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N25

AT Commands Manual

Issue 1.4 Date 2023-02-27

Notice

This document provides guide for users to use N25.

This document is intended for system engineers (SEs), development engineers, and test engineers.

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Sales@neoway.com

Support@neoway.com

Website: http://www.neoway.com

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About This Document

Scope

This document is applicable to N25.

Audience

This document is intended for system engineers (SEs), development engineers, and test engineers.

Change History

Issue	Date	Change	Changed By
1.0	2019-01	Initial draft	Tao Wenhong
1.1	2019-10	New commands: MQTT Commands and AT+NETCFG – Setting Network Mode	Tao Wenhong
1.2	2021-12	New commands: TCP Server Commands, FTP AT Commands And the following commands: • AT+IPFILTER – IP Access Control • AT+PDPKEEPALIVE–Setting PDP Keepalive Heartbeat • AT+NWNIPDATA – Sending NON-IP Data • AT$MYSIMSWITCH–Switching SIM Cards • AT+NWYRATSWITCHTIMER – Setting the Timer Time of Switching Network	Tao Wenhong
1.3	2022-07	New command: AT+CDNSCFG – Configuring Domain Name Server Added description on "Concatenation of AT commands"	Yang Di Tao Wenhong
1.4	2023-02	New commands: AT+NVSETBAND – Setting Frequency Bands and AT+MQTTCFG – Setting MQTT TLS Parameters	

Conventions

Symbol	Indication
	This warning symbol means danger. You are in a situation that could cause fatal device damage or even bodily damage.
	Means reader be careful. In this situation, you might perform an action that could result in module or product damages.
	Means note or tips for readers to use the module

Related Documents

Neoway_N25_Datasheet

Neoway_N25_Product_Specifications

Neoway_N25_HW_User_Guide

Neoway_N25_EVK_User_Guide

Boot LOG Instruction

The UART outputs **+PBREADY** after the phonebook is available.

If the module is autobauding-enabled, send **AT** 10 seconds after the module is powered on. **OK** will be returned after the initialization process is completed, and **+PBREADY** will be outputted after the phonebook is available.

Network indicator status

- Off: No network found.
- Always on: the module finds a network but the PDP context is not activated.
- Blinks (on for 0.2 seconds and off for 1.8 seconds): the PDP context is activated successfully.

1 AT Syntax

1.1 Symbols

- <CR>: carriage return character
- <LF>: linefeed character
- <..>: parameter name, the angle brackets do not appear in the command line.
- [..]: optional parameter, the square brackets do not appear in the command line.
- : space

1.2 Description

Prefix

AT or at

Command Line

Standard commands, in compliance with 3GPP 27007, 27005 and ITU-T Recommendation V.250.

Extended commands, defined by Neoway

Joint Mark

+ or $, used between the prefix and a command line

Concatenation of AT commands

In general, the "AT" prefix must be provided only at the beginning of the command line. Each command must be separated by using a semicolon (;) as delimiter only if the command has a "+" character as prefix. Commands can be in upper or lower case.

```
Example: ATI;+CGATT?;+COPS?<CR>
```

Putting multiple commands on a singal line is not applicable to asynchronous commands (whose result code is returned in asynchronous mode).

Termination Character

<CR>, i.e. 0x0D

Response Syntax

<CR><LF>response<CR><LF>

Response can be one or multiple messages.

Result Syntax

<CR><LF>OK<CR><LF> indicates that a command is executed successfully.

<CR><LF>ERROR<CR><LF> indicates that a command fails to be executed.

For general failures, the error result formats vary with the setting of AT+CMEE, see Appendix A .

1.3 Command Types

Type	Syntax	Response	Function
Set	AT+CMD=<VALUE><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>	Store a value or values for later use
Execute	AT+CMD[=<VALUE>]<CR>	[<CR><LF>response] <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>	Invoke a function of the module.
Test	AT+CMD=?<CR>	[<CR><LF>response] <CR><LF>OK<CR><LF>	Determine the range of parameter values or parameter lengths that are supported
Query	AT+CMD?<CR>	[<CR><LF>response]	Determine the

		<CR><LF>OK<CR><LF>	current value or values stored
URC (Unsolicited Result Code)	<CR><LF>+CMD: <VALUE><CR><LF>	N/A	Report the status change and data receiving
Remarks	Symbols are not displayed in AT commands. All commands comply with the rules in this chapter.		

1.4 Command Response Time-Out

Every command issued to the Neoway module returns a result response and the time needed to process the given command and return the response varies, depending on the command type.

Commands that do not interact with the SIM or the network, and only involve internal setups or readings, have an immediate response, and the maximum response timeout is default to 300 ms. Commands that interact with the SIM/USIM, the network, or the peripherals could take many seconds to send a response, depending on SIM configuration (e.g., number of contacts stored in the phonebook, number of stored SMS), on the network the command may interact with (e.g., network quality, network congestion, and so on), or on the peripheral type.

In the table below are listed only the commands whose interaction with the SIM, the network, or the peripheral could lead to long response timings. For other commands not listed in the table below, the maximum response time is 300 ms.

No.	Command	Estimated maximum time to get response (Seconds)
1	AT+CIMI	5
2	AT+CCID	5
3	AT+CFUN	120
4	AT+COPS	600
5	AT+CGDCONT	1
6	AT+XIIC	150
7	AT+CGATT	150
8	AT+TCPSETUP	60
9	AT+TCPSEND	60
10	AT+TCPREAD	300
11	AT+TCPCLOSE	120

12	AT+UDPSETUP	60
13	AT+UDPSEND	60
14	AT+UDPCLOSE	120
15	AT+PDPKEEPALIVE	1
16	AT+TCPTRANS	60
17	AT+UDPTRANS	30
18	AT+TRANSCLOSE	120
19	AT+TCPLISTEN	60
20	AT+CLOSELISTEN	120
21	AT+CLOSECLIENT	120
22	AT+TCPSENDS	60
23	AT+FTPLOGIN	30
24	AT+FTPLOGOUT	120
25	AT+FTPSIZE	30
26	AT+FTPGET	30
27	AT+FTPPUT	30
28	AT+FTPGETF	30
29	AT+HTTPSETUP	30
30	AT+HTTPACTION	30
31	AT+HTTPCLOSE	120
32	AT+HTTPCLOSED	120
33	AT+HTTPSSETUP	30
34	AT+HTTPSACTION	30
35	AT+HTTPSCLOSE	120
36	AT+MQTTCONN	30
37	AT+MQTTSUB	30
38	AT+MQTTUNSUB	30
39	AT+MQTTPUB	30
40	AT+MQTTDISCONN	30
41	AT+NCDPOPEN	180
42	AT+NCDPCLOSE	60
43	AT+UPDATETIME	30
44	AT+PING	1-255, customized

2 General Commands

2.1 ATI – Querying the Manufacturer Information

To query the manufacturer information, including manufacturer, model, and version

Format

Type	Command	Response
Execute	ATI<CR>	<CR><LF><module_info> <CR><LF>OK<CR><LF>

Parameter

<module_info> module manufacturer information

Example

```
ATI
NEOWAY
N25                                    Manufacturer information
01
OK
```

2.2 AT+CGMR – Querying the Firmware Version

To query the firmware version

Format

Type	Command	Response
Execute	AT+CGMR<CR>	<CR><LF>+CGMR: <version> <CR><LF>OK<CR><LF>

Parameter

<version> software version

Example

```
AT+CGMR
+CGMR: N25-R02-STDBZ-01
OK
```

2.3 AT+CGSN – Querying IMEI

To query the International Mobile Equipment Identity (IMEI) of the module

Format

Type	Command	Response
Execute	AT+CGSN<CR>	<CR><LF>+CGSN: <IMEI> <CR><LF>OK<CR><LF>

Parameter

<IMEI> International Mobile Equipment Identity, a character string of 15 digits

Example

```
AT+CGSN
+CGSN: 355910044336974
OK
```

2.4 AT+CIMI – Querying the IMSI

To query the international mobile subscriber identification (IMSI)

Format

Type	Command	Response
Execute	AT+CIMI<CR>	<CR><LF>+CIMI: <IMSI> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<IMSI> International mobile subscriber identification, a character string of 15 digits that starts with 3-bit MCC and 2-bit MNC.
It is used to authenticate the SIM card.

Example

```
AT+CIMI                                    Obtain the IMSI number.
+CIMI: 460022201575463
OK
AT+CIMI                                    Query the IMSI.
ERROR                                      No SIM card is inserted.
```

2.5 AT+CCID – Obtaining the ICCID of the SIM Card

To obtain the integrated circuit card identifier (ICCID) of the SIM card

Format

Type	Command	Response
Execute	AT+CCID<CR>	<CR><LF>+CCID: <ICCID> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<ICCID> SIM card ID, a string of 20 digits.

Example

```
AT+CCID                                  Read command
+CCID: 89860002190810001367
OK
AT+CCID                                  Read command
ERROR                                    The SIM card is not inserted.
```

3 UE Control and Status Report

3.1 AT+CREG – Querying Network Registration Status

To query the network registration status of the module

Format

Type	Command	Response
Execute	AT+CREG=[<n>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CREG?<CR>	<CR><LF>+CREG: <n><stat>[,<lac>,<ci>[,<Act>]] <CR><LF>OK<CR><LF>
Test	AT+CREG=?<CR>	<CR><LF>+CREG: (list of supported <n>)<CR><LF> <CR><LF>OK<CR><LF>
URC	When n=1: +CREG: <stat> When n=2: +CREG: <stat>[,[<lac>],[<ci>],[<AcT>]]	

Parameter

<n> Specifies whether to enable unsolicited result codes for network registration.
0: disable network registration unsolicited result code (default).
1: enable network registration unsolicited result code `+CREG: <stat>`.
2: enable network registration unsolicited result code with location information (Cell ID, Local ID) `+CREG: <stat>[,[<lac>],[<ci>],[<AcT>]]`

<stat> Network registration status
0: not registered, the module is not currently searching for an operator to register to
1: registered with a home network
2: not registered, but the module is currently trying to attach or searching for an operator to register to
3: registration denied
4. unknown code
5: registered, roaming

<lac> Two-byte location area code in hexadecimal format, string type

<ci> Four-byte cell ID in hexadecimal format, string type

<Act> The access technology of the serving cell, integer type

0: GSM
1: GSM compact
2: UTRAN
3: GSM w/EGPRS
4: UTRAN w/HSDPA
5: UTRAN w/HSUPA
6: UTRAN w/HSDPA and HSUPA
7: E-UTRAN
9: NB-IoT

Example

```
AT+CREG=1                Enable unsolicited codes of network registration.
OK
AT+CREG?                 Query the network registration status of the module.
+CREG: 0,1
OK
AT+CREG=?                Query the value range of the network registration status parameter.
+CREG: (0-2)
OK
```

3.2 AT+CEREG – Querying EPS Network Registration Status

To query the EPS network registration status of the module

Format

Type	Command	Response
Execute	AT+CEREG=<n><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CEREG?<CR>	<CR><LF>+CEREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>], [<Periodic-TAU>]]]] <CR><LF>OK<CR><LF>
Test	AT+CEREG=?<CR>	<CR><LF>+CEREG: (list of supported <n>s) <CR><LF>OK<CR><LF>

URC	• <n>=1 <CR><LF>+CEREG: <stat><CR><LF> • <n>=2 <CR><LF>+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]<CR><LF> • <n>=3 <CR><LF>+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>,<reject_cause>]]]<CR><LF> • <n>=4 <CR><LF>+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>],[<Periodic-TAU>]]]]<CR><LF> • <n>=5 <CR><LF>+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]<CR><LF>

Parameter

<n>	Specifies whether to enable network registration unsolicited result code. 0: disable network registration unsolicited result code (default). 1: enable network registration unsolicited result code. 2: enable network registration and location information (Cell ID, Local ID) unsolicited result code 4: enable network registration unsolicited result codes containing **Active-Time** and **Periodic-TAU** 5: enable network registration unsolicited result codes containing **cause_type**, **reject_cause**, **Active-Time**, and **Periodic-TAU**.
<stat>	Network status 0: not registered, the module is not currently searching for a new operator to register 1: registered to the home network 2: not registered, but the module is currently trying to searching for a base station 3: registration denied 4. Unknown code 5: registered, roaming
<lac>	string type; two-byte location area code in hexadecimal format.
<ci>	string type; four-byte cell ID in hexadecimal format.
<Act>	the access technology of the serving cell, integer type 0: GSM 1: GSM compact 2: UTRAN 3: GSM w/EGPRS 4: UTRAN w/HSDPA 5: UTRAN w/HSUPA 6: UTRAN w/HSDPA and HSUPA 7: E-UTRAN 8: ECGSM

	9: NB-IoT
<cause_type>	0: <reject_cause> containing EMM cause 1: <reject_cause> containing UE cause
<reject_cause>	Cause of registration failure, for details, see *3GPP TS 24.301 Annex A*.
<Active-Time>	8-bit unibyte Requested Active Time on GERAN/UTRAN network (T3324) Bit8-Bit6: unit 000 – 2 seconds 001 – 1 minute 010 – 6 minutes 111 - T3324 invalid **Bit5-Bit1**: binary-code time e.g. 00000001 indicates two seconds
<Periodic-TAU>	8-bit unibyte Requested periodic-TAU cycle on GERAN/UTRAN network (T3412) Bit8-Bit6: unit 000 – 10 minutes 001 – 1 hour 010 – 10 hours 011 – 2 seconds 100 – 30 seconds 101 – 1 minute 110 – 320 hours 111 - T3412 invalid Bit5-Bit1: binary-code time e.g. 00100010 indicates 2 hours

Example

```
AT+CEREG?                Query the network registration status of the module.
+CEREG: 0,1
OK
AT+CEREG=1               Enable network registration unsolicited code.
OK
AT+CEREG=?               Query the value range of the network registration status parameter.
+CEREG: (0-5)
OK
```

3.3 ATE1/ATE0 – Enabling & Disabling the Terminal Display

To enable or disable the terminal display function of the AT commands

The setting by this command is not saved after the module is powered off.

If the command is sent after dialing up to connect the network, terminal display is disabled automatically.

Format

Type	Command	Response
Execute	• ATE1<CR> • ATE0<CR>	<CR><LF>OK<CR><LF>

Parameter

N/A.

Example

```
ATE1                    Turn on module AT command echo function
OK                      Send AT, serial tools show "AT" and "OK".
AT
OK
ATE0                    Turn off the module AT command echo function
OK
                        Send AT, and the serial tool displays only "OK"
OK
```

3.4 ATQ – Setting the Code Result Suppression Mode

To set the mode whether to suppress the code result

The setting by this command is not saved after the module is powered off.

ATQ is equal to ATQ1.

After mode set to the code result suppression mode, **OK** or **ERROR** will no be returned.

Format

Type	Command	Response
Execute	• ATQ[<value>]<CR>	<CR><LF>OK<CR><LF>

Parameter

<value> 0: Output the code result (default)
1: Suppress the code result

Example

```
ATQ1            Set to code result suppress mode. (The module does not return OK after this
AT+CSQ          command is executed successfully.)
+CSQ:           After the mode is set, the return value to AT+CSQ does not contain the code
31,99           result OK.
ATQ0
OK              Set to the code result output mode.
AT              After the mode is set, the return value to AT contains the code result OK.
OK
```

3.5 ATV – Setting the Response Format of the Device

To set the response format of the device ATE is equal to ATE1.

The settings by this command are not be saved after the module is powered off.

ATV is equal to ATV1.

After **ATV0** is executed, the module returns 0 if a command is sent in correct format (default setting is OK) and returns 4 if a command is sent in incorrect format (default setting is ERROR).

Format

Type	Command	Response
Execute	• ATV[<value>]<CR>	<CR><LF>OK<CR><LF>

Parameter

<value> 0: Set the response format to output with only some header, footer, and digit text.
1: Set the response format to output with all headers, footers, and detailed response text (default).

Example

```
ATV1                    Set the response format to output with all headers, footers, and
OK                      detailed response text.
AT+CSQ
+CSQ: 31,99
OK
ATV0                    Set the response format to output with only some header, footer, and
0                       digit text. The module returns 0 after the format is set successfully.
AT+CSQ
+CSQ: 31, 99
0
```

3.6 AT&W – Saving the Setting

To save the settings of BASIC type commands.

- The following commands support parameter saving: ATE, +CMEE, ATV, ATQ, CEREG, IPR, etc.
- The function of **AT&W0** is the same as **AT&W**. To restore to the default settings, execute **AT&F**.

Format

Type	Command	Response
Execute	AT&W	<CR><LF>OK<CR><LF>

Parameter

N/A.

Example

```
AT+CEREG?                                   Query the current setting.
+CEREG: 0,0
OK
AT+CEREG=1                                  Save the settings supported to be saved.
OK
AT&W                                        Save the settings.
OK
AT+CEREG?
+CEREG: 1,1                                 Query the current setting after the module
OK                                          is restarted.
```

```
AT&W0                                          Save the settings.
OK
```

3.7 AT&F – Resetting the Module to Factory Settings

To reset the module to the factory settings

If the module is set to the code result suppression mode (ATQ1), reset it to factory settings by sending this command.

Format

Type	Command	Response
Execute	• AT&F[<value>]<CR>	<CR><LF>OK<CR><LF>

Parameter

<value> 0: reset the module to the factory settings.

Example

```
AT&F0
OK                                             Reset the module to factory settings.
AT&F
OK                                             Reset the module to factory settings.
```

3.8 AT+CFUN – Setting Module Functionality

To select the level of functionality of the module by setting **<fun>**.

The settings by this command are saved after the module is powered off.

Format

Type	Command	Response
Set	AT+CFUN=[<fun>[,<rst>]]<CR>	<CR><LF>OK<CR><LF> Or

		<CR><LF>ERROR<CR><LF> Or <CR><LF>+CME ERROR: <err><CR><LF>
Query	AT+CFUN?<CR>	<CR><LF>+CFUN: <fun><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CFUN=?<CR>	<CR><LF>+CFUN: (list of supported <fun>s),(list of supported <rst>s) <CR><LF>OK<CR><LF>

Parameter

<fun> Power saving function mode
0: turn off radio and SIM power
1: full functionality (default)
4: turn off the RF circuit (flight mode)

<rst> Specifies whether to restart the module
0: do not reset the module before setting it to **<fun>** power level
1: reset the module before setting it to **<fun>** power level

Example

```
AT+CFUN=1                          Set full functionality.
OK
AT+CFUN?                           Query current function level.
+CFUN: 1                           Full functionality
OK
AT+CFUN=?                          Query available parameter value ranges.
+CFUN: (0,1,4),(0-1)
OK
```

3.9 AT+CCLK – Clock

To set or query the real-time clock

The setting by this command is not saved after the module is powered off.

Format

Type	Command	Response
Set	AT+CCLK=<time><CR>	<CR><LF>OK<CR><LF>

		Or <CR><LF>ERROR<CR><LF>
Query	AT+CCLK?<CR>	<CR><LF>+CCLK: <time><CR><LF> <CR><LF>OK<CR><LF>

Parameter

<time>	Character string in format of "YY/MM/DD,hh:mm:ss[+TZ]". TZ is 0 by default.
TZ	The time lag between the local time and the GMT time, two digits.

Example

```
AT+CCLK="18/07/01,14:54:01+32"                Set the real-time clock of the module.
OK
AT+CCLK?                                      Query the setting of the real-time clock.
+CCLK: "18/07/01,14:54:10+32"
OK
AT+CCLK=14/07/02,10:48:50                     Incorrect command syntax.
ERROR
```

3.10 AT+IPR – Setting Baud Rate

To set the baud rate of the module

The baud rate is detected automatically (**0** is returned after executing **AT+IPR?**) by default.

The setting by this command is not saved after the module is powered off.

Format

Type	Command	Response
Set	AT+IPR=<baud rate><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+IPR?<CR>	<CR><LF>+IPR: <baud rate> <CR><LF>OK<CR><LF>
Test	AT+IPR=?<CR>	<CR><LF>+IPR: (list of supported <baud rate>s)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<baud rate> The value can be 0, 2400, 4800, 9600, 19200, 38400, 57600.

Example

```
AT+IPR=57600                                    Set the baud rate to 57600 bps.
OK
AT+IPR?                                         Query the current baud rate.
+IPR: 57600
OK
AT+IPR=?                                        Query the available baud rate range.
+IPR:
(0,2400,4800,9600,19200,38400,57600)
OK
AT+IPR=100                                      Set the baud rate to 100.
ERROR                                           The value is not allowed
```

3.11 AT+CPIN – Entering PIN Code

To query the PIN status and enter PIN code.

