a SUNSEA AIOT company

Y70XX Series_AT Command Manual

LPWA Module

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V1.02	2022.05.23		New version
V1.03	2022.12.29	HTTP Commands	Modify these commands
		18.2.1 T+CGNSSPWR 18.2.2 AT+CGNSSTST	Modify these commands

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1 Introduction

1.1 Scope of the document

This document presents the AT Command Set for SIMCom Y70XX Series, including Y7025 Series, Y7026 Series, Y7080 Series and Y7012 Series.

1.2 Related documents

You can visit the SIMCom Website using the following link:
http://www.simcom.com

1.3 Conventions and abbreviations

In this document, the GSM engines are referred to as following term:

- ME (Mobile Equipment);
- MS (Mobile Station);
- TA (Terminal Adapter);
- DCE (Data Communication Equipment) or facsimile DCE (FAX modem, FAX board);

In application, controlling device controls the GSM engine by sending AT Command via its serial interface. The controlling device at the other end of the serial line is referred to as following term:

- TE (Terminal Equipment);
- DTE (Data Terminal Equipment) or plainly "the application" which is running on an embedded system;

1.4 AT Command syntax

The "AT" or "at" or "aT" or "At" prefix must be set at the beginning of each Command line. To terminate a Command line enter **<CR>**.
Commands are usually followed by a response that includes. **"<CR><LF><response><CR><LF>"**
Throughout this document, only the responses are presented,**<CR><LF>** are omitted intentionally.

The AT Command set implemented by Y70XX Series is a combination of 3GPP TS 27.005, 3GPP TS 27.007 and ITU-T recommendation V.25ter and the AT commands developed by SIMCom.

NOTE

Only enter AT Command through serial port after Y70XX Series is powered on and Unsolicited Result Code "RDY" is received from serial port. If auto-bauding is enabled, the Unsolicited Result Codes "RDY" and so on are not indicated when you start up the ME, and the "AT" prefix, or "at" prefix must be set at the beginning of each command line.

All these AT commands can be split into three categories syntactically: "**basic**", "**S parameter**", and "**extended**". These are as follows:

1.4.1 Basic syntax

These AT commands have the format of "**AT<*x*><*n*>**", or "**AT&<x><n>**", where "**<*x*>**"is the Command, and "**<*n*>**"is/are the argument(s) for that Command. An example of this is "**ATE<*n*>**", which tells the DCE whether received characters should be echoed back to the DTE according to the value of "**<*n*>**". "**<*n*>**" is optional and a default will be used if missing.

1.4.2 S Parameter syntax

These AT commands have the format of "**ATS<*n*>=<*m*>**", where "**<*n*>**" is the index of the **S** register to set, and *"**<m>**"* is the value to assign to it. "**<*m*>**" is optional; if it is missing, then a default value is assigned.

1.4.3 Extended Syntax

These commands can operate in several modes, as in the following table:

Table 1: Types of AT commands and responses

Test Command **AT+<*x*>=?**	The mobile equipment returns the list of parameters and value ranges set with the corresponding Write Command or by 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>**	The execution command reads non-variable parameters affected by internal processes in the GSM engine.

1.4.4 Combining AT commands on the same Command line

You can enter several AT commands on the same line. In this case, you do not need to type the "**AT**" or "**at**" prefix before every command. Instead, you only need type "**AT**" or "**at**" the beginning of the command line. Please note to use a semicolon as the command delimiter after an extended command; in basic syntax or S parameter syntax, the semicolon need not enter, for example: ATE1Q0S0=1S3=13V1X4;+IFC=0,0;+IPR=115200.

The Command line buffer can accept a maximum of 559 characters (counted from the first command without "AT" or "at" prefix) or 39 AT commands. If the characters entered exceeded this number then none of the Command will executed and TA will return "**ERROR**".

1.4.5 Entering successive AT commands on separate lines

When you need to enter a series of AT commands on separate lines, please Note that you need to wait the final response (for example OK, CME error, CMS error) of last AT Command you entered before you enter the next AT Command.

1.5 Supported character sets

The Y70XX Series AT Command interface defaults to the **IRA** character set. The Y70XX Series supports the following character sets:
GSM format
UCS2
IRA
The character set can be set and interrogated using the "AT+CSCS" Command (3GPP TS 27.007). The character set is defined in GSM specification 3GPP TS 27.005.

The character set affects transmission and reception of SMS and SMS Cell Broadcast messages, the entry and display of phone book entries text field and SIM Application Toolkit alpha strings.

1.6 Flow control

Flow control is very important for correct communication between the GSM engine and DTE. For in the case such as a data or fax call, the sending device is transferring data faster than the receiving side is ready to accept. When the receiving buffer reaches its capacity, the receiving device should be capable to cause the sending device to pause until it catches up.

There are basically two approaches to achieve data flow control: software flow control and hardware flow control. Y70XX Series support both two kinds of flow control.
In Multiplex mode, it is recommended to use the hardware flow control.

1.6.1 Software flow control (XON/XOFF flow control)

Software flow control sends different characters to stop (XOFF, decimal 19) and resume (XON, decimal 17) data flow. It is quite useful in some applications that only use three wires on the serial interface.

The default flow control approach of Y70XX Series is hardware flow control (RTS/CTS flow control), to enable software flow control in the DTE interface and within GSM engine, type the following AT Command:
AT+IFC=1,1

Ensure that any communications software package (e.g. Hyper terminal) uses software flow control.

NOTE

Software Flow control should not be used for data calls where binary data will be transmitted or received (e.g. TCP/IP) as the DTE interface may interpret binary data as flow control characters.

1.6.2 Hardware flow control (RTS/CTS flow control)

Hardware flow control achieves the data flow control by controlling the RTS/CTS line. When the data transfer should be suspended, the CTS line is set inactive until the transfer from the receiving buffer has completed. When the receiving buffer is ok to receive more data, CTS goes active once again.

To achieve hardware flow control, ensure that the RTS/CTS lines are present on your application platform.

2 Basic command

2.1 Overview of basic Commands

Command	Description
AT+CIMI	Get IMSI
AT+CGSN	Obtaining product serial number
AT+CGMR	Querying version Information
AT+CFUN	Setting operation Mode
AT+CMEE	Reporting Terminal Error
^SIMST	The Card status is proactively reported
AT+RB/NRB	Device Soft Restart
AT+RESETCTL	RESET Button Validity duration
AT+RESET	Restoring the Device to factory Settings
AT+CEER	Extended Error reporting
AT+CNEC	Reporting a Network Error

2.2 Detailed Description of Basic Commands

2.2.1 AT+CIMI Get IMSI

Command structure

Command	Response
AT+CIMI	+CIMI:<imsi> For Y7026,return is:<imsi> OK
	+CME ERROR:<err> or ERROR
AT+CIMI=?	OK

Command description

Execution command:This command is used to query the IMSI value of the USIM card.

Defined Values

<imei>	Returns the IMSI value stored directly in the card, a decimal string.

Example

```
AT+CIMI
+CIMI:460113004670402

OK
AT+CIMI=?
OK
```

2.2.2 AT+CGSN Obtaining product serial number

Command structure

Command	Response
AT+CGSN[=<snt>]	When <snt>=0(or not exist): <SN> When <snt>=1, +CGSN:<imei> When <snt>=2, +CGSN:<imeisv> When <snt>=3, +CGSN:<svn> OK
	+CME ERROR:<err> or ERROR
AT+CGSN=?	+CGSN:(list of supported <snt>s) OK

Command description

Execution command: This command is used to query the product serial number,IMEI.

Test command: Returns the supported parameters range <snt>.

Defined Values

<snt>	The type of the query requested is an integer. The value ranges from 0 to 3.

<table>
<tr><td><SN></td><td>The serial number of the product, also known as machine code, authentication code, registration application code, etc., is used to identify and verify the "legal identity of the product". The SN code contains a maximum of 64 characters, including digits, uppercase letters and lowercase letters.</td></tr>
<tr><td><imei></td><td>Returns the IMEI value of the board. The value is a string of the following characters:
<table>
<tr><th>8 char</th><th>6 char</th><th>1 char</th></tr>
<tr><td>TAC</td><td>SNR</td><td>CD/SD</td></tr>
</table>
TAC-- Type code assigned by the device
SNR-- Equipment serial number
CD/SD-- If it is CD (Check Digit), it is used for verification. When SD (Spare Digit) is used, the default value is 0.</td></tr>
<tr><td><imeisv></td><td>IMEISV,It is a string of the following types:
<table>
<tr><th>8 char</th><th>6 char</th><th>2 char</th></tr>
<tr><td>TAC</td><td>SNR</td><td>SVN</td></tr>
</table>
SVN-- Software Version</td></tr>
<tr><td><svn></td><td>The software version number is a string of 2 bytes.</td></tr>
</table>

Example

```
AT+CGSN=1
+CGSN:012345698765430

OK
AT+CGSN=?
+CGSN:(0-3)

OK
```

2.2.3 AT+CGMR Querying version Information

Command	Response
AT+CGMR	2112B01Y7025 OK
	+CME ERROR:<err>
AT+CGMI	SIMCOM_Ltd OK
	+CME ERROR:<err>

AT+CGMM	Y7025 OK
	+CME ERROR:<err>
AT+NV=GET,HARDVER	V1.00 OK
	+CME ERROR:<err>
AT+NV=GET,EXTVER	2112B01Y7025 OK
	+CME ERROR:<err>
AT+SWVER	2112B01Y7025 OK
	+CME ERROR:<err>
AT+HVER	V1.00 OK
	+CME ERROR:<err>
AT+NV=GET,VER	2112B01Y7025,V02,HW_V1.00 OK
	+CME ERROR:<err>

Interface

The prefix of software version and hardware version meets carrier requirements. The prefix format is typical example.

Defined Values

<err>:Error code, see the err section

Example

```
AT+NV=GET,EXTVER
2112B01Y7025

OK
AT+NV=GET,HARDVER
V1.00

OK
AT+SWVER
2112B01Y7025
```

```
OK

AT+HVER
V1.00

OK
```

2.2.4 AT+CFUN Setting operation Mode

Command structure

Command	Response
AT+CFUN=<fun>[,<rst>]	OK +CME ERROR:<err> or ERROR
AT+CFUN?	+CFUN:<fun> OK
AT+CFUN=?	+CFUN:(list of supported <fun>s),(list of supported <rst>s) OK

Command description

Write command: used to set the mode of the MT or restart the MT

Read command: Returns the current mode

Test command: Returns the parameter values supported by the command

Defined Values

<fun>	The function mode level is an integer. The default value is 1. 0 The minimum function 1 Fully function 5 Fast local shutdown (no network interaction), enter the minimum function mode. Note: This value is only supported by R14 and later versions
<rst>	Integer, whether to restart. 0 MT is not reset until the <fun> functional mode level is set. The default value. 1 Reset MT before setting the <fun> functional mode level. (Not supported yet)

Example

```
AT+CFUN=0,0
```

```
OK
AT+CFUN?
+CFUN:0,0

OK
AT+CFUN=?
+CFUN:(0,1,5),(0,1)

OK
```

2.2.5 AT+CMEE Reporting Terminal Error

Command structure

Command	Response
AT+CMEE=<n>	OK +CME ERROR:<err> or ERROR
AT+CMEE?	+CMEE:<n> OK
AT+CMEE=?	+CMEE:(list of supported <n>s) OK

Command description

Set Command: Used to set whether to get reports of mobile device errors, effective immediately.

Read command: Returns the current <n> value.

Test command: Returns the parameter values supported by the command.

Defined Values

<n>	The function mode level is an integer. The default value is 1. 0 Do not use +CME ERROR:<err> result code, use ERROR instead. 1 To use the +CME ERROR:<err> result code and the value type <err>, refer to Appendix A, or refer to Section 9.2 of 3GPP TS 27.007. 2 Use the +CME ERROR:<err> result code, using the <err> value in string format.

Example

```
AT+CMEE=1

OK
```

```
AT+CMEE?
+CMEE:1

OK
AT+CMEE=?

+CMEE:(0-2)

OK
```

2.2.6 ^SIMST The Card status is proactively reported

Command structure

Command	Response
	^SIMST:<n>

Command description

Proactively report commands, and proactively report card status when powering on, starting up, or waking up from deep sleep.

Defined Values

<n>	Interger,Range is 0,1,2. 0 No Sim card 1 The card is successfully initialized after being powered on or woken up from deep sleep 2 Deep sleep wake up, no card initialization, keep the deep sleep card state, does not support hot swap during deep sleep

Example

First power-on:

Take the initiative to report:^SIMST:1

Deep sleep wake up does not do card initialization:

Take the initiative to report:^SIMST:2

No card power on power on:

Take the initiative to report:^SIMST:0

2.2.7 AT+RB/NRB Device Soft Restart

Command structure

Command	Response
AT+RB	REBOOTING
AT+NRB	REBOOTING

Interface

This command enables the chip to start the software restart process and takes effect after setting the factory NV configuration.

Example

```
AT+NRB
REBOOTING
+POWERON:2
^SIMST:1
```

2.2.8 AT+RESETCTL RESET Button Validity duration

Command structure

Command	Response
AT+RESETCTL=<mode>	OK +CME ERROR:<err>
AT+RESETCTL?	+RESETCTL:<mode> OK

Command description

RESET Specifies the restart duration triggered by the RESET button. After the restart, the WORKING NV of NB is still valid.

Defined Values

<mode>	0 Indicates that the reset signal takes effect when the button is pressed for more than 20 milliseconds. 1 Indicates that the reset signal takes effect if the button is pressed for more than 6 seconds. If the button is pressed for less than 6 seconds, the reset signal is the wake signal. The default value.

2.2.9 AT+RESET Restoring the Device to factory Settings

Command structure

Command	Response
AT+RESET	RESETING

Command description

This command is used to restore factory NVS and erase all working NVS when a serious software exception occurs and the device cannot be restored to the normal state for a long time.

Example

```
AT+RESET
RESETING
+POWERON:2
^SIMST:1
```

2.2.10 AT+CEER Extended Error reporting

Command structure

Command	Response
AT+CEER	OK +CEER:<report> OK
AT+CEER=?	OK

Command description

Run the following command to query the cause of the latest PDP activation/deactivation failure and deregistration cause:

Defined Values

<report>	the value is a string of less than 100 bytes and describes the cause of the error.

Example

```
AT+CEER
+CEER:Service option not supported

OK
AT+CEER=?
OK
```

2.2.11 AT+CNEC Reporting a Network Error

Command structure

Command	Response
AT+CNEC=<n>	OK +CME ERROR:<err> or ERROR
AT+CNEC?	+CNEC:<n> OK
AT+CNEC=?	+CNEC:(list of supported <n>s) OK

Command description

Write commands: Write commands enable or disable the error code report sent by the network. When activated, based on the <n> Settings, THE ME will report network sent EPS mobility management and EPS session management related error codes. The following result code can be reported:

+CNEC_EMM:<error_code>[,<CID>] EPS mobility management

+CNEC_ESM:<error_code>[,<CID>] EPS session management

Read command: Returns the current <n> value.

Test command: Returns the parameter values supported by the command.

Defined Values

<n>	Integer 0 Disables error code reporting 8 Enable URC +CNEC_EMM to report EPS mobility management errors according to the code specified in 3GPP TS 24.301 [83] Table 9.9.3.9.1. 16 Enable URC +CNEC_ESM to report EPS session management errors according to the code specified in 3GPP TS 24.301 [83] Table 9.9.4.4.1. 24 Enable URC +CNEC_EMM and URC +CNEC_ESM
<error_code>	Integer. Error code reference 3GPP TS 24.301 [83] Table 9.9.3.9.1 For EPS mobility management error codes. 3GPP TS 24.301 [83] Table 9.9.4.4.1 Error codes for EPS session management.
<cid>	Integer. The PDP context specified (see AT+CGDCONT command).

Note: <n>=0 is the default value. Typing +CNEC=8, followed by +CNEC=16, will not yield the same result as +CNEC=24, because +CNEC=16 overrides the previous setting.

Example

```
AT+CNEC=?
```

```
+CNEC:(0,8,16,24)

OK
AT+CNEC?
+CNEC:0

OK
AT+CNEC=8
OK
```

3 Power consumption Commands

3.1 Overview of Power consumption Commands

Command	Description
AT+FASTOFF	Quick Power off
AT+CPOF	Quick Power off
AT+WORKLOCK	Save electricity lock
AT+POWERON	Proactively Reporting the Power-on Completion
+POWERDOWN	Report in Power Saving Mode
AT+OFFTIME	Power outage time compensation(not yet operated)

3.2 Detailed Description of Power consumption Commands

3.2.1 AT+FASTOFF Quick Power off

Command structure

Command	Response
AT+FASTOFF=[<type>]	OK +POWERDOWN:0,-1 +POWERON:4 ^SIMST:1
	+CME ERROR:<err>
AT+FASTOFF=?	+FASTOFF:(0,1,2) OK
AT+FASTOFF	OK +POWERDOWN:0,-1

Command description

This command does not consider the 3GPP status. After saving important NVS quickly, the command enters the special state and waits for further operations.

When the parameter is 0, the chip will quickly go into a deep sleep and wait for an external interrupt triggered by WAKEUP_PIN to wake up.
When there is no parameter, the chip will remain in working state, but will not respond to any external interruption, and the baseboard MCU must power off the chip and then on to work normally.
This command flow does not execute the PSM flow. Therefore, when the chip is powered on again, the Attach flow must be executed for the NB protocol stack. For module users, if they are not concerned with the PSM process, the baseboard MCU can send AT+FASTOFF to control the chip into a special state quickly.

Defined Values

<type>	Fast deep sleep type 0 after saving all NV information, enter the chip to sleep deeply; WAKEUP_PIN can awaken 1 After the NV is saved, the lock is interrupted and the capacitor discharge problem is solved by waiting for the customer to power off 2 After saving the NV, the lock is interrupted and the capacitor discharge problem is solved by waiting for the customer to power off NULL does not assign a value. Same as 0.

Example

```
AT+FASTOFF
+CGEV:NW PDN DEACT 0

+CGEV:NW DETACH
+POWERDOWN:0,-1    // After receiving this command, the baseboard MCU must power off the chip
```

3.2.2 AT+CPOF Quick Power off

It has the same function as AT+FASTOFF, please refer to AT+FASTOFF instruction for specific use.

3.2.3 AT+WORKLOCK Save electricity lock

Command structure

Command	Response
AT+WORKLOCK=<enable>[,<type>]	OK
	+CME ERROR:<err>
AT+WORKLOCK=?	+WORKLOCK:<enable>,<type> OK
+WORKLOCK?	+WORKLOCK:<default_lock>,<xy_lock>,<dela

	y_lcok>,<external_lock> **OK**

Command description

The extended AT command is a work lock for the chip, and prevents the chip from entering the DEEPSLEEP mode when a service flow is in progress to ensure that the user flow is not interrupted and improve the real-time transmission of network data. After the user enters "AT+WORKLOCK=0", the chip will execute the complete PSM sleep process and enter the DEEPSLEEP mode.
The type parameter is optional and is not recommended for customers. It allows users to distinguish different task locks. Users can set the value freely. 0 or the default value, which indicates that task locks are not subdivided. To ensure proper deep sleep, all modules must ensure that locks are used in pairs. For details, see Y70XX Series_Low Power_Application Documentation.

Users can use +WORKLOCK? Query the status of the current system lock. The returned parameter indicates the number of worklock holders. It supports default user lock, internal lock, delay lock and external user lock (for example, when MCU sends AT command, it takes up an external user lock by default). Users only need to care about the default user lock and external user lock status.

Defined Values

<enable>	Applies for/releases locks 1 indicates applying for a lock. The default value 0 indicates that the lock is released
<type>	Indicates the lock type. It is not recommended. 0 indicates that lock types are not subdivided, 1/2/3... Value is used for users to set different type values for each individual task. Currently, users can only set type 3.
<err>	Indicates the error code. See the err section.
<default_lock>	Indicates the default number of user locks.
<xy_lock>	Indicates the number of internal locks.
<delay_lCOk>	Indicates the number of delay locks.
<external_lock>	Specifies the number of external user locks.

Example

```
AT+WORKLOCK=0

OK
+POWERDOWN:8824,8824        // TAU expiration time offset 8824 seconds
AT+WORKLOCK?
+WORKLOCK:1,0,0,1 // The default user has one lock, and the external user has one lock
```

3.2.4 AT+POWERON Proactively Reporting the Power-on Completion

Command structure

Command	Response
	+POWERON:<cause>

Command description

This parameter is used only when an external baseboard MCU exists and the "^SIMST:" message is reported when the SIM card initialization is complete. After the system starts, the system reports the startup reason to the external user. Normally, after the user receives the report, it indicates that the SIM card is initialized and the 3GPP protocol stack can be used.

If the value 2/5/6 is abnormally restarted, the chip restarts after the external MCU receives the value during the operation. At this time, the state machines of the two MCU are inconsistent. You need to check the specific restart cause or reset the whole device.

Defined Values

<cause>	0 POWER ON Normal power-on action 1 PIN RESET PIN reset for external hard reset of chip 2 SOFT RESET Soft restart 3 UTC WAKEUP UTC Wake up 4 External PIN WAKEUP External PIN wake up, often tied to data communication 5 WDT RESET Hardware watchdog restarts 6 UNKNOWN Unknown abnormal restart, such as insufficient capacitor discharge

3.2.5 +POWERDOWN Report in Power Saving Mode

Command structure

Command	Response
	+POWERDOWN:<next TAU offset>,<next RTC wakeup offset>

Command description

Only for products with baseboard MCU and support power off mode. When the ARM core detects that the current module can enter deep sleep, it sends a command to the external baseboard to inform the baseboard that it can power off.

Defined Values

<Next TAU offset>	Integer, in seconds, the TAU timeout offset of PSM, that is, how many seconds after the TAU timeout; If this parameter is 0, it indicates the invalid TAU duration.
<next RTC wakeup offset>	Indicates the offset of the next wake-up time of the RTC hardware timer, such as TAU time, user hard time, and FOTA time. If the parameter is -1, the RTC periodic event is not configured.

3.2.6 AT+OFFTIME Power outage time compensation(not yet operated)

Command structure

Command	Response
AT+OFFTIME=<off time>	OK

Command description

This command is used only when there is an external baseboard MCU. If the EXTERNAL MCU powers off the NB module and then powers on the NB module again, use this command to inform the NB module of the power off duration so that the NB module can update its internal RTC timer.

In case of abnormal power failure of the whole machine and baseboard MCU cannot accurately know the chip power failure duration, input "AT+OFFTIME=0" to notify the chip to abandon power failure duration compensation and directly ATTACH normal startup operation.

It is important to note that deep sleep with power outage compensation mechanism cannot use AT+FASTOFF/CPOF, but can only use AT+WORKLOCK mechanism to enter deep sleep.

If the OFFTIME function is supported, IPALIVE=0 must be set. Please use it with caution because it also involves the process interaction with baseboard MCU. If you need to use, please contact xin Xun Tong FAE!

Defined Values

<off time>	Indicates the number of seconds when the EXTERNAL MCU power off the NB module.

4 Clock AT command

4.1 Overview of Clock Commands

Command	Description
AT+CCLK	World Time Configuration
AT+NITZ	World time acquisition mode
AT+CMNTP	Querying the NTP Time
AT+XNTP	Querying the NTP Time
AT+CMSRI	Enabling RI Signals

4.2 Detailed Description of Clock Commands

4.2.1 AT+CCLK World Time Configuration

Command structure

Command	Response
AT+CCLK=<time>	**OK** **+CME ERROR:<err>**
AT+CCLK?	**+CCLK:<time>** **OK**

Command description

Used for users to dynamically set the world time, and provide real-time query commands. The interior of the platform will be obtained when attaching.

Defined Values

<time>	The format is "YY /MM/ DD,hh: MM: SS ±zz", for example, "19/05/06,22:10:00+08". The maximum year does not exceed 99. The value ranges from 0 to 69. The corresponding data are automatically translated into 1970~1999; Where, ±zz is the sub-time zone, and

	each sub-time zone is 15 minutes.

Example

```
AT+NITZ=0
OK
AT+CCLK=19/03/30,10:50:30+32
OK
AT+CCLK?
+CCLK:19/3/30,10:50:33+32

OK
AT+NITZ=0
OK
AT+CCLK=99/03/30,11:29:0+8    // It's set to 1999
OK
AT+CCLK?
+CCLK:99/3/30,11:29:0+8         // The query is in 1999

OK
```

4.2.2 AT+NITZ World time acquisition mode

Command structure

Command	Response
AT+NITZ=<mode>[,<save_mode>]	OK +CME ERROR:<err>
AT+NITZ=?	+NITZ: (list of supported <mode>s) OK
AT+NITZ?	+NITZ:<mode> OK

Command description

This command is used to set the world time. When NITZ is 1, CCLK cannot be set and can be queried. When NITZ is 0, it will filter the relevant active report +CTZV:, +CTZE:, and will not be sent to the AT mouth.

Defined Values

<mode>	Mode for updating world time. Default is 1 0 indicates that the user can run the CCLK command to set the value locally.

	1 indicates quasi-real-time update by "+CTZEU:" of 3GPP.
<save_mode>	indicates whether to save the NITZ factory NV. The default value is 0 0 does not save 1 save

Example

```
AT+NITZ=0,0
OK
AT+NITZ=0

OK
AT+CCLK=19/03/30,11:29:0+8

OK
AT+CCLK?

+CCLK:19/3/30,11:29:1+8

OK
```

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4.2.3 AT+CMNTP Querying the NTP Time

Command structure

Command	Response
AT+CMNTP=<domain>,<port>,<update_rtc>,<timeout>	OK +CMNTP:<err_no>[,<time>]
	+CME ERROR:<err>

Command description

This command is used to asynchronously query the NTP time on the specified NTP server.

Defined Values

<domain>	Indicates the IP address or domain name of the NTP server. The default value is ntp1.aliyun.com.
<port>	Indicates the PORT number of the NTP server. The value ranges from 1 to 65535. The default value is 123. If you are not sure, do not set this parameter. If this parameter is omitted or set to 0, the default port is 123.
<update_rTC>	Specifies whether to automatically update the local RTC timer. The

	default value is 1. 1 Enable the automatic update local RTC timer. That is, the queried time is saved to the local CCLK time. 2 Disable automatic update of the local RTC timer. That is, only query, not save. (Not supported, error
<timeout>	the request times out. The value ranges from 1 to 300 seconds. The default value is 20s. If this parameter is omitted or set to 0, the default value is 20s.
<time>	NTP time. The value is Greenwich Mean Time (GMT) + time zone, 15 minutes for one time zone. The date year is the year -2000, for example, 20/11/13, which means November 13, 2020.
<err_no>	The query fails and an error code is returned 0 No error, everything OK. 1 DNS error 2 Timeout -1 Operation in progress -4 Illegal argument -5 SNTP table used -6 SNTP func is not allowed

Example

```
AT+CMNTP=ntp1.aliyun.com,,1,10
OK

+CMNTP: 0,"20/07/15,20:29:20+32"
AT+CMNTP=,,1,10

OK

+CMNTP: 0,"20/07/15,20:32:10+32"
```

4.2.4 AT+XNTP Querying the NTP Time

Command structure

Command	Response
AT+XNTP=<domain>,<port>,<update_rtc>,<timeout>	+XNTP:<time> OK +CME ERROR:<err>

Command description

This command is used to query the NTP time on the specified NTP server.

Defined Values

<domain>	indicates the IP address or domain name of the NTP server. The default value is ntp1.aliyun.com.
<port>	indicates the PORT number of the NTP server. The value ranges from 1 to 65535. The default value is 123. If you are not sure, do not set this parameter
<update_rTC>	specifies whether to update the local RTC timer. The default value is 1. 1 Enable the automatic update local RTC timer. That is, the queried time is saved to the local CCLK time. 2 Disable automatic update of the local RTC timer. That is, only query, not save. (Not supported, error
<timeout>	the request times out. The value ranges from 1 to 300 seconds. The default value is 20s
<time>	NTP time. The value is Greenwich Mean Time (GMT) + time zone, 15 minutes for one time zone. The date year is the year -2000, for example, 20/11/13, which means November 13, 2020.

Example

```
AT+XNTP=ntp1.aliyun.com,,1,10
+XNTP:20/11/13,08:30:25+32

OK
AT+XNTP=,,1,10

+XNTP:20/11/13,08:34:39+32

OK
```

4.2.5 AT+CMSRI Enabling RI Signals

Command structure

Command	Response
AT+CMSRI=<ring_en>,<duration>,<permanent>	OK +CME ERROR:<err>
AT+CMSRI?	+CMSRI:<ring_en>,<duration>

	OK
	+CME ERROR:<err>

Command description

This command is used to enable RI signal. By default, the CHIP GPIO13 pin is used as the RI signal output pin. If enabled, the RI pin will be high in <Duration> milliseconds and then output URC information through the AT port.

This command needs to be developed with the customer again, so it cannot be used completely at present. If necessary, please contact FAE!

Defined Values

<ring_en>	Enable/disable RI indication, default is 0 disabled 0 disable 1 Enable
<duration>	The value is an integer greater than 0. High level output duration, in milliseconds. Default value: 120ms
<permanent>	Whether it takes effect permanently. The default value is 0 0 Effective this time 1 Permanent

Example

```
AT+CMSRI=1,10000,1
OK
AT+CMSRI?
+CMSRI:1,10000

OK
```

5 Serial port commands

5.1 Overview of Serial port Commands

Command	Description
AT+UARTSET	Setting
AT+IPR	Setting baud rate
	Adaptive baud rate
ATE	Serial Port Output is Displayed
AT+NATSPEED	Setting

5.2 Detailed Description of Serial port Commands

5.2.1 AT+UARTSET Setting

Command structure

Command	Response
AT+UARTSET=<baud_rate>[,<store>[,<openstandby>]]	OK +CME ERROR:<err>
AT+UARTSET=?	+UARTSET:(2400,4800,9600,57600,115200,230400,460800,921600) OK
AT+UARTSET?	+UARTSET: <baud_rate> OK

Command description

This command is used to set the baud rate of the AT port. The default baud rate is 9600. Currently, the platform supports only the baud rate. Use the default values for other parameters. This command supports dynamic baud rate configuration. When store is 0, the dynamic baud rate configuration takes effect and requires the peer to switch to the corresponding baud rate. If store is 1, divide the baud rate by 2400 and save the baud rate to uARt_rate of the factory NV, and restart the device to take effect.

For dynamic switching baud rate scenario, due to the need to switch between baseboard MCU and chip at the same time, there is a time difference problem, which cannot ensure that "OK" is accurately received by baseboard MCU. To prevent switchover failure, you are advised to send the switchover command and then press AT and OK to shake hands.

At a high baud rate, it takes about 3 milliseconds for BBPLL to stabilize after STANDBY is woken up, resulting in data loss. In dynamic baud rate switching scenarios, you can use parameters to dynamically switch on or off standby. If the <OpenStandby> parameter is not set, the system dynamically switches on or off STANDBY according to the baud rate when <Store> is 0. When the baud rate is less than or equal to 9600, STANDBY is enabled. When the baud rate is higher than 9600, STANDBY mode is disabled to avoid data loss.

It is not recommended to enable dynamic baud rate because of the fault tolerance mechanism.

