EICUT-E70x

AT Command Manual

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Revision History

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1. Brief Introduction

This document will describe all AT commands implemented in the SDK. As the SDK will support various chips of RDA Microelectronics, it will support various product types. Not all AT commands can be supported on any target.

1.1. AT Command Syntax

- **Description**

The AT, at, aT, or At prefix must be set at the beginning of each command line. To terminate a command line, enter<CR>.

A/is a special case. When receiving A/, the previous command line will be processed immediately. Neither AT prefix nor<CR>is required.

+++It's another special case. Strictly speaking, it is not an AT command, but an escape input sequence that represents DCE switching from data mode or PPP online mode to command mode.

The AT command can be divided into three types of syntax: basic syntax, S-parameter syntax, and extension syntax.

- **Basic Grammar**

The format of these AT commands is "AT<x><n>" or "AT&<x><n>", where "<x>" is the command and "<n>" is the parameter of the command. An example is "ATE<n>", which tells DCE whether to return the received characters to DTE based on the value of "<n>". <n>"is optional, and if it is missing, the default value will be used.

- **S-parameter syntax**

The format of these AT commands is ATS<n>=<m>, where<n>is the index of the S register to be set and<m>is the value to be assigned to it< m> It is optional, and if it is missing, a default value will be assigned.

- **Extended Grammar**

These commands can run in several modes, as shown in the table below.

Command Type	Command	Description
Test Command	AT+<x>=?	This command returns the list of parameters and value ranges set by the corresponding Write Command or internal processes.

Read Command	**AT+<x>?**	**This command returns the currently set value of the parameter or parameters.**
Write Command	**AT+<x>=<...>**	**This command sets the user-definable parameter values.**
Execution Command	**AT+<x>**	**This command reads non-variable parameters affected by internal processes in the UE.**

Note

If the command is set to AT+<x>=, use default parameter settings or return OK directly.

1.2. AT Command Line

Multiple AT commands can be combined into one command line. If the AT command line starts with the AT prefix and ends with<CR>. The extension commands should be separated by semicolons (;). And semicolons cannot be inserted between basic commands and S-parameter commands.

The empty AT command line (AT<CR>) is valid. DCE will return OK.

Before encountering<CR>, the AT command line is buffered and will not process any AT commands. The maximum capacity of the AT command line buffer can be configured in the SDK. When the maximum capacity is exceeded, the data in the buffer will be silently discarded and the AT prefix will be searched again.

When all commands can be processed successfully, it will respond with "OK". When any command in the command line fails, it will respond with "ERROR" and abandon subsequent commands in the command line.

When a series of AT commands are sent to DCE with different numbers of lines, DTE must wait for the final response from the previous command line before sending the next command line.

1.3. Supported Character Sets

1. The default character set for the AT command interface is the PCCP936 character set. Supports the following character sets.
2. -GSM
3. - HEX
4. - PCCP936
5. - UCS2

2. General AT Commands

2.1. ATS0 Automatic Response

- **Description**

This command controls the automatic answering mode for incoming calls.

- **Grammar**

Command	Possible response
Test command **ATS0=?**	**(<n>)** **OK**
Read command **ATS0?**	**<n>** **OK**
Write command **ATS0=<n>**	**OK**

- **Parameter**

<n>	0	Automatic response has been disabled.
	1-255	Enable the auto-reply on the specified phone number.

- **Note**

This command is specifically used for data services in GPRS mode.

Comment
If the <n> is set too high, the caller may hang up before the auto-answering call.

- **Example**

```
//Set three rings before auto answering the call.
ATS0=3
OK
```

```
//Incoming call
RING

RING

RING
//Automatically answer the phone after three rings
```

2.2. ATS3 response formatted character

- **Description**

  This command determines the characters identified by the module to terminate the incoming command line. It also generates the result codes and information text as well as the character values set by ATS4.

- **Grammar**

Command	Possible response
Read command **ATS3?**	**(<n>)** **OK**
Write command **ATS3=<n>**	**OK**

- **Parameter**

<n> 0-13-31 Command line termination character (default is 13=<CR>)

Comment
Using a value other than 13 when entering commands may cause issues. If ATS3, ATS4, and ATS5 are set to the same value, it may lead to some problems.

2.3. ATS4 response formatted character

- **Description**

This command determines the characters generated for the result code and information text by the module, as well as the command line termination character set set by ATS3.

- **Grammar**

Command	Possible response
Read command **ATS4?**	**(<n>)** **OK**
Write command **ATS4=<n>**	**OK**

- **Parameter**

<n> 0-10-31 Response format character (default value 10=<LF>)

Comment
If ATS3, ATS4, and ATS5 are set to the same value, it may cause some issues.

2.4. ATS5 command line editing characters

- **Description**

This command determines the character value used by the module to delete the previous character from the AT command line (i.e. equivalent to the backspace key).

- **Grammar**

Command	Possible response
Read command **ATS5?**	**(<n>)** **OK**
Write command **ATS5=<n>**	**OK**

Parameter

<n> 0-8-31 Response editing character (default 8=<Backspace>)

Comment
If ATS3, ATS4, and ATS5 are set to the same value, it may cause some issues.

2.5. AT&F will set all current parameters to factory defaults

- **Description**

  The command is reset to its factory default value when setting the AT command.

- **Grammar**

Command	Possible response
Execute command AT&F[<value>]	**OK**
Execute command AT&F	**OK**

- **Parameter**

<value>	0	Set all TA parameters to factory default values.

Note

A list of parameters reset to factory default values can be found in the chapter. In addition to the default configuration file, you can also store an individual configuration file using AT&W. To switch between the two configuration files, enter ATZ (load user configuration file) or AT&F (restore factory configuration file).

2.6. AT&W saves the current configuration to a user-defined configuration file

- **Description**

This command saves the current AT command settings to a user-defined configuration file in non-volatile memory.

- **Grammar**

Command	Possible response
Execute command **AT&W[<value>]**	**OK**

2.7. ATZ sets all current parameters to the user-defined profile

- **Description**

  If stored previously with AT&W, this command will revert the current AT command settings to the user-defined profile in non-volatile memory. Any other AT commands on the same command line can be ignored.

- **Grammar**

Command	Possible response
Execute command **ATZ[<value>]**	**OK**

Parameter

<value>	0	Factory default profile.

2.8. AT+CMEE report on mobile device errors

- **Description**

  This command controls the format of error result codes: ERROR, error number, or details such as CME ERROR:<err> and CMS ERROR:<err>.

- **Grammar**

Command	Possible response
Test command **AT+CMEE=?**	**+CMEE: (<n>)** **OK**

Read command **AT+CMEE?**	**+CMEE: <n>** **OK**
Write command **AT+CMEE=<n>**	**+CME ERROR: <err>**

- **Parameter**

<n>	0	Disable CME ERROR: <err> code and use ERROR instead
	1	Allow CME ERROR:<err> code and use numerical <err> value (see next sub-clause)
	2	Allow CME ERROR:<err>Result code and use verbose<err>value see next sub-clause)

Note

When enabling result codes, MT-related errors will cause CME ERROR: <err> final result code, rather than the regular error final result code. Errors are typically returned when associated with syntax, invalid parameters, or TA functions.

- **Example**

AT+CMEE=0

OK

AT+CMEE=5

ERROR

//only show error

//Enable error result codes with numeric values.

AT+CMEE=1

OK

AT+CMEE=5

+CME ERROR: 53

//Enable error result codes using detailed (string) values

AT+CMEE=2

OK

AT+CMEE=5

+CME ERROR: parameters are invalid

2.9. AT+CSCS Select the TE character set

- **Description**

  This write command informs the module which character set TE to use. This enables UE to correctly convert strings between TE and UE character sets.

- **Grammar**

Command	Possible response
Test command **AT+CSCS=?**	**+CSCS:** (supported **<chset>list**) **OK**
Read command **AT+CSCS?**	**+CSCS: "<chset>"** **OK**
Write command **AT+CSCS=[<chset>]**	**OK**

- **Parameter**

<chset>	“GSM”	GSM 7-bit default alphabet (3GPP TS 23.038); This setting can easily cause software flow control (XON/XOFF) issues.
	“UCS2”	16-bit universal multiple octal encoded character set (ISO/IEC10646[32]); UCS2 strings are converted to hexadecimal numbers from 0000 to FFFF; For example, "004100620063" equals three 16-bit characters, and the decimal values are 65, 98, and 99.

“HEX”	Hexadecimal mode. No character set is used; the user reads or writes the hexadecimal value directly.
“PCCP936”	The computer is set to Chinese characters.
“IRA”	International Reference Alphabet (see ITU Recommendation T.50 [13]).
“UTF-8”	octet (8-bit) lossless encoding of UCS characters (see RFC 3629 [69]); UTF-8 encodes each UCS character as a variable number of octets, where the number of octets depends on the integer value assigned to the UCS character. The input format should be an octet stream. Must not be converted to a hexadecimal number, such as "hexadecimal" or "UCS2". This character set requires an 8-bit TA – TE interface.

Comment
1、This command is used to read and write telephone book entries. Text messages are not affected by this command. **2、Values of each series module:** **8910/8850: ”GSM”、” IRA”、” UCS2”、” HEX”、” UTF-8”、 “PCCP936”** **XY4100LC：” GSM”、” IRA”、” UCS2”、” HEX”** **ASR：” GSM”、” IRA”、” UCS2”、” HEX”** **QCX216: ”GSM”、” IRA”、” UCS2”** **EC618: ”GSM”、” IRA”、” UCS2”**

Note

This command is used to read and write phonebook entries. SMS messages are not affected by this command.

2.10. AT+CMUX multiplexing mode

- **Description**

  This command is used to enable the multiplexing protocol control channel.

- **Grammar**

Command	Possible response
Test command **AT+CMUX=?**	**+CMUX: (supported<transparency>list), (supported<subset>list), (supported<port_speed>list), (supported<N1>list), (supported<T1>list), (supported<N2>list), (supported<T2>list), (supported<T3>list), (supported<k>list)** **OK**
Read command **AT+CMUX?**	**+CMUX: <transparency>,[<subset>], <port_speed>,<N1>,<T1>,<N2>,<T2>, <T3>[,<k>]** **OK**
Write command **AT+CMUX=<transparency>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]]**	**OK**

- **Parameter**

<transparency> Integer type (multiplexed transparent mechanism).

0	Basic choice
1	Advanced options

<subset> This parameter defines how the multiplexer's control channel is set. The virtual channel can then be set differently, but in the absence of any negotiation on the setting of the virtual channel, the virtual channel should be set according to the control channel <subset> settings.

0	Only use UIH frame
1	Only use UI frame

<port_speed> Integer type (transfer rate). The default value is implementation-specific.

1	9600 bit/s
2	19200 bit/s
3	38400 bit/s
4	57600 bit/s
5	115200 bit/s
6	230400 bits/s

<N1>	Integer type (maximum frame size)	
	1 ~ 2048	where 31 is the default value for the basic option and 64 is the default value for the advanced option (see <transparency>).
<T1>	Integer type (confirmation timer in 10 milliseconds).	
	1 ~ 255	where 10 is the default value (100 ms).
<N2>	Integer type (maximum number of retransmissions).	
	0 ~ 100	Three of them are the defaults.
<T2>	Integer type (multiplexer controls the response timer of the channel in 10 milliseconds).	
	2 ~ 255	where 30 is the default value (300 ms).
<T3>	Integer type (wake response timer, seconds)	
	1 ~ 255	10 of these is the default.
<K>	Integer type (window size, for advanced options with error recovery mode)	
	1 ~ 7	2 of them is the default.

Comment
T2 must be longer than T1.

2.11. AT+CLAC lists all available AT commands

- **Description**

  Executing the command will cause MT to return one or more AT commands.

- **Grammar**

Command	Possible response
Test command **AT+CLAC=?**	**OK**
Execute command **AT+CLAC**	**<AT command1>[<CR><LF>** **<AT command2>[...]]** **OK**

- **Parameter**

<AT command>	Define AT commands, including the prefix AT. The text should not include the sequence 0<CR> or OK<CR>.

2.12. AT+CBC battery charge, discharge and charge control

- **Description**

  Execute the command to return the battery connection status <bcs> and battery charge level of the ME <bcl>. The Test command returns the values supported by TA in a composite form. When the device doesn't have real power, executing the command gets the default.

- **Grammar**

Command	Possible response
Test command **AT+CBC=?**	**+CBC: (supported <bcs>list),(supported <bcl>list),(range)** **OK**
Execute command **AT+CBC**	**+CBC: <bcs>,<bcl>,<bv>** **OK**

- **Parameter**

<bcs>	0	The charging adapter is not connected.
	1	The charging adaptor is connected.
	2	The charging adapter is connected and charging.
	3	The charging adapter is connected and charging is complete.
	4	Charging error, charging interrupted.
	5	Wrong charging temperature, when the temperature is out of the allowable range, the charging is interrupted.
<bcl>	0-100	0 indicates that the battery is depleted or the capacity value is unavailable.

<bv>	3200-4200	Voltage value

Comment
Values 1, 4, and 5 are currently not supported.

2.13. AT+CEER Extension Error Reporting

- **Description**

  This command causes the TA to return one or more lines of information text, as determined by the MT manufacturer<report>, which should provide the user of the TA with an extended report stating - the reason for the last unsuccessful call setup (initiation or answer) or call modification failure; - the reason for the release of the last call; - Last unsuccessful GPRS connection or PDP context activation; Last GPRS detachment or PDP context deactivation. Typically, the text will consist of a single line containing the reason information given by the GSM/UMTS network in text format.

- **Grammar**

Command	Possible response
Test command **AT+CEER=?**	**OK**
Execute command **AT+CEER**	**+CEER: <report>** **+ceer: "0 Unknown"** **OK**

- **Parameter**

<report>	The total number of characters in the message text, including line end characters, must not exceed 2041 characters. The text should not contain the sequence 0 <CR> or OK<CR>.

- **Example**

```
AT+CEER

+CEER: 255
```

OK

ATD 13501275915;

OK

BUSY

AT+CEER

+CEER: CALL RELEASED, NETWORK SENT UDUB TO ME

OK

2.14. AT+CSCLK to set the sleep mode

- **Description**

  This command is used to set the low clock mode.

- **Grammar**

Command	Possible response
Test command **AT+CSCLK=?**	**+CSCLK: (supported<pas>list)** **OK**
Read command **AT+CSCLK?**	**+CSCLK: <pas>** **OK**
Write command **AT+CSCLK=<pas>**	**OK**

- **Parameter**

<pas>	0	Disable the slow clock.
	1	Enable Slow Clock Mode, use DTR to control the slow clock; when DTR is set to high, enable the slow clock; otherwise, disable the slow clock.
	2	Automatically set the slow clock mode, disable the slow clock when the UART receives or sends data, otherwise enable the slow clock.
	5	Enter PM2 mode
	9	Enter PM3 mode

Comment
8910 sets AT CSCLK=2 to go to sleep, and 8850 sets AT CSCLK=9 to go into sleep.

2.15. AT+CIND settings indicate whether the event is sent to ATE or not.

- **Description**

  Set the indication of whether the event is sent to ATE.

- **Grammar**

Command	Possible response
Test command **AT+CIND=?**	**+CIND:** (supported**<descr>list**) **OK**
Read command **AT+CIND?**	**+CIND: <descr>** //Battery Charging, Signal, Service, Sounder, Message, Call, Roaming, Smsfull **OK**
Write command **AT+CIND=[<ind>[,<ind>[,. . .]]]**	 **OK**

- **Parameter**

<ind>	integer value, which should be within the corresponding <descr>range.
<descr>	The values and their ranges that are reserved for this file

"Battery" Battery charge level (0-5)	"Battery" Battery charge level (0-5)
"Signal" Signal Quality (0-5)	"Signal" Signal Quality (0-5)
"Service" Service Availability(0-1)	"Service" Service Availability(0-1)
“Vocal Device” Vocal Device Activity (0-1)	“Vocal Device” Vocal Device Activity (0-1)
"Message" Messages received (0-1)	"Message" Messages received (0-1)
"Calling" is calling (0-1)	"Calling" is calling (0-1)
Roaming Roaming Indicator (0-1)	Roaming Roaming Indicator (0-1)
"smsfull" message memory storage is full (1), or memory location is available (0); namely the range is (0-1)	"smsfull" message memory storage is full (1), or memory location is available (0); namely the range is (0-1)

2.16. AT+CMER Mobile Terminal Event Report

- **Description**

  Configure or query the method in which the TA sends an unrequested result code to the TE

- **Grammar**

Command	Possible response
Test command **AT+CMER=?**	**+CMER:** (supported**<mode>list**),(supported**<keyp>list**),(supported **<disp>list**),(supported**<ind>list**) **OK**
Read command **AT+CMER?**	**+CMER: <mode>,<keyp>,<disp>,<ind>** **OK**
Write command **AT+CMER=[<mode>[,<keyp>[, <disp>[,<ind>]]]]**	**OK**

- **Parameter**

<mode> 0 Buffer unrequested result codes in TA; if the TA result code buffer is full, the code can be buffered in some buffers, and other places or the oldest places can be discarded.

1 1 When the TA-TE link is retained (e.g., in online data mode), discard the unsolicited result code; otherwise, it will be sent directly to TE.

2 2. Forward the unsolicited result code directly to TE; TA TE link-specific in-band embedding technology results code and data when TA is in online data mode.

<keyp> 0 There are no keyboard event reports.

1 The keyboard event report uses the result code CKEV:<key>,<press>. <key>Represents the key (which involves the value defined by the IRA in the "control CKPD" table in the clause "K" also) and <press>if the key is pressed or released (1 is pressed, 0 is released). Only those keys that are not caused by

CKPD should be indicated by TA to TE.

2 Keyboard events are reported using the result code CKEV: <key>,<pres>. From TA to TE, all keys pressed should be indicated.

<disp> 0 Incident reports are not displayed.

1 Displayed as CDEV: <elem>, <text>result code. Only events caused by CDIS are shown and should indicate from TA to TE.

2 The display format is the same as 1, and it is all displayed, and the character set is TE character set.

<ind> 0 No escalation time

1 Mods are not supported.

2 <ind>Report metric events using the result code CIEV:<value>. all Indicator events should be sent from TA to TE.

<bfr> 0 No escalation <mode> time When 1 or 3 is entered, the TA buffer for the unsolicited result code defined in this command will be cleared.

1 <mode>When 1 or 3 is entered, the TA buffer of the unsolicited result code defined in this command will be flushed to the TE (an OK response should be given before the code is flushed)

Comment
1、 XY4100, EC618, and QCX216 platforms do not support this command.
2、 The ASR platform can be set up.<mode>、<keyp>、<disp>、<ind>、<bfr>
8850/8910 can be set.<mode>、<keyp>、<disp>、<ind>

2.17. AT^TRACECTRL to set the log output.

- **Description**

The log output is controlled by the NV and changed via the AT command. In debug builds, the default output is log. In the release version, it is not output by default. After the AT command is executed, the configuration information is automatically saved and takes effect immediately.

- **Grammar**

Command	Possible response
Test command **AT^TRACECTRL=?**	**OK**
Read command **AT^TRACECTRL?**	**^TRACECTRL: 0, (0-1), (0-3) (ap:(0-3))** **OK**
Write command **AT^TRACECTRL=<index>,<enable>,[<device>]**	**OK**

- **Parameter**

<index>	0	AP channel	
	1	CP channel	
<enable>	0	close follow	
	1	Open follow	
<device>	0	ap log do not set	
	1	ap log set by uart	
	2	ap logset by usb	
	3	ap log set by uart and usb	
	0	cp log set by uart	
	2	cp log do not set	
	5	cp log set by usb	

3. RF Commands

3.1. AT+SETRATEPRIOR to set rate priority feature

- **Description**

This feature specifies whether to enable the rate priority feature for the stack.

- **Grammar**

Command	Possible response
Test command **AT+SETRATEPRIOR=?**	**+SETRATEPRIOR:(0-1)** **OK**
Read command **AT+SETRATEPRIOR?**	**+SETRATEPRIOR: <iRatePrior>** **OK**
Write command **AT+SETRATEPRIOR=[iRatePrior]**	**OK**

- **Parameter**

<iRatePrior> Integer type, the current value of the rate priority.

0 -Disable the rate priority feature.

1 -Enable the rate priority feature.

3.2. AT+ RFTEMPERATURE to obtain the RF temperature

- **Description**

Get the RF temperature.

- **Grammar**

Command	Possible response
read command **AT+RFTEMPERATURE ?**	**+RFTEMPERATURE : <rfValue>** **OK**

- **parameter**

  <rfValue> Floating-point, RF current temperature

3.3. AT+SETSTSEN set static scene function

- **Description**

  Used to set whether the static scene feature is enabled on the stack.

- **Grammar**

Command	Possible response
Test command **AT+SETSTSEN=?**	**+SETSTSEN:(0-1)** **OK**
Read command **AT+SETSTSEN?**	**+SETSTSEN: <enable>** **OK**
Write command **AT+SETSTSEN=<enable>**	**OK**

- **parameter**

<enable> Integer type, which enables or disables the static scene feature.

Turn off the static scene feature.

1 -Enable the static scene feature.

3.4. AT+MAI2SY Configure the external code mode

- **Description**

  If you configure an external code, the <master><width>value of the parameter sum is fixed.

- **Grammar**

Command	Possible response
Test command **AT+MAI2SY =?**	**+MAI2SY: 1,(list of supported <tran_mode>s),(list of supported <tran_mode>s),0**
Read command **AT+MAI2SY ?**	**+MAI2SY: <master>,<tran_mode>,<sample>, <width>**
Write command **AT+MAI2SY=<master>, <tran_mode>, <sample>,<width>**	**+CME ERROR <err> or OK**

- **Parameter**

<master> Audio Player Operation:

1: The module is in slave mode, and the external codec is the main mode

<tran_mode> data Transimisson mode

0:I2S mode

1:PCM mode

<sample> Sample rate:

0: 8 k

1: 16 k

2: 24 k

3: 32 k

4: 44 k

<width> width:

0: 16 bit

3.5. AT+SETRFFRP sets the frequency band power transmission range

- **Description**

  This command is used to set or read the maximum transmit power range of the frequency.

- **Grammar**

Command	Possible response
Write command **AT+SETRFFRP=<type>,<mode>,<frpBand>[,<powerLow>,<powerHigh>]**	**OK** **or** **ERROR:<err>**
Search command **AT+SETRFFRP=<type>,<mode>,<frpBand>**	**+SETRFFRP: (powerLow - powerHigh)** **OK**

- **parameter**

<type> Integer, which represents the operation performed.

0 Get the maximum power range.

1 Set the maximum power range.

<mode> Integer, which indicates the network standard to be executed.

0 Imply GSM

1 Imply LTE

<frpBand>	Integer, decimal system, indicates the frequency band in which the transmitted power is set.
	<mode> = 0 0=850M, 1=900M, 2=1800M, 3=1900M
	<mode> = 1 This value is from the list of supported frequency bands for LTE.If supported Band28A、Band28B，then 650=28A，651=28B
<powerLow>	Integer, the minimum value of the maximum transmission power range.
	<mode> = 0 When<frpBand> > 1: (0-15) Others: (5-19) (subject to PCL standard in GSM band)
	<mode> = 1 (0-69)
<powerHigh>	Integer, the maximum value of the maximum transmission power range.
	<mode> = 0 When<frpBand> > 1: (0-15) Other: (5-19) (Based on the PCL standard of GSM band)
	<mode> = 1 (0-69)

Note

The 8850 project does not support GSM mode settings.

<powerLow>Must be less than the value<powerHigh>.

Some versions do not support this command

- **Example**

```
//set GSM 850M
AT+SETRFFRP=1,0,0,5,15
OK

AT+SETRFFRP=0,0,0
```

+SETRFFRP: (5-15)

OK

//set LTE Band28A

AT+SETRFFRP=1,1,650,15,30

OK

AT+SETRFFRP=0,1,650

+SETRFFRP: (15-30)

OK

4. UART command

4.1. AT+ICF sets the DTE DCE character frame format

- **Description**

  This extended-format composite parameter is used to determine the local serial port start-stop (asynchronous) character frame that the DCE should use when accepting DTE commands and transmitting information, text, and result codes, if not automatically determined.

- **Grammar**

Command	Possible response
Test command **AT+ICF=?**	**+ICF: (supported <format> value list),(supported<parity> value list)** **OK**
Read command **AT+ICF?**	**+ICF: <format>,<parity>** **OK**
Write command **AT+ICF=[<format>[,<parity>]]**	**OK**

- **parameter**

<format> Determines the number of bits in the data bits, the presence of parity bits, and the number of stop bits in the start-stop frame.

1	8 bits of data, 2 bits of stop.
2	8 bits of data, 1 bit of check, 1 bit of stop
3	8 bits of data, 1 bits of stop.
4	7 bits of data, 2 bits of stop.
5	7 bits of data, 1 bit of check, 1 bit of stop
6	7 bits of data, 1 bits of stop.

<parity> Determines how parity bits are generated and checked.

0	odd

1	even
2	The check digit is always 1.
3	The check digit is always 0.

Note

Serial asynchronous automatic dialing and control.

Comment
Automatic detection of character frames is not supported. For hardware limitations, only ICF: (1-3), (0-1) is supported, but other values can be used for instructions.

4.2. AT+IPR to set the baud rate

- **Description**

  This Digital Extended Format parameter specifies the data rate at which the DCE accepts commands, as well as 1200 bits/sec or 9600 bits/sec.

- **Grammar**

Command	Possible response
Test command **AT+IPR=?**	IPR: (Supported Auto-Detect<rate> List)[,(Fixed <rate> List Only)] **OK**
Read command **AT+IPR?**	**+IPR: <rate>** **OK**
Write command **AT+IPR=<rate>**	 **OK**

- **parameter**

<rate> The specified Rate value should be the rate at which the DTE-DCE interface should operate in bits per second, for example, "19200" or "115200". The rates supported by a particular DCE are manufacturer-specific; however, the IPR parameters should allow any rate supported by the DCE to be set during online operation. Rates containing non-integer bits per second should be truncated to

the next lower integer (e.g., 134.5 bits per second should be specified as 134; 45.45 bits/sec should be specified as 45). If not specified or set to 0, auto-detect is selected for the range determined by the DCE manufacturer.

(0,1200,2400,4800,9600,14400,19200,28800,33600,38400,57600,115200,230400,460800,921600)

- **note**

  ITU-T V.25 ter (Serial Asynchronous Autodialling and Control).

- **Example**

```
//Set the fixed baud rate to 115200bps.
AT+IPR=115200
OK

//The current setting is stored, i.e. the serial communication speed is 115200bps after restarting the module.AT&W
OK

AT+IPR?
+IPR: 115200

OK

//Set the fixed baud rate to 115200bps and store the current setting.
AT+IPR=115200;&W
OK
```

4.3. AT+IFC DTE-DCE local flow control

- **Description**

  This command is used to control the DTE-DCE local flow.

- **Grammar**

Command	Possible response
Test command **AT+IFC=?**	**+IFC: (supported <rxfc>list**),(supported**<txfc>list**) **OK**
Read command **AT+IFC?**	**+IFC:<rxfc>,<txfc>** **OK**
Write command **AT+IFC=<rxfc>,<txfc>**	 **OK**

- **parameter**

<rxfc>	0	Disable RX flow control
	2	Enable RX flow control
<txfc>	0	Disable send flow control
	2	Enable TX flow control

5. Device information and control commands

5.1. ATI queries device information

- **Description**

  Manufacturer-specific information about the device (the software cannot use this command to determine the functionality of the device).

- **Grammar**

Command	Possible response
Execute command ATI	**<manufacturer_id>** **<module_name>** **<module_version>** **OK**

- **Parameter**

<manufacturer_id>	Manufacturer's identification.
<module_name>	Model model.
<module_version>	Software version (string without double quotes)

- **Example**

ATI //Varies according to the version.

<manufacturer_id>

<module_name>

<module_version>

OK

5.2. AT+GMI for manufacturer information

- **Description**

  Execute the command to return the manufacturer information.

- **Grammar**

Command	Possible response
Test command **AT+GMI=?**	**OK**
Execute command **AT+GMI**	**<manufacturer>** **OK**

- **parameter**

<manufacturer>	The total number of characters in the message text, including line end characters, must not exceed 2048 characters.

- **Example**

AT+GMI//Varies according to the version.

<manufacturer>

OK

5.3. AT+CGMI to check the manufacturer's name

- **Description**

  Execute the command to return the manufacturer information.

- **Grammar**

Command	Possible response
Test command **AT+CGMI=?**	**OK**
Execute command **AT+CGMI**	**<manufacturer>**

	OK

- **parameter**

<manufacturer> The total number of characters in the message text, including line end characters, must not exceed 2048 characters. The text should not contain the sequence 0 <CR> or OK<CR>.

- **Example**

AT+CGMI//Varies according to the version.

<manufacturer>

OK

5.4. AT+GMM to query the model information of the module

- **Description**

This command obtains the module model information.

- **Grammar**

Command	Possible response
Test command **AT+GMM=?**	**OK**
Execute command **AT+GMM**	**<model>** **OK**

- **parameter**

<model> The total number of characters in the message text, including line end characters, must not exceed 2048 characters.

- **example**

```
AT+GMM
<model>

OK
```

5.5. AT CGMM to query the module model information

- **Description**

This command retrieves the module model.

- **Grammar**

Command	Possible response
Test command **AT+CGMM=?**	**OK**
Execute command **AT+CGMM**	**<model>** **OK**

- **parameter**

<model> The total number of characters in the message text, including line end characters, must not exceed 2048 characters.

- **Example**

```
AT+CGMM
<model>
```

OK

5.6. AT+GMR to query the firmware version of the module

- **Description**

  This command queries the firmware version of the module.

- **Grammar**

Command	Possible response
Test command **AT+GMR=?**	 **OK**
Execute command **AT+GMR**	**<revision>** **OK**

- **parameter**

<model> The total number of characters in the message text, including line end characters, must not exceed 2048 characters.

- **example**

AT+GMR

<revision>

OK

5.7. AT+CGMR to query the firmware version of the module

- **Description**

  This command queries the firmware version of the module.

- **Grammar**

Command	Possible response
Test command **AT+CGMR=?**	**OK**
Execute command **AT+CGMR**	**<revision>** **OK**

- **parameter**

<model>	The total number of characters in the message text, including line end characters, must not exceed 2048 characters.

- **example**

```
AT+CGMR
<revision>


OK
```

5.8. AT+SGSW to query the Eicut software version information

- **Description**

  This command requests software version information

- **Grammar**

Command	Possible response
Execute command **AT+SGSW**	**<SW_revision>** **OK**

- **parameter**

<SW_revision> The total number of characters in the message text, including line end characters, must not exceed 2048 characters.

- **example**

AT+SGSW

<SW_revision>

OK

5.9. AT+SFHW to query the Eicut hardware version

- **Description**

This command requests hardware version information.

- **Grammar**

Command	Possible response
Execute command **AT+SFHW**	**<HW_revision>**

	OK

- **parameter**

<HW_revision> The total number of characters in the message text, including line end characters, must not exceed 2048 characters.

- **Example**

AT+SFHW

<HW_revision>

OK

5.10. AT+CGSN to query the serial number of the module IMEI number

- **Description**

This command queries the module serial number | IMEI number. Same as AT GSN

- **Grammar**

Command	Possible response
Test command **AT+CGSN=?**	**+CGSN:** (supported**<n>list**) **OK**
Write command **AT+CGSN=<n>**	if<n>is 1 **<imei>** **OK** if<n> is 0 **<sn>** **OK**
Execute command **AT+CGSN**	 **<imei>**

	OK

- **parameter**

<n>	0	SN (Module Serial Number)
	1	IMEI（International Mobile Equipment Identification）
	2	IMEISV（The device identifier and software version number of the international mobile station） Note: Some modules have slightly different value ranges.
	3	SVN（Software version number） Note: Some modules have slightly different value ranges.