To enter PIN code, lock current SIM card (send AT+CLCK="SC",1,"1234") and then restart the module.

If the PIN code is input incorrectly for three times, PUK is required to unlock the SIM card.

If the module detects that there is no SIM card, the URC "+CPIN: NO SIM" is prompted.

Format

Type	Command	Response
Execute	AT+CPIN=<pin>[,<newpin>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CPIN?<CR>	<CR><LF>+CPIN: <code><CR><LF> <CR><LF>OK<CR><LF>

Parameter

<pin>, <newpin>	String type values <pin> can be PIN, PUK, PIN2, or PUK2 code depending on the situation.
<code>	**READY**: no password

SIMPIN: enter PIN code.
SIMPUK: enter PUK code.
SIMPIN2: enter PIN2 code.
SIMPUK2: enter PUK2 code.

Example

```
AT+CPIN?                                    Query whether PIN code is required.
+CPIN: READY                                No password is required.
OK
AT+CPIN="0000"                              The pin code is incorrect.
ERROR
AT+CPIN="1234"
OK                                          The pin code is correct.
AT+CPIN?                                    No SIM card is inserted.
ERROR
```

3.12 CMEE – Setting Error Information

To enable or disable the **+CME ERROR:<err>** result code.

- The settings by this command are not be saved after the module is powered down.
- AT+CMEE=2 is recommended when debugging.

Format

Type	Command	Response
Execute	AT+CMEE=<n><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CMEE?<CR>	<CR><LF>+CMEE: <n><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CMEE=?<CR>	<CR><LF>+CMEE: (range of supported <n> value)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<value> 0: Disable the **+CME ERROR:<err>** result code and display **ERROR**. (default)
1: Enable the **+CME ERROR:<err>** result code and use the numeric **<err>** value.

2: Enable the **+CME ERROR:<err>** result code and use verbose **<err>** values.

Example

```
AT+CMEE=1                                   Enable the result code in digit format.
OK
AT+CMEE?
+CMEE: 1                                    Query the status of the current result code.
OK
AT+CMEE=?
+CMEE: (0-2)                                Query the status range of error code.
OK
```

4 SMS Commands

4.1 AT+CPMS – Setting Preferred SMS Storage

To set preferred SMS storage

The settings by this command are saved after the module is powered off.

Format

Type	Command	Response
Set	AT+CPMS=<mem1><CR>	<CR><LF>+CPMS: <used1>, <total1>, <used2>, <total2>, <used3>, <total3> <CR><LF>OK<CR><LF>
Query	AT+CPMS?<CR>	<CR><LF>+CPMS: <mem1>, <used1>, <total1>, <mem2>, <used2>, <total2>, <mem3>, <used3>, <total3><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CPMS=?<CR>	<CR><LF>+CPMS: (list of supported <mem1>s), (list of supported <mem2>s),(list of supported <mem3>s) <CR><LF> <CR><LF>OK<CR><LF>

Parameter

<mem1> Memory from which SMS messages are read and deleted, string type
"SM": SIM only (default)
"ME": ME only
"MT": any of storages associated with ME (SIM first)
"SR": Status Report Storage

<mem2> Memory which SMS message are written into and sent from, string type
"SM": SIM only
"ME": ME only
"MT": any of storages associated with ME (SIM first)
"SR": Status Report Storage

<mem3> Priority memory which received SMS messages are saved to
"SM": SIM only (default)

"ME": ME only
"MT": any of storages associated with ME (SIM first)
"SR": Status Report Storage

<used> Used quantity

<total> Total capacity of the storage

Example

```
AT+CPMS="SM"                                          Set the SMS storage to "SM", that
+CPMS: 0,50,0,50,0, 0                                 is, store SMS messages in SIM
OK                                                    card.

AT+CPMS?                                              Query the capacity of current SMS
+CPMS: "SM",0,50,"SM",0,50,"SM",0,50                  storage.
OK

AT+CPMS=?                                             Query the available storages.
+CPMS:
("ME","SM","MT"),("ME","SM","MT"),("ME","SM","MT")
OK
```

4.2 AT+CMGF – Setting SMS Inputting Mode

To set the SMS inputting mode

Format

Type	Command	Response
Set	AT+CMGF=<mode><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CMGF?<CR>	<CR><LF>+CMGF: <mode><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CMGF=?<CR>	<CR><LF>+CMGF: (list of supported <mode>s) <CR><LF> <CR><LF>OK<CR><LF>

Parameter

<mode> 0: PDU mode (default)
1: text mode

Example

```
AT+CMGF=1                              Set the SMS to text mode.
OK
AT+CMGF?                               Query the current mode of SMS message input.
+CMGF: 1
OK
AT+CMGF=?                              Query the value range of SMS mode setting.
+CMGF: (0,1)
OK
```

4.3 AT+CSCS – Setting the TE Character Set

To set the format of the TE character set.

Format

Type	Command	Response
Set	AT+CSCS=<chset><CR>	<CR><LF>OK<CR><LF>
Query	AT+CSCS?<CR>	<CR><LF>+CSCS: <chset><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CSCS=?<CR>	<CR><LF>+CSCS: (list of supported <chset>s) <CR><LF> <CR><LF>OK<CR><LF>

Parameter

<chset>

- "GSM": default GSM alphabet (GSM03.38.6.2.1)
- "HEX": string consisting of 0x00 to 0xFF in hexadecimal format. E.g. "032FE6" is 3 8-bit characters, which are respectively 3, 47, and 230. Conversion is not required between these characters and the source MT character set.
- "PCCP936": PC Set Chinese character
- "UCS2": 16-bit universal multiple-octet coded character set (USO/IEC10646). The UCS2 character string is converted into a hexadecimal number (ranging from 0x0000 to 0xFFFF). UCS2 encoding is used only in some character string of the statement.

Example

```
AT+CSCS="HEX"                          Set the HEX character set.
OK
AT+CSCS?                               Query the format of current character set.
```

```
+CSCS: "HEX"
OK
AT+CSCS=?                                  Query the character set formats that the module
+CSCS:                                     supports.
("GSM","HEX","PCCP936","UCS2")
OK
```

4.4 AT+CNMI – Setting SMS Indication Mode

To set the mode how the module informs users of new SMS messages received from the network

Format

Type	Command	Response
Set	AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CNMI?<CR>	<CR><LF>+CNMI: [<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]<CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CNMI=?<CR>	<CR><LF>+CNMI: (list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<mode> Set the instruction mode after receiving SMS messages. The default value is 0.
0: SMS instruction codes can be saved in the buffer of the module. If the TA is full, the old codes can be saved in other place or replaced with new codes.
1: when the module is online, it will discard saved SMS instruction codes and reject new codes. In other situations, the codes are displayed on the DTE.
2: when the module is online, the SMS instruction codes are saved in the buffer of the module. After the connection is released, the SMS instruction codes are output through UART. In other situations, codes are directly displayed on the end device.
3: when the module is online, forward unsolicited result codes to the DTE (SMS instruction codes are transmitted together with other data).

<mt> Set the format of the new SMS instruction codes. The default value is 1
0: SMS instruction codes will not be sent to the DTE.
1: the format of the new SMS instruction codes is **+CMTI: "MT"** ,**<index>**. The SMS

message is stored rather than directly displayed (default)
2: the format of the new SMS instruction codes is **+CMT :<oa>,<scts>,<tooa>,<lang>,<encod>,<priority>[,<cbn>],<length><CR><LF><data>** (text mode). SMS messages are directly displayed rather than stored.
3: use the report codes defined by **<mt>=2** to transmit SMS instruction codes to the end device. The SMS instruction codes in other modes are the same as that of **<mt>=1**.

<bm> Set the format of the new cell broadcast codes. The default value is **0**.
0: No CBM indications are routed to the TE. The CBMs are stored. Default. (default).
1: The CBM is stored and an indication of the memory location is routed to the customer application using unsolicited result code: +CBMI.
2: New CBMs are routed directly to the DTE using an unsolicited result code.
3: Class 3 CBMs: as <bm>=2. Other classes CBMs: as <bm>=1.

<ds> SMS-STATUS-REPORTs Routing.
0: No SMS-STATUS-REPORTs are routed (default).
1: SMS-STATUS-REPORTs are routed using unsolicited code: +CDS
2: SMS-STATUS-REPORTs are stored and routed using the unsolicited result code: +CDSI.

<bfr> TA (Terminal Adapter) Buffer of Unsolicited Result Codes Mode.
TA buffer defined within this command is flushed to the DTE when <mode>=1 or 2 is entered (OK response shall be given before flushing the codes). Default.
1: TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered..

- The default values are 2,1,0,0,0.
- It is recommended to set **+CNMI: 2,1,0,0,0** (new messages are stored in SIM rather than displayed directly) or **+CNMI: 2,2,0,0,0** (new messages are displayed directly rather than stored in SIM).
- SMS message types:

  Class 0: displayed not stored

  Class 1: stored in ME

  Class 2: stored in SIM

  Class 3: sent to TE

Example

```
AT+CNMI=1,1,0,0,0                          Set the SMS message indication mode.
OK
AT+CNMI=?                                  Query the value ranges of the paramters.
+CNMI: (0-3),(0-3),(0,2),(0-1),(0,1)
OK
AT+CNMI?                                   Query the current setting of the
+CNMI: 1,1,0,0,0                           parameters.
OK
```

4.5 AT+CMGR – Reading SMS Messages

To read SMS messages stored in current memory (use the **AT+CPMS** command to specify the current memory)
If the received message is unread, it status in the storage changes to received read after executing this command.

Format

Type	Command	Response
Execute	AT+CMGR=<index><CR>	Text mode (+CMGF=1) • SMS-DELIVER <CR><LF>+CMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>, <pid>,<dcs>,<sca>,<tosca>,<length>] <CR><LF><data><CR><LF> <CR><LF>OK<CR><LF> • SMS-SUBMIT: <CR><LF>+CMGR: <stat>,<da>,[<alpha>][,<toda>, <fo>,<pid>, <dcs>,[<vp>],<sca>,<tosca>,<length>] <CR><LF><data><CR><LF> • SMS-STATUS-REPORT: <CR><LF>+CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>, <st> • SMS-COMMAND: <CR><LF>+CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>], [<da>], [<toda>],<length> <CR><LF><data>]<CR><LF> • CBM-STORAGE: <CR><LF>+CMGR: <stat>,<sn>,<mid>,<dcs>, <page>,<pages> <CR><LF><data><CR><LF> PDU mode (+CMGF=0) <CR><LF>+CMGR: <stat>,[<alpha>],<length> <CR><LF><pdu><CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<index> location value **<index>** from preferred message storage **<mem1>** to the TE

<stat> Status of SMS messages in the storage

- TEXT mode
  "REC UNREAD": received unread
  "REC UNREAD": received read
  "STO UNSENT": stored unsent
  "STO SENT": stored sent
- PDU mode
  0: received unread
  1: received read
  2: stored unsent
  3: stored sent

<oa> String type, 3GPP TS 23.040 TP-Originating-Address Address-Value field. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS command in 3GPP TS 27.007). The type of address is given by **<tooa>**.

<alpha> String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry found in MT phonebook. Implementation of this feature is manufacturer specified. The used character set should be the one selected with AT+CSCS command (see definition of this command in 3GPP TS 27.007).

<scts> String type, 3GPP TS 23.040 TP-Service-Centre-Time-Stamp (refer to **<dt>**).

<tooa> Integer type, 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet (default refer to **<toda>**).

<fo> Depending on the command or result code: First octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted.

<pid> 3GPP TS 23.040 TP-Protocol-Identifier in integer format (default 0).

<dcs> Depending on the command or result code: 3GPP TS 23.038 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format.

<sca> 3GPP TS 24.011 RP SC address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS command in 3GPP TS 27.007). The type of address is given by **<tosca>**.

<tosca> Integer type, 3GPP TS 24.011 RP SC address Type-of-Address octet (default refer to **<toda>**).

<length> Integer type, indicating in the text mode (AT+CMGF=1) the length of the message body **<data>** in characters, or in PDU mode (AT+CMGF=0) the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).

<data> If **<dcs>** indicates that GSM 03.38 default alphabet is used and **<fo>** indicates that GSM 03.40 TP-User-Data-Header-Indication is not set:

- ME/TA converts GSM alphabet into current TE character set when TE character set is not configured to HEX by +CSCS.
- ME/TA converts each 7-bit octet into hexadecimal numbers containing two IRA characters when TE character set is configured to HEX by +CSCS.

If **<dcs>** indicates that 8-bit or UCS2 data coding scheme is used, or **<fo>** indicates that GSM 03.40 TP-User-Data-Header-Indication is set:

ME/TA converts each 8-bit octet into hexadecimal numbers containing two IRA

	characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)
<da>	String type, 3GPP TS 23.040 TP-Destination-Address Address-Value field. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in 3GPP TS 27.007). The type of address is given by **<toda>**
<toda>	Integer type, 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet
<vp>	GSM 03.40 TP-Validity-Period Its format determined by **<fo>** of SMS-SUBMIT: integer (167 by default) or string type (refer to **<dt>**)
<mr>	Integer type, GSM 03.40 TP-Message-Reference.
<ra>	String type, GSM 03.40 TP-Recipient-Address, refer to **AT+CSCS**.
<tora>	Integer type, GSM 04.11 TP-Recipient-Address Type-of-Address, refer to **<toda>**.
<dt>	String type, GSM 03.40 TP-Discharge-Time, in format of yy/MM/dd,hh:mm:ss±zz
<st>	Integer type, GSM 03.40 TP-Status
<ct>	Integer type, GSM 03.40 TP-Command-Type
<sn>	Integer type, GSM 03.41 CBM Serial Number.
<mid>	Integer type, GSM 03.41 CBM Message Identifier.
<page>	Integer type, GSM 03.41 CBM Page Parameter 4-7 bit
<pages>	Integer type, GSM 03.41 CBM Page Parameter 0-3 bit
<pdu>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).

Example

```
AT+CMGR=1                                                          Read the message
+CMGR: "REC READ","66421",,"11/09/13,16: 37: 59+32"                indexed as 1.
050003140401E27778592EA7E7EBE9373C3C279BCF68F59AADC7FED62779BA596
D7EBAEB5B91EBD16A5D46C35F98406A744E311A95C32594DA75688B50EADACA6D
689150EADF1B2BC5E579AD575E5B5582D5EABD5624C36A3D56C375C0E1693CD68
35DB0D9783A15C91D2E06BDAA558AC1F60C52B937CADCD2B747AA9021BDEC627E
8E9441BD42655DEF446
OK
AT+CMGF=0                                                          Set PDU mode.
OK
AT+CSCS="UCS2"
OK
AT+CMGR=39
+CMGR: 0,,23
0891683110501905F0240BA18177377949F500004130623125032304683 41A0D  Incoming SMM.
OK                                                                 Read the message.
AT+CMGF=1                                                          Set the text mode.
OK
AT+CSCS="GSM"
```

```
OK
AT+CMGR=40
+CMGR: "REC UNREAD","18777397945",,"14/03/26,13: 57: 58+32"        Incoming SMS
hello world                                                        message.
OK                                                                 Read the SMS
                                                                   message.
```

4.6 AT+CMGL – SMS Message List

To read SMS messages of one type from the current memory specified by the **+CPMS** command.

Format

Type	Command	Response
Execute	AT+CMGL[=<stat>]<CR>	Text mode (+CMGF=1) • SMS-SUBMITs or SMS-DELIVERs: <CR><LF>+CMGL: <index>,<stat>,<oa/da>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[<CR><LF>+CMGL: <index>,<stat>,<da/oa>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[...]]<CR><LF> • SMS-STATUS-REPORTs: <CR><LF>+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> [<CR><LF>+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[...]]<CR><LF> • SMS-COMMANDs: <CR><LF>+CMGL: <index>,<stat>,<fo>,<ct> [<CR><LF>+CMGL: index>,<stat>,<fo>,<ct>[...]]<CR><LF> • CBM storage: <CR><LF>+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data> [<CR><LF>+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[...]]<CR><LF> PDU mode (+CMGF=0) <CR><LF>+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu><CR><LF> [<CR><LF>+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu><CR><LF> [...]]
Test	AT+CMGL=?<CR>	<CR><LF>+CMGL: (list of supported <stat>)

<CR><LF>OK <CR><LF>

Parameter

<stat>	String type or numeric type When set **AT+CMGF=1**, "REC UNREAD": received unread "REC UNREAD": received read "STO UNSENT": stored unsent "STO SENT": stored sent "ALL": all SMS messages When set AT**+CMGF=0**, 0: received unread 1: received read 2: stored unsent 3: stored sent 4: all SMS messages
<index>	Location value **<index>** from preferred message storage **<mem1>** to the TE
<oa>	String type, 3GPP TS 23.040 TP-Originating-Address Address-Value field. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS command in 3GPP TS 27.007). The type of address is given by **<tooa>**.
<da>	String type, 3GPP TS 23.040 TP-Destination-Address Address-Value field. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS command in 3GPP TS 27.007). The type of address is given by **<toda>**
<alpha>	String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry found in MT phonebook. Implementation of this feature is manufacturer specified. The used character set should be the one selected with **AT+CSCS** command (see definition of this command in 3GPP TS 27.007).
<scts>	String type, 3GPP TS 23.040 TP-Service-Centre-Time-Stamp (refer to **<dt>**).
<tooa>	Integer type, 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet (default refer to **<toda>**).
<toda>	Integer type, 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet
<length>	Number of octets of the given TP-level data unit (octets that do not contain the service center address)
<data>	If **<dcs>** indicates that GSM 03.38 default alphabet is used and **<fo>** indicates that GSM 03.40 TP-User-Data-Header-Indication is not set: • ME/TA converts GSM alphabet into current TE character set when TE character set is not configured to HEX by +CSCS. • ME/TA converts each 7-bit octet into hexadecimal numbers containing two IRA characters when TE character set is configured to HEX by +CSCS. If **<dcs>** indicates that 8-bit or UCS2 data coding scheme is used, or **<fo>** indicates that GSM 03.40 TP-User-Data-Header-Indication is set: • ME/TA converts each 8-bit octet into hexadecimal numbers containing two IRA

characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)

<fo> Depending on the command or result code: First octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted.

<mr> Integer type, 3GPP TS 23.040 TP-Message-Reference

<ra> String type, 3GPP TS 23.040 TP-Recipient-Address Address-Value field. BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command). The type of address is given by **<tora>**.

<tora> Integer type, 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet (default refer to **<toda>**).

<scts> String type, 3GPP TS 23.040 TP-Service-Centre-Time-Stamp (refer to **<dt>**).

<dt> GSM 03.40 TP-Discharge-Time, in format of yy/MM/dd,hh:mm:ss±zz

<st> Integer type, GSM 03.40 TP-Status.

<ct> Integer type, GSM 03.40 TP-Command-Type

<sn> Integer type, GSM 03.41 CBM Serial Number

<mid> Integer type, GSM 03.41 CBM Message Identifier

<page> Integer type, GSM 03.41 CBM Page Parameter 4-7 bit

<pages> Integer type, GSM 03.41 CBM Page Parameter 0-3 bit

<pdu> In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).

Example

```
AT+CMGL="ALL"
+CMGL: 1,"REC READ","66421","","2011/09/13 16:37:59+32"
050003140401E27778592EA7E7EBE9373C3C279BCF68F59AADC78FED62779BA596D7EBAEB5B91EBD16A5D46C35F
98406A744E311A95C32594DA75688B50EADACA6D689150EADF1B2BC5E579AD575E5B5582D5EABD5624C36A3D56C
375C0E1693CD6835DB0D9783A15C91D2E06BDAA558AC1F60C52B937CADCD2B747AA9021BDEC627E8E9441BD4265
5DEF446
+CMGL: 14,"STO SENT","66045","",
050003010401E27778592EA7E7EBE9373C3C279BCF68F59AADC78FED62779BA596D7EBAEB5B91EBD16A5D46C35F
98406A744E311A95C32594DA75688B50EADACA6D689150EADF1B2BC5E579AD575E5B5582D5EABD5624C36A3D56C
375C0E1693CD6835DB0D9783A15C91D2E06BDAA558AC1F60C52B937CADCD2B747AA9021BDEC627E8E9441BD4265
5DEF446
+CMGL: 44,"REC UNREAD","8615719556937","","2011/09/30 03:00:55+32"
5E7F4E1C79FB52A863D0919260A8003A4E2D536B752862370031003500370031003900350035003600390033003
77ED960A86765753500326B21002C6700540E4E006B21572800320039002F00300039002000320030003A003400
38002C60A853EF6309901A8BDD952E62169009879952E76F463A556DE62E8
OK
AT+CMGL=?                                          Query in text format (AT+CMGF=1).
+CMGL: ("REC UNREAD", "REC READ", "STO
UNSENT", "STO SENT", "ALL")
```

```
OK
AT+CMGL=?                                   Query in PDU format (AT+CMGF=0).
+CMGL: (0-4)
OK
AT+CMGL=ALL                                 A pair of quotation marks ("") is
ERROR                                       required for the parameter.
AT+CMGF=1                                   The parameter should be set to 0.
OK
AT+CMGL=4
ERROR
AT+CMGF=0                                   The parameter should be set to 1.
OK
AT+CMGL="ALL"
ERROR
```

4.7 AT+CMGS – Sending SMS Messages

To send an SMS message from the module to the network.