Defined Values

<baud_rate>	baud rate, currently support 2400480 0960 0576 00115 200230 400460 800921 600.
<store>	indicates whether to dynamically switch baud rate. 1 indicates that the fixed baud rate is saved to the NV and the NV restarts immediately. 0 indicates that the dynamic baud rate takes effect and requires the peer party to synchronize the baud rate
<openStandby>	Indicates whether to enable standby sleep. This parameter is valid only when store is set to 0. The default value is dynamic. 1 Indicates that STANDBY sleep mechanism is enabled. 0: Disables the STANDBY sleep mechanism

Example

```
//Dynamically change the baud rate
AT+UARTSET=115200,0    // If the baud rate is dynamically changed, OK cannot be displayed on the peer end. The peer end must switch to 115200 and temporarily disable STANDBY
AT+NPING=139.224.112.6,32,1,30,1    // AT transmission AT 115200 baud rate

OK
AT+UARTSET=9600,0    // If the baud rate is dynamically changed, OK cannot be displayed on the peer end. Switch to 9600 on the peer end and enable STANDBY
AT+NPING=139.224.112.6,32,1,30,1    // AT transmission AT 9600 baud rate
OK

//Modify the default baud rate of the NV
AT+UARTSET=115200,1    // Save the baud rate configuration and restart automatically
REBOOTING              // After the chip restarts, it proactively reports the startup return code
AT+NPING=139.224.112.6,32,1,30,1    // AT transmission AT 115200 baud rate

OK
```

```
AT+NV=SAVE
REBOOTING                    // Chip restart boot back code
```

5.2.2 AT+IPR Setting baud rate

Command structure

Command	Response
AT+IPR=<baud_rate>	OK +CME ERROR:<err>
AT+IPR=?	+IPR:(4800,9600,19200,38400,57600,115200)[,(0,4800,9600,19200,38400,57600,115200,230400,460800,921600)] OK

Command description

This command is used to set the baud rate of the AT port. The default baud rate is 9600. This command divides the baud rate by 2400 and saves it in the uart_rate parameter of the NV. It takes effect immediately. Because the baud rate has changed, you are advised to restart the terminal. If the baud rate is higher than 9600, the program automatically changes the NV (lpM_standby_enable) to disable standby to prevent 8003 from reporting an error. If the baud rate is lower than or equal to 9600, the NV of the standby device is not processed. Therefore, you need to send a command to enable or disable the standby device.

Defined Values

<baud_rate>	Baud rate, supported 0,4800,9600,19200,38400,57600,115200,230400,460800,921600

Example

```
AT+IPR=19200    // Modify baud rate, effective immediately.

OK              // Change the baud rate of the peer device to the set baud rate immediately.
Otherwise, the peer device cannot receive a reply or the received reply is garbled characters
AT+IPR?         // Query the current baud rate
+IPR:9600

OK
AT+IPR=?        // Query the supported baud rate
+IPR:(4800,9600,19200,38400,57600,115200)[,(0,4800,9600,19200,38400,57600,115200,230400,46
0800,921600)]   //+IPR:(adaptive baud rate supported)[,(manually set baud rate supported)]
```

```
OK
```

5.2.3 Adaptive baud rate

The Y70XX series supports adaptive baud rate of the AT serial port up to 115200. You can run the AT+IPR=0 command to set the uart_rate of the factory NV to 0 to enable the adaptive baud rate of the AT serial port, which takes effect after restart. The default UARt_rate of the NV is 4, that is, 9600 baud rate. The adaptive baud rate is disabled.

During the initialization phase after the restart, the chip will wait until the user sends a specific string "AT\r\n" to trigger the adaptive baud rate detection. After the successful adaptive adjustment of baud rate, the chip replies "\r\n OK\r\n" and continues the software process. Under normal circumstances, after the adaptive baud rate is enabled, the specific string "AT\r\n" can be sent 100 ms after power-on to trigger the adaptive baud rate detection. Note that adaptive baud rate does not store baud rate in NV. In case of power failure, power-on or reset, the chip will go through the adaptive process again (that is, the adaptive baud rate is not saved). If a deep sleep is awakened, the chip will still use the baud rate acquired before deep sleep.

If the adaptive baud rate is higher than 9600, the application temporarily disables STANDBY mode (NV of STANDBY is not changed) to avoid data loss when STANDBY is woken up by the AT command.

Adaptive baud rate supported

2400,4800,9600,19200,38400,57600,115200

5.2.4 ATE Serial Port Output is Displayed

Command structure

Command	Response
ATEx	OK +CME ERROR:<err>

Command description

The AT command is used to display the data received by the serial port to the serial port.

ATE0: no output is displayed.

ATE1: command output is required. The output is not saved when the system is powered off. By default, the output is not displayed.

Defined Values

<X>	Whether the command output is displayed 0 no command output is displayed. Default value 1 echo

Example

```
AT+CGMR
```

```
2112B01Y7025

OK
ATE1
OK
AT+CGMR
2112B01Y7025

OK
```

5.2.5 AT+NATSPEED Setting

Command structure

Command	Response
AT+NATSPEED=<baud_rate>[,<timeout>[,<store>[,<sync_mode>[,<stopbits>]]] For EATversion: +NATSPEED=<baud_rate>,[<timeout>[,<store>[,<sync_mode>[,<stopbits>[,<parity>[,<xonxoff>]]]]]]	OK
	+CME ERROR:<err>
AT+NATSPEED?	+NATSPEED:<baud_rate> OK For EATversion: +NATSPEED:<baud_rate>,<sync_mode>,<stopbits>,<parity>[,<xonxoff>] OK
AT+NATSPEED=?	+NATSPEED: (List of supported <baud rates>) OK For EATversion: +NATSPEED: (support <baud_rate> list), support the <timeout> range), and <store> list (support), (support <sync_mode> list), (support <parity> range), (support <xonxoff> list) OK

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Command description

This command is used to set the baud rate of the AT port. The default baud rate is 9600.

Defined Values

<baud_rate>	baud rate, support 2400,4800,9600,57600,115200,230400,460800,921600.
<timeout>	indicates the timeout period. It is the time to wait before switching back to baud rate. The default value is 3. The maximum value is 30. 0 indicates that the default value is used.
<store>	indicates whether it is stored in NV. 1 indicates that it is stored in NV. Divide the baud rate by 2400 and save it to the uARt_rate parameter of the outgoing NV. 0 is not stored in the NV. The value takes effect immediately after being set and becomes invalid after being restarted.
<sync_mode>	not supported. Synchronous mode, 0 by default
<stopbits>	indicates the stopbit. [1,2] is supported. The default value is 1 stop bit. 1 indicates a stop bit. 2 indicates two stop bits.
<partity>	currently not supported. AT UART Parity check.
<xonxoff>	not supported; AT UART software (XON/XOFF) flow control.

Example

```
AT+NATSPEED=115200    // Change the baud rate and restart the system
REBOOTING

AT+NATSPEED?      // Example Query the baud rate configuration
+NATSPEED:115200

OK

// For EATversion:
AT+NATSPEED?      // Example Query the baud rate configuration
+NATSPEED:115200,0,1,0,0

OK

AT+NATSPEED=?          // Example Query the configurations supported by serial ports
+NATSPEED:(2400,4800,9600,57600,115200,230400,460800)

OK

For EATversion:
AT+NATSPEED=?          // Example Query the configurations supported by serial ports
+NATSPEED:(2400,4800,9600,57600,115200,230400,460800,921600),(0-30),(0,1),(0),(1,2),(0),(0)

OK
```

6 Security Commands

6.1 Overview of Security Commands

Command	Description
AT+CPIN	PIN Input
AT+CLCK	Locking or Unlocking Device
AT+CPWD	Changing a Password
AT+CPINR	Number of remaining PIN retries
AT+NPIN	The PIN operation

6.2 Detailed Description of Security Commands

6.2.1 AT+CPIN PIN Input

Command structure

Command	Response
AT+CPIN=<pin>[,<newpin>]	OK
	+CME ERROR:<err> or ERROR
AT+CPIN?	+CPIN:<code> OK
AT+CPIN=?	OK

Command description

Write commands are used to verify and unlock pins.
If the current password input request is PIN, enter +CPIN=<PIN> for verification.
If the current password input request is PUK, enter +CPIN=<PIN> and <newpin> to unlock the password. The first parameter <pin> is the SIM PUK code, and the second parameter <newpin> is the newpin code.
Read commands are used to indicate whether there is a password input request.

Defined Values

<PIN>	string, PIN code or PUK code.

<newpin>	string, newpin.
<code>	string (without quotes) READY MTNo password input request SIM PIN UICC/SIM PIN password request SIM PUK UICC/SIM PUK password request

Example

```
AT+CPIN?
+CPIN:READY

OK
AT+CPIN="1234"
OK
```

6.2.2 AT+CLCK Locking or Unlocking Device

Command structure

Command	Response
AT+CLCK=<fac>,<mode>[,<passwd>]	When <mode>=0 or <mode>=1, Execute success: **OK** or Whe <mode>=2, Execute success: **+CLCK:<status>** **OK**
	+CME ERROR:<err> or **ERROR**
AT+CLCK=?	**+CLCK:(list of supported <fac>s)** **OK**

Command description

Write commands: Used to lock, unlock, and query the MS or network device. Generally, you need to enter a password.

Defined Values

<fac>	specifies the function of the command. The value is a string of the following values (currently, only SC is supported). SC SIM Card
<mode>	Integer, operation mode.

	0 Unlock 1 Lock 2 query status
<status>	Integer, MS or network state value Value Description 0 unactivated 1 activated
<passwd>	The value is a string. The maximum length is 8, and the minimum length is 4.

Example

```
AT+CLCK="SC",2
+CLCK:0

OK
AT+CLCK="SC",1,"1234"
OK
AT+CLCK=?
+CLCK:("SC")

OK
```

6.2.3 AT+CPWD Changing a Password

Command structure

Command	Response
AT+CPWD=<fac>,<oldpwd>[,<newpwd>]	OK +CME ERROR:<err> or ERROR
AT+CPWD=?	+CPWD:(list of supported (<fac>,<pwdlength>)s) OK

Command description

Write command: Used to change the password (such as PIN) of the device lock function.

Defined Values

<fac>	specifies the function of the command. The value is a string of the following values (SC only is supported). "SC" SIM Card
<oldpwd>,<newpwd>	Old password, new password. The password is a string of digits.

	The maximum length is 8, and the minimum length is 4.

Example

```
AT+CPWD="SC","1234","1111"
OK
AT+CPWD=?

+CPWD:"SC",(4-8)

OK
```

6.2.4 AT+CPINR Number of remaining PIN retries

Command structure

Command	Response
AT+CPINR=<sel_code>	**OK** **+CME ERROR:<err>** or **ERROR**
AT+CPINR=?	**+CPINR:(list of supported<code>s),(list of supported<retries>s)[, (list of supported<default_retries>s)]** **OK**
AT+CPINR	**OK** **+CME ERROR:<err>** or **ERROR**

Command description

Run the following command to return the number of remaining PIN attempts of the UISM card: The format is as follows: **+CPINR: <code>,<retries>[,<default_retries>]**.

Each line returns a <code> result specified by <sel_code>. Returns all supported <code> results when the <sel_code> argument is omitted.

Test command: Returns a list of supported <code>.

Defined Values

<code>	the value is a character string of PIN type. Support SIM PIN,SIM_PUK,SIM PIN2, AND SIM PUK2.
<retries>	indicates the number of remaining PIN attempts.
<default_retries>	ndicates the number of initial PIN attempts.
<sel_code>	a string, the same as <code> or a substring. Substrings can start/start with "*" fuzzy matching. Note: * can only be at the beginning of a substring. Returns null if no <code> matches.

Example

```
AT+CPINR="*SIM*"
+CPINR:SIM PIN,3,3
+CPINR:SIM PUK,10,10
+CPINR:SIM PIN2,3,3
+CPINR:SIM PUK2,10,10

OK
AT+CPINR="*PUK"
+CPINR:SIM PUK,10,10

OK
AT+CPINR=""
OK
```

6.2.5 AT+NPIN The PIN operation

Command structure

Command	Response
AT+NPIN=<command>,<parameter1>[,<parameter2>]	OK +NPIN:OK
	+CME ERROR:<err> or ERROR +NPIN:<npin result>
AT+NPIN=?	OK

Command description

Set commands: Used for PIN authentication, unlock PIN, modify PIN, disable/enable PIN authentication. After the PIN command is executed, the system automatically reports the result code.

Defined Values

<command>,<parameter1>, <parameter2>

The value can be:

<command>	<parameter 1>	<parameter 2>	description
0	<pin>	-	Verify PIN
1	<old pin>	<new pin>	Changing the PIN Password
2	<pin>	-	Enabling PIN Authentication
3	<pin>	-	Disable PIN Authentication

	4	<puk>	<pin>	Unlock PIN
<PIN>,<old pin>	decimal format, pin code.			
<new PIN>	in decimal format, the new PIN is 4-8 in length.			
<puK>	puK code in base 10 format, length 8.			
<nPIN result>	"OK" "ERROR wrong PIN <pin retries remaining>" "ERROR"			
<pin retries remaining>	Decimal format,PIN number of remaining attempts.			

Example

```
AT+NPIN=2,1234
OK

+NPIN:OK
AT+NPIN=0,1234
ERROR

+NPIN:ERROR wrong PIN 2
```

7 UICC Card Commands

7.1 Overview of UICC Card Commands

Command	Description
AT+CRSM	Limiting SIM Access
AT+CSIM	Universal SIM Access
AT+CCHO	Opening Logical Channel
AT+CCHC	Closing a Logical Channel
AT+CGLA	Universal UICC Logical Channel access
AT+CEID	Read SIM eID

7.2 Detailed Description of UICC Card Commands

7.2.1 AT+CRSM Limiting SIM Access

Command structure

Command	Response
AT+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>[,<pathid>]]]]	**+CRSM:<sw1>,<sw2>[,<response>]** **OK**
	+CME ERROR:<err> or **ERROR**
AT+CRSM=?	**OK**

Command description

Write command: allows users to perform limited SIM card operations through MT. Each time a command is executed, all card operations related to the command are performed internally by MT, including selecting the target file and executing the actual command. After the command is executed, the SIM execution result and response data are displayed.

Defined Values

<command>	Integer, the type of the command sent by MT to SIM. 176 READ BINARY 178 READ RECORD 192 GET RESPONSE 214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS 203 RETRIEVE DATA 219 SET DATA
<fileID>	Integer, specifying the identifier of the base data file.All commands except STATUS are required.
<P1>,<P2>,<P3>	integer, the parameter that MT transmits to SIM. All commands except GET RESPONSE and STATUS are required without a default of 0. (For details about the parameters, see 3GGP TS 51.011.)
<data>	a character string in hexadecimal format, in which data is written to the SIM card.
<pathID>	a string in hexadecimal format. The directory path of the base file in SIM/UICC (see TS 102 221). If the base file is in the current directory path, you can omit this parameter.
<sw1>,<sw2>	integer, the actual command execution result code returned by SIM.
<response>	string in hexadecimal format. Response data returned by the SIM. GET RESPONSE and STATUS, which return information about the current base file, including the file type and size. The READ BINARY, READ RECORD, or RETRIEVE DATA commands return requested DATA. The UPDATE BINARY, UPDATE RECORD or SET DATA commands do not return response DATA.

Example

```
AT+CRSM=242,28423
+CRSM:144,0,62178202412183026f078a01058b036f060680020009880138

OK
AT+CRSM=176,28423,,,,,7FFF

+CRSM:144,0,084906605643411913

OK
```

7.2.2 AT+CSIM Universal SIM Access

Command structure

Command	Response

AT+CSIM=<length>,<command>	**+CSIM:<length>[,<response>]** **OK**
	+CME ERROR:<err> or **ERROR**
AT+CSIM=?	**OK**

Command description

Write command: Allows the user to send <command> directly to SIM through MT. After the SIM executes, the SIM response is returned to the user in the form of <response>.

The +CSIM command, in contrast to +CRSM, gives users almost unlimited SIM operation rights. Another difference from +CRSM is that the +CSIM command operates atomically on SIM. MT simply passes <command> to SIM and does nothing else. For example, to read a specified file, two associated commands must be delivered consecutively: select file command and read file command. Since the execution of the associated instruction of file operation is atomic, taking file reading as an example, it is necessary to ensure that the basic file selected by the file selection instruction will not be changed before the execution of the file reading instruction; otherwise, 0x6A82 will be reported.

At present, this instruction ensures that the power failure of the card will not occur within 15 seconds after the user sends it, causing the failure of the selection file of the associated instruction. Therefore, if multiple associated commands are executed, the user must execute the next command within 15 seconds after the execution of the previous associated command.

In addition:

1. Because the system operates on the card on logical channel 0, the +CSIM application cannot be switched on logical channel 0.
2. If a logical channel is opened through +CSIM, you need to close the logical channel by +CSIM/+CCHC after the operation is complete.

Defined Values

<length>	Integer, <command> or <response> string length.
<command>	string in hexadecimal format. The user executed the APDU command of the SIM operation. (See TS 102 221 for details)
<response>	string in hexadecimal format. The actual result returned by SIM.

Example

```
AT+CSIM=18,00A40804047FFF6F07
+CSIM:54,62178202412183026f078a01058b036f0608800200098801389000

OK
AT+CSIM=10,00B0000009

+CSIM:22,0849066056434119139000
```

```
OK
```

7.2.3 AT+CCHO Opening Logical Channel

Command structure

Command	Response
AT+CCHO=<dfname>	**+CCHO:<sessionid>** **OK**
	+CME ERROR:<err> or **ERROR**
AT+CCHO=?	**OK**

Command description

Write command: Open a new logical channel on the UICC and select the application specified by <DFNAem>. The new logical channel number is returned via <sessionID> and is used by the +CGLA command to send commands to the UICC through this logical channel.
Note: Because the UICC card needs to save power, the card will be powered off in the idle state. In the next operation, it will be powered on again for initialization. If a power failure occurs after a logical channel is opened, the previously opened logical channel becomes invalid. Once the logic channel is open, the UICC card will no longer enter the power-saving state until all the open logic channels are closed.

Therefore, as a constraint rule, the user opens the logical channel by +CCHO, which needs to be closed by +CCHC after all operations on the logical channel are completed.

Defined Values

<dfname>	in hexadecimal format, the DF name to be applied on the UICC is 1-16 bytes.
<sessionID>	an integer, indicating the id of the opened logical channel. The value is returned by UICC. The value ranges from 1 to 19.

Example

```
AT+CCHO=A0000000871002FF86FFFF89FFFFFFFF
+CCHO:1

OK
```

7.2.4 AT+CCHC Closing a Logical Channel

Command structure

Command	Response
AT+CCHC=<sessionid>	+CCHC OK
	+CME ERROR:<err> or ERROR
AT+CCHC=?	OK

Command description

Write command: closes the specified logical channel, used in conjunction with +CCHC.

Defined Values

<sessionID>	specifies the logical channel number as an integer.

Example

```
AT+CCHO=A000000871002FF86FFFF89FFFFFFFF
+CCHO:1

OK
AT+CCHC=1
+CCHC

OK
```

7.2.5 AT+CGLA Universal UICC Logical Channel access

Command structure

Command	Response
AT+CGLA=<sessionid>,<length>,<command>	+CGLA:<length>,<response> OK
	+CME ERROR:<err> or ERROR
AT+CGLA=?	OK

Command description

Write command: executes the card operation instruction <command> on the specified logical channel. The card operation instruction <command> is sent to MT and forwarded by MT to UICC. After the EXECUTION of UICC, <Response> is returned to the upper-layer application through MT in the same way.

This command allows remote applications on the TE to directly control the currently selected UICC.

Defined Values

<sessionID>	specifies the logical channel id as an integer. The channel id is enabled by +CCHO and cannot be the default channel id 0.
<length>	Integer. The number of characters in <command> or <response> is twice the number of bytes.
<command>	hexadecimal format, APDU instruction. (See TS 102 221 for details) Note: The logical channel number identified by CLA in <command> must be the same as that in <SessionID>.
<Response>	in hexadecimal format, UICC returns the result of card operation.

Example

```
AT+CGLA=1,18,01A4080C047FFF6F07
+CGLA:4,9000

OK
AT+CGLA=1,10,00B0000009

+CGLA:22,0849064080248905489000

OK
```

7.2.6 AT+CEID Read SIM eID

Command structure

Command	Response
AT+CEID	<eID> OK
	+CME ERROR:<err> or ERROR
AT+CEID=?	OK

Command description

Write command:Read SIM eID.

Defined Values

<eID>	string, SIM eID number.

Example

```
AT+CEID
10189770035290400000

OK
AT+CEID=?
OK
```

8 SMS Commands

8.1 Overview of SMS Commands

Command	Description
AT+CMGS	Send SMS
AT+CSCA	SMS Center Number
AT+CSMS	Selecting a Message Service
AT+CMGF	Setting SMS Encoding Mode
AT+CNMA	New Message Confirmation
AT+CMGC	Sending Commands
AT+CMMS	Sending More Messages
+CMT	SMS-DELIVER SMS reported

8.2 Detailed Description of SMS Commands

8.2.1 AT+CMGS Send SMS

Command structure

Command	Response
+CMGS=<length><CR>PDU is given<ctrl-Z/ESC>	**+CMGS:<mr>[,<ackpdu>]** **OK**
	+CME ERROR:<err> or **ERROR**
+CMGS=?	**OK**

Command description

Write command: send SMS command. Currently, SMS supports only PDU mode but not Text mode. Therefore, the +CMGF command is not required.

Defined Values

<length>	indicates the length of encoded TPDU bytes (that is, excluding SMSC address bytes).

<mr>	refer to 3GPP TS 23.040, tp-message-reference.
<ackpdu>	Refer to rp-user-data in 3GPP TS 23.040 RP-ACK PDU. When +CSMS <service> is 1, this parameter is optional. Currently, this parameter feedback is not supported.

Example

1) TEXT message content construction (PDU construction)

Referance:http://smstools3.kekekasvi.com/topic.php?id=288

Enter the platform access number and SMS center number, for example:

Platform Access Number: 1064899266603

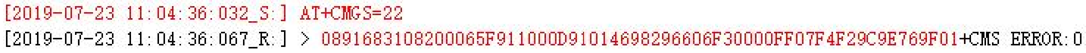
SMS center number: 8613800200569

Edit the message content, such as Testing, and then click Convert to build the message length and content.

2) Use the AT command to send SMS messages as follows:

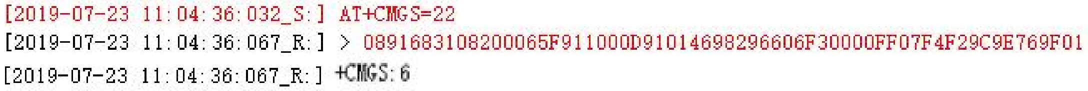
AT+CMGS, after the prompt>, enter PDU in string format and then 1A in hexadecimal format (terminating CTR+Z).

Failure warning:



```
[2019-07-23 11:04:36:032_S:] AT+CMGS=22
[2019-07-23 11:04:36:067_R:] > 0891683108200065F911000D91014698296606F30000FF07F4F29C9E769F01+CMS ERROR:0
```

Success warning:



```
[2019-07-23 11:04:36:032_S:] AT+CMGS=22
[2019-07-23 11:04:36:067_R:] > 0891683108200065F911000D91014698296606F30000FF07F4F29C9E769F01
[2019-07-23 11:04:36:067_R:] +CMGS:6
```

8.2.2 AT+CSCA SMS Center Number

Command structure

Command	Response
AT+CSCA=<sca>[,<tosca>]	OK +CME ERROR:<err> or ERROR
AT+CSCA?	+CSCA:<sca>,<tosca> OK
AT+CSCA=?	OK

Command description

Write command: Set the phone number of the SMS center. For SHORT messages in PDU mode, this command is used when sending short messages only when the length of the SMS service center number parameter (SMSC address as the destination address) in the PDU is 0.

Read command: Queries the Settings

Defined Values

<sca>	a string of characters, the ADDRESS of the SMS center.
<tosca>	Integer, type of <sca>, which may not appear in commands. If no, the value can be 129 or 145. The parameter The values are described as follows: Bit7 1 Bit4-6 <Type of number> Bit0-3 <Numbering plan identification> The seventh bit is fixed at 1. <Type-of-number>: 000: unknown 001: International number 010: domestic number <Numbering-plan-identification>: 0000: unknown 0001: ISDN/ phone number

Example

```
AT+CSCA="13500210500"
OK
AT+CSCA?

+CSCA:"13500210500",129

OK
```

8.2.3 AT+CSMS Selecting a Message Service

Command structure

Command	Response
AT+CSMS=<service>	+CSMS:<mt>,<mo>,<bm> OK
	+CME ERROR:<err> or ERROR

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

Command description

Write command: Sets the selection message service. This command returns the message types supported by the terminal: <mt> for downlink messages, <mo> for uplink messages, and <BM> for broadcast type messages.

Read command: Obtains the current value.

Test command: get the value range of services.

Defined Values

<service>	integer, message service. 0: 3GPP TS 23.040 [3] and 3GPP TS 23.041 [4] 1: 3GPP TS 23.040 [3] and 3GPP TS 23.041 [4] (the requirement of <service> setting 1 is mentioned under corresponding command descriptions)
<mt>/<mo>/<bm>	0 not supported 1 Support

Example

```
AT+CSMS=1
+CSMS:1,1,0

OK
AT+CSMS?

+CSMS:1,1,1,0

OK
AT+CSMS=?

+CSMS:(0,1)

OK
```

8.2.4 AT+CMGF Setting SMS Encoding Mode

Command structure

Command	Response
AT+CMGF=<n>	OK +CME ERROR:<err> or ERROR
AT+CMGF?	+CMGF:<n> OK
AT+CMGF=?	+CMGF:(list of supported <n>s) OK

Command description

Write command: Sets the SMS encoding mode. Currently, only the PDU format is supported. This parameter is optional (0 is supported by default).

Defined Values

<n>	indicates an integer. Currently, only 0 is supported. 0 PDU format

Example

```
AT+CMGF=?
+CMGF:(0)

OK
AT+CMGF=0

OK
AT+CMGF?

+CMGF:0

OK
```

8.2.5 AT+CNMA New Message Confirmation

Command structure

Command	Response
AT+CNMA[=<n>[,<length>[<CR> PDU is given<ctrl-Z/ESC>]]]	OK +CME ERROR:<err> or ERROR

AT+CNMA=?	**+CNMA:(list of supported <n>s)** **OK**

Command description

Write command: Acknowledgement of new messages (SMS-deliver or SMS-status-report). To use this command, you need to set the +CSMS parameter <service> to 1. Currently, only the PDU format is supported and RPACK or RP-error can be sent to the network. If <length> is greater than 0, TPDU is carried in RPACK or RP-error messages. The PDU input is similar to the +CMGS command, except that it uses the <ACKPDU> format instead of <PDU> (e.g., SMSC address fields are not included). Test command: returns the supported <n> value.

Defined Values

<n>	Integer 0 Send RP-ACK without TPDU. 1 Send the RP-ACK 2 Send RP-ERROR Note: without the <n> parameter, that is +CNMA, the function is the same as +CNMA=0.
<length>	indicates the length of encoded TPDU bytes (that is, excluding SMSC address bytes).

Example

```
AT+CNMA
OK
AT+CNMA=2

OK
```

8.2.6 AT+CMGC Sending Commands

Command structure

Command	Response
AT+CMGC=<length><CR>PDU is given<ctrl-Z/ESC>	**+CMGC:<mr>[,<ackpdu>]** **OK**
	+CME ERROR:<err> or **ERROR**
AT+CMGC=?	**OK**

Command description

Write command: Sends command messages (SMS-command) to the network. Currently, only the PDU format is supported. The PDU input type can be +CMGS. The message is sent successfully, and the message index value <mr> is returned, and <ACKPDU> is optional.

Defined Values

<length>	indicates the length of encoded TPDU bytes (that is, excluding SMSC address bytes).
<mr>	refer to 3GPP TS 23.040, tp-message-reference.
<ACKPDU>	Refer to rp-user-data in 3GPP TS 23.040 RP-ACK PDU. When +CSMS <service> is 1, this parameter is optional. Currently, this parameter feedback is not supported.

8.2.7 AT+CMMS Sending More Messages

Command structure

Command	Response
AT+CMMS=<n>	**OK**
AT+CMMS?	**+CMMS:<n>** **OK**
+CMMS=?	+CMMS: (list of supported <n>s) **OK**

Command description

Write command: Controls the continuity of the SMS trunk link. When this feature is enabled (and supported by the network), multiple messages can be sent more quickly while the link remains open.
Read command: Returns the set <n> value.
Test command: returns the supported <n> value.

Defined Values

<n>	Integer 0 Disable 1 Remain enabled until more than 5 seconds have passed between the last SMS send and the next SMS send, and set <n> to 0 automatically. 2 Leave enabled until more than 5 seconds elapsed between the last SMS send and the next SMS send, and leave the <n> setting unchanged.

Example

```
AT+CMMS=1

OK
AT+CMMS?
+CMMS:1

OK
```

8.2.8 +CMT SMS-DELIVER SMS reported

Command structure

Command	Response
	+CMT:<alpha>,<length><CR><LF><pdu>

Command description

Proactively report commands: SMS messages are received and reported to the application layer.

Defined Values

<alpha>	string that identifies the PDU format. Only HEX is supported. HEX indicates the hexadecimal format
<length>	indicates the number of PDU bytes
<PDU>	SmS-deliver SMS PDU data

Example

```
+CMT: "HEX",158
0991683108200303F200600AA101561893910D08123001017101238C050003820201301091CD5E2
679FB52A830115C0A656C76g45BA26237FF0C60A87684003267088BDD8D398D2653555DF2&00
1gFBEFF0C70B951FB67E5770B8D2653558BE660C50020D068007400740070D03A002F002F007
&002E003100300030D0380036002E0063006E002F0074002F00680038004&0075005A0042004EO
MA0049004E0078003000310063
```

9 Platform tool AT Commands

9.1 Overview of Platform tool Commands

Command	Description
AT+NPING	Ping Command
AT+XYPERF	Rate Filling Test
AT+XDSEND	SOCKET Filling
AT+TEST	DEMO Command
AT+MEMSTATS	Commands for Obtaining Memory Information
AT+XYCNNT	GPIO Connectivity Test Commands

9.2 Detailed Description of Platfom tool Commands

9.2.1 AT+NPING Ping Command

Command structure

Command	Response
AT+NPING=<host>,<data_len>,<ping_num>,<time_out>,<interval_time>[,<rai>]	**OK** **statistics: ping num:<ping_num>,reply:<ping_reply>,longest_rtt:<longest_rrt>,shortest_rtt:<shortest_rrt>, average_time:<average_time>** **+CME ERROR:<err>**

Command description

The baseboard MCU sends the data request, which is finally sent to the remote server through the NB protocol stack. If RAI=1 is used to test the release of upstream data, write a random host address to ensure that the destination IP address is unreachable, and then there is no downstream reply data.

If you need to stop the PING package during the PING process, enter AT+NPINGSTOP to stop the PING package. If the PING package service is not complete, you cannot restart the PING package service.

Defined Values

<host>	indicates the destination IP address
<data_len>	indicates the icmp data length. The maximum length is 1400 bytes
<ping_num>	indicates the number of ping operations, in bytes
<time_out>	specifies the timeout period for waiting for the ping reply result. After the timeout, the ping service is not answered. If the value is 0, the ping service is not initiated and 8001 is displayed.
<interval_time>	integer, interval between pings
<ral>	this parameter is optional. The default value is 2. 0 indicates the default. 1 indicates that the link can be released after the uplink packet is sent. 2 The link is released after the uplink packet is sent and the link back packet is received.
<ping_num>	indicates the number of ping operations
<ping_reply>	integer, number of times of ping
<longest_rrt>	indicates the maximum delay, in ms
<shortest_rrt>	integer, shortest delay, in ms
<Average time>	integer, average time, unit ms

Example

```
AT+NPING=221.229.214.202,64,4,20,2

OK

statistics: ping num:4, reply:4, longest_rtt:792ms, shortest_rtt:564ms, average_time:654ms
```

9.2.2 AT+XYPERF Rate Filling Test

Command structure

Command	Response
AT+XYPERF=<host>,<port>,<net_type>,<size>,<bandwidth>,<time>,<param>	OK +CME ERROR:<err>

Command description

This command is used for XYPERF filling. It is only used for rate filling test and cannot be used for development. When the filling is not finished, the second filling cannot be sent. The packet filling rate is determined by the packet size and bandwidth.