- **Example**

AT+CGSN=0

M320080ALA050800704

OK

AT+CGSN=1

352273017386340

OK

AT+CGSN

352273017386340

OK

5.11. AT+GSN Query Module Serial Number IMEI number

- **Description**

This command queries the module serial number IMEI number. Same as AT CGSN.

- **Grammar**

Command	Possible response
Test command **AT+GSN=?**	**+CGSN:** (supported**<n>list**) **OK**
Write command **AT+GSN=<n>**	if<n>is 1 **<imei>** **OK** if<n> is 0 **<sn>** **OK**
Execute command **AT+GSN**	**<imei>** **OK**

- **parameter**

<n>	0	SN（The module serial number）
	1	IMEI（International Mobile Equipment Identification）
	2	IMEISV（The device identifier and software version number of the international mobile station）

	Note: Some modules have slightly different value ranges.
3	SVN（Software version number） Note: Some modules have slightly different value ranges.

- **Example**

AT+GSN=0

M320080ALA050800704

OK

AT+GSN=1

352273017386340

OK

AT+GSN

352273017386340

OK

5.12. AT+CFUN sets the module function

- **Description**

  This command is used to control the function mode and can also be used to reset the UE

- **Grammar**

Command	Possible response

Test command **AT+CFUN=?**	**+CFUN :** (supported**<fun>list**),(supported**<rst>list**) **OK**
Read command **AT+CFUN?**	**+CFUN:<fun>** **OK**
Write command **AT+CFUN=<fun>[,<rst>]**	 **OK**

- **parameter**

<fun>	0	Minimal functionality
	1	Full-featured
	4	Same as 0
<rst>	0	<fun>Do not reset the MT until you have set it to the power level.
	1	Before setting the machine translation to <fun>the power level, reset the machine translation first

- **Example**

AT+CFUN=0

OK

AT+COPS?

+COPS: 0

OK

AT+CFUN=1

OK

AT+COPS?

```
+COPS: 0,0,"CHN-UNICOM",7


OK
```

5.13. AT+CPOF shutdown

- **Description**

  After executing this command, the device will shut down.

- **Grammar**

Command	Possible response
Test command **AT+CPOF=?**	**OK**
Execute command **AT+CPOF**	**+CPOF: MS OFF** **OK**

5.14. AT+TRB reboot

- **Description**

  After the command is executed, the module restarts.

- **Grammar**

Command	Possible response
Test command **AT+TRB=?**	**OK**
Test command **AT+TRB**	**REBOOTING** **OK**

5.15.AT^FORCEDNLD to force the download

- **Description**

  This command is used to force the module into download mode.

- **Grammar**

Command	Possible response
Test command **AT^FORCEDNLD**	**REBOOTING** **OK**

- **Example**

AT^FORCEDNLD //force to download mode

OK

//The mod has entered download mode

6. Time information and control commands

6.1. AT+CALA to set an alarm

- **Description**

  This command is used to set/list the alarm date/time in ME.

- **Grammar**

Command	Possible response
Test command **AT+CALA=?**	**+CALA:** (supported **<n>list**),(supported**<type>list**),**<tlength>**,**<rlength>**,(supported**<silent>list**) **OK**
Read command **AT+CALA?**	**+CALA: <time>,<n1>,<type>,[<text>],[<recurr>],<silent><CR><LF>+CALA:<time>,<n2>,<type>,[<text>],[<recurr>],<silent>[...]]** **OK**
Write command **AT+CALA=<time>[,<n>[,<type>[,<text>[,<recurr>[,<silent>]]]]]**	**OK**

- **parameter**

<time>	A string-type value in the format "yy/mm/dd,hh:mm:ss zz", where the characters represent the year (the last two digits), the month, the day, the hour, the minute, the second, and the time zone (the difference between local time and GMT, expressed in quarters of the hour; Range - 12. 13) 。 For example: May 6, 2005, 22:10:00 GMT 2 hours is equal to "05/05/06, 22:10:00 08". Note: If <time>equal to the current date and time or set to an earlier date, CME ERROR:21 is returned.	
<n>, <n1>, <n2>	1-16	Indicates the integer value of the alert index. The default value is 1.

<type>	An integer value representing the alarm type (e.g., sound, volume, LED); The default value is 0	
<text>	A string-type value that indicates the text to be displayed when the alarm time is reached; The maximum length < tlength >	
<tlength>	<text>An integer value that represents the maximum length	
<recurr>	0-7	A string type value indicating the day of the week of the alert in one of the following formats: "<1..7>[,<1..7>[. . .]] - Set recurring alerts for one or more days of the week. Numbers 1 to 7 correspond to the days of the week, Monday (1), Sunday (7). Example: The string "1,2,3,4,5" can be used to set up alerts for all weekdays. "0" - Set recurring alerts for all days of the week.
<rlength>	<recurr>An integer value that represents the maximum length	
<silent>	0-1	The integer value, which indicates whether the alarm is silent or not. If set to 1, the alarm will be muted and the only result of the alert is the unsolicited result code CALV. If set to 0, the alarm will not be silenced

Comment
If you want to set up a loop alarm, just enter the time. If you don't enter recur, it's not considered a recyclable alert. If no index is entered, the alarm index of 1 will be replaced. Alert string format: yy/MM/dd,hh:MM:ss. The maximum number of alerts is 16. Seconds are not taken into account.

- **Example**

// On December 26, 2007, the alarm was called at 10:20:34 a.m., and the alarm name was alarm1

AT+CALA=”20/10/26,10:20:34”,1,0,”alarm1”

OK

AT+CALA?

+CALA: "20/10/26,10:20:34",1,0,"alarm1",0

OK

6.2. AT+CALD to delete alarms

- **Description**

Execute this command to delete the alarm in the MT.

- **Grammar**

Command	Possible response
Test command **AT+CALD=?**	**+CALD:** (supported**<n>list**) **OK**
Read command **AT+CALD?**	**OK**
Write command **AT+CALD= <n>**	**OK**

- **parameter**

<n> Represents the integer value of the alarm index.

- **Example**

AT+CALA?

+CALA: "20/10/26,10:20:34",1,0,"alarm1",0

OK

AT+CALD=1

OK

AT+CALA?

OK

6.3. AT+CCLK real-time clock

- **Description**

  This command is used to set and query the module real-time clock.

- **Grammar**

Command	Possible response
Test command **AT+CCLK=?**	**OK**
Read command **AT+CCLK?**	**+CCLK: <time>** **OK**
Write command **AT+CCLK=<time>**	**OK**

- **parameter**

<time> A string-type value in the format "yy/mm/dd,hh:mm:ss zz", where the characters represent the year (the last two digits), the month, the day, the hour, the minute, the second, and the time zone (the difference between local time and GMT, expressed in quarters of the hour; Range-48. . . +56）。 For example: May 6, 2005, 22:10:00 GMT +2 hours equals "05/05/06,22:10:00 +08" Note: <time>CME ERROR:21 is returned if equal to the current date and time or set to an earlier date.

- **Example**

AT+CCLK?

+CCLK: "20/03/13,17:27:59+32"

OK

AT+CCLK=”20/10/25,11:33:40+08”

OK

6.4. AT+CTZR time zone report

- **Description**

This command controls the escalation of time zone change events. If reporting is enabled, the MT will actively report +CTZV:<tz>, +CTZE:<tz>,<dst>,[<time>] or +CTZEU:<tz>,<dst>, [<utime>].As soon as the time zone changes. If supported by the network, MT provides the time zone at the time of network registration.

- **Grammar**

Command	Possible response
Test command **AT+CTZR=?**	**+CTZR:** (supported **<reporting>list**) **OK**
Read command **AT+CTZR?**	**+CTZR: <reporting>** **OK**
Write command **AT+CTZR=[<reporting>]**	**OK**

- **parameter**

<reporting>	0	Disable time zone change event reporting.
	1	Enable time zone change even proactively report +CTZV:<tz>.
	2	Enable time zone change even proactively report+CTZE:<tz>，<dst>，[<time>].
	3	Enable time zone change even proactively report+CTZEU：<tz>，<dst>，[<utime>]. Note: Some modules have slightly different value ranges.
<tz>	A string-type value that represents the local time zone and displays the difference between the local time and the GMT time in 15-minute increments; Range: -48 ~ +56.	

<dst>	<tz>Indicates whether to include an integer value for daylight saving time adjustments	
	0	<tz>Daylight Saving Time adjustments are not included
	1	<tz>include+1hour（equal<tz>’s 4 quarters）Daylight Saving Time Adjustments
	2	<tz>include+2hours（equal<tz>’s 8 quarters）Daylight Saving Time Adjustments
<time>	A string-type value that represents the local time. The format is "YYYY/MM/DD,hh:MM:ss", which is an integer representing the year (YYYY), month (MM), date (DD), hour (hh), minute (MM), and second (ss). Local time can be derived by MT from information provided by the network at the time of transmission of time zone information, and if the network provides a generic time, it appears in the active result code for the extended time zone and local time reports.	
<utime>	A string-type value that represents a universal time. The format is "YYYY/MM/DD,hh:MM:ss", which is an integer representing the year (YYYY), month (MM), date (DD), hour (hh), minute (MM), and second (ss). The universal time can be provided by the network when the time zone information is transmitted, and if it is provided by the network, it will appear in the active result code of the extended time zone and universal time reports.	

- **Example**

AT+CTZR=1

OK

AT+CTZR?

+CTZR: 1

OK

6.5. AT+CTZU automatically updates the system time via NITZ

- **Description**

  This command is used to enable and disable automatic time zone updates.

- **Grammar**

Command	Possible response
Test command **AT+CTZU=?**	**+CTZU:** (supported**<mode>list**) **OK**
Read command **AT+CTZU?**	**+CTZU: <mode>** **OK**
Write command **AT+ CTZU=<mode>**	**OK**

- **parameter**

<mode>	0	Disable automatic update of the time zone via NITZ
	1	Enable automatic update of the time zone via NITZ
	2	Enable automatic update of the time zone via NITZ and update the local time to the system time
	3	Enable automatic update of the time zone via NITZ and update the local time to the system time

Comment
8850/8910: parameters 0, 1, and 2, and the parameter 2 is the same as that 3 of other platforms **XY4100: Parameters 0, 1, and 3** **ASR, QCX216, and EC618 currently only support parameters 0 and 1.**

- **Example**

```
AT+CTZU=0
OK

AT+CTZU?
+CTZR: 0

OK
```

6.6. AT+SNTP client time is synchronized with the web server time

- **Description**

This command is used to synchronize local time with network time.

- **Grammar**

Command	Possible response
Test command **AT+SNTP=?**	**+SNTP: <ntpserver>** **OK**
Write command **AT+ SNTP=<ntpserver>**	**OK** **+SNTP: OK** **or** **+CME RROR**

- **parameter**

<ntpserver>	String NTP server domain name or IP address	String NTP server domain name or IP address

- **Example**

```
AT+SNTP="ntp1.aliyun.com"
OK


+SNTP: OK
```

7. SIM card command

7.1. AT ICCID to query the ICCID of the SIM card

- **Description**

  Execute the command to return the ICCID in the SIM card. Same as AT CCID

- **Grammar**

Command	Possible response
Execute command **AT+ICCID**	**+ICCID:<iccid>** **OK**

- **parameter**

<iccid>	String type, iccid read from the SIM card

- **Example**

```
AT+ICCID
+ICCID: 89861119250086553961

OK
```

7.2. AT+CCID to check the ICCID number

- **Description**

Execute the command to return the ICCID in the SIM card. Same as AT ICCID.

- **Grammar**

Command	Possible response
Execute command **AT+CCID**	**+CCID:<iccid>** **OK**

- **Parameter**

<iccid> String type, iccid read from the SIM card

- **Example**

```
AT+CCID

+CCID: 89861119250086553961


OK
```

7.3. AT+CPIN Enter PIN for authentication

- **Description**

The write command sends the password (SIM PIN, SIM PUK, PH SIM PIN, etc.) required before the operation to the MT.

- **Grammar**

Command	Possible response
Test command **AT+CPIN=?**	**+CCID:<iccid>** **OK**
Read command **AT+CPIN?**	**+CPIN: <code>** **OK**

Write command AT+CPIN=<pin>[,<newpin>]	OK

- **Parameter**

<pin> String type. Password. If the requested password type is PUK, such as (U)SIM PUK1 or another password, you <new_pin>must enter it

<newpin> String type. New passwords. If the requested password type is PUK, you will need to re-enter a new password.

<code> A type of string without quotation marks. Indicates the type of password required

READY	No password waiting for MT to be entered
SIM PIN	MT is waiting (U)SIM PIN
SIM PUK	MT is waiting (U)SIM PUK
SIM PIN2	MT is waiting (U)SIM PIN2
SIM PUK2	MT is waiting (U)SIM PUK2

Comment
After entering the wrong PIN code three times, the SIM card will be locked!

- **Example**

```
//Input PIN
AT+CPIN?
+CPIN: SIM PIN

OK

AT+CPIN=”1234”
OK
```

AT+CPIN?

+CPIN: READY

OK

//Input PUK 和 PIN

AT+CPIN?

+CPIN: SIM PUK

OK

AT+CPIN="26601934","1234"

OK

AT+CPIN?

+CPIN: READY

OK

7.4. AT^CPINC PIN/PUK to enter the remaining number of times query

- **Description**

  Enter the PIN/PUK for the remaining number of attempts.

- **Grammar**

Command	Possible response

Test command **AT+CPIN2=?**	**OK**
Read command **AT+CPIN2?**	**+CPIN2: <code>** **OK**
Write command **AT+CPIN2=<pin>[,<newpin>]**	**OK**

- **Parameter**

<pin> String type. Password. If the requested password type is PIN2 or PUK2, e.g. (U)SIM PUK2 or another password (PIN2), you must enter it<new_pin>

<new pin> String type. New passwords. If the requested password type is PUK2, you will need to re-enter a new password (PIN2).

<code> A type of string without quotation marks. Indicates the type of password required

READY	No password waiting for MT to be entered
SIM PIN	MT is waiting (U)SIM PIN
SIM PUK	MT is waiting (U)SIM PUK
SIM PIN2	MT is waiting (U)SIM PIN2
SIM PUK2	MT is waiting (U)SIM PUK2

- **Example**

```
AT+CPIN2?
+CPIN2: READY

OK

AT+CPIN2=”2345”
OK
```

7.5. AT CPIN2 input PIN2 authentication (for SIM card)

- **Description**

  CPIN2 controls MT's network authentication.

- **Grammar**

Command	Possible response
Test command **AT+CPIN2=?**	**OK**
Read command **AT+CPIN2?**	**+CPIN2: <code>** **OK**
Write command **AT+CPIN2=<pin>[,<newpin>]**	**OK**

- **Parameter**

<pin> String type. Password. If the requested password type is PIN2 or PUK2, e.g. (U)SIM PUK2 or another password (PIN2), you must enter it<new_pin>

<new pin> String type. New passwords. If the requested password type is PUK2, you will need to re-enter a new password (PIN2).

<code> A type of string without quotation marks. Indicates the type of password required

READY	No password waiting for MT to be entered
SIM PIN	MT is waiting (U)SIM PIN
SIM PUK	MT is waiting (U)SIM PUK
SIM PIN2	MT is waiting (U)SIM PIN2
SIM PUK2	MT is waiting (U)SIM PUK2

- **Example**

AT+CPIN2?

+CPIN2: READY

OK

AT+CPIN2=”2345”

OK

7.6. AT CLCK function locking

- **Description**

  This command is used to lock, unlock, and query the status of the MT or network function. You can abort the command while you are setting up or querying the network function. Setup commands, usually not omitted. When querying the network service status (2), the command response line returns the inactive condition if all types of service status are not activated.

- **Parameter**

<fac> Type: String type

Meaning: The values retained in this document:

Note: The E70x series support**s**"AI", "IR", "AB", "AG", "AC", "PN", "PU", "PP", "PC", "PS"

“SC”	(U)SIM（Lock the currently selected (U)SIM/UICC card in the slot）. (U)SIM/UICC requires a password when the MT is powered on and the lock command is executed.
“AO”	BAOC (Barring of All Outgoing Calls) (Please refer to Clause 1 of 3GPP TS 22.088[6])
“OI”	BOIC (Barr International Call) (refer to 3GPP TS 22.088 [6] Article 1)
“OX”	BOIC exHC (Barring of Outgoing International Calls, excluding Home Country) (refer to Clause 1 of 3GPP TS 22.088[6])

	“FD”	UICC (GSM or USIM) fixed dialing memory function in the SIM card or active application (if it is PIN2
	“PS”	PH-SIM (Lock phone to SIM/UICC card) (When the inserted SIM/UICC card is not the currently used card, the MT will prompt for a password; The MT can remember a certain number of previously used cards, so no password is required when these cards are inserted)
	“AI”	BAIC (Barring of All Incoming Calls) (Refer to 3GPP TS 22.088 Clause 2)
	“IR”	BIC-Roam (when the user is roaming outside their home country, allows access to calls from the home network) (refer to 3GPP TS 22.088 Section 2).
	“AB”	Disable All Services (refer to 3GPP TS 22.030) (only applicable when <mode>=0)
	“AG”	All outgoing call barring services (refer to 3GPP TS 22.030) (only applicable when <mode>=0)
	“AC”	All inbound barring services (refer to 3GPP TS 22.030) (only applicable when <mode>=0)
	“PC”	Enterprise Personalization (refer to 3GPP TS 22.022)
	“PN”	Network Personalization (refer to 3GPP TS 22.022)
	“PU”	Personalization of network subsets (refer to 3GPP TS 22.022)
	“PP”	Service provider personalization (refer to 3GPP TS 22.022)
<mode>	0	unclock
	1	lock
	2	Query status
<status>	Type: Integer	
	Meaning:	
	0	Inactive
	1	Positive
<passwd>	Type: String type;	
	Meaning: It should be the same as the password specified for the facility from the MT user interface, or use the command to change the password +CPWD.	

<class>	Type: Integer	
	Meaning: Represents the sum of integers for a category of information (default value is 7):	
	1	Voice (telephone)
	2	Data (refers to all bearer services; if <mode>=2, it only refers to certain bearer services, if the TA does not support values 16, 32, 64, and 128)
	4	Fax (fax service)
	8	Short Message Service
	other value	default is 11.

- **Example**

AT+CLCK=”SC”,1,”1234”

OK

//need lock status

AT+CLCK=”SC”,2

+CLCK: 1

OK

<Restart system>

AT+CPIN?

+CPIN: READY

OK

AT+CPIN=”1234”

OK

AT+CLCK=”SC”,0,”1234”

OK

[Require lock status]

AT+CLCK=”SC”,2

+CLCK: 0

OK

< Restart system >

AT+CPIN?

+CPIN: READY

OK

<.FD:SIM fixed dialing memory, NO support for the moment><Call barring>

AT+CLCK = "OI",1,"0000".255

OK

ATD13560243602;

NO CARRIER

AT+CLCK = "OI",2,"0000"

+CLCK:1,1

+CLCK:1,2

```
+CLCK:1,4

OK


AT+CLCK="AC",0,"0000",3
OK
```

7.7. AT+CPWD to change passwords

- **Description**

This command is used to change the password [pin/pin2].

- **Grammar**

Command	Possible response
Test command **AT+CPWD=?**	**+CPWD:** supported(**<fac>,<pwdlength>**)list **OK** **Note:** The E70x series additionally supports returning"AO","AI","OI","OX", "IR", "AB", "AG", "AC","FD", "PN", "PU", "PP", "PC", "PS"
Write command **AT+CPWD=<fac>,<oldpwd>,<newpwd>**	**+CPIN: <code>** **OK**
AT+CPIN=<pin>[,<newpin>]	**OK**

- **Parameter**

<fac>	Type: String type. Meaning: "P2" SIM card PIN2 indicates device lock + CLCK to obtain other values.
<oldpwd>, <newpwd>	Type: String type.

Meaning: <oldpwd> should be the same as the password specified for the device in the MT user interface or the password change command +CPWD, <newpwd> is the new password; the maximum length of the password can be determined via <pwdleng>.

<pwdlength> Type: Integer type.

Meaning: Maximum password length

- **Example**

AT+CPWD=”SC”,”3333”,”1234”

OK

AT+CPIN=”5678”

+CME ERROR: 3

AT+CPINC

+CPINC: 2

OK

AT+CPWD=”SC”,”1234”,”0000”

OK

AT+CPWD=”P2”,”1111”,”1234”

+CME ERROR: 16

AT+CPINC

+CPINC: 2

OK

AT+CPWD=”P2”,”0000”,”1234”

OK

7.8. AT+CRSM Limited access to SIM cards

- **Description**

This command provides simple and limited access to the (U)SIM card database.

- **Grammar**

Command	Possible response
Test command **AT+CRSM=?**	**OK**
Write command **AT+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>]]]**	**+CRSM:<sw1>,<sw2>[,<response>]** **OK**

- **Parameter**

<command> The following commands are used for the SIM card.

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

<fileid> Integer. For, it serves as the identifier for the basic data file on the (U)SIM.

<P1>,<P2>, <P3>	Parameters for MT transmission to (U)SIM card. Except for GET RESPONSE and STATUS, all other commands must include this parameter. The parameter values refer to 3GPP TS 51.011.
<data>	Hexadecimal character format. Information to be written onto the (U)SIM card. For details, refer to AT+CSCS.
<pathid>	Hexadecimal character format. (U)SIM/UICC basic file path.
<SW1>, <SW2>	Integer. (U)SIM information regarding the actual command execution. These parameters are passed to the TE regardless of whether the command execution succeeds or fails.
<response>	Hexadecimal string format. Response after successful command transmission. For details, refer to AT+CSCS. STATUS and GET RESPONSE return information about the current basic data fields, which includes file type and its size (refer to 3GPP TS 51.011). After READ BINARY, READ RECORD, or RETRIEVE DATA commands, the requested data will be returned. No response is returned after successful execution of UPDATE BINARY, UPDATE RECORD, or SET DATA commands.

Comment
The above command plus one is used for USIM cards, such as reading USIM records, and the command is 179. Retain all other values.

- **Example**

```
//Read EF ICCID
AT+CRSM=176,12258,0,0,10
+CRSM: 144,0,”9868001810810F121561”

OK

//Reading EF(4F3A) under F105F3A
AT+CRSM=178,20282,1,4,22,”“,”7F105F3A”
+CRSM: 144,0,”FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF”
```

OK

// Update under F105F3A (4F3A)

AT+CRSM=220,20282,2,4,10,”576877756520487775 75”,”7F105F3A”

+CRSM: 144,0

OK

// Read (4F3A) under 105F3A

AT+CRSM=179,20282,2,4,10,”“,”7F105F3A”

+CRSM: 144,0,”5768777565204877 7575”

OK

AT+CRSM=192,28433,0,0,15

+CRSM:144,0,621E82054221001C0283026F40A503

OK

AT+CRSM=179,"5F3A4F3A",1,4,28 //read ADN of USIM

+CRSM:144,0,616263FFFFFFFFFFFFFFFFFFFFFF03812F3FFFFFFFFFFFFFFFFFFF

OK

7.9. AT CRSML reads EF file records on (U) SIM card

- **Description**

This command reads certain records of certain files on the SIM card.

- **Grammar**

Command	Possible response
Test command **AT+CRSML=?**	**OK**
Read command **AT++CRSML=<fileid>,<start record>, <count>**	**+CRSML: <record1\n>** **+CRSML: <recordn\n>** **OK**

- **Parameter**

<fileid>	Integer type; This is the identifier for the basic data file on the SIM card.
<start record>	Integer type; the first record read from it.
<count>	Integer type; Number of records read from the (U)SIM card.
<record1\n>, <record2\n> ... <recordn\n>	String type; records data from the (U)SIM card.

- **Example**

//Read SIM ADN, 28474 is a decimal-based 6F3A (ADN EF ID)

AT+CRSML=28474,1,2

+CRSML:144,1,616263FFFFFFFFFFFFFFFFFFFFFF038121F3FFFFFFFFFFFFFFFFFFFF

+CRSML:144,2,FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

OK

AT+CRSML=1597656890,1,2 //read USIM ADN,1597656890 IS 5F3A4F3A(ADN and PATH ID) in decimal base

+CRSML:144,1,FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

+CRSML:144,2,800000000000000000FFFFFFFFFF07815117559141F0FFFFFFFFFFFF

OK

7.10. AT CNUM to query the user number

- **Description**

Check the phone number from your SIM card.

- **Grammar**

Command	Possible response
Test command **AT+CNUM=?**	**OK**
Read command **AT+CNUM**	**+CNUM: [<alphal>],<numberl>,<typel>** **OK**

- **Parameter**

<alphax>	The optional alphanumeric string associated with <number>. He used the character set selection and command selection TE character set + CSCS.
<numberx>	String type phone number format is specified by <typex>
<typex>	Eight-byte address type in integer format
<text>	Maximum length <tlength>; The character set specified by command +CSCS. The display of the text depends on the storage format in the card. If the pbk entry is stored in ucs2 format, Chinese character strings are displayed here; otherwise, non-Chinese character strings are displayed. When storing them, we do not concern ourselves with the character set, as it is set by the command +CSCS.

- **Example**

AT+CNUM

+CNUM: "john", "111",129 (non-Chinese string) (with non-ucs2 of AT+CSCS setting as pbk storing

+CNUM: "XXXXX", "34",129 (Chinese string) (with ucs2 of AT+CSCS setting as pbk storing)

```
OK
```

7.11. AT CIMI to query the identity of international mobile subscribers

- **Description**

This command is used to query the International Mobile Subscriber Identity (IMSI) of the (U)SIM card. The IMSI allows the TE to identify the (U)SIM card in the MT or the active application in the UICC (GSM or (U)SIM).

- **Grammar**

Command	Possible response
Test command **AT+CIMI=?**	**OK**
Read command **AT+CIMI**	**<IMSI>** **OK**

- **Parameter**

<IMSI> International Mobile Subscriber Identity (string without quotation marks)

- **Example**

```
AT+CIMI
460027210576187

OK
```

7.12. AT+SIMHOTSWAP Enable/Disable SIM Card Hot Swapping

- **Grammar**

Command	Possible response
Read command **AT+SIMHOTSWAP?**	**+SIMHOTSWAP: <switch>** **OK**
Write command **AT+SIMHOTSWAP=<switch>**	**OK**

- **Parameter**

<switch>	0	Disabling SIM card hot swapping
	1	Enabling SIM card hot swapping

- **Example**

AT+SIMHOTSWAP=1

OK

//Same as the following command:

AT+SYSNV=1,"sim_hotplug",1

AT+SIMHOTSWAP=0

OK

//Same as the following command:

AT+SYSNV=1,"sim_hotplug",0

7.13. AT+CSIM (U) SIM card access

- **Description**

This command allows direct control of the (U)SIM card installed in the currently selected card slot through the remote application on the TE. Moreover, the TE should process (U)SIM information within the frames specified by GSM.

- **Grammar**

Command	Possible response
Test command **AT+CSIM=?**	**OK**
Write command **AT+CSIM=<length>,<command>**	**+CSIM:** **<length>,<response>** **OK**

- **Parameter**

<length>	Integer type; The character length sent to TE in <command> or <response> (twice the actual length of the command or response)
<command>:	Hexadecimal string type. MT commands sent to the (U)SIM card, with format reference to 3GPP TS 51.011
<response>:	String type. Response sent from the (U)SIM card to the MT, with format reference to 3GPP TS 51.011.

- **Example**

```
AT+CSIM=14, "00A40804022FE2" //select EF iccid

+CSIM: 54, 62178202412183022FE28A01058B032F060C8002000A8801109000

OK

AT+CSIM=10, "0084000004" //Get Challenge

+CSIM: 12, 2A9BB4439000

OK
```

7.14.AT CLIR Calling line identification limitations

- **Description**

The AT+CLIR command refers to the GSM supplementary service CLIR (Calling Line Identification Restriction).

- **Grammar**

Command	Possible response
Test command **AT+CLIR=?**	**+CLIR: (list of supported<n>s))**
Read command **AT+CLIR?**	**+CLIR: <n>,<m>**
Write command **AT+CLIR=<n>**	**OK**

- **Parameter**

<n>: (Parameter setting call-out adjustment) 0 Display indicators based on subscribed CLIR service 1 CLIR invocation 2 CLIR suppression

<m>: (Parameters indicate the user's CLIR service status in the network) 0 CLIR not provided 1 CLIR permanent mode provided 2 Unknown (e.g., no network, etc.) 3 CLIR temporary mode display restricted 4 CLIR temporary mode display allowed

- **Example**

AT+CLIR=2

OK

AT+CLIR=?

+CLIR:(0-2)

OK

AT+CLIR?

```
+CLIR:2,0

OK
```

7.15. AT+CPINR query for remaining PIN/PUK retry attempts

- **Description**

The execution command is used to query the remaining retry attempts for PIN/PUK.

- **Grammar**

Command	Possible response
Test command **AT+CPINR=?**	**OK**
Write command **AT+CPINR=<sel_code>**	**+CPINR: <sel_code>, <retries>, <default_retries>** **OK**

- **Parameter**

<retries>	Integer type. The remaining retry count for each PIN.
<default_retries>	Integer type. The default/initial number of retries for each PIN.
<sel_code>	String type.

- **Example**

```
AT+CPINR=?

OK


AT+CPINR=”SIM*”

+CPINR: SIM PIN,3,3

+CPINR: SIM PUK,10,10
```

```
+CPINR: SIM PIN2,3,3

+CPINR: SIM PUK2,10,10

OK
```

7.16. AT+CCHO logical channel opening

- **Description**

This command is used to activate the logical channel of the (U)SIM card.

- **Grammar**

Command	Possible response
Test command **AT+CCHO=?**	**OK** Note: The E70x series returns **+CCHO: <dfname>** **OK**
Write command **AT+CCHO=<dfname>**	**<sessionid>** **OK**

- **Parameter**

<dfname> String type. All optional applications in the UICC are referenced by DF names encoded in 1 to 16 bytes.

<sessionid> Integer. The target application on the smart card uses the session ID of the logical channel.

For more information on the defined values, please refer to 3GPP TS 31.101[65].

- **Example**

```
AT+CCHO="A000000087" //Open application 'A000000087', return session Id 1

+CCHO:1
```

OK

7.17. AT+CCHC logical channel closed

- **Description**

This command uses the specified logical channel to close the (U)SIM card.

- **Grammar**

Command	Possible response
Test command **AT+CCHC=?**	**OK**
Write command **AT+CCHC=<sessionid>**	**OK** Note: The E70x series returns **+CCHC: <sessionid>** **OK**

- **Parameter**

<sessionid> Integer. The target application on the smart card uses the session ID of the logical channel.

- **Example**

AT+CCHC=1 //Close session Id 1

OK

7.18. AT+CGLA Generic UICC Logical Channel Access

- **Description**

This command is used to access the UICC logical channel.

