC15)	Band 15

`<band_name>`: a string type value indicating the frequency band name.

`<roam>`: indicates whether roaming is supported.

0	Not supported
1	Supported
2	No change
3	Roam only

Note:

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

`<srvdomain>`: indicates the domain setting.

0	CS_ONLY
1	PS_ONLY
2	CS_PS
3	ANY
4	No change

<lteband>: a hexadecimal value that specifies the LTE frequency band. The value of <lteband> can be one of the following values and their combinations (excluding 0x7FFFFFFFFFFFFFFF):

7FFFFFFFFFFFFFFF(CM_BAND_PREF_ANY)	Any frequency band
1(CM_BAND_PREF_LTE_EUTRAN_BAND1)	LTE BC1
40(CM_BAND_PREF_LTE_EUTRAN_BAND7)	LTE BC7
1000(CM_BAND_PREF_LTE_EUTRAN_BAND13)	LTE BC13
10000(CM_BAND_PREF_LTE_EUTRAN_BAND17)	LTE BC17
40000000(CM_BAND_PREF_NO_CHANGE)	No band change
10000000000(CM_BAND_PREF_LTE_EUTRAN_BAND40)	LTE BC40

Note:

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

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

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

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

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

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

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

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

<reserve1>: reserved field 1.

<reserve2>: reserved field 2.

9.2.4 Property Description

Saving upon Power-off	PIN
NA	N

9.2.5 Example

Run: `AT^SYSCFGEX=?`

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

OK
```

Run: `AT^SYSCFGEX?`

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

OK
```

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

Response: `OK`

9.3 AT^RFSWITCH–Query W_DISABLE# Pin Status and Close Radio

9.3.1 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: (list of supported <SW state>s),(list of supported <HW state>s)<CR><LF><CR><LF>OK<CR><LF>

9.3.2 Interface Description

The execution command switches the on-off of radio by software and writes the corresponding value to NV.

The read command includes the state of W_DISABLE# pin. The W_DISABLE# pin decides the on-off of radio section's hardware. The TE may decide if prompt the Msg1 by the return value of the command.

AT^RFSWITCH command equals the combination function of AT+CFUN (two values: 0 and 1) and writes the corresponding value to NV.

AT^RFSWITCH=0 equals AT+CFUN=0 and writes NV.

AT^RFSWITCH=1 equals AT+CFUN=1 and writes NV.

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

9.3.3 Parameter Description

<SW state>: the state of radio on-off. The values are as follows:

0	Switch off radio software
1	Switch on radio software (default value)

<HW state>: the state of W_DISABLE#. The values are as follows:

0	Switch off radio hardware
1	Switch on radio hardware (default value)

9.3.4 Property Description

Saving upon Power-off	PIN
Y	N

9.3.5 Example

Run:	AT^RFSWITCH?	Query the current state of Radio switch.
Response:	^RFSWITCH: 0,1 OK	The state of radio hardware is on and the state of radio software is off.

9.4 AT^HCSQ–Query and Report Signal Strength

9.4.1 Command Syntax

AT^HCSQ?
Possible Response(s)
<CR><LF>^HCSQ: <sysmode>,<value1>,<value2>,<value3>,<value4>,<value5><CR><LF><CR><LF>OK<CR><LF>
In case of an MT-related error: <CR><LF>ERROR<CR><LF>
AT^HCSQ=?
Possible Response(s)
<CR><LF>^HCSQ: list of supported <sysmode>s<CR><LF><CR><LF>OK<CR><LF>
URC
<CR><LF>^HCSQ: <sysmode>,<value1>,<value2>,<value3>,<value4>,<value5><CR><LF>

9.4.2 Interface Description

This command is used to query and report the signal strength of the current service network. If the MT is registered with multiple networks in different service modes, you can query the signal strength of networks in each mode.

No matter whether the MT is registered with a network or not, you can run this command to query the signal strength or allow the MT to unsolicitedly report the detected signal strength if the MT camps on the network. If the MT is not using any service network or the service mode is uncertain, "NOSERVICE" will be returned as the query result.

The read command queries the current network signal strength detected by the MT.

The test command returns the list of service modes supported by the MT.

The URC command allows the MT to unsolicitedly report the current signal strength when the strength changes.