If UART debugging tool is used to send PDU SMS message, enter **\r** behind the **AT+CMG** command manually or send **<CR>** in the hexadecimal system.

For details about PDU, see B.1 Content of PDU SMS Messages.

Format

Type	Command	Response
Execute	• AT+CMGS=<da>[,<toda>]<CR> text is entered<Ctrl+Z/ESC>(Text mode) • AT+CMGS=<length><CR> PDU is given<Ctrl+Z/ESC>(PDU mode)	• Text mode (+CMGF=1): <CR><LF>+CMGS: <mr>[,<scts>] <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> • PDU mode (+CMGF=0): <CR><LF>+CMGS: <mr>[,<ackpdu>] <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<da> The destination number to which the SMS message is sent in text mode

<toda> Type of destination address.3GPP TS 24.011 TP-Destination-Address Type-of-

	Address octet in integer format.
<text>	SMS message content in text mode
<length>	the byte length of the SMS message content in PDU mode
<mr>	storage location
<CR>	end character
<Ctrl+Z>	indicates the end of the input message, → in the example.
<ESC>	indicates giving up the input message
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to <dt>).
<ackpdu>	3GPP 23.040 RP-User-Data element of RP-ACK PDU

Example

```
AT+CMGS="66358"<CR>                                   Text mode(+CMGF=1)
> This is the text→                                   → is the symbol after pressing Ctrl+Z.
+CMGS: 171
OK
AT+CMGS="15889758493"<CR>                             AT+CMGF=1 might not be executed.
> This is the text→
ERROR
AT+CMGS=33<CR>                                        PDU mode (+CMGF=0)
>0891683108705505F001000B815118784271F2000814
6DF157335E025B9D5B89533A59276D6A80545EFA→
+CMGS: 119
OK
```

4.8 AT+CMGW – Writing SMS Messages

To write an SMS message into the memory

The message status is set to "stored unsent" by default. **<stat>** also supports other values such as "stored unsent" and "stored sent".

Format

Type	Command	Response
Execute	• AT+CMGW[=<oa/da>[,<tooa/toda>[,<stat>]]]<CR>text is entered<Ctrl+Z/ESC>(text mode) • AT+CMGW=<length>[,<stat>]<CR>PDU is given<Ctrl+Z/ESC> (PDU mode)	<CR><LF>+CMGW:<index><CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+CMS

ERROR:<err><CR><LF>

Parameter

<da>	The destination number to which the SMS message is sent in text mode
<toda>	Type of destination address.3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.
<stat>	Status of SMS messages in the storage
<text>	SMS message content in text mode
<length>	The byte length of the SMS message content in PDU mode
<index>	Location information
<CR>	End character
<Ctrl+Z>	Indicates the end of the input message
<ESC>	Indicates giving up the input message

Example

```
AT+CMGW="091137880"<CR>                                   Text mode (+CMGF=1)
>"This is the text"<Ctrl+Z>
+CMGW: 15
OK
AT+CMGW=091137880                                         A pair of quotation marks ("") is
ERROR                                                     required for the number in text
                                                          mode.
AT+CMGW=31<CR>                                            PDU mode (+CMGF=0)
>0891683108705505F001000B813124248536F3000812004
00026002A535A53D153A653C1532052C7<Ctrl+Z>
+CMGW: 1
OK
```

4.9 AT+CMSS – Sending Messages from Storage

To send an SMS message specified by **<index>** in the memory (SMS-SUBMIT)

- If new phone number is set in this command, the message stored in <mem2> is sent to the new number.
- If no new phone number is set, the message is sent the number saved.

Format

Type	Command	Response
Execute	AT+CMSS=<index>[,<da>[,<toda>]]<CR>	• Text mode (+CMGF=1)]: <CR><LF>+CMSS: <mr>[,<scts>]<CR><LF> <CR><LF>OK<CR><LF> • PDU mode (+CMGF=0): <CR><LF>+CMSS: <mr>[,<ackpdu>]<CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<index>	Message location
<da>	The destination number of the SMS messages
<toda>	Type of address
<mr>	Message reference number
<scts>	Service center time stamp
<ackpdu>	3GPP 23.040 RP-User-Data element of RP-ACK PDU

Example

```
AT+CMSS=2                          Send the SMS messages stored in memory 2.
+CMSS: <mr>
OK

AT+CMSS=2                          No SMS message is stored in memory 2 or the SMS message
ERROR                              number in memory 2 is incorrect.

AT+CMSS=6,"15889758495"            Forward SMS message to 15889758495. 6 is the ID of the
+CMSS: 6                           message stored successfully. Only text message supports
OK                                 this function.
```

4.10 AT+CMGD – Deleting SMS Messages

To delete SMS messages from the current memory.

Format

Type	Command	Response
Execute	AT+CMGD=<index>[,<delflag>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+CMGD=?<CR>	<CR><LF>+CMGD: (list of supported <index>s),(value range of <delflag>) <CR><LF>OK<CR><LF>

Parameter

<index> The recording number of the stored SMS messages

<delflag> Integer

0: delete the SMS messages with the specified recording numbers.

1: delete all read SMS messages.

2: delete all read and sent SMS messages.

3: delete all read, sent, and unsent SMS messages.

4: delete all messages.

If **<delflag>** is set, ignore the parameter **<index>**.

Example

```
AT+CMGD=0,3                              Delete all read, sent, and unsent SMS messages.
OK
AT+CMGD=?                                Query the value ranges of parameters.
+CMGD: (1-50),(0,1,2,3,4)
OK
AT+CMGD=5
ERROR                                    The 5th message does not exist.
```

4.11 AT+CSCA – Setting SMS Center Number

To set the SMS center number.

The settings by this command are saved after the module is powered off.

Format

Type	Command	Response
Set	AT+CSCA=<sca>[,<tosca>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CSCA?<CR>	<CR><LF>+CSCA:<sca>, <tosca> <CR><LF>OK<CR><LF>

Parameter

<sca> SMS center number
Double quotes are not necessary.

<tosca> The format of the SMS center number.
129 indicates national number.
145 indicates international number.

Example

```
AT+CSCA="8613800755500",129                    Set an national SMSC number.
OK
AT+CSCA="8613800755500",145                    Set an international SMSC number.
OK
AT+CSCA?                                       Query the SMSC number.
+CSCA: "+8613800755500",145
OK
```

4.12 AT+CSMP – Setting Text Mode Parameters

To select required values for the additional parameters in the text mode, and set the validity period since the message is received from the SMSC, or the absolute time defining the end of the validity period.

Format

Type	Command	Response
Set	AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Query	AT+CSMP?<CR>	<CR><LF>+CSMP:<fo>,<vp>,<pid>,<dcs> <CR><LF>OK<CR><LF>

Parameter

<fo> Determined by the command or the first 8 bits of the result code **GSM 03.40 SMS-DELIVER**; SMS-SUBMIT (default value: 17); or adopt the integer-type SMS-COMMAND (default value: 2)

<vp>

Value	Validity Period
0-143	(vp+1)*5mins, 12 hours at most
144-167	12hours +((vp–143)*30mins), 24 hours at most
168-196	(vp - 166)*1day
197-255	(vp - 192)*1week

<pid> Integer-type TP-protocol-ID (default value: 0)

<dcs> Encoding plan for integer-type cell broadcast data (default value: 0)

The default setting is **17,167,0,0**.

Example

```
AT+CSMP=17,167,0,0                Text mode parameters:
OK                                No status report; the validity period of the information
                                  is 24 hours; Only messages in text format can be sent.

AT+CSMP?                          Query the current settings of the text mode.
+CSMP: 17,167,0,0
OK
```

4.13 AT+CSDH – Displaying the Parameters of the Text Mode

To set whether the detailed header information is displayed in the result code in text mode

This command is valid in text mode, which can be set by **AT+CMGF=1**.

Format

Type	Command	Response
Set	AT+CSDH=<show><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CSDH?<CR>	<CR><LF>+CSDH: <show><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CSDH=?<CR>	<CR><LF>+CSDH: (value range of <show>)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<show>: 0: not display (default)
1: display

Example

```
AT+CSDH=0                                          Set the header information to
OK                                                 not display.
AT+CMGR=14                                         Read the 14th message.
+CMGR: "REC READ","+8613430981504",
"","2013/07/17,14:49:00+50"
7B5675655FAE5C0F65F65019
OK
AT+CSDH=1                                          Set the detailed header
OK                                                 information to display.
AT+CMGR=14
+CMGR: "REC READ","+8613430981504","",             Read the 14th message.
"2013/07/17,14:49:00+50",145,4,0,8,
"8613800755500",145,12
7B5675655FAE5C0F65F65019
OK
AT+CSDH?                                           Query the current parameter
+CSDH: 0                                           setting of the command.
OK
AT+CSDH=?                                          Query the value range of
+CSDH: (0-1)                                       parameter in the command.
OK
```

5 Network Service

5.1 AT+CSQ – Querying Signal Quality

To query the receiving signal strength indication (RSSI) and bit error rate (BER) of the channel

Format

Type	Command	Response
Execute	AT+CSQ<CR>	<CR><LF>+CSQ: <signal>, <ber><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CSQ=?<CR>	<CR><LF>+CSQ: (list of supported <rssi>s),(list of supported <ber>s)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<signal> The following table shows the relationship between the CSQ and the RSSI.

	signal	Rssi
0	<4 or 99	<-107 dBm or unknown
1	<10	<-93 dBm
2	<16	<-71 dBm
3	<22	<-69 dBm
4	<28	<-57 dBm
5	>=28	>=-57 dBm

<ber>

0...7	Refer to the value of RXQUAL in the table of GSM 05.08 8.2.4.
99	Not known or not detectable

Example

```
AT+CSQ
+CSQ: 1,99                                    Query the strength of the current signal.
OK
```

```
AT+CSQ=?
+CSQ: (0-31,99),(0-7,99)                    Query the value ranges of parameters.
OK
```

5.2 AT+COPS – Operator Selection

To select an operator.

If the deregistration is performed after the PPP connection is activated, "GPRS DISCONNECTION" is promoted.

Format

Type	Command	Response
Set	AT+COPS=[<mode>[,<format>[,<oper>[,<AcT>]]]]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+COPS?<CR>	<CR><LF>+COPS: [<mode>[,<format>[,<oper>>[,<AcT>]]] <CR><LF>OK<CR><LF>
Test	AT+COPS=?<CR>	<CR><LF>+COPS: [list of supported (<stat>,long alphanumeric <oper>,short alphanumeric <oper>,numeric <oper>[,<AcT>])s][,,(list of supported<mode>s),(list of supported <format>s)] <CR><LF>OK<CR><LF>

Parameter

<mode> Specifies the mode of network selection
0: automatic (ignore the parameter <per>)
1: manual
2: deregistration
3: set only **<format>**
4: manual/automatic (<oper> shall be present). If the manual selection fails, automatic mode is entered.

<format> Format of <oper> Field
0: long alphanumeric format **<oper>**
1: short alphanumeric format **<oper>**
2: numeric **<oper>** (default)

<oper> Operator Identifier (MCC/MNC in Numeric Format only for Operator Selection) given in **<format>**. This field may be in 16-character long alphanumeric format, 8-characters

	short alphanumeric format, or 5-character numeric format (MCC/MNC).
<AcT>	Indicates the radio access technology of the network selected manually. 0: GSM 1: GSM compact 2: UTRAN 3: GSM w/EGPRS 4: UTRAN w/HSDPA 5: UTRAN w/HSUPA 6: UTRAN w/HSDPA and HSUPA 7: E-UTRAN 8: ECGSM 9: NB-IOT

If the network is selected automatically, the parameter <AcT> is ignored.

Example

```
AT+COPS=0,0                          Automatic network selection is enabled. Long
OK                                   alphanumeric mode.
AT+COPS=0,2                          Set to digital mode
OK
AT+COPS?
+COPS: 0,0,"China Mobile",9          China Mobile
OK
AT+COPS?                             If it is set to numeric mode, get the number 46000
+COPS: 0,2,"46000",9
OK
AT+COPS?
+COPS: 0,0,"China Unicom",9          China Unicom
OK
AT+COPS?                             If it is set to numeric mode, then get the number
+COPS: 0,2,"46001",9                 46001.
OK
AT+COPS=2                            Deregister.
OK
```

5.3 AT+NETSTATE – Querying Network State

To query the current network registration state

Format

Type	Command	Response
Query	• AT+NETSTATE?<CR>	<CR><LF>+NETSTATE: <net_type>,<net_band> <CR><LF>OK<CR><LF>

Parameter

<net_type> Registered network mode
0: No network
1: NB-IoT
2: GSM

<net_band> Hexadecimal registered network band
One of the following values will be returned according to the actual situation if **<net_type>** is set to 1:
0x0: No registered
0x1: LTE B1
0x2: LTE B2
0x4: LTE B3
0x8: LTE B4
0x10: LTE B5
0x80: LTE B8
0x800: LTE B12
0x1000: LTE B13
0x20000: LTE B18
0x40000: LTE B19
0x80000: LTE B20
0x2000000: LTE B26
0x8000000: LTE B28
<net_band> is invalid when **<net_type>** is set to 2.

Example

```
AT+NETSTATE?
+NETSTATE: 1,0x80
OK
```

The current registered network is NB-IoT and the frequency band is band 8.

5.4 AT+TUESTATS – Querying UE Status

To query UE status.

Format

Type	Command	Response
Query	• AT+TUESTATS=<type><CR>	<CR><LF>TUESTATS: <type> <CR><LF>OK<CR><LF>

Parameter

<type>

RADIO: radio specific information
CELL: per-cell information for the top 5 cells
BLER: block error rate information
THP: throughput
ALL: all information. The value of <type> output is the correct one for each data type.

- <type> = RADIO
  <signal power in centibels>
  <total power in centibels>
  <current TX power level in centibels >
  <total TX time since last reboot in millisecond>
  <total RX time since last reboot in millisecond>
  <last SIB1 cell ID>
  <last ECL value>
  <last snr value>
  <last earfcn value>
  <last pci value>
  <rsrq in centibels>
- <type> = CELL per-cell information for the top 5 cells. Returned entries are of the form:
  <earfcn> absolute radio-frequency channel number
  <physical cell id> physical id of the cell
  <primary cell> 1 indicates the current serving cell
  <rsrp> reference signal received power. For instance, if the device reports an <rsrp> of 32, the actual RSRP would be 32-141=-109 dBm.
  <rsrq> reference signal received quality. For instance, if the device reports an <rsrq> of 13, the actual RSRQ would be (**13**-40)/2=-13.5 dB.
  <rssi> received signal strength indicator. Integer dBm.
  <snr> signal to noise ratio. Integer dBm.
- <type> = BLER block error rate
  <rlc_ul_bler> RLC layer block error rate (uplink). Integer %
  <rlc_dl_bler> RLC layer block error rate (downlink). Integer %
  <mac_ul_bler> physical layer block error rate (uplink). Integer %
  <mac_dl_bler> physical layer block error rate (downlink). Integer %
  <total bytes transmitted>
  <total bytes received>
  <transport blocks sent>

<transport blocks received>
<transport blocks retransmitted>
<total ack/nack messages received>

- <type> = THP throughput
<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

THP query results are only valid when sending and receiving data.

Example

```
AT+TUESTATS="RADIO"
TUESTATS:RADIO,Signal power,13
TUESTATS:RADIO,Total power,45
TUESTATS:RADIO,Tx power,-1
TUESTATS:RADIO,TX time,288
TUESTATS:RADIO,RX time,44
TUESTATS:RADIO,Cell ID,197756455
TUESTATS:RADIO,ECL,0
TUESTATS:RADIO,SNR,9
TUESTATS:RADIO,EARFCN,1640
TUESTATS:RADIO,PCI,245
TUESTATS:RADIO,RSRQ,255
OK

AT+TUESTATS="CELL"
TUESTATS:CELL,2506,269,1,53,255,-
65,-1
OK

AT+TUESTATS="BLER"
TUESTATS:BLER,RLC UL BLER,0
TUESTATS:BLER,RLC DL BLER,0
TUESTATS:BLER,MAC UL BLER,0
TUESTATS:BLER,MAC DL BLER,0
TUESTATS:BLER,Total TX bytes,77
TUESTATS:BLER,Total RX bytes,77
TUESTATS:BLER,Total TX blocks,1
TUESTATS:BLER,Total RX blocks,1
TUESTATS:BLER,Total RTX blocks,0
TUESTATS:BLER,Total ACK/NACK RX,0
OK
```

```
AT+TUESTATS="THP"
TUESTATS:THP,RLC UL,600
TUESTATS:THP,RLC DL,844
TUESTATS:THP,MAC UL,2156
TUESTATS:THP,MAC DL,2464
OK
```

5.5 AT+CESTATUS – Querying CE Status

To query CE status

Format

Type	Command	Response
Execute	AT+CESTATUS<CR>	<CR><LF>+CESTATUS: <status> <CR><LF>OK<CR><LF>

Parameter

<status>
0: No CE
1: CE level 0
2: CE level 1
3: CE level 2

Example

```
AT+CESTATUS
+CESTATUS: 1
OK
```

5.6 AT+SETSCMODE – Setting SC Mode

To set scrambling code mode of the module.

It must be the same as that on the base station so that the module can register with network. The new scrambling code is used by default. The settings by this command are saved after the module is powered off.

Format

Type	Command	Response
Set	AT+SETSCMODE=<mode><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+SETSCMODE?<CR>	<CR><LF>+SETSCMODE: <mode> <CR><LF>OK<CR><LF>

Parameter

<mode> 0: Old SC
1: New SC

Example

```
AT+SETSCMODE=1                          Use new SC.
OK
AT+SETSCMODE?
+SETSCMODE: 1                           Query SC mode.
OK
```

5.7 AT+NETCFG – Setting Network Mode

To set the network mode the module searches.

The settings by this command are saved after the module is powered off.

Format

Type	Command	Response
Execute	• AT+NETCFG=<class>,<value><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	• AT+NETCFG?<CR>	<CR><LF>+NETCFG:<class>,<value> <CR><LF>OK<CR><LF>

Parameter

<class>	Setting item
<netpri>	Network searching priority 0: CAT NB1 -> GSM (default) 1: GSM -> CAT NB1

Example

```
AT+NETCFG="netpri",1                    Set the network to GSM.
OK
```

5.8 AT+CDNSCFG – Configuring Domain Name Server

To configure domain name server (DNS).

Format

Type	Command	Response
Execute	AT+CDNSCFG=<pri_dns>[,<sec_dns>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CDNSCFG?<CR>	<CR><LF>PrimaryDns: <pri_dns><CR><LF> <CR><LF>SecondaryDns: <sec_dns><CR><LF> OK<CR><LF>
Test	AT+CDNSCFG=?	<CR><LF>+CDNSCFG: "Primary DNS","Secondary DNS"<CR><LF> OK<CR><LF>

Parameter

<pri_dns>	A string parameter which indicates the IP address of the primary domain name server. Default value is 0.0.0.0.
<sec_dns>	A string parameter which indicates the IP address of the secondary domain name server. Default value is 0.0.0.0.

Example

```
AT+CDNSCFG="114.114.114.114","8.8.8.8"          Setting the primary and secondary DNS IP addresses.
OK

At+CDNSCFG?
PrimaryDns: <211.136.17.107>                    Query the DNS IP addresses.
SecondaryDns: <211.136.20.203>
OK

At+CDNSCFG=?
+CDNSCFG:                                       Query the parameter option.
"PrimaryDNS","SecondaryDNS"
OK
```

5.9 AT+NVSETBAND – Setting Frequency Bands

To set the number of frequency bands.

The settings by this command are saved after the module is powered down.