- **Grammar**

Command	Possible response
Test command **AT+CGLA=?**	**OK** Note: The E70x series returns **+CGLA: <sessionid>,<lengh>,<cmd>** **OK**
Write command **AT+CGLA=<sessionid>,<length>** **,<command>**	**+CGLA: <length>,<response>** **OK**

- **Parameter**

<sessionid>:	Integer. Session ID. An identifier for the session used to send APDU commands to the UICC. This parameter must be specified when sending commands to the UICC if the target application on the smart card uses a logical channel other than the default channel (channel "0").
<length>:	Integer. The character length sent to TE in or (twice the actual length of the command or response).
<command>:	Hexadecimal character format. MT commands transmitted to the UICC. For details, please refer to AT+CSCS in 3GPP TS 31.101.
<response>:	Hexadecimal character format. The response of the command transmitted by UICC to MT. For details, please refer to AT+CSCS in 3GPP TS 31.101.

- **Example**

```
AT+CGLA=1,18,”00A40804047FFF6F07”
+CGLA:4,9000
OK
```

7.19. AT+SIMCROSS SIM card switch

- **Description**

This command will change the default SIM card. The dual-SIM platform supports 2 SIM cards, with indexing starting from 0. However, only one SIM card can be used at a time (dual-SIM single standby). By default, SIM card 1 is active. If the user wishes to use another SIM card, they must switch using this command. After the command is executed, the default SIM card will be changed.

- **Grammar**

Command	Possible response
Test command **AT+SIMCROSS=?**	**+SIMCROSS:(0,1)** **OK**
Read command **AT+SIMCROSS?**	**+SIMCROSS:<enable>** **OK**
Write command **AT+SIMCROSS=<enable>**	**OK**

- **Parameter**

<enable>: SIM card index, default is 0

0 SIM card 1

1 SIM card 2

Comment
1. Before using this command, please ensure your board has two SIM card slots. **2.Only USIM cards are supported.**

- **Example**

```
at+simcross?
+SIMCROSS:0
```

OK

at+simcross=1

OK

at+simcross?

+SIMCROSS:1

OK

7.20. AT+GTSET Set SIM card hot-plug voltage trigger mode

- **Description**

Set the SIM hot-plug voltage trigger mode. This value must match the actual hardware and reflect the hot-plug interrupt trigger condition. When a SIM card is inserted, the hot-plug GPIO pin is at a high level, and we should set this value to 1.

- **Grammar**

Command	Possible response
Read command **AT+GTSET?**	**+GTSET:<VoltTrigMode>** **OK**
Write command **AT+GTSET=<VoltTrigMode>**	**OK**

- **Parameter**

<VoltTrigMode>: Integer: Trigger mode

0-Low level (card inserted)

1-High level (insert card)

- **Example**

```
AT+GTSET=0
OK
AT+GTSET=?
+CME ERROR: 4
AT+GTSET?
+GTSET:1
OK
```

7.21. AT+COCSIM Turn on/off SIM card

- **Description**

This command will turn on/off the SIM card.

- **Grammar**

Command	Possible response
Write command **AT+COCSIM=<op_mode>**	**OK**

- **Parameter**

<op_mode>	0	SIM card activation
	1	SIM card shutdown

- **Example**

```
AT+COCSIM=0
OK
AT+COCSIM=1
OK
```

7.22. AT+SETSIM sets the SIM index for the AT engine

- **Description**

Set the current device engine SIM card index. Starting from the next command, commands will be sent to the SIM card specified by SETSIM. The set value will not be saved to Flash, and the value after module repoweron will be set to the default 0. After setting the setsim command, the URC report message will be displayed and processed for user convenience.

1. Only URC channels in command mode will be reported.

2. If there is a channel consistent with the SIM card of the URC message, the URC will be reported to this type of channel.

3. If there is no channel consistent with the current URC message SIM card, the URC will be reported to all channels.

- **Grammar**

Command	Possible response
Write command **AT+SETSIM=<val>**	**OK**
Test command **AT+SETSIM=?**	**+SETSIM: (0-1)** **OK**
Read command **AT+SETSIM?**	**+SETSIM: (val)** **OK**

- **Parameter**

<value >	Integer type, SIM card index

- **Example**

```
AT+SETSIM=?
+SETSIM:(0,1)
OK

AT+SETSIM?
SETSIM:1
OK

AT+SETSIM=1
OK
```

8. Call control command

8.1. ATA answers phone calls

- **Description**

This command is used to answer incoming calls.

- **Grammar**

Command	Possible response
Write command ATA	Response during data invocation, if successfully connected: **CONNECT<text>** TA switches to data mode. Note: <text> is only output when the <value> in ATX <value> parameter settings is greater than 0. When TA returns to command mode after invoking the release: **OK** Voice call response when the connection is successful: **OK** Response when not connected: **NO CARRIER**

Comment
This command can only be used when there is one call. When there are multiple calls, please use AT+CHLD to answer the new call.

- **Example**

```
//call rang

RING


AT+CLCC

+CLCC: 1,0,0,1,0,"",128

+CLCC: 2,1,4,0,0,"02154450290",129
```

OK

+CIEV: "CALL",1

ATA

CONNECT

8.2. ATD makes phone calls

- **Description**

This command is used to make an outgoing call. The length of the dialed number is less than or equal to 41.

- **Grammar**

Command	Possible response
Write command **ATD <number>**	success：When the call is in progress：**OK and** **NO ANSWER or** **NO CARRIER** or //The connection is released. **NO DIALTONE** or **BUSY** fail: **ERROR**

- **Active result code**

• URC1

• CONNECT:

• URC2

• CIEV: SOUNDER 1

• CIEV: CALL 1

Comment
1、Testing without a SIM card only allows emergency calls to be made. **2、When the "Cancel" key is pressed, no operator will be returned.**

- **Parameter**

<number>	Dialing digits, including1，2，3，4，5，6，7，8，9，0，*，#，+，A，B，C。

- **Example**

ATD10086;

OK

CONNECT

AT+CLCC;

+CLCC: 1,0,0,0,0,”10086”,129

OK

ATH

OK

ATD112;

NO CARRIER

OK

8.3. ATH call disconnected

- **Description**

Terminate all existing connected calls, including active, waiting, and held calls.

- **Grammar**

Command	Possible response
Write command **ATH**	**success:** **OK** **fail:** **ERROR**

- **Active result code**

URC1

CIEV:SOUNDER 0

CIVE:CALL 0

Comment
When the connection is established or ringing, the command will return to normal. However, for connections being established, the command will result in an error.

- **Example**

ATD 13816251020;

OK

CONNECT

ATH

OK

8.4. AT+CHUP Hang up the call

- **Description**

Terminate all currently connected calls, including active, waiting, and held calls.

- **Grammar**

Command	Possible response
Test command **AT+CHUP=?**	**OK**
Write command **AT+CHUP**	success: **OK** fail: **ERROR**

- **Voluntary reporting**

URC1

CIEV: SOUNDER 0

CIEV: CALL 0

Comment
This command achieves the same behavior as ATH.

- **Example**

```
/*The following example demonstrates typical applications of this command.。*/

<There are two connected calls, one in active state and the other on hold.>

AT+CHUP

<Both phones are hung up.了>


OK
```

8.5. AT+CHLD Call hold and multiparty calling

- **Description**

This command handles functions such as call hold, retrieval, multi-party calls, and call termination.

- **Grammar**

Command	Possible response
Test command **AT+CHLD=?**	**+CHLD: (<n>)** **OK**
Execute command **AT+CHLD=<n>**	**OK**

- **Parameter**

<n>	0	Release all held calls or set the waiting call's user to User Determined User Busy (UDUB).
	1	Release all active calls (if any) and accept another (held or waiting) call [the waiting call is the first one].
	1X	Release a specific call X which can be in an active, waiting, or hold state.

	2	Place all active calls (if any) on hold and accept another (held or waiting) call.
	2X	Place all active calls except the communication-enabled call X on hold.
	3	Add call retention to the conversation.
<code2>	2	The call has been suspended (during a voice call).
	3	Call detected (during voice call).
	4	Multi-party calling (during a voice call).

Comment
1、 The maximum number of connections for a conference call is 5, while the mobile phone can also have one call on hold. **2、 If multiple calls are on the IMS, then at+chld=2x is not allowed.**

- **Example**

The following example demonstrates typical applications of this command.

ATD10086;

OK

RING

+CCWA: “13501275915”,161,1„255

AT+CHLD=0

OK

AT+CHLD=2

OK

AT+CLCC

+CLCC: 1,0,1,0,0,”10086”,129

+CLCC: 2,1,0,0,0,”13501275915”,161

OK

<When there are waiting calls and active calls>

AT+CHLD=3

OK

AT+CLCC

+CLCC: 1,0,0,0,1,”10086”,129

+CLCC: 2,1,0,0,1,”13501275915”,161

OK

AT+CHLD=21

OK

AT+CLCC

+CLCC: 1,0,0,0,0,”10086”,129

+CLCC: 2,1,1,0,1,”13501275915”,161

OK

AT+CHLD=1

OK

AT+CLCC

+CLCC: 2,1,0,0,1,”13501275915”,161

OK

AT+CHLD=12<hang up connect 2>

OK

AT+CLCC

OK

8.6. AT+CLCC lists all current calls

- **Description**

List all calls

- **Grammar**

Command	Possible response
Test command **AT+CLCC=?**	**OK**
Write command **AT+CLCC**	**[+CLCC: <id1>, <dir>, <stat>,** **<mode>,<mpty>[,<number>,<type>][<CR><LF>+CLCC:** **<id2>, <dir>, <stat>,** **<mode>,<mpty>[,<number>,<type>]. . .]** **OK** **+CME ERROR:<err>**

- **Parameter**

<idx> Integer type; Call identification number, as described in Clause 4.5.5.1 of 3GPP TS 22.030[19];

	This number can be used in +CHLD command operations.	
<dir>	0	Mobile Originated (MO) Call
	1	Mobile terminal (MT) call
<stat>	**(Call status)**	
	0	Positive
	1	Holding
	2	Dialing (MO call)
	3	Alarm (MO call)
	4	Incoming (MT call)
	5	Waiting (MT call)
	7	Release (Network release this call)
	8	Handshake
<mode>	**(Undertaking/telecommunication services)**	
	0	Voice
	1	Data
	2	Fax
	3	Voice followed by data, voice mode
	4	Alternate voice/data, voice mode
	5	Alternate voice/fax, voice mode
	6	Voice followed by data, data mode
	7	Alternate voice/data, data mode
	8	Alternate voice/fax, fax mode
	9	Unknown
<mpty>	0	The call is not one of the multiparty (conference) call participants.
	1	The call is one of the multiparty (conference) call participants.
<number>	String-type telephone number, with the format specified by <type>.	
<type>	Integer format address octet type (refer to GSM 04.08[8] clause 10.5.4.7)	

- **Example**

ATD 10086;

OK

+CIEV: “SOUNDER”,1

CONNECT

AT+CLCC

+CLCC: 1,0,0,0,0,”10086”,129

OK

ATH

+CIEV: “CALL”,0

+CIEV: “SOUNDER”,1

OK

AT+CLCC

OK

8.7. AT+VTD Tone duration

- **Description**

Set tone duration.

- **Grammar**

Command	Possible response
Test command **AT+VTD=?**	**+VTD:(<n>)** **OK**
Read command **AT+VTD?**	**+VTD:<n>** **OK**
Write command **AT+VTD=<n>**	 **OK**

- **Parameter**

<n> Continuous tone1~10 s.Default value is 1.

- **Example**

AT+VTD?

+VTD:10

OK

AT+VTD=5

OK

AT+VTD=?

+VTD:(1-10)

OK

8.8. AT+CSTA Select address type

- **Description**

The SET command selects the number type (D) requiring further dialing according to GSM/UMTS specifications. The READ command returns the current value of <type>.

- **Grammar**

Command	Possible response
Test command **AT+CSTA=?**	**+CSTA: (list of supported <type>s)** **OK / ERROR**
Read command **AT+CSTA?**	**+CSTA: <type>**
Write command **AT+CSTA=<type>**	**OK / ERROR**

- **Parameter**

<type>	Integer	
	129	Unknown number type
	145	International number
	161	Domestic phone number

- **Example**

```
AT+CSTA=129
OK
```

AT+CSTA?

+CSTA: 129

OK

8.9. AT+CPAS Telephone activity status

- **Description**

This command returns the active status <pas> of the MT. It can be used to query the MT before requesting operations from the telephone.

- **Grammar**

Command	Possible response
Test command **AT+CPAS=?**	**+CPAS:** (supported **<pas>list**) **OK**
Execute command **AT+CPAS**	**+CPAS: <pas>** **OK**

- **Parameter**

<pas>	0	Ready (MT allows commands from TA/TE)
	1	Unavailable (MT does not allow commands from TA/TE)
	2	Unknown (no guarantee that machine translation can respond to instructions)
	3	Ringing (MT is ready to accept commands from TA/TE, but the ringer is active)
	4	Currently making a call (MT is ready to accept commands from TA/TE, but is currently in the process of making a call)
	5	Dormant (MT cannot process commands from TA/TE because it is in a low-functionality state). In addition, all other values below 128 are reserved by this document.

- **Example**

AT+CPAS=?

+CPAS: (0,1,3,4)

OK

AT+CPAS

+CPAS: 0

OK

9. SMS command

9.1. AT+CSDH Set parameter display in text mode

- **Description**

This command is used to control whether detailed header information is displayed in the result codes under text mode.

- **Grammar**

Command	Possible response
Test command **AT+CSDH=?**	**+CSDH:** supported **<show>list** **OK**
Read command **AT+CSDH?**	**+CSDH: <show>** **OK**
Write command **AT+CSDH=[<show>]**	**OK**

- **Parameter**

<show>	0	Do not display values in the result code
	1	Display the value in the result code.

- **Example**

//When listing messages in memory, reading messages in memory, or indicating the reception of a new message via CMTI, the message header is not displayed.。

AT+CSDH=0

OK

AT+CMGR=2

+CMGR: "STO UNSENT","",

<This is a test from EicutSmart>

OK

//When listing messages in memory, reading messages in memory, or indicating the reception of a new message to CMTI, the message header is displayed.

AT+CSDH=1

OK

AT+CMGR=2

+CMGR: "STO UNSENT","",,128,17,0,0,143,"+8613800551500",145,18

<This is a test from EicutSmart>

OK

9.2. AT+CSMP Set text mode parameters

- **Description**

In text mode (AT+CMGF=1), this command is used to set the required additional parameter values when sending short messages to the network side or storing short messages in memory. Additionally, it can be used to set the validity period (value range: 0~255) when the short message is received from the short message service center or to define the absolute time when the validity period ends (as a string).

- **Grammar**

Command	Possible response
Test command **AT+CSMP=?**	**OK**
Read command **AT+CSMP?**	**+CSMP:<fo>,<vp>,<pid>,<dcs>** **OK**

Write command **AT+CSMP=<fo>[,<vp>[,pid>[,<dcs>]]]**	**OK**

- **Parameter**

<fo>	Default value: 17. If <fo> is set to 49, SMS status reports are supported in text mode.
<vp>	Default value: 167 User-defined settings are currently not supported
<pid>	Default value: 0 User-defined settings are currently not supported.
<dcs>	Depending on the command or result code: 3G TS 23.038[2] SMS data coding scheme (default value 0), or integer format cell broadcast data coding scheme [supports csw type, 0,4,8]

- **note**

1. Parameters <fo>, <vp>, <pid>, and <dcs>. We recommend setting their default values, but if necessary, other values can be determined according to specifications.
2. If the "fo" value of the MO message is set, it must be ensured that the "mti" segment of "fo" (as described in 03.40) is "01", i.e., bit1 is "0" and bit0 is "1"; otherwise, an exception will occur.
3. If a "dcs" value is set for MO messages, it must be ensured that dcs equals 0, 4, or 8, as other values are currently not permitted.

- **Example**

```
//In text mode, use 7-bit encoding to send messages to others or write messages to storage.
AT+CSMP=17,167,0,0
OK

AT+CMGS=”13560243602”
>abc123<CTRL Z>        //Receiving: abc123

+CMGS: 5
```

OK

//In text mode, use 8-bit encoding to send messages to others or write messages to memory.

AT+CSMP=17,167,0,4

OK

AT+CMGS=”13560243602”,129

>abc123<CTRL Z>

+CMGS:3

OK

//In text mode, messages are sent to others or written to memory using 16-bit encoding (sometimes Chinese character strings).

AT+CSMP=17,167,0,8

OK

AT+CMGS=”+13560243602”,145

>XXX<CTRL Z> (Chinese character string) //Received: XXX (Chinese character string)

+CMGS:4

OK

9.3. AT+CMSS Send SMS from memory

- **Description**

This command is used to send the specified short message (SMS-SUBMIT) from memory. If an SMS-SUBMIT short message destination address is specified, the new address will replace the destination address contained in the short message in memory when sending. Upon successful

transmission, a reference value will be returned to the TE, and its parameter value can be used to identify the short message in the sending status report URC.

- **Grammar**

Command	Possible response
Test command **AT+CMSS=?**	**OK**
Write command **AT+CMSS=<index>[, <da>[, <toda>]]**	**OK**

- **Parameter**

<index> Integer. Memory location number.

<da> String type. Destination address. For details, refer to 3GPP TS 23.040 TP-Destination-Address Address-Value field; BCD code (or characters in GSM 7-bit default alphabet format) converted to characters in the currently selected TE character set (for details, refer to AT+CSCS in 3GPP TS 27.007); the address type is specified by.

<toda> 3G TS 24.011[6] The target address type in the TP integer format address octet (when the first character of <da> is + (IRA 43), it is 145; otherwise, it defaults to 129, with the country code being 161).

- **Note**

1. <toda> has the following value: 161145129

2. In PDU mode, we are unable to send MT messages.

- **Example**

AT+CMGF=1

OK

AT+CMGW="10086"

> hfcx

+CMGW: 4

OK

AT+CMSS=4

+CMSS: 1

OK

9.4. +CMTI/+CMT indicates new SMS message

- **Description**

When receiving a new short message, send +CMTI or +CMT[+CDS is the message report].

- **Grammar**

Command	Possible response
Proactive request result code	**// PDU mode is enabled** **+CMTI: <mem>,<index>** **or** **+CMT: [<alpha>],<length><CR><LF><pdu>** **//Text mode is enabled** **+CMT:** **<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,** **<length>]<CR><LF><data>**

- **Parameter**

<mem>	Character string type; Memory for storing new messages
<index>	Integer type; Associated memory supports values within the range of position numbers

<length>	Integer type value, indicating the message body length expressed in characters in text mode (+CMGF=1) <data> (or <cdata>); or the actual TP data unit length expressed in octets in PDU mode (+CMGF=0) (i.e., the octets of the RP layer SMSC address are not counted in the length).
<fo>	Depending on the command or result code: The first eight integer digits of 3G TS 23.040[3] SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format.
<vp>	Depending on whether SMS-SUBMIT is supported, the enhanced format (hexadecimal encoded string with double quotes) is adopted.
<pid>	3G TS 23.040[3] TP protocol identifier in integer format (default is 0)
<dcs>	Depending on the command or result code: 3G TS 23.038[2] SMS data coding scheme (default value 0), or integer format cell broadcast data coding scheme.
<sca>	3G TS 24.011[6] RP SC address value field, character string format;
<tosca>	3G TS 24.011[6] RP SC address integer format address octet type
<scts>	3G TS 23.040[3] TP Service Center timestamp, time string format (please refer to <dt>)
<alpha>	The alphanumeric representation of the string type corresponding to the entry found in the MT phonebook; The implementation of this feature is manufacturer-specific; The character set used should be the one selected using the command Select TE Character.

- **Example**

AT+CMGF=0

OK

AT+CNMI=0,2,0,0,0

OK

+CMT: ,27

0891683110102105F0240D91683120117013F50000807020619393000 7F4F29C9E769F01

//Short messages are directly output upon receipt.

AT+CMGF=1

OK

AT+CNMI=0,2,0,0,0

OK

+CMT: “+8613021107315”„”2008/07/02,16:40:24+00”,145,17,0,0,”+8613010112500”,145,8 Testing

//Short messages are directly output upon receipt.

9.5. AT+CMGD Delete SMS Message

- **Description**

This command is used to delete the short message located at <index> in the preferred storage of short messages. If <delflag> is specified and not 0, the ME shall omit <index> and comply with the rules of the <delflag> parameter.

- **Grammar**

Command	Possible response
Test command **AT+CMGD=?**	**+CMGD:** (supported **<index>**), (supported **<delflag>**) **OK**
Write command **AT+CMGD=<index>[,<delflag>]**	**OK**

- **Parameter**

<Index> Index: Indicates the email to be deleted

<delflag>	Integer.	
	0	Delete the short message specified by <index>
	1	Delete all read short messages in the preferred memory
	2	Delete all read SMS messages and sent SMS messages from the preferred storage.
	3	Delete all read SMS messages, sent and unsent SMS messages from the preferred storage.
	4	Delete all short messages in the preferred storage

- **Example**

AT+CMGD=1 //Delete the message specified in <index>=1

OK

AT+CMGD=1,4 //Delete all messages from <mem1> memory

OK

9.6. AT+CMGF Set SMS message format

- **Description**

Set the input and output format of short messages.

- **Grammar**

Command	Possible response
Test command **AT+CMGF=?**	**+CMGF:**(supported**<mode>list**) **OK**
Read command **AT+CMGF?**	**+CMGF:<mode>** **OK**
Write command **AT+CMGF=<mode>**	**OK**

- **Parameter**

<mode>	0	PDU mode
	1	Txt mode

9.7. AT+CMGL Read Short Messages by Status

- **Description**

This command is used to retrieve the short message corresponding to the message status in the memory.

- **Grammar**

Command	Possible response
Test command AT+CMGL=?	**+CMGL : supported**(**<stat>**)list **OK**
Write command AT+CMGL=<state>	**OK**

- **Parameter**

<stat> **In text mode, string type.**

"REC UNREAD" Unread received short messages

"REC READ" Received and read short messages

"STO UNSENT" Stored but unsent short messages

"STO SENT" Stored and sent short messages

"ALL" All short messages

2) In PDU mode, integer type.

0 Unread received short messages

1 Received and read short messages

2 Stored but unsent short messages

3 Stored and sent short messages

3 All short messages

9.8. AT+CMGR Read SMS Message

- **Description**

This command is used to read the short message specified by <index> from the memory <mem1>. If the short message is in the "REC UNREAD" state, its status in the memory will change to "REC READ".

- **Grammar**

Command	Possible response
Test command AT+CMGR=?	**OK**
Write command AT+CMGR=<index>	**+CMGR:<stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<data>** **OK**

- **Parameter**

<index> Message to be read.

Comment
1. <alpha> and <scts> are currently not supported. **2. Unable to read short message reports at present.**

- **Example**

AT+CMGR=2

+CMGR: ""REC READ"","18117512710"",,""2020/03/03,10:26:06+32""

Sent from/to myself

OK

9.9. AT+CMGS Send SMS Message

- **Description**

This command is used to send short messages (SMS-SUBMIT) from the TE to the network side. After invoking the setup command, input the data to be sent after the > prompt, then press Ctrl+Z to indicate the end of the PDU and send the short message. Press ESC to cancel sending, and a successful cancellation will also return OK to confirm termination. Upon successful transmission, the short message reference value <mr> will be returned to the TE.

- **Grammar**

Command	Possible response
Test command **AT+CMGS=?**	**OK**
Write command **if text mode:** **AT+CMGS=<da>[,<toda>]<CR>**	**+CMGS:<mr>** **OK**
if PDU mode: **AT+CMGS=<length><CR>** **text/PDU is entered<ctrl-Z/ESC>**	**+CMGS:<mr>** **OK**

- **Parameter**

<da>	3G TS 23.040[3] TP destination address value field, string format; BCD digits (or GSM 7-bit default alphabet characters) converted to characters of the currently selected TE character set (refer to the +CSCS command in 3G TS 27.007[9]); address type given in string format; memory for write and send operations.
<toda>	3G TS 24.011[6] The target address type octet of the TP integer format address (default value is 145 when the first character of <da> is + (IRA 43), otherwise the default value is 129).

<length>	Integer value, in text mode (+CMGF=1), represents the length of the message body.
<mr>	The integer type 3GPP TS 23.040[3] TP integer format message reference identifies the parameters of SMS-SUBMIT. | Each time an SMS submission is submitted to the network, the last used TP MR value in the (U)SIM will be updated with the TP MR used in the SMS submission operation. | The reference number value can range between 0 and 255.

Comment
1. Long text messages are not supported. **2. <toda> has the following value: 161145129** **3. In PDU mode, wen cannot send MT messages.** **4. Enter the message date in the input window, <Ctrl z> to input in the receiving window.**

- **Example**

AT+CMGF=0

OK

//The value of "dcs" is obtained from the dcs octet in the pdu header.

AT+CMGS=17

>0011000B813170862334F20000A70361F118 <CTRL Z>

+CMGS: 1

OK

AT+CMGF=1

OK

//7-bit encoding for information stored or transmitted in text mode

AT+CSMP=17,167,0,0

OK

AT+CMGS=”13560243602”

>abc <CTRL Z>

+CMGS: 5

OK

//8-bit encoding of information stored or transmitted in text mode

AT+CSMP=17,167,0,4

OK

AT+CMGS=”13560243602”,129

>abc <CTRL Z>

+CMGS:3

OK

//16-bit message encoding stored or transmitted in text mode

AT+CSMP=17,167,0,8

OK

AT+CMGS=”+8613560243602”,145

>XXX <CTRL Z> (Chinese character string)

+CMGS:4

OK

9.10. AT+CMGC Send command

- **Description**

Execute the command to send a command message (SMS command) from TE to the network. The input of the text (3GPP TS 23.040[3] TP command data) is similar to that specified in the Send Message +CMGS command, but the format is fixed as a hexadecimal sequence of two IRA characters in length, which the ME/TA converts into 8-bit octets (refer to +CMGS).

The message reference value <mr> is returned to the TE upon successful message delivery. Optionally (when +CSMS<service> equals 1 and the network supports it), <scts> is returned. This value can be used to identify the message in unsolicited delivery status report result codes.

If the message fails to be sent in the network or due to an ME error, the final result code +CMS ERROR: <err> is returned. For a list of <err> values, refer to the "Message Service Failure Result Codes" chapter. This command should be abortable.

- **Grammar**

Command	Possible response
Test command **AT+CMGC=?**	**OK**
Write command **if text mode (+CMGF=1):** **AT+CMGC=<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]]<CR>**	**+CMGC: <mr>[,<scts>]** **OK**
Write command **if pdu mode (+CMGF=0):** **AT+CMGC=<length><CR>text is entered<ctrl-Z/ESC>**	**+CMGC: <mr>[,<scts>]** **OK**

- **Parameter**

<fo> Depending on the command or result code:

The first octet of 3GPP TS 23.040 [3]Short message delivery,

SMS-SUBMIT（default 17），

SMS status report,

	or SMS-command in integer format (default value 2)
<ct>	3GPP TS 23.040[3] TP command type in integer format (default is 0)
<pid>	3GPP TS 23.040 [3] TP protocol identifier in integer format (default is 0)
<mn>	3GPP TS 23.040[3] TP integer format message number, where the mn value is the mr value of the previously submitted SM.
<da>	3GPP TS 23.040[3] TP destination address value field, formatted as a character string; BCD digits (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command +CSCS in 3GPP TS 27.007[9]); the address type is given by <toda>
<toda>	3GPP TS 24.011[6] The destination address type in TP integer format address octet (when the first character of <da> is + (IRA 43), the default value is 145; otherwise, the default value is 129).

- **Example**

AT+CMGF=0

OK

//The value of "dcs" is obtained from the dcs octet in the pdu header.

AT+CMGC=17

>0011000B813170862334F20000A70361F118 <CTRL Z>

+CMGS: 1

OK

AT+CMGF=1

OK

//7-bit encoding for information stored or transmitted in text mode

AT+CSMP=17,167,0,0

OK

AT+CMGC=”13560243602”,129

>abc <CTRL Z>

+CMGS: 5

OK

//The 8-bit encoding of information stored or transmitted in text mode

AT+CSMP=17,167,0,4

OK

AT+CMGC=”13560243602”,129

>abc <CTRL Z>

+CMGS:3

OK

//16-bit encoding of information stored or transmitted in text mode

AT+CSMP=17,167,0,8

OK

AT+CMGC=”13560243602”,145

>XXX <CTRL Z> (Chinese strings)

+CMGS:4

OK

9.11. AT+CMGW writes SMS messages into memory

- **Description**

This command is used to write a short message and store it in <mem2>, returning the storage location <index> of the stored short message. Through <stat>, the short message can be set to a specified status. By default, the short message status is set to "STO UNSENT". The syntax for text input is the same as that of the AT+CMGS setting command.

- **Grammar**

Command	Possible response
Test command **AT+CMGW=?**	**OK**
Write command **if text mode (+CMGF=1):** **AT+CMGW=<oa/da>[,<tooa/toda>[,<stat>]]]<CR>**	**+CMGW: <index>** **OK**
Write command **if pdu mode (+CMGF=0):** **AT+CMGW=<length>[,<stat>]<CR>text is entered<ctrl-Z/ESC>**	**+CMGW: <index>** **OK**

- **Parameter**

<oa> GSM 03.40 TP string format priority address value field (the string should be enclosed in quotation marks); BCD digits (or GSM default alphabet characters) converted to characters of the currently selected TE character set (specified by +CSCS in TS 07.07); address type specified by <tooa>

<da> 3G TS 23.040[3] TP Destination Address Value field, string format; BCD digits (or GSM 7-bit default alphabet characters) converted to characters of the currently selected TE character set (refer to command +CSCS in 3G TS 27.007[9]); address type given in string format; memory for write and send operations.

<tooa> The TP originating address type in GSM 04.11 integer format for address octets (default reference <tode>).

<toda> 3G TS 24.011[6] TP integer format address octet destination address type (when the first character of <da> is + (IRA 43), the default value is 145; otherwise, the default value is 129)

<length> An integer value indicating the length of the message body in text mode (+CMGF=1)

<data> **(or <cdata>)**	In the character; or in PDU mode (+CMGF=0), the actual length of the TP data unit (octets) (i.e., the octets of the RP layer SMSC address are not counted in the length)
<stat>	Refer to the <stat> command in CMGL instructions.

Comment
1. Long messages are not supported. **2. <toda> has three values: 161, 145, and 129.** **3. If it is in PDU mode, the meaning of each bit in the DCS byte is as follows: DCS byte: bit7..bit0** **bit7...bit4 Coding group** **bit7 Retain** **bit6 Retain** **bit5 0: Text decompression 1: GSM default compression** **bit4 0: Bits 0 and 1 are unused** **1: Bits 0 and 1 are utilized** **bit0 : bit1 00: class1** **01: class2** **10: class3** **11: class4** **bit2 : bit3 00: GSM default 7-bit encoding** **01: 8-bit encoding** **10: 16-bit (UCS2) encoding** **11: Retain** **4. In PDU mode, if an MT message is to be written into the memory, the status must be specified as either unread or read. In PDU mode, messages cannot be written with a status of UNSENT or SENT.**

- **Example**

AT+CMGF=0

OK

//The value of "dcs" is obtained from the dcs octet in the pdu header.

AT+CMGW=17

>0011000B813170862334F20000A70361F118 <CTRL Z>

+CMGW: 1

OK

AT+CMGF=1

OK

//7-bit encoding for information stored or transmitted in text mode

AT+CSMP=17,167,0,0

OK

AT+CMGW=”13560243602”

>abc <CTRL Z>

+CMGW: 5

OK

AT+CSMP=17,167,0,4

OK

AT+CMGW=”13560243602”,129

>abc <CTRL Z>

+CMGW:3

OK

//The 16-bit encoding of information stored or transmitted in text mode

AT+CSMP=17,167,0,8

OK

AT+CMGW=”13560243602”

>XXX <CTRL Z> (Chinese strings)

+CMGW:4

OK

9.12. AT+CNMI Set New SMS Message Notification Mode

- **Description**

This command is used to configure the reporting method when the module receives a new short message.