9.4.3 Parameter Description

<sysmode>: a string type value indicating the service mode in which the MT will unsolicitedly report the signal strength.

"NOSERVICE" NOSERVICE mode

"GSM"	GSM/GRPS/EDGE mode
"WCDMA"	WCDMA/HSDPA/HSPA mode
"LTE"	LTE mode
"CDMA"	CDMA mode
"EVDO"	EV-DO/eHRPD mode
"CDMA-EVDO"	CDMA/EV-DO(eHRPD) mode

Note:

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

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

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

`<gsm_rssi>`, `<wcdma_rssi>`, `<lte_rssi>`, `<cdma_rssi>`, `<evdo_rssi>`: an integer indicating the received signal strength. These parameters are available for GSM, WCDMA, LTE, CDMA, and EV-DO mode respectively.

0	rssi < –120 dBm
1	–120 dBm ≤ rssi <–119 dBm
2	–119 dBm ≤ rssi <–118 dBm
…	
94	–27 dBm ≤ rssi < –26 dBm
95	–26 dBm ≤ rssi < –25 dBm

96	–25 dBm ≤ rssi
255	unknown or undetectable

`<wcdma_rscp>`: an integer indicating the received signal code power. This parameter is available for WCDMA mode.

0	rscp < –120 dBm
1	–120 dBm ≤ rscp < –119 dBm
2	–119 dBm ≤ rscp < –118 dBm
…	
94	–27 dBm ≤ rscp < –26 dBm
95	–26 dBm ≤ rscp < –25 dBm
96	–25 dBm ≤ rscp
255	unknown or undetectable

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

0	Ec/Io < –32 dB
1	–32 dB ≤ Ec/Io < –31.5 dB
2	–31.5 dB ≤ Ec/Io < –31 dB
…	
63	–1 dB ≤ Ec/Io < –0.5 dB
64	–0.5 dB ≤ Ec/Io < 0 dB
65	0 dB ≤ Ec/Io
255	unknown or undetectable

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

0	rsrp < –140 dBm
1	–140 dBm ≤ rsrp < – 139 dBm
2	–139 dBm ≤ rsrp < –138 dBm
…	
95	–46 dBm ≤ rsrp < –45 dBm
96	–45 dBm ≤ rsrp < –44 dBm
97	–44 dBm ≤ rsrp
255	unknown or undetectable

`<lte_sinr>`: an integer indicating the signal to interference plus noise ratio (SINR). This parameter is available for LTE mode.

0	sinr < –20 dB
1	–20 dB ≤ sinr < –19.8 dB
2	–19.8 dB ≤ sinr < –19.6 dB
…	
249	29.6 dB ≤ sinr < 29.8 dB
250	29.8 dB ≤ sinr < 30 dB
251	30 dB ≤ sinr
255	unknown or undetectable

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

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

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

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

9.4.4 Property Description

Saving upon Power-off	PIN
NA	N

9.4.5 Example

Run: `AT^HCSQ=?`

Response:
```
^HCSQ: "NOSERVICE","GSM","WCDMA","LTE","CDMA","EVDO","CDMA-EVDO"

OK
```

Run: `AT^HCSQ?`

Response:
```
^HCSQ: "WCDMA",30,30,58

OK
```

9.5 AT^TIME–Query the System Time on the Network Side

9.5.1 Command Syntax

AT^TIME
Possible Response(s)
<CR><LF>^TIME: <yyyy/mm/dd hh:mm:ss><CR><LF><CR><LF>OK<CR><LF> In case of an MT-related error: <CR><LF>ERROR<CR><LF>

9.5.2 Interface Description

This command reads the current system time from the network. If the system time cannot be obtained, "ERROR" is returned.

9.5.3 Parameter Description

<yyyy>: year.

<MM>: month.

<dd>: day.

<hh>: hour.

<mm>: minute.

<ss>: second.

9.5.4 Property Description

Saving upon Power-off	PIN
NA	N

9.5.5 Example

Run: `AT^TIME`

Response:
```
^TIME: 2010/07/24 17:35:04

OK
```

9.6 AT^IMEISV–Query the IMEISV

9.6.1 Command Syntax

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

9.6.2 Interface Description

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

9.6.3 Parameter Description

<imeisv>: IMEISV of the module. It is a 16-character decimal value. The following table lists the value structure (for details, see the 3GPP TS 23.003 protocol).