Format

Type	Command	Response
Set	AT+NVSETBAND=<band_num>,<band_value>,…<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NVSETBAND?<CR>	<CR><LF><band_num> band in total: <band_value1>, … <band_valueN><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+NVSETBAND=?<CR>	<CR><LF>+NVSETBAND: <band_num>, (list of supported <band_value>)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<band_num> Number of frequency bands, ranging from 1 to 10.
<band_value> Range of the frequency band. (1, 2, 3, 5, 8, 12, 18, 19, 20, 26, 28)

Example

AT+NVSETBAND=3,3,5,8 OK	Set the number of frequency bands to 3. The frequency bands are separately 3, 5, and 8.
AT+NVSETBAND? 3 band in total: 3,5,8 OK	Query the number of the frequency bands and the band values.

6 EGPS Commands

6.1 AT+CGDCONT – Defining PDP Context

To set the packet data protocol (PDP) format of the GPRS network.

Only one APN can be set.

Format

Type	Command	Response
Set	AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp> [,<pd1> [,…[,pdN]]]]]]]]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CGDCONT?<CR>	<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp >,< h_comp ><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CGDCONT=?<CR>	<CR><LF>+CGDCONT: (value range of <cid>),<PDP_type>,,,(value range of <d_comp>),(value range of <h_comp>),(value range of <pd1>),…(,value range of <pdN>) <CR><LF>OK<CR><LF>

Parameter

<cid>	(PDP Context Identifier) a numeric parameter that specifies a particular PDP context definition. Minimum value = 1.
<PDP_type>	(Packet Data Protocol type) a string parameter. IP: Internet Protocol (IETF STD 5)
<APN>	Access Point Name. A string parameter which is a logical name that is used to select the GGSN or the external packet data network.
<PDP_address>	A string parameter that identifies the terminal in the address space applicable to the PDP. TE will provide a value for this parameter after PDP starts if it is null or omitted. If TE fails to provide, the subscription value will be requested.
<d_comp>	Numeric parameter that controls PDP data compression. Used only for SNDCP. 0 - off (default if value is omitted)

<h_comp>		Numeric parameter that controls PDP header compression. 0 - off (default if value is omitted)
<pd1>, <pdN>	…	Zero to N string parameters whose meanings are specific to the <PDP_type>

Example

```
AT+CGDCONT=1,"IP","CMIOT"                                   Set PDP type to IP and APN to CMNET.
OK

AT+CGDCONT=1,IP,CMIOT                                       Format error
ERROR

AT+CGDCONT?                                                 Query current PDP format.
+CGDCONT: 1,"IP","CMIOT","0.0.0.0",0,0
OK

AT+CGDCONT=? +CGDCONT:(1),(IP,IPV6,IPV4V6),,,(0-            Query the available value range of PDP format.
3),(0-4),(0-1),(0-4)
OK
```

6.2 AT+XGAUTH – PDP Authentication

PDP authentication.

Execute this command after AT+CGDCONT. Add this command execution operation into your code when using the internal protocol stack since the PDP authentication is required for the application that uses the private network.

The default user name and password of the China Unicom SIM card is “card” and “card”.

Format

Type	Command	Response
Set	AT+XGAUTH=<cid>,<auth>,<name>,<pwd><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+XGAUTH=?	<CR><LF>+XGAUTH: (list of supported <cid>),(value range of<auth>),(length of <name>),(length of <pwd>) <CR><LF>OK<CR><LF>

Parameter

<cid>	(PDP Context Identifier) a numeric parameter that specifies a particular PDP

	context definition. This <cid> parameter corresponds to the <cid> parameter of the +CGDCONT command.
<auth>	Authentication type 0: NONE, meaning authentication protocol not used 1: PAP, meaning personal authentication protocol 2: CHAP, meaning handshake authentication protocol 3: PAP or CHAP, meaning handshake authentication protocol or personal authentication protocol
<name>	User name as string with length <lname>
<pwd>	Password as string with maximum length <lpwd>

Example

```
AT+XGAUTH=1,1,"gsm","1234"                    Set the first PDP authentication.
OK
AT+XGAUTH?
+XGAUTH: 1,"gsm","***"                        Query the current set values.
OK
AT+XGAUTH=?
+XGAUTH: (1-7),(0-2),32,32                    Query the value range of the parameters.
OK
```

6.3 AT+XIIC – Setting up a PPP Connection

To set up a PPP connection.

Ensure that the module registers on a network and the APN is configured before using the **AT+XIIC=1** command to set up a PPP connection.

Use **AT+CEREG?** to check whether the module registers on a network or not. If **+CEREG: 0,1** or **+CEREG: 0,5** is returned, the module does not register on networks.

Send **AT+CGDCONT** to set APN.

Format

Type	Command	Response
Set	AT+XIIC=<act><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+XIIC?<CR>	<CR><LF>+XIIC: <act>,<ip>

<CR><LF>OK<CR><LF>

Parameter

<act>	0: disconnect the PPP connection 1: set up the PPP connection
<ip>	IP address

Example

```
AT+XIIC=1                          Set up a PPP connection.
OK
AT+XIIC?                           The PPP connection is set up successfully.
+XIIC:   1,10.107.216.162          There are four spaces before 1.
OK
AT+XIIC?                           Query the PPP connection status.
+XIIC:   0,0.0.0.0                 The PPP connection is not activated successfully.
OK                                 There are four spaces before 0.
```

6.4 AT+CGATT – Attaching and Detaching to PS

To attach/detach the module to/from packet domain (PS) service

By default, the module can automatically perform GPRS attach.

Ensure that the GPRS attach is set before the PPP connection is set up. It is recommended to add the **AT+CGATT?** command to the process to query the GPRS status. If the module returns **1**, set up a PPP connection directly; otherwise, set GPRS attach manually by executing the command **AT+CGATT=1**.

Format

Type	Command	Response
Set	AT+CGATT=<state><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CGATT?<CR>	<CR><LF>+CGATT: <state><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+CGATT=?<CR>	<CR><LF>+CREG: (list of <state> value supported) <CR><LF> <CR><LF>OK<CR><LF>

Parameter

<state> 0: indicates detach
1: indicates attach

Example

```
AT+CGATT=1
OK                                  GPRS attach is set successfully.
AT+CGATT=0
OK                                  GPRS detach is set successfully.
AT+CGATT=0                          This command shall be executed after the PPP connection
GPRS DISCONNECTION                  is established (AT+XIIC=1).

OK
AT+CGATT=0                          ERROR is returned because no SIM card is installed.
ERROR
AT+CGATT?                           Query the GPRS status.
+CGATT: 0
OK
AT+CGATT=?                          Query the valid parameter values for the command.
+CGATT:(0,1)
OK
```

6.5 +IPADDR – URC Notifying the Assigned IP Address

To notify the IP address assigned by the network after the PPP connection is activated automatically.

This URC is disabled by default. You can execute the AT+NEONBIOTCFG command to enable it.

Format

Type	Command
URC	+IPADDR: <ip><CR>

Parameter

<ip> IP address.

Example

```
+IPADDR: 10.100.45.2
```

6.6 +CSCON – URC Notifying RRC Status

To notify the current RRC status.

This URC is disabled by default. You can execute the AT+NEONBIOTCFG command to enable it.

Format

Type	Command
URC	+CSCON: <status><CR>

Parameter

<status>	0: IDLE 1: CONNECTED

Example

```
+CSCON: 1
```

6.7 +PSMEVENT – URC Notifying PSM Status

To notify the current PSM status.

This URC is disabled by default. You can execute the AT+NEONBIOTCFG command to enable it.

Format

Type	Command
URC	+PSMEVENT: <status><CR>

Parameter

<status>	ENTER PSM: PSM WAKEUP

Example

```
+PSMEVENT: ENTER PSM
```

6.8 AT+RRCRLSREQ – Releasing the RRC Connection

To release the RRC connection. The module rapidly enters IDLE status from CONNECTED status after this command is excuted.

Format

Type	Command	Response
Execute	AT+RRCRLSREQ<CR>	<CR><LF>OK<CR><LF>

Parameter

N/A.

Example

```
AT+RRCRLSREQ
OK
```

6.9 AT+IPFILTER – IP Access Control

To control the range of the client-side IP addresses allowed to access the communication module. It is only valid when the module works in server mode.

After a client initiates a connection request, if the IP address of the client is within the specified IP address range, the module accepts the request and the connection is allowed to be established.

Format

Type	Command	Response
Execute	AT+IPFILTER=<id>,<action>,<ip_address>,<net_mask><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+IPFILTER?<CR>	<CR><LF>+IPFILTER: <id>,<ip_address>,<net_mask> <CR><LF>+IPFILTER: <id>,<ip_address>,<net_mask> … <CR><LF>OK<CR><LF> Or <CR><LF>+IPFILTER: <id>,<ip_address>,<net_mask> <CR><LF>OK<CR><LF>

Parameter

<IP>	0-4, 5 groups of IP addresses in total If <IP> is not set, all clients with a legal IP address are allowed to access the module.
<action>	0: delete the specified IP address for channel authentication. 1: add the specified IP address for channel authentication. 2: delete all IP addresses for channel authentication.
<ip_address>	The legal IP address of the client, character format. Format: XXX.XXX.XXX.XXX.
<net_mask>	subnet mask, character format. Format: XXX.XXX.XXX.XXX.

Example

```
AT+IPFILTER=0,1,“192.168.0.23”,“255.255.255.255”        add the specified IP address for
OK                                                      channel authentication.
AT+IPFILTER=0,0,“192.168.0.23”,“255.255.255.255”        delete the specified IP address for
OK                                                      channel authentication.
AT+IPFILTER=0,1,“192.168.0.23”,“255.255.255.0”          Add the range of the IP addresses
OK                                                      allowed to access the module. (from
                                                        192.168.0.0 to 192.168.0.255)
AT+IPFILTER?
+IPFILTER: 0,"192.168.0.23","255.255.255.255"
+IPFILTER: 1,"192.168.0.23","255.255.255.255"           Query the set IP address for
+IPFILTER: 2,"",""                                      authentication channel
+IPFILTER: 3,"",""
+IPFILTER: 4,"",""
OK
```

7 Non-Transparent TCP/UDP Commands

7.1 AT+RECVMODE – Setting Receive Mode

To set the receive mode of TCP and UDP data

Do not send this command during communications because it clears the buffer.

This command also works for UDP data.

The settings by this command are saved in PSM mode and not saved after the module is powered off.

Format

Type	Command	Response
Set	AT+RECVMODE=<n>[,<mode>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+RECVMODE?<CR>	<CR><LF>+RECVMODE: <n>,[<mode>]<CR><LF> <CR><LF>OK<CR><LF>
Test	AT+RECVMODE=?<CR>	<CR><LF>+RECVMODE: (value range of <n>),(value range of <mode>)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<n> Receive mode
0: buffer the TCP or UDP data received and the MCU sends command to read the data
1: print the TCP or UDP data received to UART directly (default)

<mode> Specifies whether to report in hexadecimal format.
0: report in ASCII format (default)
1: report in hexadecimal format

Example

```
AT+RECVMODE=0                                    Set data receive mode.
```

```
OK
```

7.2 AT+TCPKEEPALIVE – Setting the Keepalive Heartbeat

To set the TCP keepalive heartbeat.

Send this command before setting up a TCP connection. It is valid for all connections.

The settings by this command are not saved after the module is powered off.

Note that this function consumes data traffic.

Format

Type	Command	Response
Set	AT+TCPKEEPALIVE=<mode>,[<time>[,<interval>]]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+TCPKEEPALIVE?<CR>	<CR><LF>+TCPKEEPALIVE: <mode>,<time>,<interval><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+TCPKEEPALIVE=?<CR>	<CR><LF>+TCPKEEPALIVE: (list of supported <mode>s), (list of supported <time>s), (list of supported <interval>s)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<mode>	Heartbeat switch 0: disable (default) 1: enable
<time>	Heartbeat interval at which the module sends data packets to the server, ranging from 30 to 7200. Unit: second The default value is 120. The recommended value ranges from 30 t0 300.
<interval>	Retransmission interval at which the module sends heartbeat data packet again if it does not receive the response from the server, ranging from 1 to 1800, unit: second. The default value is 75. The recommended value ranges from 40 to 100.

Set <time> according to the network environment since the <time> for sending heartbeat packets varies with the network environment.

- If the value of <time> is too large, the terminal may have a false connection, and if <interval> is greater

than <time>, the data will not be resent.

- If the values of <time> and <interval> are too short, the terminal may actively close the connection because it does not receive the acknowledgement message several times and thinks that the connection is invalid.

Example

```
AT+TCPKEEPALIVE=1                                   Enable heartbeat.
OK
AT+TCPKEEPALIVE=1,120,75                            Enable heartbeat and set the intervals.
OK
AT+TCPKEEPALIVE=0                                   Disable heartbeat.
OK
AT+TCPKEEPALIVE?                                    Query heartbeat setting.
+TCPKEEPALIVE: 1,120,75
OK
AT+TCPKEEPALIVE=?                                   Query the value ranges.
+TCPKEEPALIVE: (0-1),(30-7200),(1-1800)
OK
```

7.3 AT+TCPSETUP – Setting up a TCP Connection

To set up a TCP connection.

Use the **AT+XIIC=1** command to activate PDP context before sending this command.

Format

Type	Command	Response
Execute	AT+TCPSETUP=<n>,<ip>,<port><CR>	<CR><LF>OK<CR><LF> <CR><LF>+TCPSETUP: <n>,<result><CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<n>	Socket ID, ranging from 0 to 4
<ip>	Destination IP address, in xx.xx.xx.xx or domain name format
<port>	Destination port ID in decimal ASCII code

Example

```
AT+TCPSETUP=0,220.199.66.56,6800          Set up a connection to 220.199.66.56,6800 on
OK                                        socket 0.

+TCPSETUP:0,OK                            Successful
AT+TCPSETUP=0,neowayjsr.oicp.net,60010    Set up a connection to neowayjsr.oicp.net, 60010
OK                                        on socket 0.

+TCPSETUP:0,OK                            Successful
+TCPCLOSE:0,Link Closed                   The socket is closed.
AT+TCPSETUP=1,192.168.20.6,7000           Fails to set up a connection to
OK                                        192.168.20.6,7000 on socket 1. The server is
                                          not started, the IP address is incorrect, or
+TCPSETUP: 1,FAIL                         the SIM card is out of credit.
AT+TCPSETUP=0,neowayjsr.oicp.net,60010    A TCP/UDP connection has been set up on socket
OK                                        0.
+TCPSETUP: 0,ERROR1
AT+TCPSETUP=5,192.168.20.6,7000           Parameters are set incorrectly.
+TCPSETUP: ERROR
AT+TCPSETUP=0.58.60.184.213.10012         Parameters are set incorrectly.
+TCPSETUP:ERROR
AT+TCPSET=0,58.60.184.213,10012           The AT command is incomplete.
ERROR
```

7.4 AT+TCPSEND – Sending TCP Data

To send TCP data

The module will return > after this command is sent. Send TCP data 50 ms to 100 ms later.

Ensure that a TCP connection is set up before TCP data is sent. The **AT+IPSTATUS** command is recommended to check the buffer size before sending data.

Format

Type	Command	Response
Execute	AT+TCPSEND=<n>,<length><CR>	<CR><LF>> <CR><LF>OK<CR><LF> <CR><LF>+TCPSEND: <n>,<length><CR><LF> Or <CR><LF>> <CR><LF>+TCPSEND: ERROR<CR><LF> Or <CR><LF>> <CR><LF>+TCPSEND: <n>,OPERATION

	EXPIRED<CR><LF> Or <CR><LF>+TCPSEND: <result><CR><LF>

Parameter

<n>	Socket ID, ranging from 0 to 4. A TCP connection is established on the socket.
<length>	Length of the data to be sent, ranging from 1 to 4096, unit: byte

Example

```
AT+TCPSEND=0,1                          1-byte data is successfully sent through socket 0.
>
OK

+TCPSEND: 0,1
AT+TCPSEND=0,1024                       Send 1024-byte data. Network congestion occurs; only
>                                       part of the data is sent successfully.
+TCPSEND: ERROR
AT+TCPSEND=0,10                         After ">" is returned, no more data is entered in 60
>                                       seconds. Then the expiration information is
+TCPSEND: 0,OPERATION EXPIRED           displayed.
AT+TCPSEND=0,1                          One-byte data fails to be sent over socket 0 because
+TCPSEND: SOCKET ID OPEN FAILED         the connection is not established.
AT+TCPSEND=0,4097                       4097-byte data fails to be sent on socket 0 because
+TCPSEND: DATA LENGTH ERROR             data length exceeds the limit.
```

7.5 AT+TCPACK – Querying Status of Data Sent

To query the size of data successfully sent by the TCP server and the size of the data successfully received.

Format

Type	Command	Response
Execute	AT+TCPACK=<n><CR>	<CR><LF>+TCPACK: <n>,<data_sent>, <acked_recv> <CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+TCPACK: <n>, DISCONNECT<CR><LF> Or <CR><LF>+TCPACK: NO TCP LINK <CR><LF>

Parameter

<n>	Socket number, ranging from 0 to 4.
<data_sent>	Data successfully sent through this socket, unsigned 64-bit integers in decimal ASCII, unit: byte.
<acked_recv>	Data acknowledged by the receiver, unsigned 64-bit integers in decimal ASCII, unit: byte.

Example

```
AT+TCPACK=0                    20-byte data is transmitted from socket 0 and the receiver
+TCPACK: 0,20,20               acknowledges 20-byte data.

AT+TCPACK=0                    128-byte data is transmitted from socket 0 and the receiver
+TCPACK: 0,128,120             acknowledges 120-byte data.

AT+TCPACK=1
+TCPACK:                       No connection is set up on socket 1.
1,DISCONNECT

AT+TCPACK=2
+TCPACK: NO TCP                A UDP connection is set up on socket 2.
LINK

AT+TCPACK=6
ERROR                          The socket number in the command is incorrect.
```

7.6 +TCPRECV – URC Notifying TCP Data Receiving

To notify TCP data receiving

Format

Type	Response
URC	+TCPRECV:<n>,<length>,<data><CR>

Parameter

<n>	Socket ID, ranging from 0 to 4
<length>	Length of the data received
<data>	Data received You can identify the data end through "0x0d 0x0a" which is added to the end of the data or you can identify the data end based on **<length>**.

Example

```
+TCPRECV:0,10,1234567890                    10-byte data is successfully received on
                                            socket 0. The data is 1234567890.
```

7.7 AT+TCPREAD – Reading TCP Data

To read TCP data from the buffer

Format

Type	Command	Response
Set	AT+TCPREAD=<n>,<length><CR>	<CR><LF>+TCPREAD: <n>,<length>,<data> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<n> Socket ID, ranging from 0 to 4
<length> Maximum length of data allowed to read, ranging from 1 to 1024, byte

Example

```
+TCPRECV: 0,10                  Socket 0 receives data.
AT+TCPREAD=0,100                Read data.
+TCPREAD: 0,10,1234567890       The data read is 1234567890.
OK
```

7.8 AT+TCPCLOSE – Closing a TCP Connection

To close a TCP connection

Formats

Type	Command	Response
Execute	AT+TCPCLOSE=<n><CR>	<CR><LF>+TCPCLOSE: <n>,<result><CR><LF>

		Or <CR><LF>+TCPCLOSE: ERROR <CR><LF>+TCPCLOSE: <n>,<result><CR><LF>
URC	+TCPCLOSE:<n>,<result>	

Parameter

<n>	Socket ID, ranging from 0 to 4
<result>	OK Link Closed

Example

```
AT+TCPCLOSE=1                Close the TCP connection.
+TCPCLOSE: 1,OK              The TCP connection on socket 1 is closed successfully.
AT+TCPCLOSE=5                Socket number error
+TCPCLOSE: ERROR

+TCPCLOSE: 0,Link            The TCP connection is closed.
Closed                       The server sends command to close TCP connection or the network
                             encounters abnormality or weak signals.
```

7.9 AT+UDPSETUP – Setting up a UDP Connection

To set up a UDP connection

Use the **AT+XIIC=1** command to activate PDP context before executing this command.

Format

Type	Command	Response
Execute	AT+UDPSETUP=<n>,<ip>,<port><CR>	<CR><LF>OK<CR><LF> <CR><LF>+UDPSETUP: <n>,<result><CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+UDPSETUP: <n>, ERROR1<CR><LF> Or <CR><LF>+UDPSETUP: ERROR<CR><LF>

Parameter

<n> Socket ID, ranging from 0 to 4
<ip> Destination IP address, in xx.xx.xx.xx format or domain name format (www.*XXXX*.com)
<port> Destination port ID in decimal ASCII code

Example

```
AT+UDPSETUP=1,220.199.66.56,7000          The connection to 220.199.66.560.7000 is
OK                                        successfully set up on socket 1.

+UDPSETUP:1,OK
AT+UDPSETUP=0,neowayjsr.oicp.net,60010    Set up a connection to
OK                                        neowayjsr.oicp.net,60010 on socket 0

+UDPSETUP: 0,OK                           Successful
AT+UDPSETUP=0,58.60.184.213,11008         A TCP/UDP connection is already set up on
+UDPSETUP: 0,FAIL                         socket 0.
AT+UDPSETUP=1,192.168.20.6,7000           Fail to set up the connection to
OK                                        192.168.20.6,7000 on socket 1.

+UDPSETUP: 1,FAIL
AT+UDPSETUP=5,192.168.20.6,6800           The socket ID is set incorrectly.
+UDPSETUP: ERROR
AT+UDPSETUP=0.58.60.184.213.10012         The Punctuation mark is used incorrectly.
+UDPSETUP: ERROR
AT+UDPSET=0,58.60.184.213,10012           The AT command is incomplete.
ERROR
```

7.10 AT+UDPSEND – Sending UDP Data

To send UDP data.

