

N51

AT Commands Manual

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Notice

This document provides guide for users to use N51.

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

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About This Document

Scope

This document is applicable to N51 series.

Audience

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

Change History

Issue	Date	Change	Changed By
1.0	2018-10	Initial draft	He Zhenhua
1.1	2018-12	- Added transparent TCP/UDP commands - Added TCP server commands - Added +ENPWRSAVE and +READADC - Added +URL and +SETSMSNUM - Added ATD*99# - Added +GMR/+GMM - Added error codes	He Zhenhua
1.2	2019-08	- Added +TCPKEEPALIVE - Added +FTPGETF - Added +DNSSERVER - Added +SIGNAL - Added HTTP/HTTPS commands - Added SSL TCP commands - Added SMTP/POP3 commands - Added +CPINR - Added +CPGSMLOC - Added Ali MQTT commands - Added standard MQTT commands - Added +FLOWCALC/+RATECALC - Added +SIMCOUNTCTL/+SIMCOUNTREAD - Added the remarks of +CLOUDPUB - Added the examples of +CLOUDSUB, +CLOUDPUB	ZhangYang

- Deleted 'the setting by this command is saved after the module is powered down' from the remarks of +CLOUDPUBMODE
- Modified the format, examples, and remarks of some commands

Conventions

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

Related Documents

Neoway_N51_Datasheet

Neoway_N51_Product_Specifications

Neoway_N51_HW_User_Guide

Neoway_N51_EVK_User_Guide

Boot LOG Instruction

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

If the module is booted in automatic baudrate detection mode, enter **AT** 10 seconds after the module is powered on to check if the AT function is initialized or not. The UART responds with **OK** if AT is initialized and outputs **+PBREADY** after the phonebook is available.

1 General Commands

1.1 Querying Manufacturer Information: ATI

Description	To query the manufacturer information, including manufacturer, model, and version	
Format	ATI<CR>	
Return Value	<CR><LF><manufacturer> <CR><LF><module_version> <CR><LF><soft_version> <CR><LF>OK<CR><LF>	
Parameter	<manufacturer>: Module manufacturer <module_version>: Module model <soft_version>: Software version	
Example	ATI NEOWAY N51 V001 OK	Manufacturer Module model Version
Remarks	N/A	

1.2 Querying Software Version: +CGMR

Description	To query the software version	
Format	AT+CGMR<CR>	
Return Value	<CR><LF><revision> <CR><LF>OK<CR><LF>	
Parameter	<soft_version>: Software version	
Example	AT+CGMR +CGMR: N51_E2F368_BZ_V001 OK	Query the software version
Remarks	N/A	

1.3 Querying Software Version: +GMR

Description	To query the software version	
Format	AT+GMR<CR>	
Return Value	<CR><LF><revision> <CR><LF>OK<CR><LF>	
Parameter	<version> : software version	
Example	AT+GMR +GMR: N51_E2F368_BZ_V001 OK	Query the software version
Remarks	N/A	

1.4 Querying Signal Quality: +CSQ

Description	To check the receiving signal strength indication (RSSI)																						
Format	AT+CSQ<CR>																						
Parameter	N/A																						
Return Value	<CR><LF>+CSQ: < signal >, <ber> <CR><LF>OK<CR><LF> <signal> The following table shows the relationship between the signal and the RSSI.																						
	<table><tr><th></th><th>signal</th><th>RSSI</th></tr><tr><td>0</td><td><4 or 99</td><td><-107 dBm or unknown</td></tr><tr><td>1</td><td><10</td><td><-93dBm</td></tr><tr><td>2</td><td><16</td><td><-81 dBm</td></tr><tr><td>3</td><td><22</td><td><-69 dBm</td></tr><tr><td>4</td><td><28</td><td><-57 dBm</td></tr><tr><td>5</td><td>>=28</td><td>>=-57 dBm</td></tr></table>			signal	RSSI	0	<4 or 99	<-107 dBm or unknown	1	<10	<-93dBm	2	<16	<-81 dBm	3	<22	<-69 dBm	4	<28	<-57 dBm	5	>=28	>=-57 dBm
		signal	RSSI																				
	0	<4 or 99	<-107 dBm or unknown																				
	1	<10	<-93dBm																				
	2	<16	<-81 dBm																				
	3	<22	<-69 dBm																				
	4	<28	<-57 dBm																				
	5	>=28	>=-57 dBm																				
	<ber>																						
0...7	Refer to the value of RXQUAL in the table of GSM 05.08 8.2.4.																						
99	Not known or not detectable																						
Example	AT+CSQ +CSQ: 19,2 OK	Query the signal quality																					
Remarks	N/A																						

1.5 Querying Network Registration Status: +CREG

Description	To query the network registration status of the module	
Format	• AT+CREG=[<n>]<CR> • AT+CREG?<CR> • AT+CREG=?<CR>	
Parameter	<n>: Specified whether to enable network registration unsolicited result codes. 0: Disable network registration unsolicited result codes (default setting). 1: Enable network registration unsolicited result codes +CREG: <stat>. 2: Enable network registration and location information (Cell ID, Local ID) unsolicited result code +CREG: <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 <lac>: Two-byte location area code in hexadecimal format, string type <ci>: four-byte cell ID in hexadecimal format, string type <Act>: The access technology of the serving cell, integer type 0: GSM 1: GSM compact 2: UTRAN 3: GSM w/EGPRS 4: UTRAN w/HSDPA 5: UTRAN w/HSUPA 6: UTRAN w/HSDPA and HSUPA 7: E-UTRAN 8: UTRAN w/HSPA+	
Return Value	<CR><LF>+CREG: <n>,<stat>[,<lac>,<ci>[,<Act>]] <CR><LF>OK<CR><LF> or <CR><LF>ERROR<CR><LF> or <CR><LF>+CREG:<stat>[,<lac>,<ci>[,<Act>]]<CR><LF>	
Example	AT+CREG=1	Enable network registration unsolicited codes.
	OK	
Example	AT+CREG?	Query the network registration status of the module.
	+CREG: 0,1 OK	

Remarks	AT+CREG=? +CREG:(0-2) OK	Query the value range of the network registration status parameter.
	N/A	

1.6 Selecting a Network: +COPS

Description	To select and register a network	
Format	- AT+COPS=[<mode>[,<format>[,<oper>>[,<AcT>]]]]<CR> - AT+COPS?<CR> - AT+COPS=?<CR>	
Parameter	<mode>: To set automatic network selection or manual selection: 0: Automatic selection (ignore the parameter <per>) 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 value) 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 and its value can be 0, 1, and 2. 0: GSM 1: GSM compact 2: UTRAN 3: GSM w/EGPRS 4: UTRAN w/HSDPA 5: UTRAN w/HSUPA 6: UTRAN w/HSDPA and HSUPA 7: E-UTRAN 9: CDMA	
Return Value	See the Example.	
Example	AT+COPS=0,0 OK	Automatic network selection is enabled. Long alphanumeric mode.
	AT+COPS=0,2 OK	Set to digital mode
	AT+COPS?	

	+COPS: 0,0,"CHINAMOBILE",7 OK	China Mobile
	AT+COPS? +COPS: 0,2,"46000",7 OK	If it is set to digital mode, get the number 46000
	AT+COPS? +COPS: 0,0,"CHN-UNICOM",7 OK	China Unicom
	AT+COPS? +COPS: 0,2,46011,9 OK	If it is set to digital mode, then get the number 46011.
	AT+COPS=2 OK	Deregister the network.
Remark	N/A	

1.7 Querying IMSI: +CIMI

Description	To query the international mobile subscriber identification (IMSI)	
Format	AT+CIMI<CR>	
Parameter	N/A	
Return Value	<CR><LF>+CIMI: <IMSI> <CR><LF>OK<CR><LF> or <CR><LF>ERROR<CR><LF>	
Example	AT+CIMI 460020188385503 OK	Obtain the IMSI number.
	AT+CIMI ERROR	Query the IMSI. No SIM card is installed.
Remarks	IMSI is a character string of 15 digits and starts with 3-digits MCC and 2-digits MNC. It is used to authenticate the SIM card.	

1.8 Querying IMEI: +CGSN

Description	To query the International Mobile Equipment Identity (IMEI) of the module
Format	AT+CGSN<CR>
Parameter	N/A
Return Value	<CR><LF>+CGSN: <IMEI> <CR><LF>OK<CR><LF>
Example	AT+CGSN +CGSN: 355897043139120 OK
Remarks	The IMEI is a character string of 15 digits.

1.9 Obtaining SIM Card ICCID: +CCID

Description	To obtain the integrated circuit card identifier (ICCID) of the SIM card	
Format	AT+CCID<CR>	
Parameter	<ICCID>: SIM card ID	
Return Value	<CR><LF>+CCID: <ICCID> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>	
Example	AT+CCID +CCID: 89860002190810001367 OK	Read command
	AT+CCID ERROR	Read command The SIM card is not inserted.
Remarks	The ICCID number is a character string of 20 digits.	

1.10 Querying Module Model: +CGMM

Description	To query the module model	
Format	AT+CGMM<CR>	
Parameter	<model>: Module model	
Return Value	<CR><LF>+CGMM: <model> <CR><LF>OK<CR><LF>	
Example	AT+CGMM +CGMM: N51 OK	Query the product model.
Remarks	N/A	

1.11 Querying Module Model: +GMM

Description	To query the module model	
Format	AT+GMM<CR>	
Parameter	N/A	
Return Value	<CR><LF>+CGMM: <model> <CR><LF>OK<CR><LF>	
Example	AT+GMM +GMM: N51 OK	Query the product model.
Remarks	N/A	

1.12 Setting Baud Rate: +IPR

Description	To set the baud rate of the module	
Format	• AT+IPR=<baud rate><CR> • AT+IPR?<CR> • AT+IPR=?<CR>	
Parameter	<baud rate>: The value can be 0, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800.	

Return Value	<CR><LF>OK<CR><LF>	
	<CR><LF>+IPR: <baud rate>	
	<CR><LF>OK<CR><LF>	
	<CR><LF>+IPR: (list of supported <baud rate>s) <CR><LF>OK<CR><LF>	
Example	AT+IPR=115200 OK	Set the baud rate to 115200 bps.
	AT+IPR? +IPR: 115200 OK	Query the current baud rate.
	AT+IPR=? +IPR: (0, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800) OK	Query the available baud rate range.
	AT+IPR=100 ERROR	Set the baud rate to 100. The value is not allowed
	- The default baud rate is 0, indicating automatic baud rate detection. - The settings are not saved after the module is powered off.	

1.13 Setting Module Functionality: +CFUN

Description	To select the level of functionality of the module by setting <fun>	
Format	- AT+CFUN=[<fun>[,<rst>]]<CR> - AT+CFUN?<CR> - AT+CFUN=?<CR>	
Parameter	<fun>: power saving function mode 0: turn off radio and SIM power 1: Full functionality (default) 4: Turn off the TX and RX circuits (Flight mode) <rst>: Specifies whether to restart the module 0: do not reset the MT before setting it to <fun> power level 1: reset the MT before setting it to <fun> power level	
Return Value	<CR><LF>+CFUN: (list of supported <fun>s),(list of supported <rst>s) <CR><LF>OK<CR><LF> or <CR><LF>ERROR<CR><LF>	
Example	AT+CFUN=1	Set full functionality.

	OK	
	AT+CFUN?	Query current function level.
	+CFUN: 1	Full functionality
	OK	
	AT+CFUN=?	Query available parameter value ranges.
	+CFUN: (0-1,4),(0-1)	
	OK	
	OK	
Remarks	The settings will not be saved after the module is powered off.	

1.14 Activating Multiplexing Mode: +CMUX

Description	To activate multiplexing mode
Format	- AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]]<CR> - AT+CMUX=?<CR> - AT+CMUX?<CR>
Parameter	<mode>: The mode of MUX that is enabled, integer type 0: Basic option (default value) 1: Advanced option (not supported currently) <subset>: Subset of frame format, integer type 0: UIH frames used only (default value) 1: UI frames used only (not supported currently) <port_speed>: UART port rate, integer type 1: 9600 bit/s 2: 19200 bit/s 3: 38400 bit/s 4: 57600 bit/s 5: 115200 bit/s (default value) 6: 230400 bit/s <N1>: Maximum frame size. Integer type, ranging from 1 to 32768. The range of 1 to 1509 is supported currently. The default value is 31. If Advanced option for mode is selected, the default value is 64. <T1>: Acknowledgement timer in unit of ten milliseconds, integer type, ranging from 1 to 255, where 10 is default (100 ms). <N2>: Maximum number of re-transmission, integer type, ranging from 1 to 100, where 3 is the default value. The range of 0 to 5 is supported currently. <T2>: response timer for the multiplexer control channel in units of ten milliseconds, integer type, ranging from 2 to 255, where 30 is default (300 ms) <T3>: Wake up response timer in seconds, integer type, ranging from 1 to 255,

	where 10 is default (10s) This parameter is not supported and the module returns 0 for it. <k>: window size, for Advanced option with Error-Recovery Mode, integer type, ranging from 1 to 7, where 2 is default This parameter is not supported and the module returns 0 for it.	
Return Value	<CR><LF>OK<CR><LF>	
Example	AT+CMUX=0 OK	Basic option. Other parameters are left out.
	AT+CMUX=2 ERROR	The set value exceeds the parameter range and the module returns ERROR.
	AT+CMUX=0,0,,512,254,5,255 OK	Set to basic option
	AT+CMUX=1,0,,512,254,5,255 ERROR	Advanced option, which is not supported. The module returns ERROR.
	AT+CMUX=? +CMUX: (0-1),(0-2),(1-8),(1-32768), (1-255),(0-100),(2-255),(1-255),(1-7) OK	Query the available range of parameters.
	AT+CMUX? +CMUX: 0,0,5,512,254,5,255,10,2 OK	Query the settings.
Remarks	- In accordance with the multiplexing protocol, two or more virtual channels are set up on one physical port. In general, three virtual channels are set up, among which one is used for dialing up to access the Internet, and two are used for AT command sending and receiving. <T2> must be longer than <T1>. AT+CMUX=0 is recommended to enable the multiplexing protocol control channel.	

1.15 Clock: +CCLK

Description	To set and query the real-time clock
Format	- AT+CCLK=<time><CR> - AT+CCLK?<CR>
Parameter	<time> : Character string in format of "YY/MM/DD,hh:mm:ss[+TZ]".

Return Value	TZ: Two digits, indicating the time lag between the local time and the GMT time. This information is optional because it can be displayed only when the network supports it.	
	<CR><LF>OK<CR><LF>	
Example	AT+CCLK="08/07/01,14:54:01" OK	Set the real-time clock of the module.
	AT+CCLK? +CCLK: "08/07/01,14:54:10" OK	Query the setting of the real-time clock.
	AT+CCLK=14/07/02,10:48:50 ERROR	Incorrect command syntax.
Remarks	- The settings will not be saved after the module is powered off. - The default clock is GMT+0.	

1.16 Entering PIN Code: +CPIN

Description	To query the PIN status and enter PIN code	
Format	- AT+CPIN=<pin>[,<newpin>]<CR> - AT+CPIN?<CR> - AT+CPIN=<pin><CR>	
Parameter	<pin>, <newpin>: string type value	
Return Value	<CR><LF>+CPIN: <code> <CR><LF>OK<CR><LF> <code>: READY: No password SIM PIN: Enter PIN code. SIM PUK: Enter PUK code. SIM PIN2: Enter PIN2 code. SIM PUK2: Enter PUK2 code.	
Example	AT+CPIN? +CPIN:READY OK	Query whether PIN code is required. No password is required.
	AT+CPIN? +CPIN: SIM PIN OK	Query whether PIN code is required. Required

	AT+CPIN="1234" OK	Input correct PIN code.
	PBREADY	Unlock
	AT+CPIN? +CPIN: SIM PUK OK	PUK code is required if PIN code is input incorrectly for three times
	AT+CPIN="12345678","4321" OK	Input PUK code, and new PIN code.
	PBREADY	Unlock
Remarks	- 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.	

1.17 Locking Network Facility: +CLCK

Description	To lock, unlock or interrogate an MT or a network facility
Format	- AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]<CR> - AT+CLCK=?<CR>
Parameter	<fac>: A pair of quotation marks are required for the value. "OI": Outgoing international calls "AI": All incoming calls "IR": Incoming calls when roaming outside the home country "SC": SIM card "AO": All outgoing calls "OX": All outgoing international calls except to the home country "AB": All barring services "AG": All outgoing barring services "AC": All incoming barring services "FD": SIM fixed dialing memory feature "PS": PH-SIM (lock Phone to SIM card) "PN": Network authentication "PU": Network subsystem authentication "PP": Service provider authentication "PC": Corporate authentication <mode>: 0: Unlock 1: Lock 2: Query the status

	<status>: 0: not active 1: active <passwd>: Password or code, string type. A pair of quotation marks are required for the value. <class>: 1: Voice service 2: Data service 4: Fax service 8: SMS 16: Synchronous data service 32: Asynchronous data service 64: Dedicated packet access 128: Dedicated PAD access	
Return Value	When <mode>=2 and command successful: <CR><LF>+CLCK: <status>[,<class1>[<CR><LF>+CLCK: <status>,<class2>...]]] <CR><LF>OK<CR><LF>	
Example	AT+CLCK="SC",2 +CLCK: 0 OK	
	AT+CLCK=? AT+CLCK=?+CLCK: ("PS","SC","AO","OI", "OX","AI","IR", "AB","AG", "AC","PN", "FD","PU","PP","PC") OK	Query the network information related to the module.
	AT+CLCK="SC",1,"1234" OK	Lock the current SIM card. "1234" is the PIN code of current SIM card.
	AT+CLCK="SC",0,"1234" OK	Unlock the current SIM card. "1234" is the PIN code of current SIM card.
	AT+CLCK="SC",1,"2222" ERROR	The PIN code is incorrect.
Remarks	The settings of this command take effect after the module is restarted.	

1.18 Modifying Password: +CPWD

Description	To modify the password of the lock function of the module
Format	- AT+CPWD=<fac>,<oldpwd>,<newpwd><CR> - AT+CPWD=?<CR>

Parameter	<fac>: A pair of quotation marks is required for the value. "PS": SIM password, 8 characters "P2": SIM PIN2 "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 "PN": Network authentication, 8 characters "PU": Network subsystem authentication, 8 characters "PP": Service provider authentication, 8 characters "PC": Corporate authentication, 8 characters <oldpwd>: Old password or code, string type. A pair of quotation marks is required for the value. <newpwd>: New password or code, string type. A pair of quotation marks is required for the value.	
Return Value	<CR><LF>OK<CR><LF>	
	<CR><LF>+CPWD: list of supported (<fac>,<pwdlength>)s <CR><LF>OK<CR><LF>	
	<CR><LF>ERROR<CR><LF>	
Example	AT+CPWD=? +CPWD: ("PS", 8),("SC", 8),("AO", 4),("OI", 4),("OX", 4),("AI", 4),("IR", 4),("AB", 4), ("AG", 4),("AC", 4), ("P2", 8),("FD", 8), ("PN", 8),("PU", 8),("PP", 8),("PC", 8) OK	
	AT+CPWD="SC","1234","0000"	Modify the PIN code of the current SIM card. "1234" is the old PIN code and "0000" is the new PIN code.
	AT+CPWD=SC,1234,0000	Incorrect command syntax. A pair of quotation marks ("") is required for each parameter.
Remarks	To modify the PIN code, lock the SIM card (running AT+CLCK="SC",1,"1234").	

1.19 Defining PDP Context: +CGDCONT

Description	To set the packet data protocol (PDP) format of the GPRS/3G	
Format	- AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<pd1>[,...[,pdN]]]]]]]]<CR> - AT+CGDCONT?<CR> - AT+CGDCONT=?<CR>	
Parameter	<cid>: (PDP Context Identifier) a numeric parameter that specifies a particular PDP context definition. Minimum value = 1. <PDP_type>: (Packet Data Protocol type) a string parameter. IP Internet Protocol (IETF STD 5) <APN>: Access Point Name. A string parameter which is a logical name that is used to select the GGSN or the external packet data network. <PDP_address>: a string parameter that identifies the terminal in the address space applicable to the PDP. TE will provide a value for this parameter after PDP starts if it is null or omitted. If TE fails to provide, the subscription value will be requested. <d_comp>: numeric parameter that controls PDP data compression. Used only for SNDCP 0 - off (default if value is omitted) <h_comp>: numeric parameter that controls PDP header compression. 0 - off (default if value is omitted) <pd1>, ... <pdN>: zero to N string parameters whose meanings are specific to the <PDP_type>	
Return Value	See the Example.	
Example	AT+CGDCONT=1,"IP","CMNET" OK	Set PDP type to IP and APN to CMNET.
	AT+CGDCONT? +CGDCONT: 1,"IP","CMNET","0.0.0.0",0,0,0,0 OK	Query current PDP format.
	AT+CGDCONT=? +CGDCONT:(1-11),"IP",,,(0-1),(0-1) +CGDCONT:(1-11),"IPV6",,,(0-1),(0-1) +CGDCONT:(1-11),"IPV4V6",,,(0-1),(0-1) OK	Query the available value range of PDP format.
Remarks	PPP is not supported.	

1.20 PDP Authentication: +XGAUTH

Description	PDP authentication	
Format	- AT+XGAUTH=<cid>,<auth>,<name>,<pwd><CR> +XGAUTH: (<cid>s),(<auth>s),lname,lpwd	
Parameter	<cid>: PDP context identifier <auth>: authentication may be: 0: meaning authentication protocol not used (NONE) 1: meaning personal authentication protocol (PAP) 2: meaning handshake authentication protocol (CHAP) 3: meaning handshake authentication protocol or personal authentication protocol (PAP or CHAP) <name>: user name as string with length <lname> <pwd>: password as string with maximum length <lpwd>	
Return Value	See the Example.	
Example	AT+XGAUTH=1,1,"gsm","1234" OK	Set the first PDP authentication.
	AT+XGAUTH=? +XGAUTH: (1),(0-3),32,32 OK	Query the available value range of parameters.
Remarks	- Before sending this command, send AT+CGDCONT. - To use internal protocol stack, add this command to the process. - The default user account and password of China Unicom card is "card" and "card". <cid> is same as that in +CGDCONT.	

1.21 Setting GPRS Attach and Detach: +CGATT

Description	To set GPRS attach and detach	
Format	- AT+CGATT=<state><CR> - AT+CGATT?<CR> - AT+CGATT=?<CR>	
Parameter	<state>: 0, 1 0: indicates detach 1: indicates attach	
Return Value	See the Example.	
Example	AT+CGATT=1	

	OK	GPRS attach is set successfully.
	AT+CGATT=0 OK	GPRS detach is set successfully.
	AT+CGATT=0 GPRS DISCONNECTION	Send this command after setting a PPP connection.
	OK	
	AT+CGATT=0 ERROR	ERROR is returned because no SIM card is installed.
	AT+CGATT? +CGATT: 0 OK	Query the GPRS status.
	AT+CGATT=? +CGATT:(0-1) OK	Query the valid parameter values for the command.
Remarks	- By default, the module can automatically perform GPRS attach. - Ensure that the GPRS attach is set before the PPP connection is set up. It is recommended to add AT+CGATT? 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. - The settings are not saved after the module is powered off.	

1.22 Enabling Terminal Display: ATE1/ATE0

Description	To enable or disable the terminal display function of the AT commands	
Format	- ATE1<CR> - ATE0<CR>	
Parameter	N/A	
Return Value	See the Example	
Example	ATE1 OK AT OK	Turn on module AT command echo function Send AT, serial tools show "AT" and "OK".
	ATE0 OK	Turn off the module AT command echo function
	OK	Send AT, serial tools only show "OK"

Remark

- The settings are not saved after the module is powered off.
- The terminal display function is enabled by default.
- If the command is sent after dialing network access, terminal display is disabled automatically.
- ATE is equal to ATE1.