16 digits IMEISV		
8 digits	6 digits	2 digits
TAC	SNR	SVN

TAC: type approval code

SNR: serial number

SVN: software version number

9.6.4 Property Description

Saving upon Power-off	PIN
NA	N

9.6.5 Example

Run: `AT^IMEISV?`

Response:
```
^IMEISV: 3545240400110917

OK
```

9.7 AT^CPIN–Manage PIN

9.7.1 Command Syntax

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

9.7.2 Interface Description

The set command verifies and unblocks PIN and PIN2.

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

The read command returns a string indicating whether a password is required or not and how many password entry attempts are remaining.

Note:

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

9.7.3 Parameter Description

`<pin>`, `<newpin>`: string type values with length 4–8 that must be enclosed in double quotation marks. The character allowed in `<pin>` and `<newpin>` must range from 0 to 9, otherwise, an error message is returned.

`<code>`: a string type value (without quotation marks).

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

`<times>`: remaining number of entry attempts. For PIN and PIN2, the maximum number of entry attempts is 3. For PUK and PUK2, the maximum number of entry attempts is 10.

Note:

If there is a password request, the remaining number of entry attempts of the currently requested password is indicated by the `<times>` field. If no password is requested, `<times>` is left blank.

`<puk_times>`: remaining number of PUK entry attempts. The maximum number of PUK entry attempts is 10.

<pin_times>: remaining number of PIN entry attempts. The maximum number of PIN entry attempts is 3.

<puk2_times>: remaining number of PUK2 entry attempts. The maximum number of PUK2 entry attempts is 10.

<pin2_times>: remaining number of PIN2 entry attempts. The maximum number of PIN2 entry attempts is 3.

9.7.4 Property Description

Saving upon Power-off	PIN
N	N

9.7.5 Example

Run: `AT^CPIN?`

Response:
```
^CPIN: SIM PIN,3,10,3,10,3

OK
```

Run: `AT^CPIN="1234"`

Response: `OK`

9.8 AT^CARDMODE–Query SIM/USIM Card Type

9.8.1 Command Syntax

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

9.8.2 Interface Description

This command queries the type of the currently installed SIM/USIM card. If the SIM/USIM card does not exist, or an error occurs during the query, CME Error is returned. For details about the CME errors, see 13.3 CMS Error List.

9.8.3 Parameter Description

<sim_type>: SIM/USIM card type.

0	No card is found
1	SIM card
2	USIM card
3	CSIM card (only for dual-mode datacards)
4	UIM card (only for dual-mode datacards)

9.8.4 Property Description

Saving upon Power-off	PIN
NA	N

9.8.5 Example

Run: AT^CARDMODE

Response: ^CARDMODE: 3

OK

9.9 ^SRVST–Unsolicitedly Present of Service State Change

9.9.1 Command Syntax

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

9.9.2 Interface Description

When the state of a service is changed, the MT uses this command to unsolicitedly send the new service state to the TE.

9.9.3 Parameter Description

<srv_status>: the system service status.

0	No services
1	Restricted services
2	Valid services
3	Restricted regional services
4	Power saving or hibernating state

9.9.4 Property Description

Saving upon Power-off	PIN
N	N

9.9.5 Example

Response: `^SRVST: 0`

9.10 ^SIMST–Unsolicitedly Present of SIM Card State Change

9.10.1 Command Syntax

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

9.10.2 Interface Description

When the state of the SIM card is changed, the MT uses this command to unsolicitedly send the new state to the TE. Meanwhile, it also indicates whether the SIM card is locked or not.

9.10.3 Parameter Description

`<sim_state>`: 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	ROM SIM 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.

9.10.4 Property Description

Saving upon Power-off	PIN
NA	N

9.10.5 Example

Response: `^SIMST: 1`

9.11 ^NWTIME–Unsolicitedly Present of Network Time

9.11.1 Command Syntax

URC
<CR><LF>^NWTIME: <date>,<time>,<dt><CR><LF>

9.11.2 Interface Description

This command controls the presentation of network system time, time zone, and daylight saving time.

9.11.3 Parameter Description

`<date>`: specifies date in the format of yy/MM/dd.

`<time>`: specifies time and time zone in the format of hh:mm:ss+tz. For example: "05:56:13+32", each tz is 15 min, so that +32 means 32 x 15 min (8 h).