Defined Values

<host>	indicates the IP address of the server
<port>	indicates the server port number
<net_type>	indicates the protocol type. Currently, only UDP is supported
<size>	indicates the size of the package
<bandwidth>	indicates the bandwidth. The value can contain k(k), m(m), and G (g), such as 1K, 2M, or 1024 or 2048. The minimum value cannot be lower than 1024
<time>	packet filling duration, unit: second
<param>	fixed to 1

Example

```
AT+XYPERF=139.224.112.6,10003,udp,1024,2k,30,1

OK
```

9.2.3 AT+XDSEND SOCKET Filling

This command is only used for rate irrigation test, not development.

Command structure

Command	Response
AT+XDSEND=<socket_id>,<datalen_data>	OK +CME ERROR:<err>

Command description

This command is used to XDSEND packets. The baud rate of the serial port must be set to 115200. Before filling packets, run the **AT+XSOPEN=<type>,<remote_ip>,<remote_port>[,<local_port>]** commands to create UDP sockets and send packets AT without waiting for corresponding results of the AT command. Wait for 20ms and send the next one directly, as shown in the picture below.

Defined Values

<socket_id>	indicates the link ID. The socketid returned by creating the socket.
<datalen>	Length of data to be filled (hexadecimal)
<data>	indicates the hexadecimal data

Example

```
AT+XSOPEN=1,139.224.112.6,10005
+XSOPEN:0
```

```
OK
+XSSTATE:0,1
AT+XDSEND=0,300,000000300200200202020200300AA11BB00000300200200202020200300AA1
1BB00000300200200202020200300AA11BB00000300200200202020200300AA11BB00000300200
200202020200300AA11BB00000300200200202020200300AA11BB00000300200200202020200300
AA11BB00000300200200202020200300AA11BB00000300200200202020200300AA11BB0000030
0200200000300200200202020200300AA11BB00000300200200202020200300AA11BB0000030020
0200202020200300AA11BB00000300200200202020200300AA11BB000003002002002020202030
0AA11BB00000300200200202020200300AA11BB00000300200200202020200300AA11BB000003
00200200202020200300AA11BB00000300200200202020200300AA11BB00000300200

OK
```

9.2.4 AT+TEST DEMO Command

Command structure

Command	Response
AT+TEST=<NAME>	OK +CME ERROR:<err>

Command description

Used for debugging various DEMO reference code.

Defined Values

Format	Source	Description
AT+TEST=CLIENT	at_socket_demo.c	Based on the socket client reference code of the extended AT command, the process of chain building, data interaction and release with the remote server is realized.
AT+TEST=SERVER	at_server_demo.c	AT server reference code for users to realize extended AT command information exchange between external MCU and the chip.
AT+TEST=RTC	rtc_task_demo.c	RTC timer development reference, including the use of energy-saving lock
AT+TEST=TASK	rtc_task_demo.c	Reference codes for user periodic tasks, including suggestions for first power-on and wake up from deep sleep;
AT+TEST=GPIO	gpio_demo.c	Gpio's development reference is shown in an interruption, and one is an external MCU trigger interrupt to the core information pass chip; One is

		the chip trigger chip trigger interrupts to the outside MCU
AT+TEST=ENCODE,<data>	at_encode_demo.c	Reference code for encoding and decoding, the thread stack of encoding and decoding should be 3k, and data is the coded data content filled in

Example

```
AT+TEST=RTC
OK
```

Note: If an exception occurs related to power saving, run AT+CPSMS=0 to disable PSM power saving.

9.2.5 AT+MEMSTATS Commands for Obtaining Memory Information

Command structure

Command	Response
AT+MEMSTATS=<Option>	Success: Memory information is returned Failure: Returns an error type

Command description

Used to return heap or stack usage of memory DSP or ARM core (depending on input parameters).

Defined Values

Format	Source	Description
AT+MEMSTATS=ARMMEM	heap5.c	LitOS based heap memory allocation source code, add memory heap usage debugging information
AT+MEMSTATS=ARMSTACK	los_task.c	Based on LitOS task information to obtain source code, add memory stack usage debugging information
AT+MEMSTATS=ALLMEM	os_adapt.c	Gets the total size of Flash and RAM and the remaining space.

Example

```
Example 1:
AT+MEMSTATS=ARMMEM
NUESTATS:APPSMEM, Current Allocated:      The memory size has been allocated
NUESTATS:APPSMEM, Total Free: 68497       Total remaining memory size
NUESTATS:APPSMEM, Max Free: 68185         Maximum contiguous memory block size
NUESTATS:APPSMEM, Number Allocs: 194          Historical total number of memory allocations
NUESTATS:APPSMEM, Number Frees: 159           Historical total memory release times
```

```
OK
Example 2:
AT+MEMSTATS=ALLMEM

TotalSizeOfFlash:405504            FLASH Text Total size
FlashRemaining:61419                   FLASH Text remaining size
TotalSizeOfDataAndText:106496          Data and Text Size in RAM
DataAndTextRemaining:32036             Data and Text remaining size in RAM
TotalSizeOfBSS:61440                   BSS Segment size
BSSRemaining:13912                 BSS Segment remaining size

OK
例3:
AT+MEMSTATS=ARMSTACK

+wdt_task,StackSize:1024           Total stack size
+wdt_task,StackRemaing:164             Current stack usage
+wdt_task,PeakUsedSize:504             Stack peak usage

OK
```

9.2.6 AT+XYCNNT GPIO Connectivity Test Commands

Command structure

Command	Response
AT+XYCNNT=<Bitmap>	**OK** **+CME ERROR:<err>** or **ERROR**
AT+XYCNNT?	**+XYCNNT:bitmap=<Bitmap>** **+XYCNNT:0YN,1YN...,SUCCESS** **OK**
AT+XYCNNT=?	**+XYCNNT:bitmap=(0-0x3fff)** **+XYCNNT:0YN,1YN...,SUCCESS** **OK**

Command description

Setup command: Sets the value of <Bitmap> corresponding to the pins listed in g_PIN_ID[XYCNNT_TEST_SUM].

Read command: return the set <Bitmap> value, and test the connectivity of the selected Bitmap corresponding pin: test whether the input and output of the selected pin is normal (digital signal), test in pairs, one pin output high and low level, the other pin read.
Test command: return the supported <Bitmap> value, and test the connectivity of the selected Bitmap corresponding pin: test the selected pin input and output is normal (digital signal), test in pairs, one pin output high and low level, the other pin read.
Note: the pin connectivity test code can be improved and changed by the user, and only one example is provided by Xuntong.

Defined Values
<Bitmap>: integer that returns FAIL if set to 0 to send a query or test command, corresponding to pins (user modifiable) listed in g_PIN_ID[XYCNNT_TEST_SUM].
YN in the returned value indicates whether the pin reads the high or low level correctly, Y is correct, N is wrong, and the last NN/YY indicates whether the value of ADC read is correct, and what is read is the voltage at SEN_4 (it requires a voltage divider, and the connectivity of the pin does not need to measure the value of ADC, which is decided by the user).

Example

```
AT+XYCNNT=0x3fff (Or AT+XYCNNT=16383)
OK

AT+XYCNNT?
+XYCNNT:bitmap=0x3fff

+XYCNNT:0YN,1YN,2YN,3NN,4YN,5NN,6YN,7NN,8YN,9YN,aYN,bNN,cYY,dNN,eNN,FAIL

OK

AT+XYCNNT=?
+XYCNNT:bitmap=(0-0x3fff)

+XYCNNT:0YY,1YY,2YY,3YY,4YY,5YY,6YY,7YY,8YY,9YY,aYY,bYY,cYY,dYY,eYY,SUCCESS

OK
```

10 Network Service Commands

10.1 Overview of Network Service Commands

Command	Description
AT+COPS	Carrier Selection
AT+CPSMS	Setting power Saving Mode
AT+CEDRXS	Extending DRX Settings
AT+CEREG	EPS Network Registration Status
AT+CESQ	Expanding signal quality
AT+CTZR	Reporting the Time Zone
AT+CSQ	Obtain signal strength indication
AT+NPTWEDRXS	Paging Time Window and eDRX Settings
AT+MNBIOTEVENT	Disabling or Enabling the Active reporting of PSM status

10.2 Detailed Description of Network Service Commands

10.2.1 AT+COPS Carrier Selection

Command structure

Command	Response
AT+COPS=<mode>[,<format>[,<oper>[,<AcT>]]]	**OK** **+CME ERROR:<err> or ERROR**
AT+COPS?	**+COPS:<mode>[,<format>,<oper>[,<AcT>]]** **OK**
AT+COPS=?	**+COPS:[Currently camp on (<stat>,,,numeric <oper>[,<AcT>])][,,**(list of supported <**mode**>s),(list of supported <**format**>s)**]** **OK** **+CME ERROR:<err> or ERROR**

Command description

Write commands are used to select carriers to automatically select EPS networks. Read command returns the current network selection mode.

This command can be executed only in idle steady state, but not in service process.

This command is an asynchronous command. After receiving the command, a response is returned immediately. It is only the response to the command, not the specific search result.

Defined Values

<mode>	Network selection mode 0 Automatic search, no <format> and <oper> 1 Manual search, requires a <OPER>. Manual search failed, enter automatic search (<mode>=0). 2 Unregister, without <format> and <oper> 3 Set <format> only, without <oper>,<act> 4 Manual/automatic search, with <OPER>. Manual search failed, enter automatic search (<mode>=0).
<format>	Integer, format of carrier information 2 Carrier information in digital format
<oper>	The value is a string of characters
<stat>	Integer, the status of the network. 0 Invalid 1 available 2 current use 3 Disable
<AcT>	Integer, wireless access technology. 9 E-UTRAN (NB-S1 mode)

Example

```
AT+COPS=0
OK
AT+COPS?
+COPS:0,2,"46011",9

OK
AT+COPS=?
+COPS:(2,,,"46011",9),,(0-4),(2)

OK
```

10.2.2 AT+CPSMS Setting power Saving Mode

Command structure

Command	Response
AT+CPSMS=<mode>[,<Requested_Periodic-RAU>[,<Requested_GPRS-READY-timer>[,<Requested_Periodic-TAU>[,<Requested_Active-Time>]]]]	OK +CME ERROR:<err> or ERROR
AT+CPSMS?	+CPSMS:<mode>,[<Requested_Periodic-RAU>],[<Requested_GPRS-READY-timer>],[<Requested_Periodic-TAU>],[<Requested_Active-Time>] OK
AT+CPSMS=?	+CPSMS:(list of supported <mode>s),(list of supported <Requested_Periodic-RAU>s),(list of supported <Requested_GPRS-READY-timer>s),(list of supported <Requested_Periodic-TAU>s),(list of supported <Requested_Active-Time>s) OK

Command description

Write command: Sets the parameters of UE power saving mode. To control whether the UE is in power saving mode, you can set the timer duration. The setting takes effect immediately.

Read command: Returns all the current parameter values

Test command: returns the supported range of all parameters

Defined Values

<mode>	Integer value indicating whether the UE uses PSM mode. 0 Nonuse PSM 1 Use PSM 2 PSM is not used, and other parameter values in the setting instruction are invalid. If possible, directly restore other parameter values to factory values
<Requested_Periodic-RAU>,<Requested_GPRS-READY-timer>	NB Not supported
<Requested_Periodic-TAU>	It is a string of 8 bits per byte, indicating the T3412 length. The encoding mode is bit8-bit6 for the step and bit5-bit1 for the length. For example, 01000111 indicates 70 hours. Step(bit8-bit6)

	000 times increase by multiples of 10 minutes 001 times increase by multiples of 1 hour 010 times increase by multiples of 10 hours 011 times increase by multiples of 2 seconds 100 times increase by multiples of 30 seconds 101 times increase by multiples of 1 minute 110 times increase by multiples of 320 hours 111 indicates deactivation
<requested_active-time>	a string of 8 bits per byte, indicating the T3324 duration. The encoding mode is bit8-bit6 for the step and bit5-bit1 for the duration. For example, "00100100" indicates 4 minutes. Step(bit8-bit6) 000 the duration increases by multiples of 2 seconds 001 the duration increases by multiples of 1 minute 010 the duration increases by multiples of 6 minutes 111 indicates deactivation For other values, the duration increases by multiples of 1 minute

Example

```
AT+CPSMS=1,,,01000011,01000011
OK
AT+NV=SAVE
AT+CPSMS?
+CPSMS:1,,,01000011,01000011

OK
AT+CPSMS=?
+CPSMS:(0-2),,,(00000000-11111111),(00000000-11111111)

OK
```

10.2.3 AT+CEDRXS Extending DRX Settings

Command structure

Command	Response
AT+CEDRXS=<mode>[,<AcT-type>[,<Requested_eDRX_value>][,<Requested_Paging_time_window>]]]	**OK**
	+CME ERROR:<err> or ERROR
AT+CEDRXS?	**[+CEDRXS:<AcT-type>,<Requested_eDRX_value>,<Requested_Paging_time_window>** **[<CR><LF>+CEDRXS:<AcT-type>,<Requested_eDRX_value>,<R**

	equested_Paging_time_window> **[...]]]** **OK**
AT+CEDRXS=?	**+CEDRXS:**(list of supported <**mode**>s),(list of supported <**AcT-type**>s),(list of supported <**Requested_eDRX_value**>s),(list of supported <**Requested_Paging_time_window**>s) **OK**

Command description

Set command: Sets the eRDX parameter of the UE, controls whether the UE uses eRDX and specifies the eDRX value of an access technology type.

If Requested_eDRX_value or Requested_Paging_time_window is not displayed when the eDRX function is set for the first time, the default values are 0010 (20.48s) and 0011 (10.24s).

When CEDRXS of eDRX is not opened for the first time, if Requested_eDRX_value/Requested_Paging_time_window is not displayed, the previous value is retained by default.

When <mode>=2, the eDRX mode is entered and the eDRX mode is reported:

+CEDRXP:<AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]

The Settings take effect immediately. To SAVE the Settings, enter AT+NV=SAVE.

Read command: Returns all the current parameter values.

Test command: returns the supported range of all parameters.

Defined Values

<mode>	Integer indicating whether to use eDRX mode. This value applies to all specified access technology types, that is, the access technology type is affected by MODE. 0 Do not use eDRX 1 Use eDRX 2 Use eDRX to proactively report: **+CEDRXP:<AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]** 3 EDRX is not used, and other parameter values in the instruction are invalid. If possible, directly restore other parameter values to factory values
<act-type>	integer indicating the type of access technology 0 The current connected network does not use eDRX (terminals or networks do not support eDRX). The value is used only for command +CEDRXP. If the value is 0, other parameters are ignored 5 E-UTRAN (NB-S1 mode)

<Requested_eDRX_value>:It is a string of 4 bits, half a byte. The encoding mode is as follows:

8	7	6	5	4	3	2	1	
Extended DRX parameters IEI								octet 1
Length of Extended DRX parameters								octet 2
Paging Time Window				eDRX value				octet 3

eDRX value(bit4-bit1)	eDRX cycle length duration(second)	eDRX cycle parameter 'TeDRX'
0010	20.48	2^{1}
0011	40.96	2^{2}
0101	81.92	2^{3}
1001	163.84	2^{4}
1010	327.68	2^{5}
1011	655.36	2^{6}
1100	1310.72	2^{7}
1101	2621.44	2^{8}
1110	5242.88	2^{9}
1111	10485.76	2^{10}

<NW-provided_eDRX_value>	It is a string of 4 bits in half a byte. The encoding mode is the same as that of parameters <Requested_eDRX_value>.
<Paging_time_window>	It is a string of 4 bits in half a byte. The encoding mode is as follows:

(bit8-bit5)	Paging Time Window length (seconds)
0000	2.56
0001	5.12
0010	7.68
0011	10.24
0100	12.8
0101	15.36
0110	17.92
0111	20.48
1000	23.04
1001	25.6
1010	28.16
1011	30.72
1100	33.28
1101	35.84
1110	38.4
1111	40.96

:

Example

```
AT+CEDRXS=1,5,"0101","1111"

OK
AT+NV=SAVE
AT+CEDRXS?

+CEDRXS:5,"0101","1111"

OK
AT+CEDRXS=?

+CEDRXS:(0-3),(5),("0010","0011","0101","1001-1111"),("0000-1111")

OK
```

10.2.4 AT+CEREG EPS Network Registration Status

Command structure

Command	Response
AT+CEREG=<n>	**OK** **+CME ERROR:<err>** or **ERROR**
AT+CEREG?	When <n>=0, 1, 2 or 3 and command successful: **+CEREG:<n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>,<reject_cause>]]]** **OK** When <n>=4 or 5 and command successful: **+CEREG:<n>,<stat>[,[<lac>],[<ci>],[<AcT>],[<rac>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]** **OK**
AT+CEREG=?	**+CEREG:(list of supported <n>s)** **OK**

Command description

<n>=1, when the network registration status of ME EPS changes, actively report the result code: **+CEREG:<stat>**

<n>=2, when network community change, take the initiative to report the result code: **+CEREG: <stat> [, <tac>,<ci>, [<AcT>]]**

<n>=3, when the network status changes, actively report the result code:
+CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]]
When UE uses power saving mode
If <n>=4, when the cell information changes, the result code will be reported actively:
+CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>],[<Periodic-TAU>]]]]
If <n>=5, when the network status changes, the result code is actively reported:
+CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]
Read command: Returns the values of <n> and <stat>. <stat> shows whether the current MT is registered. Whether to display other parameters is determined by the value <n> and the current registration status <stat>. The display relationship is the same as that of the active report.
The setting takes effect immediately.
Test command: returns the range of supported parameters.

Defined Values

<n>	0 The result code for network registration is disabled 1 Enable the result code for network registration +CEREG:<stat> 2 Enable the active reporting result code for network registration and location information +CEREG:<stat>[,<tac>,<ci>[,<AcT>]] 3 Enable the active reporting result code for network registration and location information and EMM rejection reason information: +CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]] 4 When UE uses power saving mode, enable network registration and location information and T3412 and T3324 timing and duration information to actively report result code: +CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]] 5 When the UE uses power saving mode, enable the active reporting result code for network registration and location information, EMM rejection reason, and T3412 and T3324 timing period information: +CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]
<stat>	EPS registration status. 0 Not registered. Currently MT is not searching for a new operator to register 1 Register, local network 2 Not registered, currently MT is looking for a new operator to register 3 Registration denied 4 Unknow 5 Registered, roaming 6 Register to "SMS ONLY", local network (not applicable)

	7 Register with SMS ONLY, roaming network (not applicable) 8 Only emergency bearer services are attached 9 Register to a non-preferred CSFB local network (not applicable) 10 Register with non-preferred CSFB Roaming network (not applicable)
<tac>	String type; A two-byte trace area code in hexadecimal format (for example, "00C3" is equal to 195 in decimal).
<ci>	String type; A 4-byte E-UTRAN cell ID in hexadecimal format.
<AcT>	Registered network access technology, value:9,EUTRAN(NB-S1 mode).
<cause_type>	Integer indicating the type of rejection reason. 0 Indicates that rejection reasons include EMM reason values, as shown in 24.301 Appendix A 1 Indicates that the rejection reason contains a vendor - defined reason value
<reject_cause>	An integer indicating the cause of the registration failure. The type is specified by <cause_type>.
<Active-Time>	It is a string of 8 bits per byte, indicating the T3324 length. The encoding mode is bit8-bit6 for the step and bit5-bit1 for the length. Step(bit8-bit6) 000 The time increases by multiples of 2 seconds 001 The time increases by multiples of 1 minute 010 The time increases by multiples of 6 minutes 111 deactivation For other values, the duration increases by multiples of 1 minute
<Periodic-TAU>	It is a string of 8 bits per byte, indicating the T34124 length. The encoding mode is bit8-bit6 for the step and bit5-bit1 for the length. Step(bit8-bit6) 000 The time increases by multiples of 10 minutes 001 The time increases by multiples of 1 hour 010 The time increases by multiples of 10 hours 011 The time increases by multiples of 2 seconds 100 The time increases by multiples of 30 seconds 101 The time increases by multiples of 1 minute 110 The time increases by multiples of 320 hours 111 deactivation

Example

```
AT+CEREG=1
OK
AT+CEREG?
+CEREG:1,1
```

```
OK
AT+CEREG=?
+CEREG:(0,1,2,3,4,5)

OK
```

10.2.5 AT+CESQ Expanding signal quality

Command structure

Command	Response
AT+CESQ	**+CESQ:<rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>** **OK**
	+CME ERROR:<err> or ERROR
AT+CESQ=?	**+CESQ:(list of supported <rxlev>s),(list of supported <ber>s),(list of supported <rscp>s),(list of supported <ecno>s),(list of supported <rsrq>s),(list of supported <rsrp>s)** **OK**

Command description

Execution command: returns the current signal quality.

Test command: Query the parameter value range.

Defined Values

<rxlev>	Integer, the received signal strength (see sub-clause 8.1.4 of 3GPPTS45.008[20]). 0 rssi<-110dBm 1 -110dBm≤rssi<-109dBm 2 -109dBm≤rssi<-108dBm … ... 61 -50dBm≤rssi<-49dBm 62 -49dBm≤rssi<-48dBm 63 -48dBm≤rssi 99 Unknown or not detected.
<ber>	Integer, channel bit error rate (%). 0-7:As RxQual value (see sub-clause 8.2.4 of 3GPPTS45.008[20]). 99:Unknown or not detected.
	<rscp>:This parameter is not used in NB. The default value is 255

	<ecno>:This parameter is not used in NB. The default value is 255
<rsrq>	0 rsrq <-19.5dB 1 -19.5dB rsrq <-19dB 2 -19dB rsrq <-18.5dB … ... 32 -4dB rsrq <-3.5dB 33 -3.5dB rsrq <-3dB 34 -3dB rsrq 255 Unknown or not detected.
<rsrp>	0 rsrp <-140dBm 1 -140dBm rsrp <-139dBm 2 -139dBm rsrp <-138dBm … ... 95 -46dBm rsrp <-45dBm 96 -45dBm rsrp <-44dBm 97 -44dBm rsrp 255 Unknown or not detected.

Example

```
AT+CESQ

+CESQ:99,99,255,255,15,60

OK
```

10.2.6 AT+CTZR Reporting the Time Zone

Command structure

Command	Response
AT+CTZR=<reporting>	**OK** **+CME ERROR:<err>** or **ERROR**
AT+CTZR?	**+CTZR:<reporting>** **OK**
AT+CTZR=?	**+CZTR:(list of supported <reporting>s)** **OK**

Command description

Write command: used to set whether to get a report about the time zone. The setting takes effect

immediately. Enter AT+NV=SAVE to SAVE the value in power failure.
Read command: Returns all the current parameter values.
Test command: returns the range of supported parameters.

Defined Values

<reporting>	Integer, functional mode level, default is 3. 0 Disable reporting when time zone changes occur 1 Enable reporting when a time zone change occurs +CTZV:<tz> 2 Enable extended time zone and local time reporting CTZE:<tz>,<dst>,[<time>] 3 Enable extended time zone and universal time reporting CTZEU:<tz>,<dst>,[<utime>]
<tz>	The value is a string. Represents the sum of the local time zone (the difference between local time and Greenwich Mean time (unit: 1/4 hour) plus the daylight saving time. The value is in the format of ±ZZ, which is a fixed width and a two-digit integer ranging from -48 to 56. To maintain a fixed width, numbers in the range -9 to 9 are represented by leading zeros, such as "-09", "00", and "09".
<DST>	Integer indicating the DST adjustment of <TZ>. 0 <tz>Daylight saving time adjustment is not included 1 Includes +1 hour (equal to 4 quarter hours in <TZ>) daylight saving time adjustment 2 Includes +2 hours (8 quarter hours in <TZ>) daylight saving time adjustment
<time>	the value is a string. Local time. The value is an integer of year (YYYY), month (MM), date (DD), hour (HH), minute (MM), and second (SS) in the format of YYYY/MM/DD, HH: MM :SS. UE can deduce the local time from the information provided by the network when providing time zone information, and if the network provides a universal time, it will be shown in the active request result code for extended time zone and local time reports.
<utime>	the value is a string. Indicates the universal time. The format is YYYY/MM/DD,HH:MM:SS, indicating the year (YYYY), month (MM), date (DD), hour (HH), minute (MM) and second (SS). The universal time can be provided by the network when it provides time zone information, and if it is provided by the network, it will appear in the unrequested result code of the extended time zone and universal time reports.

Example

```
AT+CTZR=0
OK
```

```
AT+CTZR?
+CTZR:0

OK
AT+CTZR=?
+CTZR:(0,1,2,3)

OK
```

10.2.7 AT+CSQ Obtain signal strength indication

Command structure

Command	Response
AT+CSQ	+CSQ:<rssi>,<ber> OK
	+CME ERROR:<err> or ERROR
AT+CSQ=?	+CSQ:(list of supported <rssi>s),(list of supported <ber>s) OK

Command description

Write command: return received signal strength indicator <RSSI> and channel error rate <BER> from UE.

Channel bit error rate <BER> non-NB related parameter, invalid value 99 is reported.

Test command: returns the range of supported parameters.

Defined Values

<RSSI>	integer, receiving signal strength, unit: dBm 0 <=-113dBm 1 -111dBm 2 -109dBm … ... 30 -53dBm 31 >=-51dBm 99 Invalid
<ber>	Integer, channel bit error rate (%). 0-7 As RxQual value (refer to 3GPP specification). 99 Unknown or undetectable.

Example

```
AT+CSQ
+CSQ:(0-31,99),(0-7,99)

OK
AT+CSQ
+CSQ:23,0

OK
```

10.2.8 AT+NPTWEDRXS Paging Time Window and eDRX Settings

Command structure

Command	Response
AT+NPTWEDRXS=<mode>[,<AcT-type>[,<Requested_Paging_time_window>[,<Requested_eDRX_value>]]]	**OK** **+CME ERROR:<err>** or **ERROR**
AT+NPTWEDRXS?	**+NPTWEDRXS: <AcTtype>,<Requested_Paging_time_window>,<Requested_eDRX_value>[,<NW_provided_eDRX_value>[,<Paging_time_window>]]<CR><LF>** **+NPTWEDRXS: <AcTtype>,<Requested_Paging_time_window>,<Requested_eDRX_value>[,<NW_provided_eDRX_value>[,<Paging_time_window>]]** **[...]** **OK**
AT+NPTWEDRXS=?	**+NPTWEDRXS:** (list of supported <**mode**>s),(list of supported <**AcTtype**>s) ,(list of supported <**Requested_Paging_time_window**>s),(list of supported <**Requested_eDRX_value**>s) **OK**

Command description

Write command: Set the UE paging time window and eDRX parameter values. This command controls whether the UE wants to apply the pager time window (PTW) and eDRX, as well as the requested pager time window and eDRX value, for each specified type of access technology.

When <mode>=2, the eDRX mode is entered and the eDRX mode is reported:

+NPTWEDRXP:<AcT-type>[,<Requested_Paging_time_window>[,<Requested_eDRX_value>[,<NWprovided_eDRX_value>[,<Paging_time_window>]]]]

The Settings take effect immediately. To SAVE the Settings, enter AT+NV=SAVE.

Read command: Returns all the current parameter values.
Test command: returns the supported range of all parameters.

Defined Values

<table>
<tr><td><mode></td><td>integer, whether to use eDRX mode. This value applies to all specified access technology types, that is, the access technology type is affected by MODE.
0 Do not use eDRX
1 Use eDRX
2 Use eDRX to proactively report changes in network parameters: +NPTWEDRXP:<AcT-type>[,<Requested_Paging_time_window>[,<Requested_eDRX_value>[,<NWprovided_eDRX_value>[,<Paging_time_window>]]]]
3 EDRX is not used, and other parameter values in the instruction are invalid. If possible, directly restore other parameter values to factory values</td></tr>
<tr><td><AcT-type></td><td>Integer indicating the type of access technology
5 E-UTRAN (NB-S1 mode)</td></tr>
<tr><td><Requested_Paging_time_window></td><td>It is a string of 4 bits in half a byte. The encoding mode is as follows:
(bit8-bit5) Paging Time Window length (Seconds)
0000 2.56
0001 5.12
0010 7.68
0011 10.24
0100 12.8
0101 15.36
0110 17.92
0111 20.48
1000 23.04
1001 25.6
1010 28.16
1011 30.72
1100 33.28
1101 35.84
1110 38.4
1111 40.96</td></tr>
<tr><td><Requested_eDRX_value></td><td>It is a string of 4 bits, half a byte. The encoding mode is as follows:
<table>
<tr><th>8</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th></th></tr>
<tr><td colspan="8">Extended DRX parameters IEI</td><td>octet 1</td></tr>
<tr><td colspan="8">Length of Extended DRX parameters</td><td>octet 2</td></tr>
<tr><td colspan="4">Paging Time Window</td><td colspan="4">eDRX value</td><td>octet 3</td></tr>
</table>
<table>
<tr><th>eDRX value(bit4-bit1)</th><th>eDRX cycle length duration(Seconds)</th><th>eDRX cycle parameter 'TeDRX'</th></tr>
<tr><td>0010</td><td>20.48</td><td>2^1</td></tr>
</table>
</td></tr>
</table>

	0011	40.96	2^2
	0101	81.92	2^3
	1001	163.84	2^4
	1010	327.68	2^5
	1011	655.36	2^6
	1100	1310.72	2^7
	1101	2621.44	2^8
	1110	5242.88	2^9
	1111	10485.76	2^{10}
<NW-provided_eDRX_value>	a string of 4 bits in half a byte. The encoding mode is the same <Requested_eDRX_value>.		
<Paging_time_window>	It is a string of 4 bits in half a byte. The encoding method is the same <Requested_Paging_time_window>.		

10.2.9 AT+MNBIOTEVENT Disabling or Enabling the Active reporting of PSM status

Command structure

Command	Response
AT+MNBIOTEVENT=<enable>,<event>	**OK** When <enable>=1, the URC format of PSM status is **+MNBIOTEVENT: <state>** **OK**
	+CME ERROR:<err> or **ERROR**
AT+MNBIOTEVENT?	**OK**
AT+MNBIOTEVENT=?	**+ MNBIOTEVENT:(list of supported < enable >s),(list of supported <** event **>s)** **OK**

Command description

Write command: controls whether the UE enables the active reporting of PSM status changes.

Defined Values

<enable>	Integer 0 Disable unsolicited reporting (default) 1 Enable active reporting
<event>	Integer 1 PSM Status

<state>	Character parameter "ENTER PSM" The module enters the PSM state "EXIT PSM" The module exit the PSM state When <event> is 1, the module automatically reports the following message when it enters the PSM state: **+MNBIOTEVENT: "ENTER PSM"**; Exit PSM, **+MNBIOTEVENT: "EXIT PSM"** will be reported.