1.23 GPRS Dialing Command: ATD*99#

Description	To initialize a GPRS connection using external protocol stacks	
Format	ATD*99#<CR>	
Parameter	N/A	
Return Value	<CR><LF>CONNECT<CR><LF>	
Example	ATD*99# CONNECT 21600000	Start to dial Return value after a successful dialing
Remarks	• This command is applicable only to external protocol stacks. • Ensure that the module registers with a network and APN is set before dialing any number.	

1.24 Enabling Sleep Mode: +ENPWRSAVE

Description	To enable or disable sleep mode	
Format	• AT+ENPWRSAVE=<n> <CR> • AT+ENPWRSAVE?<CR>	
Parameter	<n>: 0: Disable sleep mode. (default) 1: Enable sleep mode (Low level at DTR triggers sleep mode) 2: Enable sleep mode (High level at DTR triggers sleep mode)	
Return Value	See the Example.	
Example	AT+ENPWRSAVE=1 OK	Disable sleep mode.
	AT+ENPWRSAVE? +ENPWRSAVE: 1 OK	Query current sleep mode status.

Remarks

- The settings 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 circuits of each part inside the module allow.

1.25 Setting Blinking Status of Signal Indicator: +SIGNAL

Description	To set the different blinking status of the signal indicator
Format	• AT+SIGNAL=<value><CR> • AT+SIGNAL?<CR> • AT+SIGNAL=?<CR>
Parameter	<value>: integer type, ranging from 0 to 10. 0: blink once every second in normal situation. Being off or on if any abnormality occurs. 1: blink once every second after the module is connected to the server. Being off in any other situations. 2: flash and blink. Flash every 250 ms after the module is connected to the server and blink every second in other normal situations. 3: be on after the module is connected to the server and blink every second in other situations. 4: be on after the module is connected to the server and being off in other situations. 5: be off if the SIM card cannot be detected after the module is powered on, blink every second if the SIM card is detected. be on after the module is connected to the server. 6: Four indicator states: • If no SIM card is installed or the SIM card does not register network, the indicator blinks every one second and is on for 0.1 second. • If the SIM card registered network, the indicator blinks every three second and is on for 0.1 second. • If the server is connected, the indicator blinks every 250 ms and is on for 0.1 second. • The indicator is always on during a call. 7: Four indicator states: Off: No SIM card, not registered On: registered network On for 0.2 second and off for 1.8 second: Obtained the IP address On for 1.8 second and off for 0.2 second: Connected to the server
Return Value	<CR><LF>+SIGNAL:<value> <CR><LF>OK<CR><LF>

	Or <CR><LF>ERROR<CR><LF>	
Example	AT+SIGNAL? +SIGNAL: 2 OK	The current signal indicator status is 2.
	AT+SIGNAL=3 OK	Set current signal indicator status to 3.
	AT+SIGNAL=11 ERROR	The parameter is set to an incorrect value.
	AT+SIGNAL=? +SIGNAL: (0-7) OK	The available value of the signal indicator status ranges from 0 to 7
Remarks	• The default status setting is 7. • If the status is set to 0 to 6, the indicator will be always on when a call or SIM message is incoming in sleep mode. • The settings by this command are saved after the module is powered off.	

2 SMS Commands

2.1 Selecting SMS Services: +CSMS

Description	To select an SMS service among SMS-MO, SMS-MT, and SMS-CB	
Format	• AT+CSMS=<service><CR> • AT+CSMS?<CR> • AT+CSMS=?<CR>	
Parameter	<service>: 0: GSM03.40 and GSM03.41. SMS-related AT commands support GSM07.05 Phase 2. 1: GSM03.40 and GSM03.41. SMS-related AT commands support GSM07.05 Phase 2+. <mt>,<mo>,<bm>: 0: Not support 1: Support	
Return Value	<CR><LF>+CSMS: <mt>,<mo>,<bm> <CR><LF>OK<CR><LF>	
	<CR><LF>+CSMS: <service>,<mt>,<mo>,<bm> <CR><LF>OK<CR><LF>	
	<CR><LF>+CSMS: (list of supported <service>s) <CR><LF>OK<CR><LF>	
Example	AT+CSMS=1 +CSMS: 1, 1, 1 OK	Set SMS service to 1.
	AT+CSMS? +CSMS: 1, 1, 1, 1 OK	Query the current parameter value.
	AT+CSMS=? +CSMS:(0-1) OK	Query the value range of SMS service.
Remarks	The default settings of this command are 0, 1, 1, 1.	

2.2 Setting Preferred SMS Storage: +CPMS

Description	To set preferred SMS storage	
Format	• AT+CPMS=<mem1><CR> • AT+CPMS?<CR> • AT+CPMS=?<CR>	
Parameter	<mem1>: String type, for example, "SM", "ME" <used>: Used quantity <total>: Total capacity of the storage <mem1>: "SM": SIM only "ME": ME only	
Return Value	<CR><LF>+CPMS: <used1>, <total1>, <used2>, <total2>, <used3>, <total3> <CR><LF>OK<CR><LF> OR <CR><LF>+CPMS: <mem1>, <used1>, <total1>, <mem2>, <used2>, <total2>, <mem3>, <used3>, <total3> <CR><LF>OK<CR><LF> OR <CR><LF>+CPMS: (list of supported <mem1>s), (list of supported <mem2>s), (list of supported <mem3>s) <CR><LF>OK<CR><LF>	
Example	AT+CPMS="SM" +CPMS: 50, 50, 50, 50, 50, 50 OK	Set the SMS storage to "SM", that is, store SMS messages in SIM card.
	AT+CPMS? +CPMS: "SM", 50, 50, "SM", 50, 50, "SM", 50, 50 OK	Query the capacity of current SMS storage.
	AT+CPMS=? +CPMS: ("SM","ME"), ("SM","ME"), ("SM", "ME") OK	Query the available storages.
Remarks	• The settings by this command will be saved after the module is powered off. • The default storage is SM and MT is not supported.	

2.3 Setting SMS Inputting Mode: +CMGF

Description	To set the SMS inputting mode
Format	• AT+CMGF[=<mode>]<CR>

	• AT+CMGF?<CR> • AT+CMGF=?<CR>						
Parameter	<mode>: 0: PDU mode (default) 1: Text mode						
Return Value	<CR><LF>OK<CR><LF> <CR><LF>+CMGF: <mode> <CR><LF>OK<CR><LF> <CR><LF>+CMGF: (list of supported <mode>s) <CR><LF>OK<CR><LF>						
Example	<table> <tr> <td>AT+CMGF=1 OK</td><td>Set the SMS to text mode.</td></tr> <tr> <td>AT+CMGF? +CMGF: 1 OK</td><td>Query the current mode of SMS message input.</td></tr> <tr> <td>AT+CMGF=? +CMGF: (0-1) OK</td><td>Query the value range of SMS mode setting.</td></tr> </table>	AT+CMGF=1 OK	Set the SMS to text mode.	AT+CMGF? +CMGF: 1 OK	Query the current mode of SMS message input.	AT+CMGF=? +CMGF: (0-1) OK	Query the value range of SMS mode setting.
AT+CMGF=1 OK	Set the SMS to text mode.						
AT+CMGF? +CMGF: 1 OK	Query the current mode of SMS message input.						
AT+CMGF=? +CMGF: (0-1) OK	Query the value range of SMS mode setting.						
Remarks	N/A						

2.4 Setting TE Character Set: +CSCS

Description	To set the format of the TE character set
Format	• AT+CSCS[=<chset>]<CR> • AT+CSCS?<CR> • AT+CSCS=?<CR>
Parameter	<chset>: • "GSM": Default GSM alphabet (GSM03.38.6.2.1) • "HEX": string consisting of 0x00 to 0xFF in hexadecimal format. E.g. 032FE6 is 3 8-bit characters, which are respectively 3, 47, and 230. • "IRA": International reference alphabet (ITU-T T.50) • "PCCP437": PC character set Code Page 437 • "8859-1": ISO 8859 Latin 1 character set • "UCS2": 16-bit universal multiple-octet coded character set (USO/IEC10646). The UCS2 character string is converted into a hexadecimal number (ranging from 0x0000 to 0xFFFF). UCS2 encoding is used only in some character string of the statement.

Return Value	<CR><LF>OK<CR><LF>	
	<CR><LF>+CSCS: <chset> <CR><LF>OK<CR><LF>	
	<CR><LF>+CSCS: (list of supported <chset>s) <CR><LF>OK<CR><LF>	
Example	AT+CSCS="IRA" OK	Set IRA character set.
	AT+CSCS? +CSCS: "IRA" OK	Query the format of current character set.
	AT+CSCS=? +CSCS: ("GSM", "IRA","HEX","UCS2") OK	Query the character set formats that the module supports. The list of the character set formats is returned.
	Remarks	The default value is IRA.

2.5 Setting SMS Indication Mode: +CNMI

Description	To set the mode how the module informs users of new SMS messages received from the network
Format	- AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]<CR> - AT+CNMI?<CR> - AT+CNMI=?<CR>
Parameter	<mode>: Set the instruction mode after receiving SMS messages. 0: SMS instruction codes can be saved in the buffer of the module. If the TA is full, the old codes can be saved in other place or replaced with new codes. 1: When the module is online, it will discard saved SMS instruction codes and reject new codes. In other situations, the codes are displayed on the end device. 2: When the module is online, the SMS indication codes are saved in the buffer of the module. After the connection is released, the SMS instruction codes are output through UART. In other situations, codes are directly displayed on the end device. 3: When the module is online, the SMS indication codes are transmitted with other data and displayed on the terminal. <mt>: Set the format of the new SMS instruction codes. The default value is 0. 0: SMS instruction codes will not be sent to the end device (default) 1: The format of the new SMS instruction codes is +CMTI: "MT",<index>. The SMS message is stored rather than directly displayed. 2: The format of the new SMS instruction codes is

	+CMT :<oa>,<scts>,<tooa>,<lang>,<encod>,<priority>[,<cbn>],<length><CR><LF><data> (text mode). SMS messages are directly displayed rather than stored. 3: Use the report codes defined by <mt>=2 to transmit SMS instruction codes to the end device. The SMS instruction codes in other modes are the same as that of <mt>=1. <bm>: Set the format of the new cell broadcast codes. The default value is 0. 0: Not send the instruction information of new cell broadcast. The cell broadcast will not be stored. 1: The cell broadcast instruction code is +CBMI:" BC" ,<index> and the cell broadcast is stored. (default) 2: reserved, processed the same as <bm>=1 3: reserved, processed the same as <bm>=1 <ds>: Report status of SMS message sending. The default value is 1. 0: No status report of SMS message sending 1: The format of the SMS sending status report is +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>(text mode). 2: if a status report is stored, then the following unsolicited result code is sent: +CDSI: <memr>,<index> <bfr>: The default value is 0. 0: When <mode> is set to 1 or 2, codes defined by this command and stored in TA will be sent to TE. The module will return OK before transmitting the codes. 1: When <mode> is set to 1 or 2, the codes defined by this command and stored in TA will be cleared.	
Return Value	See the Example.	
Example	AT+CNMI=1,1,0,0,0 OK	Set the SMS message indication mode.
	AT+CNMI=? +CNMI: (0-3), (0-3), (0,3), (0-2), (0-1) OK	Query the value ranges of the parameters.
	AT+CNMI? +CNMI: 1, 1, 0, 0, 0 OK	Query the current setting of the parameters.
Remarks	- The default settings of this command are 0, 0, 0, 0, 1. - The recommended setting is +CNMI: 2,1,0,0,0 (new messages are stored on SIM card rather than displayed directly) or +CNMI: 2,2,0,0,0 (new messages are displayed rather than stored on SIM card). - SMS message types: - Class 0: Displayed not stored - Class 1: Stored in ME - Class 2: Stored in SIM - Class 3: Sent to TE	

2.6 Reading SMS Messages: +CMGR

Description	To read SMS messages stored in current memory (use the AT+CPMS command to specify the current memory)	
Format	AT+CMGR=<index><CR>	
Parameter	<index>: location value <index> from preferred message storage <mem1> to the TE	
Return Value	Text mode (+CMGF=1) - The command is executed successfully and the command is SMS-DELIVER: +CMGR: <stat>,<oa>,[<alpha>],<scts>[,<toa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>]<CR><LF><data> - The command is executed successfully and the command is SMS-SUBMIT: +CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dc>,<vp>],<sca>,<tosca>,<length>]<CR><LF><data> - The command is executed successfully and the command belongs to SMS-STATUS-REPORT: +CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> - The command is executed successfully and the command is SMS-COMMAND: +CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length>]<CR><LF><cdata>] - The command is executed successfully and the command supports CBM storage: +CMGR: <stat>,<sn>,<mid>,<dc>,<page>,<pages><CR><LF><data> Stat: "REC UNREAD" Received unread message "REC READ" Received messages have been read "STO UNSENT" Stored unsent messages "STO SENT" Stored messages have been sent PDU mode (+ CMGF=0) and the command is executed successfully: +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> Stat: 0 Unread message received 1 The read message has been received 2 Unsent messages have been stored 3 Sent messages have been stored Alpha: The number of characters to represent Length: The number of octets of the given TP-level data unit (octets that do not contain the service center address) pdu: PDU data	
Example	AT+CMGR=1 +CMGR: "REC READ","66421","11/09/13,16:37:59+32"	Read the message indexed as 1.

	050003140401E27778592EA7E7EBE9373C3C279BCF68 F59AADC78FED62779BA596D7EBAEB5B91EBD16A5D4 6C35F98406A744E311A95C32594DA75688B50EADACA 6D689150EADF1B2BC5E579AD575E5B5582D5EABD56 24C36A3D56C375C0E1693CD6835DB0D9783A15C91D2 E06BDAA558AC1F60C52B937CADCD2B747AA9021BDE C627E8E9441BD42655DEF446 OK	
	AT+CMGF=0 OK AT+CSCS="UCS2" OK	Set to PDU mode.
	+CMTI: "SM",39 AT+CMGR=39 +CMGR: 0,,23 0891683110501905F0240BA18177377949F50000413062 312503230468341A0D OK	Incoming SMS Read SMS.
	AT+CMGF=1 OK AT+CSCS="GSM" OK	Set to text mode
	+CMTI: "SM",40 AT+CMGR=40 +CMGR: UNREAD","18777397945",,"14/03/26,13:57:58+32" hello world OK	Incoming SMS. Read SMS. "REC"
Remarks	If the status of the message is received unread, the status in the storage changes to received read after executing this command.	

2.7 SMS Message List: +CMGL

Description	To read SMS messages of one type from the current memory specified by the +CPMS command
Format	- AT+CMGL[=<stat>]<CR> - AT+CMGL=?<CR>

Parameter	<state>: String type or numeric type When set AT+CMGF=1, • "REC UNREAD": Unread SMS messages received • "REC READ": Read SMS messages received • "STO UNSENT": Stored unsent SMS messages • "STO SENT": Stored sent SMS messages • "ALL": All SMS messages When set AT+CMGF=0, • 0: Unread SMS messages received • 1: Read SMS messages received • 2: Stored unsent SMS messages • 3: Stored sent SMS messages • 4: All SMS messages
Return Value	Text mode (+CMGF=1) • Command is executed successfully and is SMS-SUBMITs and/or SMS-DELIVERs: +CMGL: <index>,<stat>,<oa/da>,[<alpha>],[<scts>],[<tooa/toda>,<length>] <CR><LF><data>[<CR><LF>+CMGL: <index>,<stat>,<da/oa>,[<alpha>],[<scts>],[<tooa/toda>,<length>]<CR><LF> <data>[...]] <CR><LF>OK<CR><LF> • Command is executed successfully and SMS-STATUS-REPORTs: +CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> [<CR><LF>+CMGL:<index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> >[...]] <CR><LF>OK<CR><LF> • Command successful and SMS-COMMANDs: +CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF> +CMGL: <index>,<stat>,<fo>,<ct>[...]] <CR><LF>OK<CR><LF> • Command successful and CBM storage: +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF> <data>[<CR><LF> +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[...]] <CR><LF>OK<CR><LF> PDU mode (+CMGF=0) • Command is executed successfully: +CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu>[<CR><LF> +CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu>[...]] <CR><LF>OK<CR><LF>
Example	AT+CMGL="ALL" +CMGL: 1,"REC READ","66421","", "2011/09/13 16:37:59+32" 050003140401E27778592EA7E7EBE9373C3C279BCF68F59AADC78FED62779 BA596D7EBAEB5B91EBD16A5D46C35F98406A744E311A95C32594DA75688B 50EADACA6D689150EADF1B2BC5E579AD575E5B5582D5EABD5624C36A3D5

	<pre> 6C375C0E1693CD6835DB0D9783A15C91D2E06BDAA558AC1F60C52B937CA DCD2B747AA9021BDEC627E8E9441BD42655DEF446 +CMGL: 14,"STO SENT","66045","", 050003010401E27778592EA7E7EBE9373C3C279BCF68F59AADC78FED62779 BA596D7EBAEB5B91EBD16A5D46C35F98406A744E311A95C32594DA75688B 50EADACA6D689150EADF1B2BC5E579AD575E5B5582D5EABD5624C36A3D5 6C375C0E1693CD6835DB0D9783A15C91D2E06BDAA558AC1F60C52B937CA DCD2B747AA9021BDEC627E8E9441BD42655DEF446 +CMGL: 44,"REC UNREAD","8615719556937","", "2011/09/30 03:00:55+32" 5E7F4E1C79FB52A863D0919260A8003A4E2D536B7528623700310035003700 3100390035003500360039003300377ED960A86765753500326B21002C670054 0E4E006B21572800320039002F00300039002000320030003A00340038002C60 A853EF6309901A8BDD952E621690099879952E76F463A556DE62E8 OK. </pre>	
	<pre> AT+CMGL=? +CMGL: ("REC UNREAD", "REC READ", "STO UNSENT", "STO SENT", "ALL") OK </pre>	Query in text format (AT+CMGF=1).
	<pre> AT+CMGL=? +CMGL: (0-4) OK </pre>	Query in PDU format (AT+CMGF=0).
	<pre> AT+CMGL=ALL ERROR </pre>	The parameter format in the command is incorrect. A pair of quotation marks (") is required for the parameter.
	<pre> AT+CMGF=1 OK AT+CMGL=4 ERROR </pre>	The parameter should be set to 0 .
	<pre> AT+CMGF=0 OK AT+CMGL="ALL" ERROR </pre>	The parameter should be set to 1 .
Remarks	N/A	

2.8 Sending SMS Messages: +CMGS

Description	To send an SMS message from the module to the network The network will return reference value <mr> to the module after the SMS message is sent successfully.
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Format	- AT+CMGS=<da>[,<toda>]<CR>text is entered<Ctrl+Z/ESC> (Text command syntax) - AT+CMGS=<length><CR>PDU is given<Ctrl+Z/ESC> (PDU command syntax)	
Parameter	<da>: The destination number to which the SMS message is sent in text mode <toda>: type of destination address <text>: SMS message content in text mode <length>: The byte length of the SMS message content in PDU mode <mr>: The storage location <CR>: End character <Ctrl+Z>: Indicates the end of the input message, → in the example. <ESC>: Indicates giving up the input message	
Return Value	- if text mode (+CMGF=1) and sending successful: <CR><LF>+CMGS: <mr>[,<scts>] <CR><LF>OK<CR><LF> - if PDU mode (+CMGF=0) and sending successful: <CR><LF>+CMGS: <mr>[,<ackpdu>] <CR><LF>OK<CR><LF> <scts>: service center time stamp <ackpdu>: 3GPP 23.040 RP-User-Data element of RP-ACK PDU	
Example	AT+CMGS="66358"<CR> > This is the text → +CMGS: 171 OK	Text mode(+CMGF=1) → is the symbol after pressing Ctrl+Z .
	AT+CMGS="15889758493"<CR> > This is the text → ERROR	AT+CMGF=1 might not be executed.
	AT+CMGS=33<CR> >0891683108705505F001000B815118784271F2000 8146DF157335E025B9D5B89533A59276D6A80545E FA → +CMGS: 119 OK	PDU mode (+CMGF=0)
Remarks	N/A	

2.9 Writing SMS Messages: +CMGW

Description	To write an SMS message into the memory	
	The location information <index> will be returned after the message is saved correctly.	
Format	- Command syntax (text mode): AT+CMGW[=<oa/da>[,<tooa/toda>[,<stat>]]]<CR>text is entered <Ctrl+Z/ESC> - Command syntax (PDU mode): AT+CMGW=<length>[,<stat>]<CR>PDU is given<Ctrl+Z/ESC>	
Parameter	<da> : The destination number to which the SMS message is sent in text mode <tooda> : type of destination address <stat> : message status <text> : SMS message content in text mode <length> : The byte length of the SMS message content in PDU mode <index> : Location information <CR> : End character <Ctrl+Z> : Indicates the end of the input message <ESC> : Indicates giving up the input message	
Return Value	<CR><LF>+CMGW: <index> <CR><LF>OK<CR><LF>	
	<CR><LF>ERROR<CR><LF>	
Example	AT+CMGW="091137880"<CR> > "This is the text"<Ctrl+Z> +CMGW: 15 OK	Text mode (+CMGF=1)
	AT+CMGW=091137880 ERROR	A pair of quotation marks ("") is required for the number in text mode.
	AT+CMGW=31<CR> >0891683108705505F001000B813124248536F30008 1200400026002A535A53D153A653C1532052C7<Ctrl +Z> +CMGW: 1 OK	PDU mode (+CMGF=0)
Remarks	If PDU messages is sent through a UART commissioning tool, press the Enter button or enter <CR> in hexadecimal format.	

2.10 Sending Messages from Storage: +CMSS

Description	To send an SMS message specified by <index> in the memory (SMS-SUBMIT) The network returns reference value <mr> to the end device after the SMS message is sent successfully.	
Format	AT+CMSS=<index>[,<da>[,<toda>]]<CR>	
Parameter	<index> : Message location <da> : the destination number of the SMS messages <toda> : type of destination address	
Return Value	- if text mode (+CMGF=1) and sending successful: <CR><LF>+CMSS: <mr>[,<scts>] <CR><LF>OK<CR><LF> - if PDU mode (+CMGF=0) and sending successful: <CR><LF>+CMSS: <mr>[,<ackpdu>] <CR><LF>OK<CR><LF> <mr> : message reference number <scts> : service center time stamp <ackpdu> : 3GPP 23.040 RP-User-Data element of RP-ACK PDU	
Example	AT+CMSS=2 +CMSS: <mr> OK	Send the SMS messages stored in memory 2.
	AT+CMSS=2 ERROR	No SMS message is stored in memory 2 or the SMS message number in memory 2 is incorrect.
Remarks	N/A	

2.11 Deleting SMS Messages: +CMGD

Description	To delete SMS messages from the current memory.	
Format	- AT+CMGD=<index>[,<delflag>]<CR> - AT+CMGD=?<CR>	
Parameter	<index> : The recording number of the stored SMS messages <delflag> : Integer 0: Delete the SMS messages with the specified recording numbers. 1: Delete all read SMS messages. 2: Delete all read and sent SMS messages. 3: Delete all read, sent, and unsent SMS messages. 4: Delete all messages.	

Return Value	<CR><LF>OK<CR><LF>	
	<CR><LF>+CMGD: (list of supported <index>s, list of supported <delflag>s) <CR><LF>OK<CR><LF>	
Example	AT+CMGD=1,3 OK	Delete all read, sent, and unsent SMS messages. Delete successfully
	AT+CMGD=? +CMGD: (), (0-4) OK	Query the value ranges of parameters.
	AT+CMGD=5 ERROR	The 5 th message does not exist.
Remarks	If we set <delflag>, ignore the parameter <index>.	