- **Grammar**

Command	Possible response
Test command **AT+CNMI=?**	**+CNMI:**(supported**<mode>list**), (supported**<mt>list**), (supported**<bm>list**), (supported**<ds>list**), (supported**<bfr>list**) **OK**
Read command **AT+CNMI?**	**+CNMI:<mode>,<mt>,<bm>,<ds>,<bfr>** **OK**
Write command **AT+CNMI=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]**	**OK**

- **Parameter**

<mode> Currently supports a value [0]

0 Buffering unsolicited result codes in the TA. If the TA result code buffer is full, the indication may be buffered elsewhere, or the oldest indication may be discarded and replaced with the newly received one.

	1	When retaining the TA-TE link (e.g., in online data mode), discard the indication and reject newly received unsolicited message result codes. Otherwise, forward directly to the TE.
	2	When the TA-TE link is reserved (for example, in online data mode), buffer unsolicited result codes in the TA and flush them to the TE after the reservation is released. Otherwise, forward them directly to the TE.
	3	Forward unsolicited result codes directly to the TE. When the TA is in online data mode, use the TA-link-specific in-band technique for embedding result codes and data.
<mt>	Currently supports three values: 0, 1, 2, and there is no class type.	
	0	No SMS sending instructions were routed to TE.
	1	If the SMS DELIVER is stored in the ME/TA, the unsolicited result code is used to route the indication of the memory location to the TE: +CMTI: <mem>, <index>
	2	Short message transfer (excluding Category 2 messages and messages in the message waiting indication group (stored messages)) uses unsolicited result codes to route directly to TE: +CMT:[<alpha>],<length><CR><LF><pdu> (PDU mode enabled) or +CMT:<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>
	3	Class 3 short message transmissions using unsolicited result codes defined in <mt>=2 are directly routed to the TE. Messages employing other data coding schemes result in the indication defined in <mt>=1.
<bm>	Broadcasting CSW is not supported.	
	0	No CBM indication was transmitted to the TE.
	1	If the CBM is stored in ME/TA, the indication of the memory location is routed to the TE using an unsolicited result code: +CBMI:<mem>,<index>
	2	Route new CBMs directly to TE using unsolicited result codes: +CBM:<length><CR><LF><pdu> (enable PDU mode) or +CBM:<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (enable text mode). If the ME supports the data coding scheme group, which also defines special routing for messages other than Class 3 (e.g., (U)SIM-specific messages), the ME may choose not to route information with such data coding schemes

		to the TE (the indication of stored CBMs can be given as defined in <bm>=1).
	3	Level 3 CBM uses the unsolicited result code defined in <bm>=2 to route directly to TE. If CBM storage is supported, messages from other classes will trigger the indication defined in <bm>=1.
<ds>	Unable to store the email report, value 2 is currently not supported.	
	0	No SMS status report is routed to TE.
	1	Route SMS status reports using unsolicited result codes to TE: +CDS:<length><CR><LF><pdu> (PDU mode enabled) or +CDS:<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled)
	2	If the SMS STATUS-REPORT is stored in ME/TA, the indication of the memory location is routed to TE using the unsolicited result code: +CDSI:<mem>,<index>
<bfr>	Not supported.	
	0	When <mode>1, the TA buffer of unsolicited result codes defined in this command is flushed to the TE. Input 3 (an OK response should be given before the flush code).。
	1	When <mode>1, clear the buffer for unrequested result codes defined in this command. Input 3.

- **Example**

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

+CMTI: “SM”,7

OK

AT+CMGF=0

OK

AT+CNMI=0,2,0,0,0

+CMT: ,27
0891683110102105F0240D91683120117013F50000807020619393000 7F4F29C9E769F01

OK

AT+CMGF=1

OK

AT+CSDH=1

OK

AT+CNMI=0,2,0,0,0

+CMT: “+8613021107315”„”2008/07/02,16:40:24+00”,145,17,0,0,”+8613010112500”,145,8 testing

OK

AT+CMGF=1

OK

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

OK

AT+CMGS=”13445555991”

>abc <CTRL Z>

+CMGS: 12

OK

+CDS: 2,12,"+8613021107315",145,"2008/07/02,16:42:22+00","2008/07/02,16:42:34+00",0

9.13. AT+CPMS Configure the preferred storage location for SMS messages

- **Description**

This command is used to select the storage location for querying or configuring short messages, including <mem1>, <mem2>, and <mem3>.

- **Grammar**

Command	Possible response
Test command **AT+CPMS=?**	**+CPMS:**(supported**<mem1>list**), (supported**<mem2>list**), (supported**<mem3>list**) **OK**
Read command **AT+CPMS?**	**+CPMS: <mem1>,<used1>,<total1>,** **<mem2>,<used2>,<total2>,** **<mem3>,<used3>,<total3>** **OK**
Write command **AT+CPMS=<mem1>[,<mem2>[,<me3>]]**	**+CPMS:** **<used1>,<total1>,<used2>,<total2>,<used3>,** **<total3>** **OK**

- **Parameter**

<mem1>	String type; Memory for reading and deleting messages
<mem2>	String type; Memory for performing write and send operations
<mem3>	Character string type; Preferred memory for storing received short messages

<used1>	Integer type; Current number of messages in <mem1>
<used2>	Integer type; Current number of messages in <mem2>
<used3>	Integer type; Current number of messages in <mem3>
<total1>	Integer type; Number of messages that can be stored in <mem1>
<total2>	Integer type; Number of messages that can be stored in <mem2>
<total3>	Integer type; Number of messages that can be stored in <mem3>

- **Note**

  Parameters <mem1>, <mem2>, and <mem3> have three possible fo values: "SM", "ME", and "MT".

“ME”	ME Message Storage
“SM”	(U) SIM card information storage
“MT”	Any storage associated with ME is currently defaulted to "SM".

- **Example**

```
//"SM": SMS messages stored in the SIM, default value
AT+CPMS=”SM”,”ME”,”SM”
+CPMS: 11,50,1,100,11,50

OK

AT+CPMS?
+CPMS: “SM”,11,50,”ME”,1,100,”SM”,11,50

OK
```

AT+CPMS=”ME”,”ME”,”ME”

+CPMS: 0,100,0,100,0,100

OK

AT+CPMS?

+CPMS: “ME”,0,100,”ME”,0,100,”ME”,0,100

OK

AT+CPMS=”SM”,”SM”,”SM”

+CPMS: 11,50,11,50,11,50

OK

AT+CPMS?

+CPMS: “SM”,11,50,”SM”,11,50,”SM”,11,50

OK

9.14. AT+CSCA Set the SMS message service center address

- **Description**

This setting command is used to update the SMSC (Short Message Service Center) address after actively sending a short message. In text mode, the setting command can be used for configuration. In PDU mode, the setting command can only be used for configuration when the length encoding of the SMSC address is <pdu>=0.

- **Grammar**

Command	Possible response
Test command **AT+CSCA=?**	**OK**
Read command **AT+CSCA?**	**+CSCA:<sca>,<tosca>** **OK**
Write command **AT+CSCA=<sca>[,<tosca>]**	**OK**

- **Parameter**

<sca> Character string type. Short message service center address.

RP SC address value field in GSM 04.11 character string format

<tosca> Integer. Short message service center address type.

GSM 04.11 RP SC address integer format address octet type

9.15. +CDS has received the SMS status report

- **Description**

Indicates that the SMS status report has been received (not an AT command).

- **Grammar**

Command	Possible response
Proactive reporting	PDU mode is enabled: **+CDS:<length><CR><LF><pdu>** Text mode enabled: **+CDS:<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>**

- **Parameter**

<pdu>	In the case of SMS: 3G TS 24.011[6] SC address followed by the hexadecimal format of 3G TS 23.040[3] TPDU: ME/TA converts each octet of the TP data unit into two IRA-character-long hexadecimal numbers (for example, representing an octet with the integer value 42 as the two characters 2A (IRA 50 and 65)).
<length>	Integer type value, indicating the message body length expressed in characters in text mode (+CMGF=1) within <data>> (or <cdata>); or the actual TP data unit length expressed in octets in PDU mode (+CMGF=0) (i.e., the octets of the RP layer SMSC address are not counted in the length).
<fo>	Depending on the command or result code: Supports enhanced format (hex-encoded string in double quotes) as per 3G TS 23.040[3] SMS-DELIVER, SMS-SUBMIT, SMS-STATUS-REPORT, or the first octet of SMS-command 20196;
<scts>	3G TS 23.040[3] TP Service Center timestamp, time string format (please refer to <dt>)
<st>	3G TS 23.040[3] TP integer format status
<mr>	3G TS 23.040 [3] TP Integer Format Message Reference
<ra>	3G TS 23.040[3] TP displays the recipient address value field in string format; BCD digits (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command +CSCS in 3G TS 27.007[9]); The address type is determined by <tora>
<dt>	3G TS 23.040[3] TP discharge time, time string format: "yy/MM/dd, hh:MM:ss:zz", where the characters represent year (last two digits), month, day, hour, minute, second, and time zone. For example, May 6, 1994, 22:10:00 GMT+2 hours equals "94/05/06, 22:10:00+08".
<tora>	3G TS 24.011[6] TP integer format address octet recipient address type (default is <toda>)

Comment
Please refer to +CNMI

- **Example**

AT+CMGF=0

OK

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

+CDS: 34 91683110102105F006110D91683120117013F5807020812014008070208120740000

OK

AT+CMGF=1

OK

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

OK

AT+CMGS=”13466507607”

+CMGS: 12

OK

+CDS: 2,14,”+8613021107315”,145,”2008/07/02,17:30:50+00”,”2008/07/02,17:30:55+00 “,0

9.16. AT+CMMS sends multiple SMS messages

- **Description**

This command is used to control the continuity of the SMS message interruption protocol link. If this function is enabled (and supported by the currently used network), the link remains open, allowing for rapid transmission of multiple SMS messages in this scenario.

- **Grammar**

Command	Possible response

Test command **AT+CMMS=?**	**+CMMS:(0,1)** **OK**
Read command **AT+CMMS?**	**+CMMS:<nConcat>** **OK**
Write command **AT+CMMS=<nConcat>**	**OK**

- **Parameter**

<nConcat> Integer type; represents the concat value. The default value is 0.

0	Disable this feature
1	Keep this function enabled until the time interval between the response to the latest command to be sent (AT+CMGS, AT+CMSS, etc.) and the next command to be sent exceeds 1~5 seconds (the specific value depends on the ME). Subsequently, the ME closes the link, and the TA automatically switches<n>to 0.
2	Enable this function. If the time interval between the response to the latest command sent and the next command to be sent exceeds 1~5 seconds (the specific value depends on the ME), the ME closes the link, but the TA does not automatically switch<n>to 0.

Comment
XY4100, ASR, QCX216, EC618 parameter support (0-2) **8850/8910 parameter support (0-1)**

9.17. AT+CSMS Select SMS Service Type

- **Description**

This command is used to select the short message service type <service> and return the short message types supported by the ME.

- **Grammar**

Command	Possible response
Test command **AT+CSMS=?**	**+CSMS:** (supported **service>list**) **OK**
Read command **AT+CSMS?**	**+CSMS:<service>,<mt>,<mo>,<bm>** **OK**
Write command **AT+CSMS=<service>**	**+CSMS:<mt>,<mo>,<bm>** **OK**

- **Parameter**

<service>	Integer. Short Message Service type	
	0	(For details, please refer to 3GPP TS 23.040 and 3GPP TS 23.041)
	1	(For details, please refer to 3GPP TS 23.040 and 3GPP TS 23.041)
<mt>, <mo>, <bm>	Integer	
	0	Unsupported type
	1	Supported types

9.18. AT+CGSMS selects MO SMS service

- **Grammar**

Command	Possible response
Test command **AT+CGSMS=?**	**+CGSMS:**(supported **service>list**) **OK**
Read command **AT+CGSMS?**	**+CGSMS: <service>** **OK**

Write command **AT+CGSMS=[<service>]**	**OK**

- **Parameter**

< service > A numeric parameter that represents the service or service preference to be used

0	PS area
1	CS area
2	First choose PS area（Use the CS domain when the PS domain is not available）
3	First choose CS area（Use the PS domain when the CS domain is not available）

9.19. AT+CNMA New SMS Confirmation

- **Description**

Execute the command to confirm the correct receipt of a new message (SMS-DELIVER or SMS-STATUSREPORT), which is directly routed to the TE (refer to command +CNMI Tables 3.4.1-3 and 3.4.1-5).

When the +CSMS parameter <service> equals 1, this confirmation command should be used (causing the ME to send an RP-ACK to the network). The TA must not send another +CMT or +CDS result code to the TE before confirmation.

If the ME does not receive confirmation within the required time (network timeout), the ME shall respond to the network as specified in 3GPP TS 24.011[6].

The ME/TA shall automatically disable routing to the TE by setting the +CNMI <mt> and <ds> values to zero. If the command is executed but no confirmation is required, or if another ME-related error occurs, the final result code +CMS ERROR: <err> shall be returned. For a list of <err> values, refer to the "Message Service Failure Result Codes" chapter.

- **Grammar**

Command	Possible response
Test command **AT+CNMA**	When AT+CSMS is disabled or there is no message**+CMS ERROR: <err>** Successfully sent the ack request **OK**

- **Parameter**

CMS ERROR	Explanation
52	Command not supported, please check your input
302	Operation not allowed
340	No corresponding characters detected

For details, please refer to Chapter 17.2 CMS Error Codes.

- **Implementation**

  When the <service> value 1 supporting the command Select Message service+CSMS is required.

Comment
If a directly routed message must be buffered in the ME/TA (possible when the +CNMI parameter <mode> equals 0 or 2), or if the interpreter remains in a state where the result code cannot be sent to the TE for too long (e.g., when the user inputs a message using +CMGS), the acknowledgment (RP-ACK) must be sent to the network without waiting for the +CNMA command from the TE. Later, when the buffered result codes are flushed to the TE, the TE must send a +CNMA[=0] acknowledgment for each result code. This allows the ME/TA to determine whether the message should be placed in non-volatile memory and disable routing to the TE (if +CNMA[=0] is not received). For more detailed information on how to reliably use the <mode> parameter, refer to the +CNMI command.

9.20. AT+CSCB Cell Broadcast Message Type Selection

- **Description**

Set the relevant parameters for the cell broadcast function.

- **Grammar**

Command	Possible response
Test command **AT+CSCB=?**	**+CSCB:(0,1),(0,1,5,320-478,922),(0-3,5)** **OK**
read command **AT+CSCB?**	**+CSCB:<mode>,"<mids>","<dcss>"** **OK**
read command **AT+CSCB=<mode>,"<mids>","<dcss>"**	**OK**

- **Parameter**

<mode>	Integer type; Instruction mode
	0: Accept the message types specified in <mids> and <dcss>
	1: Does not accept the message types specified in <mids> and <dcss>
<mids>	String type; All possible distinct combinations of CBM message identifiers
<dcss>	String type; All possible different combinations of CBM data encoding modes

10. Network service command

10.1. AT+COPN Query Operator Name

- **Description**

This command is used to query the list of carrier names from ME, returning the carrier codes <numericn> stored in ME that contain alphanumeric name strings <alphan>.

- **Grammar**

Command	Possible response
Test command **AT+COPN=?**	**OK**
execute command **AT+COPN**	**+COPN: <numeric1>,<alpha1>** **+COPN: <numeric2>,<alpha2>** **[...]]** **OK**

- **Parameter**

<numeric> String type. Numeric format operator name (refer to +COPS).

<alphan> String type. Long string format operator name (please refer to +COPS).

10.2. AT+COPS selects the operator

- **Description**

This command is used to query the currently registered operator and network registration status, and can also be used to configure the registered operator and network mode.

- **Grammar**

Command	Possible response

Test command **AT+COPS=?**	**+COPS: [Supported (<stat> list, long alphanumeric <oper>, short alphanumeric <oper>, numeric <oper>[, <AcT>])][,,(Supported <mode> list), (Supported <format> list)]** **OK**
Read command **AT+COPS?**	**+COPS: <mode>[,<format>,<oper>[,<AcT>]]** **OK**
Read command **AT+COPS=mode[,<format>[,<oper>[,<AcT>]]]**	**OK**

- **Parameter**

<mode>	0	Automatic network search (omitted <oper>)
	1	Manual network search (<oper> cannot be omitted)
	2	Manual network deregistration
	3	Only set <format> (for reading command +COPS?), without registration/deregistration (<oper> omitted); this value is not applicable to the read command response.
	4	Manual/Automatic (<oper> cannot be omitted); If manual selection fails, it will enter automatic mode (<mode>=0)
<format>	0	Long string format <oper>, maximum of 16 characters
	1	Short string format <oper>
	2	Digital format <oper>
<oper>	String type; <format> indicates the format of this parameter; <mode> determines whether to omit this parameter	
<stat>	0	Unknown
	1	Available operators
	2	Currently selected carrier
	3	Prohibited selected carriers
<AcT>	0	GSM
	1	GSM Compact
	2	UTRAN

3	GSM w/EGPRS
4	UTRAN w/HSDPA
5	UTRAN w/HSUPA
6	UTRAN w/HSDPA and HSUPA
7	E-UTRAN
8	EC-GSM-IoT (A/Gb mode)

Comment
The set command is used to forcibly select and register a GSM/LTE network operator, where the mode determines whether the registration process is manual or automatic. If the initially selected mode is manual, the network should return a list from which the user can choose an operator for registration. **The query command returns the current network search mode and the currently selected operator. If no operator is selected, the fields <format>, <oper>, and <AcT> will not be returned.** **The test command returns five parameters, all representing operators present in the network. If an operator in any format is unavailable, an empty field should be returned.** **The operator list is displayed in the following order: home network, (U)SIM card recommended network, and other networks.** **The maximum waiting time is 120-180 seconds.** **The network may change the value of Act, and currently, only 7 is supported. (The module supports 2G, where 0 is under 2G, and LTE is 7.)**

- **Example**

AT+COPS=?

+COPS:

(1,”China Mobile”,”CMCC”,”46000”,7),(1,”ChinaTelecom”,”CT”,”46011”,7)„(0-4),(0,2)

OK

AT+COPS?

+COPS: 0,2,"46011",7

OK

AT+COPS=3,0

OK

AT+COPS?

+COPS: 0, 0,"CHN-CT",7

OK

10.3. AT+CREG network registration information

- **Description**

This command is used to query the registration status.

Note: The E70x series only supports LTE by default, and this command is not supported.

- **Grammar**

Command	Possible response
Test command **AT+CREG=?**	**+CREG:** (supported**<n>**list) **OK**
Read command **AT+CREG?**	**+CREG: <n>,<stat>[,<lac>,<ci>,<act>]** **OK**
Read command **AT+CREG=<n>**	**OK**

- **Parameter**

<n>	0	Disable online registration URC
	1	Enable network registration URC + CREG: <stat>

	2	Enable network registration with location information URC +CREG:<stat>[,<lac>,<ci>]
	3	Enable network registration with location information and reason URC +CREG:<stat>[,[<lac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]]
		Note: The value ranges of some modules vary slightly.
<stat>	0	Not registered, ME currently not searching for an operator to register with.
	1	Registration, home network
	2	Not registered, ME is searching for an operator to register with
	3	Registration rejected
	4	Unknown status
	5	Registered, roaming network
	6	Register "SMS only", home network (applicable only when <act> indicates E-UTRAN)
	7	Registered as "SMS only", roaming (applicable only when <act> indicates E-UTRAN)
<lac>	String type. Location area code. 2 bytes (hexadecimal format).	
<ci>	String type. 16-bit (GSM) or 28-bit (LTE) cell ID. Hexadecimal format.	
<act>	Integer; Network access technology.	
	0	GSM
	1	GSM Agreement
	2	UTRAN
	3	GSM w/GPRS
	4	UTRAN w/HSDPA
	5	UTRAN w/HSUPA
	6	UTRAN w/HSDPA and HSUPA
	7	E-UTRAN
	8	EC-GSM-IoT (A/Gb mode)

10.4. AT+CPOL Preferred Operator List

- **Description**

This command is used to configure or query the preferred operator list.

- **Grammar**

Command	Possible response
Test command **AT+CPOL=?**	**+CPOL:** (supported**<index>**list) ,(supported**<format>**list) **OK**
Read command **AT+CPOL?**	**+CPOL: <index>,<format>,<oper>** **[,<GSM>,<GSM_compact>,<UTRAN>,<** **E-UTRAN>]** **[+CPOL: <index>,<format>,<oper>** **[,<GSM>,<GSM_compact>,<UTRAN>,<** **E-UTRAN>** **…]** **OK**
Read command **AT+CPOL=<index>[,<format>[,** **<oper>[<GSM>,<GSM_compact>,<UTRAN>,<** **E-UTRAN>]]]**	**OK**

- **Parameter**

<index>	Integer type; Sequence number of (U)SIM card PLMN	
<format>	0	Long string character format <oper>
	1	Short string format <oper>
	2	Digital format <oper>
<oper>	String type; carrier operator. <format> indicates whether the parameter format adopts string format or numeric format (please refer to +COPS)	
<GSM>	Integer. Whether to select GSM access technology.	
	0	Not selected
	1	Selected

<GSM_compact>	Integer. Whether to select GSM compact access technology.
	0 Not selected
	1 Selected
<UTRAN>	Integer. Whether to select UTRAN access technology.
	0 Not selected
	1 Selected
<E-UTRAN>	Integer. Whether to select E-UTRAN access technology.
	0 Not selected
	1 Selected

- **Example**

AT+CPOL=?

+CPOL: (1-82),(0,1,2) //Note: Different SIM cards have different index ranges.

OK

AT+CPOL?

+CPOL: 1,2,”46000”

OK

AT+CPOL=2,2,”46001” //Note: Add preferred operator

OK

AT+CPOL?

+CPOL: 1,2,”46000”

+CPOL: 2,2,”46001”

OK

AT+CPOL=,0 //Note: Set the display format to long-format alphanumeric <oper>

OK

AT+CPOL?

+CPOL: 1,0,"China Mobile",0,0,0,0

+CPOL: 2,0,"China Unicom",0,0,0,0

OK

AT+CPOL=1 //Note: Delete the preferred operator with index 1

OK

AT+CPOL?

+CPOL: 2,0,"China Unicom",0,0,0,0

OK

10.5. AT+CTEC Set User Preferred RAT

- **Description**

Set the user's preferred rat (not supported in the NBIOT project).

- **Grammar**

Command	Possible response
Read command **AT+CTEC?**	**+CTEC:<nPreferRat>,<nPreferRat>** **OK**

Read command **AT+CTEC=<nCurrentRat>,<nPreferRat>**	**OK**

- **Parameter**

<nCurrentRat> Current rat value.

0	Automatic mode
2	only gsm
4	only lte

<nPreferRat> Predetermined rat value.

0	Automatic mode
2	only gsm
4	only lte

10.6. AT+CSQ query signal quality

- **Description**

This command is used to query the received signal strength <rssi> and channel bit error rate <ber> of the current serving cell.

- **Grammar**

Command	Possible response
Test command **AT+CSQ=?**	**+CSQ:** (supported**<rssi>**list),(supported**<ber>**list) **OK**
execute command **AT+CSQ**	**+CSQ: <rssi>,<ber>** **OK**

- **Parameter**

<rssi>	0	-113 dBm or less
	1	-111 dBm
	2. . . 30	-109. . . -53 dBm
	31	-51 dBm or more
	99	Unknown or undetectable
<ber>(in percent)	0. . . 7	As the RXQUAL value in Table 8.2.4 of GSM 05.08 [20]
	99	Unknown or undetectable

10.7. AT+CCED Cell Information Query

- **Description**

  Use this command to query cell information for the serving cell and neighboring cells. In GSM mode, up to 10 neighboring cells can be obtained, while in LTE mode, up to 9 neighboring cells can be acquired. There are two methods to retrieve parameters for these cells: through application requests or via automatic queries performed by the module every 5 or 10 seconds. Automatic mode is not supported during communication or registration processes.

- **Grammar**

Command	Possible response
Test command **AT+CCED=?**	**OK**
Read command **AT+CCED= <mode>, <requested dump>**	**+CCED: <net mode display>: <informations>** **OK**

- **Parameter**

<mode>	int	
	0	Single query
	1	Automatically query every 5 or 10 seconds.
	2	Stop automatic query

<requested dump>	int	
	1	Primary cell (different for GSM and LTE): MCC,MNC,imsi,roamingFlag,bandInfo,bandwidth,dlEarfcn,cellid,rsrp,rsrq,tac,SrxLev,pcid
	2	Neighboring cell 1 to neighboring cell 7 (different for GSM and LTE): MCC,MNC,frequency,cellid,rsrp,rsrq,tac,SrxLev,pcid
	8	The RSSI indication (Rxlev) of the primary cell ranges from 0 to 31.
<net mode disaplay>	Character string type	
	1	GSM current cell info
	2	GSM neighbor cell info
	3	LTE current cell
	4	LTE neighbor cell

- **Example**

AT+CCED=?

+CCED: (0,1,2),(1,2,8)

OK

AT+CCED=0,1

+CCED:LTE current cell:460,11,460110138903683,0,1,n100,100,98335491,60,36,23088,49,406

OK

10.8. AT+CESQ Extended Signal Quality

- **Description**

  Execute the command to return the received signal quality parameters. If the current service area is not a GERAN area, set <rxlev> and <ber> to the value 99. If the current service area is not a UTRA FDD or UTRA TDD area, set <rscp> to 255. If the current service area is not a UTRA FDD area, set <ecno> to 255. If the current service area is not an E-UTRA area, set <rsrq> and <rsrp> to 255.

- **Grammar**

Command	Possible response
Test command **AT+CESQ=?**	**+CESQ:** (supported **<rxlev>**list),(supported **<ber>**list),(supported **<rscp>**list),(supported **<ecno>**list),(supported **<rsrq>**list),(supported **<rsrp>**list) **OK**
execute command **AT+CESQ**	**+CESQ:<rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>** **OK**

- **Parameter**

<rxlev> Integer type, received signal strength level (see 3GPP TS 45.008[20] subclause 8.1.4)

0	rssi < -110 dBm
1	-110 dBm <= rssi < -109 dBm
2	-109 dBm <= rssi < -108 dBm
: : : :	: : : :
61	-50 dBm <= rssi < -49 dBm
62	-49 dBm <= rssi < -48 dBm
63	-48 dBm <= rssi
99	Unknown or undetectable

<ber> Integer type; Channel bit error rate (percentage)

0. . . 7	RXQUAL values in the table of subclause 8.2.4 in 3GPP TS 45.008[20]
99	Unknown or undetectable.

<rscp> Integer type, receiving signal code power (see 3GPP TS 25.133[95] section 9.1.1.3 and 3GPP TS 25.123[96] section 9.

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

<ecno> Integer type, the ratio of received energy per PN chip to the total received power spectral density (see subclause in 3GPP TS 25.133[95]).

0	Ec/Io < -24 dB
1	-24 dB <= Ec/Io < -23.5 dB
2	-23.5 dB <= Ec/Io < -23 dB
: : : :	: : : :
47	-1 dB <= Ec/Io < -0.5 dB
48	-0.5 dB <= Ec/Io < 0 dB
49	0 dB <= Ec/Io
255	Unknown or undetectable

<rsrq> Integer type, reference signal received quality (see 3GPP TS 36.133[96] subclause 9.1.7).

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
<rsrp>	Integer type, reference signal received power (see Section 9.1.4 of 3GPP TS 36.133[96]).	
	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

10.9. AT+FGCSQ Extended Signal Quality

- **Description**

  Execute the command to return the received signal quality parameters. If the current service area is not a GERAN area, set <rxlev> and <ber> to the value 99. If the current service area is not a UTRA FDD or UTRA TDD area, set <rscp> to 255. If the current service area is not a UTRA FDD area, set <ecno> to 255. If the current service area is not an E-UTRA area, set <rsrq> and <rsrp> to 255.

- **Grammar**

Command	Possible response
Test command **AT+ FGCSQ =?**	**+CESQ:** (supported **<rxlev>**list),(supported **<ber>**list),(supported **<rscp>**list),(supported **<ecno>**list),(supported **<rsrq>**list),(supported **<rsrp>**list) **OK**
execute command **AT+FGCSQ**	**+FGCSQ:<rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>** **OK**

- **Parameter**

<rxlev>	Integer type, received signal strength level (refer to 3GPP TS 45.008[20] subclause 8.1.4)	
	0	rssi < -110 dBm
	1	-110 dBm <= rssi < -109 dBm
	2	-109 dBm <= rssi < -108 dBm
	: : : :	: : : :
	61	-50 dBm <= rssi < -49 dBm
	62	-49 dBm <= rssi < -48 dBm
	63	-48 dBm <= rssi
	99	Unknown or undetectable
<ber>	Integer type; Channel bit error rate (percentage)	
	0. . . 7	As the RXQUAL value in the table under subclause 8.2.4 of 3GPP TS 45.008 [20]
	99	Unknown or undetectable.
<rscp>	integer type, received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3)	
	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
<ecno>	Integer type, the ratio of received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133[95] subclause).	
	0	Ec/Io < -24 dB
	1	-24 dB <= Ec/Io < -23.5 dB
	2	-23.5 dB <= Ec/Io < -23 dB
	: : : :	: : : :

	47	-1 dB <= Ec/Io < -0.5 dB
	48	-0.5 dB <= Ec/Io < 0 dB
	49	0 dB <= Ec/Io
	255	Unknown or undetectable
<rsrq>	Integer type, reference signal received quality (see 3GPP TS 36.133[96] subclause 9.1.7).	
	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
<rsrp>	Integer type, reference signal received power (see Section 9.1.4 of 3GPP TS 36.133[96]).	
	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

10.10. AT+TUEINFO query UE status information

- **Description**

  Execute the command to query UE status information.

- **Grammar**

Command	Possible response
Test command **AT+TUEINFO=?**	**TUEINFO:(0,1)** **OK**
Read command **AT+TUEINFO?**	**TUEINFO:<n>** **OK**
Read command **AT+TUEINFO=<n>**	**TUEINFO:<n>**
execute command **AT+ TUEINFO**	**TUEINFO:DLEARFCN,<dlEarfcn>** **TUEINFO:PCID,<pcid>** **TUEINFO:RSRP,<rsrp>** **TUEINFO:RSRQ,<rsrq>** **TUEINFO:SINR,<sinr>** **TUEINFO:MSL,<msl>** **TUEINFO:ULMCS,<ulMcs>** **TUEINFO:DLMCS,<dlMcs>** **TUEINFO:MPDCCHREPNUM,<mpdcchRepNum>** **TUEINFO:PUSCHREPNUM,<puschRepNum>** **TUEINFO:PDSCHREPNUM,<pdschRepNum>** **TUEINFO:ULINITIALBLER,<ulinitialbler>** **TUEINFO:DLINITIALBLER,<dlinitialbler>** **TUEINFO:ULRBNUM,<ulRbNum>** **TUEINFO:DLRBNUM,<dlRbNum>** **TUEINFO:ULRLCRATE,<ulRlCrate>** **TUEINFO:DLRLCRATE,<dlRlCrate>** **TUEINFO:ULTBS,<ulTbs>** **TUEINFO:DLTBS,<dlTbs>** **OK**

- **Parameter**

<n>	0	Manual mode (default)
	1	Automatic mode (will automatically report UE status information)

10.11. AT+VERCTRL automatically activates PDN

- **Description**

  PDN is automatically activated upon power-on.