Example

```
AT+MNBIOTEVENT=?
+MNBIOTEVENT:(0,1),(1)

OK

AT+MNBIOTEVENT?

OK

AT+MNBIOTEVENT=1,1

OK

+MNBIOTEVENT:"ENTER PSM"

+MNBIOTEVENT: "EXIT PSM
```

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11 PS Command

11.1 Overview of PS Commands

Command	Description
AT+CGDCONT	Defining the PDP Context
AT+CGDSCONT	Defining the Secondary PDP Context
AT+CGATT	PS Attachment/deattachment
AT+CGACT	PDP Context Activation/deactivation
AT+CGTFT	Communication flows through filters/classifiers
AT+CGEQOS	EPS Service quality
AT+CGCMOD	Modifying THE PDP Context
AT+CSODCP	Transferring Data through the Control Plane
AT+CRTDCP	Reporting CP Data
AT+CSCON	Signaling Connection Status
AT+CGPADDR	Displaying the PDP Address
AT+CGAPNRC	APN Rate Control
AT+CGEREP	Reporting a Data Domain Event
+CGEV	PS domain events report
AT+CEDRXRDP	Reading Extended DRX Dynamic Parameters
AT+CCIOTOPT	Optimal CIOT Configuration
AT+CGEQOSRDP	Reading Dynamic parameters of EPS Service Quality
AT+CGCONTRDP	Reading Dynamic Parameters in the PDP Context
+XYIPDNS	IP Address /DNS Is proactively reported
AT+CIPCA	Activating the INITIAL PDP Context
AT+CGAUTH	Defining PDP Context Authentication Parameters
AT+CNMPSD	PS Indicates the end of data Interaction
AT+NCIDSTATUS	Obtaining the CID Status
AT+NGACTR	PDP Activation/deactivation Result report
AT+NCPCDPR	Configuring the PDP Context to Be Read
AT+NQPODCP	Querying the Raw Data list to be processed on the Control Plane
AT+NSNPD	Sending Non-IP Data
AT+NRNPDM	Setting the Non-IP Data Reporting Mode
AT+NQPNPD	Querying the Non-IP Data list to be processed
AT+NIPINFO	Reporting IP Address Information
AT+CGPIAF	Controlling the Format of the Output IP address

11.2 Detailed Description of PS Commands

11.2.1 AT+CGDCONT Defining the PDP Context

Command structure

Command	Response
AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,[,[,[,[,<NSLPI>[,<securePCO>]]]]]]]]]]	OK
	+CME ERROR:<err> or ERROR
AT+CGDCONT?	[+CGDCONT:<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,[,[,[,[,<NSLPI>[,<securePCO>]]]]]]] [<CR><LF>+CGDCONT:<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,[,[,[,[,<NSLPI>[,<securePCO>]]]]]] [...]] OK
+CGDCONT=?	+CGDCONT:(range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),,,,,(list of supported <NSLPI>s) ,(list of supported <securePCO>s) [<CR><LF>+CGDCONT:(range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),,,,,(list of supported <NSLPI>s) ,(list of supported <securePCO>s) OK

Command description

Write command: MS locally saves a set of Settings indexed by <CID>. Each saved setting environment contains a set of PDP-related parameters. The setup command stores a set of PDP-related parameters into a setup environment indexed by <CID>. Each setup environment is initially undefined and becomes defined when a set of parameters is stored by the setup command. The number of defined Settings that can be saved at the same time is determined by the range of <CID> values. The EPS default payload is also defined by this command, except that the parameter segment PDP_addr should be omitted.

The +CGDCONT=<cid> command clears all parameters in the setup environment indicated by <CID>, which returns undefined status. The last CID is forbidden to define. If the initial PDP context is supported, a <CID>=0 context can be automatically defined at startup. As with all other contexts, the <CID>=0 parameter can be modified with +CGDCONT, +CGDCONT=0 resets the context number 0 to its specific default setting.

After the setting, enter AT+NV=SAVE to take effect.

Read command: Returns the parameter values of all defined Settings. Each setting is displayed on a line feed.

Test command: return all supported values. In response, the PDP_type values supported by MS are displayed as index stripes. Each determined PDP_type value contains the range of supported values for other parameters under this PDP_type value. Line feed between each entry.

Note: CID defined and active or active cannot be defined again.

Defined Values

<cid>	An integer assigned to a particular PDP context. The value range is the value returned by the test command.
<PDP_type>	The value is a string indicating the type of the packet switching protocol. For EPS, only THE IP, IPV6, IPV4V6, and non-IP types are supported. IP IPv4 protocol IPV6 IPv6 protocol IPV4V6 IPv4/v6 protocol Non-IP Non IP
<APN>	The value is a string of characters representing the domain name of the access point connected to the GGSN or extranet.
<PDP_addr>	A string value representing the address of MS. When the parameter is omitted, this value is provided by the TE during PDP activation, or a dynamic address is requested.
<d_comp>	PDP data compression. Currently, only 0 is supported. 0 Without compression 1 compression 2 V.42bis 3 V.44 **Note: Without <d_comp> is equivalent to <d_comp> being 0.**
	<h_comp>: a numeric value that controls the compression of the PDP header. Currently, only 0 is supported. 0 Without compression 1 compression 2 RFC1144(To SNDCP) 3 RFC2507 4 RFC3095(To PDCP) **Note: Without <h comp> is equivalent to <h comp> being 0.**
<NSLPI>	indicates the NAS signaling priority of the PDP context. 0-- Set to low priority when activated. 1-- Low priority indicator is set to "MS is not configured for NAS

	Signaling low Priority ". The NSLPI information used by MT is indicated in 3GPP TS 24.301 and 3GPP TS 24.008.
<securePCO>	Integer that specifies whether to request PCO's secured transport (for EPS). 0-- CPO secure transmission is not requested; 1-- Request PCO's secure protection transport.

Example

```
AT+CGDCONT=?
+CGDCONT:(0-10),("IP","IPV6","IPV4V6","Non-IP"),,,(0),(0),,,,,(0,1),(0,1)

OK
AT+CGDCONT=1,"IP","XINYI.COM",0
OK
AT+CGDCONT?
+CGDCONT:0,"IP","ctnb",,0,0,,,,,0
+CGDCONT:1,"IP","XINYI.COM",,0,0,,,,,0

OK
```

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11.2.2 AT+CGDSCONT Defining the Secondary PDP Context

Command structure

Command	Response
AT+CGDSCONT=<cid>[,<p_cid>[,<d_comp>[,<h_comp>]]]	OK +CME ERROR:<err> or ERROR
+CGDSCONT?	[+CGDSCONT:<cid>,<p_cid>,<d_comp>,<h_comp>] [<CR><LF>+CGDSCONT:<cid>,<p_cid>,<d_comp>,<h_comp> > [...]] OK
+CGDSCONT=?	+CGDSCONT:(range of supported <cid>s),(list of <p_cid>s for active primary contexts),(list of supported <d_comp>s),(list of supported <h_comp>s) OK

Command description

Write command: Sets the secondary PDP context parameter value based on the <CID> identifier assigned (locally). The number of definable PDP contexts is given by the range returned by the test command.

The special command +CGDSCONT=<cid> changes the secondary PDP context to undefined. The setting takes effect immediately. Run the AT+NV=SAVE command to SAVE the power failure.
This command is only used to configure the secondary context. To activate the secondary context, you also need to set the QoS and TFT of the secondary context. The following commands are used together: +CGDSCONT(configure the secondary context), +CGEQOS (configure QoS parameters), +CGTFT (set TFT), +CGACT (activate the secondary context).
Read command: Returns all the current parameter values.
Test command: returns the range of supported parameters.

Defined Values

<cid>	integer, assigned to a particular PDP context, in the range of values returned by the test command (minimum is 1).
<p_cid>	the primary context corresponding to the secondary context. When a secondary context is defined, it must already be defined and must not be equal to the <CID> of the secondary context. The range is the value returned by the test command (minimum is 0).
<d_comp>	The value is the same as the parameter of the +CGDCONT command.
<h_comp>	The value is the same as the parameter of the +CGDCONT command.

Example

```
AT+CGDSCONT=1,0
OK
AT+CGDSCONT?
+CGDSCONT:1,0,0,0

OK
AT+CGDSCONT=?
+CGDSCONT:(1,2,3,4,5,6,7,8,9,10),(0),(0),(0)

OK
```

11.2.3 AT+CGATT PS Attachment/deattachment

Command structure

Command	Response
AT+CGATT=<state>	OK +CME ERROR:<err> or ERROR
AT+CGATT?	+CGATT:<state>

	OK
AT+CGATT=?	+CGATT:(list of supported <state>s) OK

Command description

Write command: used to initiate the attachment/de-attachment of EPS. This command is an asynchronous command, and the response is returned immediately after receiving the command, which only represents the analytic feedback of the command, not the specific attachment result.

Read command: Returns all the current parameter values.

Test command: returns the range of supported parameters.

Defined Values

<state>	Indicates the attachment state of EPS. 0 Detach 1 Attach

Example

```
AT+CGATT=1
OK
AT+CGATT?
+CGATT:1

OK
AT+CGATT=?
+CGATT:(0,1)

OK
```

11.2.4 AT+CGACT PDP Context Activation/deactivation

Command structure

Command	Response
AT+CGACT=<state>,<cid>	OK +CME ERROR:<err> or ERROR
AT+CGACT?	[+CGACT:<cid>,<state>] [<CR><LF>+CGACT:<cid>,<state> [...]]

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

Command description

Setup command: Used to activate/deactivate the specified PDP context. After the command is executed, the MT is in the V.25ter state. If the PDP context is already in the set state, the context state does not change. If the specified context state of the request cannot be entered, an ERROR or +CME ERROR response is returned. When the activation form of this command is executed, if MT is not PS attached, MT performs PS attachment first and then activates the specified context. If the connection fails, the response is ERROR. If extended error response is enabled, MT responds with the appropriate failed connection message. When <cid> is not specified, the activation form of the command activates all defined contexts, and the invalidation form of the command deactivates all context Settings.

Read command: returns the current active status of all defined PDP contexts.

Test command: returns the range of supported parameters.

Defined Values

<state>	indicates the status of PDP context activation. 0 Nonactivated 1 Activated
<cid>	Numeric, specifying a specific PDP context.

Example

```
AT+CGACT=0,1
OK
AT+CGACT?
+CGACT:0,1

+CGACT:1,0

OK
AT+CGACT=?
+CGACT:(0,1)

OK
```

11.2.5 AT+CGTFT Communication flows through filters/classifiers

Command structure

Command	Response
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 +CME ERROR:<err> or ERROR
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>] [<CR><LF>+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
AT+CGTFT=?	**+CGTFT:<PDP_type>,**(list of supported <**packet filter identifier**>s),(list of supported <**evaluation precedence index**>s),(list of supported <**remote address and subnet mask**>s),(list of supported <**protocol number (ipv4) / next header (ipv6)**>s),(list of supported <**local port range**>s),(list of supported <**remote port range**>s),(list of supported <**ipsec security parameter index (spi)**>s),(list of supported <**type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask**>s),(list of supported <**flow label (ipv6)**>s),(list of supported <**direction**>s),(list of supported <**local address and subnet mask**>s) **[<CR><LF>+CGTFT:**<**PDP_type**>,(list of supported <**packet filter**

	identifier>s),(list of supported <**evaluation precedence index**>s),(list of supported <**remote address and subnet mask**>s),(list of supported <**protocol number (ipv4) / next header (ipv6)**>s),(list of supported <**local port range**>s),(list of supported <**remote port range**>s),(list of supported <**ipsec security parameter index (spi)**>s),(list of supported <**type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask**>s),(list of supported <**flow label (ipv6)**>s),(list of supported <**direction**>s),(list of supported <**local address and subnet mask**>s) [...]] **OK**

Command description

Write command: Adds a classifier to the TFT of the identity. A TFT consists of a maximum of six PFS. The special command +CGTFT=<cid> restores all classifiers in TFT to undefined state.
Read command: Returns all the current parameter values.
Test command: returns the range of supported parameters.

Defined Values

<cid>	integer. (See the arguments of the same name in the +CGDCONT and +CGDSCONT commands)
<PDP_type>	integer. (See the same parameter in the +CGDCONT command.)
<packet filter identifier>	integer. The value ranges from 1 to 6.
<evaluation precedence index>	indicates an integer ranging from 0 to 255.
<remote address and subnet mask>	The string format is as follows: (Each dot is separated by a number from 0 to 255) IPv4:"a1.a2.a3.a4.m1.m2.m3.m4" 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)>	The value is an integer ranging from 0 to 255.
<local port range>	the value is a string of 1 to 65535 characters in the format of f.t.
<remote port range>	the value is a string of 1 to 65535 characters in the format of f.t.
<ipsec security parameter index (SPI)>	indicates a hexadecimal value, ranging from 00000000 to FFFFFFFF.
<type of service (tos) (ipv4) and mask/traffic class (ipv6) and mask>	the value is a string of [0,255] in the format of t.m.
<flow label (ipv6)>	indicates a hexadecimal value ranging from 00000 to FFFFF, which is valid only for ipv6.
<direction>	integer, representing the transmission direction of the filter application.

	0 Pre-Release 7 TFT filter (refer 3GPP TS 24.008 table10.5.162) 1 Upload 2 Download 3 bothway (Upload and Download)
<local address and subnet mask>	The value is in the same format as <remote address and Subnet mask>. The value ranges from 0 to 255.

Example

```
AT+CGTFT=1,4,3,"1.0.21.32.4.62.31.25",12
OK
AT+CGTFT?
+CGTFT:1,4,3,"1.0.21.32.4.62.31.25",12,"","",,"",,3,""

OK
AT+CGTFT=0,2,6,"32.1.11.160.0.0.0.0.0.0.0.0.0.0.0.0.255.255.255.255.0.0.0.0.0.0.0.0.0.0.0.0",17,"
60001.60001","60350.60450",0x123456,168.252,0x12345,1
OK
```

11.2.6 AT+CGEQOS EPS Service quality

Command structure

Command	Response
AT+CGEQOS=<cid>[,<QCI>[,<DL_GBR>,<UL_GBR>[,<DL_MBR>,<UL_MBR>]]]	**OK**
	+CME ERROR:<err> or **ERROR**
AT+CGEQOS?	**+CGEQOS:<cid1>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>]** **<CR><LF>+CGEQOS:<cid2>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>]** **[…]]** **OK**
AT+CGEQOS=?	**+CGEQOS:**(range of supported<**cid**>s),(list of supported<**QCI**>s),(list of supported<**DL_GBR**>s),(list of supported<**UL_GBR**>s),(list of supported<**DL_MBR**>s),(list of supported<**UL_MBR**>s) **OK**

Command description

Write command: returns the EPS borne QoS parameters associated with the provided context identifier.

Setting instructions do not save after power failure.
Read command: Returns all the current parameter values.
Test command: returns the range of supported parameters.

Defined Values

<cid>	Integer used to specify a numeric parameter defined by a particular EPS hosting context.
<QCI>	integer, (quality level indicator) specifies the numerical parameter of EPS QoS level (see 3GPP TS 23.203). 0----- Select QCI on the network [1-4]---- Ensure the bit rate [5-9]---- Non-guaranteed bit rate 75---- Ensure the bit rate 79---- Unguaranteed bit rate [128-254]---- Specifies the QCI
<DL_GBR>	guaranteed downstream bit rate. If it is GBR QCI, it indicates that it is an upstream numerical parameter. The unit is kbit/s. If not GBR QCI, this parameter is omitted.
<UL_GBR>	guaranteed uplink bit rate. If it is GBR QCI, it is an uplink value. The unit is kbit/s. If not GBR QCI, this parameter is omitted (see 3GPP TS 24.301).
<DL_MBR>	integer, maximum downlink rate, in kbit/s. This parameter is omitted in non-GBR QCI.
<UL_MBR>	indicates the maximum uplink rate, expressed in kbit/s. If not GBR QCI, this parameter is omitted (see 3GPP TS 24.301).

Example

```
AT+CGEQOS=1,4,25600,25600,25600,25600
OK
AT+CGEQOS?
+CGEQOS:0,9,0,0,0,0
+CGEQOS:1,4,25600,25600,25600,25600

OK
AT+CGEQOS=?
+CGEQOS:(0-10),(0,1-4,5-9,75,79,128-254),(0-10000000),(0-10000000),(0-10000000),(0-10000000)

OK
```

11.2.7 AT+CGCMOD Modifying THE PDP Context

Command structure

Command	Response
AT+CGCMOD=<cid>	OK +CME ERROR:<err> or ERROR
AT+CGCMOD=?	+CGCMOD:(list of <cid>s associated with active contexts) OK

Command description

Write command: Initiate modification of one or more PDP contexts, identified by <cid>. When a PDP context is activated, both the UE and the network can initiate a PDP context change process in order to change the QOS, wireless priority, or TFT negotiated between the UE and the network parties. If the +CGCMOD command does not carry the <cid> parameter, all active PDP contexts are modified.

Test command: returns the range of supported parameters.

Defined Values

<cid>	Indicates an integer. For details, see parameters of the same name in the +CGDCONT command.

Example

```
AT+CGCMOD=0
OK
AT+CGCMOD=?
+CGCMOD:(0)

OK
```

11.2.8 AT+CSODCP Transferring Data through the Control Plane

Command structure

Command	Response
AT+CSODCP=<cid>,<cpdata_length>,<cpdata>[,<RAI>[,<type_of_user_data>]]	OK +CME ERROR:<err> or ERROR
AT+CSODCP=?	+CSODCP:(range of supported <cid>s),(maximum number of octets of user data indicated by <cpdata_length>),(list of supported <cpdata>s),(list of supported <RAI>s),(list of supported <type_of_user_data>s)

	OK

Command description

Write command: The TE transmits data to the network through the control plane.

Test command: returns the range of parameters supported by MT.

Defined Values

<cid>	an integer used to link data to the specified PDP context. For the value, see +CGDCONT.
<cpdatA_length>	an integer ranging from 0 to 1600, indicating the number of CPDATA bytes. If no data is transmitted, the value is 0.
<cpData>	string type, CP data, if no data is transferred, this field is empty string "".
<RAI>	Integer to assist in releasing indicator values. 0 No information available to indicate 1 MT expects upstream data to be sent to complete the data exchange 2 MT expects the data interaction to end when it receives a downlink reply
<type_of_user_data>	Integer indicating whether the transmitted user data is normal or abnormal. 0 normal data 1 abnormal data

Example

```
AT+CSODCP=0,3,0F0F0F,0,0
OK
```

11.2.9 AT+CRTDCP Reporting CP Data

Command structure

Command	Response
AT+CRTDCP=<reporting>	**OK** **+CME ERROR:<err>** or **ERROR**
AT+CRTDCP?	**+CRTDCP:<reporting>** **OK**
AT+CRTDCP=?	**+CRTDCP:**(list of supported **<reporting>**s),(range of supported **<cid>**s),(maximum number of octets of user

	dataindicated by **<cpdata_length>**) **OK**

Command description

Write command: Used to control whether downstream data is proactively reported. If the downstream data is proactively reported, the result code is reported.

+CRTDCP:<cid>,<cpdata_length>,<cpdata>

The write command takes effect immediately. To set the value of SAVE after power failure, enter the command AT+NV=SAVE.

Read command: Returns the current value.

Test command: returns the range of parameters.

Defined Values

<reporting>	Integer, 0 by default, that controls whether a terminal reports CPDATA. 0 Don't report 1 Report result code +CRTDCP
<cpdatA_length>	indicates the number of CPDATA bytes. If no data is transmitted, the value is 0.
<cpData>	string type, CP data, if no data is transmitted, this field is empty string "".

Example

```
AT+CRTDCP=1
OK
AT+CRTDCP?
+CRTDCP:1
OK
AT+CRTDCP=?
+CRTDCP:(0-1),(0-10),(65535)

OK
```

11.2.10 AT+CSCON Signaling Connection Status

Command structure

Command	Response
AT+CSCON=<n>	**OK** **+CME ERROR:<err>** or **ERROR**
AT+CSCON?	**+CSCON:<n>,<mode>[,<state>[,<access>]]**

	OK **+CME ERROR:<err> or ERROR**
AT+CSCON=?	**+CSCON:**(list of supported **<n>**s) **OK**

Command description

Write command: this command is used to control the result code +CSCON. If the setting fails, ERROR or +CME ERROR is returned. If the active result code is required, the active result code will be displayed after the MT migrates to the idle or connected state. The setting takes effect immediately.
Read command: Returns all the current parameter values.
Test command: returns the range of parameters.

Defined Values

<n>	integer to set whether to report the result code. 0 Do not use the active report result code 1 Use active reporting result codes +CSCON:<mode> 2 Use active reporting result codes +CSCON:<mode>[,<state>] 3 Use active reporting result codes +CSCON:<mode>[,<state>[,<access>]]
<mode>	Integer, indicating signaling connection status. 0 Free 1 Connected
<state>	Integer,indicating CS or PS state at GERAN, or RRC state information if MT is in connected mode at UTRAN and E-UTRAN. 7 E-UTRAN Connect status
<access>	Integer indicating the radio access type. 4 Represents the radio access type for E-UTRAN FDD

Example

```
AT+CSCON=0
OK
AT+CSCON?
+CSCON:0,0

OK
AT+CSCON=?
+CSCON:(0-3)

OK
```

11.2.11 AT+CGPADDR Displaying the PDP Address

Command structure

Command	Response
AT+CGPADDR[=<cid>[,<cid>]]	**[+CGPADDR:<cid>[,<PDP_addr_1>[,<PDP_addr_2>]]]** **[<CR><LF>+CGPADDR:<cid>,[<PDP_addr_1>[,<PDP_addr_2>]]** **[...]]** **OK**
	+CME ERROR:<err> or ERROR
AT+CGPADDR=?	**+CGPADDR:**(list of defined **<cid>**s) **OK**

Command description

Write command: If CID is not specified, the PDP address list of all active CID is returned. For defined but inactive CID, <CID> is returned. If CID is specified, the PDP address is returned if the CID is active, otherwise <CID> is returned.
Test command: returns the range of supported parameters.

Defined Values

<cid>	integer. See the parameter with the same name in the +CGDCONT command.
<PDP_addr_1> and <PDP_addr_2>	indicates the PDP address. For static addresses, this is set by +CGDCONT and +CGDSCONT when the context is defined. For dynamic addresses, they are assigned during the last PDP context activation. Both <PDP_addr_1> and <PDP_addr_2> can be omitted if no PDP address is available. Both exist when both IPv4 and IPv6 addresses have been assigned. <PDP_addr_1> is IPv4, and <PDP_addr_2> is IPv6. The string has the following format :(each dot is separated by a number from 0 to 255) IPv4:a1.a2.a3.a4 IPv6:a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16

Note: For dual-stack terminals (<PDP_type> for IPV4V6), the IPv6 address is provided in <PDP_addr_2>, whereas for single-stack terminals (<PDP_type> for IPv6) or for backward compatibility, the IPv6 address is provided in <PDP_addr_1>.
Note: for dual-stack terminals (<PDP_type> is IPV4V6), the IPv6 address is provided in <PDP_addr_2>, whereas for single-stack terminals
(<PDP_type> is IPV6) or because of backward compatibility, the IPV6 address is provided in <PDP_addr_1>.

Example

```
AT+CGPADDR
+CGPADDR:0,"10.12.188.9"
+CGPADDR:1

OK
AT+CGPADDR=?
+CGPADDR:(0)

OK
AT+CGPADDR=2
+CGPADDR:2

OK
```

11.2.12 AT+CGAPNRC APN Rate Control

Command structure

Command	Response
AT+CGAPNRC[=<cid>]	[+CGAPNRC:<cid>[,<Additional_exception_reports>[,<Uplink_time_unit>[,<Maximum_uplink_rate>]]] [<CR><LF>+CGAPNRC:<cid>[,<Additional_exception_reports>[,<Uplink_time_unit>[,<Maximum_uplink_rate>]]] [...]]] OK
	+CME ERROR:<err> or ERROR
AT+CGAPNRC=?	+CGAPNRC:(list of <cid>s associated with active contexts) OK

Command description

Write command: returns the APN rate control parameters associated with CID. Without CID, returns APN rate control parameters corresponding to all contexts. If CID is not activated, ERROR is returned.
Note: When each route is activated by default, if APN rate control is configured on the network side, the APNRC information of this route will be reported after activation. +CGAPNRC:<cid>[,<Additional_exception_reports>[,<Uplink_time_unit>[,<Maximum_uplink_rate>]]]
Test command: returns the range supported by CID.

Defined Values

<cid>	integer, context defined by +CGDCONT.

<Additional_exception_reports>	Integer. Additional Exception Reports Specifies whether to report when the uplink rate reaches the maximum value. 0 Don't report additional exception reports 1 Report additional exception reports
<Uplink_time_unit>	integer, specifying the time unit of the maximum uplink rate. 0 unlimited 1 Minute 2 Hour 3 Day 4 Week
<Maximum uplink rate>	indicates the Maximum uplink rate.

Example

```
AT+CGAPNRC
+CGAPNRC:0,0,0,0

OK
AT+CGAPNRC=?
+CGAPNRC:(0)

OK
```

11.2.13 AT+CGEREP Reporting a Data Domain Event

Command structure

Command	Response
AT+CGEREP=<mode>	**OK** **+CME ERROR:<err>** or **ERROR**
AT+CGEREP?	**+CGEREP:<mode>** **OK**
AT+CGEREP=?	**+CGEREP:**(list of supported <**mode**>s) **OK**

Command description

Write command: this command enables or disables the active sending of result code +CGEV:XXX from MT to TE in the case of data domain MT or some event in the network. <mode> Controls the processing of the active result code specified in the command. The setting takes effect immediately.

Read command: Returns all the current parameter values.

Test command: returns the range of supported parameters.

Defined Values

<mode>	Integer 0 The result code reporting function is disabled 1 Enable the result code reporting function

Example

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

OK
AT+CGEREP?
+CGEREP:0

OK
```

11.2.14 +CGEV PS domain events report

Command structure

Command	Response
	+CGEV:NW DETACH
	+CGEV:ME DETACH
	+CGEV:ME PDN ACT <cid>
	+CGEV:ME PDN DEACT <cid>
	+CGEV:NW PDN DEACT <cid>
	+CGEV:NW MODIFY <cid>,<change_reason>,<event_type>
	+CGEV:ME MODIFY <cid>,<change_reason>,<event_type>
	+CGEV:NW ACT<p_cid>,<cid>,<event_type>
	+CGEV:ME ACT <p_cid>,<cid>,<event_type>
	+CGEV:NW DEACT <p_cid>,<cid>,<event_type>
	+CGEV:ME DEACT <p_cid>,<cid>,<event_type>
	+CGEV:OOS
	+CGEV:IS

Command description

Proactively reports this command when the network is connected or disconnected. ME refers to the operation of mobile phone, NW to the operation of network, DEACT to the deactivation, ACT to the activation, MODIFY to the modification context, and the reported information containing PDN means that the activation or deactivation context is associated with the PDN connection in LTE or the main PDP context in GMS/UMTS.

Defined Values

<cid>	indicates an integer. For details, see parameters of the same name in the CGDCONT command.
<change_reason>	indicates the reason for the change. 1 TFT change 2 Only Qos changes
<event_type>	indicates whether this is a notification event or if the TE needs a reply received. 0 Notification event 1 TE reply has been received

Example

Activate/deactivate a context once:

```
AT+CGDCONT=1,"IP","XINYI.COM"
OK
AT+CGACT=1,1
+CGEV:ME PDN ACT 1       // Actively report information

OK
AT+CGACT=0,1
+CGEV:ME PDN DEACT 1     // Actively report information
OK
```

Modify the context when the QOS is changed:

```
AT+CGDCONT=1,"IP","XINYI.COM"
OK
AT+CGACT=1,1
+CGEV:ME PDN ACT 1            // Actively report information

OK
AT+CGEQOS=1,3,3,3,8,16
OK
AT+CGEQOS=2,3,3,3,8,16
OK
AT+CGCMOD=1
+CGEV:ME MODIFY 1,2,0     // Actively report information

OK
```

11.2.15 AT+CEDRXRDP Reading Extended DRX Dynamic Parameters

Command structure

Command	Response
AT+CEDRXRDP	+CEDRXRDP:<AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]] OK
	+CME ERROR:<err>
AT+CEDRXRDP=?	OK

Command description

Write command: If the registered cell uses eDRX, this command returns the specified <act-type>[,<Requested_eDRX_value>[,<nW-provided_edrx_value>[,<Paging_time_window>]]] parameters. If the registered cell does not use eDRX, ACT_TYPY returns 0.

Parameter Value Reference command +CEDRXS.

Defined Values

<act-type>	integer indicating the type of access technology 0 The current connected network does not use eDRX (terminals or networks do not support eDRX). If the value is 0, other parameters are ignored. 5 E-UTRAN (NB-S1 mode)
<Requested_eDRX_value>	Refer to CEDRXS for parameter definition.
<NW-provided_edrX_value>	see CEDRXS for parameter definitions.
<Paging_time_window>	Reference for parameter definition +CEDRXS.

Example

```
AT+CEDRXRDP
+CEDRXRDP:5,"0011","0010","0110"

OK
```

11.2.16 AT+CCIOTOPT Optimal CIOT Configuration

Command structure

Command	Response
AT+CCIOTOPT=<n>,[<supported_UE_opt>[,<preferred_UE_opt>]]	OK
	+CME ERROR:<err> or ERROR

AT+CCIOTOPT?	**+CCIOTOPT:<n>,<supported_UE_opt>,<preferred_UE_opt>** **OK**
AT+CCIOTOPT=?	**+CCIOTOPT:**(list of supported <**n**>s),(list of supported <**supported_UE_opt**>s),(list of supported <**preferred_UE_opt**>s) **OK**

Command description

Write command: Sets the optimizations to be supported by the UE, and the optimizations to be supported first.

<supported_UE_opt>: optimization supported by the nB-iot. CP optimization must be supported, and the value 0(no optimization) and 2(UP optimization) are not supported.

<preferred_UE_opt>: indicates the preferred optimization, and the value 0 is not supported (there is no optimization level).

Write commands can also be used to enable or disable active reporting +CCIOTPTI.

Active reporting +CCIOTOPTI:<supported Network opt>, which indicates whether the Network supports CIoT EPS optimizations.

Read command: Returns all the current parameter values.

The setting takes effect immediately.

Test command: returns the supported range of all parameters

Defined Values

<n>	Integer, 0 by default. On/off +CCIOTOPTI is reported. 0 Don't report 1 Report 3 Do not report and reset the setting value to the default value: <supported UE opt>=1 <preferred UE opt>=1
<supported_UE_opt>	Integer, 1 by default, indicating whether UE supports CIoT EPS optimizations 1 Support CP CIoT EPS optimization. 3 Support CP and UP CIoT EPS optimization.
<supported Network opt>	Integer, 1 by default, indicating whether Network supports CIoT EPS optimizations 1 Support CP CIoT EPS optimization. 3 Support CP and UP CIoT EPS optimization.
<preferred_UE_opt>	Integer, default 1, indicating which CIOT EPS optimizations UE should use first 1 Priority CP CIoT EPS optimization. 2 Priority UP CIoT EPS optimization.

Example

```
AT+CCIOTOPT=0,1,1
OK
AT+NV=SAVE
AT+CCIOTOPT?
+CCIOTOPT:0,1,1

OK
AT+CCIOTOPT=?
+CCIOTOPT:(0),(1,3),(1,2)

OK
```

11.2.17 AT+CGEQOSRDP Reading Dynamic parameters of EPS Service Quality

Command structure

Command	Response
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
AT+CGEQOSRDP=?	**+CGEQOSRDP:**(list of <**cid**>s associated with active contexts) **OK**

Command description

Write command: Returns the quality of service parameters <QCI>,[<DL_GBR> and <UL_GBR>] and [<DL_MBR> and <UL_MBR>] of the PDP context established by the provided context index <CID>. If the context is not found, an ERROR response is returned. Related parameter description Refer to the CGEQOS command.

Test command: returns the range of supported parameters.

Defined Values

<cid>	Indicates an integer. For details, see parameters of the same name in the CGDCONT command.

Example