2.12 Setting SMSC Number: +CSCA

Description	To set the SMS center number	
Format	- AT+CSCA=<sca>[,<tosca>]<CR> - AT+CSCA?<CR>	
Parameter	<sca>: SMS center number <tosca>: The format of the SMS center number. 129 indicates national number; 145 indicates international number.	
Return Value	<CR><LF>OK<CR><LF>	
	<CR><LF>+CSCA: <sca>, <tosca> <CR><LF>OK<CR><LF>	
Example	AT+CSCA="8613800755500",145 OK	Set an international SMSC number.
	AT+CSCA=8613800755500,145 OK	A pair of quotation marks (") are not mandatory for SMSC number.
	AT+CSCA? +CSCA: "+8613800755500",145 OK	Query the SMSC number.
Remarks	This command is not supported on a CDMA network.	

2.13 Setting Text Mode: +CSMP

Description	To select required values for the additional parameters in the text mode, and set the validity period since the message is received from the SMSC, or the absolute time defining the end of the validity period	
Format	- AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcsc>]]]]<CR> - AT+CSMP?<CR>	
Parameter	<fo> : Determined by the command or the first 8 bits of the result code GSM 03.40 SMS-DELIVER ; SMS-SUBMIT (default value: 17); or adopt the integer-type SMS-COMMAND (default value: 2) <vp> :	
	Value	Validity Period
	0-143	(vp+1)*5mins, 12 hours at most
	144-167	12hours +((vp-143)*30mins), 24 hours at most
	168-196	(vp-166)*1day
	197-255	(vp-192)*1week
Return Value	<pid> : Integer-type TP-protocol-ID (default value: 0) <dcsc> : Encoding plan for integer-type cell broadcast data (default value: 0)	
	<CR><LF>OK<CR><LF>	
	<CR><LF>+CSMP: <fo>,<vp>,<pid>,<dcsc>	
	<CR><LF>OK<CR><LF>	
Example	AT+CSMP=17,167,0,0 OK	Text mode parameters: No status report; the validity period of the information is 24 hours; Only messages in text format can be sent.
	AT+CSMP? +CSMP: 19,143,0,0 OK	Query the current settings of the text mode.
Remarks	The default setting is 19,143,0,0 .	

2.14 Selecting the Type of Cell Broadcast Messages: +CSCB

Description	To set the cell broadcast message (CBM) type the ME receives
Format	- AT+CSCB=[<mode>[,<mids>[,<dcsc>]]]<CR> - AT+CSCB?<CR>

Parameter	AT+CSCB=?<CR>	
	mode: 0: Receive the message type defined by <mids> and <dcss>. 1: Not receive the message type defined by <mids> and <dcss>. <mids>: char type, for example, "0, 1, 5, 320 to 478, 922": - The value range of the character is from 0 to 999. A maximum of 10 values can be set, for example, "0-9". - The separators used to separate numbers cannot exist alone. There must be numbers before and after the separator. <dcss>: value range (0-15,32-36,72), used for setting the language type. The other functions are not implemented.	
Return Value	See the example	
Example	AT+CSCB=0,"34,40,600,999","1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,32,33,34,35,36,72"	Set the cell broadcast message (CBM) type the ME receives
	OK	
	AT+CSCB? +CSCB:0,"34,40,600,999","1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,32,33,34,35,36,72"	Query the current CMB type channel.
Remarks	OK	
	AT+CSCB=? +CSCB: (0,1)	Query the value range of broadcast message status.
Remarks	OK	
	N/A	

2.15 Query Text Mode: +CSDH

Description	To set whether the detailed header information is displayed in the result code in text mode	
Format	- AT+CSDH=[<show>]<CR> - AT+CSDH?<CR> - AT+CSDH=?<CR>	
Parameter	<show>: 0: not display (default value) 1: display	
Return Value	See the Example.	
Example	AT+CSDH=0 OK	Set the header information to not display

	AT+CMGR=0 +CMGR: "RECREAD","13510895077",,"15/07/23, 20:58:28+32" abc OK	Read the 0 th message.
	AT+CSDH=1 OK AT+CMGR=0 +CMGR: "RECREAD","13510895077",,"15/07/23, 20:58:28+32",161,36,0,0,"+8613010888500",145,3 abc OK	Set the detailed header information to display. Read the 0 th message.
	AT+CSDH? +CSDH: 0 OK	Query the current parameter setting of the command.
	AT+CSDH=? +CSDH: (0-1) OK	Query the value range of current parameter in the command.
	Remarks	This command is valid in text mode, which can be set by AT+CMGF=1 .

2.16 Saving Settings: +CSAS

Description	To save current settings
Format	- AT+CSAS[=<profile>]<CR> - AT+CSAS=?<CR>
Parameter	<profile>: 0 : Save settings (or omit the parameter)
Return Value	See the Example.
Example	AT+CSAS OK Save settings
	AT+CSAS=0 OK Save settings
	AT+CSAS=1 ERROR

Remarks	AT+CSAS=? +CSAS: 0 OK	Query the valid parameter values for the command.
	Only the parameter settings of AT+CSCA , AT+CSMP , and AT+CSCB can be saved by executing this command.	

3 TCP/UDP Client Commands

3.1 Setting Network APN: +NETAPN

Description	To set the network APN	
Format	- AT+NETAPN="APN","USERNAME","PASSWORD"<CR> - AT+NETAPN?<CR>	
Parameter	APN : GPRS network access point USERNAME : GPRS user name PASSWORD : GPRS password	
Return Value	OK	
Example	AT+NETAPN="CMNET","","" OK	Set GPRS APN to CMNET and leave user account and password blank.
	AT+NETAPN=CMNET,, ERROR	ERROR is returned because the parameter format is incorrect. A pair of quotation marks is required for each parameter.
	AT+NETAPN? +NETAPN:"","","" OK	Query the current settings of APN parameter.
Remarks	N/A	

3.2 Setting Up PPP Link: +XIIC

Description	To set up a PPP link	
Format	- AT+XIIC=<n><CR> - AT+XIIC?<CR>	
Parameter	n : 0 : Deactivate the PPP link 1 : Activate the PPP link.	
Return Value	<CR><LF>OK<CR><LF>	
	<CR><LF>+XIIC: 1, <ip> <CR><LF>OK<CR><LF>	

	<ip>: IP address	
Example	AT+XIIC=1 OK	The module is required to set up a PPP link.
	AT+XIIC? +XIIC: 1, 10.107.216.162 OK	The PPP link is set up successfully and the IP address is 10.107.216.162. There are four spaces before 1.
	AT+XIIC? +XIIC: 0, 0.0.0.0 OK	The PPP link is not set up successfully. There are four spaces before 0.
Remarks	- Use AT+CGDCONT to set APN before setting up a PPP link - 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.	

3.3 Setting Up TCP Connection: +TCPSETUP

Description	To set up a TCP connection	
Format	AT+TCPSETUP=<n>,<ip>,<port><CR>	
Parameter	<n>: Socket number, ranging from 0 to 5	
	<ip>: Destination IP address, in xx.xx.xx.xx or domain name format <port>: Destination port ID in decimal ASCII code	
Return Value	See the Example.	
Example	AT+TCPSETUP=0,220.199.66.56,6800 OK	The connection to 220.199.66.56,6800 is successfully set up on socket 0.
	+TCPSETUP: 0,OK	
	AT+TCPSETUP=0,neowayjsr.oicp.net,60010 OK	The connection to neowayjsr.oicp.net, 60010 is set up on socket 0 successfully.
	+TCPSETUP: 0,OK	
	+TCPCLOSE: 0,Link Closed	The socket is closed.
	AT+TCPSETUP=1,192.168.20.6,7000 OK	Fails to set up the connection to 192.168.20.6,7000 on socket 1. The server is probably not started,

	+TCPSETUP: 1,FAIL	the IP address is incorrect, or the SIM card is out of credit.
	AT+TCPSETUP=0,neowayjsr.oicp.net,60010 +TCPSETUP: 0, ERROR1	A TCP/UDP connection is set up on socket 0.
	AT+TCPSETUP=5,192.168.20.6,7000 +TCPSETUP: ERROR	Parameters are set incorrectly.
	AT+TCPSETUP=0.58.60.184.213.10012 +TCPSETUP: ERROR	Parameters are set incorrectly.
	AT+TCPSET=0,58.60.184.213,10012 ERROR	The AT command is not complete.
Remarks	Use the AT+XIIC=1 command to set up a PPP link before running this command.	

3.4 Sending TCP Data: +TCPSSEND

Description	To send TCP data The module will return > after this command is sent. Send TCP data 50 ms to 100 ms later.	
Format	AT+TCPSSEND=<n>,<length><CR>	
Parameter	<n>: Socket number, ranging from 0 to 5. A TCP link is established on the socket. <length>: The length of the data to be sent, ranging from 1 to 4096, unit: byte.	
Return Value	See the Example.	
Example	AT+TCPSSEND=0,1 > OK	1-byte data is successfully sent through socket 0.
	+TCPSSEND:0,1	
	AT+TCPSSEND=0,1024 > +TCPSSEND:ERROR	Network congestion occurs when 1024-byte data is sent. Only some data is sent successfully.
	AT+TCPSSEND=0,10 > +TCPSSEND:0,OPERATION EXPIRED	No more data is entered in 30 seconds, and then the expiration information is displayed.
	AT+TCPSSEND=0,1 +TCPSSEND:SOCKET ID OPEN FAILED	One-byte data fails to be sent on socket 0 because the link is not established.
	AT+TCPSSEND=0,4097	Fails to send 4097-byte data on socket

	+TCPSEND:DATA LENGTH ERROR	0 because data length exceeds limit.
Remarks	- Ensure that the TCP connection is set up before sending TCP data. - The AT+IPSTATUS command is recommended to check the buffer size before sending data.	

3.5 Setting Receive Mode: +RECVMODE

Description	To set the receive mode of TCP and UDP data	
Format	- AT+RECVMODE=<n><CR> - AT+RECVMODE?<CR> - AT+RECVMODE=?<CR>	
Parameter	<n>: receive mode 0: buffer the TCP or UDP data received and MCU sends command to read the data 1: print the TCP or UDP data received to UART directly (default)	
Return Value	See the Example	
Example	AT+RECVMODE=0 OK	Set data receiving mode.
	AT+RECVMODE=? +RECVMODE: (0-1) OK	Query the value rang of parameters.
Remarks	- Do not send this command during communication because it will clear the buffer. - This command also works for UDP data.	

3.6 Receiving TCP Data: +TCPRECV

Description	To receive TCP data	
Format	+TCPRECV: <n>,<length>,<data><CR>	
Parameter	<n>: Socket number, ranging from 0 to 5 <length>: The length of the data received <data>: The data received Add 0x0d 0x0a to the end of the data. Identify the end based on <length>.	
Return Value	See the Example.	

Example	+TCPRECV: 0,10,1234567890	Socket 0 receives 10-byte data successfully. The data is 1234567890.
Remarks	N/A	

3.7 Reading TCP Data: +TCPREAD

Description	To read TCP data	
Format	+TCPREAD: <n>,<length><CR>	
Parameter	<n>: socket number, ranging from 0 to 5 <length>: maximum length of data allowed to read, ranging from 1 to 2048	
Return Value	See the Example	
Example	+TCPRECV: 0 AT+TCPREAD=0,100 +TCPREAD: 0,10,1234567890 OK	Socket 0 receives data. Read data. The data read is 1234567890.
Remark	Select the receiving mode by using +RCVMODE .	

3.8 Closing TCP Connection: +TCPCLOSE

Description	To close a TCP connection	
Format	AT+TCPCLOSE=<n><CR>	
Parameter	<n>: Socket ID, ranging from 0 to 5	
Return Value	See the Example.	
Example	AT+TCPCLOSE=1 +TCPCLOSE: 1,OK	Close the TCP connection on socket 1. The TCP connection is closed successfully.
	AT+TCPCLOSE=2 +TCPCLOSE: ERROR	Socket number error
	+TCPCLOSE: 0,Link Closed	The TCP connection is closed. The server sends TCP connection closing command or the network encounters abnormality or weak signals.
Remarks	N/A	

3.9 Setting Up UDP Connection: +UDPSETUP

Description	To set up a UDP connection	
Format	AT+UDPSETUP=<n>,<ip>,<port><CR>	
Parameter	<n>: Socket ID, ranging from 0 to 5 <ip>: Destination IP address, in xx.xx.xx.xx format or domain name format (www.XXXX.com) <port>: Destination port ID in decimal ASCII code	
Return Value	See the Example.	
Example	AT+UDPSETUP=1,220.199.66.56,7000 OK +UDPSETUP: 1,OK	The connection to 220.199.66.56.7000 is successfully set up on socket 1.
	AT+UDPSETUP=0,neowayjsr.oicp.net,60010 OK +UDPSETUP: 0,OK	The connection to neowayjsr.oicp.net,60010 is set up on socket 0 successfully.
	AT+UDPSETUP=0,58.60.184.213,11008 +UDPSETUP: 0,ERROR1	A TCP/UDP connection is set up on socket 0.
	AT+UDPSETUP=1,192.168.20.6,7000 OK +UDPSETUP: 0,FAIL	Fails to set up the connection to 192.168.20.6,7000 on socket 1 because socket 0 is unavailable.
	AT+UDPSETUP=6,192.168.20.6,6800 +UDPSETUP: ERROR	Parameters are set incorrectly.
	AT+UDPSETUP=0.58.60.184.213.10012 +UDPSETUP: ERROR	Parameters are set incorrectly.
	AT+UDPSET=0,58.60.184.213,10012 ERROR	The AT command is not complete.
Remarks	- OK is returned after the AT command in correct format is sent. +TCPSETUP: ERROR is returned if the format of the sent command is set incorrectly or +TCPSETUP: 0,ERROR1 is returned when socket 0 is in use. - Use the AT+XIIC=1 command to set up a PPP link before running this command.	

3.10 Sending UDP Data: +UDPSEND

Description	To send UDP data The module will return > after this command is sent. Send UDP data 50 ms to 100 ms later.	
Format	AT+UDPSEND=<n>,<length><CR>	
Parameter	<n>: Socket number, ranging from 0 to 5. A UDP link is established on the socket. <length>: The length of the data to be sent, ranging from 1 to 4096. unit: byte.	
Return Value	- If the AT command is input in correct format, the module returns >. - If the command is input in incorrect format, the module returns ERROR. - If the link has not been set up, the module returns +UDPSEND: ERROR. - After entering the command, input the data to be sent until the module returns >. - If the UDP data is sent successfully, the module returns +UDPSEND: <n>,<length>. <length> indicates the length of data already sent.	
Example	AT+UDPSEND=0,2 > OK +UDPSEND: 0,2	Send 2-byte data on socket 0. Then send the characters to be sent 50 ms to 100 ms after the module returns >. The data is sent successfully.
	AT+UDPSEND=0,4097 +UDPSEND: ERROR	4097-byte data fails to be sent on socket 0 because data length exceeds the limit.
	AT+UDPSEND=0,10 > +UDPSEND: 0,OPERATION EXPIRED	After the data sending command is input and > is returned, no more data is entered in 30 seconds. Then the expiration information is displayed.
Remarks	- Ensure that the UDP connection is set up before sending UDP data. - To decrease the packet loss rate, do not send more than 1472 each time.	

3.11 Receiving UDP Data: +UDPRECV

Description	To receive UDP data
Format	+UDPRECV: <n>,<length>,<data><CR>
Parameter	<n>: Socket ID, ranging from 0 to 5 <length>: The length of the data received <data>: The data received

	Add 0x0d 0x0a to the end of the data. Identify the end based on <length>.	
Return Value	See the Example.	
Example	+UDPRECV: 0,10,1234567890	Socket 0 receives 10-byte data successfully. The data is 1234567890.
Remarks	N/A	

3.12 Reading UDP Data: +UDPREAD

Description	To read UDP data	
Format	+UDPREAD: <n>,<length><CR>	
Parameter	<n>: socket number, ranging from 0 to 5 <length>: maximum length of data allowed to read	
Return Value	See the Example	
Example	+UDPRECV: 0 AT+UDPREAD=0,100 + UDPREAD: 0,10,1234567890 OK	Socket 0 receives data. Read data. The data read is 1234567890.
Remark	Select a receive mode before sending this command.	

3.13 Closing UDP Connection: +UDPCLOSE

Description	To close a UDP connection	
Format	AT+UDPCLOSE=<n><CR>	
Parameter	<n>: Socket ID, ranging from 0 to 5	
Return Value	If the value of <n> is illegal, the module returns: +UDPCLOSE: ERROR. Otherwise, the module returns +UDPCLOSE: <n>,OK.	
Example	AT+UDPCLOSE=1 +UDPCLOSE: 1,OK	The UDP connection on socket 1 is closed successfully.
	AT+UDPCLOSE=6 +UDPCLOSE: ERROR	Socket number error
Remarks	N/A	

3.14 Querying TCP/UDP Socket Status: +IPSTATUS

Description	To query the status of a TCP/UDP socket	
Format	AT+IPSTATUS=<n><CR>	
Parameter	<n>: Socket ID, ranging from 0 to 5	
Return Value	+IPSTATUS: <n>,<CONNECT or DISCONNECT>[,<TCP or UDP>, <send-buffer-size>] <CONNECT or DISCONNECT>: Socket status, CONNECT or DISCONNECT <TCP or UDP>: socket type, 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 +IPSTATUS: 0,CONNECT,TCP,4096	A TCP connection is set up on socket 0 and the buffer size is 4096 bytes.
	AT+IPSTATUS=0 +IPSTATUS: 0,CONNECT,UDP,0	A UDP connection is set up on 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.
Remarks	UDP connection does not support <send-buffer-size>.	

3.15 Querying Status of Data Sent by TCP Socket: +TCPACK

Description	To query the size of data successfully sent by the TCP socket and the size of the data successfully received	
Format	AT+TCPACK=<n><CR>	
Parameter	<n>: Socket ID, ranging from 0 to 5	
Return Value	+TCPACK: <n>,<data_sent>,<acked_rcv> <data_sent>: Data successfully sent through this socket <acked_rcv>: Data acknowledged by the receiver +TCPACK:<n>,<DISCONNECT> No connection is set up on this socket.	

	+TCPACK: NO TCP LINK A UDP connection is set up on this socket.	
Example	AT+TCPACK=0 + TCPACK: 0,20,20	20-byte data is sent from socket 0 and the receiver acknowledges 20-byte data.
	AT+TCPACK=0 + TCPACK: 0,128,120	128-byte data is sent from socket 0 and 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 is incorrect in the command.
Remarks	The values of <data_sent> and <acked_recv> are unsigned 64-bit integers in decimal ASCII. The unit is byte.	

3.16 Setting DNS Server: DNSSERVER

Description	To set primary and secondary DNS servers	
Format	- AT+DNSSERVER? <CR> - AT+DNSSERVER=<n>,<dns-ip><CR>	
Parameter	<n> : DNS server number, ranging from 1 to 2 <dns-ip> : IP address of DNS server	
Return Value	See the Example.	
Example	AT+DNSSERVER? +DNSSERVER:dns1:114.114.114.114;dns2:0.0.0.0	Query DNS server.
	AT+DNSSERVER=1,114.114.114.114 +DNSSERVER:OK	Set DNS server.
Remarks	In general, you do not have to set DNS server, which will be issued by the base station during PPP negotiation.	

3.17 Setting PDP Keepalive Heartbeat: +PDPKEEPALIVE

Description	To set PDP keepalive heartbeat
Format	AT+PDPKEEPALIVE?<CR>

Parameter	AT+PDPKEEPALIVE=<onoff>,<interval><CR>	
	<onoff> : heartbeat switch 0: disable (default) 1: enable <interval> : heartbeat interval, ranging from 1 to 65535. Unit: second	
Return Value	See the Example	
Example	AT+PDPKEEPALIVE? +PDPKEEPALIVE: 1,5 OK	Query heartbeat setting.
	AT+PDPKEEPALIVE=1,60 OK	Enable heartbeat and set the interval to 60 seconds.
Remarks	Activate PDP before sending this command.	

3.18 Querying PDP Status: +PDPSTATUS

Description	To query the status of PDP	
Format	AT+PDPSTATUS<CR>	
Parameter	NA	
Return Value	See the Example	
Example	AT+PDPSTATUS +PDPSTATUS: CONNECT	PDP connected
	AT+PDPSTATUS +PDPSTATUS: DISCONNECT	PDP disconnected
	AT+PDPSTATUS +PDPSTATUS: PSEUDO_CONNECT	PDP activated, but in pseudo_connect state
Remarks	- PDP status is returned immediately if PDPKEEPALIVE heartbeat is enabled. - PDP status is returned with a delay ranging from 200 ms to 10000 ms if PDPKEEPALIVE heartbeat is disabled.	

3.19 Setting TCP Keepalive Heartbeat: +TCPKEEPALIVE

Description	To keep the TCP session alive continuously
Format	AT+TCPKEEPALIVE=<mode>,<time>,< interval><CR>

	• AT+TCPKEEPALIVE? <CR> • AT+TCPKEEPALIVE=?<CR>
Parameter	<mode>: heartbeat switch 0: disable (default) 1: enable <time>: idle interval, the duration between two keepalive transmissions in idle condition. Value ranges from 1s to 7200s, 20s by default. <interval>: retransmission interval, the duration between two successive keepalive retransmissions, if acknowledgement to the previous keepalive transmission is not received. Value ranges from 1s to 1800s, 5s by default.
Return Value	See the example
Example	<pre>AT+XIIC=1 OK AT+TCPKEEPALIVE=1,20,5 OK AT+TCPSETUP=0,58.60.184.213,11976 OK +TCPSETUP: 0, OK</pre> Enable TCP keepalive <pre>AT+TCPKEEPALIVE? +TCPKEEPALIVE: 1,20,5 OK</pre> Query the status of TCP keepalive. <pre>AT+TCPKEEPALIVE=? +TCPKEEPALIVE: (0-1),(1-7200),(1-1800) OK</pre> Query the parameter range
Remarks	• 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. • Configure the keepalive parameters properly base on the network conditions. The device might encounter pseudo-connection if <time> is set to a great value. The heartbeat packet is not transmitted if <interval> is configured to a value larger than <time>. The device might disconnect to the server because of the sleep mechanism of WCDMA networks when <time> and <interval> are set to very small values. If multiple heartbeat packets are sent in sleep mode, they will be sent out together after the connection is waken. The receiver does not respond with acknowledgment since these packets are identified as an invalid sticking packet. The device disconnects to the server after failing to receive acknowledgment for multiple times.

4 TCP Server Commands

4.1 Setting Listening on TCP Server: +TCPLISTEN

Description	To set listening on the TCP server	
Format	- AT+TCPLISTEN=<port><CR> - AT+TCPLISTEN?<CR>	
Parameter	<Port> : Port ID <Socket> : Socket ID	
Return Value	See the Example.	
Example	AT+TCPLISTEN=6800 +TCPLISTEN: 0,OK	Listening port ID: 6800 The listening function of the server is started.
	AT+TCPLISTEN=6800 +TCPLISTEN: bind error	Fails to bind
	AT+TCPLISTEN=6800 Listening...	Transparent listening is set.
	AT+TCPLISTEN? +TCPLISTEN: listening status	Query the listening status. Here the server is in the listening status.
	AT+TCPLISTEN? +TCPLISTEN: not listening	Query the listening status. Here the server is not in the listening status.
Remarks	Connect AcceptSocket=1,ClientAddr=119.123.77.133,ClientPort=8000	Receive the connection request from the client. AcceptSocket indicates the socket ID on the module, and 119.123.77.133 is the IP address of the client.
	Use the China Unicom card or the China Mobile card with a private network to debug. The China Mobile card with a public network cannot be used as the server debugging.	