The module will return > after this command is sent. Send UDP data 50 ms to 100 ms later.

Ensure that the UDP connection is set up before sending UDP data. Send AT+IPSTATUS to query the buffer size before sending UDP data.

Format

Type	Command	Response
Execute	AT+UDPSEND=<n>,<length>[,<content>]<CR>	<CR><LF>> <CR><LF>OK<CR><LF> <CR><LF>+UDPSEND: <n>,<length><CR><LF>

	Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+UDPSEND: DATA LENGTH ERROR <CR><LF>

Parameter

<n>	Socket ID, ranging from 0 to 4. A UDP connection is established on the socket.
<length>	Length of the data to be sent, ranging from 1 to 1024, unit, byte
<content>	Data to be sent

Example

```
AT+UDPSEND=0,2                          Send 2-byte data on socket 0. Then send the
>                                       characters to be sent 50 ms to 100 ms after the
OK                                      module returns >.
                                        The data is sent successfully.
+UDPSEND: 0,2
AT+UDPSEND=0,2,ab                       Send 2-byte data through socket 0.
OK

+UDPSEND: 0,2                           Data is sent successfully.
AT+UDPSEND=0,1025                       Fail to send 1025-byte data on socket 0 because
+UDPSEND: DATA LENGTH ERROR             data length exceeds the limit.
AT+UDPSEND=0,10                         After the data sending command is input and > is
>                                       returned, no data is entered in 1 minute. Then the
+UDPSEND: 0,OPERATION EXPIRED           expiration information is displayed.
```

7.11 +UDPRECV – URC Notifying UDP Data Receiving

To notify UDP data receiving.

When the module receives UDP data from the network, the UART prints the data automatically.

Format

Type	Command
URC	+UDPRECV: <n>,<length>[,<data>]<CR>

Parameter

<n>	Socket ID, ranging from 0 to 4

<length>	Length of the data received
<data>	Data received The received data ends with **0x0d 0x0a**. You can also identify the end based on **<length>**.

Example

```
+UDPRECV: 0,10,1234567890      10-byte data is successfully received on socket 0. The data is
                               1234567890.
```

7.12 AT+UDPREAD – Reading UDP Data

To read UDP data.

Format

Type	Command	Response
Execute	AT+UDPREAD=<n>[,<length>]<CR>	<CR><LF>+UDPREAD: <n>,<length>,<data> <CR><LF>OK<CR><LF>

Parameter

<n>	Socket ID, ranging from 0 to 4
<length>	Maximum length of data allowed to read, ranging from 1 to 1024.

Example

```
+UDPRECV: 0,10                          Socket 0 receives data.
AT+UDPREAD=0,100                        Read data.
+UDPREAD: 0,10,1234567890               The data read is 1234567890.
OK
```

7.13 AT+UDPCLOSE – Closing the UDP Connection

To close the UDP connection

Format

Type	Command	Response
Execute	AT+UDPCLOSE=<n><CR>	<CR><LF>+UDPCLOSE: <n>,OK Or <CR><LF>+UDPCLOSE: ERROR

Parameter

<n>	socket ID, ranging from 0 to 4

Example

```
AT+UDPCLOSE=1                          Close the UDP connection on socket 1.
+UDPCLOSE: 1,OK
AT+UDPCLOSE=5                          Socket number error.
+UDPCLOSE: ERROR
```

7.14 AT+IPSTATUS – Querying TCP/UDP Socket Status

To query the TCP/UDP socket status.

Due to the characteristic of UDP, this command only queries whether a link has been established by the command, and does not represent the true status of the link.

Format

Type	Command	Response
Execute	AT+IPSTATUS=<n><CR>	<CR><LF>+IPSTATUS: <n>,<status>[,<type>,<send-buffer-size>] <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<n>	Socket ID, ranging from 0 to 4
<status>	Socket status, CONNECT or DISCONNECT, or CONNECTING or DISCONNECTING
<type>	Socket type, TCP or UDP

<send-buffer-size>	The size of the available send buffer on the module, in decimal ASCII mode, unit: byte.

UDP data is not cached, so the value of <send-buffer-size> is 0 after queried.

Example

```
AT+IPSTATUS=0                          A TCP connection has been set up on socket 0 and the
+IPSTATUS: 0,CONNECT,TCP,4096          buffer size is 4096 bytes.
OK
AT+IPSTATUS=1                          A UDP connection has been set up on socket 1.
+IPSTATUS: 1,CONNECT,UDP,0
OK
AT+IPSTATUS=0                          No TCP or UDP connection is set up on socket 1.
+IPSTATUS: 0,DISCONNECT
OK
```

7.15 AT+PDPKEEPALIVE – Setting PDP Keepalive Heartbeat

To set PDP keepalive heartbeat.

Activate PDP context before setting the domain name parameters.

Format

Type	Command	Response
Set	AT+PDPKEEPALIVE=<onoff>,<inerval><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<onoff>	Heartbeat switch 0: disable (default) 1: enable
<inerval>	Heartbeat interval, unit: s, ranging from 1 to 65535.

Example

```
AT+PDPKEEPALIVE?                    Query the heartbeat setting.
+PDPKEEPALIVE: 1,5
OK
AT+PDPKEEPALIVE=1,60                Enable the heartbeat function; set its interval to 60s.
OK
```

8 Transparent TCP/UDP Commands

8.1 AT+TCPTRANS – Setting up a Transparent TCP Connection

To set up a transparent TCP connection.

TCP data can be transparently transmitted after the transparent TCP connection is set up successfully and +TCPTRANS:OK is returned. At most 4096-byte data can be sent or received in transparent mode.

The UART does not display the data transmitted to the server after the transparent TCP connection is set up successfully.

Use +++ to switch the server to command mode and ATO to switch it to data mode.

Format

Type	Command	Response
Execute	AT+TCPTRANS=<ip>,<port><CR>	<CR><LF>OK<CR><LF> <CR><LF>+TCPTRANS: <result><CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<ip>	destination IP address, in xx.xx.xx.xx format or domain name format (www. *XXXXXX*.com)
<port>	destination port ID in decimal ASCII code
<result>	OK FAIL ERROR

Example

```
AT+TCPTRANS=220.199.66.56,6800          A transparent TCP connection is set up
OK                                      successfully.

+TCPTRANS: OK
```

```
AT+TCPTRANS=neowayjsr.oicp.net,60010        A transparent TCP connection is set up
OK                                          successfully by using domain name.

+TCPTRANS: OK
AT+TCPTRANS=220.199.66.56,
+TCPTRANS: ERROR                            The command format is incorrect.
AT+TCPTRANS=220.199.66.56,6800              Fails to set up a transparent TCP connection.
OK

+TCPTRANS: FAIL
AT+TCPTRANS=220.199.66.56,6800              A transparent (TCP, UDP, TCP server) connection
ERROR                                       has been set up.
```

8.2 AT+UDPTRANS – Setting up a Transparent UDP Connection

To set up a transparent UDP connection.

- UDP data can be transparently transmitted after the transparent UDP connection is set up successfully and **+UDPTRANS:OK** is returned. At most 4096-byte data can be sent or received in transparent mode.
- The UART does not display the data transmitted to the server after the transparent UDP connection is set up successfully.
- Use +++ to switch the server to the command mode and ATO to switch it to the data mode.

Format

Type	Command	Response
Execute	AT+UDPTRANS=<ip>,<port><CR>	<CR><LF>OK<CR><LF> <CR><LF>+UDPTRANS: <result><CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<ip>	destination IP address, in xx.xx.xx.xx format or in domain name format (www.*XXXXX*.com).
<port>	destination port ID in decimal ASCII code
<result>	OK FAIL ERROR

Example

```
AT+UDPTRANS=220.199.66.56,6800              A transparent UDP connection is set up
OK                                          successfully.

+UDPTRANS:OK
AT+UDPTRANS=neowayjsr.oicp.net,60010        A transparent UDP connection is set up by using
OK                                          domain name successfully.

+UDPTRANS:OK
AT+UDPTRANS=220.199.66.56,                  The command format is incorrect.
+UDPTRANS:ERROR
AT+UDPTRANS=220.199.66.56,6800              Fails to set up a transparent UDP link.
OK

+UDPTRANS:FAIL
AT+UDPTRANS=220.199.66.56,6800              A transparent (TCP, UDP, TCP server) connection
ERROR                                       has been set up.
```

8.3 AT+TRANSCLOSE – Closing a Transparent Connection

To close a transparent coennection.

Format

Type	Command	Response
Execute	AT+TRANSCLOSE<CR>	<CR><LF>+TRANSCLOSE: <n>,OK Or <CR><LF>ERROR<CR><LF>
URC	+TCPTRANS: Link Closed	

Parameter

N/A.

Example

```
AT+TRANSCLOSE
+TRANSCLOSE: 0,OK                   A transparent TCP socket is closed successfully.

AT+TRANSCLOSE
ERROR                               No transparent TCP/UDP connection is set up.

AT+TRANSCLOSE                       A transparent UDP socket is closed successfully.
```

```
+TRANSCLOSE: 1,OK

+TCPTRANS: Link Closed          The transparent TCP socket is closed by the server or because
                                of network abnormality.
```

9 TCP Server Commands

9.1 AT+TCPLISTEN – Setting TCP Listening of the Server

To set the TCP listening function of the server.

Format

Type	Command	Response
Set	AT+TCPLISTEN=<port><CR>	<CR><LF>+TCPLISTEN: <socket>,OK Or <CR><LF>+TCPLISTEN: bind error Or <CR><LF> Listening... <CR><LF> Or <CR><LF>+TCPLISTEN: ERROR
Query	AT+TCPLISTEN?<CR>	<CR><LF>+TCPLISTEN: listening status<CR><LF> <CR><LF>+TCPLISTEN: not listening<CR><LF>

Parameter

<port> Port number
<socket> Socket number

Example

```
AT+TCPLISTEN=6800                    Listening port ID: 6800
+TCPLISTEN: 0,OK                     The server starts listening
AT+TCPLISTEN=6800                    Listening port ID: 6800
+TCPLISTEN: bind error               Fails to bind
AT+TCPLISTEN=6800
Listening...                         Transparent listening is set already.
AT+TCPLISTEN=0
+TCPLISTEN: ERROR                    The port ID is invalid.
AT+TCPLISTEN?
+TCPLISTEN: listening status         Query the listening status. Here the server is in
                                     the listening status.
```

```
AT+TCPLISTEN?                          Query the listening status. Here the server is not
+TCPLISTEN: not listening              in the listening status.

Connect                                Receive the connection request from the client.
AcceptSocket=1,ClientAddr=119.123      AcceptSocket indicates the socket ID on the module,
.77.133,ClientPort=8000                and 119.123.77.133 is the IP address of the client.
```

9.2 AT+CLOSELISTEN – Closing the Listening Socket

To close the listening socket and close all connections.

Format

Type	Command	Response
Execute	AT+CLOSELISTEN<CR>	<CR><LF>+CLOSELISTEN: <Socket>,local link closed
URC	+CLOSELISTEN: <Socket>,local link closed	

Parameter

N/A.

Example

```
+CLOSELISTEN: 0,local link closed      The server closes the socket or network
                                       abnormalities occur.

AT+CLOSELISTEN                         The local socket is closed if there is any
+CLOSELISTEN: 0,local link closed      connection to the client.
```

9.3 AT+CLOSECLIENT – Closing Connections with the Client

To close all connections with the client.

Format

Type	Command	Response

Execute	AT+CLOSECLIENT[=<socket>]<CR>	<CR><LF>+CLOSECLIENT: <socket>,remote link closed<CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+CLOSECLIENT: All remote link closed<CR><LF>

Parameter

<socket> Socket number

Example

```
AT+CLOSECLIENT
+CLOSECLIENT: 1,remote link closed        All connections with the client are closed successfully.

+CLOSECLIENT: 2,remote link closed

AT+CLOSECLIENT=1
+CLOSECLIENT: 1,remote link closed        Close the connection with the client on socket 1.

AT+CLOSECLIENT=1
ERROR                                    No client on socket 1.

AT+CLOSECLIENT
+CLOSECLIENT: All remote link closed      All clients are closed.
```

9.4 +TCPRECV(S) – URC Notifying Data Received from the Client

To notify data received from the client.

Format

Type	Command
URC	+TCPRECV(S): <n>,<length>,<data><CR>

Timeout

N/A.

Parameter

<n>	Socket ID, ranging from 0 to 4.
<length>	The length of the data received.
<data>	The data received. Add 0x0d 0x0a to the end of the data. We can identify the end based on <length>.

Example

```
+TCPRECV(S): 1,10,1234567899          Socket 1 receives 10-byte data in char format from the client.

+TCPRECV(S):
0,10,30313233343536373839             Socket 0 receives 10-byte data in hexadecimal ASCII format.
```

- Additional (s) makes this command different from the receive mode of the client mode in format.
- The parameters are different from that of the +TCPRECV command.

9.5 AT+TCPSENDS – Sending Data to the Client

To send data to the client

Ensure that a TCP connection has been set up before sending TCP data.

Format

Type	Command	Response
Execute	AT+TCPSENDS=<socket>[,<length>]<CR>	<CR><LF>> <CR><LF>OK<CR><LF> <CR><LF>+TCPSENDS: <socket>[,<length>] Or <CR><LF>+TCPSENDS: Buffer not enough,439 Or <CR><LF>OK<CR><LF> <CR><LF>+TCPSENDS: <socket>,<length> Or <CR><LF>+TCPSENDS: ERROR Or <CR><LF>+TCPSENDS: SOCKET ID NOT ACTIVE Or <CR><LF>+TCPSENDS: <socket>, OPERATION

EXPIRED<CR><LF>

Parameter

<socket>	The value of AcceptSocket, that is, the socket of the module. See the description of the AT+TCPLISTEN command.
<length>	Length of the data to be sent, ranging from 1 to 2000, unit: byte.

Example

```
AT+TCPSENDS=0,10
>
OK                                  10-byte data is successfully sent through socket 0.

+TCPSENDS: 0,10
AT+TCPSENDS=0,536                   Failed to send 536-byte data through socket 0 (e.g.
>                                   1234567890...) because the internal buffer is
+TCPSENDS: Buffer not enough,439    insufficient.

                                    Send 21-byte data on socket 0.
AT+TCPSENDS=0
>                                   (e.g.: 012345678901234567890 or
OK                                  303132333435363738393031323334353637383930)
                                    (When <length> is not included in the command, end
+TCPSENDS: 0,21                     the data with Ctrl+Z. The length of data sent is
                                    2000 at most)
AT+TCPSENDS=0,1024                  Send TCP data.
>
+TCPSENDS: ERROR                    Congestion.
AT+TCPSENDS=0,10
+TCPSENDS: 0 is not link            No connection is set up on socket 0.
AT+TCPSENDS=0
+TCPSENDS: 0 is not link
AT+TCPSENDS=0,5
>                                   No data is input within 60 seconds after > is
+TCPSENDS: 0,OPERATION EXPIRED      displayed.
```

9.6 AT+TCPREADS – Reading Data from the Server

To read TCP data from the client.

Format

Type	Command	Response
Execute	AT+TCPREADS=<socket>[,<length>]<CR>	<CR><LF>+TCPREADS: <socket>,<length>,<data><CR><LF><CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<socket> The listening socket ID. The TCP connection is established between the client and the module on this socket..

<length> maximum length of data allowed to read, ranging from 1 to 1024.

<content> data read

Example

```
+TCPRECV(S): 2,24                RECVMODE=0
AT+TCPREADS=2                    Socket 2 receives data from the server.
+TCPREADS: 2,12,client
hello
OK
+TCPRECV(S): 2,36

AT+TCPREADS=2,100                Socket 2 receives data from the server.
+TCPREADS: 2,36,client
helloclient helloclient
hello
OK
```

10 FTP AT Commands

10.1 AT+FTPLOGIN – Logging in to the FTP Server

To log in to the FTP server.

The FTP functions cannot be used together with the internal protocol stack TCP/UDP function. Data can be read or written on the FTP server only after login.

Format

Type	Command	Response
Execute	AT+FTPLOGIN=<ip>,<port>,<user>,<pwd><CR>	<CR><LF>OK<CR><LF> <CR><LF>+FTPLOGIN: <result><CR><LF> Or <CR><LF>OK<CR><LF> <CR><LF>+FTP:Server Ctrl Link Disconnect Or <CR><LF>ERROR<CR><LF>

Parameter

<ip> IP address of the FTP server.

<port> Port ID of the FTP server, 21

<user> The user name to log in to the FTP server. Its length cannot exceed 100 bytes in ASCII code and comma (,) is not allowed in a name.

<pwd> The password for a user to log in to the FTP server. Its length cannot exceed 100 bytes in ASCII code and contain comma (,) is not allowed in it.

<result>

- Error: Incorrect AT command format
- Have Logged In: The user has logged in to the FTP server.
- AT Busy: The module is still executing last FTP AT command.
- User logged in: Logged into the FTP server successfully.
- 530 Not logged in: Failed to log in to the FTP server because the account or password is incorrect.
- GPRS DISCONNECTION: A PPP link is not set up yet.

Example

```
AT+FTPLOGIN=219.134.179.52,21,user1,pwd2009                    Log in to the server
OK

                                                               Successfully
+FTPLOGIN: User logged in
AT+FTPLOGIN=58.60.184.213,21,neowayftp,neow
ayftp
OK

                                                               Fail to log in to the FTP server.
+FTP: Server Ctrl Link Disconnect
+FTPLOGIN: Error
```

10.2 AT+FTPLOGOUT – Logging Out from the FTP Server

To log out from the FTP server.

Format

Type	Command	Response
Execute	AT+FTPLOGOUT<CR>	<CR><LF>+FTPLOGOUT: User logged out <CR><LF>OK<CR><LF> Or <CR><LF>+CME ERROR: INVALID SOCKET ID <CR><LF>ERROR<CR><LF>

Parameter

N/A.

Example

```
AT+FTPLOGOUT
+FTPLOGOUT: User logged out                    Log out from the FTP server.
OK

AT+FTPLOGOUT
+CME ERROR: INVALID SOCKET ID                  Log out of the FTP server because the FTP server
ERROR                                          is offline.
```

10.3 AT+FTPSIZE – Obtaining File Size on FTP Server

To obtain the size of a file on the FTP server.

Format

Type	Command	Response
Execute	AT+FTPSIZE=<filename><CR>	<CR><LF>+FTPSIZE: <size><CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+FTPSIZE: <result> <CR><LF>

- If PPP is not activated, ERROR is returned directly.
- If the file does not exist, ERROR is returned directly.

Parameter

<filename> File name. The file path is relative to the FTP root directory.

<size> File size, unit: byte.

<result>
- Error Not Login: The user has not logged in to the FTP server.
- AT Busy: The module is still executing last FTP AT command.
- Error: A PPP link is not set up yet.

Example

```
AT+FTPSIZE=test.txt                    Obtain the size of test.txt in the FTP root directory.
+FTPSIZE: 1024
```

10.4 AT+FTPGET – Downloading Data from the FTP Server

To download data from the FTP server.

Format

Type	Command	Response
Execute	AT+FTPGET=<dir&filename>,<type>,<Content or Info>[,offset[,length]]<CR>	<CR><LF>+FTPGET:<length><data><CR><LF> <CR><LF>+FTP:Server Data Link Disconnect <CR><LF> <CR><LF>+FTPGET: OK.total length is <n> Or <CR><LF>+FTPGET: OK.total length is <m><CR><LF> Or <CR><LF>+FTPGET: Error<CR><LF>

Parameter

<dir&filename>	Path and name of the file to be read (Note: The file directory under the FTP root directory)
<type>	File transfer mode: 1: ASCII 2: Binary
<Content or Info>	File content or file (or specified directory) information. 1: Obtain the file content 2: Obtain the information of the file or the specified path 3: Obtain the file length
<offset>	Specifies offset of file content.
<length>	Length of file downloaded from the start point, ranging from 1 to 8192 bytes.
<data>	Indicates data content
<m>	The length of file read.
<n>	The length of data read.