```
AT+CGEQOSRDP=1
+CGEQOSRDP:1,4,25600,25600,25600,25600
```

```
OK
```

11.2.18 AT+CGCONTRDP Reading Dynamic Parameters in the PDP Context

Command structure

Command	Response
AT+CGCONTRDP[=<cid>]	**[+CGCONTRDP:<cid>,<bearer_id>,<apn>[,<local_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,[,[,[,[,<IPv4_MTU>[,[,[,<Non-IP_MTU>[,<Serving_PLMN_rate_control_value>]]]]]]]]]]]]]** **OK**
AT+CGCONTRDP=?	**+CGCONTRDP:**(list of <**cid**>s associated with active contexts) **OK**

Command description

Write command: Returns information about the active non-secondary PDP context <bearer_id>,<APN>[,<local_addrand subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,[,[,[,[,<IPv4_MTU>[,[,[,<Non-IP_MTU>[,<Serving_PLMN_rate_contr Ol_value>]]]]]]]]]]]]]. An error response is returned if the context is not found. If MT has double stack capacity, each <CID> returns two lines of information, with IPv4 parameters in the first line, followed by IPv6 parameters.

Test command: returns the range of supported parameters.

Defined Values

<cid>	integer, non-secondary PDP context index. This parameter is native to the TE-MT interface and is used for other PDP context-specific commands.
<BEARer_id>	integer, bearing id, EPS bearing.
<APN>	string parameter, access point name, used to select GGSN or external packet data network local name.
<source address and subnet mask>	it is a string of characters. Represents the IP address and subnet mask of MT. The string is a dot delimited numeric argument, expressed as follows For IPv4 it is "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.

<gw_ADDR>	string parameter representing the gateway address of MT. The string argument takes the form of a number (0-255) separated by a decimal point. Non-ip type This parameter is omitted.
<DNS_prim_addr>	string parameter, representing the IP address of the primary DNS service. Non-ip type This parameter is omitted.
<DNS_sec_addr>	string parameter representing the IP address of the secondary DNS service. Non-ip type This parameter is omitted.
<IPv4_MTU>	integer, indicating the maximum IPV4 transmission unit in bytes. Non-ip type This parameter is omitted.
<non-IP_mtu>	integer, indicating the maximum non-IP transmission unit size in bytes. This parameter is valid only for non-IP types.
<Serving_PLMN_rate_control_value>	specifies the maximum number of uplink messages that a UE can send within six minutes.

Example

```
AT+CGDCONT=1,"IP","XINYI.COM"
OK
AT+CGACT=1,1
+CGEV:ME PDN ACT 1
OK
AT+CGCONTRDP=0
+CGCONTRDP:0,5, "XINYI.COM","10.0.10.180.255.0.0.0",,"0.0.0.0","0.0.0.0",,

OK
```

11.2.19 +XYIPDNS IP Address /DNS Is proactively reported

Command structure

Command	Response
	+XYIPDNS:<cid_num>,<cid>,<PDP_type>[,<PDP_address>,"",<primary_dns>,<secondary_dns>]

Command description

Active reporting command: Returns information about the active non-secondary PDP context. Report it every time it is activated.

Defined Values

<cid_num>	indicates the number of CID activated by the current operation. The fixed value is 1.
<cid>	integer, non-secondary PDP context index. This parameter is native

	to the TE-MT interface and is used for other PDP context-specific commands.
<PDP_type>	indicates the type of the packet switching protocol. For EPS, only THE IP, IPV6, IPV4V6, and non-IP types are supported. IP IPv4 Protocol IPV6 IPv6 Protocol IPV4V6 IPv4/v6 Protocol Non-IP Non IP
<PDP_address>	indicates the PDP address in dotted decimal notation. The length of an IPv4 address is 4, the length of an IPv6 address is 16, and the length of an IPV4V6 dual-stack address is 20. Note: For the IPV4V6 dual-stack address type, the first four are IPV4 addresses and the last 16 are IPV6 addresses. This parameter is not available when the protocol type is non-IP.
<primary_dns>,<secondary_dns>	specifies the IP addresses of the primary AND secondary DNS servers. The values are both strings. The length of aN IPv4 DNS is 4, the length of an IPv6 DNS is 16, and the length of an IPV4V6 dual-stack DNS is 20. This parameter is not available when the protocol type is non-IP. Note: For IPV4V6 dual stack, the length of the primary and secondary DNS is 20. The first four are IPv4 DNS and the last 16 are IPV6 DNS.

Example

```
AT+CFUN=1
OK
+CGEV:ME PDN ACT 0
+XYIPDNS:1,0,"IP","100.68.62.241","","211.136.17.107","211.136.20.203"
Examples of active reporting in various scenarios:
IPV4
+XYIPDNS:1,1,"IP","192.168.1.1","","",""
+XYIPDNS:1,1,"IP","192.168.1.1","","10.0.0.1",""
+XYIPDNS:1,1,"IP","192.168.1.1","","10.0.0.1","10.0.0.2"

IPV6
+XYIPDNS:1,1,"IPV6","254.128.0.0.0.0.0.0.0.0.0.0.0.0.0.1","","",""
+XYIPDNS:1,1,"IPV6","254.128.0.0.0.0.0.0.0.0.0.0.0.0.0.1","","32.0.0.0.0.0.0.0.0.0.0.0.0.0.0.1",""
+XYIPDNS:1,1,"IPV6","254.128.0.0.0.0.0.0.0.0.0.0.0.0.0.1","","32.0.0.0.0.0.0.0.0.0.0.0.0.0.0.1","32.0.0.0.0.0.0.0.0.0.0.0.0.0.0.2"

IPV4V6
+XYIPDNS:1,1,"IPV4V6","192.168.1.1.254.128.0.0.0.0.0.0.0.0.0.0.0.0.0.1","","",""
+XYIPDNS:1,1,"IPV4V6","192.168.1.1.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0","","10.0.0.1.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",""
```

```
+XYIPDNS:1,1,"IPV4V6","0.0.0.0.254.128.0.0.0.0.0.0.0.0.0.0.0.0.0.1","","0.0.0.0.32.0.0.0.0.0.0.0.0.0.0.
0.0.0.0.1","0.0.0.0.32.0.0.0.0.0.0.0.0.0.0.0.0.0.0.2"
```

Non-IP

```
+XYIPDNS:1,1,"Non-IP"
```

11.2.20 AT+CIPCA Activating the INITIAL PDP Context

Command structure

Command	Response
AT+CIPCA=<n>[,<AttachWithoutPDN>]	**OK** **+CME ERROR:<err>** or **ERROR**
AT+CIPCA?	**+CIPCA:<n>,<AttachWithoutPDN>** **OK**
AT+CIPCA=?	**+CIPCA:**(list of supported <**n**>s),(list ofsupported <**AttachWithoutPDN**>s) **OK**

Command description

Write command: set whether UE establishes PDN connection during EPS attachment process. The setting takes effect immediately.

Read command: Returns all the current parameter values.

Test command: returns the supported range of all parameters.

Defined Values

<n>	Integer, used to activate the PDP context when GERAN or UTRAN networks are attached. In EPS networks, 3 is used. 3 Do not change the current Settings
<AttachWithoutPDN>	Specifies whether to attach EPS to a PDN connection. Note: EPS attachment does not establish PDN connection, requires <AttachWithoutPDN>=1, and the network supports AttachWithoutPDN. Otherwise, the setting does not take effect. 0 EPS is attached to establish PDN connection 1 EPS attachment does not establish PDN connection

Example

```
AT+CIPCA=3,0
OK
```

```
AT+CIPCA=3,0
OK
AT+CIPCA=?
+CIPCA:(3),(0-1)

OK
```

11.2.21 AT+CGAUTH Defining PDP Context Authentication Parameters

Command structure

Command	Response
AT+CGAUTH=<cid>[,<auth_prot>[,<userid>[,<password>]]]	**OK** **+CME ERROR:<err>** or **ERROR**
AT+CGAUTH?	**[+CGAUTH:<cid>,<auth_prot>,<userid>,<password>]** **[<CR><LF>+CGAUTH:<cid>,<auth_prot>,<userid>,<password>** **[<CR><LF>[...]]** **OK**
+CGAUTH=?	**+CGAUTH:**(range of supported <**cid**>s),(list of supported <**auth_prot**>s),(range of supported <**userid**>s),(range of supported <**password**>s) **OK**

Command description

Write command: Set the PDP context authentication parameter identified by <CID>. This parameter is used in the PDP context activation or modification process. The setting takes effect immediately. Enter AT+NV=SAVE to SAVE the value in power failure.

Read command: Returns all the current parameter values.

Test command: returns the supported range of all parameters.

Defined Values

<cid>	Indicates the PDP context identifier. For the value, see +CGDCONT.
<auth_prot>	integer, the authentication protocol used by the PDP context. 0 None,Do not use authentication and delete the configured user name and password. 1 PAP 2 CHAP
<user_name>	indicates the user name for accessing the IP network. The value is a

	string of up to 16 bytes.
<password>	indicates the password used to access the IP network. The value is a string of up to 16 bytes.

Example

```
AT+CGAUTH=0,2,user1234,pass1234
OK
AT+CGAUTH?
+CGAUTH:0,2,user1234,pass1234

OK
AT+CGAUTH=?
+CGAUTH:(0-10),(0-2),(0-16),(0-16)

OK
```

11.2.22 AT+CNMPSD PS Indicates the end of data Interaction

Command structure

Command	Response
AT+CNMPSD	OK
AT+CNMPSD=?	OK

Command description

Execution command: This command indicates that no application needs to exchange data. It is used to request the network to release the RRC connection quickly after the data interaction is complete.

Example

```
AT+CNMPSD
OK
```

11.2.23 AT+NCIDSTATUS Obtaining the CID Status

Command structure

Command	Response
AT+NCIDSTATUS[=<cid>]	+NCIDSTATUS:<cid>[<status>[,<value>]] OK

	+CME ERROR:<err> or **ERROR**
AT+NCIDSTATUS	**[+NCIDTATUS:<cid>[,<status>,[backoff value]]]** **[+NCIDSTATUS:<cid>[,<status>,[backoff value]]]** **[...]** **OK**
+NCIDSTATUS=?	**+NCIDTATUS:**<list of supported <**cid**>s> **OK**

Command description

Write command: returns the status of the PDP context identified by <CID>.

Execution command: returns the status of all active PDP contexts.

Test command: Returns a list of supported <CID> identifiers.

Defined Values

<cid>	Specifies the PDP context. For the value, see +CGDCONT.
<status>	Integer. 0 Available 1 PDP context does not exist or is not activated 2 Flow control 3 Back off
<value>	Remaining time of the back OFF /T3396 timer (unit: second). This value is displayed only in the Back Off state.

Example

```
AT+NCIDSTATUS
+NCIDSTATUS:1,0

OK
AT+NCIDSTATUS=1
+NCIDSTATUS:1,1

OK
```

11.2.24 AT+NGACTR PDP Activation/deactivation Result report

Command structure

Command	Response
AT+NGACTR=<n>	**OK**

	+CME ERROR:<err> or **ERROR**
+NGACTR?	**+NGACTR:<n>** **OK**
+NGACTR=?	**+NGACTR:(list of supported <n>s)** **OK**

Command description

Write command: Sets whether to report the result code when PDP is activated or deactivated. The format is as follows:

+NGACTR: <cid>,<state>,<result>. The setting takes effect immediately. Enter AT+NV=SAVE to SAVE the value in power failure.

Read command: Returns the set <n> value.

Test command: returns the supported <n> value.

Defined Values

<n>	integer. The default value is 0. 0 Do not use active result codes 1 Use active result codes :+NGACTR:<cid>,<state>,<result>
<cid>	specifies the PDP context. For details, see +CGDCONT.
<state>	integer indicating PDP context activation status. 0 Deactive 1 Active
<result>	integer indicating the PDP context activation result. The value ranges from 0 to 19. Otherwise, only 0 to 1 is supported. 0 Success 1 Fail 2 Cause of failure: The context is active 3 Failure cause: The context is not activated 4 Failure cause: Resource error 5 Failure cause: Local reject 6 Failure cause: THE APN is incorrect 7 Failure cause: THE APN backs up 8 Failure cause: IPV4 only 9 Failure cause: IPV6 only 10 Failure cause: IP only 11 Failure cause: Non-IP only 12 Failure cause: Only one IP address is available 13 Failure cause: Service error 14 Failure cause: The number of connections reached the upper limit 15 Failure cause: Request reactivation 16 Failure cause: The last PDN is not allowed to disconnect

	17 Failure cause: Unknown 18 NSPLI rewriting is not allowed 19 Failure cause: Attachment

11.2.25 AT+NCPCDPR Configuring the PDP Context to Be Read

Command structure

Command	Response
AT+NCPCDPR=<parameter>,<state>	OK +CME ERROR:<err> or ERROR
AT+NCPCDPR?	+NCPCDPR:<parameter>,<state> [<CR><LF>+NCPCDPR:<parameter>,<state>] […] OK
AT+NCPCDPR=?	+NCPCDPR:(list of supported<parameter>s), (list ofsupported<state>s) OK

Command description

Write command: Sets whether to obtain the dynamic parameters of the PDP context.

Read command: Returns all the current parameter values.

Test command: returns the range of supported parameters.

Defined Values

<parameter>	integer, dynamic parameter to read. 0 Obtaining the IPV4 address of the DNS server. 1 Obtaining the IPV6 address of the DNS server.
<state>	integer, PDP context dynamic parameter reading status. 0 Deactive 1 Active
<result>	integer indicating the PDP context activation result. The value ranges from 0 to 19. Otherwise, only 0 to 1 is supported. 0 Disable 1 Enable

Example

```
AT+NCPCDPR=1,1
OK
```

```
AT+NCPCDPR?
+NCPCDPR:0,1
+NCPCDPR:1,1

OK

AT+NCPCDPR=?
+NCPCDPR:(0,1),(0,1)

OK
```

11.2.26 AT+NQPODCP Querying the Raw Data list to be processed on the Control Plane

Command structure

Command	Response
AT+NQPODCP=<cid>	**+NQPODCP:[<sequence>[,<sequence>...]]** **OK** **+CME ERROR:<err>** or **ERROR**
AT+NQPODCP=?	**+NQPODCP:**(range of supported <**cid**>s) **OK**

Command description

Write command: Queries the sequence number of raw messages to be processed in the specified PDP context.

Test command: returns the supported <CID> range.

Defined Values

<cid>	an integer used to link data to the specified PDP context. For the value, see +CGDCONT. Range (0-10).
<sequence>	Indicates the sequence number of the original data to be processed. Range: 1 to 255.

Example

```
AT+NQPODCP=0
OK
AT+NQPODCP=?
```

```
+NQPODCP:(0-10)

OK
```

11.2.27 AT+NSNPD Sending Non-IP Data

Command structure

Command	Response
AT+NSNPD=<cid>,<non_ip_data_length>,<non_ip_data>[,<RAI>[,<type_of_user_data>[,sequence]]]	**OK** **+CME ERROR:<err>** or **ERROR**
AT+NSNPD=?	**+NSNPD:**(range of supported <**cid**>s),(maximum number of octets of user data indicated by <**non_ip_data_length**>),(list of supported <**RAI**>s),(list of supported <**type_of_user_data**>s),(list of supported <**aequnce**>s) **OK**

Command description

Write command: The TE transmits non-IP data to the network side through the control plane or user plane.

Test command: returns the range of parameters supported by MT

Defined Values

<cid>	an integer used to link data to the specified PDP context. For the value, see +CGDCONT. Range (0-10).
<non_IP_data_length>	Integer indicating the number of bytes of the <non_IP_data> information element. This value should be set to zero when there is no data to transfer. Range :(0-1358).
<non_IP_data>	a string of eight bytes containing user data. If no data is transmitted, this field is an empty string.
<RAI>	Integer to assist in releasing indicator values. 0 No information available to indicate 1 MT expects upstream data to be sent to complete the data exchange 2 MT expects the data interaction to end when it receives a downlink reply
<type_of_user_data>	integer indicating whether the transferred user data is normal or abnormal. 0 normal data 1 abnormal data

<sequence>	indicates the data sequence number. Range :(1-255). If omitted, the data sending status is not reported. If it is not omitted, the URC: +NSNPDR:<CID>,<sequence>,<status> is reported when the server confirms that the data packet or UE is discarded.
<status>	Integer indicating data status. 0 Error 1 Sent

Example

```
AT+NSNPD=0,2,0000,0,0,6
OK
AT+NSNPD=?
+NSNPD:(0-10),(1358),(0-2),(0,1),(1-255)

OK
```

11.2.28 AT+NRNPDM Setting the Non-IP Data Reporting Mode

Command structure

Command	Response
AT+NRNPDM=<reporting>	**OK** **+CME ERROR:<err>** or **ERROR**
AT+NRNPDM?	**+NRNPDM:<reporting>** **OK**
AT+NRNPDM=?	**+NRNPDM:**(list of supported <**reporting**>s),(range of supported <**cid**>s),(maximum number of octets of user data indicated by <**non_ip_data_length**>) **OK**

Command description

Write commands: Write commands are used to enable or disable non-IP data reporting from the network to the MT. The MT transmits data to the downlink through the control plane or user plane. If used, the MT will return data received from the network as below

URC :

+NRNPDM:<cid>,<cpdata_length>,<cpdata>.

The query command returns the current Settings.

Test command: returns the range of parameters supported by MT.

Defined Values

<reporting>	An integer that controls MT non-IP data event reporting 0 Disable MT non-IP data reporting 1 Enable MT non-IP data reporting via URC +NRNPDM
<cid>	an integer used to link data to the specified PDP context. For the value, see +CGDCONT. Range (0-10).
<non_IP_data_length>	Integer indicating the number of bytes of the <non_IP_data> information element. This value should be set to zero when there is no data to transfer. Range :(0-1358).
<non_IP_data>	a string of eight bytes containing user data. If no data is transmitted, this field is an empty string.

Example

```
AT+NRNPDM=1
OK
AT+NRNPDM?
+NRNPDM:1

OK
AT+NRNPDM=?
+NRNPDM:(0,1),(0-10),(1358)

OK
```

11.2.29 AT+NQPNPD Querying the Non-IP Data list to be processed

Command structure

Command	Response
AT+NQPNPD=<cid>	**+NQPNPD:[<sequence>[,<sequence>…]]** **OK**
	+CME ERROR:<err> or ERROR
AT+NQPNPD=?	**+NQPNPD:**(range of supported <**cid**>s) **OK**

Command description

Write command: used by the MT to query the list of non-IP data to be processed on the control plane or user plane.

Test command: returns the supported <CID> range.

Defined Values

<cid>	An integer used to link data to the specified PDP context. For the value, see +CGDCONT. Range (0-10).
<sequence>	indicates the data sequence number. Range :(1-255).

Example

```
AT+NQPNPD=0
OK

AT+NQPNPD=?
+NQPNPD:(0-10)

OK
```

11.2.30 AT+NIPINFO Reporting IP Address Information

Command structure

Command	Response
AT+NIPINFO=<n>	OK +CME ERROR:<err> or ERROR
AT+NIPINFO?	+NIPINFO:<n> OK
AT+NIPINFO=?	+NIPINFO:(list of support <n>s) OK

Command description

Write command: This command is used to report IP address information. Set command to set whether to display URC:

If the IP address is successfully obtained, the <failure_cause> response is not received. The URC is reported in the format of +NIPINFO:<CID>,<IP_type>,<IP_addr>.

If the IP address fails to be obtained, <IP_addr> will not be responded. The URC is reported in the format of +NIPINFO:<CID>,<IP_type>,<failure_cause>.

Read command: Returns the current <n> status.

Test command: returns the range of supported parameters.

Defined Values

<n>	indicates an integer. The values are described as follows:

	0 Disable URC 1 Enable URC +NIPINFO:<cid>,<IP_type>,<failure_cause>
<cid>	An integer used to link data to the specified PDP context. For the value, see +CGDCONT. Range (0-10).
<IP_type>	Specifies the IP address type. IPV4/IPV6/IPV4V6 Internet Protocol (IETF STD 5[103])
<IP_addr>	Indicates a string. IP address. The IPv4 address is in dotted decimal notation, for example, 100.1.0.26. The value is a hexadecimal number and a colon, for example, 108F: 0:0:0:8:800:200C: 417A. This parameter is not displayed when the IP address fails to be obtained.
<failure_cause>	Integer. Cause of the failure to obtain the IP address. 1 Only IPv4 of the PDN type is allowed 2 Only IPv6 of the PDN type is allowed 3 Only a single address is allowed 4 IPv6 RA timeout 5 unspecified

Example

```
AT+NIPINFO=1
OK
AT+NIPINFO?
+NIPINFO:0

OK
AT+NIPINFO=?
+NIPINFO:(0,1)

OK
```

11.2.31 AT+CGPIAF Controlling the Format of the Output IP address

Command structure

Command	Response
AT+CGPIAF=[<IPv6_AddressFormat>[,<IPv6_SubnetNotation>[,<IPv6_LeadingZeros>[,<IPv6_CompressZeros>]]]]	OK +CME ERROR:<err> or ERROR
AT+CGPIAF?	+CGPIAF: <IPv6_AddressFormat>,<IPv6_SubnetNotation>,<IPv6_LeadingZeros>,<IPv6_CompressZeros>

	OK
AT+CGPIAF=?	**+CGPIAF:** (list of supported <**IPv6_AddressFormat**>s),(list of supported <**IPv6_SubnetNotation**>s),(list of supported <**IPv6_LeadingZeros**>s),(list of supported <**IPv6_CompressZeros**>s) **OK**

Command description

Write command: Determines the print format of IPV6 address parameters of some AT commands.
For example, <address and subnet mask> in +CGTFT;
+CGPADDR <PDP_addr_1> and <PDP_addr_2>;
+CGCONTRDP <local address and subnet mask>,<DNS_prim_addr>;
Read command: Returns the current command parameter Settings.
Test command: Returns the range of command parameters.

Defined Values

<IPv6_AddressFormat>	An integer that controls the IPv6 address format. 0: in dotted decimal notation Example: "32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.0.255.255.255.255.255.255.255.240.0.0.0.0.0.0.0.0" 1:Hex format Example: "2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000"
<IPv6_SubnetNotation>	Integer type, controlling the <remote address and subnet mask> format. This parameter is not used when <IPv6_AddressFormat>=0. 0 The IP address and subnet mask are explicitly represented, separated by a space. Example: "2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000" 1 Print output in/subnet prefix format (CIDR notation) For example: "2001:0 db8:0000: CD30:0000, 0000:0000:0000/60"
<IPv6_LeadingZeros>	An integer that controls whether leading zeros are omitted. This parameter is not used when <IPv6_AddressFormat>=0. 0: omits leading zero; For example: "2001: DB8:0: CD30:0:0:0:0" 1. Do not omit. For example: "2001:0 db8:0000: CD30:0000, 0000, 0000:0000"
<IPv6_CompressZeros>	An integer that controls whether zero compression is used. This parameter is not used when <IPv6_AddressFormat>=0. 0: no zero compression; For example: "2001: DB8:0: CD30:0:0:0:0" 1 use zero compression; For example: "2001: DB8:0: CD30..." "

Example

```
AT+CGPIAF=?
+CGPIAF:(0,1),(0,1),(0,1),(0,1)

OK
AT+CGPIAF?
+CGPIAF:1,0,0,1

OK
AT+CGPIAF=0,0,0,0
OK
```

12 Socket Commands

12.1 Overview of Socket Commands

Command	Description
AT+NSOCR	Starting the Service
AT+NSOCO	TCP Enabling the Service
AT+NSOST	Sending Data over UDP
AT+NSOSTF	Sending Data over UDP
AT+NSOSD	TCP Sending Data
AT+NQSOS	Querying Data being Sent
+NSOSTR	The Status of Sending Upstream Packets is Proactively reported
AT+NSONMI	Setting the Reporting Mode for Downstream Data
+NSONMI	Reporting downstream Data
AT+NSORF	Receiving Data
AT+NSOCL	Shutting down Service
AT+NSOSTATUS	Querying the Socket Status
AT+SEQUENCE	Querying the Send Status
AT+QIDNSCFG	DNS Settings
AT+QDNS	DNS Domain Name Resolution
AT+XDNSCFG	DNS Settings
AT+XDNS	Synchronizing DNS Resolution
AT+CMDNS	DNS resolution
Note	
Example	

12.2 Detailed Description of Socket Commands

12.2.1 AT+NSOCR Starting the Service

Command structure

Command	Response
AT+NSOCR=<type>,<protocol>,<listenport>[,<receive control>,[af_type]]	**+NSOCR:<socket>** **OK**
	+CME ERROR:<err>

Command description

This command is used to create a UDP/TCP socket. For TCP creation, the +NSOCO command is required to complete the creation without connect.

Defined Values

<type>	Indicates the transfer type. DGRAM and STREAM are supported.
<protocol>	Defines standard Internet protocols, such as UDP 17 and TCP 6.
<listen port>	Indicates the local port. 0 indicates that the port is randomly assigned by the module.
<socket>	Link id. The value is an integer ranging from 0 to 1.
<the receive control>	1 indicates that socket_id receives incoming downstream messages. The default value is 1 0 indicates that socket_id ignores incoming downlink messages
<af_type>	AF_INET6 stands for ipv6 (not yet implemented) AF_INET stands for ipv4 (default)
<err>	Indicates the error code. See the err section.

Example

```
AT+NSOCR=DGRAM,17,10004,1
+NSOCR:0

OK
AT+NSOCR=STREAM,6,10005,1
+NSOCR:1

OK
```

Note

- There is no argument after af type. If it is specified, the command will error.
- If the network deacts, all created sockets exit and a close message is reported

12.2.2 AT+NSOCO T CP Enabling the Service

This command is used only when you operate TCP.

Command	Response
AT+NSOCO=<socket>,<remote_addr>,<remote_port>	OK
	+CME ERROR:<err> +NSOCLI:<socket>

Command description

Baseboard MCU sends a data request. After TCP +NSOCR is completed, connect server operation is required.

Defined Values

<socket>	Indicates the socket_id returned when the SOCKET is created by the NSOCR
<remote_addr>	indicates the IP address of the server
<remote_port>	specifies the server port number, which ranges from 1 to 65535
+NSOCLI:	reports and closes the abnormal TCP link.

Example

```
AT+NSOCR=STREAM,6,10005,1
+NSOCR:0

OK
AT+NSOCO=0,139.224.112.6,10005
OK
AT+NSOCO=0,139.224.112.6,10006
+CME ERROR:8009

+NSOCLI:0
```

12.2.3 AT+NSOST Sending Data over UDP

Command structure

Command	Response
AT+NSOST=<socket>,<remote_addr>,<remote_port>,<length>,<data>[,<sequence>]	+NSOST:<socket>,<length> OK [+NSOSTR:<sockid>,<sequence>,<status>]
	+CME ERROR: <err>

Command description

The baseboard MCU sends the data request, which is finally sent to the remote server through the NB protocol stack.

Defined Values

<socket>	Indicates the socket_id determined when the socket is created
<remote_addr>	indicates an IPv4 IP address in dotted decimal notation
<remote_port>	remote port in the range of 1 to 65535.
<length>	indicates the decimal length of <data>. The maximum length is 1400
<data>	data in hexadecimal string format
<sequence>	Indicates whether to confirm the sending status of the data packets. 0 or NULL: no confirmation is required. 1-255: Indicates whether the data is successfully sent. If the "+NSOSTR:<sockid>,<sequence>,<status>" message is not received, the data is still being sent. In this case, the data commands with the same SOCkid and sequence values cannot be sent again.
<Sockid>	This parameter is determined by the socket passed in when sending data.
<Status>	data sending Status, 0 failed to send. 1 the packet is sent successfully

Example

```
AT+NSOST=0,139.224.112.6,10005,2,AB30
+NSOST:0,2

OK
AT+NSOST=0,139.224.112.6,10005,2,AB30,5
+NSOST:0,2

OK

+NSOSTR:0,5,1
```

Note

- The maximum length of the received data is 1024 bytes.
- Only supports IPv4.
- Currently, only data in hex format is supported.

12.2.4 AT+NSOSTF Sending Data over UDP

Command structure

Command	Response
AT+NSOSTF=<socket>,<remote_addr>,<remote_port>,<flag>,<length>,<data>[,<sequence>]	+NSOSTF:<socket>,<length> [+NSOSTR:<socket>,<sequence>,<status>]
	+CME ERROR: <err>

Command description

The baseboard MCU sends the data request, which is finally sent to the remote server through the NB protocol stack.

Defined Values

<socket>	indicates an integer. The Socket number returned by AT+NSOCR. The value ranges from 0 to 1.
<remote_addr>	a string. IPv4 Indicates an IP address in dotted decimal notation.
<remote_port>	integer. Remote port in the range of [0,65535].
<flag>	defines the type of messages to be sent. The value is a hexadecimal string, which is optional or not. The default value is 0x100. 0x100: Abnormal message with high priority 0x200: Indicates release after the next message 0x400: Indicates release after reply to next message
<length>	indicates the decimal length of <data>. The maximum length is 1400.
<data>	data in hexadecimal string format.
<sequence>	Indicates whether to confirm the sending status of the data packets. 0 or NULL: no confirmation is required. 1-255: Indicates whether the data is successfully sent. If the "+NSOSTR:<sockid>,<sequence>,<status>" message is not received, the data is still being sent. In this case, the data commands with the same sockid and sequence values cannot be sent again.
<status>	indicates the status of sending data. 0 -- Send failed 1 -- Send to

Example

```
AT+NSOSTF=0,139.224.112.6,10005,0x100,2,AB30
+NSOSTF:0,2

OK
AT+NSOSTF=0,139.224.112.6,10005,0x100,2,AB30,1
```

```
+NSOSTF:0,2

OK
+NSOSTR:0,1,1
```

12.2.5 AT+NSOSD TCP Sending Data

Command structure

Command	Response
AT+NSOSD=<socket>,<length>,<data>[,<flag>[,<sequence>]]	<socket>,<length> OK [+NSOSTR:<sockid>,<sequence>,<status>]
	+CME ERROR:<err>

Command description

The baseboard MCU sends TCP data requests, which are eventually sent to the remote server through the NB protocol stack.

Defined Values

<socket>	Indicates the socket_id determined when the socket is created
<length>	The decimal length of the data to be sent (must be greater than 0). Currently, the maximum length is 1400
<data>	data sent in hexadecimal string format
<flag>	defines the type of the message to be sent. The value is an optional hexadecimal string. The following parameters are optional 0x100: Abnormal message with high priority 0x200: Indicates release after the next message 0x400: Indicates release after reply to next message
<sequence>	Indicates whether to confirm the sending status of the data packets. 0: no confirmation is required. 1-255: Indicates whether the data is successfully sent. If the "+NSOSTR:<sockid>,<sequence>,<status>" message is not received, the data is still being sent. In this case, the data commands with the same SOCkid and sequence values cannot be sent again.
<sockid>	Indicates the socket_id of the data to be sent. The value is determined by the socket passed in to the data to be sent.
<status>	data sending status, 0: failed to send. 1: the packet is sent successfully

Example

```
AT+NSOSD=0,2,4444,0x200,1
0,2

OK

+NSOSTR:0,1,1
AT+NSOSD=0,2,4444,0x200
0,2

OK
```

12.2.6 AT+NQSOS Querying Data being Sent

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Command structure

Command	Response
AT+NQSOS=<socket_id>[,<socket_id>][,<socket_id>…]	[+NQSOS:<socket_id>,<sequence>] [+NQSOS:<socket_id>,<sequence>] […] OK
	If there is any error: ERROR or +CME ERROR: <err>
AT+NQSOS?	[+NQSOS:<socket_id>,<sequence>] [+NQSOS:<socket_id>,<sequence>] […] OK
	If there is any error: ERROR or +CME ERROR: <err>

Command description

This command is used to query the status of packets that are sending socket data and have not replied sequence.

Defined Values

<socket_id>	indicates an integer ranging from 0 to 5, indicating a valid link ID. Currently, only 0 and 1 can be supported.
<sequence>	indicates the sequence of the data being sent.
<err>	indicates the error code. See the err section.

Example

```
AT+NQSOS?
+NQSOS:0,1
+NQSOS:0,3
+NQSOS:1,5
+NQSOS:1,9

OK
AT+NQSOS=0,1
+NQSOS:0,1
+NQSOS:0,3
+NQSOS:1,5
+NQSOS:1,9

OK
```

Note

Read the sending state of the data state, which must be in the sending data band sequence. If the data has no data in transit, return OK.

12.2.7 +NSOSTR The Status of Sending Upstream Packets is Proactively reported

Command structure

Command	Response
	+NSOSTR:<socket_id>,<seq_num>,<status>

Command description

Active reporting Notifies the socket whether the uplink packet is successfully sent from the air port at the physical layer.

Defined Values

<socket_id>	Indicates the returned socket_id after the socket is successfully created and the passed socket_id when data is sent

<seq_num>	indicates the sequence parameter entered when the socket sends uplink data. The range is 0<=seq_num<=255
<status>	indicates the sending status 0 indicates failure 1: Success

Directions for use
Users add sequence requirements for socket communication to identify whether uplink packets have been successfully sent from the air port by the physical layer. It is necessary to use the send2\ Sendto2 interface of the platform extension to realize uplink data transmission, and the specific prototype is as follows:
send2(int s, const void *data, size_t size, int flags,int seq)
sendto2(int s, const void *data, size_t size, int flags,const struct sockaddr *to, socklen_t tolen,int seq)
You can report and process the sequence parameters based on scenario requirements, but strictly observe the platform's parsing of the socket_id and seq_num parameters. After the socket_id and seq_num parameters are successfully parsed, users can handle them by themselves or use the platform to proactively report the status of upstream data sent by the physical layer through the air port.
Matters needing attention
1. If the sending interface writes the parameter seq and does not receive "+NSOSTR:<sockid>,<sequence>,<status>", the data is still being sent and the commands with the same SOCkid and sequence cannot be sent again.
2. If the seq parameter on the sending interface is NULL or 0, +NSOSTR: is not reported.
3. The platform receives a packet from the protocol stack and parses it with two bytes. The higher 8 bits are socket_id and the lower 8 bits are seq_num.

12.2.8 AT+NSONMI Setting the Reporting Mode for Downstream Data

Command structure

Command	Response
AT+NSONMI=<mode>	**OK**
AT+NSONMI?	**+NSONMI:<mode>** **OK**
AT+NSONMI=?	**+NSONMI:(0,1,2,3)** **OK**

Command description

Set the downlink data active reporting mode.

Defined Values

<mode>	Report mode. The default value is 1. 0 Stores only 4000 bytes of downstream data without prompting, and discards excess data. The system automatically reports the +NSONMI:drop <len> bytes PKT message. The system cache a maximum of 180 times for responding to a byte. 1 When the first downstream data is coming, the system automatically reports the information in the format of "+NSONMI:<socketid>,<length>", which stores a maximum of 4000 bytes. The excess data is discarded. The second downstream data is not reported until data on the same socket is read. Until all data of a node is read, the data information of the next node is reported as +NSONMI:<socketid>,<length>. When all data is read, the status is reset. If the next node has no data, the data will not be reported. When responding to a byte, the maximum cache is 180 times, otherwise it is easy to apply for memory; 2 indicates downstream data prompt, which contains "+NSONMI:<socket>,<remote_ADDR>,<remote_port>,<length>,<data>" and does not store data. +NSONMI: <socket>,<length>,<data>, does not store data;

Note

If recv_ctl is 0 when the socket is created, downlink data is discarded and no discarded data is reported.
If the length of downstream data sent exceeds 4000 bytes, the system automatically reports the +NSONMI: DROP <len> bytes PKT message indicating that the downstream data will not be cached.
By sending "AT+NSONMI? Query the current <mode> value.