`<dt>`: specifies daylight saving time in the format of tt. When the parameter is not specified, the module presents 00. Otherwise, corresponding daylight saving time is

presented. Detailed values and descriptions are as follows (refer to table 10.5.97a/3GPP TS 24.008):

00	No adjustment for Daylight Saving Time
01	+1 hours adjustment for Daylight Saving Time
02	+2 hours adjustment for Daylight Saving Time
03	Reserved

9.11.4 Property Description

Saving upon Power-off	PIN
N	Y

9.11.5 Example

Response: `^NWTIME: 99/12/31,23:59:59+12,02`

9.12 ^SMMEMFULL–Unsolicitedly Present of Message Memory Full

9.12.1 Command Syntax

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

9.12.2 Interface Description

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

9.12.3 Parameter Description

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

"SM"	(U)SIM card
"ME"	NV memory

9.12.4 Property Description

Saving upon Power-off	PIN
NA	N

9.12.5 Example

Response: `^SMMEMFULL: "SM"`

10 Huawei Proprietary Interface: STK Interface

10.1 AT^STSF–Configure STK Mode

10.1.1 Command Syntax

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

10.1.2 Interface Description

The set command configures STK, including:

- Active and deactive the function of STK
- Set the mode of STK

The read command returns the current value of <Mode> and <RawMode> (if this parameter is supported).

The test command returns supported modes as a compound value and a list of supported <RawMode> (if this parameter is supported).

10.1.3 Parameter Description

<Mode>[1]:

0	Disable STK
1	Active STK

<RawMode>[2]:

0	Raw data mode (not supported currently)
1	Common mode (not supported currently)
2	Standard raw data mode[3]

Notes:

[1] Parameters of <Mode> are saved when MT is powered off. Parameters of <RawMode> are not saved when MT is powered off

[2] <RawMode> is a optional parameter. Some Huawei modules do not support this parameter. When <RawMode> is in standard raw data mode, which indicates customers should comply with the relative AT interface specification of STK in 3GPP TS 27.007 R11.

[3] <RawMode> has no fixed default value. Default value in different platforms may vary. If modules use with the old dashboard that does not support STK modes conversion, the default value is 1. If modules do not use with the old dashboard and support standard raw data mode, the default value is 2.

10.1.4 Property Description

Saving upon Power-off	PIN
Y	N

10.1.5 Example

Run:	AT^STSF=0,2	Disable STK
Response:	OK	
Run:	AT^STSF=3,2	Parameter setting error
Response:	ERROR	
Run:	AT^STSF=1,2	Active the function of STK and set STK to raw data mode
Response:	OK	

Run:	`AT^STSF=1,2`	Active the function of STK and set STK to standard raw data mode
Response:	`OK`	

10.2 +CUSATP–Unsolicitedly Present a UICC Proactive Command

10.2.1 Command Syntax

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

10.2.2 Interface Description

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

10.2.3 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.

10.2.4 Property Description

Saving upon Power-off	PIN
NA	NA

10.2.5 Example

Unsolicitedly report a proactive command "GET INPUT".

Response: `+CUSATP: "D01A8103012300820281828D0B043C54494D452D4F55543E9102000A"`

10.3 AT^CUSATM–Query the Main Menu

10.3.1 Command Syntax

AT^CUSATM?
Possible Response(s)
<CR><LF>^CUSATM: <setup_menu><CR><LF><CR><LF>OK<CR><LF>

10.3.2 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".

10.3.3 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.

10.3.4 Property Description

Saving upon Power-off	PIN
NA	Y

10.3.5 Example

Run: AT^CUSATM?

Response:

```
^CUSATM: "D0818A8103012500820281828511805168740390
1A005500530049004D53618F0D01444953504C415920544558
548F0A0247455420494E4B45598F0A0347455420494E505554
8F0A044D4F52452054494D458F0A05504C415920544F4E458F
0E06504F4C4C20494E54455256414C8F080752454652455348
8F130853454E442053484F5254204D455353414745"

OK
```

10.4 AT+CUSATE–Send USAT Envelope

10.4.1 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>

10.4.2 Interface Description

The execution command sends a USAT envelope command to UICC.

The test command return OK.

10.4.3 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	Indicates 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.

