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N717

AT Commands Manual

Issue 1.1 Date 2023-11-08

Notice

This document provides guide for users to use N717.

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

THIS DOCUMENT PROVIDES INSTRUCTIONS FOR CUSTOMERS TO DESIGN THEIR APPLICATIONS. PLEASE FOLLOW THE RULES AND PARAMETERS IN THIS GUIDE TO DESIGN AND COMMISSION. NEOWAY WILL NOT TAKE ANY RESPONSIBILITY OF BODILY HURT OR ASSET LOSS CAUSED BY IMPROPER OPERATIONS.

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Contents

About This Document

Scope

This document is applicable to N717 series.

Audience

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

Change History

Issue	Date	Change	Changed By
1.0	2023-07	Initial draft	Xue Bowen
1.1	2023-10	• Removed some unsupported commands • Updated the description of the ATE function • Modified the response format and examples for the +CFUN command • Modified the reply for successful sending of the +TCPSENDS command • Modified the reply for successful sending of the +TCPREADS command • Modified the parameter description and examples for the +CCLK command • Changed the response format and examples for the +CIMI command • Modified the response format and examples for the +PDPKEEPALIVE command query • Added SSL TCP service commands • Adjusted the format of AT+CGATT?/AT+CGATT=? • Updated the response format for the +GMM command • Modified the response format for the +CGMM command	Zeng Huangming Zhao Guiqiang Guo Yaobin Sun Zhen Cui Lisha Zeng Huangming Fan Keyi Li Chuyu Li Leming Yu Haijun Wang Longzhen

	• Changed the response format for the +XGAUTH command • Added a functional description for the +CGACT command • Modified the range of the +IPR command • Introduced the +NWCFG command • Removed some unsupported commands • Added the +NWNTU command • Added commands +NRSP, +NETDMSG, +BANDLOCK, $MYSYSINFO • Added the +IFC command • Updated the parameter explanation for the +CFUN command

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

1 General Introduction

1.1 Overview

Neoway modules can be driven via the serial interface using AT commands, which mainly comprise the the following two types of AT commands.

- International Standard AT Commands: in compliance with 3GPP TS27007, TS27005, and ITU-T Recommendation V.250.
- Neoway Extended AT Commands: to facilitate the implementation of a certain function, there are customized AT commands, such as internal protocol stack commands and other commands.

By utilizing AT commands, the MT can swiftly establish a wireless communication network, enabling diverse functionalities such as data transmission and remote control, thus accomplishing the interconnection of all things.

1.2 AT Interface

The AT interface is commonly used to send and receive AT commands when communicating with modems or modules. It can be accessed through the UART port or, in some cases, through the USB interface. Before debugging with AT commands, please refer to the module's EVK user guide for proper connection and interaction instructions.

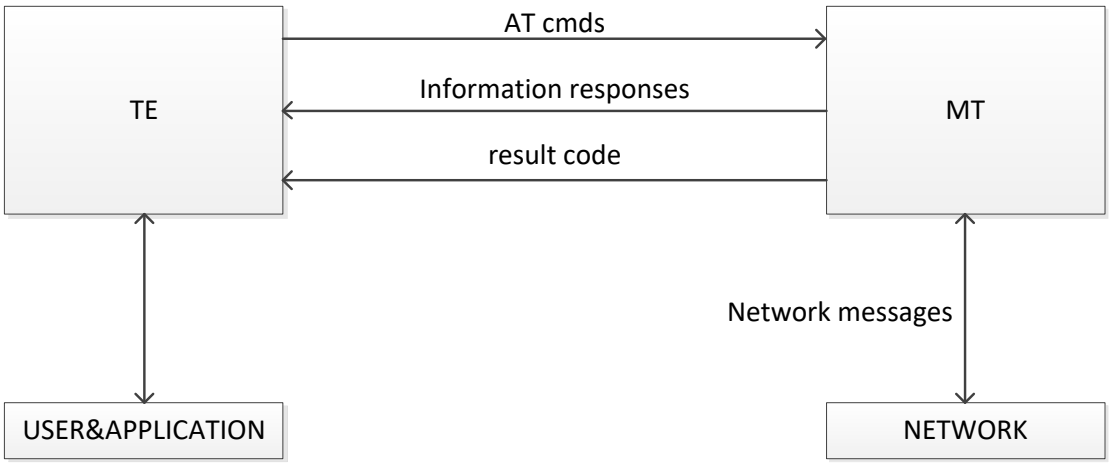
1.3 Definitions

In this document the following naming conventions are used:

- MT (Mobile Terminal): Neoway module
- TE (Terminal Equipment): Terminal that issues the command to the module.

AT commands, short for "Attention commands," are instructions that follow a specific syntax and are used to communicate with and control devices such as modems, cellular modules, and other telecommunication equipment. Below is the flow chart illustrating the response to AT commands.

Figure 1-1 AT command response flow chart



1.4 AT Command Syntax

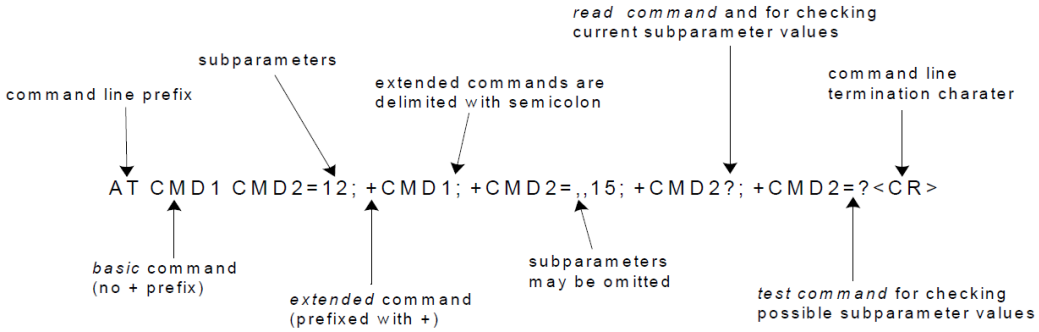
1.4.1 Symbols

- <CR>: The default termination character, which can be modified using the S3 command.
- <LF>: The default line feed character, which can be modified using the S4 command.
- <...>: the name in angle brackets is a parameter. The brackets themselves do not appear in the command line.
- [...]: the square brackets represent the optional parameters of a command or an optional part of the DCE information text response. Brackets themselves do not appear in the command line.
- Underscore: When a parameter value contains an underscore, it indicates that it is the default setting for that particular parameter.

1.4.2 Command Line

The AT commands are typically issued to the cellular modules using a command line with the following generic syntax:

Figure 1-2 AT command line



Prefix character

"**AT**" or "**at**" is a prefix that is set at the beginning of each command line. Neoway modules only recognize this type of AT commands.

Termination character

AT commands typically use **<CR>** as the default termination character, which is represented as "**0x0D**" in ASCII format.

Command parameter and response types

Numeric: Parameter data type, such as integer type, ranges from 0 to 100, with reference to the test command.

String: Parameter of string type.

- Enclosed in double quotation marks, consisting of byte stream without quotation marks or commas. Strings are by default enclosed in double quotation marks. If a string parameter is not enclosed, it will be specified separately in the command.
- If the character string content of an AT command includes special characters such as quotes, commas, slashes, etc., they need to be escaped using a backslash "\". The specific escape sequences are as follows:
  - \\: Escapes a backslash.
  - \,: Escapes a comma. Note that the comma used to separate parameters does not need to be escaped.
  - \": Escapes a double quotation mark. Double quotation marks used to indicate string parameters do not need to be escaped.

Command line length

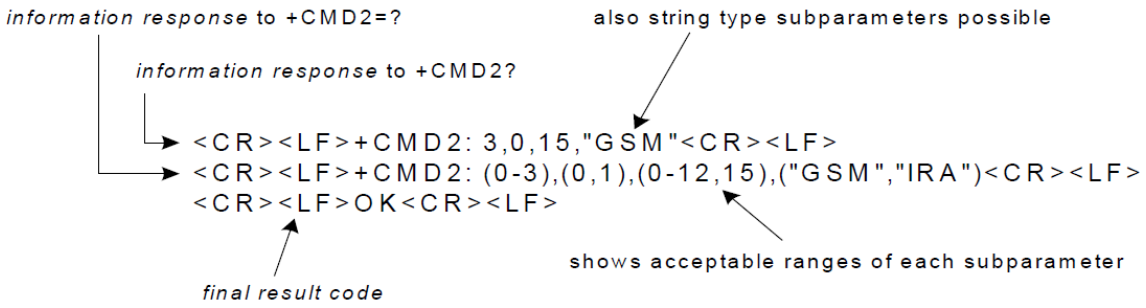
For the N717 series modules, the maximum length of a command line is 1024 bytes, including the command and all parameters.

Multiple commands can be placed on the same line using a semicolon (;). In this case, only the first command needs to have the "AT" prefix, while the subsequent commands do not require the "AT" prefix. If a command fails to execute, it does not affect the execution of the remaining commands.

AT command response

AT command responses can be divided into response information and result codes, as shown in the example below:

Figure 1-3 Command response example



- Response information syntax:

  Default format: <CR><LF>response<CR><LF>. The response can be a single line or multiple lines.

- Result code syntax:

  Default format: <CR><LF><result code><CR><LF>
  <CR><LF>OK<CR><LF> indicates that the command was executed successfully.
  <CR><LF>ERROR<CR><LF> indicates that the command execution failed.

The format of the response information and result codes returned by AT commands may vary depending on the settings of the ATV and AT+CMEE commands. For more details, please refer to the ATV and AT+CMEE commands, as well as Appendix A .

1.4.3 Unsolicited Result Code (URC)

URCs are string messages reported by the module without any request from the Terminal Equipment

(TE). They are automatically sent by the module when specific events occur. Typical events that can trigger URCs include incoming calls (ringing), received short messages, network disconnections, and so on. For example:

```
When the AT+CRGE=1 command is enabled, if there is any change in the Mobile Terminal's (MT)
network registration status,
+CREG: <Stat> will be reported.
```

1.5 Supported Character Sets

The supported character sets in the AT command interface are as follows:

- GSM
- UCS2
- IRA

You can configure and query the character set using the AT+CSCS command (defined in 3GPP TS 27.007). The character set setting affects SMS sending and receiving, as well as the input and display of text fields in phonebook entries and SMS broadcast messages.

1.6 AT Command Type

Table 1-1 AT Command Type

Command type	Syntax	Function
Basic command	AT<CMD>[< VALUE >]	<CMD> is a single letter (A to Z), or it can be the "&" character followed by a single letter. <VALUE> is a decimal number, which can be one or multiple digits. Leading zeros in <VALUE> will be ignored.
Register commands	ATS<n>=[< VALUE >]	"<n>" represents the index of the S register, while "<VALUE>" represents the assigned parameter value.
Extended commands		
Set	AT+CMD=<VALUE><CR>	Store a value or values for later use
Execute	AT+CMD[=<VALUE>]<CR>	Invoke a function of the module.
Query	AT+CMD?<CR>	Determine the current value or values stored.
Test	AT+CMD=?<CR>	Determine the range of parameter values or parameter lengths that are supported

Please note that all AT command examples provided in this document do not include syntax indicators. However, they do comply with the syntax rules specified in this section.

1.7 Command Response Time-Out

Every command issued to the Neoway module returns a result response, if response codes are enabled (default). 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+COPS	180
2	AT+CLCK	15
3	ATD*99#	30
4	AT+CMGR	30
5	AT+CMGL	30
6	AT+CMGS	30
7	AT+XIIC	60
8	AT+TCPSETUP	60
9	AT+TCPSEND	30
10	AT+TCPCLOSE	5
11	AT+UDPSETUP	30
12	AT+UDPSEND	30
13	AT+TCPSENDS	30
14	AT+TCPTRANS	"OK" or "ERROR" will be returned within 300ms, while the actual connection status will be returned within 60s.
15	AT+FTPLOGIN	30

16	AT+FTPLOGOUT	30
17	AT+FTPGET	30
18	AT+FTPPUT	30
19	AT+FTPSIZE	30
20	AT+FILEFTPGET	60
21	AT+NWFTPRENAME	30
22	AT+NWFTPMKDIR	30
23	AT+NWFTPRMDIR	30
24	AT+NWFTPDEL	30

1.8 Operating Mode of The AT Interface

The AT interface can operate in these modes:

- Command mode: in this mode, the module treats all received characters as AT commands and executes them, returning the corresponding execution results.
- Transparent data mode: after establishing a PPP connection or entering transparent data mode through AT commands (such as TCP, FTP, etc.), the module enters data transmission mode. In this mode, the module sends all received characters as data to be transmitted.

In transparent data mode, using the "+++" command (without carriage return or line feed) allows switching to command mode. In command mode, using the "ATO" command (without carriage return or line feed) switches to transparent data mode.

2 Boot LOG Instruction

If the module is powered on with a fixed baud rate, the UART port will provide a power-on response of "+PBREADY".

If the module is powered on in auto-baud rate mode, please wait for 10 seconds after power-up and send the command "AT" to the module. Once the module completes the AT initialization and responds with "OK", it will provide the power-on response of "+PBREADY".

For auto-baud rate mode, please refer to the AT+IPR command.

After power-up, the module will automatically enter command mode. In command mode, users can use AT commands to query, configure, and perform other operations on the module.

3 General Commands

3.1 ATI – Querying the Manufacturer Information

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

Format

Type	Command	Response
Execute	ATI<CR>	<CR><LF><manufacturer> <CR><LF><module_version> <CR><LF><soft_version> <CR><LF>OK<CR><LF>

Parameter

<manufacturer>	Module manufacturer, module name, software version.
<module_version>	Module model
<soft_version>	software version

Example

```
ATI
NEOWAY                                          Manufacturer
N717                                            Module model
V001                                            Version
OK
```

3.2 AT+GMR – Querying the Software Version

To query the software version

Format

Type	Command	Response
Execute	AT+GMR<CR>	<CR><LF>+GMR: <reversion> <CR><LF>OK<CR><LF>

Parameter

<reversion> Software version of the module.

Example

```
AT+GMR                                          Query the software version
+GMR: N717-R04-STD-BZ-03
OK
```

3.3 AT+CSQ – Querying Signal Quality

To query the receiving signal strength indication (RSSI).