4.2 Closing Listening Socket: +CLOSELISTEN

Description	To close the listening socket	
Format	AT+CLOSELISTEN<CR>	
Parameter	N/A	
Return Value	See the Example.	
Example	+CLOSELISTEN: 0,local link closed	The client closes the socket or network abnormalities occur.
	AT+CLOSELISTEN +CLOSELISTEN: 0,local link closed	Connection on the socket is closed.
	AT+CLOSELISTEN +CLOSELISTEN: Transparent local link Transparent mode closed	
Remarks	N/A	

4.3 Closing Connection to Client: +CLOSECLIENT

Description	To close connection to a client	
Format	AT+CLOSECLIENT[=<socket>]<CR>	
Parameter	<Socket>: Socket ID	
Return Value	<CR><LF>+CLOSECLIENT: <socket>,remote link closed<CR><LF>	
Example	AT+CLOSECLIENT +CLOSECLIENT: 1,remote link closed	No parameter in this command.
	+CLOSECLIENT: 2,remote link closed	Connections to all clients are closed.
	AT+CLOSECLIENT=1 +CLOSECLIENT: 1,remote link closed	Close connections on socket 1.
	AT+CLOSECLIENT=1 ERROR	No connection to a remote client on socket 1.
	AT+CLOSECLIENT +CLOSECLIENT: All remote link closed	Connections to all clients are closed.
Remarks	N/A	

4.4 Receiving Data from Client: +TCPRECV(S)

Description	To receive data from the client	
Format	+TCPRECV(S): <n>,<length>,<data><CR>	
Parameter	<n>: Socket ID, ranging from 0 to 5 <length>: The length of the data received <data>: The data received Add 0x0d 0x0a to the end of the data. We can identify the end based on <length>.	
Return Value	See the Example.	
Example	+TCPRECV(S): 1,10,1234567899	Socket 1 receives 10-byte data in char format from the client.
Remarks	- Additional (s) makes this command different from the receive mode of the client mode in format. - This function might not work because carriers' networks do not support.	

4.5 Reading TCP Data: +TCPREADS

Description	To read TCP data	
Format	+TCPREAD(S): <n>,<length><CR>	
Parameter	<n>: socket number, ranging from 0 to 5 <length>: maximum length of data allowed to read, ranging from 1 to 2048	
Return Value	See the Example	
Example	+TCPRECV(S): 1 AT+TCPREADS=1,100 +TCPREADS: 1,10,1234567890 OK	Socket 0 receives data. Read data. The data read is 1234567890.
Remark	N/A	

4.6 Sending Data to Client: +TCPSENDS

Description	To send data to the client
Format	AT+TCPSENDS=<socket>,<length><CR>

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.	
Return Value	See the Example.	
Example	AT+TCPSENDS=0,10 > OK +TCPSENDS: 0,10	10-byte data is successfully sent through socket 0 (eg : 1234567890).
	AT+TCPSENDS=0,536 > +TCPSENDS: Buffer not enough,439	536-byte data is sent through socket 0 (eg : 1234567890...). Fails to transmit the data because internal buffer is insufficient.
	AT+TCPSENDS=0 > OK +TCPSENDS: 0,21	Send 21-byte data through socket 0. (e.g.: 012345678901234567890). Send data successfully (input Ctrl+Z at the end of the data when the command is sent without the data length, 4096 at most).
	AT+TCPSENDS=0,10 +TCPSENDS: 0 is not link	No connection is set up on socket 0.
	AT+TCPSENDS=0,5 > +TCPSENDS: 0,OPERATION EXPIRED	No data is input within 30 seconds after > is displayed
Remarks	Ensure that the TCP connection is set up before sending TCP data.	

4.7 Querying Socket Status on Client: +CLIENTSTATUS

Description	To query the status of socket on the client
Format	AT+CLIENTSTATUS=<socket><CR>
Parameter	<socket>: value of AcceptSocket , that is, the socket of the module. See the description of the AT+TCPLISTEN command.
Return Value	+CLIENTSTATUS: <socket>,<CONNECT or DISCONNECT>,<TCP or INVALID>,<send-buffer-size>
	<CONNECT or DISCONNECT>: Socket status, CONNECT or DISCONNECT <TCP or INVALID>: socket type, value: TCP or INVALID

	<send-buffer-size> : size of the available send buffer on the module, in decimal ASCII mode. unit: byte	
Example	AT+CLIENTSTATUS=0 +CLIENTSTATUS: 0,CONNECT,TCP,61440	A TCP connection is set up to the socket 0 client and the buffer size is 61440 bytes.
	AT+CLIENTSTATUS=4 +CLIENTSTATUS: 4,DISCONNECT	No connection is set up on socket 4.
	AT+CLIENTSTATUS=1 +CLIENTSTATUS: 1,CONNECT,INVALID	Socket 1 is used for server listening.
Remarks	If the socket is invalid, it may be the listening socket of TCP/UDP client or server instead of the TCP socket that is listened.	

4.8 Querying Status of Data Sent by TCP Server: +TCPACKS

Description	To query the size of data successfully sent by the TCP server and the size of the data successfully received	
Format	AT+TCPACKS=<socket><CR>	
Parameter	<socket> : Socket ID, ranging from 0 to 5	
Return Value	+TCPACKS: <socket>,<data_sent>,<acked_recv>	
	<data_sent> : Data successfully sent through this socket	
	<acked_recv> : Data acknowledged by the client	
Example	+TCPACK: <socket>,<DISCONNECT>	
	No connection is set up on this socket.	
	AT+TCPACK=0 + TCPACK: 0,20,20	20-byte data is sent from socket 0 and the client acknowledged 20-byte data.
	AT+TCPACK=0 + TCPACK: 0,128,120	128-byte data is sent from socket 0 and the client acknowledged 120-byte data.
Remarks	AT+TCPACK=1 + TCPACK: 1,DISCONNECT	No connection is set up on socket 1.
	The values of <data_sent> and <acked_recv> are unsigned 64-bit integers in decimal ASCII. The unit is byte.	

5 Transparent TCP/UDP Commands

5.1 Setting up Transparent TCP Connection: +TCPTRANS

Description	To set up a transparent TCP connection	
Format	AT+TCPTRANS=<ip>,<port><CR>	
Parameter	<ip>: Destination IP address, in xx.xx.xx.xx format or domain name format (www.XXXXXX.com) <port>: Destination port ID in decimal ASCII code	
Return Value	See the Example.	
Example	AT+TCPTRANS=220.199.66.56,6800 OK +TCPTRANS:OK	A transparent TCP connection is set up successfully.
	AT+TCPTRANS=neowayjsr.oicp.net,60010 OK +TCPTRANS:OK	A transparent TCP connection is set up successfully by using domain name.
	AT+TCPTRANS=220.199.66.56, +TCPTRANS:ERROR	The command is in wrong format.
	AT+TCPTRANS=220.199.66.56,6800 OK +TCPTRANS:FAIL	Fails to set up a transparent TCP connection.
	AT+TCPTRANS=220.199.66.56,6800 ERROR	ERROR is returned after the command is executed because a transparent (TCP, UDP, TCP server) connection has been set up.
Remarks	- The UART does not display the data sent to the server after the transparent TCP connection is set up successfully. - Use +++ to switch the server to the command mode and ATO to switch it to the data mode. - The module disconnects the transparent connection if a call or message is incoming. - At most 4096-byte data can be sent or received in transparent mode. - TCP data can be transparently sent after a transparent TCP connection is set up successfully and +TCPTRANS:OK is returned.	

5.2 Setting Up Transparent UDP Connection: +UDPTRANS

Description	To set up a transparent UDP connection	
Format	AT+UDPTRANS=<ip>,<port><CR>	
Parameter	<ip>: Destination IP address, in xx.xx.xx.xx format or in domain name format (www.XXXXX.com). <port>: Destination port ID in decimal ASCII code	
Return Value	See the Example.	
Example	AT+UDPTRANS =220.199.66.56,6800 OK +UDPTRANS:OK	A transparent UDP connection is set up successfully.
	AT+UDPTRANS=neowayjsr.oicp.net,60010 OK +UDPTRANS:OK	A transparent UDP connection is set up by using domain name successfully.
	AT+UDPTRANS=220.199.66.56, +UDPTRANS:ERROR	The command format is incorrect.
	AT+UDPTRANS=220.199.66.56,6800 OK +UDPTRANS:FAIL	Fail to set up a transparent UDP connection.
	AT+UDPTRANS=220.199.66.56,6800 ERROR	ERROR is returned after the command is executed because a transparent (TCP, UDP, TCP server) connection is set up.
Remarks	- The UART does not display the data sent to the server after the transparent UDP connection is set up successfully. - Use +++ to switch the server to the command mode and ATO to switch it to the data mode. - The module will disconnect the transparent connection if a call or message is incoming. - At most 4096-byte data can be sent or received in transparent mode. - UDP data can be transparently sent after a transparent UDP connection is set up successfully and +UDPTRANS:OK is returned.	

5.3 Querying Status of Data Sent by Transparent TCP

Socket: +TCPACK

Description	To query the size of data successfully sent by the transparent TCP socket and the size of the data successfully received	
Format	AT+TCPACK<CR>	
Parameter	N/A	
Return Value	+TCPACK:<data_sent>,<acked_recv> <data_sent> : Data transparently transmitted through this socket successfully <acked_recv> : Transparently transmitted data acknowledged by the receiver +TCPACK:<DISCONNECT> No transparent connection is set up. +TCPACK:NO TCP LINK A transparent UDP connection is set up.	
Example	AT+TCPACK	1024-byte data is successfully sent and received in transparent TCP mode.
	+TCPACK:1024,1024	
	AT+TCPACK	No transparent connection is set up.
Remarks	+TCPACK:DISCONNECT	
	AT+TCPACK	A transparent UDP connection is set up.
	+TCPACK:NO TCP LINK	
Remarks	The values of <data_sent> and <acked_recv> are unsigned 64-bit integers in decimal ASCII. The unit is byte.	

5.4 Querying TCP/UDP Socket Status: +IPSTATUS

Description	To query the TCP/UDP socket status	
Format	AT+IPSTATUS<CR>	
Parameter	N/A	
Return Value	+IPSTATUS:<CONNECT or DISCONNECT>[,<TCP or UDP>,<send-buffer-size> <TRANSPARENT>] <CONNECT or DISCONNECT> : Socket status, value: CONNECT or DISCONNECT <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+IPSTATU	The AT command is not complete.

Remarks	ERROR	
	AT+IPSTATUS +IPSTATUS:CONNECT,TCP, 61440	A transparent TCP connection is set up. The available buffer is 61440 bytes.
	AT+IPSTATUS +IPSTATUS:CONNECT,UDP, 61440	A transparent UDP connection is set up. The available buffer is 61440 bytes.
	AT+IPSTATUS +IPSTATUS:DISCONNECT	No transparent connection is set up.
	- This command (without parameters) can be used to query the status of the transparent socket. - Querying <send-buffer-size> is not support on the UDP socket.	

5.5 Closing Transparent Socket: +TRANSCLOSE

Description	To close a transparent socket	
Format	AT+TRANSCLOSE<CR>	
Parameter	N/A	
Return Value	See the Example.	
Example	AT+TRANSCLOSE +TRANSCLOSE:0,OK	Close a transparent TCP socket. Successfully
	AT+TRANSCLOSE ERROR	No transparent TCP/UDP connection is set up.
	AT+TRANSCLOSE +TRANSCLOSE:1,OK	Close a transparent UDP socket. Successfully
	+TCPTRANS:Link Closed	A transparent TCP socket is closed.
	+UDPTRANS:Link Closed	A transparent UDP socket is closed.
Remarks	N/A	

6 Transparent TCP Server Commands

6.1 Setting Transparent TCP Listening: +TCPSRVTRANS

Description	To set transparent listening on the TCP server	
Format	- AT+TCPSRVTRANS=<port><CR> - AT+TCPSRVTRANS?<CR>	
Parameter	N/A	
Return Value	See the Example.	
Example	AT+TCPSRVTRANS=6800 +TCPSRVTRANS:OK	Listening port ID: 6800 The transparent listening is started on the TCP server.
	AT+TCPSRVTRANS=6800 +TCPSRVTRANS:bind error	Fail to bind.
	AT+TCPSRVTRANS=6800 Transparent Listening...	Transparent listening is set.
	AT+TCPSRVTRANS? + TCPSRVTRANS:listening status	Query the listening status.
	AT+TCPSRVTRANS? +TCPSRVTRANS:not listening	Query the listening status.
	AT+TCPSRVTRANS=5000 PLEASE BUILD PPP LINK FIRST!	PDP is not inactivated.
	Connect AcceptSocket=0,ClientAddr=119.123.77.133,ClientPort=8000 Receive the connection request from the client. The client has set up link 1 with the module and 119.123.77.133 is the IP address of the client, 8000 is the port ID of the client.	
Remarks	- A connection must be set up between the server and the client through a socket before the server transparently transmits TCP data. - Use +++ to switch the server to the command mode and ATO to switch it to the data mode. - Only the SIM cards with fixed IP addresses can be used as servers. - Only one TCP client (transparent mode or non-transparent mode) is allowed to connect to a server set up in transparent mode. - The server automatically disconnects from the client if a call or message is incoming. - This function might not work because carriers' networks do not support.	

6.2 Querying Socket Status on Client: +CLIENTSTATUS

Description	To query the status of the socket on the client	
Format	AT+CLIENTSTATUS<CR>	
Parameter	N/A	
Return Value	+CLIENTSTATUS: <CONNECT or DISCONNECT>,<TCP>, <send-buffer-size> <CONNECT or DISCONNECT>: Link status, CONNECT or DISCONNECT <TCP>: Socket type, TCP <send-buffer-size>: The size of the available send buffer on the module, in decimal ASCII mode. unit: byte	
Example	AT+CLIENTSTATUS +CLIENTSTATUS:CONNECT,TCP,61440	A transparent TCP connection is set up and the buffer size is 61440 bytes.
	AT+CLIENTSTATUS +CLIENTSTATUS:DISCONNECT,TCP,61440	No transparent TCP connection is set up. The available buffer is 61440.
Remarks	N/A	

7 FTP Commands

7.1 Logging in to FTP Server: +FTPLOGIN

Description	To log in to the FTP server	
Format	AT+FTPLOGIN=<ip>,<port>,<user>,<pwd><CR>	
Parameter	<ip>: FTP server address <port>: Port ID of the FTP server, 21 <user>: The user name used to log in to the FTP server. The length of the user name cannot exceed 100 ASCII codes and the user name cannot contain comma (,). <pwd>: The password for the user account to log in to the FTP server. The length of the password cannot exceed 100 ASCII codes and the password cannot contain comma (,).	
Return Value	• +FTPLOGIN: Error: The format of the AT command is incorrect • +FTPLOGIN: Have Logged In: The user has logged in to the FTP server. • +FTPLOGIN: AT Busy: Last FTP AT command is not executed completely. • +FTPLOGIN: User logged in: The user logs in to the FTP server successfully. • +FTPLOGIN: 530 Not logged in: The user fails to log in to the FTP server because the user account or password is incorrect. • +FTPLOGIN: GPRS DISCONNECTION: The user logs in to the FTP server before a PPP connection is not set up.	
Example	AT+FTPLOGIN=219.134.179.52,21,user1,pwd2009 OK +FTPLOGIN:User logged in	user1 logs in to the server 219.134.179.52 through port 21 successfully. And the password for user1 is pwd2009.
	AT+FTPLOGIN=58.60.184.213,21,neoway,neoway OK +FTPLOGIN:Error Connect Server Fail	Fails to log in to the FTP server using neoway because the connection times out.
	AT+FTPLOGIN=58.60.184.213,21,neowayftp,neowayftp OK +FTP:Server Control Link Disconnect	Fail to log in to the FTP server.
Remarks	• The FTP functions cannot be used together with the internal TCP/UDP protocol	

stack.

- Data can be read or written on the FTP server only after login.

7.2 Logging Out from FTP Server: +FTPLOGOUT

Description	To log out from the FTP server	
Format	AT+FTPLOGOUT<CR>	
Parameter	N/A	
Return Value	See the Example.	
Example	AT+FTPLOGOUT +FTPLOGOUT: User logged out OK	Log out from the FTP server
	AT+FTPLOGOUT +CME ERROR: INVALID SOCKET ID ERROR	Log out of the FTP server because the FTP server is offline.
Remarks	N/A	

7.3 Downloading Data from FTP Server: +FTPGET

Description	To download data from the FTP server	
Format	AT+FTPGET=<dir&filename>,<type>,<content or info>[,<offset>][,<len>]<CR>	
Parameter	<Dir&filename>: Path and name of the file to be read (Note: The file directory is under the FTP root directory) <Type>: File transfer mode: 1: ASCII 2: Binary <content or info>: File content or file (or specified directory) information 1: Obtain the file content 2: Obtain the information of the file or the specified path <offset>: Specifies where file data starts. <len>: Length of file downloaded from the start point. Value ranges from 1 to 8192.	
Return Value	• +FTPGET: Error: The format of the AT command is incorrect • +FTPGET: Error Not Login: The user has not logged in to the FTP server.	

- **+FTPGET: Error!Timeout:** Some failure is caused by download timeout (timeout period is 30 seconds) and the module does not receive data from the FTP server within 30 seconds.
- **+FTPGET: File Not Found:** The read file is non-existent.
- **+FTPGET: <length>,<data>:** <length> indicates the data length; <data> indicates the data content.
- **+FTPGET: OK.total length is <n>:** The module reads data successfully and the data length is n.

Example

```

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

+FTP:Server Data Link Disconnect

AT+FTPGET=test.txt,1,2
+FTPGET:65,-rw-rw-rw-  1 user      group      10 Jan 15
15:01 test.txt                                Obtain      the
                                                information about
+FTPGET: OK.total length is 65                test.txt.

+FTP:Server Data Link Disconnect

AT+FTPGET=test.txt,1,1
+FTPGET:10,1234567890                                Obtain      the
                                                information      in
+FTPGET:OK.total length is 10                test.txt.

+FTP:Server Data Link Disconnect

AT+FTPGET=test.txt,1,1,2
+FTPGET:10,0123456789                                Obtain      the
+FTPGET: OK.total length is 8                information in the
                                                hello.text file in
+FTP:Server Data Link Disconnect                the Test folder.

AT+FTPGET=test.txt,1,1,2
+FTPGET:8,23456789                                Obtain      file
+FTPGET:OK.total length is 8                content starting
                                                from the second
+FTP:Server Data Link Disconnect                byte.

```

	AT+FTPGET=test.txt,1,1,2,4 +FTPGET:4,2345 +FTPGET:OK.total length is 4	Obtain 4 bytes from the second byte.
Remarks	N/A	

7.4 Uploading Data to FTP Server: +FTPPUT

Description	To upload data to the FTP server	
Format	AT+FTPPUT=<filename>,<type>,<mode>,<size><CR>	
Parameter	<filename>: The name of the file to be uploaded <type>: File transfer mode 1: ASCII 2: Binary <mode>: Operation mode 1: STOR mode. Create a file on the FTP server and write the data to the file. If the file exists, the original file will be overwritten. 2: APPE mode. Create a file on the FTP server and write the data to the file. If the file exists, the data is attached to the end of the file. 3: DELE mode. Delete a file. <size>: Data length. The data length cannot exceed 8192.	
Return Value	• +FTPPUT: Error: The format of the AT command is incorrect. • +FTPPUT: Error Not Login: The user has not logged in to the FTP server. • +FTPPUT: AT Busy: Last FTP AT command is not executed completely. • +FTPPUT: SIZE Error: The value of <length> is greater than 8192 or less than 1. • +FTPPUT: OK,<n>: The file is sent successfully and the file length is n. • +FTPPUT: Delete File OK: The file is deleted successfully. • +FTPPUT: ErrorTimeOut: No file content is input in long time.	
Example	AT+FTPPUT=test.txt,1,1,10 >1234567890 +FTPPUT:OK,10	Upload the test.txt file, which is 10 bytes. The file is transferred in ASCII and the operated in STORE.
	AT+FTPPUT=test.txt,1,2,10 > +FTPPUT:OK,1024	Upload the test.txt file, which is 10 bytes. The file is transferred in ASCII and the operated in APPE.
	AT+FTPPUT=test.txt,1,3,0 +FTPPUT: Delete File OK	Delete the test.txt file.
Remarks	N/A	

7.5 Querying FTP Link Status: +FTPSTATUS

Description	To query the FTP link status	
Format	AT+FTPSTATUS<CR>	
Parameter	N/A	
Return Value	+FTPSTATUS: <status>,<ip>, <port> <status>: 0: The FTP link is not set up. 1: The FTP link is set up. <ip> : The IP address of the FTP server <port> : The port of the FTP server	
Example	AT+FTPSTATUS	Query the FTP link status.
	+FTPSTATUS:1,119.139.221.66,21	The module is successfully connected to the FTP server.
	AT+FTPSTATUS	Query the FTP link status.
	+FTPSTATUS: 0,0.0.0.0,0	Not logged in
Remarks	N/A	

8 HTTP Commands

8.1 Setting HTTP Parameters: +HTTTPARA

Description	To set HTTP parameters	
Format	AT+HTTTPARA=<para>,<para_value><CR>	
Parameter	<para>: HTTP parameters, including two parameters: url: destination path port: destination port ID (no default value) keepalive: enables the HTTP persistent connection recvmode: receive mode - para_value=0(default): one HTTP response contains one +HTTTPRECV (header) only. - para_value=1: the data is displayed in the form of +HTTTPRECV: <length>,<data>. <para_value>: the value of <para>. The value of URL contains at most 512 bytes and URL supports domain name translation	
Return Value	See the example	
Example	AT+HTTTPARA=url,www.neoway.com.cn/en/index.aspx OK	Set the Neoway homepage as the URL. The URL supports domain name translation.
	AT+HTTTPARA=url,121.15.200.97/Service1.asmx/GetN ote OK	Set URL.
	AT+HTTTPARA=url, ERROR	The AT command is not complete.
	AT+HTTTPARA=port,80 OK	Set the destination port ID to 80.
	AT+HTTTPARA=port,8080 OK	Set the destination port ID to 8080.
Remarks	N/A	

8.2 Setting up HTTP Link: +HTTPSETUP

Description	To set up an HTTP connection.	
Format	AT+HTTPSETUP<CR>	
Parameter	N/A	
Return Value	See the example.	
Example	AT+HTTPSETUP OK	Set up an HTTP connection successfully.
	AT+HTTPSETUP +HTTPSETUP: FAIL	Fails to set up an HTTP connection.
Remarks	- The connection is set up successfully only after setting the destination address and port ID correctly. - Ensure that PPP dialing is successful before an HTTP connection is set up.	

8.3 Executing HTTP Request: +HTTPACTION

Description	To execute an HTTP request.	
Format	- AT+HTTPACTION=<mode>[,<length>,<type>]]<CR> - AT+HTTPACTION=<mode>[,<offset>,<size>]<CR>	
Parameter	<mode>: HTTP request mode 0: GET 1: HEAD 2: POST 99: OPEN_MODE. Customized packet mode. <length>: the length of POST content or custom packets. It is required if <mode> is set to POST or OPEN_MODE. The maximum length is 2048. <type>: POST request data type 0: x-www-form-urlencoded 1: text 2: json 3: xml 4: html <offset>: specifies the start of file to be downloaded in GET mode. <size>: specifies download size for file download in GET mode.	
Return Value	See the example.	