10.4.4 Property Description

Saving upon Power-off	PIN
NA	Y

10.4.5 Example

Run: `AT+CUSATE="D30782020181900102"`

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

OK
```

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.

10.5 AT+CUSATT–Send USAT Terminal Response

10.5.1 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>

10.5.2 Interface Description

The execution command sends a USAT terminal response to UICC.

The test command return `OK`.

10.5.3 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.

10.5.4 Property Description

Saving upon Power-off	PIN
NA	Y

10.5.5 Example

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

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

Run: `AT+CUSATT="810301218002028281830100"`

Response: `OK`

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

10.6.1 Command Syntax

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

10.6.2 Interface Description

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

10.6.3 Parameter Description

None

10.6.4 Property Description

Saving upon Power-off	PIN
NA	NA

10.6.5 Example

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

Run: `AT+CUSATT="810301218002028281830100"`

Response: `OK`

`+CUSATEND`

11 Huawei Proprietary Interface: BodySAR Interface

11.1 AT^BODYSARON–Disable/Enable Body SAR

11.1.1 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>

11.1.2 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.

11.1.3 Parameter Description

<on>:

0	Disable BodySAR (default value)
1	Enable BodySAR

11.1.4 Property Description

Saving upon Power-off	PIN
N	N

11.1.5 Example

Run: AT^BODYSARON=1

Response: OK

Run: AT^BODYSARON?

Response: ^BODYSARON: 1

OK

Run: AT^BODYSARON=?

Response: ^BODYSARON: (0,1)

OK

11.2 AT^BODYSARWCDMA–Set the Maximum Tx Power Limit of WCDMA

11.2.1 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)
<CR><LF>^BODYSARWCDMA: (12-24),<band><CR><LF><CR><LF>OK<CR><LF>

11.2.2 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.

11.2.3 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
00000200	WCDMA_XIX_850
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.

11.2.4 Property Description

Saving upon Power-off	PIN
Y	N

11.2.5 Example

Run:	AT^BODYSARWCDMA=?	
Response:	^BODYSARWCDMA: (12-24),00000231 OK	Indicate that the firmware supports WCDMA I, WCDMA V, WCDMA VI and WCDMA XIX; the power is from 12 to 24.
Run:	AT^BODYSARWCDMA=20,00000001,18,00000230	Indicate that set the maximum WCDMA I Tx power limit to 20 and the maximum WCDMA V, WCDMA VI and WCDMA XIX Tx power limit to 18.
Response:	OK	
Run:	AT^BODYSARWCDMA?	
Response:	^BODYSARWCDMA: (20,00000001),(18,00000230) OK	Indicate that the current maximum WCDMA I Tx power limit is set to 20 and the maximum WCDMA V, WCDMA VI and WCDMA XIX Tx power limit is set to 18.

11.3 AT^BODYSARLTE–Set the Maximum Tx Power Limit of LTE

11.3.1 Command Syntax

AT^BODYSARLTE=<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^BODYSARLTE?
Possible Response(s)
<CR><LF>^BODYSARLTE: 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^BODYSARLTE=?
Possible Response(s)
<CR><LF>^BODYSARLTE: (12-24),<band><CR><LF><CR><LF>OK<CR><LF>

11.3.2 Interface Description

The set command sets the maximum Tx power limit of LTE for each band. Set the maximum Tx power limit of LTE for selected band accoding 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 LTE 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 LTE and the parameter values supported by the maximum Tx power limit for each band.

11.3.3 Parameter Description

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

<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 (or parameter superimposed values except FFFFFFFFFFFFFFFF).

Parameters	Band
0000000000000001	band 1
0000000000000002	band 2
0000000000000004	band 3
0000000000000008	band 4
0000000000000010	band 5
0000000000000020	band 6
0000000000000040	band 7
0000000000000080	band 8
0000000000000100	band 9
0000000000000200	band 10
0000000000000400	band 11
0000000000000800	band 12
0000000000001000	band 13
0000000000002000	band 14
0000000000004000	band 15
0000000000008000	band 16
0000000000010000	band 17
0000000000020000	band 18
0000000000040000	band 19
0000000000080000	band 20
0000000000100000	band 21
0000000000200000	band 22
0000000000400000	band 23