Format

Type	Command	Response
Execute	AT+CSQ<CR>	<CR><LF>+CSQ: <signal>,<ber> <CR><LF>OK<CR><LF>

Parameter

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

	signal	rssi
0	<4 or 99	<-107 dBm or unknown
1	<10	< -93 dBm

	2	<16	< -111 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                                          Query the signal quality.
+CSQ: 19,2

OK
```

3.4 AT+CREG – Querying the 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> Or <CR><LF>+CREG:<stat>[,<lac>,<ci>[,<Act>]]<CR><LF>
Query	AT+CREG?	<CR><LF>+CREG: <n>,<stat> <CR><LF>OK<CR><LF>
Test	AT+CREG=?	<CR><LF>+CREG: range of supported<n> <CR><LF>OK<CR><LF>

Parameter

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

<stat>	0: Not registered, the module is not currently searching an operator to register to 1: Registered the home network 2: Not registered, but the module is currently trying to attach or searching an operator to register to 3: Registration denied 4. Unknown code 5: Registered, roaming 6: ltesms only home 7: ltesms only roaming 8: EMER SVCE ONLY 9: CSFB NOT PREFER HOME 10: CSFB NOT PREFER ROAMING
<lac>	Two-byte location area code in hexadecimal format, string type.
<ci>	Four-byte cell ID in hexadecimal format, string type.
<Act>	0: GSM 1: GSM compact 2: UTRAN 3: GSM w/EGPRS 4: UTRAN w/HSDPA 5: UTRAN w/HSUPA 6: UTRAN w/HSDPA AND w/HSUPA 7: E-UTRAN 8: UTRAN w/HSPA+

Example

```
AT+CREG=1                    Enable network registration unsolicited codes.
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
+CREG: (0-2)                 parameter.
OK
```

3.5 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>
Query	AT+CEREG?<CR>	<CR><LF>+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<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>

Parameter

<n>	0: Disable network registration unsolicited result code (default setting). 1: Enable network registration unsolicited result code +CREG: <stat>. 2: Enable network registration and location information (Cell ID, Local ID) unsolicited result code +CREG: <stat>[,[<lac>],[<ci>],[<AcT>]] 4: Enable network registration unsolicited result codes containing Active-Time and Periodic-TAU
<stat>	0: Not registered, the module is not currently searching an operator to register to 1: Registered the home network 2: Not registered, but the module is currently trying to attach or searching an operator to register to 3: Registration denied 4. Unknown code 5: Registered, roaming
<tac>	Two-byte location area code in hexadecimal format, string type.
<ci>	Four-byte cell ID in hexadecimal format, string type.
<Act>	0: GSM 1: GSM compact 2: UTRAN 3: GSM w/EGPRS 4: UTRAN w/HSDPA 5: UTRAN w/HSUPA 6: UTRAN w/HSDPA and HSUPA 7: E-UTRAN

Example

```
AT+CEREG?                Query the network registration status of the module.
+CEREG: 0,1              Registered the home network.
OK
AT+CEREG=1               Enable unsolicited codes of network registration.
OK
AT+CEREG=?               Query the value range of the network registration status
+CEREG: (0-2,4)          parameter.
OK
```

3.6 AT+COPS – Selecting an Operator

To select an operator.

Format

Type	Command	Response
Execute	AT+COPS=[<mode>[,<format>[,<oper>>[,<AcT>]]]]<CR>	<CR><LF>OK<CR><LF>
Query	AT+COPS?<CR>	<CR><LF>+COPS:<mode>[,<format>,<oper>[,<AcT>]]
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> <CR><LF>OK<CR><LF>

Parameter

<mode>	To set automatic network selection or manual selection. 0: Automatic selection (ignore the parameter <oper>) 1: Manual selection 2: Deregister from the network 3: Set <format> only 4: Manual/automatic selection (if the manual selection fails, automatic mode starts)
<format>	0: Long alphanumeric <oper> (default). 1: Short format alphanumeric <oper> 2: Numeric <oper>
<oper>	It is 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. 0: GSM 1: GSM compact 3: GSM w/EGPRS 7: E-UTRAN

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?                             China Mobile
+COPS: 0,0,"CHINAMOBILE",7
OK
AT+COPS?                             If it is set to digital mode, get the number 46000.
+COPS: 0,2,"46000",7
OK
AT+COPS?                             China Unicom
+COPS: 0,0,"CHINA UNICOM",7
OK
AT+COPS?                             If it is set to digital mode, then get the number
+COPS: 0,2,"46001",7                 46001.
OK
AT+COPS?                             China Telecom
+COPS: 0,0,"CHINA TELECOM",7
OK
AT+COPS?                             If it is set to digital mode, get the number 46011.
+COPS: 0,2,46011,7
OK
AT+COPS=2                            Deregister the network.
OK
```

3.7 AT+CIMI – Requesting International Mobile Subscriber Identity (IMSI)

Execution command causes the TA to return <IMSI>, which is intended to permit the TE to identify the individual SIM card or active application in the UICC (GSM or USIM) which is attached to MT.

Format

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

Parameter

<IMSI>	International Mobile Subscriber Identity. IMSI is a character string of 15 digits and starts with 3-bits of MCC and 2-bits of MNC. It is used to authenticate the SIM card.

Example

```
AT+CIMI                                  Query the IMSI.
460020188385503                          IMSI: 460022201575463
OK
AT+CIMI                                  Query the IMSI.
ERROR                                    No SIM card is installed.
```

3.8 AT+CGSN – Requesting Product Serial Number Identification

To obtain the product serial number, identified as the IMEI of the module.

Format

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

Parameter

<IMEI>	Product serial number identification of the module.

Example

```
AT+CGSN                                  Read command
+CGSN: 355897043139120
OK
```

On a 3GPP2 network, the return code is an 8-digit ESN.

3.9 AT+GSN – Requesting Product Serial Number Identification

To obtain the product serial number, identified as the IMEI of the module.

Format

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

Parameter

<IMEI>	Product serial number identification of the module, a character string of 15 digitals.

Example

```
AT+GSN                                          Query the IMEI number.
+GSN: 355897043139120
OK
```

3.10 AT+CCID – Obtaining ICCID of 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 The ICCID number is a string of 20 digits.

Example

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

3.11 AT+CGMM – Requesting Model Identification

To request model identification which consists of a single line containing the name of the module.

Format

Type	Command	Response
Execute	AT+CGMM<CR>	<CR><LF>+CGMM: <model> <CR><LF>OK<CR><LF>

Parameter

<model> Module model

Example

```
AT+CGMM                    Request model identification of the module.
+CGMM: N717
OK
```

3.12 AT+GMM – Querying Module Model

To request model identification which consists of a single line containing the name of the module.

Format

Type	Command	Response
Execute	AT+GMM<CR>	<CR><LF>+GMM: <model> <CR><LF>OK<CR><LF>

Parameter

<model>	Module model

Example

```
AT+GMM                          Request model identification which consists of a single
+GMM: N717                      line containing the name of the module.
OK
```

3.13 AT+IPR – Setting Baud Rate

To set the baud rate of the module.

If a query returns 0, it indicates that the module's baud rate is self-adaptive. The UART communication is set to self-adaptive baud rate by default.

Format

Type	Command	Response
Execute	AT+IPR=<baud rate><CR>	<CR><LF>OK<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>OK<CR><LF>

Parameter

<baud rate>	Baud rate (0, 2400, 4800, 9600, 14400, 19200, 28800, 33600, 38400, 57600, 115200, 230400, 460800, 921600, 1000000)

Example

```
AT+IPR=115200                           Set the baud rate to 115200 bps.
OK
AT+IPR?                                 Query the current baud rate.
+IPR: 115200
OK
AT+IPR=?                                Query the available baud rate range.
```

```
+IPR:0, 2400, 4800, 9600, 19200, 28800,
33600, 38400, 57600, 115200, 230400,
460800, 921600, 1000000

OK
AT+IPR=100                                  Set the baud rate to 100. The value is not
ERROR                                       allowed.
```

3.14 AT+CFUN – Setting Module Functionality

To select the level of functionality of the module by setting <fun>. <fun>: only certain values are supported.

The setting is not saved after the module is powered down.

Format

Type	Command	Response
Execute	AT+CFUN=[<fun>[,<rst>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CFUN?<CR>	<CR><LF>+CFUN: <fun> <CR><LF>OK<CR><LF>
Test	AT+CFUN=?<CR>	<CR><LF>+CFUN: (list of supported <fun>s),(range of supported <rst>) <CR><LF>OK<CR><LF>

Parameter

<fun>	0: minimum functionality 1: normal operation mode (default, when an SIM card is inserted) 4: turn off the TX and RX RF circuits (Flight mode)
<rst>	0: do not reset the MT before setting it to <fun> power level 1: reset the MT before setting it to <fun> power level

Example

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

```
+CFUN: (0-1,4),(0-1)
OK
```

3.15 AT+CCLK – Clock

To set and query the real-time clock.

The settings are not saved after the module is powered off. The default clock is GMT+0.

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>OK<CR><LF>

Parameter

<time>	Character string in format of yy/MM/dd,hh:mm:ss[TZ].
TZ	A 2-digit number indicates the time difference between local time and GMT. This value is displayed only when the network is supported. Default to "Zero Time Zone + TZ".

Example

```
AT+CCLK="18/07/01,14:54:01"                 Set the real-time clock.
OK
AT+CCLK?
+CCLK: "18/07/01,06:54:10+32"               Query the current clock.
OK
AT+CCLK=14/07/02,10:48:50
ERROR                                       The parameter format of <time> is incorrect.
```

3.16 AT+CPIN – Entering PIN Code

to enter a password or query whether or not the module requires a password which is necessary before it can be operated. The password may be SIM PIN, SIM PUK, PH-SIM PIN, etc.

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

module. If PIN code is input incorrectly for three times, PUK is required to unlock.

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>OK<CR><LF>

Parameter

<pin>,<newpin>	String type
<code>	READY: ME is not pending for any password. SIM PIN: ME is waiting SIM PIN to be given. SIM PUK: ME is waiting SIM PUK to be given. SIM PIN2: ME is waiting SIM PIN2 to be given. SIM PUK2: ME is waiting SIM PUK2 to be given

Example

```
AT+CPIN?                                  Query whether PIN code is required.
+CPIN: READY                              You don't need to enter any password.
OK
AT+CPIN?                                  Query whether PIN code is required.
+CPIN: SIM PIN                            PIN code is required.
OK
AT+CPIN="1234"
OK                                        Correct PIN code is entered.

+PBREADY                                  The SIM card is unlocked.
AT+CPIN?                                  If PIN code is input incorrectly for three
+CPIN: SIM PUK                            times, PUK is required to unlock.
OK
AT+CPIN="12345678","4321"
OK                                        Enter PUK code and then enter the new PIN code.

+PBREADY                                  The SIM card is unlocked.
```

3.17 AT+CLCK – Facility Lock

To lock, unlock or interrogate a MT or a network facility <fac>. The setting by this command valid after the module is restarted.

Format

Type	Command	Response
Set	AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]<CR>	• When <mode>=2: <CR><LF>+CLCK: <status>[,<class1>[<CR><LF>+CLCK: <status>,<class2>[...]] <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> • When <mode>≠2: <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+CLCK=?<CR>	<CR><LF>+CLCK: (list of supported <fac> values) <CR><LF>OK<CR><LF>

Parameter

<fac>	Value with double quotes. "OI": Outgoing international calls "AI": all incoming calls "IR": incoming calls when roaming outside the homing place "SC": SIM card "AO": All outgoing calls "OX": All outgoing international calls except to the home country "AB": all calling services "AG": all outgoing call services "AC": all incoming call services "FD": Fixed dialing of the SIM card "PS": lock phone to the SIM card "PN": network authentication "PU": network subsystem authentication "PP": service provider authentication "PC": corporate authentication
<mode>	0: unlock 1: lock 2: registration
<status>	0: not active 1: active
<passwd>	Password or operation code; string type, string with double quotes.
<classx>	1: voice service 2: data service 4: fax service 8: SMS

16: data circuit sync
32: data circuit async
64: dedicated packet access
128: dedicated PAD access

Example

```
AT+CLCK="SC",2
+CLCK: 0
OK
AT+CLCK=?
+CLCK: ("CS", "PS", "PF",
"SC", "AO", "OI", "OX",
"AI", "IR", "NT", "NM",
"NS", "NA", "AB", "AG",
"AC", "FD", "PN", "PU",
"PP", "PC")
OK
AT+CLCK="SC",1,"1234"
OK
AT+CLCK="SC",0,"1234"
OK
AT+CLCK="SC",1,"2222"
ERROR
```

Query the network information related to the module.

Lock the current SIM card. "1234" is PIN code of current SIM card.

Unlock the current SIM card. "1234" is PIN code of current SIM card.

Incorrect PIN code is inputted.

3.18 AT+CPWD – Changing the Password

To set a new password for the facility lock function defined by command **Facility Lock**.

Before changing PIN code, lock the SIM card (running AT+CLCK="SC",1,"1234").

Format

Type	Command	Response
Set	AT+CPWD=<fac>,<oldpwd>,<newpwd><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+CPWD=?<CR>	<CR><LF>+CPWD:(list of supported (<fac>,<pwdlength>)s) <CR><LF>OK<CR><LF>

Parameter

<fac> Value with double quotes.

	"P2": SIM PIN2 "SC": SIM card
<oldpwd>	string with double quotes; the old password or operation code.
<newpwd>	string with double quotes; the new password or operation code.

Example

```
AT+CPWD=?
+CPWD: ("SC",8),("P2",8)          Query the parameters range.
OK
AT+CPWD="SC","1234","0000"        Modify the PIN code of the current SIM card. "1234" is
OK                                the old PIN code and "0000" is the new PIN code.
AT+CPWD=SC,1234,0000              The command format is incorrect; a pair of quotation
ERROR                             marks is a must for the value.
```

3.19 AT+CGDCONT – Defining PDP Context

To specify GPRS PDP context parameter values for a PDP context.

Format

Type	Command	Response
Set	AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]]<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: [list of supported (<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>)] <CR><LF>OK<CR><LF>

Parameter

<cid>	integer type; specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. (The minimum value is 1).
<PDP_type>	string type; specifies the type of packet data protocol.

	“IP” Internet Protocol (IETFSTD 5)
<APN>	Access Point Name, string type; a logical name that is used to select the GGSN or the external packet data network.
<PDP_address>	String type, identifies the MT 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, a dynamic address is requested, and even if the address is assigned during the PDP startup process, it is returned empty when queried with this command.
<d_comp>	Integer type, controls PDP data compression (applicable for SNDCP only) 0 - off (if omitted, this parameter is the default value).
<h_comp>	integer type; controls PDP header compression 0 - off (default value)
<pd1>, … <pdN>	String type, their definitions are corresponding to <PDP_type>

Example

```
AT+CGDCONT=1,"IP","CMNET"                          Set the PDP type to IP and set the APN
OK                                                 name to CMNET.
AT+CGDCONT?
+CGDCONT:                                          Query the current PDP format.
1,"IP","APN","10.123.13.30",0,0,,,,
OK
AT+CGDCONT=?
+CGDCONT: (1-15),"IP",,,(0-3),(0-
4),(0,1),(0-4),(0-2),(0,1)
+CGDCONT: (1-15),"IPV6",,,(0-3),(0-                Query the value range of the PDP format,
4),(0,1),(0-4),(0-2),(0,1)                         the number of parameters.
+CGDCONT: (1-15),"IPV4V6",,,(0-3),(0-
4),(0,1),(0-4),(0-2),(0,1)

OK
```

3.20 AT+CGACT – Activate or Deactivate PDP context

To activate or deactivate PDP context.

Before executing this set command, use the AT+CGDCONT command to set the APN and the channel.

Format

Type	Command	Response
Set	AT+CGACT=<state>[,<cid>[,cid]….]<CR>	<CR><LF>+CGACT: <cid>,<state> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Query	AT+CGACT?<CR>	<CR><LF>+CGACT:<cid>,<state><cid> <CR><LF>OK<CR><LF>
Test	AT+CGACT=?<CR>	<CR><LF>+CGACT: (list of supported <cid>s) <CR><LF>OK<CR><LF>

Parameter

<state>	State of PDP activation 0: deactivated 1: activated
<cid>	PDP activation channel, ranging from 1 to 15. Only one channel can be activated in one time.

Example

```
AT+CGACT=1,1
+CGACT: 1,1                                   Set the activation channel to 1.
OK
AT+CGACT?
+CGACT: 1,1
                                              Query the value set.

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

3.21 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”.

This <cid> parameter corresponds to the <cid> parameter of the +CGDCONT command.

Format

Type	Command	Response
Set	AT+XGAUTH=<cid>,<auth>[	<CR><LF>OK<CR><LF>

	,<name>,<pwd>]<CR>	Or <CR><LF>ERROR<CR><LF>
Test	AT+XGAUTH=?	<CR><LF>+XGAUTH: (list of supported <cid>),(value range of<auth>),<username>, <password> <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 1: PAP (default) 2: CHAP 3: CHAP/ PAP When the PDP authentication typeb is NONE, the command contains the <name> and <pwd> parameters.
<name>	User name
<pwd>	Password

Example

```
AT+XGAUTH=1,1,”gsm”,”1234”                    Set the first PDP authentication.
OK
AT+XGAUTH=?
+XGAUTH: (1-7),(0-3),99,99                    Query the value range of the parameters.
OK
```

3.22 AT+CGATT – Setting GPRS Attach and Detach

To attach the MT to, or detach the MT from, the Packet Domain service. The setting by this command is not saved after the module is powered off.

If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup.

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 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>GPRS DISCONNECTION<CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+CGATT?<CR>	<CR><LF>+CGATT: <state> <CR><LF>OK<CR><LF>
Test	AT+CGATT=?<CR>	<CR><LF>+CGATT: (value range of <state>)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<state>	0: detached 1: attached

Example

```
AT+CGATT=1
OK                                  GPRS is attached successfully.
AT+CGATT=0
OK                                  GPRS is detached successfully.
AT+CGATT=0
GPRS DISCONNECTION                  Send the return value of this command after AT+XIIC=1
                                    is executed to establish a PPP connection.
OK
AT+CGATT=0
ERROR                               The SERROR is returned because no SIM card is inserted.
AT+CGATT?
+CGATT: 0                           Query the current GPRS status.

OK
AT+CGATT=?
+CGATT: (0-1)                       Query the valid parameter values for the command.