```
Example:AT+NSONMI?
+NSONMI:1
OK
```

Example

```
AT+NSONMI=2
OK
+NSONMI:0,139.224.112.6,10005,10,31313232323231313131
```

12.2.9 +NSONMI Reporting downstream Data

Command structure

Command	Response

	+NSONMI:drop <length> bytes pkt or **+NSONMI:<socket>,<length>** or **+NSONMI:<socket>,<remote_addr>,<remote_port>,<length>,<data>** or **+NSONMI: <socket>,<length>,<data>**

Command description

Active reporting notifies the socket of newly received downlink data so that the baseboard can read the data through +NSORF. The report mode can be set by AT+NSONMI.

Defined Values

<socket>	Socket_id (AT+NSOCR) determined when the socket is created.
<length>	indicates the length of the latest downstream data. The maximum value is 1024 bytes.
<remote_addr>	indicates the IP address of the server
<remote_port>	specifies the server port number, which ranges from 1 to 65535
<data>	data in hexadecimal string format

Example

+NSONMI:0,139.224.112.6,10005,10,31313232323231313131

Note

If the total length of multiple downlink data sent exceeds 4000 bytes, the system automatically reports the +NSONMI: DROP <len> bytes PKT message indicating that the subsequent downlink data will not be cached. The maximum length of a single downlink data is 1024 bytes. A byte can be cached for a maximum of 180 times. Otherwise, memory resources cannot be allocated.

12.2.10 AT+NSORF Receiving Data

Command structure

Command	Response
AT+NSORF=<socket>,<req_length>	**+NSORF:<socket>,<ip_addr>,<port>,<length>,<data>,<remaining_length>**

	OK **[+NSONMI:socket,length_next]**
	+CME ERROR:<err>

Interface

The received downlink data packets are actively read and processed by baseboard MCU. This AT command is aimed AT the data node in the data. After the operation, the data information of the next data node will be reported until the data node is NULL.

Note: This command supports only IPv4.

Defined Values

<socket>	Indicates the socket_id determined when the socket is created
<req_length>	Indicates the decimal length of data to be read. If req_length is greater than or equal to the length of data stored in the socket, all data will be read. Otherwise, only the specified length of data will be read and the rest will be stored.
<ip_addr>	indicates the remote IP address
<port>	Indicates the remote port number. The value ranges from 1 to 65535.
<length>	indicates the decimal byte length of the received data
<remaining_length>	length of the remaining unread data
<data>	data received in hexadecimal format
<length_next>	The length of the next data node

Example

```
+NSONMI:0,3// The first downstream data, when the data reporting mode is 1
AT+NSORF=0,1
+NSORF:0,139.224.112.6,10005,1,68,2

OK
AT+NSORF=0,1
+NSORF:0,139.224.112.6,10005,1,74,1

OK
AT+NSORF=0,1
+NSORF:0,139.224.112.6,10005,1,74,20// After reading the data of the first node, this length is the
data length of the second data node

OK
+NSONMI:0,20// The data information of the second data node is not reported until the data of the last
```

```
data node is read. The data reporting mode is 1
AT+NSORF=0,1
+NSORF:0,139.224.112.6,10005,1,70,19

OK
```

12.2.11 AT+NSOCL Shutting down Service

Command structure

Command	Response
AT+NSOCL=<socket>	OK +NSOCLI:<socket_id>
	+CME ERROR:<err>

Command description

This command is used to shut down a specified link.

Defined Values

<socket>	Indicates the socket_id determined when the socket is created
<socket_id>	Indicates that the socket link is closed
<err>	Indicates the error code. See the err section.

12.2.12 AT+NSOSTATUS Querying the Socket Status

Command structure

Command	Response
AT+NSOSTATUS=<socket>	+NSOSTATUS:<socket>[<status>] OK
AT+NSOSTATUS	[+NSOSTATUS:<socket>[,<status>] [+NSOSTATUS:<socket>[,<status>] OK
+NSOSTATUS=?	+NSOSTATUS:(0-1)

	OK

Command description

The write command returns the socket status information corresponding to the specified socket number, and the list of all sockets is displayed by executing the command.

Defined Values

<socket>	Indicates an integer. The Socket number. The core wing supports two sockets. The value ranges from 0 to 1.
<status>	Integer. Indicates the socket status. 0 -- available. 1 -- Does not exist (this status is returned if the Socket is not bound to the assigned correct IP address NW). 2 -- Flow control, currently not supported. 3 -- Back off, not currently supported.
<err>	Indicates an integer. Error code.

Example

```
AT+NSOSTATUS=0 // Query the status of the socket whose ID is 0
+NSOSTATUS:0,0

OK
AT+NSOSTATUS
+NSOSTATUS:0,0

+NSOSTATUS:1,1

OK
AT+NSOSTATUS=?
+NSOSTATUS:(0-1)

OK
```

12.2.13 AT+SEQUENCE Querying the Send Status

Command structure

Command	Response
AT+SEQUENCE=<socket>,<sequence>	**<status>**

	OK
	+CME ERROR:<err>

Command description

Baseboard MCU sends data request and queries data sending status.

Defined Values

<status>	Indicates the queried status. 0: failed to send. 1: The message is successfully sent. 2: Sending. -1: the sequence is not used.

Example

```
AT+SEQUENCE=0,5
1

OK
AT+SEQUENCE=0,5
2

OK
AT+SEQUENCE=0,150
-1

OK
```

12.2.14 AT+QIDNSCFG DNS Settings

Command structure

Command	Response
AT+QIDNSCFG=<pri_dns>[,<sec_dns>]	OK +CME ERROR:<err>
AT+QIDNSCFG?	PrimaryDns:<pri_dns> SecondaryDns:<sec_dns> OK
AT+QIDNSCFG=?	OK

Command description

This command is used to manually set the DNS server. <pri_dns> and <sec_dns> have reserved the end character '\0' and need not be considered again.

Note

Write commands set user DNS information to Factory NV. Read commands are used to query the DNS recorded by the platform. Normally, the DNS is configured by 3GPP. If 3GPP does not report DNS information, the platform uses the DNS configured in FactorynV. In simple terms, the user setting or factory NV configuration is a backup DNS, which only takes effect if 3GPP does not report DNS.

Defined Values

<pri_dns>	indicates the IP address of the active DNS server, in dotted decimal notation
<sec_dns>	indicates the IP address of the secondary DNS server, in dotted decimal notation

Example

```
AT+QIDNSCFG=110.110.110.110
OK
AT+QIDNSCFG?
PrimaryDns:110.110.110.110
SecondaryDns:0.0.0.0

OK
```

12.2.15 AT+QDNS DNS Domain Name Resolution

Command structure

Command	Response
AT+QDNS=[<mode>],<domain>	OK +QDNS:<ip address> or +QDNS:QUERY_DNS_FAILED
	+CME ERROR:<err>

Command description

This command is used to obtain the IP address of the URL. If no DNS is reported, the default NV address is used. This command is an asynchronous query mechanism. After the AT command returns OK, the query result is reported.

Defined Values

<mode>	Integer 0 -- DNS domain name resolution. <domain> cannot be empty. 1 -- If <domain> is not empty, clear DNS cache data for the corresponding domain. If <domain> is empty, all DNS resolved cache data is cleared. 2 -- DNS domain name resolution, <domain> cannot be empty. Parsing results are not cached.
<domain>	Indicates the domain name of the URL. The length cannot exceed 100 bytes.
<IP address>	Indicates the IP address of the URL.

Example

```
AT+QDNS=0,www.baidu.com
OK

+QDNS:39.156.66.18

AT+QDNS=1,www.baidu.com
OK
AT+QDNS=2,www.baidu.com
OK

+QDNS:39.156.66.18
```

12.2.16 AT+XDNSCFG DNS Settings

Command structure

Command	Response
AT+XDNSCFG=<pri_dns>[,<sec_dns>]	OK +CME ERROR:<err>
AT+XDNSCFG?	+XDNSCFG:<pri_dns>[,<sec_dns>] OK

Command description

This command is used to manually set the DNS server. End "\0" is reserved for <pri_dns> and <sec_dns>.

Note

Write command AT+XDNSCFG Set user DNS information to Factory NV, AT+XDNSCFG? Yes Query the DNS configured on 3GPP. In normal cases, the DNS is configured by 3GPP. If 3GPP does not report DNS information, the platform uses the DNS configured in Factory NV. In simple terms, the user setting or factory NV configuration is a backup DNS, which only takes effect if the protocol stack does not report DNS.

Defined Values

<pri_dns>	indicates the IP address of the active DNS server, in dotted decimal notation
<sec_dns>	indicates the IP address of the secondary DNS server, in dotted decimal notation

Example

```
AT+XDNSCFG=8.8.8.8,114.114.114.114
OK
```

12.2.17 AT+XDNS Synchronizing DNS Resolution

Command structure

Command	Response
AT+XDNS=<domain>	+XDNS:<ip address> OK
	+CME ERROR:<err>

Command description

This command is used to obtain the IP address of the URL. If no DNS is reported, the default NV address is used. This command supports both asynchronous and synchronous query mechanisms. When vertype is CMIOT_VER, the query mechanism is asynchronous. The AT command returns OK and reports the query result, for example, +XDNS:111.62.246.155 or +XDNS:QUERY_DNS_FAILED. When vertype is not CMIOT_VER, the link is synchronized. If the AT command is blocked, the link is blocked until the AT returns a result.

Defined Values

<domain>	Indicates the domain name of the URL. The length cannot exceed 100 bytes

<IP address>	Indicates the IP address of the URL

Example

```
AT+XDNS=www.baidu.com
+XDNS:183.232.231.172

OK
```

12.2.18 AT+CMDNS DNS resolution

Command structure

Command	Response
AT+CMDNS=<domain>	**OK** **+CMDNS:<ip address>** or **+CMDNS:QUERY_DNS_FAILED**
	+CME ERROR:<err>

Command description

This command is used to obtain the IP address of the URL. If no DNS is reported, the default NV address is used. This command is an asynchronous query mechanism. After the AT command returns OK, the query result is reported.

Defined Values

<domain>	Indicates the domain name of the URL. The length cannot exceed 100 bytes
<IP address>	Indicates the IP address of the URL

Example

```
AT+CMDNS=www.baidu.com
OK
+CMDNS:183.232.231.172
```

12.2.19 Note

AT present, the platform automatically obtains the IP address and proactively reports "+CGEV:PDN ACT" and "+CGEV:PDN DEACT", indicating that the IP address is obtained or invalid respectively. Users need to monitor these two reports to design their OWN AT command flow. Only two sockets can work at the same time, and it takes some time to release Socket resources internally. You are advised to disable the Socket after completing services using UDP or TCP sockets to avoid repeated creation, sending and receiving, and closing of sockets in a short period of time. In case +NSOCR fails to be created again because Socket resources are exhausted in a short time.

If the data to be sent is entered continuously and the speed is higher than the bottom sending speed, the sending buffer may be full and an error may occur. Please send data again after several seconds.

A certain amount of received data can be cached inside the module. When data arrives in manual receiving mode, it is necessary to read the data in time, otherwise it may cause subsequent data loss. If a large amount of data needs to be continuously received, you are advised to increase the baud rate to speed up the receiving speed.

For the extended AT command for data transmission, it is not recommended that users use the ASCII mode for content transfer. Instead, hexadecimal ASCII characters are recommended to describe ASCII characters.

If a terminal deregisters and reports a DEACT, all socket actions are closed. In this case, the user needs to create the socket again after the network injection.

12.2.20 Example

```
AT+CGATT?                 // To check whether the IP address is attached, obtain an external IP address
+CGATT:1                 //1 indicates attached. If the value is 0, you need to perform cyclic query

OK
AT+NSOCR=DGRAM,17,10005      // Create a UDP socket connection
+NSORC:0

OK
AT+NSOST=0,139.224.112.6,10005,5,1234567890      // UDP data packets are sent
OK
+NSONMI:0,4               // Active report command: 4 bytes of data are reported
AT+NSORF=0,4               // Accepts 4 bytes of data
0,139.224.112.6,10005,4,1234ABCD,0

OK
AT+NSOCL=0           // Close the created socket connection
OK
+NSOCLI:0

AT+WORKLOCK=0
OK
+POWERDOWN:5360          // If the command is reported, the chip is in deep sleep
```

13 MQTT Commands

13.1 Overview of MQTT Commands

Command	Description
AT+MQNEW	Establishing a New MQTT Client
AT+MQCON	Sending Link Packets to the MQTT Server
AT+MQDISCON	Disconnecting from the MQTT server
AT+MQSUB	Sending an MQTT Subscription Packet
AT+MQUNSUB	Sending an MQTT Unsubscribe Packet
AT+MQPUB	Sending MQTT Advertisement Packets
AT+MQNEW	Establishing a New MQTT Client

13.2 Detailed Description of MQTT Commands

13.2.1 AT+MQNEW Establishing a New MQTT Client

Command structure

Command	Response
AT+MQNEW=<server>,<port>,<command_timeout_ms>,<bufsize>	+MQNEW:<mqtt_id> OK
	+CME ERROR:<err>

Command description

This command is used to establish a new MQTT connection with the MQTT server over TCP. A maximum of 0-1 new MQTT connections can be established.

Defined Values

<server>	Indicates the domain name or IP address of the MQTT server.

<port>	String, MQTT server port number.
<command_timeout_ms>	Integer, AT command waiting time, in milliseconds. The value ranges from 2000 to 90,000.
<bufsize>	Indicates the size of the sent and received packets, in bytes. The recommended value ranges from 20 to 1000. If the size is too large, memory will be wasted; if the size is too small, error return code 8002 will be generated.

Example

```
AT+MQNEW=mqtt.ctwing.cn,1883,5000,200
+MQNEW:0

OK
```

13.2.2 AT+MQCON Sending Link Packets to the MQTT Server

Command structure

Command	Response
AT+MQCON=<mqtt_id>,<version>,<client_id>,<keepalive_interval>,<cleansession>,<will_flag>[,<will_options>][,<username>,<password>]	OK +CME ERROR:<err>

Command description

This command is used to send MQTT link packets.

Defined Values

<mqtt_id>	integer, MQTT link ID, return value of AT+MQNEW.
<version>	integer, MQTT version, currently only version 4 is supported.
<client_id>	indicates the client ID.
<keepalive_interval>	indicates the keepalive interval. The value ranges from 10 to 65535 seconds. In this interval, an MQTT keepalive message is proactively sent to maintain the MQTT connection. Setting it too small will cause frequent packets to be sent.
<cleansession>	integer, cleansession, 0 or 1. (0: After the Client is disconnected, the Server should save the subscription information of the Client. 1:

	indicates that the Server should immediately discard any session status information.
<will_flag>	integer, will flag, 0 or 1 (1: followed by an option).
<will_options>	The value is a character string. This option must be included if will flag is 1. Retained, message_len, and message.
<topic>	string, WILL feature topic.
<QoS>	integer, WILL feature QoS.
<retained>	a string. WILL Specifies whether the feature is published to a new subscriber. 0: no distribution, and 1: publishing.
<message_len>	integer. WILL Indicates the length of the message.
<message>	string, WILL message.
<username>	indicates the username (optional).
<password>	indicates the password (optional).

Example

```
AT+MQCON=0,4,"client_id",1000,1,0
OK
AT+MQCON=0,4,"client_id",1000,1,1,"WILL",1,0,2,"3838"
OK
AT+MQCON=0,4,"client_id",1000,1,1,"WILL",1,0,2,"3838","username","password"
OK
```

13.2.3 AT+MQDISCON Disconnecting from the MQTT server

Command structure

Command	Response
AT+MQDISCON=<mqtt_id>	OK +CME ERROR: <err>

Command description

This imperative is used to send an MQTT disconnection message, disconnect the TCP connection from the MQTT server, and delete the MQTT link information.

Defined Values

<mqtt_id>: integer, MQTT ID, return value of AT+MQNEW command.

Example

```
AT+MQDISCON=0 // The MQTT disconnection packet was sent. Procedure
```

```
OK
```

13.2.4 AT+MQSUB Sending an MQTT Subscription Packet

Command structure

Command	Response
AT+MQSUB=<mqtt_id>,<topic>,<QoS>	OK +CME ERROR: <err>

Command description

This command is used to send MQTT subscription packets.

Defined Values

<mqtt_id>	Integer, MQTT ID, return value of the AT+EMQNEW command.
<topic>	String that subscribes to the topic of the message.
<QoS>	Integer, QoS of the message, 0, 1 or 2.

Example

```
AT+MQSUB=0,"topic",1 // Send a SUBSCRIBE message
OK
```

13.2.5 AT+MQUNSUB Sending an MQTT Unsubscribe Packet

Command structure

Command	Response
AT+MQUNSUB=<mqtt_id>,<topic>	OK +CME ERROR: <err>

Command description

This command is used to send an MQTT unsubscribe message.

Defined Values

<mqtt_id>	Integer, MQTT ID, return value of AT+MQNEW command.
<topic>	String that subscribes to the topic of the message.

Example

```
AT+MQUNSUB=0,"topic" // Send the unsubscribe message

OK
```

13.2.6 AT+MQPUB Sending MQTT Advertisement Packets

Command structure

Command	Response
AT+MQPUB=<mqtt_id>,<topic>,<QoS>,<retained>,<dup>,<message_len>,<message>	OK +CME ERROR: <err>

Command description

This command is used to send MQTT packets.

Defined Values

<mqtt_id>	Integer, MQTT ID, return value of AT+MQNEW command.
<topic>	String, the topic of the published message.
<QoS>	Integer, QoS of the message, 0, 1 or 2.
<retained>	Integer, retained flag,0 or 1 0 Retained message is not retained. 1 Reserved message.
<dUP>	Integer, repeat flag, 0 or 1 0 first sent 1 Repeat send
<message_len>	Indicates the length of the published message, expressed in bytes. The value ranges from 1 to 1000 bytes (s).
<message>	A hexadecimal string used to publish the message content.

Example

```
AT+MQPUB=0,"mytopic",1,0,0,4,61626364// Send MQTT publish message, publish message is "ABCD"
```

OK

13.2.7 An MQTT reply packet is Proactively reported and received

Command structure

Response	Description
The connection disconnection message is reported **+MQDISON:<mqtt_id>**	mqtt_id:MQTT client id
Reported received MQTT CONACK **+MQCONNACK:<socket_id>,<RERURN CODE>**	RERURN CODE:MQTT CONACK return code 0 Connection Accepted 1 Connection Refused: unacceptable protocol version 2 Connection Refused: identifier rejected 3 Connection Refused: server unavailable 4 Connection Refused: bad user name or password 5 Connection Refused: not authorized
Reported received MQTT PUBACK **+MQPUBACK:<socket_id>**	
Reported received MQTT SUBACK **+MQSUBACK:<socket_id>,<topic>,<qos>**	Topic: Subscribed topics Qos: Message service publishing quality (consistent with Qos in MQTTsubscribe)
Reported received MQTT UNSUBACK +MQUNSUBACK:<socket_id>,<topic>	
Reported received MQTT PUBLISH **+MQPUB: <socket_id>,<topic>,<QoS>,<retained>,<dup>,<message_len>,<message>**	Retained: 1: indicates that the sent message needs to be persistent, not only to the current subscribers, and the new subscribers subscribed to this Topic name will be pushed immediately. Note: New subscribers will only retrieve the latest RETAIN Flag=1 message push. 0: Push this message only for current subscribers. Dup: The default value is 0 and occupies only one byte, indicating the first sending A value of 1 indicates that the current message has been delivered previously Message_len: indicates the length of the published message "Message" : published messages

Reported received MQTT PUBREC **+PUBREC:<socket_id>,<dup>,<msgid>**	Msgid: Field in a packet, used for protocol interaction processing (users do not need to pay attention)
Reported received MQTT PUBREL **+PUBREL:<socket_id>,<dup>,<msgid>**	
Reported received MQTT PUBCOMP +PUBCOMP:<socket_id>,<dup>,<msgid>	

14 CoAP Commands

14.1 Overview of CoAP Commands

Command	Description
AT+COAPCREATE	Creating a New COAP Client
AT+COAPDEL	Deleting a COAP Client
AT+COAPHEAD	Configuring a COAP Packet Header
AT+COAPOPTION	Configuring COAP Packets option
AT+COAPSEND	Sending COAP Packets
+COAPURC	Proactively Reporting and Receiving COAP Reply Packets

14.2 Detailed Description of CoAP Commands

14.2.1 AT+COAPCREATE Creating a New COAP Client

Command structure

Command	Response
AT+COAPCREATE=<server>,<port>	OK +CME ERROR:<err>

Command description

This command is used to specify the IP address (or domain name) and port number of the COAP SERVER by setting up the COAP client.

Defined Values

<server>	Indicates the domain name or IP address of the COAP server.
<port>	Integer, port number of the COAP server (default: 5683)

Example

```
AT+COAPCREATE=ota.simteek.com,5683
OK
```

14.2.2 AT+COAPDEL Deleting a COAP Client

Command structure

Command	Response
AT+COAPDEL	OK +CME ERROR:<err>

Command description

This command is used to delete the COAP client.

Example

```
AT+COAPDEL
OK
```

14.2.3 AT+COAPHEAD Configuring a COAP Packet Header

Command structure

Command	Response
AT+COAPHEAD=<msgid>,<tkl>,<token>	OK +CME ERROR: <err>

Command description

This command is used to configure the Message ID,TKL, and Token in the COAP header.

Defined Values

<msgid>	Integer used to associate COAP request and response messages. The value ranges from 0 to 65535[msgid is set to a random value when 0].
<tkl>	Integer, token length, range: 0-8[0 token set random value];

<token>	A character string that does not support special characters and is used to associate COAP request and response packets.

Example

```
AT+COAPHEAD=5555,8,abcdefgh // Specify msgid and token

OK
AT+COAPHEAD=5555,0 // Specify msgid ,random token
OK
AT+COAPHEAD=0,8,abcdefgh    //random msgid ,Specify token
OK
AT+COAPHEAD=0,0      //Random misgid and token
OK
```

14.2.4 AT+COAPOPTION Configuring COAP Packets option

Command structure

Command	Response
AT+COAPOPTION=<opt_count>,<opt_name>,<opt_value>[,......]	OK +CME ERROR: <err>

Command description

This command is used to configure the COAP packet option. The latest configuration prevails.

Defined Values

<opt_count>	Specifies the total number of options to be configured. The value ranges from 1 to 12.
<opt_name>	Integer, option name The supported option name. Refer to the RFC 7252. 3 Uri-Host 6 Observe 7 Uri-Port 11 Uri-Path 12 Content-Format 15 Uri-Query 27 Block1 35 Proxy-Uri 60 Size1

	No.	Name	Format	Length
	3	Uri-Host	string	1-255
	6	Observe	uint	0-3
	7	Uri-Port	uint	0-2
	11	Uri-Path	string	0-255
	12	Content-Format	uint	0-2
	15	Uri-Query	string	0-255
	27	Block1	uint	0-3
	35	Proxy-Uri	string	1-1034
	60	Size1	uint	0-4
<opt value>	The value of option is a character string			

Example

```
AT+COAPOPTION=2,11,"abc",11,"core"
OK
```

14.2.5 AT+COAPSEND Sending COAP Packets

Command structure

Command	Response
AT+COAPSEND=<type>,<method>,<datalen>,<data>	OK +CME ERROR: <err>

Interface

This command is used to send COAP packets.

Defined Values

<type>	The value is a character string. The value can be CON, NON, ACK, or RST.
<method>	A string of COAP methods, including GET, POST, PUT, and DELETE. The string is case-sensitive.
<datalen>	The length of the data carried is an integer, in bytes. The value ranges from 1 to 1000 bytes (s).
<data>	String indicates the data carried in hexadecimal string format.

Example

```
AT+COAPSEND="con","put",3,616263// Send COAP packets and advertise the message as ABC.