Example

AT+HTTTPARA=url,www.neoway.com.cn/en/index.aspx	Set the destination path. The port is 80.
OK	
AT+HTTTPARA=port,80	To set up an HTTP connection.
OK	
AT+HTTPSETUP	
OK	
AT+HTTPACTION=0	
OK	Get request.
+HTTPRECV:	
HTTP/1.1 200 OK	
Cache-Control: private	Receive the response from the HTTP server.
Content-Type: text/html; charset=utf-8	
Server: Microsoft-IIS/7.5	
Set-Cookie:	
ASP.NET_SessionId=rh3fjg554ufzb145aevgz45;	
path=/; HttpOnly	
X-AspNet-Version: 2.0.50727	
X-Powered-By: ASP.NET	
X-UA-Compatible: IE=EmulateIE7	
Date: Thu, 28 Nov 2013 03:06:57 GMT	
Connection: close	
Content-Length: 13842	
/*Homepage content of Neoway website, HTML format, contains 13842 bytes*/	
.....	
/*Homepage content of Neoway website*/	
+HTTPCLOSED: HTTP Link Closed	The server disconnects to the module after finishing responding.
AT+HTTTPARA	
=url,www.neoway.com.cn/en/index.aspx	Set the destination path.
OK	Set the destination port to 80.
AT+HTTTPARA=port,80	To set up an HTTP connection.
OK	
AT+HTTPSETUP	
OK	
AT+HTTPACTION=1	HEAD request.
OK	
+HTTPRECV:	
HTTP/1.1 200 OK	
Cache-Control: private	The HTTP server responds.
Content-Length: 13842	
Content-Type: text/html; charset=utf-8	

Remarks	Server: Microsoft-IIS/7.5 Set-Cookie: ASP.NET_SessionId=znt4fqabqsuclz55pvfufn55; path=/; HttpOnly X-AspNet-Version: 2.0.50727 X-Powered-By: ASP.NET X-UA-Compatible: IE=EmulateIE7 Date: Thu, 28 Nov 2013 03:32:35 GMT Connection: close +HTTPCLOSED: HTTP Link Closed	
	AT+HTTPACTION=0 +HTTPSEND: ERROR	Failed to send data.
	AT+HTTPACTION=2,adasd ERROR	Other errors.
	- Comply with the HTTP protocol when defining packets. - Add a carriage return to the end of the packets if the HTTP request is set to custom packet mode.	

8.4 Closing HTTP Link: +HTTPCLOSED

Description	To close an HTTP link	
Format	AT+HTTPCLOSE<CR>	
Parameter	N/A	
Return Value	See the example.	
Example	AT+HTTPCLOSE OK	Close HTTP link.
	+HTTPCLOSE: HTTP Link Closed	Unsolicited message after the link is closed successfully
	AT+HTTPCLOSE OK	Close the HTTP link
Remarks	- After the +HTTPCLOSE command is sent, the HTTP link is closed and the settings of +HTTTPARA are cleared. - Only OK is returned after this command is executed if the HTTP socket is not connected.	

8.5 Receiving HTTP Data: +HTTPRECV

Description	To report the data received from the HTTP connection	
Format	• <CR><LF>+HTTPRECV: <datas> • <CR><LF>+HTTPRECV: <length>,<datas>	
Parameter	<length> : Data length. <data> : Data received through the HTTP socket.	
Return Value	See the example.	
Example	<pre>+HTTPRECV: HTTP/1.1 200 OK Cache-Control: private Content-Length: 13842 Content-Type: text/html; charset=utf-8 Server: Microsoft-IIS/7.5 Set-Cookie: ASP.NET_SessionId=pvlaai3fizxg44eyvyqsyenk; path=/; HttpOnly X-AspNet-Version: 2.0.50727 X-Powered-By: ASP.NET X-UA-Compatible: IE=EmulateIE7 Date: Thu, 28 Nov 2013 05:40:24 GMT Connection: close +HTTPCLOSED: HTTP Link Closed</pre>	
	<pre>+HTTPRECV: 803,HTTP/1.1 206 Partial Content Cache-Control: no-cache Connection: Keep-Alive Content-Length: 10 Content-Range: bytes 0-9/14615 Content-Type: text/html Date: Tue, 10 Jul 2018 00:55:30 GMT Etag: "5b3c3650-3917" Last-Modified: Wed, 04 Jul 2018 02:52:00 GMT P3p: CP=" OTI DSP COR IVA OUR IND COM " Pragma: no-cache Server: BWS/1.1 Set-Cookie: BAIDUID=F18E6894A34321D8CF9AAF28C14FACC 9:FG=1; expires=Thu, 31-Dec-37 23:55:55 GMT; max- age=2147483647; path=/; domain=.baidu.com Set-Cookie: BIDUPSID=F18E6894A34321D8CF9AAF28C14FAC C9; expires=Thu, 31-Dec-37 23:55:55 GMT; max- age=2147483647; path=/; domain=.baidu.com</pre>	

Report the data received from the HTTP connection.

Data format when RECVMODE is set to 1.

	Set-Cookie: PSTM=1531184130; expires=Thu, 31-Dec-37 23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com Vary: Accept-Encoding X-Ua-Compatible: IE=Edge,chrome=1 <!DOCTYPE
Remarks	N/A

8.6 HTTP Link Closed Report: +HTTPCLOSED

Description	Unsolicited report of the HTTP link closing
Format	<CR><LF>+HTTPCLOSED: HTTP Link Closed<CR><LF>
Parameter	N/A
Return Value	See the example.
Example	+HTTPCLOSED: HTTP Link Closed Unsolicited report of the HTTP link closing
Remarks	N/A

9 HTTPS Commands

9.1 Configuring HTTPS Parameters: +HTTPSCFG

Description	To configure SSL parameters for HTTPS	
Format	• AT+HTTPSCFG=<type>,<type_name><CR> • AT+HTTPSCFG?<CR> • AT+HTTPSCFG=?<CR>	
Parameter	type : SSL options. type_name : setting of SSL	
Return Value	<CR><LF>OK<CR><LF> Or <CR><LF>+ HTTPSCFG: <type>,<type_name> Or <CR><LF>+ HTTPSCFG: <sslversion>,<authmode>,<cacert>,<clientcert>,<clientkey> type : SSL options sslversion : SSL version authmode : authentication mode cacert : CA certificate clientcert : client certificate clientkey : client key type_name : setting of 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, certificate of the client clientkey : string, client key	
Example	AT+HTTPSCFG="sslversion",0 OK	Set SSL to ssl3.0

	AT+HTTPSCFG="authmode",0 OK	Set no authentication.
	AT+HTTPSCFG? +HTTPSCFG: 0,1,ca.pem,cc.pem,ck.pem OK	Query current SSL settings.
	AT+HTTPSCFG=? +HTTPSCFG: <type>,<type_name> OK	Query the value range of parameters.
Remarks	If authmode is set to 0, you do not have to set cacert, clientcert, or clientkey.	

9.2 Setting HTTPS Parameters: +HTTPSPARA

Description	To set HTTPS parameters	
Format	AT+HTTPSPARA=<para>,<para_value><CR>	
Parameter	<para>: HTTP parameters, including two parameters: url: destination address port: destination port ID (no default value) keepalive: enables the HTTP persistent connection recvmode: receive mode - para_value=0(default): one HTTPS response contains one +HTTPRECV (header) only. - para_value=1: the data is displayed in the form of +HTTPRECV: <length>,<data>. <para_value>: the value of <para>. The value of URL contains at most 512 bytes and URL supports domain name translation	
Return Value	See the example.	
Example	AT+HTTPSPARA=url,mybank.icbc.com.cn/icbc/perbank/index.jsp OK	Set the ICBC homepage as the URL. The URL supports domain name translation.
	AT+HTTPSPARA=url,132.188.73.13/prodreg/beginRegistration.action OK	Set destination address to 132.188.73.13.

	AT+HTTPSPARA=port,443 OK	Set the destination port ID to 443.
Remarks	- Set new HTTPS parameters for new HTTPS requests. - After the +HTTPSCLOSE command is sent, the connection is closed and parameter settings will be cleared.	

9.3 Setting up HTTPS Link:+HTTPSSETUP

Description	To set up an HTTPS connection.	
Format	AT+HTTPSSETUP<CR>	
Parameter	N/A	
Return Value	See the example.	
Example	AT+HTTPSSETUP OK	Set up an HTTPS link. Successful.
	AT+HTTPSSETUP +HTTPSSETUP: FAIL	Set up an HTTPS link. Failed
Remarks	- The connection is set up successfully only after setting the destination address and port ID correctly. - Ensure that PPP dialing is successful before an HTTPS connection is set up.	

9.4 Executing HTTPS Request: +HTTPSACTION

Description	To execute an HTTPS request	
Format	- AT+HTTPSACTION=<mode>[,<length>[,<type>]<CR> - AT+HTTPSACTION=<mode>[,<offset>,<size>]<CR>	
Parameter	<mode>: HTTPS request mode, available value can be 0, 1, 2, 99 0: GET 1: HEAD 2: POST 99: OPEN_MODE, Customized packet mode. <length>: the length of POST content or custom packets. It is required if <mode> is set to POST or OPEN_MODE. The maximum length is 2048. <type>: POST request data type 0: x-www-form-urlencoded 1: text 2: json	

	3: xml 4: html <offset> : Specifies offset of file content when GET a file. <size> : Length of file downloaded from the start point	
Return Value	See the example.	
Example	AT+HTTPSPARA=url,support.cdmatech.com/login/ OK AT+HTTPSPARA=port,443 OK AT+HTTPSSETUP OK AT+HTTPSACTION=0 OK	Set the destination address. Set the port to 443. Set up an HTTPS connection.
	+HTTPSRECV: HTTP/1.1 200 OK Server: QUALCOMM X-Powered-By: Servlet/2.5 JSP/2.1 Content-Type: text/html; charset=ISO-8859-1 Date: Sat, 15 Feb 2014 05:58:54 GMT Content-Length: 7630 Connection: close Set-Cookie: JSESSIONID=8V1dS1CpzIPcyNI2LzJZLQgDxWclpMJzP 3FHZhVhpGb83GVM02sn!1955538012; path=/; HttpOnly /*Content of the homepage, in html format*/ /*Content of the homepage*/ +HTTSCLOSED: HTTPS Link Closed	Get request. Receive responses from the HTTPS server. Unsolicited report that The connection is closed after the server responds to the request.
	AT+HTTPSPARA=url,support.cdmatech.com/login/ OK AT+HTTPSPARA=port,443 OK AT+HTTPSSETUP OK AT+HTTPSACTION=1 OK	Set the destination address. Set the port to 443. Set up an HTTPS connection.
	+HTTPSRECV: HTTP/1.1 200 OK Server: QUALCOMM X-Powered-By: Servlet/2.5 JSP/2.1 Content-Type: text/html; charset=ISO-8859-1 Date: Sat, 15 Feb 2014 06:05:39 GMT	HEAD request. The HTTPS server responded.

Remarks	Content-Length: 0 Connection: close Set-Cookie: JSESSIONID=qyNVS1DSmnjS9cvh72yW1xz1jtjBBRj0yv 0zTmMy2LVyBG7HK02b!1955538012; path=/; HttpOnly +HTTSCLOSED: HTTPS Link Closed
	- Follow the HTTPS protocol when you customize the message - Check whether the package contains carriage returns or line feeds characters when customizing message.

9.5 Closing HTTPS Link: +HTTSCLOSE

Description	To close an HTTPS link	
Format	AT+HTTSCLOSE<CR>	
Parameter	N/A	
Return Value	See the example.	
Example	AT+HTTSCLOSE OK	Close an HTTPS link
	+HTTSCLOSE: HTTPS Link Closed	
Remarks	The parameters that are set by +HTTTPARA are cleared while the HTTP connection is being closed after +HTTSCLOSE is executed.	

9.6 Receiving HTTPS Data: +HTTPSRECV

Description	To report the data received from the HTTP connection	
Format	<CR><LF>+HTTPSRECV: <CR><LF><datas> <CR><LF>+HTTPSRECV: <length>,<datas>	
Parameter	<datas>: Data received through the HTTPS connection	
Return Value	See the example.	
Example	+HTTPSRECV: HTTP/1.1 200 OK	Report the data received from the HTTPS connection.

	Cache-Control: private Content-Length: 13842 Content-Type: text/html; charset=utf-8 Server: Microsoft-IIS/7.5 Set-Cookie: ASP.NET_SessionId=pvlaai3fizxg44eyvyqsy enk; path=/; HttpOnly X-AspNet-Version: 2.0.50727 X-Powered-By: ASP.NET X-UA-Compatible: IE=EmulateIE7 Date: Thu, 28 Nov 2013 05:40:24 GMT Connection: close +HTTSCLOSED: HTTPS Link Closed
Remarks	N/A

```

+HTTPSRECV: 832,HTTP/1.1 206 Partial
Content
Server: Tengine/2.1.0
Date: Tue, 10 Jul 2018 01:09:25 GMT
Content-Type: text/html; charset=utf-8
Content-Length: 10
Connection: keep-alive
x-server-id: 40-5005
request-id:
0bea4b2215311849654971530e6674
Accept-Ranges: bytes
set-cookie:
ctoken=MBHI38pHhdL6q0ltGFqjkviz; path=/;
domain=.alipay.com; secure
set-cookie:
ALIPAYJSESSIONID=jMi6e4Q2JmIN8HRk6
8wm53KXisfnB5H0homeproxy; path=/;
domain=.alipay.com
x-frame-options: SAMEORIGIN
x-xss-protection: 1; mode=block
x-content-type-options: nosniff
x-download-options: noopen
strict-transport-security: max-age=31536000
Content-Range: bytes 0-9/21651
x-readtime: 2
Set-Cookie: ssl_upgrade=0;path=/;secure;
Set-Cookie:
spanner=aGuTtGMbvBcOy1dCyZ/e4JI97JSi
PcR1Xt2T4qEYgj0=;path=/;secure;
Via: spanner-internet-g2-35.em14[206]

```

Data format when RECVMODE is
set to 1.

9.7 HTTPS Link Closed Report: +HTTPSCLOSE

Description	Unsolicited report that an HTTPS link is closed	
Format	<CR><LF>+HTTPSCLOSED: HTTPS Link Closed <CR><LF>	
Parameter	N/A	
Return Value	See the example.	
Example	+HTTPSCLOSED: HTTPS Link Closed	Unsolicited report that the HTTPS link is closed
Remarks	N/A	

10 SSL TCP Data Service

10.1 Configuring SSL Parameters for TCP:+SSLTCPCFG

Description	To configure SSL parameters for TCP data service	
Format	- AT+SSLTCPCFG=<type>,<type_name><CR> - AT+SSLTCPCFG?<CR> - AT+SSLTCPCFG=?<CR>	
Parameter	type: SSL parameter options type_name: the specific setting of type <CR><LF>OK<CR><LF> Or <CR><LF>+SSLTCPCFG: <type>,<type_name> Or <CR><LF>+SSLTCPCFG: <type_name1>,<type_name2>,<type_name3>... type: sets the parameter type sslversion: SSL protocol version authmode: authentication mode cacert: CA certificate clientcert: client certificate clientkey: client key	
Return Value	type_name: settings for SSL 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+SSLTCPCFG="sslversion",0 OK	Set SSL to SSL3.0

	AT+SSLTCPCFG="authmode",0 OK	Set authmode to no authentication.
	AT+SSLTCPCFG? +SSLTCPCFG: 0,1,ca.pem,cc.pem,ck.pem OK	Query the current SSL settings.
	AT+SSLTCPCFG=? +SSLTCPCFG: <type>,<type_name> OK	Query the value range of the parameters.
Remarks	If the authmode is set to 0, you do not have to set other parameters, such as cacert, clientcert, and clientkey.	

10.2 Setting up TCP Connection over SSL: +SSLTCPSETUP

Description	To set up a TCP connection over SSL	
Format	- AT+SSLTCPSETUP=<socket_id>,<ip>,<port>,<mode><CR> - AT+SSLTCPSETUP=? - AT+SSLTCPSETUP?	
Parameter	Socket_id: socket ID, ranging from 0 to 5, used to identify the connection to the server. IP address or domain name of the server. Port: server port Mode: transmission mode 0: non-transparent mode 1: transparent	
Return Value	<CR><LF>OK<CR><LF> Or <CR><LF>CONNECT<CR><LF> Or <CR><LF>+SSLTCPSETUP: (0-5),ip,port,mode Or <CR><LF>+SSLTCPSETUP: <socket_id>,<ip>,<port>,<mode> <CR><LF>+SSLTCPSETUP: <socket_id>,<ip>,<port>,<mode>...	
Example	AT+SSLTCPSETUP=0,183.239.240.45,4451,0 OK +SSLTCPSETUP: 0,OK	Set up a non-transparent connection to 183.239.240.45 on socket 0. The port number is 4451.

	AT+SSLTCPSETUP=0,183.239.240.45,4451,1 OK CONNECT	Set up a transparent connection to 183.239.240.45 on socket 0. The port number is 4451.
	AT+SSLTCPSETUP=0,183.239.240.45,4451,0 OK +SSLTCPSETUP: 0,FAIL	Set up a non-transparent connection to 183.239.240.45 on socket 0. The port number is 4451. Fails because of timeout.
	AT+SSLTCPSETUP=0,183.239.240.45,4451,0 OK +SSLTCPSETUP: 0,AUTHFAIL	Set up a non-transparent connection to 183.239.240.45 on socket 0. The port number is 4451. Fails to authenticate.
	AT+SSLTCPSETUP? +SSLTCPSETUP: 0,183.239.240.45,4451,0 +SSLTCPSETUP: 1,183.239.240.45,4452,0 OK	Query the connection status. A transparent TCP connection has been set up on socket 0 and socket 1.
	AT+SSLTCPSETUP=0,183.239.240.45,4451,0 OK +SSLTCPSETUP: 0,ERROR1	A connection has been set up on socket 0.
	Remarks	Activate PPP and apply one IP address before setting up a TCP connection over SSL.

10.3 Closing TCP Connection over SSL: +SSLTCPCLOSE

Description	To close a SSL TCP connection over SSL.	
Format	- AT+SSLTCPCLOSE=<socket_id> - AT+SSLTCPCLOSE=?	
Parameter	Socket_id : socket number, ranging from 0 to 5.	
Return Value	<CR><LF>+SSLTCPCLOSE: <socket_id>,OK<CR><LF> Or <CR><LF>+SSLTCPCLOSE: ERROR<CR><LF>	
Example	AT+SSLTCPCLOSE=0 +SSLTCPCLOSE: 0,OK	Close the TCP connection on socket 0.

Remarks	AT+SSLTCPCLOSE=0	Socket ID is incorrect.
	+SSLTCPCLOSE: ERROR	
	+SSLTCPCLOSE: 0,Link Closed	The connection on socket 0 is closed.
Remarks	N/A	

10.4 Sending TCP Data over SSL: +SSLTCPSEND

Description	To send TCP data over SSL.	
Format	- AT+SSLTCPSEND=<socket_id>,<data_length> - AT+SSLTCPSEND=?	
Parameter	Socket_id : socket ID, ranging from 0 to 5, used to identify the connection to the server, the same as the socket number that is set through +SSLTCPSETUP. Data_length : the length of the data to be sent, ranging from 1 to 4096.	
Return Value	<CR><LF> Or <CR><LF>OK<CR><LF>+SSLTCPSEND: <socket_id>,<data_length><CR><LF> Or <CR><LF>+SSLTCPSEND: <socket_id>,FAIL<CR><LF>	
Example	AT+SSLTCPSEND=0,20 > OK	Send 20-byte data to the server over socket 0.
	+SSLTCPSEND: 0,20 AT+SSLTCPSEND=0,1024 > +SSLTCPSEND: 0,FAIL	Failed
	AT+SSLTCPSEND=? +SSLTCPSEND:(0-5),(1-4096) OK	Query the value range of the parameters.
Remarks	N/A	

10.5 Unsolicited SSLTCP Data Output: +SSLTCPRECV

Description	Unsolicited SSLTCP data output. When the module receives SSLTCP data from the network, the UART prints the data automatically.	
Format	+SSLTCPRECV: <socket_id>,<data_length>,<data><CR><LF>	
Parameter	Socket_id : socket ID, ranging from 0 to 5, used to identify the connection to the server, the same as the socket number that is set through +SSLTCPSETUP. Data_length : the length of the data received Data : data received	
Return Value	N/A	
Example	+SSLTCPRECV: 0,20,1234567890abcdefghjk	Received 20-byte data over socket 0.
Remarks	N/A	

10.6 Writing SSL Certificate: +CERTADD

Description	To write an SSL certificate to the module	
Format	AT+CERTADD=<file_name>,<length><CR>	
Parameter	File_name : certificate file name Length : file length	
Return Value	<CR><LF>CONNECT<CR><LF> Or <CR><LF>+CERTADD: <length>,OK<CR><LF> Or <CR><LF>+CERTADD: ERROR<CR><LF> Or <CR><LF>OK<CR><LF>	
Example	AT+CERTADD=ca_cert.pem,1428 CONNECT +CERTADD: 1428,OK	Add the ca_cert.pem certificate of 1428 bytes to the module.
	AT+CERTADD=clent_cert.pem,1938 CONNECT +CERTADD: 1938,OK	Add the clent_cert.pem certificate of 1938 bytes to the module.

	AT+CERTADD=client_key.pem,1097 CONNECT	Add the client_key.pem certificate of 1097 bytes to the module.
	+CERTADD: 1097,OK	
Remarks	The writing process can be interrupted by +++.	

10.7 Checking SSL Certificate: +CERTCHECK

Description	To check the SSL certificate	
Format	- AT+CERTCHECK=<file_name><CR> - AT+CERTCHECK?<CR>	
Parameter	File_name : certificate file name	
Return Value	<CR><LF>+CERTCHECK: <file_name>,OK<CR><LF> Or <CR><LF>+CERTCHECK: ERROR<CR><LF>	
Example	AT+CERTCHECK=ca_cert.pem +CERTCHECK: ca_cert.pem,OK	Check the ca_cert.pem certificate.
	AT+CERTCHECK=clent_cert.pem +CERTCHECK: clent_cert.pem,OK	Check the clent_cert.pem certificate.
	AT+CERTCHECK=client_key.pem +CERTCHECK: ERROR	client_key.pem does not exist.
	AT+CERTCHECK? cacert.pem keycert.pem OK	Check the added file.
Remarks	N/A	

10.8 Deleting SSL Certificate: +CERTDEL

Description	To delete an SSL certificate	
Format	- AT+CERTDEL=<file_name><CR> - AT+CERTDEL<CR>	
Parameter	File_name : certificate file name	

Return Value	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>	
	AT+CERTDEL=ca_cert.pem OK	Delete ca_cert.pem
Example	AT+CERTDEL=clent_cert.pem OK	Delete clent_cert.pem
	AT+CERTDEL=client_key.pem OK	Delete clent_key.pem
	AT+CERTDEL OK	Delete all added files.
Remarks	N/A	

11 SMTP Commands

11.1 Setting Parameters for the SMTP Login Server: +SMTPSRV

Description	To set parameters of the SMTP server	
Format	AT+SMTPSRV=<addr>,<port><CR>	
Parameter	<addr>: SMTP server address, a pair of quotation marks (") are not mandatory for the address. <port>: destination port ID. In general, the port ID of the SMTP server is 25.	
Return Value	See the example.	
Example	AT+SMTPSRV="smtp.163.com",25 OK	Log in to the server smtp.163.com through port 25.
	AT+SMTPSRV="smtp.qq.com",25 OK	Log in to the server smtp.qq.com through port 25.
Remarks	None	

11.2 Setting SMTP Login Account: +SMTPAUTH

Description	To set the SMTP login account	
Format	AT+SMTPAUTH=<user>,<password><CR>	
Parameter	<user>: email account, a pair of quotation marks (") are not mandatory. <password>: password for the account, a pair of quotation marks (") are not mandatory.	
Return Value	See the example.	
Example	AT+SMTPAUTH="zhangyanun101","167483" OK	Log in to the email zhangyanuN111 with the password 167483.
Remarks	The link can be set up successfully only after you set the destination address and port ID correctly.	

11.3 Setting SMTP Sending Parameters: +SMTPFROM

Description	To set the SMTP sending parameters	
Format	AT+SMTPFROM =<sender>,<name><CR>	
Parameter	<sender>: the email address of the sender, a pair of quotation marks (") are not mandatory. <name>: the name of the sender (user-defined), a pair of quotation marks (") are not mandatory.	
Return Value	See the example.	
Example	AT+SMTPFROM="zhangyanun101@163.com","Damon" OK	Send emails to zhangyanun111@163.com with the sender name Damon.
Remarks	The content before @ in the sender email address must be the same as the login email account.	