OK
```

3.23 ATE1/ATE0 – Enabling/Disabling the Terminal Display

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

The terminal display function is enabled by default. The USB port is disabled by default.

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

Format

Type	Command	Response
Set	ATE[<value>]<CR>	<CR><LF>OK<CR><LF>

Parameter

<value>	Whether to enable the terminal display function of AT commands 0: disabled (default) 1: enable

ATE = ATE0

Example

```
                                        Turn on the terminal display function.
ATE1
OK                                      Send "AT"
AT
OK                                      Serial tool displays "AT" and "OK"

ATE0                                    Turn off the terminal display function.
OK
                                        Send "AT"
OK                                      Serial tools displays only "OK".
```

3.24 ATD*99# – GPRS

To establish a GPRS connection using external protocol stacks.

Ensure that the module has registered the network (through CREG) and set APN before dialing any number.

Format

Type	Command	Response
Execute	ATD*99#<CR>	<CR><LF>CONNECT<CR><LF>

Parameter

N/A.

Example

```
ATD*99#                                          Start a dial-up connection.
CONNECT                                          Successful
```

3.25 AT+ENPWRSAVE – Enabling or Disabling Sleep Mode

To enable or disable sleep mode. The settings by this command are not saved after the module is powered off.

Sleep mode is triggered by inputting low level at DTR by default.

After this command is sent and low (or high) level is input at DTR, the module can enter sleep mode unless circuit of each part inside the module allows.

Format

Type	Command	Response
Set	AT+ENPWRSAVE=<n>[,<usb>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+ENPWRSAVE?<CR>	<CR><LF>+ENPWRSAVE: <n><usb> <CR><LF>OK<CR><LF>

Parameter

<n>	0: Forbid sleep mode (default). 1: Allow sleep mode (Low level at DTR triggers sleep mode) 2: Allow sleep mode (High level at DTR triggers sleep mode)

<usb>	0: Forbid USB remote wake-up (default) 1: allow USB remote wakeup (the module enters sleep mode only after the USB host suspends the USB. After the USB host resumes the USB bus or there are network DL events (data, SMS, call), the module wakes up the USB host through the USB bus.)

Example

```
AT+ENPWRSAVE=1,1                    Set the module to allow sleep mode. Allow USB remote wakeup.
OK
AT+ENPWRSAVE?
+ENPWRSAVE: 1,0                     Query current sleep mode status.
OK
```

3.26 AT+CESQ – Extended Signal Quality

To query the extended signal quality.

- If the current serving cell is not a GERAN cell, <rxlev> and <ber> are set to value 99.

  If the current serving cell is not a UTRA FDD or UTRA TDD cell, <rscp> and <ecno> are set to 255.

  If the current serving cell is not an E-UTRA cell, <rsrq> and <rsrp> are set to 255.
- If the current serving cell is not an NR cell, <ss_rsrq>, <ss_rsrp> and <ss_sinr> are not displayed.

  For the detailed rule, see the 3GPP TS 27.007 8.69.

Format

Type	Command	Response
Execute	AT+CESQ<CR>	<CR><LF>+CESQ: <rxlev>,<ber>,<rscp>,<ecno>, <rsrq>,<rsrp>,<ss_rsrq>,<ss_rsrp>,<ss_sinr> <CR><LF>OK<CR><LF>
Test	AT+CESQ=?<CR>	<CR><LF>+CESQ: (list of supported <rxlev>s),(list of supported <ber>s),(list of supported <rscp>s),(list of supported <ecno>s),(list of supported <rsrq>s),(list of supported <rsrp>s),(list of supported <ss_rsrq>s),(list of supported <ss_rsrp>s),(list of supported <ss_sinr>s)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<rxlev>	integer type, received signal strength level
<ber>	Bit Error Rate
<rscp>	received signal strength indicator
<ecno>	downlink carrier interference ratio
<rsrq>	reference signal quality
<rsrp>	reference signal received power
<ss_rsrq>	reference signal command (based on synchronization signal)
<ss_rsrp>	reference signal received power (based on synchronization signal)
<ss_sinr>	signal-to-noise and interference ratio (based on synchronization signal)

Example

```
AT+CESQ                                                    Query the signal quality.
+CESQ: 99,99,255,255,16,47
OK
AT+CESQ=?                                                  Signal display range
+CESQ: (0-63,99),(0-7,99),(255),(255),(0-
34,255),(0-97,255)
OK
```

3.27 AT+NWDNS – Parsing the Domain Name

To query the DNS parsing result after the module establishes a dial-up connection using the internal protocol stack successfully.

Before executing this command, ensure that the dial-up connection is established through the AT+XIIC command successfully.

Ensure that the entered content is correct since its correctness is not verified.

Currently the query command only retrieves the IPv4 address.

Format

Type	Command	Response
Execute	AT+NWDNS=<hostname><CR>	<CR><LF>+NWDNS: <Sign>,<IP><CR><LF> <CR><LF>+NWDNS: <Sign>,<IP><CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NWDNS?<CR>	<CR><LF>+NWDNS: <Sign>,<IP><CR><LF>

	<CR><LF>+NWDNS: <Sign>,<IP><CR><LF> <CR><LF>OK<CR><LF>

Parameter

<hostname>	Hostname, character type, 128 bytes in length at most; double quotation marks are required.
<IP>	IP address, string type
<Sign>	IPv4 or IPv6, string type

Example

```
AT+NWDNS="WWW.BAIDU.COM"          An empty string is returned because there is no IPv6
+NWDNS:                           address.
IPV4,"220.181.112.244"

+NWDNS: IPV6,""

OK
AT+NWDNS="www.google.com"
ERROR                             Querying of the google domain name times out.
AT+NWDNS="www.google.com"         No dialing; the returned value indicates that PDP is not
ERROR                             activated.
AT+NWDNS?
+NWDNS:
IPV4,"220.181.112.244"
                                  Query the obtained IP address.
+NWDNS: IPV6,""

OK
```

3.28 AT+CGREG – Querying 3G/2G PS Network Registration Status

To query the 3G/2G PS network registration status of the module

Format

Type	Command	Response
Set	AT+CGREG=[<n>]<CR>	<CR><LF>OK<CR><LF> Or

		<CR><LF>ERROR<CR><LF>
Query	AT+CGREG?<CR>	CR><LF>+CGREG: <n>,<stat> <CR><LF>OK<CR><LF>
Test	AT+CGREG=?<CR>	<CR><LF>+CGREG: (range of <n> value supported) <CR><LF>OK<CR><LF>
URC	<CR><LF>+CGREG: <stat>[,<lac>,<ci>[,<AcT>]]<CR><LF>	

Parameter

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

<stat> network status
0: Not registered, the module is not currently searching an operator to register to
1: Registered the home network
2: Not registered, but the module is currently trying to attach or searching an operator to register to
3: Registration denied
4. Unknown code
5: Registered, roaming
6: ltesms only home
7: ltesms only roaming
8: EMER SVCE ONLY
9: CSFB NOT PREFER HOME
10: CSFB NOT PREFER 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 w/HSUPA
7: E-UTRAN
8: UTRAN w/HSPA+

Example

```
AT+CGREG=1                          Enable network registration unsolicited codes.
OK

AT+CGREG?                           Query the network registration status of the module.
+CGREG: 0,1
OK

AT+CGREG=?                          Query the value range of the network registration status
+CGREG: (0-2)                       parameter.
OK
```

4 TCP/UDP Client Commands

4.1 AT+NETAPN – Setting Network APN

To set the network APN.

Format

Type	Command	Response
Set	AT+NETAPN="APN","username","password"<CR>	<CR><LF>OK<CR><LF>
Query	AT+NETAPN?<CR>	<CR><LF>+NETAPN: "APN","username","password" <CR><LF>OK<CR><LF>

Parameter

APN	GPRS network access point
username	GPRS user name
password	GPRS password

Example

```
AT+NETAPN="CMNET","",""          Set GPRS APN to CMNET and leave user account and
OK                               password blank.
AT+NETAPN=CMNET,,                A pair of quotation marks is required for each
ERROR                            parameter.
AT+NETAPN?
+NETAPN:"","",""                 Query the current settings of APN parameter.
OK
```

4.2 AT+XIIC – Setting up a PPP Link

To set up a PPP link.

Format

Type	Command	Response
Execute	AT+XIIC=<n><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+XIIC? <CR>	<CR><LF>+XIIC: <state>,<ip> <CR><LF>OK<CR><LF>

Parameter

<n>	0: Disconnect the PPP link 1: Activate the PPP link.
<state>	0: PPP connection is closed. 1: PPP connection is activated.
<ip>	IP address

Example

```
AT+XIIC=1                                   Set up the first PPP link.
OK
AT+XIIC?                                    The PPP link is set up successfully and the IP
+XIIC:1,10.107.216.162                      address is 10.107.216.162.
OK                                          There are four spaces before 1.
AT+XIIC?
+XIIC:0,0.0.0.0                             The PPP link is not set up successfully.
OK                                          There are four spaces before 0.
```

- Before executing this command, use the AT+CGDCONT command to set the parameters including <APN>.
- Ensure that the module registers the network before using the AT+XIIC=1 command to set up PPP link. Use AT+GREG? to check whether the module registers the network or not. If +CREG: 0,1 or +CREG: 0,5 is returned, the module did not register to the network.

4.3 AT+TCPSETUP – Setting up a TCP Connection

To set up a TCP connection.

After the AT command is executed, if the command format is correct, it will immediately return "OK". If the command parameters are incorrect, it will return "+TCPSETUP: ERROR". Alternatively, if link 0 is already in use, it will return "+TCPSETUP: 0,ERROR1".

It is recommended to establish a PPP connection first by using the command "AT+XIIC=1" before using it.

Format

Type	Command	Response
Execute	AT+TCPSETUP=<n>,<ip>,<port><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
URC	+TCPSETUP: 0,<result>	

Parameter

<n>	Socket ID, ranging from 0 to 5.
<ip>	destination IP address, in form of xx.xx.xx.xx or www.xxxxxx.com (domain name with or without quotation marks).
<port>	Destination port ID in decimal ASCII code.
<result>	Result code OK FAIL

Example

```
AT+TCPSETUP=0,220.199.66.56,6800
OK

+TCPSETUP: 0,OK
AT+TCPSETUP=0,neowayjsr.oicp.net,60010
OK

+TCPSETUP: 0,OK
+TCPCLOSE: 0,Link Closed
AT+TCPSETUP=1,192.168.20.6,7000
OK

+TCPSETUP: 1,FAIL
```

```
Set up a connection to 220.199.66.56,6800 on
socket 0.
Successful

Set up a connection to
neowayjsr.oicp.net,60010 on socket 0.
Set up a connection to neowayjsr.oicp.net,
60010 on socket 0.
The socket is closed.

Failed to set up a connection to
192.168.20.6,7000 on socket 1. The server may
be not started; the IP address or the port
```

```
AT+TCPSETUP=0,neowayjsr.oicp.net,60010
+TCPSETUP: 0, ERROR1
AT+TCPSETUP=6,192.168.20.6,7000
+TCPSETUP: ERROR
AT+TCPSETUP=0.58.60.184.213.10012
+TCPSETUP: ERROR
AT+TCPSET=0,58.60.184.213,10012
ERROR
```

```
number may be incorrect; the SIM card fee may
be overdue.
A TCP/UDP connection has been set up on socket
0.
Parameters are set incorrectly.
Parameters are set incorrectly.
The AT command is not complete.
```

4.4 AT+TCPSEND－Sending TCP Data

To send TCP data.

This command support data sending in command mode and buffer mode as well as in ASCII and HEX format. The module will return > after this command is sent. Send UDP data 50 ms to 100 ms later.

The mode setting is not saved. Set it when sending data.

- Ensure that a TCP connection has been set up before sending TCP data.
- Run AT+IPSTATUS to check the buffer size before sending data.
- When ASCII data in command mode is required to be sent, length of the <content> parameter must be less than or equal to 1024 bytes.
- To send data containing more than 15 commas, use buffer mode.

Format

Type	Command	Response
Execute	AT+TCPSEND=<n>,<length>[,<content>][,mode]]<CR>	<CR><LF>><content> <CR><LF>OK<CR><LF> Or <CR><LF>OK<CR><LF> Or <CR><LF>+TCPSEND: ERROR<CR><LF> Or <CR><LF>+TCPSEND: <n>, OPERATION EXPIRED<CR><LF> Or <CR><LF>+TCPSEND: SOCKET ID OPEN FAILED<CR><LF> Or

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

Parameter

<n>	Socket ID, ranging from 0 to 5. A TCP connection is established on the socket.
<length>	Length of the data to be sent, unit: byte. 1 to 4096 for ASCII data sent in buffer mode. 1 to 2018 for HEX data sent in buffer mode. 1 to 512 for data sent in command mode (HEX). 1 to 512 for data sent in command mode (ASCII).
<content>	data sent in command mode with a length ranging from 0 to 1024.
<mode>	data format 0: ASCII (default) 1: HEX

Example

```
AT+TCPSEND=0,1
>
OK                                  Send 1-byte data on socket 0.
                                    Successful

+TCPSEND: 0,1
AT+TCPSEND=0,1024,,1                Send 1024-byte data in hexadecimal format in buffer
>                                   mode.
OK

+TCPSEND: 0,1024                    Successful
AT+TCPSEND=0,6,"123459"
OK                                  Command mode (Only plain text can be sent, not special
                                    symbols.)
+TCPSEND: 0,6
AT+TCPSEND=0,3,”313233”,1           Send data in hexadecimal format in command mode.
OK

                                    Successfully
+TCPSEND: 0,3
AT+TCPSEND=0,10                     No data is input within 30 seconds after > is
>                                   displayed.
+TCPSEND: 0,OPERATION EXPIRED
AT+TCPSEND=0,1                      One-byte data fails to be sent on socket 0 because the
+TCPSEND: SOCKET ID OPEN            socket is not opened.
FAILED
AT+TCPSEND=0,4097                   4097-byte data fails to be sent on socket 0 because
+TCPSEND: DATA LENGTH ERROR         data length exceeds the limit.
```


4.5 AT+RECVMODE – Setting Receive Mode

To set the receive mode of TCP and UDP data. The setting by this command is not saved after the module is powered off.

Do not send this command during communication because it will clear the buffer. This command also works for UDP data.

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>OK<CR><LF>
Test	AT+RECVMODE=?<CR>	<CR><LF>+RECVMODE: (list of supported <n>s), (list of supported <mode>s) <CR><LF>OK<CR><LF>

Parameter

<n>	receive mode 0: buffer the TCP or UDP data received and sending command to read the data by MCU is required. 1: print the TCP or UDP data received to UART directly (default).
<mode>	report format 0: ASCII report (default). 1: Hexadecimal

Example

```
AT+RECVMODE=0                                   Set the receive mode to 0.
OK
AT+RECVMODE=1,1                                 Print data and report data in HEX format.
OK
AT+RECVMODE=?                                   Query the value range can be set.
+RECVMODE: (0-1),(0-1)
OK
```

4.6 +TCPRECV – URC Notifying Data Received from Server

To notify TCP data received from the TCP server.

Format

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

Parameter

<n>	Socket ID, ranging from 0 to 5.
<length>	Length of the data received.
<data>	data received, end with 0x0d 0x0a; users can determine the end according to the <message_len>.

Example

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

4.7 A+TCPREAD – Reading TCP Data

To read TCP data.

Format

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

Parameter

<n>	Socket ID, ranging from 0 to 5.
<length>	maximum length of data allowed to read, ranging from 1 to 2048.

Example

```
+TCPRECV: 0                          RECVMODE=0
AT+TCPREAD=0,100                     Data received on socket 0.
+TCPREAD: 0,10,1234567890            Read data.
OK                                   The data read is 1234567890.
```

The receive mode is set by the +RECVMODE command.

4.8 AT+TCPCLOSE – Closing the TCP Connection

To close the TCP connection.

Format

Type	Command	Response
Execute	AT+TCPCLOSE=<n><CR>	<CR><LF>+TCPCLOSE: <n>,OK<CR><LF> Or <CR><LF>+TCPCLOSE: ERROR<CR><LF>
URC	+TCPCLOSE:0,Link Closed	

Parameter

<n> socket ID, ranging from 0 to 5.

Example

```
AT+TCPCLOSE=1                        Close the TCP connection on socket 1.
+TCPCLOSE: 1,OK                      Successfully.
AT+TCPCLOSE=2                        Socket number error
+TCPCLOSE: ERROR
+TCPCLOSE: 0,Link Closed              The TCP connection is closed.
                                     The server sends closing command or the network
                                     encounters abnormality or weak signals.
```

4.9 AT+UDPSETUP – Setting up a UDP Connection

To set up a UDP connection.

Use the AT+XIIC=1 command to set up a PPP link before running 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: ERROR<CR><LF>

- If the parameter is incorrect, +UDPSETUP: ERROR is prompted.
- If the socket ID is used, for example, socket 0, +UDPSETUP: 0,ERROR1 is prompted.

Parameter

<n>	Socket ID, ranging from 0 to 5.
<ip>	destination IP address, in form of xx.xx.xx.xx, e.g. www.china.com (domain name)
<port>	Destination port ID in decimal ASCII code.
<result>	Result codes OK FAIL ERROR1: a connection is already set up on the socket.

Example

```
AT+UDPSETUP=1,220.199.66.56,7000
OK                                          Set up a connection to 220.199.66.56,7000
                                            Successfully

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

+UDPSETUP: 0,OK
AT+UDPSETUP=0,58.60.184.213,11008           A TCP/UDP connection is set up on socket 0.
+UDPSETUP: 0, ERROR1
AT+UDPSETUP=1,192.168.20.6,7000
OK                                          Failed to set up a connection to 192.168.20.6,7000

+UDPSETUP: 1,FAIL
```

```
AT+UDPSETUP=6,192.168.20.6,6800
+UDPSETUP: ERROR
AT+UDPSETUP=0.58.60.184.213.10012
+UDPSETUP: ERROR
AT+UDPSET=0,58.60.184.213,10012
ERROR
```

```
Socket number error

The punctuations in the command are incorrect.