Example

```
AT+FTPGET=,1,2
+FTPGET: 446,drw-rw-rw-1 user group
0 Apr 14 15:55 .
drw-rw-rw- 1 user group 0 Apr 14
15:55.
-rw-rw-rw- 1 user group 1238528 Jan
14 10:36 1M.doc                          Obtain information of the root directory.
-rw-rw-rw- 1 user group 10 Jan 15
15:01 test.txt

+FTP:Server Data Link Disconnect
```

```
+FTPGET: OK.total length is 446
AT+FTPGET=test.txt,1,2
+FTPGET: 65,-rw-rw-rw-   1 user
group    10 Jan 15 15:01 test.txt
                                        Obtain information about test.txt.
+FTP:Server Data Link Disconnect

+FTPGET: OK.total length is 65
AT+FTPPUT=test.txt,1,2,10
>                                       Upload 10-byte data.
+FTPPUT: OK,10
AT+FTPGET=test.txt,1,1
+FTPGET: 10,0123456789
                                        Read all data from the beginning of the file.
+FTP:Server Data Link Disconnect

+FTPGET: OK.total length is 10
AT+FTPGET=test.txt,1,1,2
+FTPGET: 8,23456789
                                        Read all data starting from the 2nd byte of the
+FTP:Server Data Link Disconnect        file.

+FTPGET: OK.total length is 8
AT+FTPGET=test.txt,1,1,2,4
+FTPGET: 4,2345
                                        Read 4-byte data starting from the 2nd byte of
+FTP:Server Data Link Disconnect        the file.

+FTPGET: OK.total length is 4
AT+FTPGET=test.txt,1,3
+FTPGET: OK.file length is 10           Obtain the file length.
```

10.5 AT+FTPPUT – Uploading Data to the FTP Server:

To upload data to the FTP server.

Format

Type	Command	Response
Execute	AT+FTPPUT=<dir&filename>,<type>,<mode>[,<size>]<CR>	<CR><LF>> <CR><LF>+FTPPUT: OK,<n><CR><LF> Or <CR><LF>+FTPPUT: <result><CR><LF>

Parameter

<dir&filename>	The name and path of the file to be uploaded The file path is relative to the FTP root directory.
<type>	File transfer mode. 1: ASCII 2: Binary
<mode>	Operation mode 1: STOR mode Create a file on the FTP server and write the data to the file. If the file exists, the original file is overwritten. 2: APPE mode Create a file on the FTP server and write the data to the file. If the file exists, the data is attached to the end of the file. 3: DELE mode Delete a file.
<size>	Data length. The data length cannot exceed 8192.
<result>	• Error: The format of the AT command is incorrect or the last FTP command is not executed successfully. • Error Not Login: The user has not logged in to the FTP server. • AT busy: The module is still executing last FTP AT command. • SIZE Error: The value of <length> is greater than 8192. • Delete File OK: The file is deleted successfully. • Error TimeOut: No data input for long time.

Example

```
AT+FTPPUT=test.txt,1,1,10          Upload the text.txt file, which is 10 bytes. The file is
>                                  transferred in ASCII and the operated in STORE.
+FTPPUT: OK,10
AT+FTPPUT=test.txt,1,2,10          Upload the text.txt file, which is 10 bytes. The file is
>                                  transferred in ASCII and the operated in APPE.
+FTPPUT: OK,10
AT+FTPPUT=test.txt,1,3,0           Delete the test.txt file.
+FTPPUT: Delete File OK
```

10.6 AT+FTPSTATUS – Querying FTP Connection Status

To query the FTP connection status.

Format

Type	Command	Response
Execute	AT+FTPSTATUS<CR>	<CR><LF>+FTPSTATUS: <status>,<ip>,<port><CR><LF>

	Or <CR><LF>+FTPSTATUS: 0<CR><LF>

Parameter

<status>	0: The FTP connection has not been set up. 1: The FTP connection has been set up.
<ip>	The IP address of the FTP server
<port>	The port of the FTP server.

Example

```
AT+FTPSTATUS                          Query the FTP connection status.
+FTPSTATUS:                           The module is successfully connected to the FTP
1,119.139.221.66,21                   server. The IP address of the FTP server is
                                      119.139.221.66 and the port is 21.
AT+FTPSTATUS
+FTPSTATUS: 0                         Not logged in.
```

11 Remote Upgrade Via FTP

11.1 AT+FTPGETFURC – Enabling/Disabling the URC Indicating the Start of an FTP Upgrade

To enable or disable the URC indicating the start of an FTP Upgrade.

If the URC is enabled, the module reports **+FTPGETF: DOWNLOAD START** after the FTP upgrade starts.

Format

Type	Command	Response
Set	AT+FTPGETFURC=<download_start><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+FTPGETFURC?<CR>	<CR><LF>+FTPGETFURC: <n> <CR><LF>OK<CR><LF>
Test	AT+FTPGETFURC=?<CR>	<CR><LF>+FTPGETFURC: (value range of <download_start>) <CR><LF>OK<CR><LF>

Parameter

<download_start> Switch of URC of download start
0: disable (default) .
1: enable

Example

```
AT+FTPGETFURC=1                    Enable the URC of download start.
OK
AT+FTPGETFURC?
+FTPGETFURC: 1                     Query the switch status.
```

```
OK
AT+FTPGETFURC=?
+FTPGETFURC: (0-1)                    Query the value range of the parameter.
OK
```

11.2 AT+FTPGETF – FTP Upgrade

To upgrade the module remotely through an FTP server.

- Before the upgrade, you need to prepare the upgrade package and save it on the FTP server.
- After the package is downloaded successfully, the module powers down and up and then executes the upgrade automatically.
- After the upgrade is successful, power down and re-power the module, while pressing and holding the POWER_KEY button to start the module.

Format

Type	Command	Response
Execute	AT+FTPGETF=<ip>,<port>,<mode>,<filename>,<user>[,<pwd>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+FTPGETF: <res><CR><LF>
Query	AT+FTPGETF?<CR>	<CR><LF>+FTPGETF:<n><CR><LF> <CR><LF>OK<CR><LF>

Parameter

<ip>	IP address or domain name of the FTP server
<port>	Server port, 21 in general
<mode>	0: module upgrade 1: other upgrade
<filename>	Name of the upgrade file on the FTP server
<user>	Users name used to log in to the FTP server. The length of the user name cannot exceed 100 ASCII codes and the user name cannot contain a comma (,).
<pwd>	Password used to log in to the FTP server. The length of the password cannot exceed 100 ASCII codes and the password cannot contain a comma (,).
<process>	• LOGIN OK • DOWNLOAD START: displayed only after the Unsolicited result code is enabled • FILE END: the file is downloaded successfully

- ERROR EPSV: the server should support IPv6 since an IPv6 network is used.
- ERROR PPP: PPP is not activated.
- ERROR SOCKET: the module fails to obtain a SOCKET.
- ERROR EVENT: the module fails to set SOCKET properties.
- ERROR ADDR: The module fails to connect to the FTP IP address.
- ERROR DOMAIN: the module fails to connect to the FTP domain name.
- ERROR CONNECT: the module fails to connect to the FTP socket.
- ERROR LOGIN: the module fails to log into the FTP server.
- ERROR NO FILE: the file is inexistent or permissions are limited.
- ERROR FSIZE: the module fails to obtain the file size.
- ERROR PASV: the module fails to establish a data connection through FTP.
- ERROR HEADER: the download file fails in the header verification.
- ERROR LENGTH: the module fails to check the length of the downloaded file.
- ERROR DISCONNECT: the link is disconnected abnormally.
- ERROR TIMEOUT: timeout

<n> Module status
0: idle
1: downloading
2: download ends
When n is 1, and the status is downloading, the return value is:
+FTPGETF: 1,<total_size>,<length>
total_size: Total size of the upgrade package in bytes;
length: Bytes downloaded.

<prompt> Upgrade result
FOTA START: start to upgrade
FOTA SUCCESS: upgraded successfully
FOTA FAIL num: failed to upgrade, num ranges from 1 to 15. The customer does not need to pay attention to the serial number.

Example

```
AT+FTPGETF=58.60.184.213,11979,0,N27_
E2F368_BZ_V001A.pkt,hzh,hzh                    Execute upgrade.

AT+FTPGETF?                                    Downloading
+FTPGETF: 1,23653645,156320                    The package is 23653645 bytes and 156320 bytes
OK                                             are downloaded already

AT+FTPGETF?
+FTPGETF: 2                                    Download ends.

OK
+FTPGETF: FILE END                             File download ends

FOTA START                                     Started to upgrade

FOTA SUCCESSS                                  Upgraded successfully
```

12 HTTP Commands

12.1 AT+HTTPPARA – Setting HTTP Parameters

To set HTTP parameters.

- Do Not execute this command together with the HTTPSPARA command.
- After the **+HTTPSCLOSE** command is executed, the connection is closed and parameter settings will be cleared.

Format

Type	Command	Response
Set	AT+HTTPPARA=<para>,<para_value><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<para> HTTP parameters, supporting the following two parameters:
URL: Destination path
port: Destination port ID (no default value)

<para_value> Value of **<para>** with double quotes. The value of URL contains at most 2048 bytes and URL supports domain name translation.

Example

```
AT+HTTPPARA =url,www.neoway.com.cn/en/index.aspx          Set the Neoway homepage as the
OK                                                        URL. The URL supports domain name
                                                          translation.
AT+HTTPPARA=url,121.15.200.97/Service1.asmx/GetNote       Set URL.
OK
AT+HTTPPARA=url,                                          The AT command is not complete.
ERROR
```

```
AT+HTTPPARA=port,80                    Set the destination port ID to
OK                                     80.
AT+HTTPPARA=port,8080                  Set the destination port ID to
OK                                     8080.
```

12.2 AT+HTTPSETUP – Setting up an HTTP Connection

To set up an HTTP connection.

The connection is set up successfully only after setting the destination address and port ID correctly. Ensure that a network connection has been set up successfully before setting an HTTP connection.

Format

Type	Command	Response
Execute	AT+HTTPSETUP<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

N/A.

Example

```
AT+HTTPSETUP                           Set up an HTTP connection
OK                                     Successful
AT+HTTPSETUP                           Set up an HTTP connection
ERROR                                  DNS translation fails
```

12.3 AT+HTTPACTION – Initiating an HTTP Request

To initiate an HTTP request.

Comply with the HTTP protocol when defining packets.

Format

Type	Command	Response
Execute	AT+HTTPACTION=<mode>[,<length>[,<type>[,<offset>,<size>]]]]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>><post_content><CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<mode>	HTTP request mode, available value can be 0, 1, 2, 99 0: GET (When downloading a file by GET method, you can set the offset and size parameters to achieve a segmented download.) 1: HEAD 2: POST 99: OPEN_MODE, custom packet mode
<length>	POST content length or custom packet length; mandatory when <mode> is set to POST or OPEN_MODE, 2048 at most.
<type>	data type of POST request 0: x-www-form-url encoded 1: text 2: json 3: xml 4: html
<offset>	Offset in GET mode
<size>	Size of file to be downloaded in GET mode
<post_content>	Content sent through HTTP POST

Example

```
AT+HTTPPARA=url,www.neoway.com.cn/en/index.aspx          Set the destination path.
OK                                                       Set up an HTTP connection.
AT+HTTPSETUP
OK
AT+HTTPACTION=0                                          GET request
OK

                                                         Receive the response from
+HTTPRECV:                                               the HTTP server.
HTTP/1.1 200 OK
Cache-Control: private
Content-Type: text/html; charset=utf-8
Server: Microsoft-IIS/7.5
```

```
Set-Cookie: ASP.NET_SessionId=rh3fjg554ufzb145aevgzz45;
path=/; HttpOnly
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
X-UA-Compatible: IE=EmulateIE7
Date: Wed, 02 Mar 2016 06:52:35 GMT
Connection: close
Content-Length: 13842                                   The server finishes the
                                                        response and disconnects
/*neoway homepage, html format, 13842 bytes*/          the connection.
……..
/* neoway homepage*/
+HTTPCLOSED: HTTP Link Closed
AT+HTTPPARA =url,www.neoway.com.cn/en/index.aspx        Set the destination path.
OK                                                      Set up an HTTP connection
AT+HTTPSETUP                                            HEAD request
OK
AT+HTTPACTION=1
OK                                                      The HTTP server responds.

+HTTPRECV:
HTTP/1.1 200 OK
Cache-Control: private
Content-Length: 13842
Content-Type: text/html; charset=utf-8
Server: Microsoft-IIS/7.5
Set-Cookie: ASP.NET_SessionId=znt4fqabqsuclz55pvfufn55;
path=/; HttpOnly
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
X-UA-Compatible: IE=EmulateIE7
Date: Thu, 28 Nov 2013 03:32:35 GMT
Connection: close


+HTTPCLOSED: HTTP Link Closed
AT+HTTPPARA=url,121.15.200.97/Service1.asmx/GetNote    Set destination path
OK
AT+HTTPPARA=port,8080                                   Set the destination port ID
OK                                                      as 8080.
AT+HTTPSETUP                                            Set up an HTTP connection
OK
AT+HTTPACTION=2,23                                      POST request.
>MAC=NEOWAY&DATA=0123456                               Send 23 bytes; enter the
OK                                                      contents to be uploaded
                                                        after > is displayed.
+HTTPRECV:
                                                        Receive the response from
HTTP/1.1 200 OK                                        the HTTP server.
Cache-Control: private, max-age=0
Content-Type: text/xml; charset=utf-8
```

```
Server: Microsoft-IIS/7.5
X-AspNet-Version: 4.0.30319                                  The server replies an XML
X-Powered-By: ASP.NET                                        file containing the
Date: Thu, 28 Nov 2013 03:41:52 GMT                          uploaded content NEOWAY and
Connection: close                                            0123456.
Content-Length: 98

<?xml version="1.0" encoding="utf-8"?>                       The server disconnected
<string xmlns="http://wsliu.cn/">NEOWAY+0123456              with the module after it
</string>                                                    finished responding.

+HTTPCLOSED: HTTP Link Closed
AT+HTTPPARA=url,www.neoway.com.cn/en/index.aspx              Set destination path
OK
AT+HTTPSETUP                                                 The HTTP connection is set
OK                                                           up through port 80.
AT+HTTPACTION=99,76
>HEAD /en/index.aspx HTTP/1.1
connection: close
HOST: "www.neoway.com.cn"

                                                             Send 76-byte user-defined
OK                                                           packets

+HTTPRECV:
HTTP/1.1 200 OK
Cache-Control: private                                       Receive the response from
Content-Length: 13842                                        the HTTP server.
Content-Type: text/html; charset=utf-8
Server: Microsoft-IIS/7.5
Set-Cookie: ASP.NET_SessionId=pvlaai3fizxg44eyvyqsyenk;
path=/; HttpOnly
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
X-UA-Compatible: IE=EmulateIE7
Date: Thu, 28 Nov 2013 05:40:24 GMT
Connection: close                                            The server disconnects with
                                                             the module after it
                                                             finishes responding.

+HTTPCLOSED: HTTP Link Closed
```

12.4 AT+HTTPCLOSE – Closing an HTTP Socket

To close an HTTP socket

After the +HTTPCLOSE command is executed, the HTTP socket is closed and the setting of +HTTPPARA is cleared.

Format

Type	Command	Response
Execute	AT+HTTPCLOSE<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>+HTTPCLOSE: <result>

Parameter

<result> HTTP Link Closed

Example

```
AT+HTTPCLOSE                          Close the HTTP socket.
OK

                                      The socket connection is closed successfully.
+HTTPCLOSE: HTTP Link Closed
```

12.5 +HTTPRECV – URC Notifying HTTP Data Receiving

To notify the received HTTP data.

When the module receives HTTP data from the network, the UART prints the data automatically.

Format

Type	Response
URC	<CR><LF>HTTPRECV: <CR><LF><datas>

Parameter

<data> Data received through the HTTP socket

Example

```
+HTTPRECV:                                    Report the data
HTTP/1.1 200 OK                               received from the HTTP
Cache-Control: private                        connection.
Content-Length: 13842
```

```
Content-Type: text/html; charset=utf-8
Server: Microsoft-IIS/7.5
Set-Cookie: ASP.NET_SessionId=pvlaai3fizxg44eyvyqsyenk;
path=/; HttpOnly
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
X-UA-Compatible: IE=EmulateIE7
Date: Thu, 28 Nov 2013 05:40:24 GMT
Connection: close


+HTTPCLOSED:
HTTP Link Closed
```

12.6 +HTTPCLOSED – URC Notifying HTTP Socket Connection Closed

To notify that the HTTP socket connection is closed.

Format

Type	Response
URC	<CR><LF>+HTTPCLOSE: Link Closed<CR><LF>

Parameter

N/A

Example

```
+HTTPCLOSED: HTTP Link Closed              the HTTP socket connection is closed.
```

13 HTTPS Commands

13.1 AT+HTTPSPARA – Setting HTTPS Parameters

To set HTTPS parameters

- Do Not execute this command together with the HTTPPARA command.
- After the **+HTTPSCLOSE** command is executed, the connection is closed and parameter settings will be cleared.

Format

Type	Command	Response
Set	AT+HTTPSPARA=<para>,<para_value><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<para> HTTPS parameters, supporting the following two parameters:
url: destination path
port: destination port ID

<para_value> The value of <para>. The value of url contains at most 1022 bytes and url supports domain name translation. A pair of quotation marks is required for url.

Example

```
AT+HTTPSPARA=url,www.alipay.com/index.html          Set the Alipay homepage as the URL. The
OK                                                  URL supports domain name translation.
AT+HTTPSPARA=url,"132.188.73.13/prodreg/begin       Set URL.
Registration.action"
OK
AT+HTTPSPARA=port,443                               Set the destination port ID to 443.
OK
```

13.2 AT+HTTPSSETUP – Setting up an HTTPS Connection

To set up an HTTPS connection.

The connection is set up successfully only after setting the destination address and port ID correctly.

Ensure that PPP dialing is successful before an HTTPS connection is set up.

Format

Type	Command	Response
Execute	AT+HTTPSSETUP<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

N/A

Example

```
AT+HTTPSSETUP                Set up an HTTPS connection.
OK                           Successful
AT+HTTPSSETUP                Set up an HTTPS connection.
ERROR                        Failed
```

13.3 AT+HTTPSACTION – Initiating an HTTPS Request

To initiate an HTTPS request

Comply with the HTTPS protocol when defining packets.

Different status codes might be returned. For example, **405 Method Not Allowed** is prompted if the request methods is not supported.

Format

Type	Command	Response
Execute	AT+HTTPSACTION=<mode>[,<length>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>><post_content><CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>OK<CR><LF>

Parameter

<mode>	HTTPS request mode, available value can be 0, 1, 2, 99 0: GET 1: HEAD 2: POST 99: OPEN_MODE, custom packet mode
<length>	POST content length, ranging from 1 to 2048; or custom packet length when **<mode>** is set to **POST** or **OPEN_MODE**
<size>	Size of file to be downloaded in GET mode
<post_content>	Content sent through HTTPPOST

Example

```
AT+HTTPSPARA=url,"www.alipay.com/ index.html"        Set the destination address. The
OK                                                   default port is 443.

AT+HTTPSSETUP                                        Set up an HTTPS connection.
OK

AT+HTTPSACTION=0                                     GET request
OK


+HTTPSRECV:                                          Receive the response from the HTTPS
HTTP/1.1 200 OK                                      server.
Server: spanner/1.0.6
Date: Fri, 01 Aug 2014 03:02:34 GMT
Content-Type: text/html; charset=gbk
Content-Length: 56028
Connection: close
Last-Modified: Wed, 23 Jul 2014 07:51:38 GMT
Strict-Transport-Security: max-age=31536000
Accept-Ranges: bytes
Set-Cookie:
spanner=Z761rjOVBLsAdq8c3/Rwpd9j7dWQJZjm;path
=/;secure;
```

```
/*alipay homepage, html format, 56028 bytes
*/
……..                                          Unsolicited report that the connection
/* alipay homepage*/                           is closed after the server responds to
                                               the request.
+HTTPSCLOSED: HTTPS Link Closed
AT+HTTPSPARA=url,"www.alipay.com/index.html"
OK
AT+HTTPSSETUP
OK
AT+HTTPSACTION=1                               Set the destination address. The
OK                                             default port is 443.
                                               Set up an HTTPS connection.
+HTTPSRECV:
HTTP/1.1 200 OK
Server: spanner/1.0.6
Date: Fri, 01 Aug 2014 03:05:41 GMT
Content-Type: text/html; charset=gbk
Content-Length: 56028                          HEAD request
Connection: close
Last-Modified: Wed, 23 Jul 2014 07:51:40 GMT
Strict-Transport-Security: max-age=31536000
Accept-Ranges: bytes                           HTTPS server response
Set-Cookie:
spanner=G0TDss3KCl08k1dgppqS1y6qNx1FfX2V;path
=/;secure;

+HTTPSCLOSED: HTTPS Link Closed
AT+HTTPSPARA=url,"www.alipay.com/index.html"
OK
AT+HTTPSSETUP                                  Set URL.

OK
AT+HTTPSACTION=99,69                           Use the default port 443 to set up an
>HEAD /index.html HTTP/1.1                     HTTPS connection.
HOST:www.alipay.com
connection: close                              Use custom packet mode to send 69-byte
                                               packets.
OK

+HTTPSRECV:
HTTP/1.1 200 OK                                Receive HTTPS server response.
Server: spanner/1.0.6
Date: Sat, 02 Aug 2014 06:06:21 GMT
Content-Type: text/html; charset=gbk
Content-Length: 56059
Connection: close
Last-Modified: Fri, 01 Aug 2014 07:45:49 GMT
Strict-Transport-Security: max-age=31536000
```

```
Accept-Ranges: bytes
Set-Cookie:
spanner=LBKsxiiZAaTeM3wRYcCaUtMjpheSwnH+;path
=/;secure;                                          The server finishes responding and
                                                    closes the connection.
+HTTPSCLOSED: HTTPS Link Closed
```

13.4 AT+HTTPSCLOSE – Closing an HTTPS Socket

To close an HTTPS socket

After the **+HTTPSCLOSE** command is sent, the HTTPS socket is closed and the setting of **+HTTPSPARA** is cleared.