OK
```

14.2.6 +COAPURC Proactively Reporting and Receiving COAP Reply Packets

Command structure

Command	Description
COAP packets without payload **+COAPURC:<request_or_response>,<return_code>,<msgid>**	request_or_response:Indicates a COAP request or reply return_code:return code 0,Empty Message 2.01, Created 2.02, Deleted 2.03, Valid 2.04, Changed 2.05, Content 4.00, Bad Request 4.01, Unauthorized 4.02, Bad Option 4.03, Forbidden 4.04, Not Found 4.05, Method Not Allowed 4.06, Not Acceptable 4.12, Precondition Failed 4.13, Request Entity Too Large 4.15, Unsupported Content-Format 5.00, Internal Server Error 5.01, Not Implemented 5.02, Bad Gateway 5.03, Service Unavailable 5.04, Gateway Timeout 505 5.05, Proxying Not Supported Msgid:Used to associate COAP request and response messages
COAP packets with payloads **+COAPURC:<request_or_response>,<return_code>,<msgid>,<payload_len>,<payload>**	payload_len:Payload length carried by COAP packets payload:Payload carried by COAP packets

15 FOTA Commands

15.1 Overview of FOTA Commands

Command	Description
AT+FOTACTR	Fota Upgrade Switch
AT+NFWUPD	Upgrading FOTA Locally

15.2 Detailed Description of FOTA Commands

15.2.1 AT+FOTACTR Fota Upgrade Switch

Command structure

Command	Response
AT+FOTACTR=<n>	OK +CME ERROR:<err>
AT+FOTACTR?	+FOTA:<n> OK

Command description

This command is used to enable or disable the Fota automatic upgrade function. If Fota upgrade tasks exist on the cloud platform, Fota upgrade tasks are automatically triggered. When Fota operations initiated by the cloud platform are disabled, the TERMINAL ignores Fota operations initiated by the cloud platform. You need to manually enable this function or initiate a connection to a private Fota server.

Defined Values

<n>	the default value is 0, that is, FOTA automatic upgrade is enabled 0 Enable the fota automatic upgrade function 1 Disable the fota automatic upgrade function
<err>	Error code, see the err section.

15.2.2 AT+NFWUPD Upgrading FOTA Locally

Command structure

Command	Response
AT+NFWUPD=<cmd>[,<sn>,<len>,<data>,<crc>]	**OK**
	+CME ERROR:<err>
AT+NFWUPD=?	**+NFWUPD:**(list of supported <**cmd**>s) **OK**
	+CME ERROR:<err>

Command description

This command supports firmware update. It allows package downloads, package verification and firmware upgrades. Before upgrading the firmware, download the software package. After downloading, send the package validity CMD. It can be upgraded if the subcontracting is legal, otherwise return an error and print the reason. Send firmware upgrade command after subcontract verification is complete. If the subcontract is not verified, refuse to execute the firmware upgrade command.

Defined Values

<CMD>	Subcontract processing command 0 erases the FLASH and initializes it 1 <sn>,<len>,<data>,<CRC>; Download a package segment. A packet segment is a contiguous segment of a FOTA packet. Segments can be of any length (less than 512 bytes), but must be provided in order. 2 check difference subcontracting 5 Starts the upgrade
<sn>	Serial number. It starts at 0 and increments each packet segment by 1
<len>	Indicates the length of the data in bytes, which should be 32/64/128/256/512.
<data>	Indicates the data transmitted by this packet in hexadecimal string format.
<CRC>	CRC for packet segment binary data. CRC is sent as a hexadecimal string. CRC is xOR8 for each byte in a packet segment.

16 Protocol stack extension commands

16.1 Overview of Protocol stack extension Commands

Command	Description
AT+NEARFCN	Specifying the Search frequency
AT+NCSEARFCN	Clearing storage Frequency Points
AT+NBAND	Setting supported Bands
AT+NCONFIG	Configuring UE Behavior
AT+NUESTATS	Querying UE Statistics
AT+NCCID	ICCID named
AT+NSET	Protocol Stack Extension Settings
AT+NPOWERCLASS	Setting the BNAD Power Level
AT+NTSETID	ID set
AT+NPOPB	Presetting the CARRIER PLMN and Valid Band
AT+CUPREFER	Switch the primary number to the preferred network and trigger the search
AT+CUPREFERTH	Setting the preferred network resident threshold
AT+CMEE	Setting the ERROR Reporting Mode

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16.2 Detailed Description of Protocol stack extension Commands

16.2.1 AT+NEARFCN Specifying the Search frequency

Command structure

Command	Response
AT+NEARFCN=<search_mode>,<earfcn>[,<pci>]	OK +CME ERROR:<err> or ERROR
AT+NEARFCN?	+NEARFCN:<Lock_mode>[,<earfcn>[,<pci>]] OK
AT+NEARFCN=?	OK

Command description

Write command: Provide lock specific E-UTRA absolute radio frequency mechanism channel number (EARFCN) and physical cell ID if required. All operations lock the carrier until the lock is removed. If EARFCN is not specified, the UE goes into service free mode. If the specified PCI does not exist, the UE goes into service-free mode. After the Settings are complete, enter AT+NV=SAVE to take effect.

Defined Values

<search_mode>	Specify the search type and define the supplied parameters. 0 Lock to the specified frequency point
<earfcn>	: A number in the range of 1 to 65535, representing the EARFCN to be searched. A value of <earfCN> of 0 indicates that the EARfCN lock and any associated physical cell ID lock are removed.
<pci>	the value is a string of e-UTRAN physical cell IDS in hexadecimal format. The value ranges from 0 to 1F7.
<Lock_mode>	reports the current lock type, 0 not locked frequency, not locked cell. In this case, only the <Lock_mode> parameter is reported in the query command 1 frequency lock. <Lock_mode>,<earfCN> 2 Lock the cell. <Lock_mode>,<earfCN>,<pci>

Example

```
AT+NEARFCN=0,10,AB
OK
AT+NV=SAVE
AT+NEARFCN?
+NEARFCN:2,10,AB

OK
AT+NEARFCN=?
OK
```

16.2.2 AT+NCSEARFCN Clearing storage Frequency Points

Command structure

Command	Response
AT+NCSEARFCN	**OK**
	+CME ERROR:<err> or ERROR

Command description

Write command: Used to clear the stored frequency list. This command must be set after the soft shutdown (AT+CFUN=0) command, and then enter the AT+NV=SAVE command to take effect.

Example

```
AT+NCSEARFCN

OK
AT+NV=SAVE
```

16.2.3 AT+NBAND Setting supported Bands

Command structure

Command	Response
AT+NBAND=<n>[,<n>[,<n>[…]]]	OK +CME ERROR:<err> or ERROR
AT+NBAND?	+NBAND:<n>[,<n>[,<n>[…]]] OK
AT+NBAND=?	+NBAND:(<n>[,<n>[,<n>[…]]]) OK

Command description

Write command: Supported BAND. The configured BAND must be within the UE capability range; otherwise, the setting does not take effect.

Read command: Returns the BAND information supported by the current setting.

Test command: Returns the BAND information supported by UE radio configuration.

Defined Values

<n>	indicates the decimal Band number. NB bands supported by Rel14 include 1, 2, 3, 5, 8, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 28, 31, 66, and 70. The actual Settings must be based on the supported capabilities of the terminal. If the BAND Settings exceed the capabilities, an ERROR message is returned.

Example

```
AT+NBAND=5
OK
AT+NV=SAVE
```

```
AT+NBAND=?
+NBAND:(5,8,3,20)

OK
AT+NBAND?
+NBAND:5

OK
```

16.2.4 AT+NCONFIG Configuring UE Behavior

Command structure

Command	Response
AT+NCONFIG=<function>,<value>	**OK** **+CME ERROR:<err> or ERROR**
AT+NCONFIG?	**+NCONFIG:<function>,<value>** **[+NCONFIG:<function>,<value>** **[…]]** **OK**
AT+NCONFIG=?	**+NCONFIG:(<function>,(<value1>,<value2>[,<value3>[,…]]))** **[+NCONFIG:(<function>,(<value1>,<value2>[,<value3>[,…]]))** **[…]]** **OK**

Command description

Write command: This command allows you to configure certain aspects of UE behavior. It requires a function item and a corresponding value to control the operation of that function. The setting takes effect immediately.

Read command: returns the current setting

Test command: returns information about the UE's actual support.

Defined Values

<function>	UE function configuration. AUTOCONNECT Controls whether the platform will automatically attempt to connect to the network after power-on or restart. When enabled, it sets AT+CFUN=1 and reads PLMN from USIM. And it will use the APN provided by the network. For <value>, the value is 0/1, 0- Disable /1- Effective. The value takes effect by default (1). (The value of EAT/Y7026 is FALSE or TRUE.)

	COMBINE_ATTACH Use or disable joint attachment. The value of <value> is 0/1, which indicates that the value is disabled or takes effect. This function does not take effect and is disabled by default (0). (The value of EAT version is FALSE or TRUE). CR_0354_0338_SCRAMBLING Enables/disables SCRAMBLING and has the values FALSE and TRUE. To disable and SCRAMBLING respectively, only TRUE is supported. (Currently only supported by EAT version) CR_0859_SI_AVOID disables SI_AVOID. The value can be FALSE or TRUE. (Currently only supported by EAT version) CELL_RESELECTION Supports RRC cell reelection. The value of <value> is 0/1, 0- Not supported /1- Supported. (1) is supported by default. (The value of EAT version is FALSE or TRUE). ENABLE_BIP: indicates whether the BIP function is supported. The value of <value> is 0/1, 0- Not supported /1- Supported. Currently, (1) is supported by default. (The value of EAT version is FALSE or TRUE). MULTITONE Multi Tone supported or not. The value of <value> is 0/1, 0- Not supported/supported. (1) is supported by default. (The value of EAT version is FALSE or TRUE). NAS_SIM_POWER_SAVING_ENABLE USIM card power saving mode. The value can be FALSE or TRUE, and only TRUE is supported. (Currently only supported by EAT version) BARRING_RELEASE_DELAY specifies the BAR timer duration when the BAR cell is not specified on the network. The value ranges from 0 to 1800 seconds. The default value is 0. RELEASE_VERSION indicates the protocol version. The value is 13/14, 13-REL13/14-rel14. SYNC_TIME_PERIOD SIB16 read period. The value ranges from 0 to 65535. The default value is 0. PCO_IE_TYPE Specifies the PCO type supported. The value is 0/1, 0-PCO/1-EPCO. The default EPCO is 1. (The value of THE EAT version is PCO/EPCO). NON_IP_NO_SMS_ENABLE specifies whether to disable SMS in non-IP mode. The value is 0/1. 0- Disable /1- Disable. The default value is 0. (The value of EAT version is FALSE or TRUE). T3324_T3412_EXT_CHANGE_REPORT Specifies whether to report T3324/T3412 changes. Value: 1- Reported (1) by default. Currently, only the value 1 is supported. (The value of EAT version is FALSE or TRUE). IPV6_GET_PREFIX_TIME wait for ipv6 prefix RA message time, scope (0-65535), 65535 RA said had been waiting for RS packets are not sent. 0 indicates the minimum RA time, which is 200ms by default. If no RA packet is received within this time, RS requests will be sent

Example

```
AT+NCONFIG=AUTOCONNECT,1
OK
AT+NV=SAVE
AT+NCONFIG=?
+NCONFIG:(AUTOCONNECT,(0,1))
+NCONFIG:(COMBINE_ATTACH,(0))
+NCONFIG:(CELL_RESELECTION,(0,1))
+NCONFIG:(ENABLE_BIP,(0))
+NCONFIG:(MULTITONE,(0,1))
+NCONFIG:(BARRING_RELEASE_DELAY,(0-1800))
+NCONFIG:(RELEASE_VERSION,(13,14))
+NCONFIG:(SYNC_TIME_PERIOD,(0-65535))
+NCONFIG:(PCO_IE_TYPE,(0,1))
+NCONFIG:(NON_IP_NO_SMS_ENABLE,(0,1))
+NCONFIG:(T3324_T3412_EXT_CHANGE_REPORT,(0,1))
+NCONFIG:(IPV6_GET_PREFIX_TIME,(0-65535))

OK
AT+NCONFIG?
+NCONFIG:AUTOCONNECT,1
+NCONFIG:COMBINE_ATTACH,0
+NCONFIG:CELL_RESELECTION,1
+NCONFIG:ENABLE_BIP,0
+NCONFIG:MULTITONE,1
+NCONFIG:BARRING_RELEASE_DELAY,0
+NCONFIG:RELEASE_VERSION,13
+NCONFIG:SYNC_TIME_PERIOD,0
+NCONFIG:PCO_IE_TYPE,1
+NCONFIG:NON_IP_NO_SMS_ENABLE,0
+NCONFIG:T3324_T3412_EXT_CHANGE_REPORT,0
+NCONFIG:IPV6_GET_PREFIX_TIME,0

OK
```

16.2.5 AT+NUESTATS Querying UE Statistics

Command structure

Command	Response
AT+NUESTATS=RADIO	**+Signal power:<signal power in centibels>** **+Total power:<total power in centibels>** **+TX power:<current Tx power level in centibels>**

	+TX time:<total Tx time since last reboot in millisecond> +RX time:<total Rx time since last reboot in millisecond> +Cell ID:<last cell ID> +ECL:<last ECL value> +SNR:<last snr value> +EARFCN:<last earfcn value> +PCI:<last pci value> +RSRQ:<rsrq in centibels> +PLMN:<current PLMN> +TAC:<current tac> +SBAND:<band> +OPERATION MODE:<operation mode> OK
	+CME ERROR:<err>
AT+NUESTATS=CELL	+NUESTATS:CELL,<earfcn>,<physical cellid>,<primarycell>,<rsrp>,<rsrq>,<rssi>,<snr> [+NUESTATS:CELL,<earfcn>,<physical cellid>,<primarycell>,<rsrp>,<rsrq>,<rssi>,<snr> [...]] OK
	+CME ERROR:<err>
AT+NUESTATS=BLER	+NUESTATS:BLER,RLC UL BLER,<rlc_ul_bler> +NUESTATS:BLER,RLC DL BLER,<rlc_dl_bler> +NUESTATS:BLER,MAC UL BLER,<mac_ul_bler> +NUESTATS:BLER,MAC DL BLER,<mac_dl_bler> +NUESTATS:BLER,Total TX bytes,<total bytes transmitted> +NUESTATS:BLER,Total RX bytes,<total bytes received> +NUESTATS:BLER,Total TX blocks,<transport blocks sent> +NUESTATS:BLER,Total RX blocks,<transport blocks received> +NUESTATS:BLER,Total RTX blocks,<transport blocks retransmitted> +NUESTATS:BLER,Total ACK/NACK RX,<total ack/nack messages received>
	+CME ERROR:<err>
AT+NUESTATS=THP	+NUESTATS:THP,<throughput_type>,<throughput> [+NUESTATS:THP,<throughput_type>,<throughput> [...]] OK
	+CME ERROR:<err>
AT+NUESTATS=SBAND	+NUESTATS:SBAND,<Band> OK

	+CME ERROR:<err>
AT+NUESTATS=?	**+NUESTATS:[<type>,…]** **OK**

Command description

Write command: this command gets the latest operation statistics. It can carry an optional parameter that allows different sets of statistics to be displayed. <type>=RADIO provides a default set of values, and <type>=ALL will print ALL data.

Read command: Returns the BAND information supported by the current setting.

Test command: returns all bands that the UE actually supports.

Defined Values

<type>	The data type to display as an unquoted string. The supported <type> values are: RADIO Radio-specific information. Invalid value if the cell does not reside. CELL Information about the first 8 cells. BLER Ratio information of Block error. THP throughput. APPSMEM This parameter is defined in a platform command ARMMEM same meaning as APPSMEM. ARMSTACK system stack information. ALLMEM FLASH and RAM details. SBAND service community BAND information. ALL indicates ALL information. The output value of <type> is the data type.
If <type>=RADIO, return the default value:	
<Signal power in centibels>	Signal power in centibels, RSRP, unit: 0.1dBm, valid value range: -1650 to -400, invalid value: 0x8000.
<Total power in centibels>	Total power in centibels, RSSI, unit: 0.1dBm, valid value range: -1330 to -250, invalid value: 0x8000.
<Current TX power level in centibels>	current TX power level in centibels, last transmitted power, in 0.1dBm, valid value range -400 to 230, invalid value 0x8000.
<Total TX time since last reboot in millisecond>	Total TX time since last reboot in millisecond, the value is 0.
<total RX time since last reboot in millisecond>	Total RX time since last reboot in millisecond, the value is 0.
<Last SIB1 cell ID>	Last SIB1 cell ID, 28bit CELLID, valid value range: 0 to 0xFFFFFFF, invalid value 0xFFFFFFFF.
<last ECL value>	last ECL value, coverage level, value range [0,2], invalid value 0xFF.
<last SNR value>	last SNR value, expressed in 0.1dbm, valid value range: -180 to 300, invalid value 0x8000.

<last earfCN value>	last earfCN value, corresponding to the lower line frequency of the current service cell. Valid value ranges from 0 to 68535, invalid value 0xFFFFFFFF.
<LAST PCI Value>	last PCI value, corresponding to the physical ID of the current cell, valid value range 0 to 503, invalid value 0xFFFF.
<RSRQ in centibels>	Reference signal received quality in centibels, corresponding to RSRQ, unit: 0.1dBm, valid value range: -400 to -108, invalid value 0x8000.
<current PLMN>	indicates the PLMN of the current cell. The value is a string of characters in the form of 46000. If no cell is found, empty "" is displayed.
<current TAC>	indicates the two-byte tracing area code in hexadecimal format (for example, 00C3 is equal to 195 in decimal notation). The invalid value is 0xFFFF.
<band>	indicates the band number corresponding to the service cell frequency point
<operation mode>	indicates the service cell deployment mode. The values are as follows 0 The same PCI is deployed in LTE bands 1 LTE in-band deployment of different PCI 2 LTE protection belt deployment 3 Independent Deployment 2 55 invalid values
If <type>=CELL, return information for each of the first five cells, or only OK if no CELL currently resides. Format: <earfcn>,<physical cell id>,<primary cell>,<rsrp>,<rsrq>,<rssi>	
<earfcn>	indicates the absolute NUMBER of an RF channel. Valid value ranges from 0 to 68535, invalid value 0xFFFFFFFF.
<Physical cell ID>	Indicates that the physical ID of the cell ranges from 0 to 503 and is invalid.
<primary cell>	indicates whether the cell or neighborhood is being served. The value can be 0, 1, 0- neighborhood, and 1- service cell.
<RSRP>	reference signal receiving power, unit: 0.1dBm, valid range: -1650 to -400, invalid value: 0x8000.
<RSRQ>	reference signal receiving quality, corresponding to RSRQ, unit: 0.1dbm, valid value range: -400~-108, invalid value 0x8000.
<RSSI>	indicates the received signal strength, that is, RSSI, unit: 0.1dbm, valid value range: -1330 to -250, invalid value: 0x8000.
<SNR>	signal-to-noise ratio (SNR), unit: 0.1dBm, valid value range: -180 to 300, invalid value 0x8000.
If <type>=BLER, return:	
<RLC_ul_bler>	RLC layer block error rate (uplink), integer %.
<RLC_dl_bler>	RLC layer block error rate (downstream), integer %.
<MAC_ul_bler>	physical layer block error rate (uplink), integer %.
<MAC_dl_bler>	physical layer block error rate (downstream), integer %.
<Total bytes transmitted>	Indicates the total number of bytes transmitted
<total bytes received>	indicates the total number of bytes received

<transport blocks sent>	transport blocks sent
<transport blocks received>	indicates the received transport blocks
<transport blocks retransmitted>	indicates the transfer block retransmitted
<Total ACK/NACK messages received>	indicates the total number of ACK/NACK messages received
If <type>=THP, return:	
<rlc_ul>	RLC layer throughput (uplink), integer BPS
<rlc_dl>	RLC layer throughput (downlink), integer BPS
<mac_ul>	physical layer throughput (uplink), integer BPS
<mac_dl>	physical layer throughput (downlink), integer BPS
If <type>=SBAND, return:	
<Band>	indicates the Band number corresponding to the service cell frequency point

Example

```
AT+NUESTATS
+Signal power:-745
+Total power:-625
+TX power:190
+TX time:23016633
+RX time:192846
+Cell ID:186035667
+ECL:0
+SNR:160
+EARFCN:2508
+PCI:260
+RSRQ:-120

OK
AT+NUESTATS=CELL
+NUESTATS:CELL,2508,260,1,-740,-115,-625,205

OK
AT+NUESTATS=THP
+NUESTATS:THP,RLC UL,180
+NUESTATS:THP,RLC DL,272
+NUESTATS:THP,MAC UL,399
+NUESTATS:THP,MAC DL,430

OK
AT+NUESTATS=BLER
+NUESTATS:BLER,RLC UL BLER,0
+NUESTATS:BLER,RLC DL BLER,0
```

```
+NUESTATS:BLER,MAC UL BLER,0
+NUESTATS:BLER,MAC DL BLER,8
+NUESTATS:BLER,Total TX bytes,399
+NUESTATS:BLER,Total RX bytes,430
+NUESTATS:BLER,Total TX blocks,0
+NUESTATS:BLER,Total RX blocks,11
+NUESTATS:BLER,Total RTX blocks,0
+NUESTATS:BLER,Total ACK/NACK RX,12

OK
```

16.2.6 AT+NCCID ICCID named

Command structure

Command	Response
AT+NCCID	+NCCID:<ICCID> OK
	+CME ERROR:<err> or ERROR
AT+NCCID?	+NCCID:<ICCID> OK
AT+NCCID=?	OK

Command description

Report card information actively, from card read iccid (Integrated CircuitCardIdentification) SIM card ID number.

Defined Values

<ICCID>	Indicates the USIM card ID number.

Example

```
AT+NCCID
+NCCID:89861118216007272115

OK
AT+NCCID?
+NCCID:89861118216007272115
```

```
OK
AT+NCCID=?
OK
```

16.2.7 AT+NSET Protocol Stack Extension Settings

Command structure

Command	Response
AT+NSET=”<function>”,<n1>[,<n2>]	OK +CME ERROR:<err> or ERROR
AT+NSET=”<function>”	[+NSET:”<function>”,<n1>]<CR><LF> OK

Command description

Write command: Extended setup command. The function of the command varies according to the <function> type. The Settings take effect immediately. To SAVE the Settings after power-off, enter AT+NV=SAVE.

Read command: Query values except SETIMEI, SETSVN, and SETSN of the <function> type. (For SETIMEI, SETSVN, and SETSN Settings, see +CGSN)

Defined Values

<function>: Indicates the function of the command. The following table describes the values and meanings.

<function>	Description	Declare
SETIMEI	Set the IMEI number. Used to set IMEI, instruction format: +NSET=”SETIMEI”,<n1>,<n2>.	<n1>: in decimal format, the highest 7 bits of the IMEI (BCD code). <n2>: indicates the lower 8 bits (BCD code) of the IMEI. This parameter is valid only when the IMEI is set.
OOS_TIMER	Set the interval for OOS search. Instruction format: +NSET=”OOS_TIMER”,<n1>.	<n1>: in decimal format, OOS search time interval, in seconds. Value range: [0,65535]. 0 indicates the default value 60s.
UPREQ	The terminal expects UP transmission Settings. Set whether the terminal expects the data to go UP optimized transmission mode. Instruction format: +NSET=”UPREQ”,<n1>.	<n1>: indicates the decimal value 0 or 1. 0-- Not expected to go UP; Factory default value. 1-- Expect to go UP.

SETSVN	Set the SVN number corresponding to the last two BCD codes in IMEISV (for details, see the +CGSN command section). Instruction format: +NSET=”SETSVN”,<n1>.	<n1>:It is a 2-bit BCD code of the SVN in decimal notation.
SETSN	Set the product sequence (SN) number. Instruction format: +NSET=”SETSN”,<n1>.	<n1>:The value is a string of digits, uppercase and lowercase letters. The value can contain a maximum of 64 characters (with or without double quotation marks). Note: This directive is only supported by version R13.
NOSIMST	Set the delay time for entering deep sleep without card. After the machine is powered on without card, the machine is allowed to enter deep sleep after the delay time. Default to infinite length (i.e., no deep sleep mode). Instruction format: +NSET=”NOSIMST”,<n1>.	<n1>:The value ranges from 0 to 127, where 127 indicates the infinite length. The value ranges from 0 to 126, in seconds.
PSRPT	Set whether to enable AT to output debugging information about PS. Instruction format: +NSET=”PSRPT”,<n1>.	<n1>:The value 0/1 indicates that 0 is disabled. 1 indicates open. The default is 0. After this function is opened, the system automatically reports the printed information in the following format: +PS:<EventType>[,<Para1>[,<Para2>.....]].
INITUSIM	Sets the control for card initialization on sleep wake up. Instruction format: +NSET=”INITUSIM”,<n1>.	<n1>:The value is 0 or 1 in decimal notation. 0 -- Sleep wake does not do card initialization; The default value; The card cannot be replaced, inserted or removed during deep sleep. 1 -- Sleep wake up to do card initialization.
AT_HEADER_SPACE	Set whether AT output AT header ":" contains a space. Like :+XXX:YY/+XXXX: YY. 指令格式: +NSET=”AT_HEADER_SPACE”,<n1>.	<n1>:The value is 0 or 1 in decimal notation. 0 -- AT header ":" without space, format: +XXXX:YY. Default. 1 -- AT header ":" without a space, format:

		+XXX: YY.
NOTSTARTPS	This command is used to set whether PS is in shutdown state during power-off. Instruction format: +NSET=”NOTSTARTPS”,<n>.	<n>:The value is 0,1 in decimal notation. The default value is 0. 0: Power on and enter the startup state. (Common mode) 1 -- Power on, save shutdown state after startup, input AT+CFUN=1 to display. (Flight mode)

Example

```
AT+NSET=”SETIMEI”,0123456,98765430 // Set the 15-digit IMEI of the ue: 012345698765430
OK
AT+NV=SAVE
AT+CGSN=1
+CGSN: 012345698765430

OK
AT+NSET=”OOS_TIMER”,125 // Set the OOS search interval of the terminal as 125s
OK
AT+NV=SAVE
AT+NSET=”OOS_TIMER”
+NSET:”OOS_TIMER”,125

OK
AT+NSET=”UPREQ”,1 // The terminal is expected to work in UP mode when sending data

OK
AT+NV=SAVE
AT+NSET=”UPREQ”
+NSET:”UPREQ”,1

OK
AT+NSET=”SETSVN”,01 // Set the 2-bit SVN number of the terminal: 01
OK
AT+NV=SAVE
AT+CGSN=3
+CGSN:01

OK
AT+CGSN=2
+CGSN:4552010335439901

OK
AT+NSET=”SETSN”,”XINYI232354562315490” // Set the 20-bit product sequence (SN) number of the
terminal
```

```
OK
AT+NV=SAVE
AT+CGSN=0
XINYI232354562315490

OK
AT+NSET=”NOSIMST”,20 // Set the sleep delay without card to 20s
OK
AT+NV=SAVE
AT+NSET=”PSRPT”,1 // Set the terminal to open AT output PS printing
OK
AT+NV=SAVE
AT+NSET=”INITUSIM”,1 // The terminal expects to display the card initialization action upon sleep
awakening
OK
AT+NV=SAVE
AT+NSET=”INITUSIM”
+NSET=”INITUSIM”,1

OK
AT+NSET=”AT_HEADER_SPACE”,1 // Set AT header ":" followed by space and query
OK
AT+NV=SAVE
AT+NSET=”AT_HEADER_SPACE”
+NSET=”AT_HEADER_SPACE”,1

OK
AT+NSET=”NOTSTARTPS”,1 // Set whether to keep the power off state during power-on
OK
AT+NV=SAVE
AT+NSET="NOTSTARTPS"
+NSET:"NOTSTARTPS",1

OK
```

16.2.8 AT+NPOWERCLASS Setting the BNAD Power Level

Command structure

Command	Response
AT+NPOWERCLASS=<band>,<powerclass>	**OK** **+CME ERROR:<err> or ERROR**
AT+NPOWERCLASS?	**[+NPOWERCLASS:<band>,<powerclass><CR><LF>** **[+NPOWERCLASS:<band>,<powerclass>][…]]]**

	OK
AT+NPOWERCLASS=?	**+NPOWERCLASS:((list of supported <band>s),(list of supported <powerclass>s)** **OK**

Command description

Set command: Sets the power level of the specified BAND.

Note: <powerClass>=6 does not support BAND Settings. If <poewrClass>=6, all BAND power levels are set to 6. When changing from <poewrClass>=6 to other values, all other BAN power levels are set to 3.

Read command: returns the power levels of all bands.

Test command: returns the range of supported parameters.

Defined Values

<band>	indicates an integer that specifies the band. NB in Rel14 supports 1, 2, 3, 5, 8, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 28, 31, 66, and 70 bands. The actual Settings must be based on the supported capabilities of the terminal. If the BAND Settings exceed the capabilities, an ERROR message is returned.
<powerClass>	integer, power level. 3 23dBm 5 20dBm 6 14dBm

Example

```
AT+NPOWERCLASS=3,5
OK
AT+NPOWERCLASS?
+NPOWERCLASS:5,3
+NPOWERCLASS:8,3
+NPOWERCLASS:3,5
+NPOWERCLASS:20,3

OK
AT+NPOWERCLASS=?
+NPOWERCLASS:(5,8,3,20),(3,5,6)

OK
```

16.2.9 AT+NTSETID ID set

Command structure

Command	Response
AT+NTSETID=<snt>,<data>	OK
	+CME ERROR:<err> or ERROR
AT+NTSETID=?	OK

Command description

Write command: Used to set the IMEI. The Settings take effect immediately. To SAVE the Settings, enter AT+NV=SAVE.

Defined Values

<snt>	specifies the ID type. Currently, only 1 is supported, indicating that the IMEI is set.
<data>	the value is in decimal notation. It is an IMEI number and contains 15 characters. The last character is the parity code.

Example

```
AT+NTSETID=1,012345678901237
OK
AT+CGSN=1
+CGSN:012345678901237

OK
```

16.2.10 AT+NPOPB Presetting the CARRIER PLMN and Valid Band

Command structure

Command	Response
AT+NPOPB=<n>[,<PLMN>[,<BANDN>,<STARTFREQ>,<OFFSET>]]	OK
	+CME ERROR:<err> or ERROR
AT+NPOPB?	**[+NPOPB:<n>,**(list of supported<**PLMN**>s),(list of supported(**<BANDN>,<STARTFREQ>,<OFFSET>**)s) [+NPOPB:<**n**>,(list of supported<**PLMN**>s),(list of supported(**<BANDN>,<STARTFREQ>,<OFFSET>**)s) **[......]]]**

	OK

Command description

Write command: NPOPB (Preset Operator PLMN or/and Band) Is used to incrementally set the PLMN and/or authorized spectrum resource of the carrier as the Preset frequency Band and Preset PLMN. The preset PLMN is used to identify which carrier the inserted USIM card belongs to. The preset frequency band is used to speed up the dwell of the search network. After the Settings are complete, enter AT+NV=SAVE to take effect. The set value will only be incremented from the set value. A carrier supports a maximum of three PLMNS. One carrier supports a maximum of 10 PLMNS, and one carrier supports a maximum of five PLMNS. (If the two PLMNS are configured separately, they are merged into one band automatically.)

Read command: Displays all configured carriers and the preset PLMN list and preset frequency band list.

Defined Values

<n>	indicates an integer ranging from 0 to 2. Currently, only Mobile, China Telecom, and China Unicom are supported. 0 Mobile, 1 Unicom, 2 Telecom. A maximum of three carriers can be configured.
<PLMN>	integer. If a carrier is adding a PLMN network, you can use this parameter to add Settings. A maximum of 10 DIFFERENT PLMNS can be configured for one carrier.
<BANDN>	integer, set the preset BAND number. The value refers to the BAND value supported by the NB-iot.
<STARTFREQ>	integer, starting EARFCN value corresponding to preset frequency band;
<OFFSET>	integer, indicating the OFFSET of the corresponding frequency point of the preset frequency band. The next frequency point of the nb-iot corresponds to the bandwidth of 100KHz.

Example

Configure the mobile network. Add the preset bandwidth of 5M on BAND5, whose starting frequency number is 2400

```
AT+NPOPB=0,,5,2400,50
OK
AT+NV=SAVE
AT+NPOPB?
+NPOPB:0,(46000,46002,46007,46008,46004,46013),((3, 1200, 249),(8, 3540, 199))
+NPOPB:1,(46001,46006,46009),((1, 200, 249),(3, 1450, 299),(8, 3690, 109))
+NPOPB:2,(46003,46005,46011),((1, 0, 199),(3, 1750, 149),(5, 2410, 99))
```

```
OK
```

16.2.11 AT+CUPREFER Switch the primary number to the preferred network and trigger the search

Command structure

Command	Response
AT+CUPREFER	OK
	+CME ERROR:<err> or ERROR

Command description

Write command: If the primary network does not meet the resident conditions, switch the primary number to the primary network to initiate a search. (Preferred network is Unicom by default)

Note: Custom function, only for MeSIM and eSIM, one cardo IMSI cut mark operation. If the current IMSI belongs to a non-preferred network, the system returns OK and triggers a soft restart to switch the primary number to the preferred network and search the network again. If the current IMSI belongs to the preferred network, this command only returns OK.

Example

```
AT+CUPREFER
OK

+POWERON:2

^SIMST:1

AT+CUPREFER
OK
```

16.2.12 AT+CUPREFERTH Setting the preferred network resident threshold

Command structure

Command	Response
AT+CUPREFERTH=<n>	OK
	+CME ERROR:<err> or ERROR
AT+CUPREFERTH?	+CUPREFERTH:<n>

	OK
AT+CUPREFERTH=?	**+CUPREFERTH:**(list of supported<**n**>s) **OK**

Command description

Write command: used to set the minimum resident threshold of the preferred network. After the Settings are complete, enter AT+NV=SAVE to take effect. (Preferred network is Unicom by default)

Note: Custom function, only for MeSIM and eSIM, one cardo IMSI cut mark operation. When the signals of the search cell do not meet the threshold threshold, the network loss will be triggered, the other IMSI in the card will be switched to the main number, and the search will be performed. After the search is successful, the work will start. If there is still no suitable cell, OOS will be reported, but it will not actively switch back to the preferred network. You can cut back to the preferred network by AT+CUPREFER.

Read command: Returns the current set threshold.

Test command: Query the supported threshold range.

Defined Values

<n>	integer; Value range: 0,97. (Initial value is 0) value Measured quantity value(dBm) 0 RSRP>=-141 1 RSRP>=-140 2 RSRP>=-139 … … 96 RSRP>=-45 97 RSRP>=-44

Example

```
AT+CUPREFERTH=?
+CUPREFERTH:(0-97)

OK
AT+CUPREFERTH=31
OK
AT+CUPREFERTH?
+CUPREFERTH:31

OK
```

16.2.13 AT+CMEE Setting the ERROR Reporting Mode

Command structure

Command	Response
AT+CMEE=<error_mode>	OK
AT+CMEE=?	+CMEE:(0-2) OK

Command description

The 3GPP command is used to set the ERROR reporting mode. After processing by M3 core, it will be transmitted to DSP core for processing.

Defined Values

<error_mode>	0 When the AT command reports an error, only \r\nERROR\r\n is responded with no error code. 1 response \r\n +CME ERROR:XXX\r\n(reply \r\n +CIS ERROR:XXX\r\n if related to Onenet business), with ERROR code. 2 AT command ERROR, reply \r\n +CME ERROR:XXX\r\n(related to Onenet business reply \r\n +CIS ERROR:XXX\r\n), with the description of the ERROR cause.

Example

```
AT+CMEE=0
OK
AT+CMG
ERROR
AT+CMEE=1
OK
AT+CMG
+CME ERROR:4
AT+MIPLNOTIFY=0,514456,3303,0,5601,4,4,88,0,0
+CIS ERROR:601
AT+CMEE=2
OK
AT+MIPLNOTIFY=0,514456,3303,0,5601,4,4,88,0,0

+CIS ERROR:CIS_PARAM_ERROR
AT+CMG
+CME ERROR:"operation not supported"
```

17 Platform extensions Commands

17.1 Overview of Platform extensions Commands

Command	Description
AT+NV	NV Dynamic Configuration
AT+ASSERT	Active assertion
AT+WDT	Turning on or off the watchdog
AT+DIV	Main frequency Adjustment
AT+SIMVCC	Setting the SIM Card voltage
AT+XYRAI	Releasing the User Quick Link
AT+STANDBY	Dynamic Switch
+LOWVBAT	Low Voltage Alarms
AT+VBAT	Voltage Query
AT+ZADC	Voltage Conversion
+UICCTYPE	The SIM Card Type Is Proactively Reported
AT+NUESTATS	Dynamically Viewing Memory Information
AT+TRANSPARENTDEMO	Transparent Transmission Mode
ATD*98/ATD*99	Transparent Transmission of Data(Only for internal debugging)

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17.2 Detailed Description of Platform extensions Commands

17.2.1 AT+NV NV Dynamic Configuration

Command structure

Command	Response
AT+NV=<action>[,<param>[,<val>]]	**OK** **+CME ERROR:<err>**

Command description

Used to set/query all kinds of factory NV parameters, only for debugging, should not use AT+NV as normal AT code development. To facilitate the POWERTEST, reduce the input AT command. "AT+NV=SET,POWERTEST,1" is used for the POWERTEST of the instrument, and "AT+NV=SET,POWERTEST,2" is used for the POWERTEST of the SDK version. Because log output and URC output are closed during power consumption test, only some information can be queried through AT request.

Defined Values

<action>	Indicates the operation on the NV parameter. The values are as follows: SET Set factory NV parameters GET Read a factory NV parameter SAVE Save factory NV to Flash ? Query the dynamically configurable factory NV parameters supported
<param>	Indicates NV parameters. In order to facilitate user memory, some non-factory NV parameter query and setting are added. MEM Query the minimum remaining heap memory space during the running of ARM and DSP cores to help determine whether to open the heap space to prevent memory failure FACTORY Example Query key factory NV values configured by users VER Query all internal and external version numbers to quickly find the corresponding source files RATETEST When downlink packets are irrigated, the transmission to the M3 core is not transparent to solve the problem of excessive upper ICMP packet interference DEMOTEST This parameter is used to enable DEMO tasks in bitmap mode PRODUCTVER Set the product version information MODULVER Set module Version information. Note: The format should refer to XXX-XXXXX HARDVER Set the Hardware Version information VERSIONEXT Set the External version information DM Set Device Mangement Self Register DMRETRYNUM Set DM retry number
<val>	this parameter is optional. It has no fixed value and can be set to empty

Example

```
AT+NV=SET,IPALIVE,1
```

```
OK
AT+NV=SAVE,1,1,1   // Save the nV corresponding to dSP_VARNV_save, dSP_invarNV_save
and user_nv_save

REBOOTING
AT+NV=GET,MEM
ARM:27888;DSP:71184
OK

AT+NV=GET,ARMSTACK
Swt_TaskStackSize:720
Swt_TaskStackRemaing:164
Swt_TaskPeakUsedSize:164
...