11.4 Setting SMTP Receiving Parameters: +SMTPRCPT

Description	To set the SMTP receiving parameter	
Format	AT+SMTPRCPT=<receiver_type>,<receiver_num>,<receiver_addr>,<receiver_name><CR>	
Parameter	<receiver_type>: 0: Receiver 1: Copy to 2: Bcc to <receiver_num>: 0~9: (<receiver_type> is 0 or 1) 0~5: (<receiver_type> is 2) <receiver_addr>: the email address of receivers, a pair of quotation marks (") are not mandatory for the IP address. <user>: the name of the receiver, a pair of quotation marks (") are not mandatory for the IP address.	
Return Value	See the example.	
Example	AT+SMTPRCPT=0,0,"571783423@qq.com","yf" OK AT+SMTPRCPT=0,1,"571783424@qq.com","yg" OK	Add the first receiver. Add the second receiver.

	AT+SMTPRCPT=1,0,"571783425@qq.com","yh" OK	Add the first person the email is copied to
	AT+SMTPRCPT=1,1,"571783426@qq.com","yj" OK	Add the second person the email is copied to
	AT+SMTPRCPT=2,0,"571783427@qq.com","yk" OK	Add the first person the email is blind carbon copied to
	AT+SMTPRCPT=2,1,"571783427@qq.com","yl" OK	Add the second tertiary recipient.
Remarks	AT+SMTPRCPT=2,1,"571783427@qq.com",yl +SMTPRCPT:Error	
	Before sending an email, you can execute this command for several times to add different types of recipients:	
	At most 10 primary recipients (0 to 9)	
	At most 10 secondary recipients (0 to 9)	
	At most 5 tertiary recipients (0 to 4)	

11.5 Entering an Email Subject: +SMTPSUB

Description	To enter the subject of an email	
Format	AT+SMTPSUB=<subject><CR>	
Parameter	<subject>: the maximum length of an email subject is 100 bytes. A pair of quotation marks ("") are not mandatory for the IP address.	
Return Value	See the example.	
Example	AT+SMTPSUB="flower" OK	The email subject is flower.
Remarks	The email subject must be in character string type.	

11.6 Entering Email Content: +SMTPBODY

Description	To enter the content of an email	
Format	AT+SMTPBODY=<context><CR>	
Parameter	<context>: the maximum length of email content is 400 bytes. A pair of quotation marks ("") are not mandatory for the IP address.	

Return Value	See the example.	
Example	AT+SMTPBODY="rose is better" OK	Mail content: rose is better.
Remarks	The email content must be in character string type.	

11.7 Sending an Email: +SMTPSEND

Description	To send an email	
Format	AT+SMTPSEND<CR>	
Parameter	N/A	
Return Value	See the example.	
Example	AT+SMTPSEND OK	The email is sent successfully.
	AT+SMTPSEND +SMTPSEND:ERROR	The email fails to be sent because bad network connection, incorrect SMTP server setting.
	AT+SMTPSEND +CME ERROR: OTHER ERROR +SMTPSEND:ERROR	OTHER ERROR is returned if an email is sent without email server settings.
	AT+SMTPSEND +SMTPSEND:ERROR +SMTP CLOSE_2: SMTP Link Closed	An email is sent without email body or subject settings.
Remarks	There is a delay to return OK. The email service must support SMTP function. The login password needs to be reset if you use the QQ mailbox. (The password for logging in to the mailbox cannot be the same with the QQ password.)	

12 POP3 Commands

12.1 Connecting POP3 Server: +POPSRV

Description	To connect to the POP3 server	
Format	AT+POPSRV=<addr>,<port><CR>	
Parameter	<addr>: POP3 server address, a pair of quotation marks (") are not mandatory for the address. <port>: destination port ID. In general, the port ID of the POP3 server is 110.	
Return Value	See the example.	
Example	AT+POPSRV="pop3.163.com",110 OK	Connect to 163 server
	AT+POPSRV="pop.qq.com",110 OK	Connect to Tencent server
	AT+POPSRV="pop.qq.com",112 +POPSRV:Error	The destination port number is incorrect.
	+POP:POP Link Closed	The link to the server is closed.
Remarks	Some email servers supports POP but do not support POP3.	

12.2 Using Account to Log In to the mailbox: +POPAUTH

Description	To use an account to log in to the mailbox	
Format	AT+POPAUTH=<user>,<password><CR>	
Parameter	<user>: email account, a pair of quotation marks (") are not mandatory for the IP address. <password>: account password, a pair of quotation marks (") are not mandatory for the IP address.	
Return Value	See the example.	
Example	AT+POPAUTH="zhangyanun101","167483" OK	Log in to the mailbox successfully.

	AT+POPAUTH="547618730","tanyanjiao82564988" +POPSTAT:Error	The account or the password for the account is incorrect.
	+POP:POP Link Closed	
	AT+POPAUTH="547618730","tanyanjiao82564982" +POPSTAT:Error	The POP session is end.
Remarks	The connection is set up successfully only after setting the destination address and port ID correctly.	

12.3 Querying the Email Box Status: +POPSTAT

Description	To query the email box status	
Format	AT+POPSTAT<CR>	
Parameter	N/A	
Return Value	+POPRECV:<bytes> +OK <num><totalsize> <bytes> : The bytes sent by the email server, including all characters following OK <num> : Email number <totalsize> : Email size	
Example	AT+POPSTAT +POPRECV:15 +OK 36 327235	Query the email box status Receive 15 bytes. 36 emails in total, 327235 in size.
	AT+POPSTAT +POPSTAT:Error	The POP session is end.
Remarks	N/A	

12.4 Querying Specified Email Information: +POPLIST

Description	To query specified email information
Format	- AT+POPLIST=<num><CR> - AT+POPLIST<CR>

Parameter	<num>: Numeric type, email number	
Return Value	+POPRECV:<bytes> +OK <num><totalsize> <bytes>: The bytes sent by the email server, including all characters following OK <num>: Email number <totalsize>: Email size	
Example	AT+POPLIST=1 +POPRECV:12 +OK 1 7743	Query the information of email 1. Receive 12 bytes. One email in total, 7743 in size. There is line space after +OK 1 7743.
	AT+POPLIST +POPRECV:344 +OK 36 327235 1 7743 2 2589 3 7528 4 5711 5 4301 6 1890 7 700 8 4202 9 14820 10 25609 11 18182 12 5780 13 3393 14 27736 15 17749 16 17750 17 23050 18 6172 19 5797 20 28983 21 4088 22 28545 23 26138 24 1332 25 1326 26 1333 27 1328 28 1330 29 10498 30 1328 31 1333	Obtain the sizes of all emails There is line space after the period (.).

	32 1331 33 1328 34 1330 35 4486 36 10496 .	
	AT+POPLIST +POPLIST:Error	The POP session is end.
	AT+POPLIST=1 +POPrecv:30 -ERR Message already deleted +POPLIST:Error +POP:POP Link Closed	Query email 1 which is marked as deleted.
Remarks	None	

12.5 Marking an Email Deleted: +POPDELE

Description	To mark the email deleted	
Format	AT+POPDELE=<num><CR>	
Parameter	<num>: Email number	
Return Value	See the example.	
Example	AT+POPDELE=1 OK	Delete the email 1. The email is deleted successfully
	AT+POPDELE=1 +POPDELE:Error	The POP session is end.
Remarks	The email is not deleted from the email box after this command is executed. You can also execute the +POPRSET command to cancel the marks.	

12.6 Cancelling All Deleting Marks: +POPRSET

Description	To cancel all deleting marks	
Format	AT+POPRSET<CR>	
Parameter	N/A	
Return Value	See the example.	
Example	AT+POPRSET OK	Cancel all deleting marks. The marks are cancelled successfully.
	AT+POPRSET +POPRSET:Error	The POP session is end.
Remarks	N/A	

12.7 Reading Emails: +POPRETR

Description	To read an email	
Format	AT+POPRETR=<num><CR>	
Parameter	<num>: Email number	
Return Value	See the example.	
Example	<pre> AT+POPRETR=7 +POPRECV:716 +OK 700 octets Received: from web1.sportsnine.com (unknown [211.234.111.105]) by mx32 (Coremail) with SMTP id UsCowECpsm83YNdPX_v8lg--.404S2; Tue, 12 Jun 2012 23:28:55 +0800 (CST) Received: (qmail 24046 invoked by uid 3001); 12 Jun 2012 22:29:14 +0900 Received: from unknown (HELO sxchnsy) (postmaster@222.78.124.127) by 0 (qmail 1.03 + ejcp v14 + HB patch) with SMTP; 12 Jun 2012 22:29:14 +0900 X-CM-TRANSID:UsCowECpsm83YNdPX_v8lg- -.404S2 X-Coremail-Antispam: 1Uf129KBjDUn29KB7ZKAUJUUUUU529EdanIXcx71U UUUU7v73 </pre>	

Read email 7.

Remarks	VFW2AGmfu7bjvjm3AaLaJ3UblYCTnIWlevJa73Uj IFyTuYvjxU6OJeDUUUU Message-Id: <4FD76037.194D40.02028@m12-82.163.com> Date: Tue, 12 Jun 2012 23:28:55 +0800 (CST) From: postmaster@recro.or.kr . +POPRECV:3	
	AT+POPRETR=6 +POPRETR:Error	The POP session is end.
	AT+POPRETR=1 +POPRECV:30 -ERR Message already deleted	Query email 1 which is marked as deleted.
	Multiple +POPRECV may be returned because sticky packages and splited packages may be transmitted in a TCP connection.	

12.8 Ending the Session: +POPQUIT

Description	To end a session	
Format	AT+POPQUIT<CR>	
Parameter	N/A	
Return Value	See the example.	
Example	AT+POPQUIT OK	End the POP session. The session is ended successfully.
	+POP:POP Link Closed	
	+POP:POP Link Closed	POP session is ended.
Remarks	None	

13 STK Commands

13.1 Enabling/Disabling STK: +STKEN

Description	To enable/disable STK	
Format	• AT+STKEN=<n> • AT+STKEN? • AT+STK=?	
Parameter	<n>: 0: enable 1: disable	
Return Value	<CR><LF>OK<CR><LF> <CR><LF>ERROR<CR><LF>	
Example	AT+STKEN=1 OK	
	AT+STKEN? +STK: 0 OK	Query the current settings of the command.
	AT+STKEN=? +STK: (0-1) OK	Query the value range of the parameter.
Remarks	The settings by this command are saved after the module is powered off.	

13.2 STK Terminal Response: STKTR

Description	To send the STK Terminal Response to SIM card.	
Format	• AT+STKTR=<terminal_response> • AT+STKTR=?	
Parameter	<terminal_response>: a hexadecimal character string responded by the STK	
Return Value	<CR><LF> STKTR: <n><CR><LF> <CR><LF>OK<CR><LF> <n>:	

	0: Successful 1: Failed <CR><LF> +STKTR: <terminal_response><CR><LF> AT+STKTR=810301250082028281830100 +STKPCI:D074810301250082028182850F80005500530049004D53615E947528 8F0A01807CBE54C163A883508F0A02806C83901A884C8BC18F0C0380624B6 73A84254E1A53858F0804806C8353C280038F0A0580727960E0793C53058F0 806806C8377E597F38F0807806C8373AF74038F0808806C835A314E50
Example	The modem reports STK SETUP MENU +STKTR: 0 OK The application replies that the text is displayed successfully. The modem reports that AT+STKTR is executed successfully. +SPUSATENDSESSIONIND Modem side reports that one STK session is end. • <terminal_response>: The structure of terminal response, is specified in GSM 11.14. • The proactive commands that need to be responded when AT+STKTR is executed: DISPLAY TEXT GET INKEY GET INPUT PLAY TONE REFRESH SET UP MENU SELECT ITEM PROVIDE LOCAL INFORMATION (Only the language and the time zone are transmitted to the AP side while the other types of parameter are processed in the Modem side.) SETUP EVENT LIST SETUP IDLE MODE TEXT SEND DTMF LANGUAGE NOTIFICATION LAUNCH BROWSER OPEN CHANNEL CLOSE CHANNEL SEND DATA RECEIVE DATA GET CHANNEL STATUS
Remarks	

13.3 STK Envelope: +STKENV

Description	To send STK envelope command to the SIM card by ME
Format	- AT+STKENV=<sat_command> - AT+STKENV=?
Parameter	<sat_command>: character string in hexadecimal format, envelope value
Return Value	<CR><LF> STKENV: <n><CR><LF> <CR><LF>OK<CR><LF> <n>: 0: Successful 1: Failed <CR><LF> + STKENV : <sat_command><CR><LF>
Example	AT+STKENV=d30782020181900102 The customer selects the second item of the STK menu. +STKENV: 0 OK The modem side executes AT+STKENV successfully. +STKPCI:D03F810301130082028183850D8077ED4FE153D190014E2D20268B 25010008810156151000041A4F544156312E3098681081082205148622084906 103027262660 The SIM card requests to SEND SMS after the first item of the STK menu is selected. +STKPCI:D01A8103012101820281028D0F0877ED4FE153D190016210529FFF 01 The SMS is sent successfully.
Remarks	<sat_command>: The structure of envelope command, is specified in GSM 11.14. AT+SPUSATENVECMD needs to be executed if the following STK functions is involved. MENU SELECTION USER ACTIVITY EVENT DOWNLOAD IDLE SCREEN AVAILABLE EVENT DOWNLOAD LANGUAGE SELECT EVENT DOWNLOAD BROWSER TERMINATION EVENT DOWNLOAD DATA AVAILABLE EVENT DOWNLOAD CHANNEL STATUS EVENT DOWNLOAD

13.4 Setting up an STK Call: +STKCALL

Description	The application side responses to SETUP CALL on whether to receive the STK call
Format	• AT+STKCALL=<n> • AT+STKCALL=?
Parameter	<n>: 0: Reject the call. 1: Receive the call.
Return Value	<CR><LF>OK<CR><LF>
Example	<pre>+STKPCI:D02281030110018202818385084475726174696F6E8609911032042143651C2C8402010A</pre> The modem reports the setup call command. <pre>AT+ STKCALL=1</pre> The modem starts a call after the user of the application side presses the enter key to agree to set up a call. The terminal response is returned by the modem. <pre>OK</pre> OK is returned by the modem, indicating that AT+STKENV is executed successfully.
Remarks	• Pre-operation before the AP side starts a call. • If the SIM card requests to hold one previous call, the AP side will send AT+SPUSATCALLSETUP=1 to hold the call and send AT+SPUSATCALLSETUP=1 again after the call is held successfully. • If the call fails to be hold, the terminal response will be returned by the AP side using AT+SPUSATTERMINAL. • Terminal response will be returned by the modem after the AP side sends AT+SPUSATCALLSETUP=1. The re-dial operation and the relevant timeout mechanism is processed in the modem if the SIM requests to dial again.

14 Ali MQTT Commands

14.1 Device Authentication Information (East China Site 2): +CLOUDHDAUTH

Description	Device authentication information	
Format	• AT+ CLOUDHDAUTH=<productKey> ,<deviceName>,<deviceSecret><CR> • AT+CLOUDHDAUTH<CR> • AT+CLOUDHDAUTH?<CR>	
Parameter	<productKey>: Product key, mandatory, character string, maximum length of 11 bytes <deviceName>: Device name, mandatory, character string, maximum length of 32 bytes <deviceSecret>: Device key, mandatory, character string, maximum length of 32 bytes	
Return Value	After the authentication is started, OK is returned to indicate legal input and then authentication result is returned. + CLOUDHDAUTH: OK The device was authenticated successfully. + CLOUDHDAUTH: FAIL The device failed to authenticate. Query the authentication parameters: ProductKey= product key DeviceName= device name DeviceSecret= device key OK	
Example	<pre>AT+ CLOUDHDAUTH=kfOZFbrf,Ndevice_T1,Bd PNgkKXcMP6WnCQucnLXigThPn5i9fr OK +CLOUDHDAUTH: OK AT+CLOUDHDAUTH? ProductKey=J5VSBJMed74 DeviceName=TEST_0 DeviceSecret=AchwwtoDacnYdyq5hoi21fO 6IQXYke10 OK</pre>	The device is authenticated successfully. The authentication parameters are saved to NV after the device is authenticated successfully. The authentication parameters are returned after querying.

Remarks	- After the device is authenticated successfully using parameters, <productKey>, <deviceName>, and <deviceSecret> are saved in the NV area and the device can be authenticated by executing AT+CLOUDHDAUTH. - This command is applicable to Ali East China site 2.
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14.2 Configuring MQTT Connection Parameters: +CLOUDCONN

Description	To configure MQTT connection parameters, including the keepalive time of MQTT and server, clean session information, and MQTT version.	
Format	AT+CLOUDCONN=< keepAlive >,<clean>,<version><CR>	
Parameter	<keepAlive>: keepAlive time setting, mandatory, ranging from 60 to 180 seconds. <clean>: whether to clean session, digit type, 0-Not clean; 1-Clean <Version>: MQTT version, 3 = 3.1; 4 = 3.1.1	
Return Value	See the Example	
Example	AT+CLOUDCONN=60,0,4 OK	Connect to the MQTT server successfully.
Remarks	After the connection to the MQTT server is set up successfully, developers can call the +CLOUDSUB command to register the default topic /pk/\${deviceName}/get of each device and custom topics.	

14.3 Subscription: +CLOUDSUB

Description	To subscribe to messages. Only one subscription can be added at once.	
Format	AT+CLOUDSUB=<topic>,<qos><CR>	
Parameter	<topic>: Topic to subscribe to, character string type <Qos>: QoS grade of the topic, digit, 0-1	
Return Value	After the subscription is successful, +CLOUDSUBACK: OK After the subscription fails, +CMD ERROR: <code> Code: -1 Non-existent MQTT device pointer	

	Code: -2 Failed MQTT SUB/PUB/UNSUB
	Code: -3 ACK to MQTT server times out (Qos>0)
	Code: -4 MQTT server publishes invalid topics
	Code: -5 The received message published by MQTT server is too large
Example	AT+CLOUDSUB=/1000146090/Ndevice_ T1/neo001,1 OK Subscribe to the topic successfully.
	+CLOUDSUBACK: <OK>
	AT+CLOUDSUB=/1000146090/Ndevice_ T1/neo001,1 OK Fail to subscribe to the topic. ACK timed out.
Remarks	+ CMD ERROR: <-3>
	AT+CLOUDSUB=/1000146090/Ndevice_ T1/neo001 ERROR The number of parameters were incorrect.
	- When subscribing to a topic, the time to get ACK from the service is 10 seconds. If the device does not receive ACK within 10 seconds, the subscription times out. - The length of the topic does not exceed 128 bytes.

14.4 PUBLISH Data:

+CLOUDPUBLISH\+PUBLISHDEFAULT

Description	Publish data received after subscribing to a topic
Format	+CLOUDPUBLISH:<packId>,<topic>,<msg_len>,<msg> +PUBLISHDEFAULT:<packId>,<topic>,<msg_len>,<msg>
Parameter	<packId>: Data packet ID <Topic>: Name of the topic received <Msg_len>: Length of message received <Msg>: Content of message received
Return Value	See the example.
Example	+PUBLISHDEFAULT: 24760,/1000146090/Ndevice_T1/neo001,5,hello Receive published data
	+CLOUDPUBLISH: Receive published data (after

	24761,/1000146090/Ndevice_T1/neo001,5,hello subscribing to a topic using +CLOUDSUB)
Remarks	- If a topic is not subscribed to by using +CLOUDSUB, the publish data for this topic is displayed as +PUBLISHDEFAULT: <packId>,<topic>,<msg_len>,<msg>. Otherwise, the publish data is displayed as + CLOUDPUBLISH: <packId>,<topic>,<msg_len>,<msg>

14.5 Publishing: +CLOUDPUB

Description	To publish messages, specifying topic, QoS, and message content.	
Format	AT+CLOUDPUB=<topic>,<qos>,<message><CR>	
Parameter	<Topic> : Publish topic <Qos> : QoS of publish message <Msg> : Message content, maximum length of 1024 bytes	
Return Value	After the subscription is successful, +CLOUDPUBACK: <OK> After the subscription fails, +CMD ERROR: <code>	
Example	AT+CLOUDPUB=/1000146090/Ndevice_T1/ neo001,1,hello OK	Successful
	AT+CLOUDPUB=/1000146090/Ndevice_T1/ neo001,1,hello + CMD ERROR: <-3>	Fail to publish message. ACK timed out.
	AT+CLOUDPUB=/1000146090/Ndevice_T1/ neo001,1 ERROR	The number of parameters is incorrect.
Remarks	- If the body of the message has a comma in English, you must include the message body in double quotation marks. - When publishing message, the time to get ACK from the service is 30 seconds. If the device does not receive ACK within 10 seconds, the subscription times out.	

14.6 Publish Topics: +CLOUDPUBMSG

Description	To publish long messages or non-character string message by specifying retained, qos, topic, and message length	
Format	AT+CLOUDPUBMSG=<topic>,<qos>,<msg_length><CR>	
Parameter	<topic>: topic to be published <qos>: quality of service <msg_length>: Length of will messages, maximum 10240 bytes. After the UART returns >, input message content of the specified length.	
Return Value	After the subscription is successful. +CLOUDPUBACK: <OK> After the subscription fails, +CMD ERROR: <code>	
Example	<pre>AT+CLOUDPUBMSG=/J5VSBJMed74/TES T_0/neo00,1,10 > OK</pre>	Successful
	<pre>+CLOUDPUBACK: <OK> +CLOUDPUBLISH: 42069,/J5VSBJMed74/TEST_0/neo00,10,77 77777777</pre>	
	<pre>AT+CLOUDPUBMSG=/J5VSBJMed74/TES T_0/neo00,1,10 > +CLOUDPUBMSG: Timeout!</pre>	Times out
Remarks	The timer of publish message input is 30 seconds.	

14.7 Cancelling the Subscription: +CLOUDUNSUB

Description	To unsubscribe. Only one subscription is canceled at once.	
Format	AT+CLOUDUNSUB=<topic><CR>	
Parameter	<topic> : topic of the cancelled subscription, character string type	
Return Value	After the subscription is successful, OK After the subscription fails, ERROR	

Example	AT+CLOUDUNSUB=/1000146090/Ndevice_ T1/neo001 OK	Cancel the subscription to the topic successfully.
	+CLOUDUNSUBACK: <OK>	
Remarks	AT+CLOUDUNSUB ERROR	The number of parameters is incorrect.
	N/A	

14.8 Disconnecting to the MQTT Server: +CLOUDDISCONN

Description	To disconnect to the MQTT server and release resources	
Format	AT+CLOUDDISCONN<CR>	
Parameter	N/A	
Return Value	See the example.	
Example	AT+CLOUDDISCONN OK	Disconnect to the MQTT server and released resources.
Remarks	The device disconnects to the MQTT server proactively and releases the MQTT resources. To publish messages after disconnecting, set up the connection again.	

14.9 Querying the MQTT Connection Status: +CLOUDSTATE

Description	To query the status of the MQTT connection.	
Format	AT+CLOUDSTATE?<CR>	
Parameter	N/A	
Return Value	+CLOUDSTATE:0: Disconnected to the MQTT server +CLOUDSTATE:1: Connected to the MQTT server	

Example	AT+CLOUDSTATE? +CLOUDSTATE: 1 OK	The device is connected to the MQTT server.
Remarks	- The device sends ping packets to the MQTT server by default. If the server does not respond with ACK, the device automatically reconnects to the server. Developers can also send this command to check the connection status and decide whether to reconnect automatically after detecting disconnection. - To reconnect manually, execute +MQTTDISCONN to release resources and execute +MQTTDISCONN to set up a new connection.	