- **Grammar**

Command	Possible response
Test command **AT+VERCTRL=?**	**+VERCTRL: enable=[0-1](0-storeroom; 1-gcf),pdn_auto_attach=[0-1](0-disable;1-enable)** **OK**
Read command **AT+VERCTRL?**	**+VERCTRL:<FTA>,<Auto-Activate_PDP>** **OK**
Read command **AT+VERCTRL=<FTA>, <Auto-Activate_PDP>**	**OK**

- **Parameter**

<FTA>	0	Prohibited (warehouse)
	1	Enable (GCF)
<Auto-Activate_PDP >	The flag for automatically activating PDP context upon power-up:	
	0	Disabled
	1	Enable

10.12. AT+CTECQ Set user front-end RAT

- **Description**

  Set user preferred rat

- **Grammar**

Command	Possible response
Read command **AT+CTECQ?**	**+CTECQ:<nPreferRat>** **OK**
Read command **AT+CTECQ=<nPreferRat>**	**OK**

- **Parameter**

<nPreferRat> Predetermined rat value.

0	Automatic mode
2	only gsm
4	only lte

10.13. AT+SETBAND Set frequency band operating frequency

- **Description**

  2G mode band setting, controlling the terminal's operating frequency band via AT commands locks the terminal to operate only within that specified frequency band. The setting will be saved to NV and takes effect after device reboot.

- **Grammar**

Command	Possible response
Read command **AT+SETBAND?**	**+SETBAND:<band>** **OK** **or** **+CME ERROR:<err>**
Read command **AT+SETBAND=<band>**	**OK** **or** **+CME ERROR:<err>**

- **Parameter**

<band>	0	900P | 900e | 850 | 1800 | 1900
	1	900E
	2	1800

10.14. AT+SETLOCK Set Band Operating Frequency (4G)

- **Description**

  4G mode band setting. When controlling the terminal's operating frequency to lock onto a specific band via AT commands, the terminal can only operate within that designated frequency band. The configuration will be saved to NV and takes effect after device reboot.

- **Grammar**

Command	Possible response
Test command **AT+SETLOCK=?**	**OK**
Read command **AT+SETLOCK=<oper>,<type>** **If oper is 0 or 2, command format:** **AT+SETLOCK=<oper>,<type>**	**OK** **or** **+CME ERROR:<err>**
If oper is 1, command format: **oper=1,type=0:AT+SETLOCK=<oper>,<type>,<band>** **oper=1,type=1:AT+SETLOCK=<oper>,<type>,<freq>** **oper=1,type=2:AT+SETLOCK=<oper>,<type>,<freq>,<cell>** **oper=1,type=3:AT+SETLOCK=<oper>,<type>,<TDD or FDD>**	**OK**

- **Parameter**

<oper>	Integer, indicating personal operation	
	0	unlock
	1	lock
	2	Acquire lock
<type>	Lock the frequency band, frequency, or according to the oper's cell	

	0	Frequency band
	1	Frequency (oper=1 or 2) and cell and frequency (oper=0)
	2	Cell (oper=2 or 0) and cell and frequency (1)
	3	TDD or FDD
<band>	""" Integer, supported frequency bands 1,3,5,7,8,34,38,39,40,41 """	
<frequency>	Different frequency bands support different frequencies, refer to3GPP TS 36.101 , 1：0-599 3:1200-1949 5:2400-2649 7：2750-3449 8:3450-3799 38:37750-38249 39：38250-38649 40:38650-39649 41:39650-41589	
<cell>	Integer, 0-503	
<tdd or fdd>	Character string type	“TDD”or”FDD”

- **Example**

• Lock frequency band

AT+SETLOCK=1,0,5

OK

+CIEV: “MESSAGE”,1

+CSCON: 0

+CREG: 0

+CSCON: 1

+CREG: 1

+GSM Service

+CTZV: +32

+CSCON: 0

+CSCON: 1

+CIEV: “MESSAGE”,1

• Obtaining frequency bands

AT+SETLOCK=2,0

+SETLOCK: 1,5

OK

• Unlock frequency bands

AT+SETLOCK=0,0

OK

• Lock the cell

AT+SETLOCK=1,2,500,400

OK

+CIEV: “MESSAGE”,1

+CSCON: 0

+CREG: 0

+CSCON: 1

+CREG: 1

+GSM Service

+CTZV: +32

+CSCON: 0

+CSCON: 1

+CIEV: “MESSAGE”,1

• Obtaining residential communities

AT+SETLOCK=2,2

+SETLOCK: 400

OK

• Unlock the residential area

AT+SETLOCK=0,2

OK

10.15. AT+LOCREL RCC Connection Release Delay Optimization Method

- **Description**

  Connection release delay optimization method.

- **Grammar**

Command	Possible response
Test command **AT+LOCREL=?**	**AT+LOCREL:** (supported**<value>**list) **OK**
Read command **AT+LOCREL?**	**+LOCREL: <value>** **OK**
Read command **AT+LOCREL=<value>**	**OK** **or** **+CME ERROR: <err>**

- **Parameter**

<value> Plastic surgery, value range 0-20, unit: seconds, a value of 0 indicates it does not take effect.

Comment
In the 8850/8910 platform, the unit is 0.5 s, meaning within the value range of 0~20, each step increment is 0.5 s, resulting in an effective range of 0~10 s. For example, AT+LOCREL=4 indicates that the local release time after no data transmission is 2 s. **In the ASR platform, the unit is 1 s, meaning within the value range of 0~20, each step increment is 1 s, resulting in an effective range of 0~20 s. For example, AT+LOCREL=4 indicates that the local release time after no data transmission is 4 s.**

10.16. AT+MGCFG configuration parameter command

- **Description**

This command specifies the frequency band for UE's network search.

- **Grammar**

Command	Possible response
Test command **AT+MGCFG=?**	**+MGCFG: "BAND",0x(0-FFFF),0x(0-7FFFFFFFFFFFFFFF),0x(0-FFFF),(0,1)**
search command **Query the currently configured network search frequency bands** **AT+MGCFG="band"**	**+MGCFG:** **"band",<bandval>,<ltebandval>** **OK**
Write command **Configure network search frequency bands** **AT+CFG="band"[,<bandval>,<ltebandval>[,<effect>]]**	**OK** **or** **ERROR**

- **Parameter**

<bandval> Hexadecimal number. This value specifies the frequency band of GSM. If set to 0, it indicates that the GSM frequency band will not be changed.

example: 0003 = 0001 (EGSM900) + 0002 (DCS1800)

0 not change

0001 EGSM900

0002 DCS1800

0004 GSM850

0008 PCS1900

FFFF Full frequency band

<ltebandval> Hexadecimal number. This value specifies the LTE frequency band. If set to 0, it indicates no change to the LTE frequency band.

example: 0x15 = 0x1 (LTE B1) + 0x4 (LTE B3) + 0x10 (LTE B5)

0 not change

0x1 (CM_BAND_PREF_LTE_EUTRAN_BAND1) LTE B1

0x2 (CM_BAND_PREF_LTE_EUTRAN_BAND2) LTE B2

0x4 (CM_BAND_PREF_LTE_EUTRAN_BAND3) LTE B3

0x8 (CM_BAND_PREF_LTE_EUTRAN_BAND4) LTE B4

0x10 (CM_BAND_PREF_LTE_EUTRAN_BAND5) LTE B5

0x40 (CM_BAND_PREF_LTE_EUTRAN_BAND7) LTE B7

0x80 (CM_BAND_PREF_LTE_EUTRAN_BAND8) LTE B8

0x80000 (CM_BAND_PREF_LTE_EUTRAN_BAND20) LTE B20

<effect> **Integer. Command activation method.**

example：0 UE Take effect after restart

1 Effective immediately

Comment
1. The module can simultaneously configure up to 5 LTE frequency bands (all configured bands will be unlocked when <ltebandval> is set to "full band"); if the number of configured bands exceeds 5, an error code will be returned. **2. For detailed information on the frequency bands actually supported by the module, please refer to the product specifications of each module.** **3. Use AT+MGCFG="band",0x0000FFFF,0x7fffffffffffffff,0x0 to restore the network search frequency band.**

11. PSM Command

11.1. AT+CPSMS sets PSM

- **Description**

The command writes the settings for the UE power-saving mode (PSM) parameters. This command controls whether the UE should apply PSM, as well as the requested extended periodic RAU value and the requested GPRS ready timer value (for GERAN/UTRAN), the requested extended periodic TAU value (for E-UTRAN), and the requested active time value. Refer to the active time value, extended periodic RAU value, and GPRS ready timer value (assigned to the UE by the network in GERAN/UTRAN) provided by the +CGREG command, as well as the active time value and extended periodic TAU value (assigned to the UE by the network in E-UTRAN) provided by the +CEREG command.
A special form of the command may be specified as +CPSMS= (omitting all parameters). In this form, the parameter <mode> will be set to 0, disabling the use of PSM, and all parameter data in the +CPSMS command will be deleted or, if available, set to manufacturer-specific default values.
The read command returns the current parameter values.
The test command returns the supported <mode> and the value ranges for the requested extended periodic RAU value, the requested GPRS ready timer value (for GERAN/UTRAN), the requested extended periodic TAU value (for E-UTRAN), and the requested active time value.

- **Grammar**

Command	Possible response
Test command **AT+CPSMS=?**	**+CPSMS: mode=[0-2],,,Requested_Periodic-TAU=”8bitStringofByte eg. 01000111 1”,Requested_Active-Time=”8bitStringofByte eg. 01100101”** **OK**
Read command **AT+CPSMS?**	**+CPSMS: <mode>,,,<Requested_Periodic-TAU>,<Requested_Active-Time>** **OK** **or** **+CME ERROR: <err>**

Read command **AT+CPSMS=<mode>[,[,[,<Requested_Periodic-TAU>[,<Requested_Active-Time>]]]]**	**OK** **or** **+CME ERROR: <err>**

Reference: 3GPP TS 27.007 V3.12.0

- **Parameter**

<mode> Integer type. Enable or disable PSM in UE.

0	Disabled PSM
1	Enable PSM
2	Disable PSM and discard all parameters of PSM, resetting to manufacturer-specific default values if available. In this mode, the read parameter <mode> will be set to 0.

<Requested_Periodic-RAU> String type; an 8-bit formatted byte. The requested extended periodic RAU value (T3312) is allocated to UEs in GERAN/UTRAN. The requested extended periodic RAU value is encoded as one byte (octet 3) of the GPRS timer 3 information element in bit format (e.g., "01000111" equals 70 hours). For encoding and value ranges, refer to 3GPP TS 24.008 [8] Table 10.5.163a/3GPP TS 24.008. Also see 3GPP TS 23.682 [149] and 3GPP TS 23.060 [47]. If available, use manufacturer-specific default values.

<Requested_GPRS-READY-timer> String type; an 8-bit formatted byte. The requested GPRS ready timer value (T3314) is allocated to the UE in GERAN/UTRAN. The requested GPRS READY timer value is encoded as one byte (octet 2) of the GPRS timer information element in bit format (e.g., "01000011" equals 3 decahours or 18 minutes). For encoding and value ranges, refer to the GPRS timer IE in 3GPP TS 24.008 [8] Table 10.5.172/3GPP TS 24.008. See also 3GPP TS 23.060 [47]. If available, use manufacturer-specific default values.

<Requested_Periodic-TAU> String type; an 8-bit formatted byte. Requests the extended periodic TAU value (T3412) allocated to the UE in E-UTRAN. The requested extended periodic TAU value is encoded as one byte (octet 3) of the GPRS timer 3 information element in bit format (e.g., "01000111" equals 70 hours). For encoding and value ranges, refer to GPRS timer 3 IE in 3GPP TS 24.008 [8] Table 10.5.163a/3GPP TS 24.008. Also see 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82]. If available, use manufacturer-specific default values.

<Requested_Active-Time> String type; an 8-bit formatted byte. The requested active time value (T3324) allocated to the UE. The requested active time value is encoded as one byte

(octet 3) of the GPRS Timer 2 information element in bit format (e.g., "00100100" equals 4 minutes). For encoding and value range, refer to the GPRS Timer 2 IE in 3GPP TS 24.008 [8] Table 10.5.163/3GPP TS 24.008. Also see 3GPP TS 23.682 [149], 3GPP TS 23.060 [47], and 3GPP TS 23.401 [82]. If available, use manufacturer-specific default values.

- **Example**

AT+CPSMS=?

+CPSMS: mode=[0-2]„,Requested_Periodic-TAU

="8bitStringofByte eg. 01000111",

Requested_Active-Time

="8bitStringofByte eg. 01100101"

OK

AT+CPSMS?

+CPSMS: 1„, "01000101", "00000000"

OK

AT+CPSMS=1

OK

11.2. AT+CEDRXS eDRX settings

- **Description**

The write command controls the configuration of UE's eDRX parameters. This command determines whether the UE should apply eDRX and specifies the required eDRX values for each designated type of access technology.
The write command also governs the reporting of +CEDRXP: <AcT type>[, <Requested_eDRX_value>[, <NW-provided_eDRX_value>[, <Paging_time_window>]]], triggered when <n>=2 and the network-provided eDRX parameters are modified.
A special form of the command, AT+CEDRXS=3, disables eDRX and either clears all parameter data in AT+CEDRX or, if eDRX is enabled, resets all parameters to manufacturer-specific default values.
The read command returns the current settings for each defined value of <AcT type>.
The test command provides the supported <mode> and access technology value ranges, along with the requested eDRX values.

- **Grammar**

Command	Possible response
Test command **AT+CEDRXS=?**	**+CEDRXS:** (supported**<mode>**list), (supported**<AcT-type>**list), (supported**<Requested_eDRX_value>**list) **OK**
Read command **AT+CEDRXS?**	**+CEDRXS:[<mode>,[,<AcTtype>[,** **<Requested_eDRX_value>]]]** **OK**
Read command **AT+CEDRXS=[<mode>,[,<AcTtype>[,<Requested_eDRX_value>]]]** **AT+CEDRXS=[<mode>,[,<AcTtype>[,<Requested_eDRX_value>]]]**	**OK** **or** **+CME ERROR: <err>**

- **Parameter**

<mode> Integer, indicating the disabling or enabling of eDRX on the terminal. This parameter applies to all user-specified access technology types, meaning the latest setting of <mode> will affect all specified values of <AcT-type>.

0 Disable DRX

1	Enable eDRX
2	Under this configuration, the read parameter <mode> will be set to 1. + CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NWprovided_eDRX_value>[,<Paging_time_window>]]]
3	Disable the use of eDRX, discard all parameters of eDRX, and if available, reset to manufacturer-specific default values. In this form, the read parameter <mode> will be set to 0.

<AcT-type>

Integer type, indicating the type of access technology. AT+CEDRXS is used to specify the relationship between the access technology type and the requested eDRX value.

0	The access technology does not use eDRX. This parameter value is only used in unrequested result codes.
1	EC-GSM-IoT (A/Gb mode)
2	GSM (A/Gb mode)
3	UTRAN (Iu mode)
4	E-UTRAN (WB-S1 mode)

<Requested_eDRX_value>

String type; A nibble represented in 4-bit format. The eDRX value refers to bits 4 to 1 of octet 3 in the extended DRX parameter information element (see clause 10.5.5.32 of 3GPP TS 24.008[8]). For encoding and value ranges, refer to the extended DRX parameter information element in 3GPP TS 24.008[8]. If available, use manufacturer-specific default values.

- **Example**

AT+CEDRXS=?

+CEDRXS: mode=[0-3], AcT-type=[4-5],Requested_eDRX_value ="4bitStringeg.0100"

OK

AT+CEDRXS?

+CEDRXS: 0,4, "0000"

OK

AT+CEDRXS=1,4, "0100"

OK

11.3. AT+CEDRXRDP eDRX dynamic parameter query

- **Description**

  If eDRX is used for the cell where the MS has registered, the command returns <AcT type>, <Requested_eDRX_value>, <NW-provided_eDRX_value>, and <Paging_time_window>. If the MS is currently registered to a cell that does not use eDRX, AcT type=0 is returned.

- **Grammar**

Command	Possible response
Test command AT+CEDRXRDP=?	**OK**
execute command AT+CEDRXRDP	**+CEDRXRDP: <AcT-type>[,<Requested _eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]** **OK**

- **Parameter**

<AcT-type> Integer type, indicating the type of access technology. The AT command is used to specify the relationship between the access technology type and the requested eDRX value.

0	The access technology did not employ eDRX.
1	EC-GSM-IoT (A/Gb mode)

	2	GSM (A/Gb mode)
	3	UTRAN (Iu mode)
	4	E-UTRAN (WB-S1 mode)
	5	E-UTRAN (NB-S1 mode)
<Requested_eDRX_value>	String type; 4-bit format nibble. The eDRX value refers to bits 4 to 1 of octet 3 of the extended DRX parameter information element (see subclause 10.5.5.32 of 3GPP TS 24.008[8]). For encoding and value ranges, please refer to the extended DRX parameter information element in Table 10.5.5.32/3GPP TS 24.008[8].	
<NW-provided_eDRX_value>	String type; 4-bit format semi-octet. The eDRX value refers to bits 4 to 1 of octet 3 in the extended DRX parameter information element (see subclause 10.5.5.32 of 3GPP TS 24.008[8]). For encoding and value ranges, please refer to Table 10.5.5.32/3GPP TS 24.008 for the extended DRX parameter information element in 3GPP TS 24.008[8].	
<Paging_time_window>	Character string type; 4-bit format nibble. The paging time window refers to the extension of the DRX parameter information element from 8 bits to 5 bits (see subclause 10.5.5.32 of 3GPP TS 24.008[8]). For encoding and value ranges, please refer to the extended DRX parameter information element in Table 10.5.5.32/3GPP TS 24.008[8].	

11.4. AT+CSODCP transmits initial data via the control plane.

- **Description**

  The write command is used for the TE to transmit control plane data to the network via the MT. The background information identifier <cid> is used to link the data to a specific context.
  This command enables applications on the MT to expect data exchange: it will be completed either upon uplink data transmission or upon the next reception of downlink data.
  This command can also indicate whether the transmitted data is abnormal.
  The command triggers the transmission of an ESM data transfer message, as defined in 3GPP TS 24.301 [83].
  The test command returns the supported range of <cid>, the maximum number of bytes for user data <cpdata_length>, support for <RAI>, and supported <type_of_user_data> values.

- **Grammar**

Command	Possible response
Test command **AT+CSODCP=?**	**+CSODCP:** (supported**<cid>**list), **<cpdata_length>**, (supported**<RAI>**list) , (supported**<type_of_user_data>**list) **OK**
Read command **AT+CSODCP=<cid>,<cpdata_length>,<cpdata>[,<RAI>[,<type_of_user_data>]]**	**OK** **or** **+CME ERROR: <err>**

- **Parameter**

<cid> Integer type. A numeric parameter used to specify the definition of a particular PDP context or EPS bearer context. The <cid> parameter is a local parameter of the TE-MT interface, used to identify that the PDP or EPS bearer context has been configured via AT commands (refer to the +CGDCONT and +CGDSCONT commands).

<cpdata_length> Integer type. Indicates the byte count of the <cpdata> information element. When there is no data transmission, this value should be set to zero.

<cpdata> Octet string. Contains the user data container content (refer to 3GPP TS 24.301 [83] clause 9.9.4.24). When there is no data to transmit, <cpdata> shall be an empty string (""). This parameter shall not undergo regular character conversion according to +CSCS. The encoding format of the user data container and the maximum length of <cpdata> are implementation-dependent.

<RAI> Integer type. Indicates the value of the release assistance indication, refer to 3GPP TS 24.301 [83] subclause 9.9.4.25.

0 No available information

	1	MT expects the data exchange to be completed with the transmission of ESM data transfer messages.
	2	MT expects to complete the data exchange transportation information upon receiving the ESM data.

<type_of_user_data> Integer type. Indicates whether the transmitted user data is normal or abnormal.

0	Conventional data
1	Abnormal data

Comment
Xinyi platform does not support this command

11.5. AT+CRTDCP upgrades the final data through the control plane.

- **Description**

  The write command is used to enable and disable the reporting of downlink data transmission from the network to the MT via the control plane. If reporting is enabled, the MT will return +CRTDCP: <cid>,<cpdata_length>,<cpdata>.
  The read command returns the current settings.
  The test command returns the supported values in the form of compound values.

- **Grammar**

Command	Possible response
Test command **AT+CRTDCP=?**	**+CRTDCP:**(supported**<reporting>**list),(supported **<cid>**range),(**<cpdata_length>**The maximum number of octets representing user data) **OK**

Read command AT+CRTDCP?	**+LOCREL: <value> OK**
Read command AT+CRTDCP=[<reporting>]	**OK**

- **Parameter**

<reporting> Integer type, controlling the reporting of mobile terminal control plane data events.

0 Disable the reporting of MT control plane data.

1 Enable reporting of MT control plane data via unsolicited result code +CRTDCP.

<cid> Integer type.

A numeric parameter specifying a particular PDP context or EPS bearer context definition. The <cid> parameter is a local parameter of the TE-MT interface, used to identify the PDP or EPS bearer context configured via AT commands (refer to the +CGDCONT and +CGDSCONT commands).

<cpdata_length> Integer type.

Indicates <cpdata> the number of octets of the information element. When there is no data to be transmitted, this value shall be set to zero.

<cpdata> Octal character string.

Contains user data container contents (refer to 3GPP TS 24.301[83] subclause 9.9.4.24). When there is no data to be transmitted, <cpdata> shall be an empty string (""). This parameter shall not undergo routine character conversion according to +CSCS. The encoding format of the user data container and the maximum length of <cpdata> are implementation-specific.

Comment
Xinyi platform does not support this command

12. ESP command

12.1. AT+CEMODE EPS Operation UE Mode

- **Description**

  The write command is used to set the MT operation according to the specified operation mode of EPS. If the requested operation mode is not supported, an error or +CME ERROR response will be returned.
  The read command returns the operation mode set by TE.
  The test command is used to return the range of modes.

- **Grammar**

Command	Possible response
Test command **AT+CEMODE=?**	**+CEMODE:**(supported**<mode>**list) **OK**
Read command **AT+CEMODE?**	**+CEMODE:<mode>** **OK**
Read command **AT+CEMODE=[<mode>]**	**OK** **or** **ERROR**

- **Parameter**

<mode> Integer type; indicates the operation mode. The default value is manufacturer-specific.

0	PS operation mode 2: The UE only registers to EPS services, with the UE usage setting configured as "data-centric".
1	CS/PS operation mode 1: The UE is only registered to EPS and non-EPS services, with the UE usage setting configured as "voice-centric".
2	CS/PS operation mode 2: The UE only registers to EPS and non-EPS services, with the UE's usage setting configured as "data-centric".
3	PS operation mode 1: The UE only registers to EPS services, with the UE usage setting configured as "voice-centric".

Comment
1.When in CS/PS mode, data cannot be directly saved to NVM as it may affect GCF testing. It is necessary to send the AT+NVPC=0,2 command for saving; otherwise, the settings will be reset after reboot. **2.When 4G disables the CS domain, sending AT+CEMODE=3 to disable it may allow the UE to register on 2G or non-voltage-supported networks before voltage activation. It is recommended to use AT+CEMODE=0. The difference lies in that AT+CEMODE=0 is data-centric, while AT+CEMODE=3 is voice-centric.**

12.2. AT+CGEQOS defines EPS Quality of Service

- **Description**

  The write command allows the TE to specify EPS quality of service parameters <cid>, <QCI>, [<DL-GBR> and <UL-GBR>], and [<DL-MBR> and <UL-MBR>] for a PDP context or traffic flow. In UMTS/GPRS, the MT applies the mapping function to the UMTS/GPRS quality of service.
  A special form of the write command, +CGEQOS=<cid>, causes the value of the context number <cid> to become undefined.
  The read command returns the current settings of each parameter.
  The test command returns the supported parameter ranges as compound values.

- **Grammar**

Command	Possible response
Test command **AT+CGEQOS=?**	**+CGEQOS:** (supported**<cid>**list),(supported **<QCI>** supported),(supported**<DL_GBR>** supported),(supported**<UL_GBR>** supported),(supported**<DL_MBR>** supported),(supported**<UL_MBR>** supported) **OK**
Read command **AT+CGEQOS?**	**+CGEQOS:** **<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>][<CR><LF>]** **+CGEQOS:<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>][...]]**
AT+CGEQOS=<cid>[,<QCI>[,<DL_GBR>,<UL_GBR>[,<DL_MBR>,<UL_MBR]]]	**OK** or **ERROR**

- **Parameter**

<cid> Integer type; identifies specific communication flows in EPS and PDP contexts in UMTS/GPRS (please refer to the +CGDCONT and +CGDSCONT commands).

<QCI> Integer type; Specifies the EPS QoS class (refer to 3GPP TS 23.203[85] and 3GPP TS 24.301[83])

0	QCI is selected by the network
[1 - 4]	Numerical range of guaranteed bit rate in communication flow
75	The numerical value of the guaranteed bit rate in the communication flow
[5 - 9]	The numerical range of the non-guaranteed bit rate in the communication flow
79	The numerical value of the non-guaranteed bit rate in the communication flow
[128 - 254]	Operator-specific QCI value range

The UE is not allowed to request QCI values 65, 66, 67, 69, and 70. If the TE requests QCI parameters 65, 66, 67, 69, or 70, the MT will respond with the result code +CME ERROR:181 (unsupported QCI value).

<DL_GBR> Integer type; represents DLGBR in the case of GBRQCL. The unit of this value is kbit/s. This parameter is omitted in non-GBRQCL (refer to 3GPP TS 24.301[83]).

<UL_GBR> Integer type; represents ULGBR in the case of GBRQCI. The unit of this value is kbit/s. This parameter is omitted in non-GBRQCL (refer to 3GPP TS 24.301[83]).

<DL_MBR> Integer type; represents the DLMBR under GBRQCL conditions. The unit of this value is kbit/s. This parameter is omitted in non-GBRQCI cases (refer to 3GPP TS 24.301[83]).

<UL_MBR> Integer type; represents the ULMBR in the case of GBRQCL. The unit of this value is kbit/s. This parameter is omitted in non-GBRQCL scenarios (refer to 3GPP TS 24.301[83]).

- **Example**

```
AT+CGEQOS=?

+CGEQOS: (1..7), (0..9,75,79,128..254), (0..10000), (0..5000), (0..10000), (0..5000)
```

OK

AT+CGEQOS?

+CGEQOS: 1,0,0,0,0,0

+CGEQOS: 2,0,0,0,0,0

+CGEQOS: 3,0,0,0,0,0

+CGEQOS: 4,0,0,0,0,0

+CGEQOS: 5,0,0,0,0,0

+CGEQOS: 6,0,0,0,0,0

+CGEQOS: 7,0,0,0,0,0

OK

AT+CGEQOS=2,3

OK

AT+CGEQOS?

+CGEQOS: 1,0,0,0,0,0

+CGEQOS: 2,3,0,0,0,0

+CGEQOS: 3,0,0,0,0,0

+CGEQOS: 4,0,0,0,0,0

+CGEQOS: 5,0,0,0,0,0

+CGEQOS: 6,0,0,0,0,0

+CGEQOS: 7,0,0,0,0,0

OK

12.3. AT+CGEQOSRDP EPS Quality of Service Read Dynamic Parameters

- **Description**

  Set the command to return the Quality of Service (QoS) parameters <QCI>, [<DL_GBR> and <UL_GBR>], and [<DL_MBR> and <UL_MBR>] for the PDP context established by the provided context index <cid>. If the parameter <cid> is omitted, return the QoS parameters for all established PDP contexts.
  The test command returns the active context-related <cid>.

- **Grammar**

Command	Possible response
Test command AT+CGEQOSRDP=?	**+CGEQOSRDP:** (Activated 上下文相关的**cid>**list) **OK**
Read command **AT+CGEQOSRDP=<cid>**	**+CGEQOSRDP:<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>][,<DL_AMBR>,<UL_AMBR>]][<CR><LF>** **+CGEQOSRDP:** **<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],** **[<DL_MBR>,<UL_MBR>][,<DL_AMBR>,<UL_AMBR>][...]]** **OK**

- **Parameter**

<cid> Integer type; identifies specific communication flows in EPS and PDP contexts in UMTS/GPRS (please refer to the +CGDCONT and +CGDSCONT commands).

<QCI> Integer type; Specifies the EPS QoS class (refer to 3GPP TS 23.203[85] and 3GPP TS 24.301[83])

0	QCI is selected by the network
[1 - 4]	Numerical range of guaranteed bit rate in communication flow
75	The numerical value of the bit rate guaranteed in the communication flow
[5 - 9]	The numerical range of the bit rate not guaranteed in the communication flow

	79	The numerical value of the non-guaranteed bit rate in the communication flow
	[128 - 254]	The specified QCI value range for the operator

The UE is not allowed to request QCI values 65, 66, 67, 69, and 70. If the TE requests QCI parameters 65, 66, 67, 69, or 70, the MT will respond with the result code +CME ERROR:181 (unsupported QCI value).

<DL_GBR> Integer type; represents DLGBR under GBRQCL conditions. The unit of this value is kbit/s. This parameter is omitted in non-GBRQCL cases (refer to 3GPP TS 24.301[83]).

<UL_GBR> Integer type; represents ULGBR in the case of GBRQCI. The unit of this value is kbit/s. This parameter is omitted in non-GBRQCL (refer to 3GPP TS 24.301[83]).

<DL_MBR> Integer type; represents the DLMBR in the case of GBRQCL. The unit of this value is kbit/s. This parameter is omitted in non-GBRQCI (refer to 3GPP TS 24.301[83]).

<UL_MBR> Indicates the DL APN Aggregate MBR (see 3GPP TS 24.301[83]). This value is measured in kbit/s.

<DL_AMBR> Indicates the UL APN Aggregate MBR (see 3GPP TS 24.301[83]). The value is in kbit/s.

<UL_AMBR> Integer type; represents DLGBR under GBRQCL conditions. The unit of this value is kbit/s. This parameter is omitted in non-GBRQCL scenarios (refer to 3GPP TS 24.301[83]).

- **Example**

```
//The following example demonstrates a typical application of this command.
AT+CGEQOSRDP=?
+CGEQOSRDP: (1..7)
OK

AT+CGEQOSRDP=1
OK
```

12.4. AT+CEREG EPS network registration status

- **Description**

This command is used to query the network status and control the reporting of unsolicited result codes for network registration status.
When <n>=1, it controls the reporting of URC +CEREG: <stat>, which indicates changes in the EPS network registration status of MT in E-UTRAN.
When <n>=2, it controls the reporting of URC +CEREG: <stat>[,<tac>,<ci>[,<AcT>]], which indicates changes in the network cell within E-UTRAN.
When <n>=3, it controls the reporting of URC +CEREG: <stat>[,<tac>,<ci>[,<AcT>,<cause_type>,<reject_cause>]], which indicates a change in the value of <stat>.
If the UE intends to apply PSM to reduce its power consumption, please refer to the +CPSMS command and 3GPP TS 23.682[149]. The write command controls the unsolicited result code +CEREG:<stat>[, [<tac>], [<ci>], [<AcT>][, [<cause_type>], [<reject_cause>][, [<Active Time>], [<Periodic TAU>]]].
When <n>=4, if the network cell in E-UTRAN changes, the URC reports that the UE provides additional information about the Active Time value and the extended Periodic TAU value.
When <n>=5, the URC is reported when the <stat> value changes. The parameters <AcT>, <tac>, <ci>, <cause-type>, <reject-cause>, <Active Time>, and <Periodic TAU> are provided only when available.