OK
AT+NV=GET,FACTORY
VERTYPE:2,WORKMODE:0,KEEPALIVE:0,STANDBY:1,OFFTIME:1,POWEROFF:1,WFI:1,

OK
```

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17.2.2 AT+ASSERT Active assertion

Command structure

Command	Response
AT+ASSERT	+ASSERT
AT+ASSERTCP	

Command description

This command is used for active assertion by users. ASSERT is used for M3 core assertion. ASSERTCP is used for DSP core assertion. If the debugging version is used, you can run the two commands to export the real-time information about the current operation to help locate faults. In the Release version, you can use this command to verify whether the system can restart after assertions. Check whether the user_flash_hook_by_reset interface is executed as planned.

17.2.3 AT+WDT Turning on or off the watchdog

Command structure

Command	Response

AT+WDT=SET,WDT,<enable>	OK

Command description

Used to turn on/off the chip watchdog function. When the DEBUG mode (AT+NV=SET,CLOSEDEBUG,1) is disabled, the watchdog function is enabled. If a crash occurs, the hardware watchdog will reset the chip. After restart, only factory NVS are saved and all working NVS are erased.

Defined Values

<enable>	The door opening dog function is selected 0 indicates closed. 1 indicates open. The default value

17.2.4 AT+DIV Main frequency Adjustment

Command structure

Command	Response
AT+NV=SET,DIV,<hclk_div>,<pclk_div>	OK

Command description

Used to adjust the clock frequency of the system, the calculation formula is the main frequency=391.68mhz/hCLK_div

Defined Values

<hclk_div>	system clock division coefficient. The default value is 10. You can select 4,5,6,7,8,10,12,16
<pclk_div>	peripheral frequency division coefficient, currently only 1 can be used.

17.2.5 AT+SIMVCC Setting the SIM Card voltage

Command structure

Command	Response
AT+NV=SET,SIMVCC,<val>	OK

Command description

The corresponding NV parameter sim_vcc_ctrl is used to select the SIM card voltage. It supports dynamic and static configurations of 1.8V and 3V voltages.
If the user needs to adapt from 1.8V to 3V every time they start up, sim_vCC_CTRL parameter is set to 10 (1010 high left, low right, binary value, converted to base 10 is 8+2=10).
The platform does not support the hot swap function of THE SIM card. The SIM card adaptive action is performed only in power-off scenarios. All other scenarios use the previously saved value, that is, the bit of <val> [4-6].
Example: the AT+NV=GET SIMVCC; 42(0101010) is adapted to 3V, 74 is 1.8
It should be noted that the chip internal crystal oscillator and SIM card share VDDIO power supply, so enabling self-adaptation requires that the crystal oscillator also support 1.8V. If the crystal oscillator does not support 1.8 VOLTS, it may cause an abnormal crash.

Defined Values

<val>	Integer. Subdivide by digit number. See the following table for detailed values.

bit[0-3]	Bit[4-6]	Bit[7]	Description
0000	--	--	selective type,3V
0001	--	--	selective type,1.8V
1010	--	--	selective type,priority 1.8V
1011	--	--	selective type,priority 3V
--	010	--	The current SIM card voltage is 3V
--	100	--	The current SIM card voltage is 1.8V
--	--	Reserved	Internal debug bit, not open

17.2.6 AT+XYRAI Releasing the User Quick Link

Command structure

Command	Response
AT+XYRAI[=<remote_ip>,<remote_port>]	OK +CME ERROR:<err>

Command description

The extended AT command is used to trigger the link release process. After receiving the command, the platform sends an empty UDP message to the network side with RAI=1 indication to inform the base station to release the link quickly. When using this command, ensure that the current NB protocol stack is in the linked state; otherwise, redundant links are created and released.

Defined Values

<remote_IP>	Specifies the IP address or domain name in dotted decimal notation.

	The value cannot exceed 20 bytes, for example, 10.0.122.10.
<remote_port>	Port number of the server.

17.2.7 AT+STANDBY Dynamic Switch

Command structure

Command	Response
AT+STANDBY=<enable>[,<time>]	**OK** **+CME ERROR:<err>**

Command description

This command is used to enable or disable the STANDBY sleep function and set the sleep threshold. The STANDBY sleep mechanism turns off the BBPLL clock of the serial port. As a result, it takes about 2 milliseconds for the AT to wake up next time. As a result, AT commands may be lost.
To facilitate debugging and development, you can use this command to dynamically enable or disable standby. <time> indicates the standby shutdown time.
You are advised not to use this command for system development. For details about the development process, see the Y70XX Series_Low Power Mode_Application Note.

Defined Values

<enable>	Indicates whether to enable standby 1 indicates that the standby sleep mechanism is enabled. The default value 0 Closed
<time>	Indicates the time when standby is disabled, in seconds. This parameter is valid only when enable is set to 0.
<err>	Indicates the error code. See the err section.

17.2.8 +LOWVBAT Low Voltage Alarms

Command structure

Command	Response
	+LOWVBAT:<vbat val>

Command description

The low-voltage alarm is reported to inform the baseboard MCU of battery replacement or other policies.
The trigger condition of this initiative report is that the min_mVbat value is valid and the factory NV

parameter indicates the lowest working voltage of the product. SIMCOM platform performs low voltage detection during startup initialization and flash erase interface, and provides xy_check_low_vBat interface for users to call at appropriate points during secondary development to check whether low voltage exists.

Defined Values

<vbat val>	Low voltage operating lower limit of the product. The current operating voltage of the chip is 3.1-4.2V

17.2.9 AT+VBAT Voltage Query

Command structure

Command	Response
AT+VBAT?	+VBAT:<val> OK

Command description

This command is used to query the current voltage, in millivolts.

17.2.10 AT+ZADC Voltage Conversion

Command structure

Command	Response
AT+ZADC?	+ZADC:<voltage> OK
AT+ZADC=?	+ZADC:(0,1000) OK

Command description

The extended command is used to obtain information about AD conversion. The conversion result is expressed in mV. ADC voltage conversion range, (0, 1000)mV, accuracy is ±10mV.

Note:

1. Chip pin Sensor3 is externally grounded and Sensor4 is pulled out for customers to access external signal source on the reference design of each module of our company.

2. If the AD calibration information is missing inside the chip, the error value -1 is returned. If this happens, please contact FAE.

17.2.11 +UICCTYPE The SIM Card Type Is Proactively Reported

This command is only used during debugging.

Command structure

Command	Response
	+UICCTYPE:<type>

Command description

After the PDP is successfully activated, the system automatically reports the type of the SIM card. It is only used for debugging.

Defined Values

<type>	Indicates the SIM card type. The value can be: Zero no card 1 TELECOM 2 MOBILE card 3 UNICOM

17.2.12 AT+NUESTATS Dynamically Viewing Memory Information

Command structure

Command	Response
AT+NUESTATS=<param>	**OK**

Command description

This feature is similar to the "AT+MEMSTATS" feature provided by the platform for viewing heap and stack dynamic statistics while the system is running.

Defined Values

<para>	

	APPSMEM/ARMMEM Example Query the M3 heap usage ARMSTACK Example Query the M3 stack usage ALLMEM Example Query the M3 ROM, RAM, and FLASH capacity

Example

```
AT+NUESTATS=APPSMEM

NUESTATS:APPSMEM, Current Allocated:   // The memory size has been allocated
NUESTATS:APPSMEM, Total Free: 68497   // Total remaining memory size
NUESTATS:APPSMEM, Max Free: 68185 // Maximum contiguous memory block size
NUESTATS:APPSMEM, Number Allocs: 194 // Historical total number of memory allocations
NUESTATS:APPSMEM, Number Frees: 159 // Historical total memory release times

OK
```

17.2.13 AT+TRANSPARENTDEMO Transparent Transmission Mode

Command structure

Command	Response
AT+TRANSPARENTDEMO=<data len>	**CONNECT** **OK**
	+CME ERROR:<err>

Command description

This extension command is used to select the transparent transmission mode.

Defined Values

<data len>:Length of transparently transmitted data.

Example

```
AT+TRANSPARENTDEMO=10          // Switch to the transparent mode
OK
CONNECT

AHjha5a55                      // transparent data

Ok
```

17.2.14 ATD*98/ATD*99 Transparent Transmission of Data(Only for internal debugging)

Command structure

Command	Response
ATD*98/ATD*99	CONNECTING OK
	+CME ERROR:<err>
+++	OK
	+CME ERROR:<err>

Command description

The extended command is modified to the PPP dial-up mode. You can use the command to change the status of the serial port to implement transparent data transmission.

Defined Values

ATD*98/ATD*99:In the AT command mode, Send ATD*98/ R/N or ATD*99/r/ N to switch to the transparent data transmission mode.

+++:End The transparent transmission mode. Enter consecutive "+++" to exit the transparent transmission mode and enter the AT command mode.

Caution User data cannot contain "+++"; otherwise, transparent transmission mode ends.

CONNECTING:Report instructions for entering transparent mode

<err>:Error code

Example

```
ATD*98              // Switch to the transparent mode
CONNECTING          // The transparent transmission mode has been switched to enable transparent
data transmission
OK
QWERTYUIOPASDFGHJKLZXCVB
QWERTYUIOPASDreasxVB
QWERTYUIOPASXCVBNM+++        // +++ is used to end the transparent transmission mode

OK
ATD*99                 // Switch to the transparent mode
CONNECTING
OK
QWERTYUIOPASXCVBNM
```

```
QWERTYUIOPASDreasxVB
+++      // After the last group of data is sent, you can send +++ to end transparent transmission

OK
```

Note

- To switch to the pass-through mode, add the suffix \r\n. To end the pass-through mode, you only need to send a three-byte "+++" message. The specific sending mode depends on the AT debugging tool.
- Currently, it is only used for internal debugging and is not provided for users

18 GPS Commands

This chapter applies only to modules that support THE GPS function, such as Y7080E.

18.1 Overview of GPS Commands

Command	Description
AT+CGNSSPWR	GPS Enable
AT+CGNSSTST	Output GPS Data to the Serial port
AT+CGPSCOLD	GPS cold start
AT+CGPSHOT	GPS Hot start
AT+CGPSWARM	GPS warm start
AT+CGNSSINFO	Obtaining GPS Positioning Information
AT+CGNSSMODE	Setting the GPS Mode

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18.2 Detailed Description of GPS Commands

18.2.1 AT+CGNSSPWR GPS Enable

Command structure

Command	Response
AT+CGNSSPWR=<gps_power_status>	**OK** **+CME ERROR:<err>**
AT+CGNSSPWR=?	Response **+CGNSSPWR: (0,1)** **OK**

Command description

Used to control GPS switch

Defined Values

<gps_power_status>	0	Disable GPS
	1	Enable GPS

18.2.2 AT+CGNSSTST Output GPS Data to the Serial port

Command structure

Command	Response
AT+CGNSSTST=<uart_port_status>	OK +CME ERROR:<err>
AT+CGNSSTST=?	Response +CGNSSTST: (0,1) OK

Command description

Used to control whether to output GPS native data to the serial port

Defined Values

<uart_port_status>	0	Does not output GPS native data to the serial port
	1	Output the GPS native data to the serial port

18.2.3 AT+CGPSCOLD GPS cold start

Command structure

Command	Response
AT+CGPSCOLD	OK +CME ERROR:<err>

Command description

GPS Cold start

18.2.4 AT+CGPSHOT GPS Hot start

Command structure

Command	Response
AT+CGPSHOT	OK +CME ERROR:<err>

Command description

GPS Hot start

18.2.5 AT+CGPSWARM GPS warm start

Command structure

Command	Response
AT+CGPSWARM	OK
	+CME ERROR:<err>

Command description

GPS Warm start

18.2.6 AT+CGNSSINFO Obtaining GPS Positioning Information

Command structure

Command	Response
AT+CGNSSINFO	Response **+CGNSSINFO:** **[<mode>],[<GPS-SVs>],[<GLONASS-SVs>],[BEIDOU-SVs],[<lat>],[<N/S>],[<log>],[<E/W>],[<date>],[<UTC-time>],[<alt>],[<speed>],[<course>],[<PDOP>],[HDOP],[VDOP]** **OK**
AT+CGNSSINFO?	**+CGNSSINFO: <time>** **OK**
AT+CGNSSINFO=?	Response **+CGNSSINFO: (0-255)** **OK**
AT+CGNSSINFO=<time>	1)If successfully: **OK** +CGNSSINFO: **[<mode>],[<GPS-SVs>],[<GLONASS-SVs>],[BEIDOU-SVs],[<lat>],[<N/S>],[<log>],[<E/W>],[<date>],[<UTC-time>],[<alt>],[<speed>],[<course>],[<PDOP>],[HDOP],[VDOP]** 2)If <time>=0: **OK**

Command description

This command is used to read GPS location information

Defined Values

<time>	The range is 0-255, unit is second. after set <time> will report the GNSS information every the seconds. The function will take effect immediately.
<mode>	Fix mode 2=2D fix 3=3D fix
<GPS-SVs>	GPS satellite valid numbers
<GLONASS-SVs>	GLONASS satellite valid numbers
<BEIDOU-SVs>	BEIDOU satellite valid numbers
<lat>	Latitude of current position. Output format is ddmm.mmmmmm.
<N/S>	N/S Indicator, N=north or S=south.
<log>	Longitude of current position. Output format is dddmm.mmmmmm.
<E/W>	E/W Indicator, E=east or W=west.
<date>	Date. Output format is ddmmyy.
<UTC-time>	UTC Time. Output format is hhmmss.s.
<alt>	MSL Altitude. Unit is meters.
<speed>	Speed Over Ground. Unit is knots.
<course>	Course. Degrees.
<PDOP>	Position Dilution Of Precision.
<HDOP>	Horizontal Dilution Of Precision.
<VDOP>	Vertical Dilution Of Precision.

18.2.7 AT+CGNSSMODE Setting the GPS Mode

Command structure

AT+CGNSSMODE=?	Response **+CGNSSMODE: (1-3)** **OK**
AT+CGNSSMODE?	Response **+CGNSSMODE: <mode>** **OK**
AT+CGNSSMODE=<mode>	Response 1)If successfully: **OK**
AT+CGNSSMODE	Response Set default value 3 **OK**

Command description

This command is used to set the GPS mode

Domestic support mode:

1 GPS L1 + BDS B1 + QZSS
2 BDS B1
3 GPS L1+QZSS

Foreign support mode:

1 GPS L1+SBAS+QZSS
2 BDS B1
3 GPS+GLONASS+GALILEO+SBAS+QZSS
4 GPS+BDS+GALILEO+SBAS+QZSS

Example

```
AT+CGNSSMODE=?
+CGNSSMODE: (1-3)

OK
AT+CGNSSMODE?
+CGNSSMODE: 3

OK
AT+CGNSSMODE=1
OK
```

19 HTTP Commands

19.1 Overview of HTTP Commands

Command	Description
AT+HTTPCREATE	Create Http instance
AT+HTTPCFG	Config HTTPS instance
AT+HTTPHEADER	Config HTTP(S) Header
AT+HTTPCONTENT	Config HTTP(S) Content
AT+HTTPSEND	HTTP Send Request
AT+HTTPCLOSE	Close HTTP instance

19.2 Detailed Description of HTTP Commands

19.2.1 AT+HTTPCREATE Create HTTP instance

Command structure

Command	Response
AT+HTTPCREATE=<url>	**+HTTPCREATE:<httpclient_id>** **OK**
	+CME ERROR:<err>

Command description

Create a communication instance that triggers the HTTP terminal code inside the platform to initialize the access IP address.

After the communication instance is created successfully, the system returns the instance ID in +HTTPCREATE: mode. Currently, the module only supports the creation of a communication instance.

Defined Values

<url>	String. Http server address
<httpclient_id>	Integer.

	HTTP instance id.

Example

```
AT+HTTPCREATE=http://www.xytest.site:3000
+HTTPCREATE:0

OK
```

19.2.2 AT+HTTPCFG Config HTTPS instance

Command structure

Command	Response
AT+HTTPCFG=<id>,<type>[,<value>[,<encode>]]	+HTTPCREATE:<httpclient_id> OK
	+CME ERROR:<err>

Command description

HTTPS one-way authentication: Only the server CERT certificate needs to be configured for the terminal authentication server.

HTTPS two-way authentication: You need to configure the server CERT certificate and client CERT certificate and client PK. Due to the limitation of computing capacity and storage space on terminals, two-way authentication takes a long time. Therefore, only one-way authentication is recommended

Defined Values

<id>	Integer. The instance id create by HTTPCREATE.
<type>	Integer. 1 indicates the server cert certificate 2 indicates the client cert certificate 3 indicates client PK 4 Configure the print mode: 1 indicates that the received string is printed in hexadecimal, 0 indicates the string mode (default is 0).
<encode>	Integer. Whether to use hexadecimal when entering certificate data: You can send characters in hexadecimal or a string when entering certificate data. The default value 1 is recommended, indicating that the serial port is input with hexadecimal numbers.

NOTE

1. For single authentication, you only need to send an AT command to configure the service certificate

2. You can use the following methods to generate client PK and certificate:
Openssl genrsa 2048 >./private.pem # Generates a private key file
Openssl req-new-key./private.pem -out csr.pem # Generates a CSR certificate signature using the private key file
Openssl x509 -req-days 365 -in csr.pem -signkey./private.pem -out./file. CRT # Generates a certificate file by signing the private key file and the CSR certificate

19.2.3 AT+ HTTPHEADER Config HTTP(S) Header

Command structure

Command	Response
AT+HTTPHEADER=<id>[,<header>[,<encode_method>]]	**OK** **Or** **+HTTPHEADER:<id>,<length><CR><LF>** **<header>** **OK**
	+CME ERROR:<err>

Command description

This command sets and queries HTTP header information.

Defined Values

<id>	Integer. The instance id create by HTTPCREATE.
<header>	String. This parameter specifies the header information to be configured.
<encode_method>	Integer. This parameter is optional. Specify that the input parameter <header> must be an escape character or hexadecimal ASCII code. 0 Escape string, default value. 1 A hexadecimal character string.

NOTE

(1) The HTTP protocol requires header fields to be separated by \r\n.
(2) When the input header field is empty, the previously entered headers will be cleared
(3) When the entered header field is not empty, the newly entered header will be added after the last entered header.

Example

```
//Add the header information, hexadecimal
AT+HTTPHEADER=0,6170692D6B65793A4A4459694B794B6669344934734F4657654A0d0a,1

OK
```

```
//Append the header information, Escape string
AT+HTTPHEADER=0,api-key:JDYiKyKfi4I4sOFWeJ\r\n,0

OK

//Query the header information
AT+HTTPHEADER=0
+HTTPHEADER:0,76
api-key:JDYiKyKfi4I4sOFWeJ
api-key:JDYiKyKfi4I4sOFWeJ

OK

//Delete the header information
AT+HTTPHEADER=0, ,0
OK
```

19.2.4 AT+ HTTPCONTENT Config HTTP(S) Content

Command structure

Command	Response
AT+HTTPCONTENT=<id>[,<content>[,<encode_method>]]	OK Or + HTTPCONTENT:<id>,<length><CR><LF> <header> OK
	+CME ERROR:<err>

Command description

This command sets and queries HTTP information.

Defined Values

<id>	Integer. The instance id create by HTTPCREATE.
<conetnt>	String. This parameter specifies the content information to be configured.
<encode_method>	Integer. This parameter is optional. Specify that the input parameter <header> must be an escape character or hexadecimal ASCII code. 0 Escape string, default value. 1 A hexadecimal character string.

NOTE

(1) The HTTP protocol requires the content fields to be separated by \r\n.

(2) When the input content field is empty, the previously entered content will be cleared

(3) When the input content field is not empty, the newly entered content will be added after the last input content. entered header.

Example

```
//Add the content information, hexadecimal
AT+HTTPCONTENT=0,7b2252504d223a32327d0d0a,1

OK

//Append the content information, Escape string
AT+HTTPCONTENT=0,{"RPM":22}\r\n,0

OK


//Query the content information
AT+HTTPCONTENT=0
+HTTPCONTENT:0,40
{"RPM":22}
{"RPM":22}

OK

//Delete the content information
AT+HTTPCONTENT=0, ,0
OK
```

19.2.5 AT+ HTTPSEND HTTP Send Request

Command structure

Command	Response
AT+HTTPSEND=<id>,<method>,<path>	OK +CME ERROR:<err>

Command description

This command sends an HTTP request.

Defined Values

<id>	Integer. The instance id create by HTTPCREATE.
<method>	Integer. Request type. 0 GET 1 POST 2 PUT 3 DELETE 4 HEAD

<path>	String. The URL path

NOTE

In AT command mode, the request and response information is actively reported and printed on the serial port.

Example

```
AT+HTTPSEND=0,0,"/"

OK

+REQUESTSUCCESS
+HTTPNMIH:0,0,206
HTTP/1.1 200 OK
X-Powered-By: Express
Content-Type: text/html; charset=utf-8
Content-Length: 164
ETag: W/"a4-OvJrs8UraBmCoilWp5p41bZoKjI"
Date: Sat, 14 Nov 2020 07:21:47 GMT
Connection: keep-alive

+HTTPNMIC:0,0,164,164
<!DOCTYPE html><html><head><title>Xinyi</title><link rel="stylesheet"
href="/stylesheets/style.css"></head><body><h1>Xinyi</h1><p>Welcome to
Xinyi</p></body></html>
+HTTPDICONN:0,-2
```

19.2.6 AT+ HTTPCLOSE Close HTTP instance

Command structure

Command	Response
AT+HTTPCLOSE=<id>	OK +CME ERROR:<err>

Command description

This command close HTTP instance.

Defined Values

<id>	Integer. The instance id create by HTTPCREATE.

NOTE

This command disables the HTTP instance. Currently, only one HTTP instance is supported. Therefore, you must delete the previous instance when creating an HTTP instance next time.

Example

```
AT+CLOSE=0

OK
```

20 Error code

Error codes provided by the platform include: error codes of the 3GPP standard AT command, ranging from 0 to 500. Application platform-level extended error codes, ranging from 8000-9000; Model extended error code customized by the customer. The value range is greater than 9000.

20.1 Result Error Code Format

Now the judgment of the error result code of the AT command is not sound, so the format of the error result code needs to be specified. The following is the format specification of the SIMCOM error result code:

\r\n +CME ERROR:XXX\r\n (XXXCan be arbitrary)
\r\n +CMS ERROR:XXX\r\n (XXXCan be arbitrary)
\r\n ERROR\r\n
\r\n +CIS ERROR:XXX\r\n (XXXCan be arbitrary,OneNETCloud use, other unavailable)

Note: These error codes are not allowed to be preceded by characters other than \r\n, otherwise they will not be judged as the error result code of AT command, resulting in busy channel 8007. If an AT command response error code is reported in another format, modify the error code in the preceding format.

20.2 General Errors (27.007)

Code of <err>	Description
3	Operation not allowed
4	Operation not supported
5	Need to enter PIN
23	Memory failure
30	No network service
50	Incorrect parameters
51	Command implemented but currently disabled
52	Command aborted by user
100	Unknown
159	Uplink busy/flow control

20.3 General Errors (27.005)

Code of <err>	Description
300	ME failure
301	SMS service of ME reserved
302	Operation not allowed
303	Operation not supported
304	Invalid PDU mode parameter
305	Invalid text mode parameter
310	USIM not inserted
311	USIM PIN required
312	PH-USIM PIN required
313	USIM failure
314	USIM busy
315	USIM wrong
316	USIM PUK required
317	USIM PIN2 required
318	USIM PUK2 required
320	Memory failure
321	Invalid memory index
322	Memory full
330	SMSC address unknown
331	No network service
332	Network timeout
340	No +CNMA acknowledgement expected
500	Unknown ERR

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20.4 Enhanced Errors

Code of <err>	Description
8000	The device needs to be restarted
8001	The entered AT command parameters are invalid
8002	The operation is not allowed, usually because the state machine does not meet the requirement
8003	The AT command is lost or the characters are dirty, which is commonly caused by PLL instability when standby is awakened
8004	FOTA upgrade is currently in progress and no other operational control is accepted
8005	Temporary unused
8006	The waiting duration for the AT response times out. You need to set the waiting duration to a larger value
8007	The AT channel is busy. The last AT request has not been processed.

	Procedure
8008	The current mode is single-core, and only THE M3 core works normally. AT commands that need to be processed by DSP core are sent incorrectly
8009	The NB network is abnormal and the TCPIP network is abnormal
8010	When a power failure occurs, enter AT+OFFTIME=<time> to compensate for the power failure duration. This error is reported only when both poweroff_enable and OFFTIME are set to 1
8012	The prefix is invalid. Such as: the AT +=XXX? : QQQ and AT+XXX? QQQ
9000	User-defined start value of extended error codes

20.5 Summary of CME ERROR Codes

Note: The following table lists the possible +CME errors of each interface command and their causes. The first row of the table contains the <err> value of +CME ERROR and the cause of the ERROR. The number in the table represents the cause number.

<err>	cause
0	Phone failure
1	Unable to connect to phone
2	Telephone adapter connection reserved
3	Operation not allowed
4	An unsupported operation
5	Ph-sim PIN code is required
6	Ph-fsim PIN code is required
7	Ph-fsim PUK code is required
10	Not insert SIM card
11	Require the PIN of the SIM card
12	The PUK code of the SIM card is required
13	SIM card failure
14	SIM card is busy
15	SIM error
16	Password mistake
17	Request SIM card PIN2 code
18	Request THE PUK2 code of the SIM card
20	Memory is full
21	Invalid id
22	Could not find
23	Memory failure
24	The text string is too long
25	The text string contains illegal characters
26	The number is too long
27	The dialing number contains invalid characters
30	No Network service

31	Network timeout
32	Network disallowed. Emergency calls only
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
46	corporate personalization PIN required
47	corporate personalization PUK required
48	Request to hide key (note: This key is required to access the phone book)
50	Incorrect parameter
100	An unknown error
101	Terminal not ready
114	The PDP is busy
115	The PDP activation is disabled
132	This service is not supported
133	This service option is not included in the contract scope
134	Network anomalies
148	Unknown error -GPRS service related
149	Certification failed
171	PDN is not allowed to connect the last way
181	Unsupported QCI value

Appendix

A AT Command Delay description

1, AT+CFUN=0 May exceed 5s, and the longest may not exceed 10s

2. The following commands may keep trying when the network is lost. The protection timer has been set for 1 minute and the feedback result can be received at most 1 minute:

AT+CGACT=1

AT+CGCMOD=0

3, AT+CMGS=<length><CR>PDU is given<Ctrl-z /ESC>

4. PIN code verification command, with protection timer, no longer than 10s.

5. All other commands give feedback within 1s.

In conclusion:

1, the longest 10s command:

The PIN verification commands are +CPIN, +CLCK, and +CPWD

AT+CFUN=0

2. A command with a maximum of 1 minute

AT+CGACT=1

AT+CGCMOD=0

AT+CMGS

3, and the rest is no more than 1s

B List of cascading AT commands

The 3GPP commands and some extended commands in the document support the cascade of AT commands. The cascade AT command format is as follows:
<CR><LF>AT+CMD1=<parameter 1>,<parameter 2>;+CMD2 =<parameter>;MD3<CR><LF>
1. Run each command in sequence. Run the next command after the previous command is executed.
2. Only an OK/ERROR message is returned. If an ERROR occurs during the execution, the cascading command is terminated and an ERROR message is returned.

Example
Request: the AT+CIMI;+NCCID
Response: +CIMI: 460113029339230
Response: +NCCID: 89861118284000997369
Response: OK

The AT commands that support cascading are as follows:
Chapter 2, Basic commands: +CIMI, +CGSN, +CFUN, +CEER
Section 6, security-related commands: all
Section 7, UICC Card operation Commands: All
Section 8, SMS related commands: all
Section 10, Network service Commands: All
Section 11, PS related Commands: all
Section 16 Protocol stack extension Commands: All