14.10 Device authentication (Unique-certificate-per-product): +CLOULDXMAUTH

Description	Device authentication, to write the unique-certificate-per-product parameters	
Format	- AT+CLOULDXMAUTH[=<PRODUCT_KEY>,<PRODUCT_SECRET>,<DEVICE_NAME>]<CR> - AT+CLOULDXMAUTH?<CR> <CR><LF>+CLOULDXMAUTH: <STATUE><CR><LF>	
Parameter	<PRODUCT_KEY>: product KEY (unique value), obtains through the cloud platform <PRODUCT_SECRET>: product secret (unique value), obtains through the cloud platform <DEVICE_NAME>: character string type, device name (user-defined), obtains through the cloud platform <STATUE>: Authentication status OK: authentication is successful. FAIL: authentication is failed.	
Return Value	- Setting commands AT+CLOULDXMAUTH[=<PRODUCT_KEY>,<PRODUCT_SECRET>,<DEVICE_NAME>]<CR> <CR><LF>OK<CR><LF> <CR><LF>+CLOULDXMAUTH: <STATUE><CR><LF> - Querying commands AT+CLOULDXMAUTH?<CR> <CR><LF>+CLOULDXMAUTH:<PRODUCT_KEY>,<PRODUCT_SECRET>,<DEVICE_NAME><CR><LF> <CR><LF>OK<CR><LF>	
Example	AT+CLOULDXMAUTH="a1ExpAkj9Hi","ffFn FIKQW3HYjjPR","Example_dyn1"	Write the unique-certificate-per-product authentication, reporting that

	OK	the authentication is successful.
	+CLOUDXMDAUTH: OK	
	AT+CLOUDXMAUTH="a1ExpAkj9Hi","ffFnFIKQW3HYjjPR","Example_dyn1" OK	Write the unique-certificate-per-product authentication, reporting that the authentication is failed.
	+CLOUDXMAUTH: FAIL	
	AT+CLOUDXMAUTH? +CLOUDXMAUTH:"a1ExpAkj9Hi","ffFnFIKQW3HYjjPR","Example_dyn1" OK	Query the written unique-certificate-per-product authentication parameter.
Remarks	- The settings by this command are saved after the module is powered off. AT+CLOUDXMAUTH can be executed directly after first write. - Applicable to non-ICA command. - This command supports the authentication of East China Site 2.	

14.11 Setting the Way of Getting Publish Messages: +CLOUDPUBMODE

Description	To set the way of getting publish messages
Format	- AT+CLOUDPUBMODE=<MODE1>[,<MODE2>]<CR> - AT+CLOUDPUBMODE?<CR>
Parameter	<MODE1>: mode of getting publish messages 0: proactively report (default) 1: buffer 2-99: reserved <MODE2>: switch of reporting the indicator of incoming data, only valid in buffer mode 0: disable (default) 1: enable
Return Value	Execution command AT+CLOUDPUBMODE=<MODE1>[,<MODE2>]<CR> <CR><LF>OK<CR><LF> Or Querying commands AT+CLOUDPUBMODE=?<CR>

	<CR><LF>+CLOUDPUBMODE:<MODE1>[,<MODE2>]<CR><LF> <CR><LF>OK<CR><LF>	
Example	AT+CLOUDPUBMODE=1,0 OK	Set buffer mode. The indicator of the incoming data is not reported.
	AT+CLOUDPUBMODE? +CLOUDPUBMODE: 1,0 OK	Buffer mode is queried. The indicator of the incoming data is not reported.
	Remarks	Applicable to non-ICA command product.

14.12 Reading the Publish Message in Buffer Mode: +CLOUDPUBLISH

Description	To read the publish data that is received after subscribing to a topic from the cache	
Format	- AT+CLOUDPUBLISH<CR> +CLOUDPUBLISH:<n><CR>	
Parameter	<n>: 0: indicator of the incoming package 1-99: reserved 1-99: reserved <packId>: packet ID <topic>: topic name of the received message <message_len>: the length of the data received <msg>: data received	
Return Value	Execution command AT+CLOUDPUBLISH<CR> <CR><LF>+CLOUDPUBLISH: <packId>,<topic>,<msg_len>,<msg><CR><LF> <CR><LF>OK<CR><LF> Or Enable proactive report. Report the indicator when data arrives. <CR><LF>+CLOUDPUBLISH: <n><CR><LF>	
Example	AT+CLOUDPUBMODE=1,1 OK	Set buffer mode. Unsolicited report the indicator when data arrives.
	+CLOUDPUBLISH: 0	Publish the incoming data
	AT+CLOUDPUBLISH	

Remarks	+CLOUDPUBLISH:24761,/1000146090/N device_T1/neo001,5,hello	Read the publish data.
	OK	
	AT+CLOUDPUBMODE=1,0 OK	Set buffer mode. The indicator of the incoming data is not reported.
	AT+CLOUDPUBLISH OK	Fail to read data.
	AT+CLOUDPUBLISH +CLOUDPUBLISH:24761,/1000146090/N device_T1/neo001,5,hello	Read data successfully.
Remarks	OK	
	• Only one package of data is cached currently. If cached data is existed, it will be updated when the module receives data from the platform again. • OK is returned only when data read is failed. • The cache is cleared after the module is powered off. • Applicable to the non-ICA product.	

15 MQTT Commands

15.1 Configuring TLS Parameters: +MQTTTSL

Description	To configure MQTT TLS parameters	
Format	- AT+MQTTTSL=<type>,<value><CR> - AT+MQTTTSL?<CR> - AT+MQTTTSL=?<CR>	
Parameter	type : parameter type type_name : parameter value	
Return Value	<CR><LF>OK<CR><LF> Or <CR><LF>+ MQTTTSL: <type>,<type_name> Or <CR><LF>+ MQTTTSL: <sslmode>,<authmode>,<rootca _name>,<clientcert _name>,<clientkey _name>	
	sslmode : secure encryption mode authmode : authentication mode rootca : CA certificate clientcert : client certificate clientkey : client key type_name : value of the parameter type: Authmode: 0: verify optional 1: verify required sslmode: 0: not authentication 1: authentication rootca : string, CA certificate clientcert : string, the certificate of client clientkey : string, the key of client	
Example	AT+MQTTTSL=authmode,1 OK	Set authentication mode to verify required.

Remarks	AT+MQTTTTL?	
	+MQTTTTL: 1,1,ca.pem,cc.pem,ck.pem	Query the current SSL settings.
	OK	
Remarks	AT+MQTTTTL=?	Query the value range of the parameters.
	+MQTTTTL: <type>,<type_name>	
	Send AT+CERTADD to import certificates.	

15.2 Setting User Parameter: +MQTTCONNPARAM

Description	To set ID, user name and password	
Format	AT+MQTTCONNPARAM=<clientId>,<username>,<password><CR>	
Parameter	<"cliendID">: device ID, 256 bytes at most <"username">: user name, 512 bytes at most <"password">: password, 256 bytes at most	
Return Value	<CR><LF>OK<CR><LF>	
Example	AT+MQTTCONNPARAM="C_201801021127", neoway02test/thing01","0lSoY/eYnlSqUeAsbAKKQ/AC mipZwEw9H7Ff0h1kOps="	Parameters are set successfully.
Remarks	Parameters above for reference only	

15.3 Will Settings: +MQTTWILLPARAM

Description	To set will parameters	
Format	AT+MQTTWILLPARAM=<retained>,<qos>,<topicname>,<message><CR>	
Parameter	<retained>: retain mark, digit type, 0 and 1 <qos>: quality of service, only 0,1 and 2 are supported <"topicname">: topic, 128 bytes at most <message>: Will Message, max. 1024 bytes	
Return Value	<CR><LF>OK<CR><LF>	
Example	AT+MQTTWILLPARAM=0,1,"neoway02",byby OK	The will is set successfully.
Remarks	N/A	

15.4 Setting Long Will Messages: +MQTTWILLMSG

Description	To set long will messages or will messages of non-character string by specifying retained, qos, topic, and message length	
Format	AT+MQTTWILLMSG =<retained>,<topic>,<qos>,<msg_length><CR>	
Parameter	<retained> : retain mark, digit type, 0 and 1 <topic> : Publish topic <qos> : QoS of publish message <willmsg_length> : Length of will messages, maximum 10240 bytes. After the UART returns >, input message content of the specified length.	
Return Value	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>	
Example	AT+MQTTWILLMSG =1,1,"neoway02",10 > OK	Set will message. Successfully
	AT+MQTTWILLMSG=1,1,"neoway02",10 > +MQTTWILLMSG: Timeout!	Set will message. Failed
Remarks	If the message is not input completely within 30 seconds, the UART returns timeout.	

15.5 Connection command: +MQTTCONN

Description	To connect to the MQTT server	
Format	AT+MQTTCONN=<host>,<clean>,<keep_alive><CR>	
Parameter	<"host"> : Server address (URL:port) <clean> : whether to clean session, digit type, 0-Not clean (by default) 1-Clean <Keep_alive> : keepAlive time, ranging from 20 to 180, unit: second	
Return Value	<CR><LF>OK<CR><LF>	
Example	AT+MQTTCONN=121.43.166.63:1883,0,60 OK	Connect to the MQTT server Successfully
Remarks	N/A	

15.6 Subscription: +MQTTSUB

Description	To subscribe a topic	
Format	AT+MQTTSUB=<topicname>,<qos><CR>	
Parameter	<topicname>: Topic to subscribe to, 128 bytes at most <qos>: quality of service, only 0,1 and 2 are supported	
Return Value	<CR><LF>OK<CR><LF>	
Example	AT+MQTTSUB="neoway02",1 OK	Subscribe to the topic successfully.
	+MQTTSUB:9,"neoway02",11,neoway mqtt	The server issues the topic retained last time.
	AT+MQTTSUB= neoway02,1 OK	Subscribe to the topic successfully
Remarks	N/A	

15.7 Cancelling the Subscription: +MQTTUNSUB

Description	To cancel the subscription to a topic	
Format	AT+MQTTUNSUB=<topicname><CR>	
Parameter	<"topicname">: topic to unsubscribe to, 128 bytes at most.	
Return Value	<CR><LF>OK<CR><LF>	
Example	AT+MQTTUNSUB="neoway02" OK	Cancel the subscription to a topic
Remarks	N/A	

15.8 Publishing Topic: +MQTTPUB

Description	To publish a topic	
Format	AT+MQTTPUB=<retained>,<qos>,<topicname>,<message><CR>	
Parameter	<retained>: retain mark, digit type, 0 and 1 <qos>: quality of service, only 0,1 and 2 are supported	

	<"topicname">: topic, 128 bytes at most <message>: Will Message, 1024 bytes at most	
Return Value	<CR><LF>OK<CR><LF>	
Example	AT+MQTTPUB=1,1,"neoway02", neoway mqtt OK	The topic is published successfully
	AT+MQTTPUB=1,1,"neoway02", neoway mqtt OK +MQTTSUB:5,"neoway02",11, neoway mqtt	The topic is published successfully and the server issues the topic at the same time
Remarks	N/A	

15.9 Publishing Topic: +MQTTPUBS

Description	To publish long messages or non-character string message by specifying retained, qos, topic, and message length	
Format	AT+MQTTPUBS =<retained>,<qos>,<topic>,<msg_length><CR>	
Parameter	<retained>: retained mark, digit type, 0 and 1 <qos>: quality of service, 0 and 1 are supported <topic>: topic to be published <msg_length>: the length of message published, 10240 bytes at most	
Return Value	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>	
Example	AT+MQTTPUBS=1,1,"lixtopic",10 > OK	Successful
	AT+MQTTPUBS=0,1,"lixtopic",12 > +MQTTPUBS: Timeout!	Times out
Remarks	The timer of publish message input is 30 seconds.	

15.10 Disconnecting to the MQTT Server: +MQTTDISCONN

Description	To disconnect to the MQTT server and release resources	
Format	AT+MQTTDISCONN<CR>	
Parameter	N/A	
Return Value	<CR><LF>OK<CR><LF>	
Example	AT+MQTTDISCONN OK	Close the MQTT socket.
Remarks	- The device disconnects to the MQTT server proactively and releases the MQTT resources. - To publish messages after disconnecting, set up the connection again.	

15.11 Receiving Topic Content: +MQTTSUB

Description	To receive the topic content sent by the server.	
Format	+MQTTSUB=<message_id>,<"topicname">,<message_len>,<message><CR>	
Parameter	<message_id> : message ID <"topicname"> : topic name <message_len> : the length of the data received <message> : data received	
Return Value	See the example.	
Example	+MQTTSUB:1,"neoway02",5,12345	Receive messages published by the topic subscribed to
Remarks	Topicname must be marked by quotation marks.	

15.12 Querying MQTT Connection Status: +MQTTSTATE

Description	To query the status of the MQTT connection.	
Format	AT+MQTTSTATE?<CR>	
Parameter	N/A	

Return Value	See the example.	
Example	AT+MQTTSTATE? +MQTTSTATE: 1 OK	Query the MQTT connection status 1 means the device is connected to the MQTT server
	AT+MQTTSTATE? +MQTTSTATE: 0 OK	Query the MQTT connection status 0 means the device is disconnected to the MQTT server
Remarks	N/A	

16 Time Synchronization Command

16.1 Updating Time: +UPDATETIME

Description	To update the module time to the network time	
Format	• AT+UPDATETIME=<mode>[,<serv_ip>,<time>[[,<TZ>][,<DST>]]]<CR> • AT+UPDATETIME?<CR> • AT+UPDATETIME=?<CR>	
Parameter	<mode>: 0: Query mode. Query when the time was updated to the network time last time. 1: Setting mode. Synchronize the time to the network time. <serv_ip>: The IP address of the time server, in form of xx.xx.xx.xx or domain name <time>: the timeout period, ranging from 1 to 30, unit: second <TZ>: Time zone, in format of E/W+digits; E8 by default E: east time zone, 0 to 13 W: west time zone, 0 to 12 0: Zero time zone <DST>: Daylight Saving Time 1: Select DST auto-adjustment 0: Not select (by default)	
Return Value	• No PPP Link • Time Updating, Please Wait... • Time Out • Time Data Is Null • Send Request Fail • Update To yyyy-mm-dd,hh:mm:ss • Last Update Time yyyy-mm-dd,hh:mm:ss • Domain Name Invalid • Socket Error	
Example	AT+UPDATETIME=0	
	+UPDATETIME: Last Update Time 2014-03-31, 11:10:26	Query when the time was updated last time.
	OK	
	AT+UPDATETIME=0	
Example	+UPDATETIME: Last Update Time 0000-00-00, 00:00:00	Query when the time was updated last time.
	OK	
		The time was not updated.
	AT+UPDATETIME=1,210.72.145.44,10	Set up a PPP link.

+UPDATETIME: No PPP Link		
AT+UPDATETIME=1,210.72.145.44,10 OK	Time Updating,Please Wait...	Update the time to that of the server 210.72.145.44. Timeout period is 10 seconds. East time zone 8 by default No DST
+UPDATETIME: Time Out		
AT+UPDATETIME=1,128.138.141.172,10,"E8",0 OK	Time Updating,Please Wait...	Update the time to that of the server 128.138.141.172. Timeout period is 10 seconds. East time zone 8 by default No DST
+UPDATETIME: Update To 2014-03-31,11:32:55		
Time is updated successfully.		
AT+UPDATETIME=1,time.windows.com,10,"W12",1 OK	Time Updating,Please Wait...	Update time to that of time.windows.com. Timeout period is 10 seconds. Select west time zone 12. Select DST.
+UPDATETIME: Update To 2014-04-12,15:17:48		
Time is updated successfully.		
AT+UPDATETIME=1,128.138.141.172,10,"W12",1 OK		Time update request sending fails. The reason probably is bad network connection or inability to support time update.
+UPDATETIME: Send Request Fail		
AT+UPDATETIME=1,time.windows.com,10,"W12",1 +UPDATETIME: Domain Name Invalid		The domain name is invalid. The possible reason is the SIM (USIM) card is out of credit.
AT+UPDATETIME=1,time.windows.com,10,"W12",1 OK		Socket error. The possible reason might be network congestion.
+UPDATETIME: Socket Error		
AT+UPDATETIME? +UPDATETIME: 128.138.141.172,10,"E8",0 OK		Query the IP address of the server to which the time is updated and the timeout period, time zone, and

Remarks		DTS.
	AT+UPDATETIME=? +UPDATETIME: (0-1),,(1-30),,(0-1) OK	Query the value range of parameters.
	• The settings by this command are not saved after the module is powered off. • Set up a PPP link (AT+XIIC=1) before sending this command. • Send AT+CCLK? to query whether RTC is synchronized to the current network time after this command is sent successfully. • Currently the following time servers support time update: time.windows.com, time.nist.gov, etc.	

17 File System Commands

17.1 Writing Data to File: +FSWF

Description	To write data to a file	
Format	AT+FSWF=<file_name>,<mode>,<size>,<time><CR>	
Parameter	<file_name>: File name, at most 50 characters <mode>: mode 0: If the file already exists, new data is written to the start of the file and then it will overwrites original data. 1: If the file already exists, new data is written to the end of the file. <size>: Data size, ranging from 0 to 16384, unit: byte <time>: timeout period, ranging from 0 to 60000, unit: ms	
Return Value	<CR><LF>+FSWF: Timeout!<CR><LF>	
	<CR><LF>OK<CR><LF>	
	<CR><LF>ERROR<CR><LF>	
Example	AT+FSWF="test.txt",1,1024,10000 >	Write 1024-byte data to the test.txt file. For example, start012...
	OK	The command is executed successfully.
	AT+FSWF="test.txt",1,1024,10000 >	Write 1024-byte data to the test.txt file.
	+FSWF: Timeout!	The command times out after 10 seconds.
	AT+FSWF="test.txt",1,1024,60001 ERROR	ERROR is returned because the set value exceeds the parameter range.
	AT+FSWF="/sdcard/test.txt",1,10,60000 >	Write data to the test.txt file in SD card.
Remarks	OK	
	- The data to be written cannot exceed the threshold of the <size> value. - The user file space is 512 KB, that is, the total size of files stored, cannot exceed 512 KB. - If SD card is supported, include /sdcard in file name to operate files in the SD card.	

17.2 Reading Data from File: FSRF

Description	To read data from a file	
Format	AT+FSRF=<file_name>,<mode>,<size>[,<position>]<CR>	
Parameter	<file_name>: File name, at most 50 characters <mode>: mode 0: Read data from the beginning of the file. 1: Read data from the <position> of the file. <size>: data size, not exceed the size of the file, 0 is valid <position>: the position in the file, where data to be read starts, valid when <mode> is set to 1, 0 is invalid	
Return Value	See the Example	
Example	AT+FSRF="test.txt",0,10 +FSRF: 10,start01234 OK	Read 10-byte data from the beginning of the test.txt file.
	AT+FSRF="test.txt",0,0 +FSRF: 0, OK	Read 0-byte data from the beginning of the test.txt file.
	AT+FSRF="test.txt",0,1025 ERROR	ERROR is returned because <size> exceeds the file size.
	AT+FSRF="test.txt",1,20,2 +FSRF: 20,tart0123456789012345 OK	Read 20-byte data from the second byte of the test.txt file. The data is read successfully.
	AT+FSRF="test.txt",1,0,2 +FSRF: 0, OK	Read 0-byte data from the second byte of the test.txt file.
	AT+FSRF="test.txt",1,10,0 ERROR	ERROR is returned because the set value exceeds the parameter range.
	AT+FSRF="/sdcard/test.txt",0,10 +FSRF: 10,start01234 OK	Read data from test.txt in SD card.
Remarks	- The data to be read should not exceed the size of the file. <size> and <position> is determined by the file size. - If SD card is supported, include /sdcard in file name to operate files in the SD card.	

17.3 Deleting a File: +FSDF

Description	To delete a file	
Format	AT+FSDF=<file_name><CR>	
Parameter	<file_name>: File name, at most 50 characters	
Return Value	See the Example	
Example	AT+FSDF="test.txt" OK	Delete the test.txt file.
	AT+FSDF="123.txt" ERROR	Delete the 123.txt file. ERROR is returned because the file does not exist.
	AT+FSDF=/sdcard/1.txt OK	Delete 1.txt from SD card
Remarks	If SD card is supported, include /sdcard in file name to operate files in the SD card.	

17.4 Obtaining File List: +FSLIST

Description	To obtain the list of files in the file system	
Format	AT+FSLIST?<CR>	
Parameter	N/A	
Return Value	N/A	
Example	AT+FSLIST? i.amr,6181 file.txt,6000 OK	File name before comma File size after comma
	AT+FSLIST? OK	No file in the file system
	AT+FSLIST=/sdcard/dir OK	Query file list in /sdcard/dir
Remarks	If SD card is supported, include /sdcard in file name to operate files in the SD card.	

17.5 Obtain the Size of a File: +FSFS

Description	To obtain the size of a file	
Format	AT+FSFS=<file_name><CR>	
Parameter	<file_name>: File name, at most 50 characters	
Return Value	See the Example	
Example	AT+FSFS="test.txt" +FSFS: 1024 OK	Obtain the size of the test.txt file. The size is 1024 bytes.
	AT+FSFS="123.txt" ERROR	Obtain the size of the 123.txt file. ERROR is returned because the file does not exist.
	AT+FSFS="/sdcard/1.txt" +FSFS: 10 OK	Obtain the size of the 1.txt file in SD card.
Remarks	If SD card is supported, include /sdcard in file name to operate files in the SD card.	

17.6 Obtaining the Remaining Storage Size of User Disk: FSLS

Description	To obtain the remaining storage size of user disk	
Format	AT+FSLS?<CR>	
Parameter	N/A	
Return Value	See the Example	
Example	AT+FSLS? +FSLS: 48128 OK	Query the remaining storage size of the user disk. The remaining storage size is 48128 bytes, that is, 127 data blocks (512 bytes/block)
	AT+FSLS? +FSLS: DiskInfo Not Right!	The disk is not ready.
	AT+FSLS="/sdcard" +FSLS: 1535345345 OK	Check the remaining size of SD card

Remarks

- The total size of user disk is 64 Kb.
- Every 1- to 512-byte data occupies one data block (512 bytes). For example, the total file size in the disk is 100 bytes, and then the actual remaining size is 65436 (65536 minus 100). But the return value of +FSLS is 65024 (65536 minus 512) bytes.
- If SD card is supported, include /sdcard in file name to operate files in the SD card.

17.7 Formatting User Disk:+FSFAT

Description	To format user disk	
Format	AT+FSFAT<CR>	
Parameter	N/A	
Return Value	See the Example.	
Example	AT+FSFAT OK	Format user disk.
	AT+FSLS? +FSLS: 65536 OK	The remaining size of the user disk is 65536 bytes.
	AT+FSFAT ERROR	ERROR is returned because user disk is not ready.
	AT+FSFAT=/sdcard OK	Format SD card
Remarks	If SD card is supported, include /sdcard in file name to operate files in the SD card.	