The AT command is not complete.
```

4.10 AT+UDPSEND – Sending UDP Data

To send UDP data.

Ensure that the UDP link is set up before sending UDP data. Set it when sending data. In Buffer mode, the module will return > after this command is sent. Send UDP data 50 ms to 100 ms later.

- In buffer mode, at most 2048 bytes can be sent in HEX format and at most 4096 bytes can be sent in ASCII format.
- To decrease the packet loss rate, do not send data more than 1472 bytes each time.
- For how to send quotation marks and backslash in command mode, see the Example.
- The mode parameter can be omitted. Data in ASCII format supports escape mode by default.
- When ASCII data in command mode is required to be sent, length of the <content> parameter must be less than or equal to 102 bytes.

Format

Type	Command	Response
Execute	AT+UDPSEND=<n>,<length>[[,<content>][,mode]]<CR>	<CR><LF>> <CR><LF>OK<CR><LF> <CR><LF>+UDPSEND: <n>,<length> Or <CR><LF>+UDPSEND: <n>, OPERATION EXPIRED<CR><LF> Or <CR><LF>+UDPSEND: DATA LENGTH ERROR<CR><LF>

Parameter

<n>	Socket ID, ranging from 0 to 5. A UDP connection is established on the socket.
<length>	Length of the data to be sent, unit: byte. 1 to 2018 for HEX data sent in buffer mode. 1 to 4096 for ASCII data sent in buffer mode.

	1 to 512 for data sent in command mode (HEX). 1 to 512 for data sent in command mode (ASCII).
<content>	data sent in command mode, ranging from 0 to 1024. To send data containing more than 15 commas, use buffer mode.
<mode>	data format 0: ASCII 1: HEX

Example

```
AT+UDPSEND =0,1024,,1
>                                          Send 1024-byte data in hexadecimal format in
OK                                         buffer mode.

+UDPSEND: 0,1024                           Successfully
AT+UDPSEND=0,10,"DEGHHRFRRD",0

                                           In command mode, send data in ASCII mode.
OK

                                           Successfully
+UDPSEND: 0,10
AT+UDPSEND=0,4097                          4097-byte data fails to be sent on socket 0
+UDPSEND: DATA LENGTH ERROR                because data length exceeds the limit.

AT+UDPSEND=1,6,”313233343536”,1            Send data in hexadecimal format in command
OK                                         mode.

+UDPSEND: 0,6
                                           Successfully
AT+UDPSEND=0,10                            After the data sending command is input and > is
>                                          returned, no more data is entered in 30 seconds.
+UDPSEND: 0,OPERATION EXPIRED              Then the expiration information is displayed.
```

4.11 +UDPRECV – URC Displaying UDP Data Received

To indicate that UDP data has been received.

Format

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

Parameter

<n>	Socket ID, ranging from 0 to 5.
<length>	Length of the data received.
<data>	data received. Add 0x0d 0x0a to the end of the data. You can identify the end based

on <length>.

Example

```
+UDPRECV: 0,10,1234567890
```

10-byte of data is received on socket 0. The data is 1234567890.

4.12 AT+UDPREAD – Reading UDP Data

To read UDP data. Executing the +RECVMODE command to select the receive mode is required.

Format

Type	Command	Response
Execute	AT+UDPREAD=<n>[,<length>]<CR>	<CR><LF>+UDPREAD: <n>,<length>,<data> <CR><LF>OK<CR><LF> Or <CR><LF>+UDPREAD:SOCKET ID OPEN FAILED<CR><LF> Or <CR><LF>+UDPREAD: ERROR<CR><LF>

Parameter

<n>	Socket ID, ranging from 0 to 5.
<length>	maximum length of data allowed to read, ranging from 1 to 1024.
<data>	UDP data read

Example

```
+UDPRECV: 0
AT+UDPREAD=0,100
+UDPREAD: 0,10,1234567890
OK
AT+UDPREAD=1,100
+UDPREAD: SOCKET ID OPEN FAILED
AT+UDPREAD=0,0
+UDPREAD: ERROR
```

Data received on socket 0.
Read data.
The data read is 1234567890.

No connection is set up on socket 1.

Parameters are set incorrectly.

4.13 AT+UDPCLOSE – Closing UDP Link

To close the UDP connection.

Format

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

Parameter

<n>	Socket ID, ranging from 0 to 5.

Example

```
AT+UDPCLOSE=1                          The TCP link on socket 1 is closed successfully.
+UDPCLOSE: 1,OK
AT+UDPCLOSE=6
+UDPCLOSE: ERROR                       Socket number error
```

4.14 AT+IPSTATUS – Querying the Transparent TCP/UDP Socket Status

To query the transparent 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>,<CONNECT or DISCONNECT >[,<TCP or UDP>,<send-buffer-size>] <CR><LF>OK<CR><LF> Or <CR><LF>+IPSTATUS: 1,DISCONNECT<CR><LF> Or

<CR><LF>ERROR<CR><LF>

Parameter

<STATUS>	Socket type, value: CONNECT or DISCONNECT.
<CONNECT or DISCONNECT>	Socket type, value: CONNECT or DISCONNECT; CONNECTING or DISCONNECTING
<TCP or UDP>	socket type, value: TCP or UDP
<send-buffer-size>	The size of the available send buffer on the module, in decimal ASCII mode. Unit: byte.

Example

```
AT+IPSTATUS=0                          A TCP connection is set up on socket 0 and the buffer
+IPSTATUS: 0,CONNECT,TCP,4096          size is 4096 bytes.
AT+IPSTATUS=0                          Currently the UDP connection is only established on
+IPSTATUS: 0,CONNECT,UDP,0             socket 0.
AT+IPSTATUS=1
+IPSTATUS: 1,DISCONNECT                No TCP or UDP connection is set up on socket 1.
AT+IPSTATU
ERROR                                  The AT command is not complete.
AT+IPSTATUS=6
ERROR                                  The socket number in the command is incorrect.
```

Querying of the <send-buffer-size> parameter is not supported on the UDP link.

4.15 AT+TCPACK – Querying Status of Data Sent by TCP Socket

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<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 ID, ranging from 0 to 5.
<data_sent>	Size of data successfully sent through this socket, unsigned 64-bit integer in decimal ASCII. Unit: byte
<acked_recv>	Size of data acknowledged by the receiver, unsigned 64-bit integer in decimal ASCII. Unit: byte

Example

```
AT+TCPACK=0                          20-byte data is transmitted from socket 0 and
+TCPACK: 0,20,20                     the receiver acknowledges 20-byte data.
AT+TCPACK=0                          128-byte data is transmitted from socket 0 and
+TCPACK: 0,128,120                   the receiver acknowledges 120-byte data.
AT+TCPACK=1
+TCPACK: 1,DISCONNECT                No connection is set up on socket 1.
AT+TCPACK=2
+TCPACK: NO TCP LINK                 A UDP connection  is set up on socket 2.
AT+TCPACK=6
ERROR                                The socket number in the command is incorrect.
```

4.16 AT+DNSSERVER – Setting DNS Server

To set primary and secondary DNS servers.

In general, you do not have to set DNS server, which will be issued by base station during PPP negotiation.

Format

Type	Command	Response
Set	AT+DNSSERVER=<n>,<dns-ip><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+DNSSERVER?<CR>	<CR><LF>+DNSSERVER: dns1:<dns-ip1>;dns2: <dns-ip2><CR><LF>

Parameter

<n>	DNS server number 1: primary DNS server 2: secondary DNS server
<dns-ip>	IP address of the DNS server.

Example

```
AT+DNSSERVER=1,114.114.114.114                          Set the DNS.
OK
AT+DNSSERVER?
+DNSSERVER: dns1:114.114.114.114;dns2:0.0.0.0           Query the DNS.
```

4.17 AT+TCPKEEPALIVE – Setting TCP Keepalive Heartbeat

To set the TCP keepalive heartbeat.

The settings by this command are not saved after the module is powered off. Execute this command before setting up a TCP connection. It is valid for all connections. DO NOT send it after establishing a TCP connection.

This function consumes data traffic.

Format

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

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

Parameter

<mode>	0: disable 1: enabled
<time>	Interval for which the TCP is idle before the module sends the KEEPALIVE packet to the remote server. A value between 30 seconds to 7200 seconds is recommended and the default value is 120 seconds.
<interval>	Interval for the module to resend the KEEPALIVE packet since it sends last time and does not receive response. The value ranges from 1s to 1800s, and the default value is 75s.
<keepcount>	Count of retransmissions, ranging from 1 to 15, and the default value is 9.

- The <time> for sending heartbeat packets varies with the network environment. Set <time> according to the network environment. If the value of < time> is too large, the terminal may have a false connection, and the <interval> time exceeds <time> will not be resent; if the values of <time> and <interval> are too short, the terminal may disconnect due to the hibernation mechanism of the module air port. If the interval is too short and multiple heartbeat packets are sent during the hibernation period, the heartbeat packets will be sent out together after waking up. The receiving side thinks that the sticky packet data is invalid and does not reply to the acknowledgement message, and if the terminal does not receive the acknowledgement message several times, it thinks that the connection is invalid and disconnects actively.
- Recommended ranges:
  <time>: 120 - 300s
  <interval>: 40 - 100s

Example

```
AT+TCPKEEPALIVE=1                                    Enable the KEEPALIVE function.
OK

AT+TCPKEEPALIVE=1,120,75,9                           Enable and set the KEEPALIVE
OK                                                   parameters.
AT+TCPKEEPALIVE=0                                    Disable the KEEPALIVE function.
OK
AT+TCPKEEPALIVE?                                     Query the setting of the
+TCPKEEPALIVE: 1,120,75,9                            KEEPALIVE parameters.
OK
AT+TCPKEEPALIVE=?
+TCPKEEPALIVE: (0-1),(30-7200),(1-1800),(0-15)
OK
```

5 TCP Server Commands

5.1 AT+TCPLISTEN – Setting TCP Listening for 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: <status><CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+TCPLISTEN?<CR>	<CR><LF>+TCPLISTEN: <status><CR><LF>

Parameter

<port>	Port ID
<socket>	Socket ID
<status>	Listening… bind error not listening listening status

Example

```
AT+TCPLISTEN=6800                       Listening port ID: 6800
+TCPLISTEN: 0,OK                        The server starts to listen.
AT+TCPLISTEN=6800                       Listening port ID: 6800
+TCPLISTEN: bind error                  The server fails to bind.
AT+TCPLISTEN=6800
+TCPLISTEN: Listening...                Transparent listening is set already.
AT+TCPLISTEN?                           Query the listening status. Here the server is in the
+TCPLISTEN: listening status            listening status.
AT+TCPLISTEN?                           Query the listening status. Here the server is not in
+TCPLISTEN: not listening               the listening status.
```

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

5.2 AT+CLOSELISTEN – Closing Listening Socket

To close the socket connection.

Format

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

Parameter

<socket_id>	Socket ID

Example

```
    +CLOSELISTEN: 0,local link          The host closes the socket or network abnormalities
    closed                              occur.
    AT+CLOSELISTEN
    +CLOSELISTEN: 0,local link          The connections to client are closed.
    closed
    AT+CLOSELISTEN
    +CLOSECLIENT: All remote link
    closed                              The connections to client are closed.

    +CLOSELISTEN: 0,local link
    closed
    AT+TCPSRVTRANS?
    +TCPSRVTRANS: not listening         Failed to close the connection since there is no a
    AT+CLOSELISTEN                      listening socket.
    ERROR
```

5.3 AT+CLOSECLIENT – Closing Remote Socket

To close remote sockets.

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 ID

Example

```
AT+CLOSECLIENT
+CLOSECLIENT: 1,remote link closed          There is no parameter in this command. Remote
                                           sockets are closed successfully.
+CLOSECLIENT: 2,remote link closed
AT+CLOSECLIENT=1                           The command contains parameters. One remote socket
+CLOSECLIENT: 1,remote link closed         is closed successfully.
AT+CLOSECLIENT=1
ERROR                                      No client connected to socket 1.
AT+CLOSECLIENT
+CLOSECLIENT: All remote link closed       All clients are closed.
```

5.4 +TCPRECV(S) – Receiving Data from the Client

To indicate data received from the client.

Format

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

Parameter

<n>	Socket ID, ranging from 0 to 5.
<length>	Length of the data received.
<data>	data received. Add 0x0d 0x0a to the end of the data. Identify the end based on <length>.

Example

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

Additional (s) makes this command different from the receive mode of the client mode in format.

Note that the parameters are different from that of the client mode.

5.5 AT+TCPREADS – Reading TCP Data from the Client

To read TCP data from the client.

Format

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

Parameter

<n>	Socket ID, ranging from 0 to 5.
<length>	maximum length of data allowed to read, ranging from 1 to 2048 bytes.
<content>	data read

Example

```
+TCPRECV(S): 1                          RECVMODE=0
AT+TCPREADS=1,100                       Socket 1 receives 10-byte data in character format from the
+TCPREADS: 1,10,1234567890              client.
OK
```

5.6 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>]<CR><LF> Or <CR><LF>> <CR><LF>+TCPSENDS: Buffer not enough,439<CR><LF> Or <CR><LF>+TCPSENDS: <socket> is not link<CR><LF> Or <CR><LF>+TCPSENDS: <socket>, OPERATION EXPIRED<CR><LF>

Parameter

<socket>	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 4096, unit: byte.

Example

```
AT+TCPSENDS=0,10
>                                       Send 10-byte data on socket 0.
OK                                      (E.g.: 1234567890).