Comment
1. If the EPS MT in GERAN/UTRAN/E-UTRAN also supports circuit mode services and/or GPRS services, the +CREG command and +CREG:result codes and/or +CGREG command and +CGREG:result codes apply to the registration status and location information of these services. **The read command returns the status presented by the result codes and returns an integer <stat> indicating whether the network currently shows the registration of the MT. The location information elements <ci> and <AcT> (if available) are returned only when <n>=2 and the MT is registered in the network. The parameters [, <cause_type>, <reject_cause>] are returned when <n>=3 if available.** **2. The test command returns the supported values as composite values. When the EPS network (LTE mode PS network) registration status changes, it will automatically report "+CEREG:<stat>".**

- **Grammar**

Command	Possible response
Test command AT+CEREG=?	**+CEREG:** (supported **<n>**list)

	OK
Read command AT+CEREG?	When <n>=0, 1, 2 or 3, stat=0, 3 or 4, and the command is successful: **+CEREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>,<reject_cause>]]]** **OK** When <n>=0, 1, 2 or 3, stat=1 or 5, and the command is successful: **+CEREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>]]** **OK** When <n>=4 or 5 and the command succeeds: **+CEREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>][, [<cause_type>],[<reject_cause>][, [<Active-Time>],[<Periodic-TAU>]]]]** **OK**
Read command AT+CEREG=[<n>]	**OK** or **ERROR**

- **Parameter**

<n>	0	Prohibit reporting network registration URC
	1	Permitted to report network registration URC+CEREG:<stat>
	2	Allow reporting of network registration and location information URC +CEREG:<stat>[, [<tac>], [<ci>], [<AcT>]]
	3	Allow reporting of network registration and location information and EMM cause value information URC +CEREG:<stat>[, [<tac>], [<ci>], [<AcT>][, <cause_type>, <reject_cause>]]
	4	For UEs that need to apply PSM, reporting network registration and location information +CEREG:<stat>[, [<tac>], [<ci>], [<AcT>][, [<Active Time>], [<Periodic TAU>]]] is allowed.
	5	For UEs that need to apply PSM, reporting of network registration and location information as well as EMM cause value information URC +CEREG:<stat>[, [<tac>], [<ci>], [<AcT>][, [<cause_type>], [<reject_cause>][, [<Active Time>], [<Periodic TAU>]]]] is permitted.

<stat>	Integer type; indicates EPS registration status	
	0	MT currently does not detect any registered service operators.
	1	Registration, home network
	2	Not registered, but MT is currently attempting to attach to or search for a network for registration.
	3	Registration rejected
	4	Unknown (e.g., beyond e-UTRAN coverage)
	5	Registration, roaming
	6	Register "SMS only", home network (not applicable)
	7	Registration "SMS only", roaming (not applicable)
	8	For emergency bearing service only (see Note 3)
	9	Register "CSFB not prioritized", home network (not applicable)
	10	Register "CSFB not prioritized", roaming (not applicable)
	Note: 3GPP TS 24.008[8] and 3GPP TS 24.301[83] specify the conditions under which the MS is considered as an emergency bearer service attachment.	
<tac>	String type. Two-byte tracking area code in hexadecimal format (e.g., "00C3" equals 195 in decimal).	
<ci>	String type. A 28-byte (E-UTRAN) cell ID in hexadecimal format.	
<AcT>	Integer type; Network access technology	
	0	Default（No internet connection）
	1	GSM Compact（Not applicable）
	2	UTRAN（Not applicable）
	3	GSM w/EGPRS（See Note 3） （Not applicable）
	4	UTRAN w/HSDPA（See Note 4） （Not applicable）

	5	UTRAN w/HSUPA（See Note 4） （Not applicable）
	6	UTRAN w/HSDPA和HSUPA（See Note 4） （Not applicable）
	7	E-UTRAN
	9	E-UTRAN（NB-S1 mode）

Note:

3GPP TS 44.060[71] specifies the system information message, which provides information on whether the serving cell supports EGPRS.

3GPP TS 25.331[74] specifies the system information block, which provides information on whether the serving cell supports HSDPA or HSUPA.

3GPP TS 36.331[86] specifies the system information block that provides information on whether the serving cell supports NB-IoT, with this block corresponding to E-UTRAN (NB-S1 mode).

<cause_type> Integer type; indicates the type of <reject_cause>.

0	Indicates that <reject_cause> contains the EMM cause value, please refer to Appendix A of 3GPP TS 24.301[83].
1	Indicates that <reject_cause> contains manufacturer-specific reasons.

<reject_cause> Integer type; contains the reason for registration failure. The value type is defined by <cause_type>.

<Active-Time> String type; an 8-bit formatted byte. Indicates the active time value (T3324) allocated to the UE in E-UTRAN. The active time value is encoded as one byte (octet 3) of the GPRS timer.

The information element is encoded in a 2-bit format (e.g., "00100100" equals 4 minutes). For encoding and value ranges, refer to the GPRS Timer 2 IE in 3GPP TS 24.008 [8] Table 10.5.163/3GPP TS 24.008. Also see 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82].

<Periodic-TAU> String type; An 8-bit formatted byte indicating the extended periodic TAU value (T3412) assigned to the UE in E-UTRAN. The extended periodic TAU value is encoded as one byte (octet 3) of the GPRS timer 3 information element in bit format (e.g., "01000111" equals 70 hours). For encoding and value ranges, refer to GPRS timer 3 IE in 3GPP TS 24.008 [8] Table

10.5.163a/3GPP TS 24.008. Also see 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82].

Comment
When the network does not allocate activity time and period T values, when <n>=4 or 5 and the command succeeds, the command response read is the same as when <n>=1, 2, or 3. Currently, the rejection reason is unsupported.

- **Example**

AT+CEREG?

+CEREG: 1, 1

OK

AT+CEREG=3

OK

AT+CEREG?

+CEREG: 3, 1,"5a30","05dc7b03",7

OK

12.5. AT+CSCON signaling connection status

- **Description**

Write the command URC +CSCON for reporting.
If <n>=1, when the connection mode of the MT changes, the URC reports +CSCON:<mode>.
If <n>=2, and a state exists in the current mode, the URC reports +CSCON:<mode>[,<state>].
If <n>=3, when the connection mode, state, or access of the MT changes, the URC reports +CSCON:<mode>[,<state>[,<access>]].

When the MT is in UTRAN or E-UTRAN, <mode> idle mode indicates that no PS signaling connection is established between the UE and the network, while connected mode indicates that a PS signaling connection is established between the UE and the network. When the UE is in GERAN, <mode> idle mode indicates that the MT is in an idle or standby state, while connected mode indicates that the MT is in a ready state.
<state> represents the state of the MT when it is in GERAN, UTRAN connected mode, E-UTRAN, or NG-RAN.
<access> indicates the current radio access type of the MT when it is in GERAN, UTRAN, E-UTRAN, or NG-RAN.
The read command returns a result code indicating the status and an integer <mode>, which shows whether the MT is currently in idle mode or connected mode. Only when <n>=2 is the state information <state> returned. Only when <n>=3 is the radio access type information <access> returned.
The test command returns supported values as composite values.

- **Grammar**

Command	Possible response
Test command **AT+CSCON=?**	**+CSCON:** (supported**<n>**list) **OK**
Read command **AT+CSCON?**	**+CSCON: <n>,<mode>[,<state>]** **OK**
Read command **AT+CSCON=[<n>]**	**OK** or **ERROR**

- **Parameter**

<n>	0	Prohibited from reporting
	1	Permission to report+CSCON:<mode>
	2	Permission to report+CSCON:<mode>[,<state>]
	3	Permission to report+CSCON:<mode>[,<state>[,<access>]]
	4	Permission to report+CSCON:<mode>[,<state>[,<access>[,<coreNetwork>]]]
		Note: The value ranges of some modules vary slightly.

<mode>	Indication of signaling connection status	
	0	Idle
	1	Connected
<state>	The CS or PS status in GERAN and RRC status information when the MT is in connected mode in UTRAN, E-UTRAN, and NG-RAN.	
	0	UTRAN URA_PCH status
	1	UTRAN Residential community_PCH status
	2	UTRAN Cell_FACH status
	3	UTRAN Cell_DCH status
	4	GERAN CS Connected status
	5	GERAN PS Connected status
	6	GERAN CS and PS Connected status
	7	E-UTRAN Connected status
<access>	Indicates the current radio access type.	
	0	Indicates the use of GERAN-type radio access, please refer to 3GPP TS 45.001[146].
	1	Indicates the use of UTRAN TDD type radio access, refer to 3GPP TS 25.212[144].
	2	Indicates the use of UTRAN FDD type radio access, refer to 3GPP TS 25.212[144].
	3	Indicates the use of E-UTRAN TDD type radio access, refer to 3GPP TS 36.3[145].
	4	Indicates the use of E-UTRAN FDD type radio access, refer to 3GPP TS 36.3[145].

- **Example**

AT+CSCON?

+CSCON: 1,0

OK

AT+CSCON=3

+CSCON: 3,0

OK

13. GPRS command

13.1. AT+CGATT PS domain attachment or detachment

- **Description**

This setup command is used to attach the MT to the PS domain or detach the MT from the PS domain. After the command is completed, the MT remains in the V.250 command state. If the MT is already in the requested state, the command will be ignored and still respond with OK. If the MT cannot achieve the requested state, it will respond with ERROR or +CME ERROR.

- **Grammar**

Command	Possible response
Test command **AT+CGATT=?**	**+CGATT: (supported<state>list)** **OK**
Read command **AT+CGATT?**	**+CGATT: <state>** **OK**
Read command **AT+CGATT=<state>**	**OK**

- **Parameter**

<state> Integer type; indicates the status of PS attachments.

0 Separated state

1 Adhesion state

- **Note**

If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup, refer to subclause 10.1.0. When the attachment state changes to "detached," all active PDP contexts will be automatically deactivated. The read command returns the current packet domain service state. The test command is used to request information about the supported packet domain service states.

13.2. AT+CGDCONT defines PDP context

- **Description**

This command is used to define the PDP context.

- **Grammar**

Command	Possible response
Test command **AT+CGDCONT=?**	**+CGDCONT:**(supported**<cid>**range) **,<PDP_type>, , ,**(supported**<d_comp>**list) **,** (supported**<h_comp>**list) **OK**
Read command **AT+CGDCONT?**	**+CGDCONT:<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>** **[+CGDCONT:<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>]** **[...]** **OK**
Read command **AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[<PDP_addr>[,<d_comp>[,<h_comp>]]]]]**	**OK** **or** **+CME ERROR: <err>**

- **Parameter**

<cid> Integer. PDP context identifier used to specify the definition of a particular PDP context. This parameter is a local parameter of the TE-MT interface and is utilized in other PDP context-related commands. The range of allowable values is returned by the test command (minimum value is 1).

<PDP_type> String type. Specifies the grouping data protocol type.

IP	Internet Protocol (IETF STD 5)
IPV6	Internet Protocol, Version 6 (IETF RFC 2460)
IPV4V6	Configure dual-stack UE functionality to support both IPv4 and IPv6 (RFC 2460)

<APN>	Character string type. Access Point Name, used to select the logical name of the GGSN or external packet data network. If this value is empty or omitted, the subscription value will be used.
<PDP_address>	String type. Used to identify the MT in the address space applicable to the PDP. If the value is empty or omitted, the TE provides this value during the PDP activation process; otherwise, a dynamic address will be requested. The assigned address can be read using AT+CGPADDR.
<d_comp>	Integer. Controls whether PDP data needs to be compressed (applicable only to SNDCP) (for details, please refer to 3GPP TS 44.065). 0 Close (default value if ignored) 1 On (manufacturer's preferred compression) 2 V.42bis 3 V.44bis retains other values.
<h_comp>	Integer. Controls PDP header data compression (for details, please refer to 3GPP TS 44.065 and 3GPP TS 25.323). 0 Close (default value if ignored) 1 On (manufacturer's preferred compression) 2 RFC1144 3 RFC2507 4 RFC3095 Retain other values.

- **Note**

1. cid 0 indicates the default PDN, used only in the read command and exclusively in Project 8910.

2. The AT+CGDCONT set command saves parameters to NV, which are retained after reboot and root operations.

3. The AT+CGDCONT=<cid> or AT+CGDEL command can delete PDP contexts stored in NV.

4. +CGDCONT? displays the last 8 bytes of the IPv6 address, while AT^NETIF? shows the full 16-byte IPv6 address.

- **Example**

AT+CGDCONT=?

+CGDCONT: (1..7),(IP,IPV6,IPV4V6,PPP,Non-IP),(0..3),(0..4)

OK

AT+CGDCONT?

+CGDCONT: 0,"IP","","10.162.212.175"

+CGDCONT: 1,"IPV4V6","ctnet","IPV4:0.0.0.0 IPV6: ::",0,0

OK

AT+CGDCONT=1,"IPV4V6","ctnet"

OK

13.3. AT+CGACT PDP Context Activation or Deactivation

- **Description**

This setup command is used to activate or deactivate the specified PDP context. After the command is configured, the MT maintains the V.250 command state. If any PDP context has already entered the requested state, the context state remains unchanged; when executing the activation command, if the MT is not attached to PS, the MT will first perform PS attachment and then attempt to activate the specified context. If no <cid> is specified for the activation or deactivation command, all defined contexts will be activated or deactivated.

- **Grammar**

Command	Possible response

Test command **AT+CGACT=?**	**+CGACT:** (supported **<state>**list) **OK**
Read command **AT+CGACT?**	**+CGACT: <state>** **OK**
Read command **AT+CGACT=<state>[,<cid>[,<cid>[]]]**	**OK** **or** **+CME ERROR:<err>**

- **Parameter**

<state> Status indicates the status of the PS attachment:

0 Disable

1 Activate

Other values are retained, which will result in erroneous responses to the execution commands.

<cid> A numeric parameter specifying a particular PDP context definition (refer to +CGDCONT and +CGDSCONT commands 20196; s). The range is from 1 to 7.

- **Note**

Before activation, please first use the command AT+CGATT=1 to connect to the network.

- **Example**

AT+CGACT?

+CGACT: 0, 0

OK

AT+CGACT=1,1

OK

Note:

• The maximum waiting time is 60 seconds

13.4. AT+CRC Cellular Result Code

- **Description**

This command is used to control whether the extended format is utilized for incoming call indication. If the extended format is employed, the URC +CRING: <type> will be used to alert the TE upon an incoming call, instead of using RING.

- **Grammar**

Command	Possible response
Test command **AT+CRC=?**	**+CRC:** (supported **<mode>**list) **OK**
Read command **AT+CRC?**	**+CRC: <mode>** **OK**
Read command **AT+CRC=<mode>**	 **OK**

- **Parameter**

<mode>	0	Disable extended formatting
	1	Enable extended format

13.5. AT+CGQMIN Introduction to Service Quality (Minimum Acceptable)

- **Description**

This command allows the TE to specify the minimum acceptable profile parameters, which are checked by the MT against the negotiated parameters when activating the PDP context. The set command specifies the parameters for the context identified by the context identifier <cid>.

- **Grammar**

Command	Possible response
Test command **AT+CGQMIN=?**	**+CGQMIN: <PDP_type>,** (supported **<precedence>**list), (supported**<delay>**list), (supported**<reliability>**list), (supported**<peak>**list), (supported**<mean>**list) **OK**
Read command **AT+CGQMIN?**	**[+CGQMIN:** **<cid>,<precedence>,** **<delay>,** **<reliability.>,<peak>,<mean>** **+CGQMIN:<cid>,<precedenc** **e>,<delay>,** **<reliability.>,<peak>,<mean>** **[...]]** **OK**
Read command **AT+CGQMIN=<cid>[,<precedence>[,<delay>[,<reliabilit>** **[,<peak>[,<mean>]]]]]**	**+CGQMIN:** **<cid>,<precedence** **>, <delay>, <reliability>,** **<peak>,<mean>** **OK** **or** **+CME ERROR:<err>**

- **Parameter**

<cid> Integer. Definition of a specific PDP context (see +CGDCONT and +CGDSCONT).

<Precedence > Integer. Priority level.

0	Online subscription value
1	High priority. Service priority precedes levels 2 and 3.

	2	Normal priority. Service priority is before level 3.
	3	Low priority. Continue maintaining service levels 1 and 2 as before.
<Delay>	Integer. Delay category. This parameter defines the end-to-end transmission delay that occurs when transmitting SDUs over the network.	
	0	Online subscription value
	1	< 0.5
	2	< 5
	3	< 50
	4	Not specified
<reliability>	Integer. Dependency level.	
	0	Online subscription value
	1	Unable to effectively handle data loss and bit error-sensitive applications with non-real-time transmission
	2	Unable to effectively handle applications sensitive to occasional data loss and non-real-time transmission bit errors.
	3	Capable of effectively handling data loss, GMM/SM and SMS non-real-time transmission error-sensitive applications
	4	Capable of effectively handling data loss and bit error-sensitive applications in real-time transmission
	5	Capable of effectively handling data loss and insensitive to bit errors in real-time transmission applications
<peak>	Integer. Peak throughput rate per second (in bytes).	
	0	Online subscription value
	1	Achieve 1 000 (8 kbit/s)
	2	Achieve 2 000 (16 kbit/s).

	3	Achieve 4 000 (32 kbit/s)
	4	Achieve 8 000 (64 kbit/s)
	5	Achieve 16 000 (128 kbit/s)
	6	Achieve 32 000 (256 kbit/s)
	7	Achieve 64 000 (512 kbit/s)
	8	Achieve 128 000 (1 024 kbit/s)
	9	Achieve 256 000 (2 048 kbit/s)
<mean>	Integer. Average throughput rate per second (in bytes).	
	0	Online subscription value
	1	（Bytes/hour） 100 (~0.22 bit/s)
	2	200 (~0.44 bit/s)
	3	500 (~1.11 bit/s)
	4	1 000 (~2.2 bit/s)
	5	2 000 (~4.4 bit/s)
	6	5 000 (~11.1 bit/s)
	7	10 000 (~22 bit/s)
	8	20 000 (~44 bit/s)
	9	50 000 (~111 bit/s)
	10	100 000 (~0.22 kbit/s)
	11	200 000 (~0.44 kbit/s)
	12	500 000 (~1.11 kbit/s)
	13	1 000 000 (~2.2 kbit/s)
	14	2 000 000 (~4.4 kbit/s)
	15	5 000 000 (~11.1 kbit/s)

	16	10 000 000 (~22 kbit/s)
	17	20 000 000 (~44 kbit/s)
	18	50 000 000 (~111 kbit/s)
	31	Make the best effort
<PDP_type>	String type. Specifies the grouping data protocol type.	
	IP	Internet Protocol（IETF STD 5）
	IPV6	Internet Protocol，6th Edition（IETF RFC 2460）
	IPV4V6	Introducing Virtual<PDP_type> to handle dual IP stack UE functionality. (See 3GPP TS 24.301[83])
	PPP	Point-to-Point Protocol (IETF STD 51)

- **Example**

AT+CGQMIN=?

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

OK

AT+CGQMIN?

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

+CGQMIN:2,0,0,0,0,0

+CGQMIN:3,0,0,0,0,0

+CGQMIN:4,0,0,0,0,0

+CGQMIN:5,0,0,0,0,0

+CGQMIN:6,0,0,0,0,0

+CGQMIN:7,0,0,0,0,0

```
OK

AT+CGQMIN=1,1,1,1,1,1
+CGQMIN:1,1,1,1,1,1

OK

AT+CGQMIN?
+CGQMIN:1,1,1,1,1,1
+CGQMIN:2,0,0,0,0,0
+CGQMIN:3,0,0,0,0,0
+CGQMIN:4,0,0,0,0,0
+CGQMIN:5,0,0,0,0,0
+CGQMIN:6,0,0,0,0,0
+CGQMIN:7,0,0,0,0,0

OK
```

13.6. AT+CGPADDR displays the PDP address

- **Description**

Execute the command to return a list of PDP addresses corresponding to the specified context identifiers.

- **Grammar**

Command	Possible response

Test command **AT+CGPADDR=?**	**+CGPADDR:**(supported **<cid>**list) **OK**
Read command **AT+CGPADDR[=<cid>[,<cid>[,. . .]]]**	**[+CGPADDR: <cid>,<PDP_addr>** **+CGPADDR: <cid>,<PDP_addr>** **[. . .]]** **OK**

- **Parameter**

<cid> A numeric parameter specifying a particular PDP context definition (refer to +CGDCONT). If <cid> is not specified, the addresses of all defined contexts are returned.

<PDP_address> Character string type. PDP address, used to identify the TE within the address space applicable to PDP. The address can be static or dynamic: static addresses are set by AT+CGDCONT when defining the context. Dynamic addresses are allocated during the last PDP context activation (using the context definition specified by <cid>). If no address is available, <PDP_addr> is omitted.

- **Example**

AT+CGPADDR=?

+CGPADDR:(1)

OK

AT+CGPADDR=1

+CGPADDR: 1,"IPV4:10.165.166.71 IPV6:::"

OK

AT+CGPADDR

+CGPADDR: 1,"IPV4:10.165.166.71 IPV6:::"

OK

13.7. AT+CGAUTO Automatic response to PDP context network requests

- **Description**

Issue the command to disable or enable automatic positive response (auto-answer) for receiving PDP context activation messages from the network. It also provides control over the use of V.25ter basic commands "S0", "A", and "H", which are employed to handle network requests for PDP context activation. This setting does not affect the issuance of unsolicited result codes RING or +CRING.

- **Grammar**

Command	Possible response
Test command **AT+CGAUTO=?**	**+CGAUTO:** (supported **<n>**list) **OK**
Read command **AT+CGAUTO?**	**+CGAUTO: <n>** **OK**
Read command **AT+CGAUTO=<n>**	**OK**

- **Parameter**

<n>	0	Only disable the automatic response for the packet domain
	1	Enable automatic response only for the data packet field.
	2	Modem compatibility mode, packet domain only
	3	Modem compatibility mode, packet domain and circuit-switched calls (default)

- **Note**

When receiving the +CGAUTO=0 command, if the MT is already connected, it should not perform a PS detach.

Subsequently, when the MT announces a network request for PDP context activation by issuing the unsolicited result codes RING or +CRING, the TE can manually accept or reject this request by issuing the +CGANS command, or may simply ignore this network request.

When receiving the +CGAUTO=1 command, if not yet connected, the MT should attempt to perform a PS attach. A failure will result in an error, or, if enabled, a +CME error will be returned to the TE.

Subsequently, when the MT announces a network request for PDP context activation to the TE by issuing the unsolicited result codes RING or +CRING, followed by the intermediate result code CONNECT, the MT then enters the V.25ter online data state and follows the same procedure after receiving a +CGANS=1 with unspecified <L2P> or <cid> values.

Comment
1. For <n>=0 packet domain, network requests are manually accepted or rejected by the +CGANS command. **2. For <n>=1 packet domain, network requests are automatically accepted as described above.** **3. For <n>=2, the automatic acceptance of packet domain network requests is controlled by the "S0" command. Manual control uses the "A" and "H" commands to accept and reject packet domain requests, respectively. (+CGANS may also be used.) Incoming circuit-switched calls cannot be answered either manually or automatically.** **4. For <n>=3, the automatic acceptance of packet domain network requests and incoming circuit-switched calls is controlled by the "S0" command. Manual control uses the "A" and "H" commands to accept and reject packet domain requests, respectively. (+cANS may also be used.) Circuit-switched calls are handled as described elsewhere in this specification.**

- **Example**

AT+CGAUTO=?

+CGAUTO: (0-3)

OK

AT+CGAUTO=0

OK

AT+CGAUTO?

+CGAUTO: 0

OK

13.8. AT+CGQREQ Quality of Service Configuration (Request)

- **Description**

When activating the PDP context in TE, this command allows the TE to specify quality of service parameters.

- **Grammar**

Command	Possible response
Test command **AT+CGQREQ=?**	**+CGQREQ: <PDP_type>,** (supported**<precedence>**list), (supported**<delay>**list), (supported**<reliability>**list), (supported**<peak>**list), (supported**<mean>**list) **OK**
Read command **AT+CGQREQ?**	**[+CGQREQ:<cid>,<precedence>,<delay>,>reliability>,<peak>,<mean>]** **[+CGQREQ: <cid>,<precedence>,** **<delay>,<reliability>,<peak>,<mean>]** **[…]** **OK**

Read command **AT+CGQREQ=[<cid> [,<precedence> [,<delay>[,<reliability> [,<peak>[,<mean>]]]]]]**	**+CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>** **OK**

- **Parameter**

< cid > Integer. Definition of a specific PDP context (refer to the +CGDCONT and +CGDSCONT commands).

<precedence > Integer. Priority level.

0	Online subscription value
1	High priority. Service priority takes precedence over levels 2 and 3.
2	Normal priority. Service priority precedes level 3.
3	Low priority. Continue maintaining service levels 1 and 2 as before.

< delay > Integer. Delay category. This parameter defines the end-to-end transmission delay that occurs when transmitting SDUs over the network.

0	Online subscription value
1	< 0.5
2	< 5
3	< 50
4	Not specified

< reliability > Integer. Dependency level.

0	Online subscription value
1	Unable to effectively handle data loss and non-real-time transmission error-sensitive applications

	2	Unable to effectively handle occasional data loss and non-real-time transmission error-sensitive applications
	3	Capable of effectively handling data loss, GMM/SM and SMS non-real-time transmission in error-sensitive applications
	4	Capable of effectively handling data loss and bit error-sensitive applications in real-time transmission
	5	Capable of effectively handling data loss and insensitive to bit errors in real-time transmission applications
< peak >	Integer. Peak throughput rate per second (measured in bytes).	
	0	Online subscription value
	1	reach 1 000 (8 kbit/s)
	2	reach 2 000 (16 kbit/s).
	3	reach 4 000 (32 kbit/s)
	4	reach 8 000 (64 kbit/s)
	5	reach 16 000 (128 kbit/s)
	6	reach 32 000 (256 kbit/s)
	7	reach 64 000 (512 kbit/s)
	8	reach 128 000 (1 024 kbit/s)
	9	reach 256 000 (2 048 kbit/s)
< mean >	Integer. Average throughput rate per second (in bytes).	
	0	Online subscription value
	1	(Bytes per hour) 100 (~0.22 bit/s)
	2	200 (~0.44 bit/s)
	3	500 (~1.11 bit/s)
	4	1 000 (~2.2 bit/s)

	5	2 000 (~4.4 bit/s)
	6	5 000 (~11.1 bit/s)
	7	10 000 (~22 bit/s)
	8	20 000 (~44 bit/s)
	9	50 000 (~111 bit/s)
	10	100 000 (~0.22 kbit/s)
	11	200 000 (~0.44 kbit/s)
	12	500 000 (~1.11 kbit/s)
	13	1 000 000 (~2.2 kbit/s)
	14	2 000 000 (~4.4 kbit/s)
	15	5 000 000 (~11.1 kbit/s)
	16	10 000 000 (~22 kbit/s)
	17	20 000 000 (~44 kbit/s)
	18	50 000 000 (~111 kbit/s)
	31	Make the best effort
<PDP_type>	String type. Specifies the grouping data protocol type.	
	IP	Internet Protocol（IETF STD 5）
	IPV6	Internet Protocol，Edition 6（IETF RFC 2460）
	IPV4V6	Introducing Virtual<PDP_type> to handle dual IP stack UE functionality. (See 3GPP TS 24.301[83])

Comment
After activating the PDP context, the read command will return the actual value from the network.

- **Example**

AT+CGQREQ=?

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

+CGQREQ: IPV6, (0..3), (0..4), (0..5) , (0..9), (0..18,31)

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

OK

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

+CGQREQ:1,1,1,1,1,1

OK

AT+CGQREQ?

+CGQREQ: 1,1,1,1,1,1

+CGQREQ: 2,0,0,0,0,0

+CGQREQ: 3,0,0,0,0,0

OK

13.9. AT+CGREG GPRS Online registration status

- **Description**

This AT command is used to set and display the registration information and location information of the MT.

Note: When the GPRS network (GSM mode PS network) registration status changes, "+CGREG:<stat>" will not be automatically reported.

Note: The E70x series only supports LTE by default, and this command is not supported.

- **Grammar**

Command	Possible response
Test command **AT+CGREG=?**	**+CGREG:** (supported **<n>**list) **OK**
Read command **AT+CGREG?**	**+CGREG: <n>,<stat>[,<lac>,<ci>]** **OK**
Read command **AT+CGREG=<n>**	**OK**

- **Parameter**

<n>	0	Prohibit reporting network registration URC
	1	Allow reporting network registration URC+CGREG:<stat>
	2	Allow reporting network registration and location information URC +CGREG:<stat>[,<lac>,<ci>]
	3	Enable reporting of network registration and location information along with EMM cause value information URC +CGREG:<stat>[,[<lac>],[<ci>],[<AcT>],[,<cause_type>,<reject_cause>]]
<stat>	0	Unregistered: Unregistered. The MT currently does not detect an operator registered for the service. The UE is in the GMM state GMM-NULL or GMM-DEREGISTERED-INITIATED. GPRS service is disabled, but the UE is allowed to attach to GPRS upon user request.
	1	Registered home network: The UE is in the GMM state of GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED within the home PLMN.

	2	Not registered, but the MT is currently attempting to attach to or search for a network for registration. The UE is in the GMM state GMM-DEREGISTERED or GMM-REGISTERED-INITIATED. The GPRS service is enabled, but the allowed PLMN is currently unavailable. The UE will initiate GPRS attachment when the allowed PLMN becomes available.
	3	Registration rejected: UE is in GMM state GMM-NULL. GPRS service is disabled and the UE cannot attach to GPRS when requested by the user.
	4	Unknown
	5	Registration, roaming
<lac>	String type. Two-byte location area code in hexadecimal format (e.g., "00C3" equals decimal 195)	
<ci>	String type. A 16-bit (GSM) or 28-bit (LTE) cell ID in hexadecimal format.	

- **Example**

```
AT+CGREG?
+CGREG: 1,1

OK

AT+CGREG=2
OK

AT+CGREG?
+CGREG: 2,1,"5A30","05DC"

OK
```

13.10. AT+CGANS Manual response for network-requested PDP context activation

- **Description**

The setup command requests an MT response for the network request of PS domain PDP context activation. This network request has already signaled the TE through the form of RING or +CRING active codes. The <response> parameter allows the TE to accept or reject this request.

- **Grammar**

Command	Possible response
Test command **AT+CGANS=?**	**+CGANS:** (supported**<response>**list), (supported**<L2P>**list) **OK**
Read command **AT+CGANS=[<response>,** **[<L2P>,[<cid>]]]**	**CONNECT . . .** (data transmission) **OK**

- **Parameter**

< response > The response is a numeric parameter specifying how the request should be responded to.

0 Reject the request

1 Accept and request PDP context activation

< L2P > A string parameter indicating the Layer 2 protocol to be used (refer to the +CGDATA command).

< cid > Specify the numerical parameters defined for a specific PDP context (refer to the +CGDCONT and +CGDSCONT commands).

13.11. AT+CGEREP group domain event reporting

- **Description**

When certain events occur in the packet domain or network, this configuration command enables/disables the unsolicited result code +CGEV from being sent from the MT to the TE.