Format

Type	Command	Response
Execute	AT+HTTPSCLOSE<CR>	<CR><LF>OK<CR><LF> <CR><LF>+HTTPSCLOSE: HTTPS Link Closed

Parameter

N/A

Example

```
AT+HTTPSCLOSE                              Close the HTTPS socket.
OK

+HTTPSCLOSE: HTTPS Link Closed
```

13.5 +HTTPSRECV – URC Notifying HTTPS Data Receiving

To notify the received HTTPS data.

Format

Type	Command
URC	<CR><LF>+HTTPSRECV: <datas><CR><LF>

Parameter

<datas> Data that the HTTPS socket receives

Example

```
+HTTPSRECV:
HTTP/1.1 200 OK
Cache-Control: private
Content-Length: 13842
Content-Type: text/html; charset=utf-8
Server: Microsoft-IIS/7.5
Set-Cookie:
ASP.NET_SessionId=pvlaai3fizxg44eyvyqsyenk;
path=/; HttpOnly                                  Data received by the HTTPS connection.
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
X-UA-Compatible: IE=EmulateIE7
Date: Thu, 28 Nov 2013 05:40:24 GMT
Connection: close

+HTTPSCLOSED: HTTPS Link Closed
```

13.6 +HTTPSCLOSED – URC Notifying HTTPS Socket Connection Closed

To notify that the HTTPS socket connection is closed.

Format

Type	Response
URC	<CR><LF>+HTTPSCLOSED: HTTPS Link Closed <CR><LF>

Parameter

N/A

Example

```
+HTTPSCLOSED: HTTPS Link Closed       Unsolicited report of the HTTPS socket closing
```

14 MQTT Commands

14.1 AT+ MQTTCFG – Setting MQTT TLS Parameters

To set the MQTT configuration parameters.

Parameter

Type	Command	Response
Set	AT+MQTTCFG=<type>,<type_name><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<type> SSL option configuration
sslversion: SSL protocol version
authmode: safe authentication mode
ciphersuite: encryption suit
cacert: root certificate
clientcert: client-side certificate
clientkey: client-side key

<type_name> Relations between <type> and <type_name>.
sslversion
0: SSL3.0
1: TLS1.0
2: TLS1.1
3: TLS1.2
authmode
0: No authentication
1: Manage server authentication
2: Manage server and client authentication if requested by the remote server
ciphersuite: reserved.
cacert: file name of the root certificate
clientcert: file name of the client-side certificate
clientkey: file name of the client-side key

Enclose character strings within quotation marks (" ").

If authmode is 0, cacert, clientcert, and clientkey are not required to be set.

Example

```
AT+MQTTCFG="cacert","ca_cert.pem"                          Set the root certificate
OK
AT+MQTTCFG="clientcert","client_cert.pem"                  Set the client-side certificate.
OK
```

14.2 AT+MQTTCONNPARAM – User Parameter Settings

To set ID, user name, and password.

This command is invalid after the MQTT connection has been set up.

The settings by this command are not saved after the module is powered off.

Format

Type	Command	Response
Set	AT+MQTTCONNPARAM=<"clientdID">,<"username">,<"password"><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+MQTTCONNPARAM?<CR>	<CR><LF>+MQTTCONNPARAM:<"clientID">,<"username">,<"password"> <CR><LF>OK<CR><LF>
Test	AT+MQTTCONNPARAM=?<CR>	<CR><LF>+MQTTCONNPARAM:<"clientID">,<"username">,<"password">[,<"pubk">] <CR><LF>OK<CR><LF>

Parameter

<"clientID"> Device ID, 256 bytes at most
<"username"> User name, 512 bytes at most
<"password"> Password, 256 bytes at most

Example

```
AT+MQTTCONNPARAM="C_201801021127","lixytest/thing0        Parameters are set successfully.
1","0lSoY/eYnlSqUeAsbAKKQ/ACmipZwEw9H7Ff0h1kOps="
OK
```

The above parameters are for reference only.

14.3 AT+MQTTWILLPARAM – Will Settings

To set will parameters.

This command is invalid if an MQTT connection has been set up.

The settings by this command are not saved after the module is powered off.

Format

Type	Command	Response
Set	AT+MQTTWILLPARAM=<retained>,<qos>,<"topicname">,<"message"><CR>	<CR><LF>+GNSSSTATE: <status><CR><LF> Or <CR><LF>OK<CR><LF>
Query	AT+MQTTWILLPARAM?<CR>	<CR><LF>+MQTTWILLPARAM:<retained>,<qos>,<"topicname">,<"message"><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+MQTTWILLPARAM=?<CR>	<CR><LF>+MQTTWILLPARAM:<retained>,<qos>,<"topicname">,<"message"><CR><LF> <CR><LF>OK<CR><LF>

Parameter

<retained>	Retain mark, digit, 0 or 1
<qos>	Quality of service, only 0 and 1 are supported
<"topicname">	Will topic, at most 128 bytes
<"message">	Will Message, at most 1024 bytes

Example

```
AT+MQTTWILLPARAM=0,1,"lixytopic","by      The will is set successfully.
by"
OK
```

14.4 AT+MQTTCONN – Connection Command

To connect to the MQTT server.

- The module embeds reconnection mechanism. Do not set up connection manually during reconnection until the module disconnects to the server or reports a disconnection.
- Do not repeat the operation of setting up a connection when waiting for the return value.
- If the module reports +MQTTDISCONNED: Link Closed after an MQTT connection is set up successfully, send to command to set up a connection manually.

Format

Type	Command	Response
Execute	AT+MQTTCONN=<"host">,<clean>,<keep_alive><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+MQTTCONN?<CR>	<CR><LF>+MQTTCONN:<"host">,<clean>,<keep_alive><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+MQTTCONN=?<CR>	<CR><LF>+MQTTCONN:<"host">,<clean>,<keep_alive><CR><LF> <CR><LF>OK<CR><LF>

Parameter

<"host">	Server address (URL:port)
<clean>	whether to clean session, digit type, 0-Not clean (default) 1-Clean
<keep_alive>	keepAlive time, ranging from 20 to 180, unit second

Example

```
AT+MQTTCONN="121.43.166.63:1883",0,60                    Connect to the MQTT server
OK                                                       successfully.
```

14.5 AT+MQTTSUB – Subscription

To subscribe to a topic.

After the modules fails to subscribe to a topic, query the status of the network and the MQTT connection and then perform next operation. When the network is in poor quality, the modules might return value late.

Format

Type	Command	Response
Execute	AT+MQTTSUB=<"topicname">,<qos><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+MQTTSUB?<CR>	<CR><LF>+MQTTSUB:<"topicname">,<qos> <CR><LF>OK<CR><LF>
Test	AT+MQTTSUB=?<CR>	<CR><LF>+MQTTSUB:<"topicname">,<qos(0~1)> <CR><LF>OK<CR><LF>

The query command can obtain only QoS and topic of last subscription.

Parameter

<"topicname">	Topic to subscribe to, 128 bytes at most
<qos>	Quality of service, only 0 and 1 are supported

Example

```
AT+MQTTSUB="/lixytopic",1                                Subscribe to the topic
OK                                                       successfully.
```

14.6 AT+MQTTUNSUB – Unsubscription

To cancel a subscription.

After the modules fails to cancel a subscription, query the network status. When the network is in poor quality, the modules might return value late.

Format

Type	Command	Response
Execute	AT+MQTTUNSUB=<"topicname"><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<"topicname"> Topic name of the subscription to be canceled.

Example

```
AT+MQTTUNSUB="/lixytopic"                                    Cancel a subcription.
OK
```

14.7 AT+MQTTPUB – Topic Publish

To publish a topic.

When the network is in poor quality, the modules might return value late.

Format

Type	Command	Response
Execute	AT+MQTTPUB=<retained>,<qos>,<"topicname">,<"message"><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+MQTTPUB=?<CR>	<CR><LF>+MQTTPUB:<retained>,<qos>,<"topicname">,<"message"> <CR><LF>

	<CR><LF>OK<CR><LF>

Parameter

<retained>	Retain mark, digit type, 0 and 1
<qos>	Quality of service, only 0 and 1 are supported.
<"topicname">	Topic name, 128 bytes at most
<"message">	Message, 1024 bytes at most

Example

```
AT+MQTTPUB=1,1,"/lixytopic","123321HELLO
"
OK                                          The topic is published successfully and the
                                            server issues the topic at the same time.

+MQTTSUB:3,"/lixytopic",11,123321HELLO
```

14.8 AT+MQTTDISCONN – Disconnecting to the MQTT Server

To disconnect to the MQTT server and release resources.

- After the device disconnects to the MQTT server proactively, it releases the MQTT resources and clears parameter settings.
- To publish messages after disconnecting, configure parameters and set up a connection again.

Format

Type	Command	Response
Execute	AT+MQTTDISCONN<CR>	<CR><LF>OK<CR><LF> Or <CR><LF> ERROR<CR><LF>

Parameter

N/A.

Example

```
AT+MQTTDISCONN                    To disconnect to the MQTT server and release
OK                                resources
```

14.9 +MQTTSUB – URC Notifying the Messages of the Subscribed Topic

To notify the message of the subscribed topic.

Format

Type	Command
URC	+MQTTSUB:<message_id>,<"topicname">,<message_len>,<message><CR>

Parameter

<message_id>	Message ID
<"topicname">	Topic name
<message_len>	The length of the data received
<message>	Data received

Example

```
+MQTTSUB:2,"/lixytopic",11,123321HELO        messages of the subscribed topic.
```

14.10 +MQTTDISCONN – URC Notifying MQTT Disconnection

To notify that the MQTT connection is closed.

If the module disconnects to the server actively, no URC will be prompted.

Format

Type	Command

URC	<CR><LF>+MQTTDISCONNED: Link Closed<CR>

Parameter

N/A.

Example

```
+MQTTDISCONNED: Link Closed                    The connection is closed.
```

14.11 AT+MQTTSTATE – Querying the MQTT Connection Status

To query the status of the MQTT connection.

Format

Type	Command	Response
Query	AT+MQTTSTATE?<CR>	<CR><LF>+MQTTSTATE: <state><CR><LF> <CR><LF>OK<CR><LF>

Parameter

<state> Reconnection status
0: the MQTT connection is closed.
1: the MQTT connection is established.
2: The device is reconnecting to the MQTT server.
3: The device starts to reconnect to the MQTT server.
4: The device fails to reconnect to the MQTT server.

Example

```
AT+MQTTSTATE?
+MQTTSTATE:2                    The device is reconnecting to the MQTT server.
OK
AT+MQTTSTATE?
+MQTTSTATE:1                    The device is connected to the MQTT server.
OK
```

```
AT+MQTTSTATE?
+MQTTSTATE:0                    The device is disconnected to the MQTT server.
OK
```

15 PSM&eDRX Commands

15.1 AT+CPSMS – Setting PSM Mode

To set PSM mode.

The settings by this command are saved after the module is powered off.

To use this command, execute the AT+CSCLK command to set the UART clock to automatic mode and execute the AT+NVSETPM command to set the power management to ultra-low power consumption mode.

The settings should be negotiated with the network. For valid values, consult the carrier.

Format

Type	Command	Response
Execute	AT+CPSMS=[<mode>[,<Requested_Periodic-RAU>[,<Requested_GPRS-READY-timer>[,<Requested_Periodic-TAU>[,<Requested_Active-Time>]]]]]<CR>	AT+CPSMS=[<mode>[,<Requested_Periodic-RAU>[,<Requested_GPRS-READY-timer>[,<Requested_Periodic-TAU>[,<Requested_Active-Time>]]]]]<CR>
Query	AT+CPSMS?<CR>	<CR><LF>+CPSMS: <mode>,<Requested_Periodic-RAU>,<Requested_GPRS-READY-timer>,<Requested_Periodic-TAU>,<Requested_Active-Time><CR><LF><CR><LF>OK<CR><LF>
Test	AT+CPSMS=?<CR>	<CR><LF>+CPSMS: list of supported mode>,<Requested_Periodic-RAU>,<Requested_GPRS-READY-timer>,<Requested_Periodic-TAU>,<Requested_Active-Time><CR><LF><CR><LF>OK<CR><LF>

Parameter

<mode>	Enable or disable PSM mode

	0: disable PSM mode 1: enable PSM mode 2: disable PSM mode, and restore all the parameters to default.
<Requested_Periodic-RAU>	8-bit unibyte Requested periodic RAU cycle on GERAN/UTRAN network (T3312） Bit8-Bit6: unit 000 – 10 minutes 001 – 1 hour 010 – 10 hours 011 – 2 seconds 100 – 30 seconds 101 – 1 minute 110 – 320 hours 111 - T3312 invalid Bit5-Bit1: binary-code time e.g. 00100001 indicates 1 hour
<Requested_GPRS-READY-timer>	8-bit unibyte Requested GPRS READY cycle on GERAN/UTRAN network (T3314) Bit8-Bit6: unit 000 – 2 seconds 001 – 1 minute 010 – 6 minutes 111 - T3314 invalid Bit5-Bit1: binary-code time e.g. 00100001 indicates 1 minute
<Requested_Periodic-TAU>	8-bit unibyte Requested periodic-TAU cycle on GERAN/UTRAN network (T3412) Bit8-Bit6: unit 000 – 10 minutes 001 – 1 hour 010 – 10 hours 011 – 2 seconds 100 – 30 seconds 101 – 1 minute 110 – 320 hours 111 - T3412 invalid Bit5-Bit1: binary-code time e.g. 00100001 indicates 1 hour
<Requested_Active-Time>:	8-bit unibyte Requested Active Time on GERAN/UTRAN network 000 – 2 seconds 001 – 1 minute 010 – 6 minutes 111 - T3324 invalid **Bit5-Bit1**: binary-code time e.g. 00100001 indicates 1 minute

The value of <Requested_Periodic-RAU> must be greater than that of <Requested_GPRS-READY-timer>.

Example

```
AT+CPSMS?
+CPSMS: 0,,,"01100000","00000000"          Query the state of PSM mode.
OK
AT+CPSMS=1
OK                                         Enable PSM mode.
AT+CPSMS=0
OK                                         Disable PSM mode.
AT+CPSMS=1,,,"01100001","00000001"
OK                                         Set PSM parameters.
```

15.2 AT+CEDRXS – Setting eDRX Mode

To set eDRX mode.

The settings by this command are saved after the module is powered down.

To use this command, send **+CSCLK** to set the UART clock to automatic mode and send **+NVSETPM** to set the power management to low or ultra-low power consumption mode.

Format

Type	Command	Response
Execute	AT+CEDRXS=<mode>[,<AcT_type>[,<Requested eDRX value>]]<CR>	AT+CEDRXS=<mode>[,<AcT_type>[,<Requested eDRX value>]]<CR>
Query	AT+CEDRXS?<CR>	<CR><LF>+CEDRXS: <mode>,<AcT_type>,<"Requested eDRX value"> <CR><LF>OK<CR><LF>
Test	AT+CEDRXS=?<CR>	<CR><LF>+CEDRXS: mode=[0-3], AcT-type=5,Requested_eDRX_value="4bitString eg.0100 " OK<CR><LF>OK<CR><LF>

Parameter

<mode>	to specify whether to enable eDRX mode 0: disable eDRX mode 1: enable eDRX mode

2: enable eDRX mode and state report
3: restore to default setting *

<AcT_type> NB-IoT networks support 5 only
0: used only for state report
1: EC-GSM-IoT (A/Gb mode)
2: GSM (A/Gb mode)
3: UTRAN (Iu mode)
4: E-UTRAN (WB-S1 mode)
5: E-UTRAN (NB-S1 mode)

<Requested_eDRX_value> Requested eDRX cycle, 4-bit character string

A/Gb mode				
4	3	2	1	GERAN eDRX cycle length duration
0	0	0	0	~1,88 seconds
0	0	0	1	~3,76 seconds
0	0	1	0	~7,53 seconds
0	0	1	1	12,24 seconds
0	1	0	0	24,48 seconds
0	1	0	1	48,96 seconds
0	1	1	0	97,92 seconds
0	1	1	1	195,84 seconds
1	0	0	0	391,68 seconds
1	0	0	1	783,36 seconds
1	0	1	0	1566,72 seconds
1	0	1	1	3133,44 seconds
Iu mode				
4	3	2	1	UTRAN eDRX cycle length duration
0	0	0	0	10,24 seconds
0	0	0	1	20,48 seconds
0	0	1	0	40,96 seconds
0	0	1	1	81,92 seconds
0	1	0	0	163,84 seconds
0	1	0	1	327,68 seconds
0	1	1	0	655,36 seconds
0	1	1	1	1310,72 seconds
1	0	0	0	1966,08 seconds
1	0	0	1	2621,44 seconds

WB-S1/NB-S1 mode				
4	3	2	1	E-UTRAN eDRX cycle length duration
0	0	0	0	5,12 seconds (WB-S1)
0	0	0	1	10,24 seconds (WB-S1)
0	0	1	0	20,48 seconds
0	0	1	1	40,96 seconds
0	1	0	0	61,44 seconds (WB-S1)/20,48 seconds (NB-S1)
0	1	0	1	81,92 seconds
0	1	1	0	102,4 seconds (WB-S1)/20,48 seconds (NB-S1)
0	1	1	1	122,88 seconds (WB-S1)/20,48 seconds (NB-S1)
1	0	0	0	143,36 seconds (WB-S1)/20,48 seconds (NB-S1)
1	0	0	1	163,84 seconds
1	0	1	0	327,68 seconds
1	0	1	1	655,36 seconds
1	1	0	0	1310,72 seconds
1	1	0	1	2621,44 seconds
1	1	1	0	5242,88 seconds (NB-S1)/ 2621,44 seconds (WB-S1)
1	1	1	1	10485,76 seconds (NB-S1)/ 2621,44 seconds (WB-S1)

The settings should be negotiated with the network. For valid values, consult the carriers.