+TCPSENDS: 0,10
```

```
AT+TCPSENDS=0                          Send 21-byte data on socket 0.
>                                      (E.g.: 012345678901234567890).
OK                                     The command ends with Ctrl+Z if no data length is contained.
                                       The data length should not exceed 4096 bytes.
+TCPSENDS: 0,21
AT+TCPSENDS=0,5
>                                      No data is input within 30 seconds after > is displayed.
+TCPSENDS: 0,OPERATION
EXPIRED
```

5.7 AT+CLIENTSTATUS – Querying Client Connection Status

To query the connection status of the client.

Format

Type	Command	Response
Execute	AT+CLIENTSTATUS=<cid><CR>	<CR><LF>+CLIENTSTATUS: <socket>,<CONNECTor DISCONNECT>,<TCP orINVALID>, <send-buffer-size><CR><LF>

Parameter

<channel>	Value of AcceptSocket, that is, the socket of the module. See the description of the AT+TCPLISTEN command.
<CONNECT or DISCONNECT>	Socket type, value: CONNECT or DISCONNECT.
<TCP or INVALID>	Socket type, value: TCP or INVALID.
<send-buffer-size>	The size of the available send buffer on the module, in decimal ASCII mode. Unit: byte.

If the socket is invalid, it may be the listen socket of TCP/UDP client or server.

Example

```
AT+CLIENTSTATUS=0                      A TCP connection to the client has been set up on
+CLIENTSTATUS: 0,CONNECT,TCP,61440     the socket 0 and the buffer size is 61440 bytes.
AT+CLIENTSTATUS=4                      No connection is set up on socket 4.
+CLIENTSTATUS: 4,DISCONNECT
```

```
AT+CLIENTSTATUS=1                       Type of the connection on socket 1 is invalid. It
+CLIENTSTATUS: 1,CONNECT,INVALID        is not a TCP connection.
```

5.8 AT+TCPACKS – Querying Status of Data Sent by TCP Server

To query the size of data successfully sent and received over the TCP connection.

Format

Type	Command	Response
Execute	AT+TCPACKS=<socket><CR>	<CR><LF>+TCPACKS: <socket>,<data_sent>,<acked_recv> Or <CR><LF>+TCPACKS: <socket>,<DISCONNECT> Or <CR><LF>ERROR<CR><LF>

Parameter

<socket>	Value of AcceptSocket detected, that is, the socket used by the server to establish a connection with the module. It ranges from 0 to 5.
<data_sent>	Size of data successfully sent to the client.
<acked_recv>	Size of data acknowledged by the client.

The values of <data_sent> and <acked_recv> are unsigned 64-bit integers in decimal ASCII. The unit is byte.

Example

```
AT+TCPACKS=0                    The module sends 20-byte data to client through socket 0 and the
+TCPACKS: 0,20,20               client acknowledges 20-byte data.
AT+TCPACKS=0                    The module sends 128-byte data to client through socket 0 and the
+TCPACKS:0,128,120              client acknowledges 120-byte data.
AT+TCPACKS=1                    No connection is set up on socket 1.
+TCPACKS: 1,DISCONNECT
AT+TCPACKS=6                    The socket ID is incorrect.
ERROR
```

6 SSL TCP Data Service

6.1 AT+SSLTCPCFG – Configuring SSL Parameters for TCP

To configure SSL parameters for TCP data service.

If the **authmode** is set to 0, you do not have to set other parameters, such as **cacert**, **clientcert**, and **clientkey**.

Format

Type	Command	Response
Execute	AT+SSLTCPCFG=<type>,<type_name><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+SSLTCPCFG?<CR>	<CR><LF>+SSLTCPCFG:<sslversiontype>,<authmode>,<cacert>,<clientcert>,<clientkey> <CR><LF>OK<CR><LF>
Test	AT+SSLTCPCFG=?<CR>	<CR><LF>+SSLTCPCFG: <type>,<type_name> <CR><LF>OK<CR><LF>

Parameter

<type>	SSL parameter options. **sslversion**: SSL protocol version **authmode**: authorization mode **ciphersuite**: Cupher cuite **cacert**: CA certificate **clientcert**: Client certificate **clientkey**: Client key
<type_name>	parameter settings for SSL 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
Cacert: string, CA certificate
Clientcert: string, client certificate
Clientkey: string, client key

Example

```
AT+SSLTCPCFG=”sslversion”,0                    Set SSL version to SSL3.0.
OK
AT+SSLTCPCFG=”authmode”,0                      Set authmode to no authentication.
OK
AT+SSLTCPCFG?                                  Query the current SSL settings.
+SSLTCPCFG: 0,1,,ca.pem,cc.pem,ck.pem
OK
AT+SSLTCPCFG=?                                 Query the value range of the parameters.
+SSLTCPCFG: <type>,<type_name>
OK
```

6.2 AT+SSLTCPCFGA – Configuring SSL Parameters for TCP

To configure SSL parameters for TCP data service.

Certificate must be imported before setting.

Certificate can be set empty.

Format

Type	Command	Response
Execute	AT+SSLTCPCFGA=<sslversion>,<authmode>,<cacert>,<clientcert>,<clientkey><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+SSLTCPCFGA?<CR>	<CR><LF>+SSLTCPCFGA: <sslversion>,<authmode>,<cacert>,<clientcert>, <clientkey> <CR><LF>OK<CR><LF>
Test	AT+SSLTCPCFGA=?<CR>	<CR><LF>OK<CR><LF>

Parameter

<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
<Cacert>	string, CA certificate
<Clientcert>	string, client certificate
<Clientkey>	string, client key

Example

```
AT+SSLTCPCFGA=3,1,"ca.pem","",""                Set SSL TCP parameters
OK
AT+SSLTCPCFGA?                                  Query the current SSL settings.
+SSLTCPCFGA: 0,1,ca.pem,cc.pem,ck.pem
OK
```

6.3 AT+SSLTCPSETUP – Setting up TCP Connection over SSL

To set up a TCP connection over SSL.

Activate PPP and apply one IP address before setting up a TCP connection over SSL.

Format

Type	Command	Response
Execute	AT+SSLTCPSETUP=<n>,<ip>,<port>,<mode><CR>	<CR><LF>OK<CR><LF> <CR><LF>+SSLTCPSETUP: <n>,<status> Or <CR><LF>CONNECT Or <CR><LF>+SSLTCPSETUP: ERROR Or <CR><LF>+SSLTCPSETUP: GPRS DISCONNECTION
Query	AT+SSLTCPSETUP?	<CR><LF>+SSLTCPSETUP: <socket_id>,<ip>,<port>,<mode> [<CR><LF>+SSLTCPSETUP:

		<socket_id>,<ip>,<port>,<mode>]… <CR><LF>OK<CR><LF>
Test	AT+SSLTCPSETUP=?	<CR><LF>+SSLTCPSETUP:(value range of supported <socket_id>),<ip>,<port>,<mode><CR><LF>

Parameter

<n>	socket ID, ranging from 0 to 5, used to identify the connection to the server
<ip>	IP address or domain name of the server
<port>	server port
<mode>	transmission mode 0: non-transparent 1: transparent
<status>	OK ERROR1 AUTHFAIL FAIL

Example

```
AT+SSLTCPSETUP=0,183,239.240,45,4451,0          Set up a non-transparent connection to
OK                                              183.239.240.45 on socket 0. The port
                                                number is 4451.
+SSLTCPSETUP: 0,OK
AT+SSLTCPSETUP=0,183,239.240,45,4451,1          Set up a transparent connection to
CONNECT                                         183.239.240.45 on socket 0. The port
                                                number is 4451.
AT+SSLTCPSETUP=0, www.alipay.com,443,0          Set up a non-transparent connection to
OK                                              www.alipay.com on socket 0. The port
                                                number is 443.
+SSLTCPSETUP: 0,FAIL                            Fails because of timeout.
AT+SSLTCPSETUP=0, www.alipay.com,443,0          Set up a non-transparent connection to
OK                                              www.alipay.com on socket 0. The port
                                                number is 443.
+SSLTCPSETUP: 0,AUTHFAIL                        Fails to authenticate.
AT+SSLTCPSETUP?                                 Query the connection status.
+SSLTCPSETUP: 0,183.239.240.45,4451,0           A transparent TCP connection has been set
+SSLTCPSETUP: 1,183.239.240.45,4452,0           up on socket 0 and socket 1.
OK
AT+SSLTCPSETUP=0,183,239.240,45,4451,0          A connection has been set up on socket 0
OK

+SSLTCPSETUP: 0,ERROR1
```

6.4 AT+SSLTCPCLOSE－Closing TCP Connection over SSL

To close a TCP connection over SSL.

Format

Type	Command	Response
Execute	AT+SSLTCPCLOSE=<socket_id>	<CR><LF>+SSLTCPCLOSE: <socket_id>,<result> Or <CR><LF>+SSLTCPCLOSE: ERROR<CR><LF>
Unsolicited result code	+SSLTCPCLOSE: <socket_id>,Link Closed	

Parameter

<socket_id> socket ID, ranging from 0 to 5.

Example

```
AT+SSLTCPCLOSE=0                          Close the TCP connection on socket 0.
+SSLTCPCLOSE: 0,OK
AT+SSLTCPCLOSE=0
+SSLTCPCLOSE: ERROR                       Socket ID is incorrect.
+SSLTCPCLOSE: 0,Link Closed                The connection on socket 0 is closed.
```

6.5 AT+SSLTCPSEND－Sending TCP Data over SSL

To send TCP data over SSL.

Format

Type	Command	Response
Execute	AT+SSLTCPSEND=<socket_id>,<data_length>	<CR><LF>> <CR><LF>+SSLTCPSEND: <socket_id>,OK Or <CR><LF>+SSLTCPSEND: Data length error<CR><LF> Or

		<CR><LF>+SSLTCPSEND: <socket_id>,FAIL<CR><LF>
Test	AT+SSLTCPSEND=?	<CR><LF>+SSLTCPSEND:(value range of<n>),(value range of<data_length>)<CR><LF>

Parameter

<socket_id>	ranging from 0 to 5, used to identify the connection to the server.
<data_length>	data length, ranging from 1 to 4096.
<result>	OK FAIL

Example

```
AT+SSLTCPSEND=0,20                          Send 20-byte data to the server over
>                                           socket 0.
+SSLTCPSEND: 0,OK
AT+SSLTCPSEND=0,1024                        Send 1024-byte data to the server over
>                                           socket 0.
+SSLTCPSEND: 0,FAIL                         Failed because buffer is full.
AT+SSLTCPSEND=0,4097                        Send 4097-byte data to the server.
+SSLTCPSEND: Data length error              Failed because the data length exceeds the
                                            threshold.
AT+SSLTCPSEND=?                             Query the value range of the parameters.
+SSLTCPSEND: (0-5),(1-4096)
OK
```

6.6 AT+SSLTCPREAD – Reading SSL TCP Data

To read SSL TCP data.

This command is sent after executing **AT+RECVMODE=0** to modify receive mode.

Format

Type	Command	Response
Execute	AT+SSLTCPREAD=<n>,<length><CR><LF>	<CR><LF>+SSLTCPREAD:<id>,<len>,<data><CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<n>	socket ID, ranging from 0 to 5.
<length>	data length, ranging from 1 to 2048.
<len>	Length of data read
<data>	Data read

Example

```
AT+SSLTCPSETUP=0,58.60.184.213,12004,0
OK
+SSLTCPSETUP: 0,OK
AT+SSLTCPSEND=0,10
>
+SSLTCPSEND: 0,OK

+SSLTCPRECV: 0

AT+SSLTCPREAD=0,2048
+SSLTCPREAD: 0,10,1111111111
OK
```

6.7 +SSLTCPRECV – Notifying SSLTCP Data Output

To notify SSLTCP data output.

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

Format

Type	Command
Unsolicited result code	+SSLTCPRECV: <socket_id>,<data_length>,<data><CR><LF>

Parameter

<socket_id>	ranging from 0 to 5, used to identify the connection to the server, the same as the socket ID in the +SSLTCPSETUP command.
<data_length>	data length.
<data>	data received

Example

```
+SSLTCPRECV: 0,20,1234567890abcdefghjk          Received 20-byte data over socket 0
```

6.8 AT+CERTADD – Writing SSL Certificate

To write an SSL certificate to the module.

The writing process can be interrupted by +++.

Format

Type	Command	Response
Execute	AT+CERTADD=<file_name>,<length><CR>	<CR><LF>CONNECT<CR><LF> <CR><LF>+CERTADD: <length>,OK<CR><LF> Or <CR><LF>+CERTADD: ERROR<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<filen_ame>	Certificate file name
<length>	file length

Example

```
AT+CERTADD=ca_cert.pem,1428          Add the alipay.crt certificate of 1428 bytes to the
CONNECT                              module.

+CERTADD: 1428,OK
AT+CERTADD=clent_cert.pem,1938       Add the alipay.crt certificate of 1938 bytes to the
CONNECT                              module.

+CERTADD: 1938,OK
AT+CERTADD=client_key.pem,1097       Add the alipay.crt certificate of 1907 bytes to the
CONNECT                              module.

+CERTADD: 1097,OK
```

6.9 AT+CERTCHECK – Checking SSL Certificate

To check the SSL certificate.

Format

Type	Command	Response
Execute	AT+CERTCHECK=<file_name><CR>	<CR><LF>+CERTCHECK: <file_name>,OK Or <CR><LF>+CERTCHECK: ERROR
Query	AT+CERTCHECK?<CR>	<CR><LF><file_name> [<CR><LF><file_name>] <CR><LF>OK<CR><LF>

Parameter

<file_name> Certificate file name

Example

```
AT+CERTCHECK=ca_cert.pem                    Check the ca_cert.pem certificate.
+CERTCHECK: ca_cert.pem,OK
AT+CERTCHECK=clent_cert.pem                 Check the clent_cert.pem certificate.
+CERTCHECK: clent_cert.pem,OK
AT+CERTCHECK=client_key.pem                 client_key.pem does note exist.
+CERTCHECK: ERROR
AT+CERTCHECKT?                              Check the added file.
cacert.pem
keycert.pem
OK
```

6.10 AT+CERTDEL – Deleting SSL Certificate

To delete an SSL certificate.

Format

Type	Command	Response
Execute	AT+CERTDEL=<file_name><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+CERTDEL: ERROR<CR><LF>

Parameter

<file_name> name of the certificate file to be deleted.

Example

```
AT+CERTDEL=ca_cert.pem                          Delete ca_cert.pem.
OK
AT+CERTDEL=client_cert.pem                      Delet client_cert.pem
OK
AT+CERTDEL=client_key.pem                       Delete cilent_key.pem
OK
AT+CERTDEL                                      Delete all added files.
OK
```

7 FTP Commands

7.1 AT+FTPLOGIN－Logging in to the FTP Server

To log in to the FTP server.

- The FTP functions can be used together with the internal protocol stack TCP/UDP function.
- Before performing the FTP operation, you need to log in to the FTP server.
- The FTP function is in passive mode by default.

Format

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

Parameter

<ip>	IP address of the FTP server.
<port>	Port number of the FTP server; generally it is 21.
<user>	User name used to log in to the FTP server. Its length cannot be larger than 100 ASCII codes and it cannot contains any comma.
<pwd>	Password used to log in to the FTP server. Its length cannot be larger than 100 ASCII codes and it cannot contains a comma.
<ftpmode>	FTP mode: 0: PASV (passive mode, default) 1: PORT (active mode)
<result>	Result codes

Have Logged In: The user has logged in to the FTP server.
AT Busy: Last FTP AT command has not been executed completely.
User logged in: The user logs in to the FTP server successfully.
530 Not logged in: The user fails to log in to the FTP server because the user account or password is incorrect.
GPRS DISCONNECTION: The user logged in to the FTP server before a PPP link is set up.

Example

```
AT+FTPLOGIN=219.134.179.52,21,user1,pwd200
9
OK                                          Log in to the server.

+FTPLOGIN: User logged in
AT+FTPLOGIN=183.239.240.40,12150,pp,123
OK                                          Fail to log in to the server; the user
                                            account or password is incorrect.
+FTPLOGIN: 530 Not logged in
AT+FTPLOGIN=58.60.184.213,21,neoway,neoway
OK
                                            Failed to log in to the FTP server.
+FTPLOGIN: FAIL
+FTP:Server Control Link Disconnect          The FTP control link closes.
+FTP: Server Data Link Disconnect            The FTP data link closes.
AT+FTPLOGIN=240e:980:9900::e1d:f8a9,21,neo
way_ftp_test,neowayadmin
OK                                          Failed to log in the FTP server.