0000000000800000	band 24
0000000001000000	band 25
0000000002000000	band 26
0000000004000000	band 27
0000000008000000	band 28
0000000010000000	band 29
0000000020000000	band 30
0000000040000000	band 31

Parameters	Band
0000000080000000	band 32
0000000100000000	band 33
0000000200000000	band 34
0000000400000000	band 35
0000000800000000	band 36
0000001000000000	band 37
0000002000000000	band 38
0000004000000000	band 39
0000008000000000	band 40
0000010000000000	band 41
0000020000000000	band 42
0000040000000000	band 43
0000080000000000	band 44
0000100000000000	band 45
0000200000000000	band 46
0000400000000000	band 47
0000800000000000	band 48
0001000000000000	band 49
0002000000000000	band 50
0004000000000000	band 51
0008000000000000	band 52
0010000000000000	band 53
0020000000000000	band 54
0040000000000000	band 55
0080000000000000	band 56
0100000000000000	band 57
0200000000000000	band 58
0400000000000000	band 59
0800000000000000	band 60
1000000000000000	band 61
2000000000000000	band 62

Parameters	Band
4000000000000000	band 63
8000000000000000	band 64
FFFFFFFFFFFFFFFF	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.

11.3.4 Property Description

Saving upon Power-off	PIN
Y	N

11.3.5 Example

Run: `AT^BODYSARLTE=?`

Response: `^BODYSARLTE: (12-24),0000000000160401`

`OK`

Indicate that the firmware supports band 1, band 11, band 18, band 19 and band 21; the power is from 12 to 24.

Run: `AT^BODYSARLTE=20,FFFFFFFFFFFFFFFF`

Set the maximum Tx power limit of bands supported by firmware to 20.

Response: `OK`

Run: `AT^BODYSARLTE?`

Response: `^BODYSARLTE: (20,FFFFFFFFFFFFFFFF)`

`OK`

Indicate that the maximum Tx power limit of bands supported by firmware is set to 20.

11.4 AT^BODYSARCDMA–Set the Max Tx Power Limit of CDMA

11.4.1 Command Syntax

AT^BODYSARCDMA=<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^BODYSARCDMA?
Possible Response(s)
<CR><LF>^BODYSARCDMA: 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^BODYSARCDMA=?
Possible Response(s)
<CR><LF>^BODYSARCDMA: (19-24),<band><CR><LF><CR><LF>OK<CR><LF>

11.4.2 Interface Description

The set command sets the max transmit power limit of CDMA.

The read command queries the current value of the max transmit power limit.

The test command returns supported value of the max transmit power limit.

11.4.3 Parameter Description

<power>: the max transmit power limit of CDMA. Integer from 19 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	BC0 A
00000002	BC0 B
00000004	BC1

Parameters	Band
00000008	BC2
00000010	BC3
00000020	BC4
00000040	BC5
00000080	BC6
00000100	BC7
00000200	BC8
00000400	BC9
00000800	BC10
00001000	BC11
00002000	BC12
00004000	BC13
00008000	BC14
00010000	BC15
00020000	BC16
00040000	BC17
00080000	BC18
00100000	BC19
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.

11.4.4 Property Description

Saving upon Power-off	PIN
Y	N

11.4.5 Example

Run: `AT^BODYSARCDMA=?`

Response:	^BODYSARCDMA: (19-24),00000081 OK	Indicate that the firmware supports BC0 A and BC6; the power is from 19 to 24.
Run:	AT^BODYSARCDMA=20,00000001	Indicate that set the maximum Tx power limit of BC0 A supported by firmware to 20.
Response:	OK	
Run:	AT^BODYSARCDMA?	
Response:	^BODYSARCDMA: (20,00000001), (24,00000080) OK	Indicate that the current maximum BC0 A Tx power limit is set to 20 and the maximum BC6 Tx power is remain the default value 24.

12 Huawei Proprietary Interface: M.2 Interface

12.1 AT+XTSM–Set Thermal Sensor with the Threshold

12.1.1 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>

12.1.2 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.

12.1.3 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.

`<TripPointTemp>`: minimum value is 0 and maximum value is 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 is 100, maximum value is 99000 in MiliDegC. `<Hysteresis>` can be used only with `<TripPointTemp>`.

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

12.1.4 Property Description

Saving upon Power-off	PIN
NA	N

12.1.5 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`

- Example 4:

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

Response: `OK`

- Example 5:

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

Response: `OK`

12.2 +XTS–Unsolicitedly Present of the Threshold Reached

12.2.1 Command Syntax