- **Grammar**

Command	Possible response
Test command **AT+CGEREP=?**	**+CGEREP:** (supported**<mode>**list),(supported**<bfr>**list) **OK**
Read command **AT+CGEREP?**	**+CGEREP: <mode>,<bfr>** **OK**
Read command **AT+CGEREP=<mode>[,<bfr>]**	**OK**

- **Parameter**

< mode >	0	Cache non-requested result codes in MT; if the MT result code cache is full, the earliest non-requested result code will be discarded. Result codes will not be forwarded to TE.
	1	When the link between MT and TE is occupied (e.g., in online data mode), discard unsolicited result codes; otherwise, forward them directly to TE.
	2	When the MT TE link is in a reserved state (such as in the online data state), save the unsolicited result codes and send them all to the TE when the link is restored; otherwise, the MT directly forwards the unsolicited result codes to the TE. Note: The value ranges of some modules may vary slightly.
< bfr >	0	When <mode> is 1, clear the specified non-request result codes cached in MT.
	1	When <mode> is 1, the specified non-request result codes cached in the MT are flushed to the TE (flushed after returning OK).

- **Proactive request result code**

URC1 +CGEV:REJECT <PDP_type>, <PDP_addr>

When the MT is unable to report the PDP context activation event to the TE via the +CRING unsolicited result code and the MT is automatically rejected, it will request the network to activate the PDP context. Note: This event is not applicable to EPS.

URC2 +CGEV:NW REACT <PDP_type>, <PDP_addr>, [<cid>]

The network has requested context reactivation. If the MT is aware, it will provide the <cid> for reactivating the context. Note: This event is not applicable to EPS.

URC3 +CGEV:NWDEACT <PDP_type>, <PDP_addr>, [<cid>]

Network-initiated deactivation of context. If the MT knows the <cid>, it will provide the <cid> used for activating the context.

URC4 +CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]

The ME has forcibly deactivated the context. If the MT is aware, it will provide the <cid> used for activating the context.

URC5 +CGEV: NW DETACH

The network has forcibly detached the packet domain, indicating that all activated contexts have been deactivated. The deactivated contexts will not be reported separately.

URC6 +CGEV: ME DETACH

ME has forcibly detached from the packet domain, indicating that all activated contexts have been deactivated. The deactivated contexts will not be reported separately.

URC7 +CGEV: NW CLASS <class>

The network has forcibly changed the mobile station type and reported the highest available type (for details, refer to AT+CGCLASS).

URC8 +CGEV: ME CLASS <class>

The ME has forcibly changed the mobile station type and reported the highest available type (for details, please refer to AT+CGCLASS).

- **Example**

AT+CGEREP=?

```
+CGEREP: (0-2),(0-1)


OK
AT+CGEREP=1,1
OK


AT+CGEREP?
+CGEREP: 1,1


OK
```

13.12. AT+CGDATA Enter data state

- **Description**

After executing the setup command, the MT will operate using one or more packet domain PDP types to establish communication between the TE and the network, which may also include performing PS attachment and one or more PDP context activation operations. The MT will not process commands following AT+CGDATA in the AT command line.

If the MT cannot accept the <L2P> value, it will return ERROR or +CME ERROR. If it can accept the value, the MT will return the intermediate result code CONNECT and enter the V.250 online data transfer state. Upon completion of data transmission and successful termination of the Layer 2 protocol procedure, the MT will re-enter the command state and return the final result code OK.

- **Grammar**

Command	Possible response

Test command **AT+CGDATA=?**	**+CGDATA:** (supported**<L2P>**list) **OK**
Read command **AT+CGDATA=<L2P>,<cid>**	**CONNECT . . .** (data transmission) **OK**

- **Parameter**

< L2P > String type. The Layer 2 protocol used between TE and MT.

PPP Point-to-Point Protocol used between PDPs.

< cid > Specify the numerical parameters defined for a specific PDP context (refer to the +CGDCONT command).

Comment
This command can be used in both normal and modem-compatible modes. This command is currently unavailable.

- **Example**

AT+CGDATA=”PPP”,1

CONNECT 115200

OK

13.13. AT+CGCLASS GPRS Mobile station level

- **Description**

This command directs the MT to operate according to the specified GPRS mobile station operation mode. For details, please refer to 3GPP TS 23.060.

- **Grammar**

Command	Possible response
Test command **AT+CGCLASS=?**	**+CGCLASS:** (supported**<class>**list) **OK**
Read command **AT+CGCLASS?**	**+CGCLASS: <class>** **OK**
Read command **AT+CGCLASS =[<class>]**	**OK**

- **Parameter**

< class > Character string type. Indicates the GPRS mobile station class.

A	Class A operation mode (A/Gb mode) or CS/PS operation mode (Iu mode) (highest operation mode)
B	Class B operation mode (A/Gb mode), (not applicable to Iu mode)
CG	Class C operation mode, limited to PS mode (A/Gb mode), or PS operation mode (Iu mode)
CC	Class C operation mode, limited to CS mode (A/Gb mode) or CS (Iu mode) (minimum operation mode).

Comment
<class>A: It means that MT will simultaneously operate both PS and CS services. **<class>B: It means that MT will operate the PS and CS services, but cannot operate them simultaneously.** **<class>CG: It means the MT only runs the PS service.** **<class>CC: It means the MT only runs the CS service.** **Other values are reserved and will result in an error response to the set command.** **If the MT is attached to the PS domain when issuing the set command with the specified <class>=CC, the MT shall perform a PS detach.**

13.14. AT+CGEQREQ 3G Quality of Service Profile (Request)

- **Description**

This command allows the TE to specify the UMTS Quality of Service profile used when the MT activates a PDP context.

The write command specifies the profile for the context identified by the (local) context identifier parameter <cid>. The specified profile will be stored in the MT and only sent to the network when activating or modifying the relevant context initiated by the MS. Since this parameter is the same as the one used in the +CGDCONT and +CGDSCONT commands, the +CGEQREQ command essentially serves as an extension of these commands. The QoS profile consists of multiple parameters, each of which can be set to an individual value.

A special form of the write command, +CGEQREQ=<cid>, causes the requested profile for the context number <cid> to become undefined.

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

The test command returns the supported values as composite values. If the MT supports multiple PDP types, the parameter value ranges for each PDP type are returned on separate lines.

- **Grammar**

Command	Possible response
Test command AT+CGEQREQ=?	**+CGEQREQ: <PDP_type>,** (supported **<Traffic class>**list), (supported**<Maximum bitrate UL>**list), (supported**<Maximum bitrate DL>**list), (supported**<Guaranteed bitrate UL>**list), (supported**<Guaranteed bitrate DL>**list), (supported**<Delivery order>**list), (supported**<Maximum SDU size>**list), (supported**<SDU error ratio>**list),

	(supported**<Residual bit error ratio>**list), (supported**<Delivery of erroneous SDUs>**list), (supported**<Transfer delay>**list), (supported**<Traffic handling priority>**list), (supported**<Source statistics descriptor>**list), (supported**<Signalling indication>**list) **OK**
Read command **AT+CGEQREQ?**	**[+CGEQREQ: <cid>,** **<Traffic class>,** **<Maximum bitrate UL>,** **<Maximum bitrate DL>,** **<Guaranteed bitrate UL>,** **<Guaranteed bitrate DL>,** **<Delivery order>,** **<Maximum SDU size>,** **<SDU error ratio>,** **<Residual bit error ratio>,** **<Delivery of erroneous SDUs>,** **<Transfer delay>,** **<Traffic handling priority>,** **<Source statistics descriptor>,** **<Signalling indication>]** **[...]** **OK**
Read command **AT+CGEQREQ=[<cid>[,<Traffic class>[,<Maximum bitrate UL>[,<Maximum bitrate DL>[,<Guaranteed bitrate UL>[,<Guaranteed bitrate DL>[,<Delivery order>[,<Maximum SDU size>[,<SDU error ratio>[,<Residual bit error ratio>[,<Delivery of erroneous SDUs>[,<Transfer delay>[,<Traffic handling priority>[,<Source statistics descriptor>[,<Signalling indication>]]]]]]]]]]]]]]**	**OK**

- **Parameter**

<cid>	Integer type; Specifies a particular PDP context definition (refer to the +CGDCONT and +CGDSCONT commands)
<PDP_type>	String type; specifies the type of data packet data protocol (refer to the +CGDCONT command). For the following parameters, also see 3GPP TS 23.107[46].
<Traffic class>	Integer type; indicates the application type for optimized UMTS bearer services (refer to 3GPP TS 24.008[8] Section 10.5.6.5). 0 Conversation of 1 Flow 2 Interactive 3 Background 4 Subscription value **Note: If the traffic class is designated as session or flow, guaranteed value and maximum bit rate parameters should also be provided.**
<Maximum bitrate UL>	Integer type; indicates the maximum Kbit/s value passed to UMTS (uplink communication) on SAP. For example, a bit rate of 32kbit/s is specified as "32" (e.g., AT+CGEQREQ=...,32,...). This parameter shall be provided if the traffic class is specified as conversational or streaming (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5).
<Maximum bitrate DL>	Integer type; indicates the maximum number of kbit/s transmitted by UMTS (downlink communication) on SAP. For example, a bit rate of 32 kbit/s is specified as "32" (e.g., AT+CGEQREQ=...,32,...). If the parameter is set to "0", the subscribed value will be requested. This parameter shall be provided if the traffic class is specified as conversational or streaming (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5).
<Guaranteed bitrate UL>	Integer type; indicates the guaranteed number of kbit/s transmitted from SAP (provided there is data to transfer) to UMTS (uplink communication). For example, a bit rate of 32 kbit/s is specified as "32" (e.g., AT+CGEQREQ=.. . ,32,. . .). If the parameter is set to "0", the subscribed value will be requested. This parameter shall be

provided if the traffic class is specified as conversational or streaming (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Guaranteed bitrate DL> Integer type; indicates the guaranteed kbit/s number transmitted by UMTS (downlink communication) on the SAP (if there is data to transmit). For example, a bit rate of 32kbit/s is specified as "32" (e.g., AT+CGEQREQ=...,32,...). If the parameter is set to "0", the subscribed value will be requested. This parameter shall be provided if the traffic class is specified as conversational or streaming (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Delivery order> Integer type; indicates whether the UMTS bearer should provide SDU transmission in sequence (refer to 3GPP TS 24.008[8] section 10.5.6.5).

0 Not

1 right

2 Subscription value

<Maximum SDU size> Integer type; (1,2,3,...) indicates the maximum allowed SDU size in octets. If the parameter is set to "0", the subscription value will be requested (refer to 3GPP TS 24.008[8] subclause 10.5.6.5).

<SDU error ratio> String type; Indicates the target value for the portion of the SDU that is lost or detected as erroneous. The SDU error ratio is defined solely for conformance purposes. This value is specified as "mEe". For example, a target SDU error ratio of 5?10-3 would be specified as "5e 3" (e.g., AT+CGEQREQ=..., "5E3", ...). "0E0" denotes the subscription value (refer to 3GPP TS 24.008 [8] Section 10.5.6.5).

<Residual bit error ratio> Character string type; Indicates the target value for the undetected bit error rate in the transmitted SDU. If error detection is not requested, the residual bit error rate indicates the bit error rate in the transmitted SDU. This value is specified as "mEe". For example, a target residual bit error rate of 5?10-3 would be specified as "5e 3" (e.g., AT+CGEQREQ=..., "5E3", ...). "0E0" refers to the subscription value (refer to 3GPP TS 24.008 [8] Section 10.5.6.5).

<Delivery of erroneous SDUs> Integer type; indicates whether SDUs detected as erroneous should be delivered (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5).

0 not

1 right

2 No detection

3 Subscription value

<Transfer delay> Integer type; (0,1,2,...) indicates the target time (in milliseconds) between the transmission of an SDU request on one SAP and its delivery on another SAP. If the parameter is set to "0", the requested subscription value shall be used (refer to 3GPP TS 24.008[8] subclause 10.5.6.5).

<Traffichandling priority> Integer type; (1,2,3,...) Specifies the relative priority of processing all SDUs belonging to a UMTS bearer compared to SDUs of other bearers. If the parameter is set to "0", the requested subscription value shall be used (refer to 3GPP TS 24.008[8] subclause 10.5.6.5).

<SourceStatistics Descriptor> Integer type; Specifies the characteristics of the source of submitted SDUs for the PDP context. This parameter shall be provided if the traffic class is specified as conversational or streaming (refer to 3GPP TS 24.008[8] subclause 10.5.6.5).

0 The properties of SDU are unknown.

1 The characteristics of SDU correspond to a speech source.

<Signalling Indication> Integer type; indicates the signaling content of the SDU submitted for the PDP context. If the traffic class is specified as interactive, this parameter shall be provided (refer to 3GPP TS 24.008[8] subclause 10.5.6.5).

0 The PDP context is not optimized for signaling.

1 The PDP context has been optimized for signaling <PDP_type> (please refer to the +CGDCONT and +CGDSCONT commands).

If the value of a particular class is omitted, the value is considered unspecified.

Comment
When operating in dual mode with EPS, the MT provides mapping functionality to EPS quality of service parameters for EPS bearer resource activation requests.

13.15. AT+CGEQMIN 3G Service Quality Profile (Minimum Acceptable Level)

- **Description**

This command allows the TE to specify the minimum acceptable profile, which the MT checks against the negotiated profile returned during PDP context establishment and PDP context modification procedures.

The write command specifies the profile for the context identified by the (local) context identifier parameter <cid>.

The specified profile is stored in the MT and is only checked against the negotiated profile during activation or MS-initiated related context modifications. Since this uses the same parameters as those in the +CGDCONT and +CGDSCONT commands, the +CGEQMIN command effectively serves as an extension of these commands. The QoS profile consists of multiple parameters, each of which can be set to an individual value.

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

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

The test command returns the supported values as composite values. If the MT supports multiple PDP types, the parameter value ranges for each PDP type are returned on separate lines.

- **Grammar**

Command	Possible response
	+CGEQMIN: <PDP_type>,(supported **<Traffic class>**list)**,** (supported **<Maximum bitrate UL>**list)**,** (supported **<Maximum bitrate DL>**list)**,** (supported **<Guaranteed bitrate UL>**list)**,** (supported **<Guaranteed bitrate DL>**list)**,** (supported **<Delivery order>**list)**,**

Test command **AT+CGEQMIN=?**	(supported **<Maximum SDU size>**list), (supported **<SDU error ratio>**list), (supported **<Residual bit error ratio>**list), (supported **<Delivery of erroneous SDUs>**list), (supported **<Transfer delay>**list), (supported **<Traffic handling priority>**list), (supported **<Source statistics descriptor>**list), (supported **<Signalling indication>**list) **OK**
Read command **AT+CGEQMIN?**	**[+CGEQMIN: <cid>,** **<Traffic class>,** **<Maximum bitrate UL>,** **<Maximum bitrate DL>,** **<Guaranteed bitrate UL>,** **<Guaranteed bitrate DL>,** **<Delivery order>,** **<Maximum SDU size>,** **<SDU error ratio>,** **<Residual bit error ratio>,** **<Delivery of erroneous SDUs>,** **<Transfer delay>,** **<Traffic handling priority>,** **<Source statistics descriptor>,** **<Signalling indication>]** **[. . .]]** **OK**

Read command **AT+CGEQMIN=[<cid>[,<Traffic class>** **[,<Maximum bitrate UL>** **[,<Maximum bitrate DL>** **[,<Guaranteed bitrate UL>** **[,<Guaranteed bitrate DL>** **[,<Delivery order>** **[,<Maximum SDU size>** **[,<SDU error ratio>** **[,<Residual bit error ratio>** **[,<Delivery of erroneous SDUs>** **[,<Transfer delay>** **[,<Traffic handling priority>** **[,<Source statistics descriptor>** **[,<Signalling indication>]]]]]]]]]]]]]]**	**OK**

- **Parameter**

<cid> Integer type; specifies a particular PDP context definition (please refer to the +CGDCONT and +CGDSCONT commands).

<PDP_type> String type; specifies the type of data packet data protocol (please refer to the +CGDCONT command). Currently supports IP, IPv6, and PPP. For the following parameters, also refer to 3GPP TS 23.107[46].

<Traffic class> Integer type; indicates the application type for optimized UMTS bearer services (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5).

0	Conversation
1	Flow
2	Interactive
3	Background

<Maximum bitrate UL> Integer type; indicates the maximum Kbit/s value passed to UMTS (uplink communication) on SAP. For example, specify a bit rate of 32kbit/s as "32" (e.g., AT+CGEQMIN=.,32,...) (refer to 3GPP TS 24.008 [8] Section 10.5.6.5).

<Maximum bitrate DL> Integer type; indicates the maximum number of kbit/s transmitted by UMTS (downlink communication) on SAP. For example, a bit rate of 32kbit/s is specified as "32" (e.g., AT+CGEQMIN=.,32,...) (refer to 3GPP TS 24.008 [8] Section 10.5.6.5).

<Guaranteed bitrate UL>	Integer type; indicates the guaranteed number of kbit/s transmitted from SAP (provided there is data to transmit) to UMTS (uplink communication). For example, a bit rate of 32 kbit/s is specified as "32" (e.g., AT+CGEQMIN=.,32,…) (refer to 3GPP TS 24.008 [8] Section 10.5.6.5).
<Guaranteed bitrate DL>	Integer type; indicates the guaranteed kbit/s number transmitted by UMTS (downlink communication) on SAP (if there is data to transmit). For example, specifying a bit rate of 32kbit/s as "32" (e.g., AT+CGEQMIN=.,32,...) (refer to 3GPP TS 24.008 [8] Section 10.5.6.5).
<Delivery order>	Integer type; indicates whether UMTS bearers should provide SDU transmission in sequence (refer to 3GPP TS 24.008[8] Section 10.5.6.5). 0 no 1 yes
<Maximum SDU size>	Integer type; (1,2,3,...) indicates the maximum allowed SDU size in octets (refer to 3GPP TS 24.008[8] subclause 10.5.6.5).
<SDU error ratio>	Character string type; Indicates the target value for the portion of SDU that is lost or detected as erroneous. The SDU error ratio is only defined for conformance services. This value is specified as "mEe". For example, a target SDU error ratio of 5?10-3 would be specified as "5e 3" (e.g., AT+CGEQMIN=., "5E3", ...) (refer to 3GPP TS 24.008 [8] Section 10.5.6.5).
Residual bit error ratio>	Character string type; Indicates the target value for the undetected bit error rate in the transmitted SDU. If error detection is not requested, the residual bit error rate indicates the bit error rate in the transmitted SDU. This value is specified as "mEe". For example, a target residual bit error rate of 5?10-3 would be specified as "5e 3" (e.g., AT+CGEQMIN=., "5E3", ...) (refer to 3GPP TS 24.008 [8] Section 10.5.6.5).
<Delivery of erroneous SDUs>	Integer type; Indicates whether SDUs detected as erroneous should be delivered (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5). 0 no 1 yes 2 No detection
<Transfer delay>	Integer type; (0,1,2,...) indicates the target time (in milliseconds) for delivering the transfer of an SDU from one SAP to another SAP (refer to 3GPP TS 24.008[8] subclause 10.5.6.5).

<Traffic handling priority>	Integer type; (1,2,3,...) Specifies the relative importance of processing all SDUs belonging to a UMTS bearer compared to SDUs of other bearers (refer to 3GPP TS 24.008[8] clause 10.5.6.5).
<Source Statistics Descriptor>	Integer type; specifies the characteristics of the source of submitted SDUs for the PDP context. This parameter shall be provided if the traffic class is specified as conversational or streaming (refer to 3GPP TS 24.008[8] subclause 10.5.6.5). 0 The properties of SDU are unknown. 1 The characteristics of SDU correspond to a speech source.
<Signalling Indication>	Integer type; indicates the signaling content of the SDU submitted for the PDP context. If the traffic class is specified as interactive, this parameter shall be provided (refer to 3GPP TS 24.008[8] subclause 10.5.6.5). 0 PDP context is not optimized for signaling. 1 The PDP context is optimized for signaling. If a value for a specific class is omitted, the value is considered unspecified.

13.16. AT+CGDSCONT Define secondary PDP context

- **Description**

The write command is identified by the context identifier parameter <cid>, which designates the PDP context parameter values written to the secondary PDP context. In EPS, this command is used to define traffic flows.

A special form of the write command, +CGDSCONT=<cid>, causes the value of the context number <cid> to become undefined.

Comment
If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup. **The read command returns the current settings for each defined context.** **The test command returns the supported values as a composite value.**

- **Grammar**

Command	Possible response

Test command **AT+CGDSCONT=?**	**+CGDSCONT:**(supported**<cid>**range), (主活动上下文的 **<p_cid>**list), (supported**<d_comp>**list), (supported **<h_comp>**list) **OK**
Read command **AT+CGDSCONT?**	**[+CGDSCONT:<cid>,<p_cid>,<d_comp>,<h_comp>** **[…]** **OK**
Read command **AT+CGDSCONT=[<cid>,<p_cid>[,<d_comp>[,<h_comp>]]]**	**OK**

- **Parameter**

<cid> Integer type; Specifies a particular PDP context definition. This parameter is a local parameter of the TE-MT interface, used in other command-related PDP contexts. The range of allowed values (minimum value=1) is returned by the test form of the command.

Note: The value of <cid> for the PDP context used for network activation will exceed the range indicated for <cid> in the test forms +CGDCONT and +CGDSCONT.

<p_cid> Integer type; defined by the specific PDP context specified through the +CGDCONT command. The parameters are local parameters of the TE-MT interface. The list of allowed values is returned by the test form of the command.

<d_comp> Integer type; Controls PDP data compression (applicable only to SNDCP) (refer to 3GPP TS 44.065[61]).

0	Close
1	Open (manufacturer's preferred compression)
2	V.42bis
3	V.44

<h_comp> Integer type; controls PDP header compression (refer to 3GPP TS 44.065[61] and 3GPP TS 25.323[62]).

0	close
1	On (manufacturer's preferred compression)
2	V.42bis
3	V.44

- **Example**

AT+CGDSCONT=?

+CGDSCONT: (1,2,3,4,5,6,7),(1),(0-3),(0-4)

OK

AT+CGDSCONT=2,1

OK

AT+CGDSCONT?

+CGDSCONT: 1,0,0,0

+CGDSCONT: 2,1,0,0

OK

13.17. AT+CGTFT Data flow template

- **Description**

This command is used to set a packet filter for the TFT (Traffic Flow Template) of a PDP context or QoS flow. A TFT can contain 1 to 16 packet filters, each with a unique priority. All packet filters across all PDP contexts under the same PDP address must have unique priorities, meaning no duplicate priorities are allowed for packet filters within all bearers under the same APN.

The configuration command (AT+CGTFT=....) is used to define and add a packet filter to the TFT of a specified context, with a maximum of 16 packet filters per TFT. The <cid> parameter specifies the TFT of the context to which the packet filter will be added. Upon successful execution, the parameters are permanently stored in the MT (Mobile Terminal).

This <cid> parameter is the same as the <cid> in the +CGDCONT/+CGDSCONT commands, indicating that +CGTFT serves as a supplement to the +CGDCONT/+CGDSCONT commands. In essence, +CGDCONT/+CGDSCONT creates the PDP context or QoS flow, while +CGTFT configures the TFT parameters for the PDP context or QoS flow.

- **Grammar**

Command	Possible response
Test command **AT+CGTFT=?**	**+CGTFT: <PDP_type>,** (supported **<packet filter identifier>**list), (supported **<evaluation precedence index>**list),(supported **<remote address and subnet mask>**list),(supported **<protocol number (ipv4) / next header (ipv6)>**list),(supported **<local port range>**list), (supported **<remote port range>**list), (supported **<ipsec security parameter index (spi)>**list),(supported **<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>**list),(supported **<flow label (ipv6)>**list),(supported **<direction>**list),(supported **<local address and subnet mask>**list) **OK**
Read command **AT+CGTFT?**	**[+CGTFT: <cid>,<packet filter identifier>,<evaluation precedence index>,<remote address and subnet mask>,<protocol number (ipv4) / next header (ipv6)>,<local port range>,<remote port range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction>,<local address and subnet mask>]** **[. . .]]** **OK**
Read command **AT+CGTFT=[<cid>,[<packet filter identifier>,<evaluation precedence index>[,<remote address and subnet mask>[,<protocol number (ipv4)**	

/ next header (ipv6)>[,<local port range>[,<remote port range>[,<ipsec security parameter index (spi)>[,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>[,<flow label (ipv6)>[,<direction>[,<local address and subnet mask>]]]]]]]]]	**OK**

- **Parameter**

<cid>	Integer type. Specifies a particular PDP context definition (refer to the +CGDCONT and +CGDSCONT commands).
<PDP_type>	String type. Specifies the type of data packet protocol (refer to the +CGDCONT command).
<packet filter identifier>	Integer type. The value range is from 1 to 16.
<evaluation precedence index>	Integer type. The value range is from 0 to 255.
<remote address and subnet mask>	String type. The string is given in the form of dot-separated numeric (0-255) parameters, with the following format: For IPv4：“a1.a2.a3.a4.m1.m2.m3.m4” For IPv6.：“a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16. m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16”,
<protocol number (ipv4) / next header (ipv6)>	Integer type. The value range is from 0 to 255.
<local port range>	String type. The string is given in the form of dot-separated numeric parameters (0-65535), with the format "f.t".
<remote port range>	String type. The string is given in the form of dot-separated numeric (0-65535) parameters, with the format being "f.t".
<ipsec security parameter index (spi)>	Hexadecimal formatted value. The value range is from 00000000 to FFFFFFFF.

<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>	String type. The string is given in the form of dot-separated numeric (0-255) parameters, with the format "t.m".
<flow label (ipv6)>	Hexadecimal formatted value. The value range is from 00000 to FFFFF. Valid only for IPv6.
<direction>	Specify the transmission direction of the application package filter. 0 Pre-release 7 TFT filter (see 3GPP TS 24.008[8], Table 10.5.162) 1 Uplink 2 Downlink 3 Bidirectional (uplink and downlink)
<local address and subnet mask>	String type. The string is given in the form of dot-separated numeric (0-255) parameters, with the following format: For IPv4：“a1.a2.a3.a4.m1.m2.m3.m4” For IPv6.：“a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16. m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16”, Some of the attributes listed above can coexist in the packet filter, while others are mutually exclusive, with possible combinations as shown in 3GPP TS 23.060 [47].

- **Example**

AT+CGTFT=?

+CGTFT:(IP,IPV4V6,IPV6),(1-16),(0-255),(0-255).(0-255).(0-255).(0-255).(0-255).(0-255).(0-255).(0-255),(0-

255),(0-65535).(0-65535),(0-65535).(0-65535),(0-FFFFFFFF),(0-255).(0-255),(0-FFFFF),(0-3),(0-255).(0-

255).(0-255).(0-255).(0-255).(0-255).(0-255).(0-255)

OK

AT+CGTFT=1,2,2,”172.168.70.151.255.255.255.255”,17,”5001.5001”,”5002.5002”,,,,3

OK

AT+CGTFT?

+CGTFT: 1, 2, 2, 172.168.70.151.255.255.255.255,
17,5001.5001,5002.5002,0,0.0,0,3,0.0.0.0.0.0.0.0

OK

13.18. AT+CGCMOD PDP Context modification

- **Description**

The execution command is used to modify the specified PDP context, which includes the QoS profile and TFT. Upon command completion, the MT returns to the V.250 online data state. If the requested modification for any specified context cannot be implemented, an error or +CME ERROR response is returned. For EPS, the network will respond to the modification request for EPS bearer resources through an EPS bearer modification request. The MT must accept the request before the PDP context can be effectively modified. If no <cid> is specified, the active form of the command will modify all activated contexts.

- **Grammar**

Command	Possible response
Test command **AT+CGCMOD=?**	**+CGCMOD:**(Activated <cid> list) **OK**
Read command **AT+CGCMOD=<cid>[,<cid>[,...]]**	**OK**

- **Parameter**

<cid> Integer type; specifies a particular PDP context definition (refer to the +CGDCONT and +CGDSCONT commands).

13.19. AT+CGPDNSADR Obtain the activated PDP DNS address

- **Description**

This command allows the TE to obtain all activated PDP DNS addresses.

- **Grammar**

Command	Possible response
Test command **AT+CGPDNSADDR=?**	**+CGPDNSADDR:**(Activated PDP**<cid>**list) **OK**
Read command **AT+CGPDNSADDR=<cid>[,<cid>[,]]**	**[+CGPDNSADDR:<cid>,<dns address>]** **[+CGPDNSADDR:<cid>,<dns address>]** **[. . .]** **OK**

- **Parameter**

<cid> Integer type; Specifies a particular PDP context definition. This parameter is a local parameter of the TE-MT interface, used in other command-related PDP contexts. The allowable value range (minimum value=1) is returned by the test form of the command.

<dns address> String type, DNS IP address

Comment
The value of <cid> in the PDP context initiated by the network will exceed the test format specified in the +CGDCONT and +CGDSCONT commands.<cid>Scope of the instruction.

- **Example**

//After PDP activation:

AT+CGPDNSADDR=1

+CGPDNSADDR: 1,”DNS1:221.179.155.193 DNS2:221.179.155.209”

OK

AT+CGPDNSADDR=?

+CGPDNSADDR:(1)

OK

13.20. AT+CGCONTRDP PDP Context reads dynamic parameters

- **Description**

If the parameter <cid> is omitted, it returns information related to all active non-secondary PDP contexts.

The test command returns a list of <cid> values associated with active non-secondary contexts.

- **Grammar**

Command	Possible response
Test command **AT+CGCONTRDP=?**	**+CGCONTRDP:** (Activated **<cid>**list) **OK**
Read command **AT+LOCREL?**	**[+CGCONTRDP: <cid>,<bearer_id>,** **<apn>[,<local_addr and subnet_mask>]]** **[+CGCONTRDP: <cid>,<bearer_id>,** **<apn>[,<local_addr and subnet_mask>]]** **[. . .]]** **OK**

- **Parameter**

<cid> Integer. Used to specify a non-secondary PDP context. This parameter is a local parameter of the TE-MT interface for other commands related to the PDP context.

<bearer_id>	Integer. The identifier it carries. For example, the EPS bearer in EPS, or the NSAPI in GPRS.
<apn>	Character string type. Used to select the logical name of a GGSN or external packet data network.
<local_addr and subnet_mask>	String type. Represents the IP address and subnet mask of MT. This string follows the format of dot-separated numeric parameters (0~255), as shown below: IPv4 in the form of"a1.a2.a3.a4.m1.m2.m3.m4"or IPv6 in the form of"a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a 15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16"。

- **Example**

AT+CGCONTRDP

+CGCONTRDP: 2,6,”CMNET.MNC002.MCC460.GPRS”,”10.190.99.191.0.0.0.0”

OK

13.21. AT+CGTFTRDP Communication flow filter dynamically reads parameters

- **Description**

The SET command returns information related to the communication flow filter indexed by <cid> and the additional network-specified values when established by the network. If the context is not found, an ERROR response is returned. If the parameter <cid> is omitted, it returns the communication flow filters for all established PDP contexts. Parameters for network-initiated and MT/TA-initiated PDP contexts will be returned.

The TEST command returns the active context associated with <cid>.