+FTPLOGIN: ERROR
```

7.2 AT+FTPLOGOUT – Logging out from 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> <CR><LF>ERROR<CR><LF>

Example

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

7.3 AT+FTPGET – Downloading Data from FTP Server

To download data from the FTP server.

Format

Type	Command	Response
Execute	AT+FTPGET=<dir&filename>,<type>,<Content or Info>[,offset[,lenth]] <CR>	<CR><LF>+FTPGET: Error Not Login<CR><LF> Or <CR><LF>+FTPGET: Error TimeOut<CR><LF> Or <CR><LF>+FTPGET: <length>,<data><CR><LF> Or <CR><LF>+FTPGET: OK.total length is <n><CR><LF> Or <CR><LF>ERROR<CR><LF>
URC	+FTPSTATE: <result>	

Parameter

<dir&filename>	Path and name of the file to be read. The file path is relative to the FTP root path.
<type>	File transmission 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
<offset>	Specifies offset of file content.
<lenth>	Length of file downloaded from the start point, ranging from 1 to 8192 bytes
<length>	Data length
<data>	Data content

<n>	The module reads data successfully and the data length is n.

Example

```
AT+FTPGET=,1,2
OK

+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
-rw-rw-rw-   1 user    group
10 Jan 15 15:01 test.txt
+FTPGET: OK.total length is 446

+FTP:Server Data Link Disconnect
AT+FTPGET=test.txt,1,2
OK

+FTPGET:65,-rw-rw-rw-   1 user
group    10 Jan 15 15:01 test.txt
+FTPGET:OK.total length is 65

+FTP:Server Data Link Disconnect
AT+FTPGET=123.txt,1,1
+FTPGET: File Not Found
AT+FTPPUT=test.txt,1,2,10
>
+FTPPUT: OK,10
AT+FTPGET=test.txt,1,1
+FTPGET:10,0123456789
+FTPGET: OK.total length is 10

+FTP:Server Data Link Disconnect
AT+FTPGET=test.txt,1,1,2
+FTPGET:8,23456789
+FTPGET:OK.total length is 8

+FTP:Server Data Link Disconnect
AT+FTPGET=test.txt,1,1,2,4
+FTPGET:4,2345
+FTPGET:OK.total length is 4
```

Obtain information under the root directory.

Obtain information of **test.txt**.

The file is inexistent.

10-byte data is successfully uploaded.

Read all data.

Offset 2 bytes, read all data after the third byte.

Offset 2 bytes, read 4-byte data after the third byte.

7.4 AT+FTPPUT – Uploading Data to FTP Server

To upload data to the FTP Server.

Format

Type	Command	Response
Execute	AT+FTPPUT=<filename>,<type>,<mode>[,<size>]<CR>	In non-transparent mode <CR><LF>+FTPPUT: OK,<size><CR><LF> In transparent mode: <CR><LF>CONNECT <CR><LF>+FTPPUT: OK,<size><CR><LF> Or <CR><LF>+FTPPUT:Error Not Login<CR><LF> Or <CR><LF>+FTPPUT:AT Busy<CR><LF> Or <CR><LF>+FTPPUT:SIZE Error (non-transparent mode) Or <CR><LF>+FTPPUT:OK,<n><CR><LF> Or <CR><LF>+FTPPUT:Delete File OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

- In transparent mode, after data is transmitted completely, you can execute +++ (excluding <CR><LF>) to end the upload process.
- Executing +++ (excluding <CR><LF>) can end the upload process anytime.

Parameter

<filename>	Name of the file to be uploaded. The file path is relative to the FTP root path.
<type>	File transmission mode 1: ASCII 2: Binary
<mode>	Operating mode 1: STOR mode Create a file in the server and write data into the file; if the file exists already, overwriting the original file. 2: APPE mode Create a file in the server and write data into the file; if the file exists already, write the data at the end of the file. 3: DELE mode Delete a file.
<size>	Data length, ranging from 1 to 8192 bytes. Transparent mode is used if this parameter is omitted.
<n>	Length of the file sent.

- **+FTPPUT: AT Busy**: Last FTP-related AT command has not been executed completely.
- Executing +++ (excluding <CR><LF>) to exit from transparent mode and end the uploading.
- If the file you upload over a connection in transparent mode is large, the port will be occupied all the time that affects the sending and receiving of other commands. So, it is recommended to transmit files in buffer mode; when you need to send large files, use APPE mode to send them in segment.

Example

```
AT+FTPPUT=test.txt,1,1,10                Upload the 10-byte test.txt file in ASCII mode and the
> 1234567890                             operation is
+FTPPUT:OK,10                            in STOR mode.

AT+FTPPUT=test.txt,1,2,10                Upload the 10-byte test.txt file in ASCII mode and the
> 1234567890                             operation is
+FTPPUT:OK,10                            in APPE mode.

AT+FTPPUT=test.txt,1,3,0                 Delete the test.txt file.
+FTPPUT:Delete File OK
AT+FTPPUT=test.txt,1,1
CONNECT                                  Transparent mode, upload the 10-byte test.txt file in ASCII
1234567890                               mode and the operation is in STOR mode.
+FTPPUT:OK,10
AT+FTPPUT=test.txt,1,2
CONNECT                                  Transparent mode, upload the 10-byte test.txt file in ASCII
1234567890                               mode and the operation is in APPE mode.
+FTPPUT:OK,10
AT+FTPPUT=test.txt,1,3
+FTPPUT:Delete File OK                   Transparent mode; delete the test.txt file.
```

7.5 AT+FTPSIZE – Obtaining the FTP File Size

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

Format

Type	Command	Response
Execute	AT+FTPSIZE=<filename><CR>	<CR><LF>+FTPSIZE: <size> <CR><LF>OK<CR><LF> Or <CR><LF>+FTPSIZE: File Not Found<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<filename>	Name of the file to be uploaded.
<size>	The actual file size

Example

```
AT+TPSIZE=test 500k.txt
+FTPSIZE: 512000                          The file size is 512000 bytes.
OK
AT+FTPSIZE=test.txt
+FTPSIZE: File Not Found                  The queried file is inexistent.
AT+FTPSIZE=test 500.txt,100
ERROR                                     The format of the AT command is incorrect
```

7.6 AT+FTPSTATUS – Querying the 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>

Parameter

<status>	0: FTP connection is not set up. 1: FTP connection is set up.
<ip>	IP address of the FTP server.
<port>	Port number of the FTP server.

Example

```
AT+FTPSTATUS                              Query the FTP link status.
+FTPSTATUS:1,119.139.221.66,21            Set up an FTP link, and display the IP address
                                          and port ID of the server.
AT+FTPSTATUS                              Query the FTP link status.
+FTPSTATUS:0,0.0.0.0,21                   The FTP connection is not set up yet.
```

8 LwM2M Function Commands

This chapter lists the AT commands ralated to the LwM2M function and these commands are only supported by some variants of the N717 series.

8.1 AT+NLWSERV – LwM2M Server Parameter Configuration

To configure the URL and port of the connected LwM2M server.

Format

Type	Command	Response
Execute	AT+NLWSERV=<url>,<port><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NLWSERV?<CR>	<CR><LF>+NLWSERV: <url>,<port><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+NLWSERV=?<CR>	<CR><LF>+NLWSERV: <url>,<port><CR><LF> <CR><LF>OK<CR><LF>

Parameter

<url>	URL of the connected LwM2M server.
<port>	Port of the connected LwM2M server.

Example

```
AT+NLWSERV=58.60.184.213,12009              Configure the URL and port of the connected
OK                                          LwM2M server.
AT+NLWSERV?
+NLWSERV: "58.60.184.213",12009             Configure parameters of the connected LWM2M
                                            server.
OK
AT+NLWSERV=?
+NLWSERV: <url>,<port>                      Query the parameter ranges.
```

```
OK
```

8.2 AT+NLWCONF – Configuring the LwM2M Connection Parameters

To configure the LwM2M connection parameters.

Format

Type	Command	Response
Execute	AT+NLWCONF=<endpointname>,<lifetime><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NLWCONF?<CR>	<CR><LF>+NLWCONF: <endpointname>,<lifetime> <CR><LF>OK<CR><LF>
Test	AT+NLWCONF=?<CR>	<CR><LF>+NLWCONF: <endpointname>[,<lifetime>]<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<endpointname>	Endpoint name of the device.
<lifetime>	Lifetime of the device connection.

Example

```
AT+NLWCONF=neo_lwm2m_client2,60                  Configure the LwM2M connection parameters.
OK
AT+NLWCONF?
+NLWCONF: "lwm2m_client2",60                     Query the set parameters.

OK
AT+NLWCONF=?
+NLWCONF:
<endpointname>[,<lifetime>]                      Query the parameter ranges.

OK
```

8.3 AT+NLWDTLSCFG – Configuring the LwM2M Encrypted Connection Parameters

To configure the LwM2M encrypted connection parameters.

When adding a certificate for encryption, you must first use AT+CERTADD to add the certificate to the module.

Format

Type	Command	Response
Execute	AT+NLWDTLSCFG=<dtls_mode>[,dtls_val,…]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NLWDTLSCFG?<CR>	<CR><LF>+NLWDTLSCFG: <dtls_mode>[,dtls_val,…]<CR><LF> <CR><LF>ERROR<CR><LF>
Test	AT+NLWDTLSCFG=?<CR>	<CR><LF>+NLWDTLSCFG: <dtlsmode>[,<cert_val1>,<cert_val2>,<cert_val3>]<CR><LF><CR><LF>OK<CR><LF>

Parameter

<dtls_mode>	Encrypted connection mode. 0: Pre-Shared Key mode 1: Raw Public Key mode 2: Certificate mode 3: NoSec mode (default)
<dtls_val>	Parameters required for the encryption mode. When dtls_mode = 0: AT+NLWDTLSCFG =0,<psk_identity>,<psk _key> Where, psk _key must be in HEX format. When dtls_mode = 1: AT+NLWDTLSCFG =1,<cli_prikey>,<cli_pubkey>,<ser_pubkey> It is currently not supported. When dtls_mode = 2: AT+NLWDTLSCFG =2,<cli_prikey>,<cli_cert>,<ser_cert>, <cli_prikey>: client private key name. <cli_cert>: client certificate name. <ser _cert>: server certificate name. The certificate is added by the AT+CERTADD command. When dtls_mode = 3:

AT+NLWDTLSCFG =3

Example

```
AT+NLWDTLSCFG=0,public_pn,3031323334                    Configure PSK encryption for the
OK                                                      LwM2M DTLS connection.
AT+NLWDTLSCFG=2,clikey,clicert,sercert                  Configure certificate encryption for
OK                                                      the LwM2M DTLS connection.
AT+NLWDTLSCFG?
+NLWDTLSCONF: 2,"clikey","clicert","sercert"            Query the LwM2M DTLS connection
                                                        parameters.
OK
AT+NLWDTLSCFG=?
+NLWDTLSCFG:
<dtlsmode>[,<cert_val1>,<cert_val2>,<cert_val3>]       Query the parameter ranges.

OK
```

8.4 AT+NLWADDOBJ – Adding an LwM2M Object

To add an LwM2M object.

The three objects, including security, server, and devices, are added by default when the client connection is set up.

This command can be added before and after the connection is set up.

Format

Type	Command	Response
Execute	AT+NLWADDOBJ=<obj_id>,[<ins_id>[,<res_id>]]<CR>	<CR><LF>OK<CR><LF> <CR><LF>+NLWADDOBJ: OK<CR><LF> Or <CR><LF>ERROR<CR><LF> <CR><LF>+NLWADDOBJ: FAIL,<lwm2m_err><CR><LF>
Query	AT+NLWADDOBJ?<CR>	<CR><LF>+NLWADDOBJ:<CR><LF>(list of "/<obj_id>/<ins_id><CR><LF>")<CR><LF>OK<CR><LF>
Test	AT+NLWADDOBJ=?<CR>	<CR><LF>+NLWADDOBJ: <obj_id>[,<ins_id>[,<res_id>]]<CR><LF><CR><LF>OK<CR><LF>

Parameter

<obj_id>	Int type, Object ID.
<ins_id>	Int type, Instance ID.
<res_id>	Int type, Resources ID number.
err	Error code -13: adding this object is not supported. -14: failed to add an object or failed to add an instance of an object. Others: other errors

Example

```
AT+NLWADDOBJ=0
OK

+NLWADDOBJ: OK                                          Object is added successfully.

AT+NLWADDOBJ=65535
OK                                                      Fail to add object.

+NLWADDOBJ: FAIL,<-13>
AT+NLWADDOBJ?
+NLWADDOBJ:
/0/0                                                    Query the added objects.

OK
AT+NLWADDOBJ=?
+NLWADDOBJ: <obj_id>[,<ins_id>[,<res_id>]]              Query the parameter range.

OK
```

8.5 AT+NLWDELOBJ – Deleting an LwM2M Object

To delete an LwM2M object.

This command can be added before and after the connection is set up.

Format

Type	Command	Response
Execute	AT+NLWDELOBJ=<obj_id><CR>	<CR><LF>OK<CR><LF> <CR><LF>+NLWDELOBJ: OK<CR><LF> Or <CR><LF>ERROR<CR><LF> <CR><LF>+NLWDELOBJ: FAIL,<lwm2m_err><CR><LF>

Parameter

<obj_id>	Int type, Object ID.
err	Error code -132: deleting this object is supported but the object does not exist. -13: deleting this object is supported. Others: other errors

Example

```
AT+NLWDELOBJ=0
OK                                          Delete the object successfully.

+NLWDELOBJ: OK
AT+NLWDELOBJ=0
OK

+NLWDELOBJ: FAIL,<-132>
                                            Fail to delete the object.
AT+NLWADDOBJ=65535
OK

+NLWADDOBJ: FAIL,<-13>
AT+NLWDELOBJ?
+NLWDELOBJ: 0
                                            Query the deleted object.
OK
AT+NLWDELOBJ=?
+NLWDELOBJ: <obj_id>
                                            Query the parameter range.
OK
```

8.6 AT+NLWOPEN – Setting up an LwM2M Connection

To set an LwM2M data receiving mode and set up the connection.

Format

Type	Command	Response
Execute	AT+NLWOPEN=<mode><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>OK<CR><LF><CR><LF>+NLWOPEN: FAIL,<err><CR><LF> Or

		<CR><LF>OK<CR><LF><CR><LF>+NLWOPEN: OK<CR><LF>
Query	AT+NLWOPEN?<CR>	<CR><LF>+NLWOPEN: <mode><CR><LF><CR><LF>OK<CR><LF>
Test	AT+NLWOPEN=?<CR>	<CR><LF>+NLWOPEN: (range of <mode>)<CR><LF><CR><LF>OK<CR><LF>

Parameter

<mode>	LWM2M data receiving mode. 0: Direct push mode 1: Buffer access mode
err	Error code -6: the connection times out. -7: failed to connect to the server. -17: no dial-up connection is established. Others: other errors

Example

```
AT+NLWOPEN=0
OK                                  Set the LWM2M data receiving mode and set up the connection.

+NLWOPEN: OK
AT+NLWOPEN?
+NLWOPEN: 0                         The LWM2M data reception mode is direct push mode.

OK
AT+NLWOPEN=?
+NLWOPEN: (0-1)                     Query the parameter range.

OK
```

8.7 AT+NLWUPDATE – Updating LwM2M Data

To initiate an LwM2M data update request.

Format

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

	<CR><LF>ERROR<CR><LF> Or <CR><LF>OK<CR><LF><CR><LF>+NLWUPDATE: FAIL,<err><CR><LF> Or <CR><LF>OK<CR><LF><CR><LF>+NLWUPDATE: OK<CR><LF>

Parameter

err	Error code -8: the module does not connect to the server Others: other errors

Example

```
AT+NLWUPDATE
OK
                                        LwM2M data updated successfully

+NLWUPDATE: OK
AT+NLWUPDATE
OK

+NLWUPDATE: FAIL,<-8>
```

8.8 AT+NLWDATASEND – Sending LwM2M Data

To send LwM2M data.

Format

Type	Command	Response
Execute	AT+NLWDATASEND=<obj_id>,<ins_id>,<res_id>,<date><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>OK<CR><LF><CR><LF>+NLWDATASEND: FAIL,<err><CR><LF> Or <CR><LF>OK<CR><LF><CR><LF>+NLWDATASEND: OK<CR><LF>

Parameter

<obj_id>	Int type, Object ID.
<ins_id>	Int type, Instance ID.
<res_id>	Int type, Resources ID number.
<date>	Data to be sent, ranging from 1 to 1024.

Example

```
AT+NLWDATASEND=3,0,9,50
OK
                                        Send data "50" to the /3/0/9 resource.

+NLWDATASEND: OK
```

8.9 AT+NLWDATASTATUS – Querying LwM2M Sending Status

To query the LwM2M sending status.

The initial NLWDATASTATUS is 4.

Format

Type	Command	Response
Query	AT+NLWDATASTATUS?<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+NLWDATASTATUS: <status><CR><LF><CR><LF>OK<CR><LF>

Parameter

<status>	LwM2M sending status. 0: Not sent. 1: Waiting for a response after sending. 2: Failed to send. 3: Sending timeout. 4: Sent successfully.

Example

```
AT+NLWDATASTATUS?
+NLWDATASTATUS: 4                                   Query the LwM2M sending status.

OK
```

8.10 AT+NLWRD – Reading LwM2M Data

To read the LwM2M data received in Buffer access mode.

Format

Type	Command	Response
Execute	AT+NLWRD=<read_len><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+NLWRD: <read_actual_length>,<remain_length>[<CR><LF><data>]<CR><LF><CR><LF>OK<CR><LF>
Test	AT+NLWRD=?<CR>	<CR><LF>+NLWRD: <read_len><CR><LF><CR><LF>OK<CR><LF>

Parameter

<read_len>	The length of data read.
<data>	Data read

Example

```
+NLWDATARECV: 1,0,2,2

AT+NLWRD =2
                                    After the uploaded data is received, read 2 bytes of
+NLWRD: 2,0                         data.
60

OK
AT+NLWRD=?
+NLWRD: <read_len>
                                    Query the parameter range.