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

12.2.2 Interface Description

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

12.2.3 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.

12.2.4 Property Description

Saving upon Power-off	PIN
NA	N

12.2.5 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.

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

12.3.1 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>

12.3.2 Interface Description

This command returns the current temperature value of particular thermal sensor.

12.3.3 Parameter Description

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

0	RF sensor

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

12.3.4 Property Description

Saving upon Power-off	PIN
NA	N

12.3.5 Example

Run: `AT+XTAMR=0`

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

`OK`

12.4 AT+XADPCLKFREQINFO–Query Adaptive Clock Frequency Info

12.4.1 Command Syntax

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

12.4.2 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 or disables the `+XADPCLKFREQINFO` URC.

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

The test command returns the list of available frequency information. The test command can be used only after running `AT+XADPCLKFREQINFO=1`.

12.4.3 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.

12.4.4 Property Description

Saving upon Power-off	PIN
N	N

12.4.5 Example

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

Response:	`+XADPCLKFREQINFO: 0`
	
	`OK`	

Run:	`AT+XADPCLKFREQINFO=1`	Enable 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`	

12.5 +XADPCLKFREQINFO–Unsolicitedly Present of Adaptive Clock Frequency Info

12.5.1 Command Syntax

URC

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

12.5.2 Interface Description

The URC displays the adaptive clock frequency information.

12.5.3 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.

12.5.4 Property Description

Saving upon Power-off	PIN
NA	NA

12.5.5 Example

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

13 Appendix

13.1 List of URC Commands

URC	Function
+CMTI	Indicate a new message received
+CMT	Indicate a new message reported directly
+CDSI	Indicate a new message status report received
+CDS	Indicate a new message status report reported directly
+CUSATEND	Report terminating a UICC proactive command session
+CUSATP	Report a UICC proactive command
+CUSD	Report USSD of network
^DSDORMANT	Report instructions into the dormant
^HCDS	Report a new status report short message
^HCMGS	Report successfully sending a short message
^HCMT	Report a new short message
^HCSQ	Report signal strength
^THERM	Report thermal protection activated
+XADPCLKFREQINFO	Report adaptive clock frequency info
+XTS	Indicate the threshold reached

13.2 General CME Error List

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

Table 13-1 General "CME ERROR" Codes

Numeric mode	Verbose mode
0	phone failure
1	no connection to phone
2	phone adaptor link reserved
3	operation not allowed
4	operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted (not supported currently. If no SIM is inserted, return SIM failure)
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout
32	network not allowed - emergency calls only
40	network personalization PIN required

Numeric mode	Verbose mode
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
46	corporate personalization PIN required
47	corporate personalization PUK required
48	hidden key required
49	EAP method not supported
50	Incorrect parameters
51	Parameter length error for all Auth commands
52	Temporary error for all auth cmds
100	unknown
103	Illegal Mem_Store
106	Illegal ME
107	GPRS services not allowed
111	PLMN not allowed
112	Location area not allowed
113	Roaming not allowed in this location area
132	service option not supported
133	requested service option not subscribed
134	service option temporarily out of order (#34)
148	unspecified GPRS error
149	PDP authentication failure
150	invalid mobile class
257	network rejected request
258	retry operation
259	invalid deflected to number
260	deflected to own number
261	unknown subscriber
262	service not available

Numeric mode	Verbose mode
263	unknown class
264	unknown network message
273	Minimum TFT per PDP address error
274	Duplicate TFT eval prec index