Example

```
AT+CEDRXS=1,5,”0001”                    Set eDRX cycle to 10.24s seconds in WB-S1 mode
OK
AT+CEDRXS?
+CEDRXS: 1,5,”0001”                     Query the eDRX settings.
OK
AT+CEDRXS=0
OK                                      Disable the eDRX mode.
```

15.3 AT+CEDRXRDP – Reading eDRX Parameters

To read eDRX parameters

Format

Type	Command	Response
Execute	AT+CEDRXRDP<CR><LF>	<CR><LF>+CEDRXRDP: <AcT_type>,<Requested_eDRX_value>,<NW_provided_eDRX_value>,<Paging_Time_window> <CR><LF>OK<CR><LF>

Parameter

<AcT_type> 0 No eDRX, used to report status only
1 EC-GSM-IoT (A/Gb mode)
2 GSM (A/Gb mode)
3 UTRAN (Iu mode)
4 E-UTRAN (WB-S1 mode)
5 E-UTRAN (NB-S1 mode)

<Requested_eDRX_value> Requested eDRX circle (refer to +CEDRXS: Requested_eDRX_value)

<NW_provided_eDRX_value> eDRX circle provided by network (refer to +CEDRXS: Requested_eDRX_value)

<Paging_Time_window> paging time window, a 4-bit character string
NB-S1 Mode

4	3	2	1	Paging Time Window
0	0	0	0	2,56 seconds
0	0	0	1	5,12 seconds
0	0	1	0	7,68 seconds
0	0	1	1	10,24 seconds
0	1	0	0	12,8 seconds
0	1	0	1	15,36 seconds
0	1	1	0	17,92 seconds
0	1	1	1	20,48 seconds
1	0	0	0	23,04 seconds
1	0	0	1	25,6 seconds
1	0	1	0	28,16 seconds

1	0	1	1	30,72 seconds
1	1	0	0	33,28 seconds
1	1	0	1	35,84 seconds
1	1	1	0	38,4 seconds
1	1	1	1	40,96seconds

Example

```
AT+CEDRXRDP                          In NB-S1 mode, the module does not request eDRX circle,
+CEDRXRDP: 5,0000,0010,0011          the network supports an eDRX circle of 20.48 seconds,
OK                                   and the paging time window is 10.24 seconds.
```

16 NON-IP Command

16.1 AT+NWNIPDATA – Sending NON-IP Data

Send non-IP data.

Format

Type	Command	Response
Execute	AT+NWNIPDATA=<cid>,<type>,<data><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
URC	<CR><LF>+NWNIPDATA: <cid>,<len>,<recv><CR><LF>	

Parameter

<cid>	Integer type, ID of the channel used to send data, corresponding to the channel activated by +CGACT.
<type>	Data type 0: character string 1: Hexadecimal
<data>	Data to be sent
<len>	Length of data received
<recv>	Data received, displayed in HEX format.

Example

```
AT+CGDCONT=1,"Non-IP","nidd.test"          Configure the PDN type to NON-IP, APN to
OK                                         "nidd.test"
AT+CGACT=1,1
OK                                         Activate the network.
AT+NWNIPDATA=1,0,"1111"
OK                                         Send "1111" in character string type
AT+NWNIPDATA=1,1,"31313131"
OK                                         Send "1111" in hex type

+NWNIPDATA: 1,5,3132333435                 Receive NON-IP data; the data is "12345".
```

17 Other Commands

17.1 AT+UPDATETIME – Updating Time to Network

To update the module time to the network time.

Set up a PPP link (AT+XIIC=1) before sending this command. Send **AT+CCLK?** to query whether RTC is synchronized to the current network time after this command is sent successfully.

The following time servers support time update: time.windows.com, time.nist.gov, etc.

The settings by this command are not saved after the module is powered off.

Format

Type	Command	Response
Execute	AT+UPDATETIME=<mode>[,<serv_ip>,<time>[[,<TZ>][,<DST>]]]<CR>	<mode>=0 <CR><LF>+UPDATETIME: Last Update Time yyyy-mm-dd,hh:mm:ss <CR><LF>OK<CR><LF> <mode>=1 <CR><LF>OK<CR><LF> <CR><LF>+UPDATETIME:<result code><CR><LF> Or <CR><LF>OK<CR><LF> <CR><LF>Time Updating,Please Wait...<CR><LF> <CR><LF>+UPDATETIME: Update To yyyy-mm-dd,hh:mm:ss<CR><LF>
Query	AT+UPDATETIME?<CR>	<CR><LF>+UPDATETIME: <serv_ip>,<time>,<TZ>,<DST><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+UPDATETIME=?<CR>	<CR><LF>+UPDATETIME: (list of supported <mode>s),(list of supported <time>s), (list of supported <DST>s)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<mode>	0: Query mode. Query when the time was updated to the network time last time. 1: Setting mode. Synchronize the time to the network time.
<serv_ip>	The IP address of the time server, in form of xx.xx.xx.xx or domain name.
<time>	the timeout period, ranging from 1 to 60, unit: second.
<TZ>	Time zone, in format of E/W+digits; E8 by default. E: east time zone, 0 to 13 W: west time zone, 0 to 12 0: Zero time zone
<DST>	Daylight Saving Time 1: Select DST auto-adjustment 0: Not select (by default)
<result code>	No PPP Link Time Out Time Data Is Null Send Request Fail Domain Name Invalid Socket Error

Example

```
AT+UPDATETIME=0                                          Query when the time was updated last
+UPDATETIME:Last Update Time 2014-03-                    time.
31,11:10:26

                                                         The updated time: 2014-03-31,11:10:26
OK

AT+UPDATETIME=0                                          Query when the time was updated last
+UPDATETIME: Last Update Time 0000-00-                   time.
00,00:00:00

                                                         The time was not updated.
OK

AT+UPDATETIME=1,210.72.145.44,10                         No PPP connection is set up.
+UPDATETIME: No PPP Link

                                                         Synchronize with the network time of
AT+UPDATETIME=1,210.72.145.44,10                         210.72.145.44.
OK                                                       Time out: 10s.
                                                         The default time zone is East 8.
Time Updating,Please Wait...                             Daylight saving time is not selected to
                                                         prompt.
+UPDATETIME: Time Out                                    Synchronization times out because the
                                                         network is busy.
AT+UPDATETIME=1,128.138.141.172,10,"E8",0                 Update the time to that of the server
OK                                                       128.138.141.172.
                                                         Time out: 10s.
Time Updating,Please Wait...                             The time zone is set to East 8.
```

```
+UPDATETIME: Update To 2014-03-31,11:32:55
```
Daylight saving time is not selected to prompt.
Time is updated successfully.

```
AT+UPDATETIME=1,time.windows.com,10,"W12",1
OK

Time Updating,Please Wait...

+UPDATETIME: Update To 2014-04-12,15:17:48
```
Synchronize with the network time of time.windows.com.
Time out: 10s.
The time zone is set to West 12.
Select daylight saving time.
Time is updated successfully.

```
AT+UPDATETIME=1,185.255.55.20,10,"E8:15"

OK

Time Updating,Please Wait...

+UPDATETIME: Update To 2019-11-21,13:56:47
```
1/4 TZ

```
AT+UPDATETIME=1,185.255.55.20,10,"E8:30"
OK

Time Updating,Please Wait...

+UPDATETIME: Update To 2019-11-21,14:11:26
```
2/4 TZ

```
AT+UPDATETIME=1,185.255.55.20,10,"E8:45"
OK

Time Updating,Please Wait...

+UPDATETIME: Update To 2019-11-21,14:27:12
```
3/4 TZ

```
AT+UPDATETIME=1,128.138.141.172,10,"W12",1
OK

+UPDATETIME: Send Request Fail
```
Time update request sending fails.
The reason probably is bad network connection or inability to support time update.

```
AT+UPDATETIME=1,time.windows.com,10,"W12",1
OK

+UPDATETIME: Domain Name Invalid
```
The domain name is invalid. The possible reason is the SIM (USIM) card is out of credit.

```
AT+UPDATETIME=1,time.windows.com,10,"W12",1
OK

+UPDATETIME: Socket Error
```
Socket error.
The possible reason might be network congestion.

```
AT+UPDATETIME?
+UPDATETIME: 128.138.141.172,10, "E8",0

OK
```
Query the IP address of the server to which the time is updated and the timeout period, time zone, and DTS.

```
AT+UPDATETIME=?
+UPDATETIME: (0-1),,(1-30),,(0-1)

OK
```
Query available parameter value ranges.

17.2 AT+CPWROFF – Powering Off Module

To power off the module

Format

Type	Command	Response
Execute	AT+CPWROFF<CR>	<CR><LF>OK<CR><LF>

Parameter

N/A

Example

```
AT+CPWROFF                                          Power off the module.
OK
```

17.3 AT+CSCLK – Setting Clock Mode

To set clock mode of serial port This command is used together with PSM and eDRX commands.

Format

Type	Command	Response
Set	AT+CSCLK=<mode><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<mode>	0: Normal mode 1: DTR controls low-frequency clock of serial port High level: enable

Low level: disable
2: Auto mode (UART automatically exits from low-frequency clock when receiving or sending data.)

Example

```
AT+CSCLK=2                                          Set to auto mode
OK
```

17.4 AT+NVSETPM – Setting PM Mode

To set power management mode.

This command is used together with PSM and eDRX commands.

Settings by this command are saved after the module is powered off.

Format

Type	Command	Response
Set	AT+NVSETPM=<mode><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<mode> 0: Normal mode
1: Low power consumption mode (eDRX)
2: Ultra-low power consumption mode (eDRX and PSM)

Example

```
AT+NVSETPM=1                                        Set to low power consumption mode
OK
```

17.5 AT+PING – PING Test

PING Test.

It is recommended to execute the next PING comand after the execution of the PING command has completely finished.

Format

Type	Command	Response
Execute	AT+PING=<ip>[,<timeout>,<size>,<num>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<ip>	IP address
<timeout>	Timeout interval, 0 to 255 seconds
<size>	Size of data packet, IPv4 (36 to 1500 bytes), IPv6 (56 to 1500 bytes)
<num>	Number of ping tests, 1 to 65535

Example

```
AT+PING=58.60.184.213,255,64,4
OK
Reply from 58.60.184.213: bytes= 64 time = 764(ms), TTL = 255
Reply from 58.60.184.213: bytes= 64 time = 172(ms), TTL = 255
Reply from 58.60.184.213: bytes= 64 time = 206(ms), TTL = 255
Reply from 58.60.184.213: bytes= 64 time = 243(ms), TTL = 255

Ping statistics for 58.60.184.213
Packets: Sent = 4, Received = 4, Lose = 0 <0%>, max_delay = 764 ms, min_delay = 172 ms,
average delay = 346 ms
```

17.6 AT+NEONBIOTCFG – Enabling Extending Functions

To enable or disable extending functions, such as automatic PPP activation, time update, PSM status report, and RRC status report The settings by this command are saved after the module is powered off.

Send AT+IPR to set a fixed baud rate before using this function.

Format

Type	Command	Response

Set	AT+NEONBIOTCFG=<auto_ip>,<time_inc>,<psm_inc>,<rrc_inc><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NEONBIOTCFG?<CR>	<CR><LF>+NEONBIOTCFG: <auto_ip>,<time_inc>,<psm_inc>,<rrc_inc> <CR><LF>OK<CR><LF>

Parameter

<auto_ip>	Activate PPP automatically and report IP address after registering with network 0: Disable 1: Enable
<time_inc>	Report time after registering with network or waking up from PSM 0: Disable 1: Enable
<psm_inc>	Report PSM status (PSM ENTER, PSM WAKEUP) 0: Disable 1: Enable
<rrc_inc>	Report RRC status 0: Disable 1: Enable

Example

```
AT+NEONBIOTCFG=1,0,0,0                  Enable automatic PPP activation.
OK
AT+NEONBIOTCFG=0,1,1,0                  Enable time update and PSM report.
OK
AT+NEONBIOTCFG?
+NEONBIOTCFG: 1,1,1,1                   Query current settings.
OK
```

17.7 AT+LEDMODE – Setting LED

To enable or disable STATUS and NET indicators The settings by this command are saved after the module is powered off.

- Status indicator
  - The indicator turns on after the module is powered on.
  - The indicator keeps off if the STARUS indicator is disabled.

- NET indicator
  - Network indicator turns off if the module does not search networks and turns on if the module finds networks and does not activate PPP.
  - It blinks (on for 0.2 second and off for 1.8 second) after the module actives PPP.

Format

Type	Command	Response
Set	AT+LEDMODE=<mode><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+LEDMODE?<CR>	<CR><LF>+LEDMODE: <mode> <CR><LF>OK<CR><LF>

Parameter

<mode>	0: disabled (default) 1: enabled

Example

```
AT+LEDMODE=1                                    Enable STATUS and NET LED indicators.
OK
AT+LEDMODE?
+LEDMODE: 1                                     Query LED settings.
OK
```

17.8 AT$MYSIMSWITCH – Switching SIM Cards

To switch the SIM cards.

The setting by this command is saved after the module is powered off.

Format

Type	Command	Response
Set	AT$MYSIMSWITCH=<cmd_type><CR>	<CR><LF>OK<CR><LF> Or

		<CR><LF>ERROR<CR><LF>
Query	AT$MYSIMSWITCH?<CR>	<CR><LF>$MYSIMSWITCH: <cmd_type> <CR><LF>OK<CR><LF>
Test	AT$MYSIMSWITCH=?<CR>	<CR><LF>$MYSIMSWITCH: (value range of <cmd_type>) <CR><LF>OK<CR><LF>

Parameter

<cmd_type> 0: low level (SIM1) (default)
1: high level (SIM2)

Example

```
AT$MYSIMSWITCH=0                          Pull the PIN34 GPIO1 to low level
OK

AT$MYSIMSWITCH?                           Query the level setting at PIN34 GPIO1
$MYSIMSWITCH: 0
OK

AT$MYSIMSWITCH=?                          Query the value range of the parameter.
$MYSIMSWITCH: (0,1)
```

17.9 AT+NWYRATSWITCHTIMER – Setting the Timer Time of Switching Network

To configure the timer time of switching from 2G to NB when the module is in NB priority mode.

The setting by this command is saved after the module is powered off.

Format

Type	Command	Response
Set	AT+NWYRATSWITCHTIMER =<timer><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NWYRATSWITCHTIMER?	<CR><LF>+NWYRATSWITCHTIMER: <timer>

<CR>	<CR><LF>OK<CR><LF>

Parameter

<timer> The timer time (timeout period) of switching from 2G to NB, unit: second.

Example

```
AT+NWYRATSWITCHTIMER=3600                    Set the timer time to 3600s.
OK
AT+NWYRATSWITCHTIMER?                        Query the timer time.
+NWYRATSWITCHTIMER: 300
OK
```

A Common Error Codes

Error Code	Meaning
1	No connection to phone
2	Phone adapter link reserved
3	Operation not allowed
4	Operation not supported
5	PH_SIM PIN required
6	PH_FSIM PIN required
7	PH_FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	Incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	Memory full
21	Invalid index
22	Not found
23	Memory failure
24	Text string too long
25	Invalid characters in text string
26	Dial string too long
27	Invalid characters in dial string
30	No network service
31	Network timeout
32	Network not allowed, emergency calls only

40	Network personalization PIN required
41	Network personalization PUK required
42	Network subset personalization PIN required
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
49	Execute not support
50	Execute fail
51	No memory
52	Option not support
53	Param invalid
58	Invalid command line

B Reference Process of AT Command Programming

B.1 Content of PDU SMS Messages

<PDU> SMS message sending format:

1>: 0891

08: indicates the length of the SMSC address information

91: indicates the format of the SMSC address

2>: Inversion of every two bits (add F if the bits are not sufficient) in SMSC number, fixed. For example, China Unicom 8613010888500 should be 683108705505F0 here.

3>: 0100

01: Indicates basic parameters

00: indicates message baseline value

4>: Convert the receiving number into hexadecimal. For example, the number length is 11 bits and then the hexadecimal length should be 0B.

5>: 81 (Receiving mode) there are multiple receiving modes. 81 indicates that the receiving mode is unknown.

6>: Inversion of every two bits (add F if the bits are not sufficient) in the recipient number. For example, 13421839693 should be 3124819396F3 after conversion.

7>: 0008

8>: The hexadecimal length of the SMS message content. For example, the UCS2 code of hello is 00080A00680065006C006C006F, that is 10 bits and the hexadecimal length is 0A.

9>: Message content, for example, the USC2 code of hello is 00080A00680065006C006C006F.

One PDU message contains the above 9 parts and the parameter values are determined by the actual situation.

If the SMSC address length is 0, replace 08 with 00 and the SMSC type and address fields must be omitted.

The following is an example of the PDU message whose SMSC address length is not 0:

0891683110808805F001000B813124819396F300080A00680065006C006C006F

Wherein,

0891

683108705505F0: SMSC number of China Unicom

0100

0B: the length of the recipient number

81: Receiving mode

3124819396F3: The number of recipient

0008

0A: The length of the content

00680065006C006C006F: SMS message content

Message content: hello

The SMS message content starts from 0100, so the value of LENGTH in AT+CMGS=LENGTH is 23.

The following is an example of the PDU message whose SMSC address length is **0**:

0001000B813124819396F300080A00680065006C006C006F

Wherein,

00: SMSC address information length

SMSC number is not needed.

0100

0B: the length of the recipient number

81: Receiving mode

3124819396F3: The number of recipient

0008

0A: The length of the content

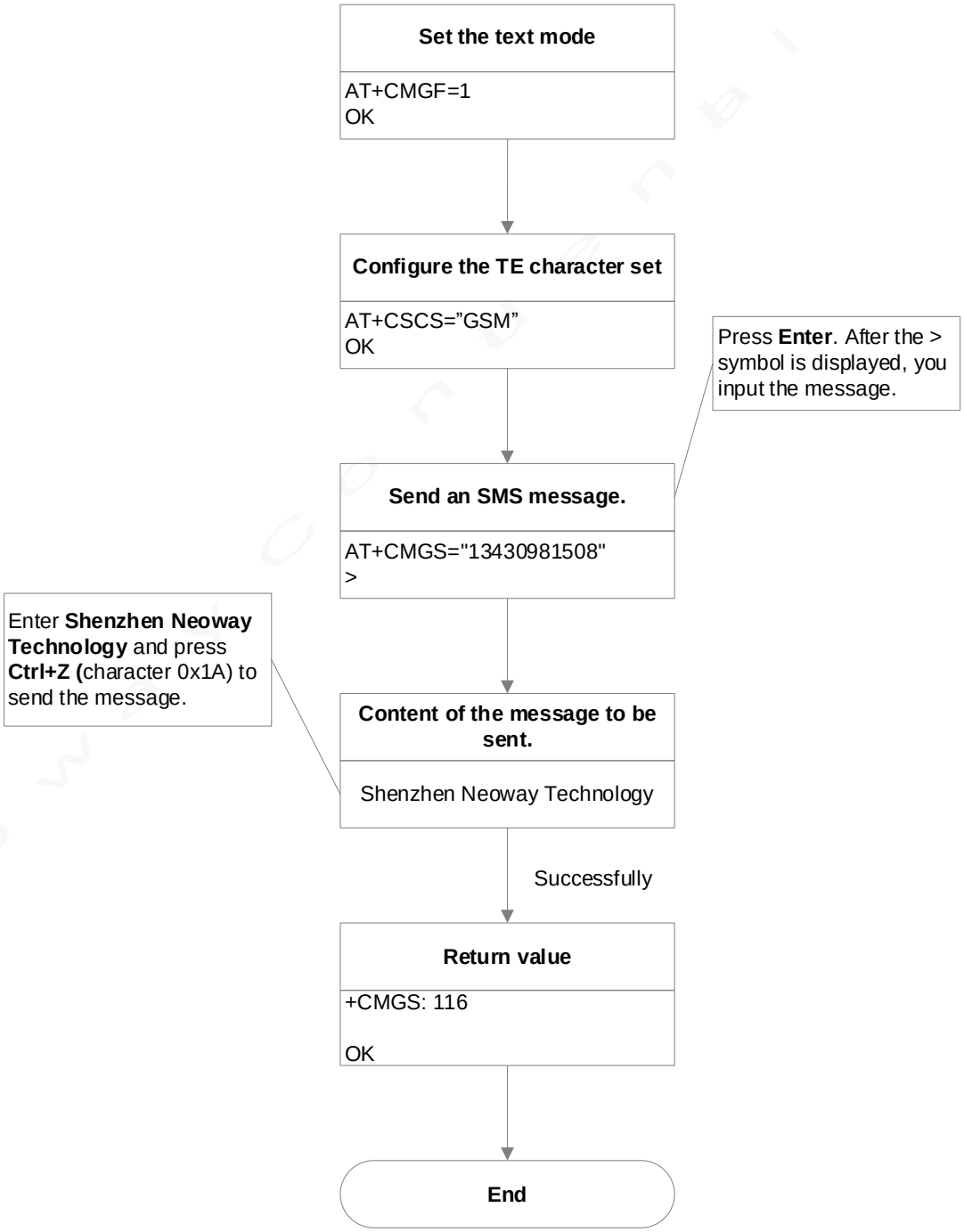
00680065006C006C006F: SMS message content

SMS message content: hello

The SMS message content starts from 0100, so the value of LENGTH in **AT+CMGS=LENGTH** is **23**.

B.2 Flowchart of Sending Text SMS Messages (Through UART)

Figure B-1 Flowchart of sending text format SMS messages



B.3 Flowchart of Sending PDU SMS Messages (Through UART)

Figure B-2 Flowchart of Sending PDU SMS messages