OK
```

8.11 AT+NLWSTATUS – Querying LwM2M Connection Status

To query the LwM2M connection status.

Format

Type	Command	Response
Query	AT+NLWSTATUS?<CR>	<CR><LF>+NLWSTATUS:<status><CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<status>	LwM2M connection status 0: INITIAL 1: BOOTSTRAP_REQUIRED 2: BOOTSTRAPPING 3: REGISTER_REQUIRED 4: REGISTERING 5: READY (The connection is successfully set up.)

Example

```
AT+NLWSTATUS?
+NLWSTATUS: 5                                   Query the LwM2M status

OK
```

8.12 AT+NLWCLOSE – Closing an LwM2M Connection

To close an LwM2M connection.

Format

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

	Or <CR><LF>ERROR<CR><LF> Or <CR><LF>OK<CR><LF><CR><LF>+NLWCLOSE: OK<CR><LF>

Parameter

N/A.

Example

```
AT+NLWCLOSE
OK                                          Close the LwM2M connection.

+NLWCLOSE: OK
```

8.13 AT+NLWCFG – Configuring LwM2M Optional Parameters

To configure the LwM2M optional parameters.

If the configured data sending type is HEX, the data sent by the +NLWDATASEND command must be in HEX format.

Format

Type	Command	Response
Execute	AT+NLWCFG=<type>,<type_value1>[,<type_value2>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NLWCFG?<CR>	<CR><LF>+NLWCFG: <CR><LF>(list of configuration) <CR><LF>OK<CR><LF>
Test	AT+NLWCFG=?<CR>	<CR><LF>+NLWCFG: <type>,<type_value1>[,<type_value2>]<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<type>	Optional parameter type.
<type_value1>[,<type_value2>]	Optional parameter value. The following types are supported currently: Dataformat: Sent and received data format. Dataformat parameters: <send_data_format>,<recv_data_format> 0: text format, 1: hex format bootstrap: Whether to connect to the Bootstrap server. family: 4: Use the IPv4 mode for auto connection. 6: Use the IPv6 mode for auto connection. factory_save: 2: Save the connection parameters to the EFS file system.

Example

```
AT+NLWCFG=DATAFORMAT,1,0                          Set the data sending format to the hex format
OK                                                and the data receiving format to the text
                                                  format.
AT+NLWCFG=BOOTSTRAP,1
OK                                                Open a connection to the Bootstrap server.
AT+NLWCFG?
+NLWCFG:
dataformat,0,0                                    Query the list of optional parameter
bootstrap,0                                       configurations.

OK
AT+NLWCFG=?
+NLWCFG:
<type>,<type_value1>[,<type_value2>]              Query the setting parameters of the command.

OK
```

8.14 +NLWOBSERVE – URC Notifying the Observation Mode

To notify the current observation mode.

Format

Type	Command
URC	+NLWOBSERVE:<flag>,<obj_id>,<ins_id>,<res_id><CR>

Parameter

<flag>	Indicates whether the observe mode is enabled. 0: Enable the observe mode. 1: Disable the observe mode.
<obj_id>	Int type, Object ID.
<ins_id>	Int type, Instance ID.
<res_id>	Int type, Resources ID. When res_id=65535, the operated object is the entire instance, including all resources of the instance.

Example

```
+NLWOBSERVE: 0,1,0,0                    Start to observe the /1/0/0 resource.
+NLWOBSERVE: 0,1,0,65535                Start to observe all the /1/0 resources.
```

8.15 +NLWDATARECV – URC Notifying Data Received

To notify the received data.

If the buffer access mode is configured upon setup of the connection, only the latest data record is cached, and the previous records are cleared.

The display format of <data> is determined by the setting of data format.

Format

Type	Command
URC	+NLWDATARECV:<obj_id>,<ins_id>,<res_id>,<length>[,<data>] <CR>

Parameter

<obj_id>	Int type, Object ID.
<ins_id>	Int type, Instance ID.
<res_id>	Int type, Resources ID.
<length>	Length of the data received.
<data>	Received data. If the direct push mode is configured upon setup of the connection, this data will be displayed. If the buffer access mode is configured upon setup of the connection, this data will be cached and can be read by using the +NLWRD command.

Example

```
+NLWDATARECV: 3,0,13,10,"1554346580"          Receive the report indicating that the resource
                                              /3/0/13 observation starts.
```

8.16 AT+NLWDATASET – Setting Data

To set the resource value/setting reporting conditions.

Format

Type	Command	Response
Execute	AT++NLWDATASET=<data>,<type>,<obj_id>,<obj_ins_id>,<res_id>[,<res_ins_id>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+NLWDATASET=?<CR>	<CR><LF>+NLWDATASET: <data>,<type>,<obj_id>,<obj_ins_id>,<res_id>[,<res_ins_id>]<CR><LF><CR><LF> OK<CR><LF>

Parameter

<obj_id> Int type, Object ID.

<obj_ins_id> Int type, Object Instance ID.

<res_id> Int type, Resources ID.

<res_ins_id> Int type, Resources Instance ID.

<type> Data type:

1 to 2: NLWDATASET is used to fill the value of the resource. <type> represents the data type of <data>:

1: Integer

2: String

4 to 9: Set the conditions for reporting the resource value or setting:

4: Set the reporting condition as follows: If the time since the previous check of the resource value is less than <data> (unit: second), the current change of the resource value will be reported; otherwise it will not be reported.

5: Set the reporting condition as follows: If the time since the previous check of the resource value is greater than <data>, the current change of the resource value will be reported; otherwise it will not be reported.

6: Set the reporting condition as follows: If the resource value is greater than <data>, the current resource value will be reported; otherwise it will not be reported.

7: Set the reporting condition as follows: If the resource value is less than <data>, the current resource value will be reported; otherwise it will not be reported.

	8: Set the reporting condition as follows: If the change amount of resource value changed compared with that in the previous check is greater than <data>, the current change of the resource value will be reported; otherwise it will not be reported. 9: Set the condition as reporting unconditionally. -4 to -8: Cancel the configured reporting conditions.
<data>	Fill in the resource value (integer/string) or set the reporting standard (integer).

Example

```
AT+ NLWDATASET=1                          The command format is incorrect.
ERROR
AT+ NLWDATASET=160,1,1,0,1                The resource 1/0/1 resource is successfully set to 160.
OK
AT+NLWDATASET=?
+NLWDATASET:
<data>,<type>,<obj_id>,<obj_
ins_id>,<res_id>[,<res_ins_i
d>]

OK
```

9 Others

9.1 AT^SYSINFO – Obtaining System Information

To obtain system information.

Format

Type	Command	Response
Set	AT^SYSINFO<CR>	<CR><LF>^SYSINFO: <srv_status>,<srv_domain>,<roam_status>,<sys_mode>,<sim_state>[,[<reserve>],<sys_submode>] <CR><LF>OK<CR><LF>

Parameter

<srv_status>	0: No service
	1: Limited service
	2: Service
	3: Service with area limit
	4: power saving
<srv_domain>	0: No service
	1: CS only
	2: PS only
	3: PS + CS
	4: EPS service
<roam_status>	0: Non-roaming
	1: Roaming
<sys_mode>	0: No service
	1: AMPS mode
	2: CDMA mode
	3: GSM mode
	4: EVDO mode or TDS mode
	5: WCDMA mode
	6: GPS mode
	7: GSM and WCDMA mode
	8: CDMA Hybrid mode
	9: LTE mode

	10: GSM, WCDMA, and LTE mode
	17: LTE mode
<sim_state>	0: invalid
	1: valid
	255: No SIM card or PIN code is required
<reserve>	Reserved field
<sys_submode>	System sub mode
	0: No service
	1: GSM mode
	2: GPRS mode
	3: EDGE mode
	4: WCDMA mode
	5: HSDPA mode
	6: HSUPA mode
	7: HSUPA and HSDPA mode
	8: TD-SCDMA mode
	9: TDD_SUBACT
	10: FDD_SUBACT

Example

```
AT^SYSINFO
^SYSINFO: 2,3,0,4,1

OK
```

9.2 AT$MYSYSINFO – Querying or Locking the Network Mode

To query or lock the network mode.

When the network mode is set to any non-AUTO mode, the module will automatically check the network status.

- If the module registers a network, it will determine whether the network is the mode set by the command. The module will switch to the set network if the registered network is not the mode set by the command.
- If the module fails to register any network within interval set by $MYNETAUTO, the module will automatically switch to the AUTO mode.

Format

Type	Command	Response
Set	AT$MYSYSINFO=<SysMode><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Execute	AT$MYSYSINFO<CR	<CR><LF>$MYSYSINFO: <Sys_Mode>,<mnc> <CR><LF>OK<CR><LF>
Test	AT$MYSYSINFO=?<CR>	<CR><LF>$MYSYSINFO: value range of <SysMode> <CR><LF>OK<CR><LF>

Parameter

<SysMode> Network mode
1: AUTO
2: 2G (including GSM, EDGE)
4: 4G (including FDD-LTE, TDD-LTE)

<Sys_Mode> 0: No service
2: 2G (including GSM, EDGE)
4: 4G (including FDD-LTE, TDD-LTE)

<mnc> Network carrier code
00: Fail to register
01: China Mobile
02: China Unicom
03: China Telecom
04: Unknown

Example

```
AT$MYSYSINFO                                  The module registered to the 4G network of
$MYSYSINFO: 4,01                              China Mobile.
OK
AT$MYSYSINFO=1                                Set network mode to auto.
OK
AT$MYSYSINFO=?                                Query the value range of the parameter.
$MYSYSINFO: 1,2,4
OK
```

9.3 AT$MYNETAUTO – Enabling/Disabling the Default AUTO Network Modes during Startup

To query the software version

Format

Type	Command	Response
Set	AT$MYNETAUTO=<ONOFF>[,<CYCLE>]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT$MYNETAUTO?<CR>	<CR><LF>$MYNETAUTO: <ONOFF>,<CYCLE> <CR><LF>OK<CR><LF>

Parameter

<ONOFF>	0: Disable the default AUTO network modes during startup 1: Enable the default AUTO network modes during startup
<CYCLE>	the period that the module restores to auto mode after the network mode is locked and the module failed to register with the network. This value ranges 2 to 1440 minutes, 2 minutes by default.

Example

```
AT$MYNETAUTO=0
OK
AT$MYNETAUTO?
$MYNETAUTO: 0,2
OK
```

9.4 AT+NCUSTSWITCH – Controlling Extended Functions

To enable of disable extended functions

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

Execute this command before the TCP connection is established.

Format

Type	Command	Response
Execute	AT+NCUSTSWITCH=<typeX>,<modeX><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NCUSTSWITCH?<CR>	<CR><LF>+NCUSTSWITCH: <type1>,<mode1> <CR><LF>OK<CR><LF>
Test	AT+NCUSTSWITCH=?<CR>	<CR><LF>+NCUSTSWITCH: (value range of <type>) <CR><LF>OK<CR><LF>

Parameter

<typeX> Extended function
3: TCP sub-packet reading
4: Configure the wake-up source
Currently, only type3 and type4 are supported.

<modeX> Frequency band supported.
Mode3:
0: sub-packet reading (default)
1: Automatic packet combination
Mode4:
Bit[X]=1, enable
Bit[X]=0, disable

Flag	Bit[15~3]	Bit[2]	Bit[1]	Bit[0]
Ring report type	Undefined	DATA	CALL	SMS
Enable	1	1	1	1
Disable	0	0	0	0

0x0001 enable SMS status indication
0x0002 enable CALL status indication
0x0003 enable CALL+SMS status indication
0x0004 enable DATA status indication (DATA is only used for the internal protocol stack services.)
0x0005 enable DATA+SMS status indication
0x0006 enable DATA+CALL status indication
0x0007 enable DATA+CALL+SMS status indication (default)

Example

```
AT+NCUSTSWITCH=3,1                          Set to automatic packet combination.
OK
AT+NCUSTSWITCH?                             Query the setting.
+NCUSTSWITCH: 3,1
OK
AT+NCUSTSWITCH=?
+NCUSTSWITCH: (1-4),(0-7)
OK
AT+NCUSTSWITCH=4,1                          Set the ring status indication, only SMS report.
OK
AT+NCUSTSWITCH?                             Query the setting.
+NCUSTSWITCH: 3,0
+NCUSTSWITCH: 4,7
OK
```

9.5 AT+NWCFG – Custom Configuration

To add specified cells to a blacklist.

The setting by this command is unsaved after the module is powered down.

Format

Type	Command	Response
Set	AT+NWCFG=<option>,<type>[,<rat>,<freq1>,<phyid1>[,<freq2>,<phyid2>...[,<freqn>,<phyidn>,]]]<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NWCFG=<option><CR>	<CR><LF>+NWCFG: "bar_cell"[,<rat>,<freq1>,<phyid1>[,<freq2>,<phyid2>...[,<freqn>,<phyidn>,]]]<CR><LF> ... ["bar_cell"[,<rat>,<freq1>,<phyid1>[,<freq2>,<phyid2>...[,<freqn>,<phyidn>,]]]]<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<option>	”bar_cell”: operate the cell blacklist function
<type>	0: clear all list 1: lock the cell 2: unlock the cell
<rat>	1: gsm

	2: wcdma (not supported) 3: lte 4: catm (not supported) 5: nb (not supported) 6: nr (not supported)
<freq>	freq1,freq2,...,freqn, n can be 10 at most. nr:nr-arfcn lte/catm/nb: earfcn wcdma: uarfcn gsm: arfcn
<phyid>	phyid1,phyid2,...,phyidn, n can be 10 at most. lte/catm/nb/nr: pci wcdma: psc gsm: bsic

Example

```
AT+NWCFG="bar_cell"
+NWCFG: "bar_cell",3,1506,266
                                        Query information about the blacklist cell
OK

AT+NWCFG="bar_cell",1,3,1506,266
OK                                      Lock lte cell: earfcn(1506) + pci(266)

AT+NWCFG="bar_cell",2,3,1506,266
OK                                      Unlock lte cell: earfcn(1506) + pci(266)

AT+NWCFG="bar_cell",1,1,34,0
OK                                      Set the gsm cell: arfcn + bsic

AT+NWCFG="bar_cell",0
OK                                      Clear all blacklist
```

9.6 AT+NWNTU – Synchronizing Network Time

To synchronize the module time to the network time.

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

Enable PPP link (AT+XIIC=1) before executing this command.

You can execute AT+CCLK? to query whether RTC is synchronized to the current network time after this command is executed successfully.

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

Format

Type	Command	Response
Execute	AT+NWNTU=<mode>[,<remote_addr>,<timeout>[[,<TZ>][,<DST>]]]<CR>	<CR><LF>OK<CR><LF> +NWNTU: <newtime><CR><LF> Or <CR><LF>OK<CR><LF> +NWNTU: <err_code><CR><LF>
Query	AT+NWNTU?<CR>	<CR><LF>+NWNTU: <serv_ip>,<time>,<TZ>,<DST> <CR><LF> <CR><LF>OK<CR><LF>
Test	AT+NWNTU=?<CR>	<CR><LF>+NWNTU: (list of supported <mode>s),(range of supported <timeout>),(range of supported <TZ>),(range of supported <DST>)<CR><LF> <CR><LF>OK<CR><LF>

Parameter

<mode>	Unsigned integer 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.
<remote_addr>	The IP address or domain name of the time server. The format of the IP address is: xx.xx.xx.xx. The format of the domain name is: www.china.com
<timeout>	the timeout period, ranging from 1 to 30, unit: second.
<TZ>	Time zone, in format of E/W+digits; E8 by default. E: east time zone, 0 to 12. 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)
<newtime>	The latest time obtained from the time server, format: YYYY-MM-DD,HH:MM:SS.
<err_code>	Time command error code. 100: No dial-up, no network connection. 101: Connection to NTP server timed out. 102: Failed to send NTP request. 103: Invalid domain name. 104: Socket link error, the reason may be network busy.

Example

```
AT+NWNTU=?
+NWNTU: (0-1),,(1-30),,(0-1)                    Query the parameter ranges.
OK
AT+NWNTU=1
OK                                              Time synchronization.
                                                Failure to connection to network.
+NWNTU: 100
AT+XIIC=1
OK

+CGEV: NW PDN DEACT 1

+CGEV: ME DETACH

+CGEV: EPS PDN ACT 1                            Synchronize Time successfully.
AT+XIIC?
+XIIC:    1,10.98.108.39
OK
AT+NWNTU=1
OK