- **Grammar**

Command	Possible response

Test command **AT+CGTFTRDP=?**	**+CGTFTRDP:**(A list of <cid> associated with the activity context) **OK**
Read command **AT+CGTFTRDP[=<cid>]**	**[+CGTFTRDP: <cid>,<packet filter identifier>,<evaluation precedence index>,<remote address and subnet mask>,<protocol number (ipv4) / next header (ipv6)>,<local port range>, <remote port range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>, <direction>,<NW packet filter Identifier>,<local address and subnet mask>]** **[. . .]]** **OK**

- **Parameter**

<cid>	Integer. Used to specify a non-secondary PDP context. This parameter is a local parameter of the TE-MT interface, employed in other commands related to the PDP context.
<packet filter identifier>	Integer type. The value range is from 1 to 16.
<evaluation precedence index>	Integer type. The value range is from 0 to 255.
<remote address and subnet mask>	String type. Represents the IP address and subnet mask of the MT. This string takes the form of dot-separated numeric parameters (0~255), as shown below: IPv4 in the form of"a1.a2.a3.a4.m1.m2.m3.m4"or IPv6 in the form of"a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16"。
<protocol number (ipv4) / next header (ipv6)>	Integer type. The value range is from 0 to 255.
<local port range>	String type. The string is given in the form of dot-separated numeric (0-65535) parameters, with the format "f.t".

<remote port range>	String type. The string is given in the form of dot-separated numeric (0-65535) parameters, with the format being "f.t".
<ipsec security parameter index (spi)>	Hexadecimal formatted value. The value range is from 00000000 to FFFFFFFF.
<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>	String type. The string is given in the form of dot-separated numeric (0-255) parameters, formatted as "t.m".
<flow label (ipv6)>	Hexadecimal formatted value. The value range is from 00000 to FFFFF. Valid only for IPv6.
<direction>	Integer type. Specifies the transmission direction of the application package filter 0 Pre-release 7-layer TFT traffic filter (refer to Table 10.5.162 in the 3GPP TS 24.008 [8] standard document) 1 Uplink 2 Downlink 3 Bidirectional (for uplink and downlink)
<NW packet filter Identifier>	Integer type. The value range is from 1 to 16. In EPS, the value is assigned by the network during establishment.
<local address and subnet mask>	String type. Represents the IP address and subnet mask of the MT. This string follows the format of dot-separated numeric parameters (0~255), as shown below: IPv4 in the form of"a1.a2.a3.a4.m1.m2.m3.m4"or IPv6 in the form of"a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16"。

13.22. AT+CGSCONTRDP Secondary PDP context reads dynamic parameters

- **Description**

Test command returns a list of <cid>s associated with active secondary PDP contexts.

Comment
Return the parameters for UE-initiated and network-initiated PDP context activation.

- **Grammar**

Command	Possible response
Test command **AT+CGSCONTRDP=?**	**+CGSCONTRDP:** (Activated <cid> list) **OK**
Read command **AT+CGSCONTRDP[=<cid>]**	**[+CGSCONTRDP: <cid>,<p_cid>,** **<bearer_id>** **[+CGSCONTRDP: <cid>,<p_cid>,** **<bearer_id>** **[. . .]]** **OK**

- **Parameter**

<cid> Integer type; used to specify a non-secondary PDP context. This parameter is a local parameter of the TE-MT interface, employed in other commands related to the PDP context.

<p_cid> Integer type; Specified by using the +CGDCONT command; Specified particular PDP context definition or default EPS context identifier. This parameter is a local parameter of the TE-MT interface (see +CGDSCONT command).

<bearer_id> Integer type; bearer identifier. For example, EPS bearer in EPS, NSAPI in GPRS.

- **Example**

```
AT+CGSCONTRDP=?

+CGSCONTRDP: cid= (1,2,3,4,5,6,7)

OK
```

AT+CGSCONTRDP

+CGSCONTRDP: 1,0,5

+CGSCONTRDP: 2,1,255

OK

13.23. AT+CGDEL Delete inactive PDP contexts

- **Description**

Execute the command +CGDEL=<cid> to delete the indicated PDP context and remove all associated data related to the inactive indicated PDP context. The AT command will not delete or remove information of activated PDP contexts. The deleted PDP contexts are listed by the +CGDEL:<cid> intermediate result code. If the initial PDP context is supported (see subclause 10.1.0), +CGDEL=0 will return an error, and the context will not be deleted.

If <cid> points to the primary PDP context, and if no PDP context is activated, the PDP context will be deleted along with all linked secondary PDP contexts.

If <cid> points to a secondary PDP context, the inactive PDP context will be deleted. A special form of the command can be specified as +CGDEL (omitting =<cid>). In this form, all inactive primary PDP contexts or those with any activated secondary PDP contexts will be deleted, and all inactive secondary PDP contexts will also be removed. All associated data of the deleted PDP contexts will be erased.

If the initial PDP context is supported (see subclause 10.1.0), +CGDEL (omitting =<cid>) will not cause the initial PDP context to be deleted or result in +CGDEL returning an error.

Note:

1. The AT+CGDCONT set command saves parameters to NV, which will not be lost upon reboot or root.

2. The AT+CGDCONT=<cid> or AT+CGDEL command can delete the PDP context in NV.

- **Grammar**

Command	Possible response
Test command **AT+CGDEL=?**	**+CGDEL:(1-7)** **OK**
Read command **AT+CGDEL=<cid>**	**[+CGDEL: <cid>[,<cid>[,. . .]]]** **OK**
Read command **AT+CGDEL**	**[+CGDEL: <cid>[,<cid>[,. . .]]]** **OK**

- **Parameter**

<cid> Integer type; specifies a particular PDP context definition (refer to the +CGDCONT and +CGDSCONT commands)

13.24. AT+CGAUTH Define PDP context authentication parameters

- **Description**

The write command allows the TE to specify authentication parameters for the PDP context identified by the (local) context identifier parameter <cid> used during PDP context activation and PDP context modification procedures. Since <cid> is the same parameter used in the +CGDCONT and +CGDSCONT commands, +CGAUTH is essentially an extension of these commands. A special form of the write command, +CGAUTH=<cid>, causes the authentication parameters for the context number <cid> to become undefined.

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

The test command returns the supported values as a composite value.

- **Grammar**

Command	Possible response

Test command **AT+CGAUTH=?**	**+CGAUTH:** (supported**<cid>**range), (supported**<auth_prot>**list), (supported**<userid>**range), (supported**<password>**range) **OK**
Read command **AT+CGAUTH?**	**[+CGAUTH: <cid>,<auth_prot>,** **<userid>,<password>]** **[+CGAUTH:<cid>,<auth_prot>,<userid>,** **<password>]** **[. . .]]** **OK**
Read command **AT+CGAUTH=<cid>[,<auth_prot>[,<userid>[,** **<password>]]]**	**OK**

- **Parameter**

<cid> Integer type. Specifies a particular PDP context definition (refer to the +CGDCONT and +CGDSCONT commands).

<auth_prot> Integer type. The authentication protocol used for this PDP context.

0	None. Indicates that no authentication protocol is used for this PDP context. If previously specified, the username and password are deleted.
1	PAP
2	CHAP

<userid> String type. The username used for accessing IP networks.

<password> String type. Password for accessing the IP network.

- **Example**

```
AT+CGAUTH=?

+CGAUTH: <cid>,<auth_prot>,<userid>,<password>][<CR><LF>[. . . ]]

OK
```

AT+CGAUTH=1,0,”Y6dNgXbuLRsTzcbD1aNL”,”0YSaZWrR9IhcKeuBt9gC”

OK

13.25. AT+CFGIMSPDN Define IMS PDP Context

- **Description**

This command is used to define the IMS PDP context.

- **Grammar**

Command	Possible response
Test command AT+CFGIMSPDN=?	**+CFGIMSPDN:** (supported**<cid>**list),**<PDP_type>**, (supported**<ping_count>**list),(supported**<h_comp>**list) **OK**
Read command AT+CFGIMSPDN?	**+CFGIMSPDN: <cid>,<PDP_type>, <APN>,<PDP_addr>,<d_comp>,<h_comp>** **OK**
Read command AT+CFGIMSPDN=<cid> [,<PDP_type> [,<APN> [,<PDP_addr> [,<d_comp> [,<h_comp>]]]]]	**OK**

- **Parameter**

<cid>	Must be 11.
<PDP_type>	String type. Specifies the grouping data protocol type.| "IP" Internet Protocol Version 4 (IETF STD 5) "PPP" Point-to-Point Protocol (IETF STD 51)

	"IPV6" Internet Protocol Version 6 "IPV4V6" Configures dual-stack UE functionality, supporting both IPv4 and IPv6 (RFC 2460)
<APN>	Character string type. Access Point Name, used to select the logical name of the GGSN or external packet data network. If this value is empty or omitted, the subscription value will be used.
<PDP_addr>	Character string type. Used to identify the MT in the address space applicable to the PDP. If the value is empty or omitted, the TE provides this value during PDP startup; otherwise, a dynamic address will be requested. The assigned address can be read using AT+CGPADDR.
<d_comp>	Integer. Controls whether PDP data needs to be compressed (applicable only to SNDCP) (for details, please refer to 3GPP TS 44.065). 0 Close (default value if ignored) 1 Open (manufacturer's preferred compression) 2 V.42bis 3 V.44bis Retain other values.
<h_comp>	Integer. Controls PDP header data compression (for details, please refer to 3GPP TS 44.065 and 3GPP TS 25.323). 0 Close (default value if ignored) 1 On (manufacturer's preferred compression) 2 RFC1144 3 RFC2507 4 RFC3095 Retain other values.

- **Example**

AT+CFGIMSPDN=?

+CFGIMSPDN: 11, (IP,IPV6,IPV4V6,PPP),(0..3),(0..4)

OK

AT+CFGIMSPDN=11, "IP", "cmnet"

OK

AT+CFGIMSPDN?

+CFGIMSPDN:11, "IP", "cmnet", ,0,0

OK

13.26. AT+CFGCIOT CIOT Functional configuration

- **Description**

  Configure and query CIOT parameters

- **Grammar**

Command	Possible response
Test command **AT+CFGCIOT=?**	**+CFGCIOT: nonip=[0-1], cpciot=[0-1] (NBIoTIgnore),upciot=[0-1], erwopdn =[0-1],sms_wo_comb_att=[0-1], apn_rate_control=[0-1]** **OK**
Read command **AT+CFGCIOT?**	**+CFGCIOT: <nonip>,<cpciot>,<upciot> ,<erwopdn>,<sms_wo_comb_at t> ,<apn_rate_control>** **OK**
Read command **AT+CFGCIOT=[<nonip>[,<cpciot>[,<upciot>[,<erwop dn>** **[,<sms_wo_comb_att>[,<apn_rate_control>]]]]]]**	**OK**

- **Parameter**

<nonip>	Configure nonip	
	0	Non-support for nonip
	1	Support nonip
<cpciot>	Configure cpciot	
	0	CPCIoT is not supported, this value is not applicable to Narrowband Internet of Things.
	1	Support CPCIOT
<upciot>	Whether the configuration supports the UPCIoT feature and prioritizes the use of the UPCIoT feature	
	0	Does not support UPCIOT
	1	Support UPCIOT
	2	Support but do not optimize upciot (CP mode is preferred for PDN services that simultaneously use both CP and up)
	3	Support and optimize upciot (the preferred up method that can simultaneously use CP and up's PDN services)

Note: Approximately 2 and 3 are the preferences of upciot,

Impact:

a) EMM indicates the preferred method in Additionupdatetypeie;

	b) For PDN services that can use both CP and up, RABM prioritizes which method.
<erwopdn>	Whether the configuration supports erwopdn, and whether it takes priority.
	0 Does not support erwopdn
	1 Support but do not optimize erwopdn (additional processes must carry PDN)
<sms_wo_comb_att>	Does the configuration support SMS without combined binding
	0 SMS not supported No combined connection
	1 Support SMS does not have combined connectivity
<apn_rate_control>	Does the configuration support APN rate control.
	0 APN rate control is not supported.
	1 Support APN rate control.

- **Example**

AT+CFGCIOT=1,1,1,1,1,1

OK

AT+CFGCIOT=?

+CFGCIOT: nonip=[0-1], cpciot=[0-1](NBIoT Ignore), upciot=[0-1], erwopdn=[0-1], sms_wo_comb_att=[0-1],

apn_rate_control=[0-1]

OK

AT+CFGCIOT?

+CFGCIOT: nonip=1, cpciot=1, upciot=1, erwopdn=1, sms_wo_comb_att=1, apn_rate_control=1

OK

13.27. AT+QGPCLASS GPRS class supported by UE

- **Description**

  GPRS class supported by UE

- **Grammar**

Command	Possible response
Test command **AT+QGPCLASS=?**	**Success:** **+QGPCLASS: <class>** **OK**
Read command **AT+QGPCLASS?**	**Success:** **+QGPCLASS: <class>** **OK**
Read command **AT+QGPCLASS =[<class>]**	**ERROR**

- **Parameter**

<class> 12: 4 down, 2 up, maximum 5

- **Example**

```
AT+QGPCLASS=?

+QGPCLASS: 12

OK
```

13.28. AT+CFGDFTPDN Define the initial PDP context

- **Description**

- This command is used to define the initial PDP context cid 0.

- **Grammar**

Command	Possible response
Test command **AT+CFGDFTPDN=?**	**+CFGDFTPDN: <pdptype>=[123],<nAuthProt>=[0,1,2],<apn>,<Username>,<Password>** **OK**
Read command **AT+CFGDFTPDN?**	**+CFGDFTPDN: <pdptype>,<nAuthProt>,<apn>,<Username>,<Password>** **OK**
Read command **AT+CFGDFTPDN=<pdptype>,[<nAuthProt>,[,<apn>[,<Username>,<Password>]]]]**	**OK**

- **Parameter**

<pdptype>	Identifier parameter, specifying the type of data packet protocol	
	1	IP
	2	IPV6

	3	IPV4V6

Note: AT+CFGDFTPDN=0 indicates deleting all configuration parameters.

<nAuthProt>	Parameters of the identifier.	
	0	None
	1	PAP
	2	CHAP

<apn>	Character string type. Access Point Name, used to select the logical name of the GGSN or external packet data network. If this value is empty or omitted, the subscription value will be used.
<Username>	String type. The username used to access the IP network.
<Password>	String type. The password for accessing the IP network.

- **Example**

AT+CFGDFTPDN=?

+CFGDFTPDN: pdptype=[1,2,3],nAuthProt=[0,1,2], "apn", "Username", "Password"

OK

AT+CFGDFTPDN=1,2, "CMNET", "User1", "password"

OK

AT+CFGDFTPDN?

+CFGDFTPDN:1,2, "CMNET", "User1", "password"

OK

13.29. AT+SETCSPAGFLAG Set the flag controlling CS paging

- **Description**
- The Set command is used to configure the CS paging control flag.
- **Grammar**

Command	Possible response
Test command **AT+SETCSPAGFLAG=?**	**+SETCSPAGFLAG:** (supported **<flag>**list) **OK**
Read command **AT+SETCSPAGFLAG?**	**+SETCSPAGFLAG: <flag>** **OK**
Read command **AT+SETCSPAGFLAG=<flag>**	**OK** **or** **+CME ERROR: <err>**

- **Parameter**

<flag>	Ignore CS paging:	
	0	Do not ignore
	1	Ignore

13.30. AT^PDNACTINFO Configure the number of times and duration for PDP activation and deactivation

- **Description**

- This command is used to set the timeout retry duration and number of attempts for PDP activation and deactivation.

- **Grammar**

Command	Possible response
Test command **AT^PDNACTINFO=?**	**^PDNACTINFO:** (supported**<operwr>**list).(supported**<pdnmode>**list).(supported**<retrytimer>**list),(supported**<retrymaxcount>**list) **OK** **or** **+CME ERROR: <err>**
Read command **AT^PDNACTINFO=<operwr>,<pdnmode>,[<retrytime>],[<retrymaxcount>]**	**^PDNACTINFO: <retrytimer>, <retrymaxcount>** **OK** **or** **+CME ERROR: <err>**

- **Parameter**

<operwr>	Integer, set or read command	
	0	Reading command
	1	Set command
<pdnmode>	Integer, PDP activation or deactivation mode	
	0	Inactive mode

	1	Activation mode
<retrytimer>	Integer, timeout retry interval • When Pdnmode is 1, the retrytimer range for GSM mode is 5-30, with a default value of 10 (the default value for TestSimCard is 30). • When Pdnmode is 1, the retrytimer range for LTE mode is 5 ~ 8, with a default value of 8. • When Pdnmode is 0, the retrytimer range for GSM mode is 2-8, with a default value of 5 (the default value for TestSimCard is 8). • When Pdnmode is 0, the retrytimer range for LTE mode is 2-6, with a default value of 6.	
<retrymaxcount>	Integer, the timeout retry count range is 2 ~ 4, with a default value of 4	

Comment
The settings will be saved to NV and remain effective even after power-off. **After the settings are completed, they will take effect upon the next power-on.** **When using a Test SIM card and GSM mode, the user-configured activation (value 30) or deactivation (value 8) timeout will not take effect.**

- **Example**

AT^PDNACTINFO=1,1,7,4

OK

AT^PDNACTINFO=0,1

^PDNACTINFO: 7, 4

OK

AT^PDNACTINFO=?

```
^PDNACTINFO:(0-1),(0-1),(GSM:[act:5-30 deact:2-8]/LTE:[act:5-8 deact:2-6]),(2-4)

OK
```

14. PING command

14.1. AT+PING Start PING IP address or host(?)

- **Description**

- This command is used to check network status. If the network is functioning normally, it can successfully ping and display network latency. If the network is poor, it will show a request timeout.

- **Grammar**

Command	Possible response
Test command **AT+PING=?**	**+PING:(DNS/IP address),** (supported **<timeout>**list), (supported**<packet_length>**list), (supported**<ping_count>**list), (supported**<rai>**list) **OK**
Read command **AT+PING=<IP address>,** **[<timeout>,<packet_length>,<ping_count>]**	**OK** **Reply from <IP address>: bytes= <nbyte>** **time =< replyTime >(ms), TTL = <ttl>** **Reply from <IP address>: bytes= <nbyte>** **time =< replyTime >(ms), TTL = <ttl>** **[...]** **Ping statistics for <IP address>:Packets:** **Sent= <nsendPackage>, Received = <** **nreceivePackage>, Lose =** **<nlostPackage><<lostRange>%>** **max_delay=<nmax_delay>,** **min_delay=<nmin_delay>,** **average delay=<naverage_delay>**
Read command **AT+PING=<domain name>,** **[<timeout>,<packet_length>,<ping_count>]**	**OK** **Reply from <IP address>: bytes= <nbyte>** **time =< replyTime >(ms), TTL = <ttl>** **Reply from <IP address>: bytes= <nbyte>** **time =< replyTime >(ms), TTL = <ttl>** **[...]** **Ping statistics for <IP address>:Packets:** **Sent= <nsendPackage>, Received = <** **nreceivePackage>, Lose =** **<nlostPackage><<lostRange>%>** **max_delay=<nmax_delay>,** **min_delay=<nmin_delay>,** **average delay=<naverage_delay>**

- **Parameter**

<IP address>	ping the string parameter of the IP address
<domain name>	String parameter for pinging a domain name
<timeout>	Ping ICMP packet timeout (1~255)
<packet_length>	Ping ICMP packet size (36~1500 ipv4) (56~1500 ipv6)
<ping_count>	Ping ICMP packet transmission count (1~65535)
<rai>	The flag indicating auxiliary release instructions. 0 The MME will trigger its configured S1 release approximately 20 seconds after no data transmission. 1 The MME will immediately trigger S1 release. 2 The MME will trigger S1 release upon obtaining one downlink packet.
<nbyte>	Ping packet size
< replyTime >	The time required to receive the response, in milliseconds.
<ttl>	Survival time
<nsendPackage>	Parcel tracking number
<nlostPackage>	Lost package number
<lostRange>	Range of lost packets

- **Example**

AT+PING=?

+PING: DNS/IP address, timeout(1~255), packet_length(36~1500,ipv4)(56~1500,ipv6), ping_count(1~65535)

OK

AT+PING=”183.230.40.39”,20,36,30

OK

Reply from 183.230.40.39: bytes=36 time=958(ms), TTL=255

Reply from 183.230.40.39: bytes=36 time=346(ms), TTL=255

[. . .]

Ping statistics for 183.230.40.39

Packets: Sent=30, Received=30, Lose=0<0%>, max_delay=2791ms, min_delay=190ms, average delay=565ms

14.2. AT+PINGSTOP Stop pinging the IP address or host (?)

- **Description**

This command is used to terminate Ping.

- **Grammar**

Command	Possible response
Test command **AT+PINGSTOP**	**OK**

Note:

• AT+PINGSTOP can stop AT+PING in <ping_count>

15. SYSNV command

15.1. AT+SYSNV Read/Set the current system NV value

- **Description**

Set/Read SYSNV item values. This document cannot enumerate all items as they are constantly subject to change.

- **Grammar**

Command	Possible response
Test command AT+SYSNV=?	+SYSNV: "ap_trace_en","0.Disable; 1.Enable" +SYSNV: "deep_sleep_en","0.Disable; 1.Enable" +SYSNV: "psm_sleep_en","0.Disable; 1.Enable" +SYSNV: "usbmode","0.Charger only; 1.RDA (8910 ROM) serial; 2.Eight serials; 3.RNDIS and 8 serials; 4.SPRD U2S Diag; 5.ECM and 8 serials; 6.ECM ACM[0-4], USL[2,4]; 7.RNDIS only; 8.ECM only; 9.Six serials; 10.RNDIS and 6 serials; 11.ECM and 6 serials" +SYSNV: "usb_detect_mode","0.Charger Detect; 1.Always On" +SYSNV: "diag_device","1.diag device uart; 2.diag device usb serial" +SYSNV: "sim_hotplug", "0.disable; 1.enable" +SYSNV: "sim_hotplug_vol_trigmode", "0.disable; 1.enable" +SYSNV: "nat_cfg", "0 disable; 16bit config nat cid; 101 =0000000100100101 sim 0 cid(1,3,6 enable)(2,4,5,7,8 disable) sim1 cid(1 enable)(2,3,4,5,6,7,8 disable)" +SYSNV: "fstrace", "[0]: aplog, [1] profile, [2] bsdump, [3] cplog, [4] zsplog, [5] moslog" +SYSNV: "poff_charge_en", "0.disable; 1.enable" | +SYSNV: "pm2_ind", "0.disable; 1.enable" +SYSNV: "pm3_ind", "0.disable; 1.enable"
Read command AT+SYSNV=<type>,<item>	+SYSNV: "<item>", <value> OK

Read command **AT+SYSNV=<type>,<item>,<value>**	**OK**

- **Parameter**

<item>	Project Name	
<value>	The value to be set	
<type>	0	Read "<item>"
	1	Write down "<item>"

- **Example**

AT+SYSNV=?

+SYSNV: "ap_trace_en", "0.disable; 1.enable"

+SYSNV: "deep_sleep_en", "0.disable; 1.enable"

+SYSNV: "psm_sleep_en", "0.disable; 1.enable"

OK

AT+SYSNV=0,"sim_hotplug"

+SYSNV: "sim_hotplug",1

OK

AT+SIMHOTSWAP?

+SIMHOTSWAP:1

OK

AT+SIMHOTSWAP=0

OK

AT+SYSNV=0,"sim_hotplug"

+SYSNV: "sim_hotplug",0

OK

AT+SYSNV=1,"sim_hotplug",1

OK

AT+SIMHOTSWAP?

+SIMHOTSWAP:1

OK

16. STK/SS command

16.1. AT+CLIP Calling Line Identification Demonstration

- **Description**

This command refers to the GSM supplementary service CLIP (Calling Line Identification Presentation), which enables the called party to obtain the calling line identification of the caller when receiving a call from a mobile terminal.

- **Grammar**

Command	Possible response
Test command **AT+CLIP=?**	**+CLIP: (0,1)** **OK**
Read command **AT+CLIP?**	**+CLIP: <n><m>** **OK**
Read command **AT+CLIP=<n>**	**OK**

Result URC reporting

```
+CLIP: <number>,<type>[,<subaddr>,<satype>[,[<alpha>][,<CLI validity>]]]
```

- **Parameter**

<n> Integer type, set/display the result code presentation status in MT/TA

0 disable

1 enable

<m> Integer type, the parameter displays the user's CLIP service status in the network.

0 CLIP not provided

	1	Provide CLIP
	2	Unknown
<number>	String type, telephone number of call address specified by <type> format	
<type>	Integer type, address byte type (refer to GSM 04.08 [8] subclause 10.5.4.7)	
<alpha>	The optional string type <number> corresponds to the alphanumeric representation of entries in the phone book; the character set used should be the one selected by the TE character setting via the AT+CSCS command.	
<CLI validity>	Integer type	
	0	CLI valid
	1	The CLI has been withheld by the initiator.
	2	Due to interconnection issues or restrictions imposed by the originating network, the CLI is unavailable.
	3	Since the calling party is using a toll-free number, CLI cannot be utilized.
	4	CLI is unavailable due to other reasons.
<subaddr>	String type, with the sub-address format specified by <satype>	
<satype>	Subaddress byte type in integer format (refer to GSM 04.08 [8] subclause 10.5.4.8)	

Comment
The parameter <n> can control whether the unsolicited result code +CLIP should be presented to the TE.

- **Example**

```
AT+CLIP=1
OK
RING
+CLIP: "02085563192",129,,,0
```

17. Error code summary

17.1. CME Error code meaning

Table 1-CME Error code meaning

Error ID	Meaning of the question
0	PHONE_FAILURE
1	NO_CONNECT_PHONE
2	PHONE_ADAPTER_LINK_RESERVED
3	OPERATION_NOT_ALLOWED
4	OPERATION_NOT_SUPPORTED
5	PHSIM_PIN_REQUIRED
6	PHFSIM_PIN_REQUIRED
7	PHFSIM_PUK_REQUIRED
10	SIM_NOT_INSERTED
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_LONG
25	INVALID_CHAR_INTEXT
26	DAIL_STR_LONG
27	INVALID_CHAR_INDIAL
30	NO_NET_SERVICE
31	NETWORK_TIMOUT
32	NOT_ALLOW_EMERGENCY
40	NET_PER_PIN_REQUIRED
41	NET_PER_PUK_REQUIRED
42	NET_SUB_PER_PIN_REQ
43	NET_SUB_PER_PUK_REQ
44	SERVICE_PROV_PER_PIN_REQ
45	SERVICE_PROV_PER_PUK_REQ
46	CORPORATE_PER_PIN_REQ
47	CORPORATE_PER_PUK_REQ
48	PHSIM_PBK_REQUIRED
49	EXE_NOT_SURPORT
50	EXE_FAIL
51	NO_MEMORY
52	OPTION_NOT_SURPORT
53	PARAM_INVALID
54	EXT_REG_NOT_EXIT

55	EXT_SMS_NOT_EXIT
56	EXT_PBK_NOT_EXIT
57	EXT_FFS_NOT_EXIT
58	INVALID_command_LINE
59	ITF_DIFFERENT
60	BURN_FLASH_FAIL
61	TFLASH_NOT_EXIST
103	GPRS_ILLEGAL_MS_3
106	GPRS_ILLEGAL_MS_6
107	GPRS_SVR_NOT_ALLOWED
111	GPRS_PLMN_NOT_ALLOWED
112	GPRS_LOCATION_AREA_NOT_ALLOWED
113	GPRS_ROAMING_NOT_ALLOWED
132	GPRS_OPTION_NOT_SUPPORTED
133	GPRS_OPTION_NOT_SUBSCRIBED
134	GPRS_OPTION_TEMP_ORDER_OUT
149	GPRS_PDP_AUTHENTICATION_FAILURE
150	GPRS_INVALID_MOBILE_CLASS
148	GPRS_UNSPECIFIED_GPRS_ERROR
264	SIM_VERIFY_FAIL
265	SIM_UNBLOCK_FAIL
266	SIM_CONDITION_NO_FULLFILLED
267	SIM_UNBLOCK_FAIL_NO_LEFT
268	SIM_VERIFY_FAIL_NO_LEFT

269	SIM_INVALID_PARAMETER
270	SIM_UNKNOW_command
271	SIM_WRONG_CLASS
272	SIM_TECHNICAL_PROBLEM
273	SIM_CHV_NEED_UNBLOCK
274	SIM_NOEF_SELECTED
275	SIM_FILE_UNMATCH_command
276	SIM_CONTRADICTION_CHV
277	SIM_CONTRADICTION_INVALIDATION
278	SIM_MAXVALUE_REACHED
279	SIM_PATTERN_NOT_FOUND
280	SIM_FILEID_NOT_FOUND
281	SIM_STK_BUSY
282	SIM_UNKNOW
283	SIM_PROFILE_ERROR

17.2. CMS Error code meaning

Table 2-CMS Error code meaning

Error ID	Meaning of the question
1	UNASSIGNED_NUM
8	OPER_DETERM_BARR
10	CALL_BARRED
21	SM_TRANS_REJE
27	DEST_OOS
28	UNINDENT_SUB

29	FACILIT_REJE
30	UNKONWN_SUB
38	NW_OOO
41	TMEP_FAIL
42	CONGESTION
47	RES_UNAVAILABLE
50	REQ_FAC_NOT_SUB
52	COMMAND_NOT_SUPPORTED
69	RFQ_FAC_NOT_IMP
81	INVALID_SM_TRV
95	INVALID_MSG
96	INVALID_MAND_INFO
97	MSG_TYPE_ERROR
98	MSG_NOT_COMP
99	INFO_ELEMENT_ERROR
111	PROT_ERROR
127	IW_UNSPEC
128	TEL_IW_NOT_SUPP
129	SMS_TYPE0_NOT_SUPP
130	CANNOT_REP_SMS
143	UNSPEC_TP_ERROR
144	DCS_NOT_SUPP
145	MSG_CLASS_NOT_SUPP
159	UNSPEC_TD_ERROR
160	CMD_CANNOT_ACT
161	CMD_UNSUPP
175	UNSPEC_TC_ERROR

176	TPDU_NOT_SUPP
192	SC_BUSY
193	NO_SC_SUB
194	SC_SYS_FAIL
195	INVALID_SME_ADDR
196	DEST_SME_BARR
197	SM_RD_SM
198	TP_VPF_NOT_SUPP
199	TP_VP_NOT_SUPP
208	D0_SIM_SMS_STO_FULL
209	NO_SMS_STO_IN_SIM
210	ERR_IN_MS
211	MEM_CAP_EXCCEEDED
212	SIM_APP_TK_BUSY
213	SIM_DATA_DL_ERROR
255	UNSPEC_ERRO_CAUSE
300	ME_FAIL
301	SMS_SERVIEC_RESERVED
302	OPER_NOT_ALLOWED
303	OPER_NOT_SUPP
304	INVALID_PDU_PARAM
305	INVALID_TXT_PARAM
310	SIM_NOT_INSERT
311	SIM_PIN_REQUIRED
312	PH_SIM_PIN_REQUIRED
313	SIM_FAIL
314	SIM_BUSY

315	SIM_WRONG
316	SIM_PUK_REQUIRED
317	SIM_PIN2_REQUIRED
318	SIM_PUK2_REQUIRED
320	MEM_FAIL
321	INVALID_MEM_INDEX
322	MEM_FULL
330	SCA_ADDR_UNKNOWN
331	NO_NW_SERVICE
332	NW_TIMEOUT
340	NO_CNMA_ACK_EXPECTED
500	UNKNOWN_ERROR
512	USER_ABORT
513	UNABLE_TO_STORE
514	INVALID_STATUS
515	INVALID_ADDR_CHAR
516	INVALID_LEN
517	INVALID_PDU_CHAR
518	INVALID_PARA
519	INVALID_LEN_OR_CHAR
520	INVALID_TXT_CHAR
521	TIMER_EXPIRED
530	SMS_SEND_FAIL