275	Invalid TFT param combination

Table 13-2 General "CME ERROR" Codes (Huawei proprietary)

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

13.3 CMS Error List

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

`<err>` values used by common messaging commands:

Numeric mode	Verbose mode
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

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

13.4 Final Result Code

Final Result Code	No.	Description
OK	0	A command is executed, and there is no error.
CONNECT	1	A connection is established.
RING	2	An incoming call is originated.
NO CARRIER	3	A connection is terminated.
ERROR	4	There is a common error.
NO DIALTONE	6	There is no dialing tone.

Final Result Code	No.	Description
BUSY	7	The peer is busy.
NO ANSWER	8	Timeout occurs when the connection is complete, and there is no reply.
+CME ERROR: <err>		The error type is specified by <err>.
+CMS ERROR: <err>		It is a short message-related error.
COMMAND NOT SUPPORT	numeric is not supported	The command is not supported.
TOO MANY PARAMETERS	numeric is not supported	Too many parameters in the issued command

Note:

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

13.5 Initial Values of Command Parameters After MT Startup

The following table lists the initial values of the interface parameters mentioned in this document during MT startup.

Command	Initial Value
ATI	<value>=0
ATV	<value>=1
AT+CFUN	<fun>=1
AT+CPBS	<storage>="SM"
AT+CGSMS	<service>=1
AT+CPMS	In 3GPP, all of <mem1>, <mem2>, and <mem3> are "SM"; In 3GPP2, all of <mem1>, <mem2>, and <mem3> are "ME"
AT+CGDCONT	Obtained from the NV memory after reboot.
AT+CUSD	<n>=0
AT+CSCA	<sca>=null, <tosca>=null. The AT+CSCA? command shall be used to obtain the SMSC number from the SIM.
AT+CSMS	<service>=0
AT+CMGF	<mode>=0

Command	Initial Value
AT+CNMI	In 3GPP, all of <mode>, <mt>, <bm>, <ds>, and <bfr> are 0; In 3GPP2, <mode>=1, <mt>=1, <bm>=0, <ds>=2, and <bfr>=0
AT+COPS	<mode>=0, <format>=0
AT+CREG	<n>=0
AT+CGREG	<n>=0
AT^HCMGR	<mode>=0

13.6 References

The following list is most of the references for this document.

[1] 3GPP TS 23.003

[2] 3GPP TS 23.038

[3] 3GPP TS 23.040

[4] 3GPP TS 23.041

[5] 3GPP TS 24.008

[6] 3GPP TS 25.331

[7] 3GPP TS 27.005

[8] 3GPP TS 27.007

[9] 3GPP TS 31.111

[10] 3GPP TS 44.060

[11] ETSI TS 102.221

[12] ETSI TS 102.223

[13] GSM 07.05

[14] GSM 51.011

[15] HUAWEI Terminal AT Command Interface Specifications

[16] ITU-T Recommendation V.25 ter

13.7 Acronyms and Abbreviations

Acronym or Abbreviation	Full spelling
3GPP	Third Generation Partnership Project
AT	ATtention

Acronym or Abbreviation	Full spelling
APN	Access Point Name
CDMA	Code Division Multiple Access
CS	Circuit Switched (CS) domain
DC-HSPA+	Double Carrier HSPA Evolution
DCE	Data Circuit - terminating Equipment
DCS	Data Coding Scheme
DTE	Data Terminal Equipment
EDGE	Enhanced Data Rate for GSM Evolution
EGPRS	Enhanced General Packet Radio Service
eHRPD	Evolved High Rate Packet Date
EVDO	Evolution Data Optimization
E-UTRAN	Enhanced UMTS Terrestrial Radio Access Network
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HSDPA	High Speed Downlink Packet Access
HSPA	High Speed Packet Access
HSPA+	HSPA Evolution
HSUPA	High Speed Uplink Packet Access
IMEI	International Mobile Equipment Identity
IP	Internet Protocol
ITU-T	International Telecommunication Union-Telecommunication Standardization Sector
IWF	Interworking Function
LTE	Long Term Evolution
ME	Mobile Equipment
MS	Mobile Station
MT	Mobile Terminal
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PIN	Personal Identity Number

Acronym or Abbreviation	Full spelling
PLMN	Public Land Mobile Network
PPP	Point-to-Point Protocol
PUK	PIN Unblocking Key
PS	Packet Switched (PS) domain
QoS	Quality of Service
RSSI	Receive Signal Strength Indicator
SCA	Service Center Address
SIM	Subscriber Identity Module
SM	Short Message
SMS	Short Message Service
SMSC	Short Message Service Center
TA	Terminal Adapter
TE	Terminal Equipment
TPDU	Transfer Protocol Data Unit
UICC	Universal Integrated Circuit Card
UMTS	Universal Mobile Telecommunications System
URC	Unsolicited Result Code
USAT	USIM Application Toolkit
USIM	Universal Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	UMTS Terrestrial Radio Access Network
VP	Validity Period
WCDMA	Wideband CDMA