+NWNTU: "2023-10-31,09:17:20"
AT+NWNTU=1,"time.nist.gov",30,"W8",0
OK                                              Synchronize time according to the
                                                specified parameters.
+NWNTU: "2023-10-30,17:22:13"
AT+NWNTU=0
+NWNTU: 2023-10-31,09:17:20                     Query the last synchronization time.
OK
AT+NWNTU?
+NWNTU: "time.windows.com",15,"E8",0            Query the parameters used when
OK                                              synchronizing time.
```

9.7 AT+NRSP – Querying RSRP, RSRQ, SINR of Cells in a Neighbor of a Serving Cell on LTE Network

To query RSRP, RSRQ, SINR in a neighbor of LTE cell.

This command is valid only on LTE networks.

Format

Type	Command	Response
Execute	AT+NRSP<CR>	<CR><LF>+NRSP: <rsrp1>,<rsrq1>,<rsrp2>,<rsrq2>,…,<sinr> <CR><LF>OK<CR><LF>

Parameter

<rsrpN>	Reference Signal Received Power, the unit is 0.1 dBm. It is valid only on LTE networks. N is the number of cells in a neighbor of the serving cell. The maximum value of N is 8: <rsrp1>,<rsrq1>,<rsrp2>,<rsrq2>,…, <rsrpN>,<rsrqN>
<rsrqN>	Reference Signal Received Quality, the unit is 0.1 dBm. It is valid only on LTE networks. N is the number of cells in a neighbor of the serving cell: <rsrp1>,<rsrq1>,<rsrp2>,<rsrq2>,…, <rsrpN>,<rsrqN>
<sinr>	Signal-to-Interface plus Noise Ratio. The value is 10 times of actual SINR. It is valid only on LTE networks.

Example

```
AT+NRSP
+NRSP: -1093,-115,-1054,-118,-1117,-181,-
1109,-172,-1166,-200,-1231,-200,107
OK
```

9.8 AT$MYSYSINFO – Querying or Locking the Network Mode

To query or lock the network mode.

When the network mode is set to any non-AUTO mode, the module will automatically check the network status.

- If the module registers a network, it will determine whether the network is the mode set by the command. The module will switch to the set network if the registered network is not the mode set by the command.
- If the module fails to register any network within interval set by $MYNETAUTO, the module will automatically switch to the AUTO mode.

Format

Type	Command	Response
Set	AT$MYSYSINFO=<SysMode><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Execute	AT$MYSYSINFO<CR	<CR><LF>$MYSYSINFO: <Sys_Mode>,<mnc> <CR><LF>OK<CR><LF>

Test	AT$MYSYSINFO=?<CR>	<CR><LF>$MYSYSINFO: value range of <SysMode> <CR><LF>OK<CR><LF>

Parameter

<SysMode>	Network mode 0: No service 2: 2G (including GSM, EDGE, CDMA) 3: 3G (including WCDMA, TD-SCDMA, EVDO) 4: 4G (including FDD-LTE, TDD-LTE) 5: 2G+3G (including GSM,EDGE,CDMA,WCDMA,TD-SCDMA,EVDO) 6: 2G+4G (including GSM,EDGE,CDMA,FDD-LTE,TDD-LTE) 7: 3G+4G (including WCDMA,TD-SCDMA,EVDO,FDD-LTE,TDD-LTE)
<Sys_Mode>	Network mode 0: No service 2: 2G (including GSM, EDGE, CDMA) 3: 3G (including WCDMA, TD-SCDMA, EVDO) 4: 4G (including FDD-LTE, TDD-LTE)
<mnc>	Network carrier code 00: Fail to register 01: China Mobile 02: China Unicom 03: China Telecom 04: Unknown

Example

```
AT$MYSYSINFO                                    The module registered to the 4G network of
$MYSYSINFO: 4,01                                China Mobile.
OK
AT$MYSYSINFO=1                                  Set network mode to auto.
OK
AT$MYSYSINFO=?                                  Query the value range of the parameter.
$MYSYSINFO: 1-7
OK
```

9.9 AT+NETDMSG – Querying Network Registration Information

To query the network registration information.

This command works only after the module is registered with a network.

<TA> is valid only when the module is in GSM communication or GPRS data receiving/sending status.

On a 3GPP network, there will be valid values in the fields of LAC, CELL_ID, and BSIC and the value in the SID, NID, and BID fields is 0.

On a CDMA1X network, there will be valid values in the fields of SID, NID, and BID and the value in the LAC, CELL_ID, and BSIC fields is 0. For HDR only, the values in the SID, NID, and BID fields is 0. For HDR only, <LAC>,<CELL_ID>, and <BSIC> do not exist

RX power, RSRQ, and SINR are valid only on LTE networks.

Format

Type	Command	Response
Execute	AT+NETDMSG	+NETDMSG:<MCC+MNC>,[<LAC>/<TAC>],<CELL_ID>, [<BSIC>/<Phy_cellid>/<PSC>],<net_mode>,<BAND>, <ARFCN>,<RX_dBm>,<TX_dBm>,<SID>,<NID>,<BID>, <RSRP>,<RSRQ>,<SINR> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Parameter

<MCC+MNC>	Mobile Country Code + Mobile Network + Code
[<LAC>/<TAC>]	Location Area Code/Tracking Area Code, valid for LTE
[<CELL_ID>]	Cell ID
[<BSIC>/<Phy_cellid>/<PSC>]	Base Station Identity Code/Physical Cell ID of LTE networks/Main cell code of WCDMA networks
<net_mode>	NONE CDMA1X CDMA1X and HDR CDMA1X and LTE CDMA1X and EHRPD HDR HDR REV0 HDR REVA HDR REVB HDR EMPA EHRPD HDR MMPA EHRPD GSM GPRS EDGE WCDMA

	TDSCDMA
	HSDPA
	HSUPA
	HSDPA and HSUPA
	HSDPA+
	HSDPA+ and HSUPA
	DC HSDPA+
	DC HSDPA+ and HSUPA
	64QAM HSDPA+
	64QAM HSDPA+ and HSUPA
	DC HSDPA+ and DC HSUPA
	TDD LTE
	FDD LTE
<BAND>	Network Bands
	GSM 900
	GSM 1800
	WCDMA 2100
	WCDMA 900
	LTE BAND 1
	…
	LTE BAND 3
	LTE BAND 5
	LTE BAND 8
	LTE BAND 38
	LTE BAND 39
	LTE BAND 40
	LTE BAND 41
<ARFCN>	Absolute Radio-Frequency Channel Number
<RX dBm>	Absolute Radio-Frequency Channel Number
<TX dBm>	TX power, 199 indicates invalid
<SID>	TX power, 199 indicates invalid
<NID>	Network Identity Number on a CDMA1X network
<BID>	BID on a CDMA1X network
<RSRP>	Reference Signal Received Power, unit 0.1 dBm, valid on an LTE network
<RSRQ>	Reference Signal Received Quality, unit 0.1 dB, valid on an LTE network
<SINR>	Signal-to-Interference-Plus-Noise Ratio, unit 0.1 dB, valid on an LTE network.

Example

```
AT+NETDMSG
+NETDMSG: "460+11", 0x7757, 0x077E9B30,
219, "CDMA1X and LTE", LTE BAND 3, 1825, -
58, 11, 0x0, 0x0, 0x0, -848, -83, 159
OK
```

Query the network registration information on an LTE network.

```
AT+NETDMSG
```

Query the network registration information on a non-LTE 3GPP2 network.

```
+NETDMSG: "460+11", 0x0, 0x0, 0, "HDR
REVA", CDMA BC 0, 37, -60, 199, 0x0, 0x0,
0x0, 0, 0, 0
OK
AT+NETDMSG
+NETDMSG: "460+00", 0xA57B, 0x0AC1474C, 0,
"HSDPA", TDSCDMA BAND A, 10080, -69, 199,
0x0, 0x0, 0x0, 0, 0, 0
OK
AT+NETDMSG
+NETDMSG:
"0",0,0,0,"NONE",0,0,0,0,0,0,0,0,0,0
OK
```

Query the network registration information on a non-LTE 3GPP network.

The module has not been registered with any network or the network encountered abnormalities.

9.10 AT+BANDLOCK – Locking to Band

To lock to a frequency band.

The network mode will change as a frequency band is locked. E.g. the network mode will change to LTE ONLY after locking to LTE_B1.

The frequency band setting will restore to auto mode if other network mode command is issued.

If no frequency band is locked, NONE will be returned when issuing AT+BANDLOCK? To query frequency band locked.

If the network mode is set to AUTO mode by other command, frequency band locking will expire after the module is restarted. The setting by this command will be saved after the module is powered off if no other command is issued to enable AUTO mode.

Format

Type	Command	Response
Execute	AT+BANDLOCK=<band_string><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+BANDLOCK?<CR><CR>	<CR><LF>+BANDLOCK: <band_string> <CR><LF>OK<CR><LF> Or <CR><LF>+BANDLOCK:NONE <CR><LF>OK<CR><LF>
Test	AT+BANDLOCK=?<CR>	<CR><LF>+BANDLOCK: <band_string_list> <CR><LF>OK<CR><LF>

Parameter

<band_string>	band in string type. The value can be any band that the hardware supports. Issue a query command before locking to a frequency band to check the band supported.
<band_string_list>	List of frequency band supported

Example

```
AT+BANDLOCK=?                                          Query the frequency bands
+BANDLOCK:                                             supported.
CDMA_BC0,GSM_900,GSM_1800,WCDMA_2100,WCDMA_900,TDS
CDMA_B34,TDSCDMA_B39,LTE_B1,LTE_B3,LTE_B5,LTE_B8,L
TE_B38,LTE_B39,LTE_B40,LTE_B41,AUTO
OK
AT+BANDLOCK=LTE_B1                                     Lock to LTE_B1.
OK
AT+BANDLOCK?                                           Query the frequency band locked
+BANDLOCK: LTE_B1                                      to.
OK
AT+BANDLOCK=AUTO                                       Restore to auto frequency band
OK                                                     mode.
```

9.11 AT+IFC – Enabling Hardware Flow Control

To enable hardware flow control.

Format

Type	Command	Response
Execute	AT+IFC=<dce_by_dte>, <dte_by_dce><CR>	<CR><LF>OK<CR><LF>
Query	AT+IFC?<CR>	<CR><LF>+IFC: <dce_by_dte>,<dte_by_dce><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+IFC=?<CR>	<CR><LF>+IFC: (value range of <dce_by_dte>),(value range of <dte_by_dce>)<CR><LF> <CR><LF>OK <CR><LF>

Parameter

<type_dte>	The module sends data 0: disable RTS 2: enable RTS

<type_dce>	The module receives data 0: disable CTS 2: enable CTS

Example

```
AT+IFC=2,2                                                    Set command
OK

AT+IFC?                                                       Read command
+IFC: 2,2

OK
AT+IFC=?                                                      Test command
+IFC: (0,2),(0,2)

OK
```

A Error Codes

Code (AT+CMEE=1)	Text(AT+CMEE=2)
0	PHONE FAILURE
1	NO CONNECTION TO PHONE
2	PHONE-ADAPTOR LINK RESERVED
3	OPERATION NOT ALLOWED
4	OPERATION NOT SUPPORTED
5	PH-SIM PIN REQUIRED
6	PH-FSIM PIN REQUIRED
7	PH-FSIM PUK REQUIRED
10	SIM NOT INSERTED (SEE NOTE 1)
11	SIM PIN REQUIRED
12	SIM PUK REQUIRED
13	SIM FAILURE (SEE NOTE 1)
14	SIM BUSY (SEE NOTE 1)
15	SIM WRONG (SEE NOTE 1)
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
48	HIDDEN KEY REQUIRED (SEE NOTE 2)
49	EAP METHOD NOT SUPPORTED
50	INCORRECT PARAMETERS
51	COMMAND IMPLEMENTED BUT CURRENTLY DISABLED
52	COMMAND ABORTED BY USER
53	NOT ATTACHED TO NETWORK DUE TO MT FUNCTIONALITY RESTRICTIONS
54	MODEM NOT ALLOWED - MT RESTRICTED TO EMERGENCY CALLS ONLY
55	OPERATION NOT ALLOWED BECAUSE OF MT FUNCTIONALITY RESTRICTIONS
56	FIXED DIAL NUMBER ONLY ALLOWED - CALLED NUMBER IS NOT A FIXED DIAL NUMBER (REFER 3GPP TS 22.101 [147])
57	TEMPORARILY OUT OF SERVICE DUE TO OTHER MT USAGE
58	LANGUAGE/ALPHABET NOT SUPPORTED
59	UNEXPECTED DATA VALUE
60	SYSTEM FAILURE
61	DATA MISSING
62	CALL BARRED
63	MESSAGE WAITING INDICATION SUBSCRIPTION FAILURE
100	UNKNOWN

B Support Band List

B.1 GSM Bands

GSM Band Name	Bit	HEX Band Mask
GSM_450	1	1
GSM_480	2	2
GSM_900P	3	4
GSM_900E	4	8
GSM_900R	5	10
GSM_850	6	20
GSM_1800	7	40
GSM_1900	8	80

B.2 LTE Bands

LTE Band Name	Bit	HEX Band Mask
EUTRAN_BAND1	1	1
EUTRAN_BAND2	2	2
EUTRAN_BAND3	3	4
EUTRAN_BAND4	4	8
EUTRAN_BAND5	5	10
EUTRAN_BAND6	6	20
EUTRAN_BAND7	7	40
EUTRAN_BAND8	8	80
EUTRAN_BAND9	9	100
EUTRAN_BAND10	10	200
EUTRAN_BAND11	11	400
EUTRAN_BAND12	12	800
EUTRAN_BAND13	13	1000
EUTRAN_BAND14	14	2000

EUTRAN_BAND17	17	10000
EUTRAN_BAND33	33	100000000
EUTRAN_BAND34	34	200000000
EUTRAN_BAND35	35	400000000
EUTRAN_BAND36	36	800000000
EUTRAN_BAND37	37	1000000000
EUTRAN_BAND38	38	2000000000
EUTRAN_BAND39	39	4000000000
EUTRAN_BAND40	40	8000000000
EUTRAN_BAND41	41	10000000000
EUTRAN_BAND42	42	20000000000
EUTRAN_BAND43	43	40000000000
EUTRAN_BAND44	44	80000000000
EUTRAN_BAND65	51	4000000000000
EUTRAN_BAND66	52	8000000000000
EUTRAN_BAND71	60	800000000000000
EUTRAN_BAND252	61	1000000000000000
EUTRAN_BAND253	62	2000000000000000
EUTRAN_BAND255	64	8000000000000000

C Result Codes

<err>	Description
0	Operation successful
601	Unknown error
602	FTP(S) server blocked
603	FTP(S) server busy
604	DNS parse failed DNS
605	Network error
606	Control connection closed.
607	Data connection closed
608	Socket closed by peer
609	Timeout error
610	Invalid parameter
611	Failed to open file
612	File position invalid
613	File error
614	Service not available, closing control connection
615	Open data connection failed
616	Connection closed; transfer aborted
617	Requested file action not taken
618	Requested action aborted: local error in processing
619	Requested action not taken: insufficient system storage
620	Syntax error, command unrecognized
621	Syntax error in parameters or arguments
622	Command not implemented
623	Bad sequence of commands
624	Command parameter not implemented
625	Not logged in
626	Need account for storing files

627	Requested action not taken
628	Requested action aborted: page type unknown
629	Requested file action aborted
631	SSL authentication failed SSL

D FTP(S) Protocol Error Codes

<protocol_error>	Description
0	Invalid result
200	Command okay
421	Service not available, closing control connection
425	Open data connection failed
426	Connection closed; transfer aborted
450	Requested file action not taken
451	Requested action aborted: local error in processing
452	Requested action not taken: insufficient system storage
500	Syntax error, command unrecognized
501	Syntax error in parameters or arguments
502	Command not implemented
503	Bad sequence of commands
504	Command parameter not implemented
530	Not logged in
532	Need account for storing files
550	Requested action not taken: file unavailable
551	Requested action aborted: page type unknown
552	Requested file action aborted: exceeded storage allocation
553	Requested action not taken: file name not allowed

E Related Documents

Neoway_N717_Datasheet

Neoway_N717_Product_Specifications

Neoway_N717_HW_User_Guide

Neoway_N717_EVK_User_Guide

Neoway_Standard Modules_TCP_Application_Guide

Neoway_Standard Modules_HTTP_Application_Guide

Neoway_Standard Modules_MQTT_Application_Guide

Neoway_Standard Modules_FTP_Application Guide

3GPP TS 27.010 - Terminal Equipment to User Equipment (TE-UE) multiplexer protocol (Release 1999)