18 GSM Location Command

18.1 Obtaining the Location of the Module:

Description	To obtain the location information of the module.
Format	- AT+CIPGSMLOC<CR> - AT+CIPGSMLOC=<n><CR>
Parameter	<n>: request selection 0: close location request(default) 1: multi-BS positioning request(reserved)
Return Value	<CR><LF>+CIPGSMLOC: <fail_string><CR><LF> <fail_string>: prompt code that is used to request failure <fail_string>: CONTACT FAIL LINK FAIL LINK NOT FREE
	<CR><LF>OK<CR><LF> <CR><LF>+CIPGSMLOC: {<result_string>} <CR><LF>+CIPGSMLOC: OK<CR><LF> <result_string>: string including longitude and latitude
	<CR><LF>OK<CR><LF> <CR><LF>+CIPGSMLOC: <code><CR><LF> <CR><LF>+CIPGSMLOC: FAIL<CR><LF> <code>: return code after request is submitted successfully but not longitude or latitude information is returned. 401: No right 400: error occurs during request parsing. 404: legal request, but the queried BS is not included. 408: parsing times out. 500: internal error of server
	<CR><LF>OK<CR><LF> <CR><LF>+CIPGSMLOC: TIMEOUT<CR><LF>

Example	AT+CIPGSMLOC OK +CIPGSMLOC:{"location":{"lat":34.2062006,"lng":108.836387},"accuracy":550.0} +CIPGSMLOC: OK	BS positioning request is executed successfully. The module reports location coordinates.
	AT+CIPGSMLOC +CIPGSMLOC: LINK FAIL	The connection to the server fails to be set up.
	AT+CIPGSMLOC OK +CIPGSMLOC: 404 +CIPGSMLOC: FAIL	The location request is sent successfully, but the queried BS is not included.
	AT+CIPGSMLOC GPRS DISCONNECTION	PPP is not enabled.
	AT+CIPGSMLOC=1 OK	Reserved. OK is returned directly.
	AT+CIPGSMLOC +CIPGSMLOC: LINK FAIL	The connection to the server fails to be set up.
	AT+CIPGSMLOC OK AT+CIPGSMLOC +CIPGSMLOC: LINK NOT FREE	Request BS positioning. Last request has not been responded.
	AT+CIPGSMLOC=0 OK +CIPGSMLOC:{"location":{"lat":34.2062006,"lng":108.836387},"accuracy":550.0} +CIPGSMLOC: OK	Request single BS positioning in standard mode is executed successfully. The module reports its location coordinates.
Remarks	- The obtained location information is the GPS coordinates. - If the server does not reply in 10 seconds after the request is submitted successfully, the module returns +CIPGSMLOC: TIMEOUT. - The current coordinates of latitude and longitude are valid and precision is reserved (0.0 by default). - Activate PPP before executing the command.	

19 Statistics on Data Traffic

19.1 Statistics on Total Data Traffic: +FLOWCALC

Description	To collect the statistics on total data bytes that the module transmits and receives	
Format	AT+FLOWCALC?<CR>	
Parameter	N/A	
Return Value	<CR><LF>+FLOWCALC: <rx_count>,<tx_count> <CR><LF>OK<CR><LF>	
	Rx_count: Total data the module received, unit byte Tx_count: Total data the module transmitted, unit byte	
	<CR><LF>ERROR<CR><LF>	
Example	AT+FLOWCALC? +FLOWCALC: 1355,1260 OK	Query the total data that the module transmitted and received.
	AT+FLOWCALC? +FLOWCALC: 0,0 OK	Query the total data that the module transmitted and received.
Remarks	This command supports only statistics on data that the module transmitted and received using external protocols since it was connected to the network last time.	

19.2 Statistics on Transient Traffic: +RATECALC

Description	To collect statistics on transient data bytes that the module transmits and receives within 100ms	
Format	AT+RATECALC?<CR>	
Parameter	N/A	
Return Value	<CR><LF>+RATECALC: <rx_count>,<tx_count> <CR><LF>OK<CR><LF>	
	<CR><LF>ERROR<CR><LF>	

Example	AT+RATECALC? +RATECALC: 1355,1260 OK	Query the total data that the module transmitted and received within 100ms.
	AT+RATECALC? +RATECALC: 0,0 OK	Query the total data that the module transmitted and received within 100ms.
Remarks	This command supports only statistics on data that the module transmitted and received using external protocols since it was connected to the network last time.	

20 Other Commands

20.1 Setting Network: ^SYSCONFIG

Description	To set system configurations
Format	- AT^SYSCONFIG=<mode>,<acqorder>,<roam>,<srvdomain><CR> - AT^SYSCONFIG?<CR>
Parameter	<mode>: Network mode 2: Auto selection 13: GSM 14: WCDMA 16: No change Other (this value cannot be set but can be queried) <acqorder>: Network access order 0: Auto 1: GSM, TD-SCDMA, LTE 2: TD-SCDMA, GSM, LTE <roam>: Roam 0: Not support 1: Roam 2: No change <srvdomain>: Domain setting 0: CS_ONLY 1: PS_ONLY 2: CS_PS 3: ANY 4: No change
Return Value	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> ^SYSCONFIG: <mode>,<acqorder>,<roam>,<srvdomain><CR><LF> <CR><LF>OK<CR><LF>
Example	AT^SYSCONFIG=13,2,1,2 OK AT^SYSCONFIG? ^SYSCONFIG: 2,2,0,2

	OK
Remarks	The queried parameter is 2 when the first parameter is 2 and the second parameter is 0. 3G networks are selected in auto selection mode in this situation.

20.2 Obtaining System Information: ^SYSINFO

Description	To obtain system information
Format	AT^SYSINFO<CR>
Return Value	N/A
Parameter	<CR><LF>^SYSINFO:<srv_status>,<srv_domain>,<roam_status>,<sys_mode>,<sim_state>[,<reserve>],<sys_submode>] <CR><LF> <CR><LF>OK<CR><LF> <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

	<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
Remarks	N/A

20.3 Reading ADC Value: +READADC

Description	To read the value from pins corresponding to the ADC channel	
Format	AT+READADC=<channel><CR>	
Parameter	<channel>: Integer, value is taken as 1, channel 0 of the ADC	
Return Value	See the Example	
Example	AT+READADC=1 +READADC:0,53 OK	Read the value from the pin corresponding to ADC 1.
	AT+READADC=3 ERROR	The parameter value is invalid.
Remarks	Refer to the pin description in hardware user guide (only channel 0 is set to the ADC channel in N51).	

20.4 Setting IP Address and Port for POWER FAIL Report: +URL

Description	To set the IP address and port to which POWER FAIL is reported POWER FAIL is 13-byte abnormality detect code.	
Format	- AT+URL=<domain>,<port><CR> - AT+URL?<CR>	
Parameter	<domain>: domain name or IP address <port>: port	
Return Value	<CR><LF>OK<CR><LF> <CR><LF>+URL: <domain>,<port> <CR><LF>OK<CR><LF>	
Example	AT+URL="58.60.184.213",11976 OK	Set IP address and port.
	AT+URL? +URL: "58.60.184.213",11976 OK	Query IP address and port.
Remarks	This command is used to Indian electricity metering.	

20.5 Setting Number to Set POWER FAIL Report: +SETSMSNUM

Description	To set a phone number from which SMS is sent to set POWER FAIL report	
Format	- AT+SETSMSNUM=n,[phone number]<CR> - AT+ SETSMSNUM?<CR>	
Parameter	<n>: 0: not parse SMS message, close PF TCP connection 1: parse all SMS messages received 2: parse SMS messages from a specified phone number <phone number> : phone number	
Return Value	<CR><LF>OK<CR><LF> <CR><LF>+ SETSMSNUM: n,<phone number> <CR><LF>OK<CR><LF>	

Example	AT+SETSMSNUM =2,13360518728 OK	Set IP address and port for POWER FAIL report through SMS messages sent from 13360518728. Send an SMS message URL:192.168.1.1,PORT:5000.
	AT+SETSMSNUM=1 OK	Set IP address and port for POWER FAIL report through SMS messages sent from any phone number
	AT+SETSMSNUM=0 OK	IP address and port for POWER FAIL report cannot be set through SMS messages
Remarks	This command is used to Indian electricity metering.	

20.6 FTP Upgrade: +FTPGETF

Description	To remotely upgrade the module firmware using FTP server.
Format	- AT+FTPGETF=<ip>,<port>,<mode>,<filename>,<user>[,<pwd>]<CR> - AT+FTPGETF?<CR>
Parameter	<ip>: FTP server address or domain name <port>: port ID of the FTP server, 21 <mode>: fixed to 0 <filename>: name of the file to be downloaded in the FTP server <user>: user account used to log in to the FTP server. The length of the user name cannot exceed 100 ASCII chars and the user name cannot contain comma (,). <pwd>: password for the account to log in to the FTP server. The length of the password cannot exceed 100 ASCII chars and the password cannot contain comma (,).
Return Value	<CR><LF>OK<CR><LF> <CR><LF>+FTPGETF:n <CR><LF>OK<CR><LF> OK: the AT command format is set properly. +FTPGETF: LOGIN OK: the module logs in to FTP server successfully. +FTPGETF: RATE, rate of the downloading progress after the module begins to download upgrading file. +FTPGETF: FILE END: the upgrading file is downloaded completely. +FTPGETF: ERROR EPSV: the server needs to support IPv6 if the module uses IPv6. +FTPGETF: ERROR PPP: PPP is disabled.

- **+FTPGETF: ERROR SOCKET:** the module obtains socket failed via FTP.
- **+FTPGETF: ERROR EVENT:** the module fails to set the socket attribute.
- **+FTPGETF: ERROR ADDR:** the module fails to establish an FTP connection through the IP address.
- **+FTPGETF: ERROR DOMAIN:** the module fails to establish an FTP connection through the domain name.
- **+FTPGETF: ERROR CONNECT:** the module fails to set up the FTP control connection
- **+FTPGETF: ERROR LOGIN:** the module fails to log in to the FTP server.
- **+FTPGETF: ERROR FSIZE:** the module fails to obtain the file size from the FTP server.
- **+FTPGETF: ERROR PASV:** the module fails to set up the FTP data connection.
- **+FTPGETF: ERROR HEADER:** verification for the downloading file header.
- **+FTPGETF: ERROR LENGTH:** verification for the downloading file length fails.
- **+FTPGETF: ERROR DISCONNECT:** FTP link disconnects exceptionally.
- **+FTPGETF: ERROR TIMEOUT:** the FTP connection expires and the module does not receive responses.

Query the return value of the commands:

n (ranging from 0 to 2):

0: idle

1: download is in progress

2: download is completed properly

+FTPGETF: 1,<total_size>,<length> is returned when the queried value of **n** is 1 (download is in progress).

<total_size>: total size of the upgrade package. Unit: byte.

<length>: downloading size of the upgrade package. Unit: byte.

Below is the unsolicited code of upgrade status after the module restarts.

- **FOTA START:** the module starts to upgrade.
- **FOTA SUCCESS:** the upgrade is successful.
- **FOTA FAIL num:** the upgrade is failed. num (sequence number) value ranges from 1 to 15. The customer does not need to be concerned with this number.

Example

AT+FTPGETF=58.60.184.213,11979,0,N51_E2F3 68_BZ_V001A.pkt,hzh,hzh	Set the parameters and start to download the upgrade package that needs to be stored locally.
AT+FTPGETF? +FTPGETF: 1,23653645,156320 OK	The download is in progress.156320 bytes out of a total 23653645 bytes is downloaded.
AT+FTPGETF? +FTPGETF: 2 OK	The download is completed, only one parameter.

Remarks

- Generate the upgrade package before upgrading and copy the upgrade file to

the FTP server.

- The upgrade is performed automatically after the module powered off and powered on. Power off and then power on the module, **POWER_KEY** should be kept low at the meantime.

20.7 Setting the DSN server: +DNSSERVER

Description	To set the primary and secondary DNS server.	
Format	• AT+DNSSERVER?<CR> • AT+DNSSERVER=<n>,<dns-ip><CR>	
Parameter	<n> : number of the DNS server, ranging from 1 to 2. 1: primary DNS server. 2: secondary DNS server. <dns -ip> : IP address of the DNS server.	
Return Value	See the example.	
Example	AT+DNSSERVER=1,8.8.8.8 +DNSSERVER:OK	Set the primary DNS server.
	AT+DNSSERVER? +DNSSERVER: dns1:8.8.8.8; dns2:8.8.9.9	Query the DNS server.
	AT+DNSSERVER=2,9.9.9.9 +DNSSERVER:OK	Set the secondary DNS server.
	AT+DNSSERVER? +DNSSERVER: dns1: 8.8.8.8; dns2: 9.9.9.9	Query the DNS server (IPv4)
	AT+DNSSERVER=1,2000::1:2345:6789:abcd +DNSSERVER:OK	Set the primary DNS server (IPv6)
	AT+DNSSERVER? +DNSSERVER: dns1:2000:0000:0000:0000:0000:0001:2345:6789	Query the DNS server (IPv6)
	AT+DNSSERVER? +DNSSERVER: dns1:2000:0000:0000:0000:0000:0001:2345:6789:abcd; dns2: 9.9.9.9	Query the DNS server (IPv4v6)
Remarks	• Generally, you do not need to set the DNS server manually. The base station controller assigns the DNS servers in the communicating process of PPP. The	

system uses the DNS servers assigned by the base station in preference.

- The IPv6 address of the DNS server must be set on the primary DNS server and the PPP connection must be established before address setting.
- The return value of querying DNS server is different. It depends on the current network type. The addresses of the primary and the secondary DNS server are both IPv4 address when the current network type is IPv4. The IPv6 address of the primary DNS server is returned when the current network is IPv6. The IPv6 address of the primary DNS server and the IPv4 address of the secondary server are returned when the current network type is IPv4v6.

20.8 Querying the Remaining Count of PIN/PUK: +CPINR

Description	To query remaining count of PIN/PUK for SIM unlock attempts	
Format	AT+CPINR=<sel_code><CR>	
Parameter	<sel_code>/<code>: string type, SIM PIN or SIM PUK <retries>: integer type, current remaining count of PIN/PUK <default_retries>: integer type, default count of PIN/PUK	
Return Value	<CR><LF>+CPINR: <code>,<retries>,<default_retries> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF> Or <CR><LF>+CME ERROR: <err><CR><LF>	
Example	AT+CPINR="SIM PIN"	
	+CPINR: SIM PIN,2,3 OK	The remaining count of PIN is 2
	AT+CPINR="SIM PUK"	
	+CPINR: SIM PUK,9,10 OK	The remaining count of PUK is 9
	AT+CPINR="SIM PIN"	
	ERROR	The SIM card is not identified.
Remarks	N/A	

20.9 Enabling/Disabling Statistics on SIM Card Write: +SIMCOUNTCTL

Description	To enable/disable statistics on SIM card write	
Format	• AT+SIMCOUNTCTL=<n><CR> • AT+SIMCOUNTCTL=?<CR> • AT+SIMCOUNTCTL?<CR>	
Parameter	n: to specify whether to enable statistics on SIM card write 0: disable (default) 1: enable	
Return Value	<CR><LF>OK<CR><LF> Or <CR><LF>+SIMCOUNTCTL: <n> Or <CR><LF>+SIMCOUNTCTL: (0-1)	
Example	AT+SIMCOUNTCTL=0 OK	Disable the statistics on SIM card write
	AT+SIMCOUNTCTL? +SIMCOUNTCTL: 0 OK	Query the setting of the statistics on SIM card write.
	AT+SIMCOUNTCTL=? +SIMCOUNTCTL: (0-1) OK	Query the value range of the parameters.
Remarks	Statistics on SIM card write is disabled by default. The setting by this command are not saved after the module is powered off	

20.10 +CLOUDPUB Reading the Statistics on SIM Card Write: +SIMCOUNTREAD

Description	To read the statistics on SIM card write.	
Format	• AT+SIMCOUNTREAD=<n><CR> • AT+SIMCOUNTREAD=?<CR> • AT+SIMCOUNTREAD?<CR>	
Parameter	n: to specify the operation 0: to read the statistics on SIM card write. 1: erase the statistics record	

Return Value	<CR><LF>+SIMCOUNTREAD: <count> Or <CR><LF>+SIMCOUNTREAD: (0-1)	
	<count>: times count of SIM card write	
Example	AT+SIMCOUNTREAD=0 +SIMCOUNTREAD: 13 OK	The module wrote to the SIM card for 13 times.
	AT+SIMCOUNTREAD +SIMCOUNTREAD: 13 OK	The module wrote to the SIM card for 13 times.
	AT+SIMCOUNTREAD=1 OK AT+SIMCOUNTREAD=0 +SIMCOUNTREAD: 0 OK	Erase the statistics record
	AT+SIMCOUNTREAD? OK	Query the setting.
	AT+SIMCOUNTCTL=? +SIMCOUNTCTL: (0-1) OK	Query the value range of the parameters.
	• Before powering off the module, read the statistics record and save it. • The records need to be backed up before the module is shut down.	
Remarks		

A Error Codes

AT+CMEE=<value> can be sent to set format in which errors are returned.

Table A-1 <value> description

<value>	Description
0	Disable return code of +CME ERROR.
1	Activate return code of +CME ERROR and use error codes.
2	Activate return code of +CME ERROR and use error description.

Table A-2 error codes and description of commands except SMS.

Table A-2 Error codes and description

Item	Error Code	Description
1	+CME ERROR:0	+CME ERROR: phone failure
2	+CME ERROR:1	+CME ERROR: no connection to phone
3	+CME ERROR:2	+CME ERROR: phone-adaptor link reserved
4	+CME ERROR:3	+CME ERROR: operation not allowed
5	+CME ERROR:4	+CME ERROR: operation not supported
6	+CME ERROR:5	+CME ERROR: PH-SIM PIN required
7	+CME ERROR:6	+CME ERROR: PH-FSIM PIN required
8	+CME ERROR:7	+CME ERROR: PH-FSIM PUK required
9	+CME ERROR:10	+CME ERROR: SIM not inserted
10	+CME ERROR:11	+CME ERROR: SIM PIN required
11	+CME ERROR:12	+CME ERROR: SIM PUK required
12	+CME ERROR:13	+CME ERROR: SIM failure
13	+CME ERROR:14	+CME ERROR: SIM busy
14	+CME ERROR:15	+CME ERROR: SIM wrong
15	+CME ERROR:16	+CME ERROR: incorrect password
16	+CME ERROR:17	+CME ERROR: SIM PIN2 required
17	+CME ERROR:18	+CME ERROR: SIM PUK2 required
18	+CME ERROR:20	+CME ERROR: memory full

19	+CME ERROR:21	+CME ERROR: invalid index
20	+CME ERROR:22	+CME ERROR: not found
21	+CME ERROR:23	+CME ERROR: memory failure
22	+CME ERROR:24	+CME ERROR: text string too long
23	+CME ERROR:25	+CME ERROR: invalid characters in text string
24	+CME ERROR:26	+CME ERROR: dial string too long
25	+CME ERROR:27	+CME ERROR: invalid characters in dial string
26	+CME ERROR:28	+CME ERROR: GPRS operation failure
27	+CME ERROR:29	+CME ERROR: GPRS send data failure
28	+CME ERROR:30	+CME ERROR: no network service
29	+CME ERROR:31	+CME ERROR: network timeout
30	+CME ERROR:32	+CME ERROR: network not allowed - emergency calls only
31	+CME ERROR:40	+CME ERROR: network personalization PIN required
32	+CME ERROR:41	+CME ERROR: network personalization PUK required
33	+CME ERROR:42	+CME ERROR: network subset personalization PIN required
34	+CME ERROR:43	+CME ERROR: network subset personalization PUK required
35	+CME ERROR:44	+CME ERROR: service provider personalization PIN required
36	+CME ERROR:45	+CME ERROR: service provider personalization PUK required
37	+CME ERROR:46	+CME ERROR: corporate personalization PIN required
38	+CME ERROR:47	+CME ERROR: corporate personalization PUK required
39	+CME ERROR:60	+CME ERROR: AT command discarded
40	+CME ERROR:62	+CME ERROR: SIM card reject by network
41	+CME ERROR:63	+CME ERROR: SIM card service not available
42	+CME ERROR:64	+CME ERROR: SIM card PIN uninitialized
43	+CME ERROR:65	+CME ERROR: SIM card PIN blocked
44	+CME ERROR:66	+CME ERROR: SIM card PUK blocked
45	+CME ERROR:70	+CME ERROR: service is barred by fdn
46	+CME ERROR:100	+CME ERROR: unknown
47	+CME ERROR:101	+CME ERROR: GPRS temporarily blocked
48	+CME ERROR:103	+CME ERROR: Illegal MS (#3)
49	+CME ERROR:106	+CME ERROR: Illegal ME (#6)
50	+CME ERROR:107	+CME ERROR: GPRS services not allowed (#7)
51	+CME ERROR:111	+CME ERROR: PLMN not allowed (#11)

52	+CME ERROR:112	+CME ERROR: Location area not allowed (#12)
53	+CME ERROR:113	+CME ERROR: Roaming not allowed in this location area (#13)
54	+CME ERROR:132	+CME ERROR: Service option not supported (#32)
55	+CME ERROR:133	+CME ERROR: Request service option not subscribed (#33)
56	+CME ERROR:134	+CME ERROR: Service option temporarily out of order(#34)
57	+CME ERROR:149	+CME ERROR: PDP authentication failure
58	+CME ERROR:200	+CME ERROR: AT command line length is zero
59	+CME ERROR:201	+CME ERROR: no or wrong command prefix
60	+CME ERROR:202	+CME ERROR: wrong ctrl_z command

Table A-3 lists error codes and description of SMS commands.

Table A-3 Error codes and description of SMS commands

Item	Error Code	Description
1	+CMS ERROR:301	+CMS ERROR: SMS service of ME reserved
2	+CMS ERROR:302	+CMS ERROR: Operation not allowed
3	+CMS ERROR:303	+CMS ERROR: Operation not supported
4	+CMS ERROR:304	+CMS ERROR: Invalid PDU mode parameter
5	+CMS ERROR:305	+CMS ERROR: Invalid text mode parameter
6	+CMS ERROR:310	+CMS ERROR: SIM not inserted
7	+CMS ERROR:311	+CMS ERROR: SIM PIN required
8	+CMS ERROR:312	+CMS ERROR: SIM failure
9	+CMS ERROR:313	+CMS ERROR: SIM PUK required
10	+CMS ERROR:316	+CMS ERROR: SIM PIN2 required
11	+CMS ERROR:317	+CMS ERROR: SIM PUK2 required
12	+CMS ERROR:318	+CMS ERROR: SIM failure
13	+CMS ERROR:321	+CMS ERROR: Invalid memory index
14	+CMS ERROR:322	+CMS ERROR: SIM memory full
15	+CMS ERROR:330	+CMS ERROR: SC address unknown
16	+CMS ERROR:334	+CMS ERROR: no +CNMA acknowledgement expected

Table A-4 lists the error codes and description of extended commands

Table A-4 Error codes and description of extended commands

Item	Error Code	Description
1	+CEER ERROR:0	+CEER ERROR: no detail information
2	+CEER ERROR:1	+CEER ERROR: unassigned number
3	+CEER ERROR:3	+CEER ERROR: no route to destination
4	+CEER ERROR:6	+CEER ERROR: unacceptable channel
5	+CEER ERROR:8	+CEER ERROR: operator determinate barring
6	+CEER ERROR:16	+CEER ERROR: normal clearing
7	+CEER ERROR:17	+CEER ERROR: user busy
8	+CEER ERROR:18	+CEER ERROR: no user responding
9	+CEER ERROR:19	+CEER ERROR: alerting no answer
10	+CEER ERROR:21	+CEER ERROR: call rejected
11	+CEER ERROR:22	+CEER ERROR: number changed
12	+CEER ERROR:26	+CEER ERROR: nonselect user clearing
13	+CEER ERROR:27	+CEER ERROR: destination out of order
14	+CEER ERROR:28	+CEER ERROR: invalid number format
15	+CEER ERROR:29	+CEER ERROR: facility rejected
16	+CEER ERROR:30	+CEER ERROR: response to status query
17	+CEER ERROR:31	+CEER ERROR: normal unspecified
18	+CEER ERROR:34	+CEER ERROR: no circuit channel available
19	+CEER ERROR:38	+CEER ERROR: net out of order
20	+CEER ERROR:41	+CEER ERROR: temporary failure
21	+CEER ERROR:42	+CEER ERROR: switch congestion
22	+CEER ERROR:43	+CEER ERROR: access information discarded
23	+CEER ERROR:44	+CEER ERROR: request circuit channel unavailable
24	+CEER ERROR:47	+CEER ERROR: resources unavailable
25	+CEER ERROR:49	+CEER ERROR: QOS unavailable
26	+CEER ERROR:50	+CEER ERROR: request facility not subscribe
27	+CEER ERROR:55	+CEER ERROR: CUG incoming barred
28	+CEER ERROR:57	+CEER ERROR: bear capability not authorization
29	+CEER ERROR:58	+CEER ERROR: bear capability unavailable
30	+CEER ERROR:63	+CEER ERROR: service unavailable
31	+CEER ERROR:65	+CEER ERROR: bear service not implement

32	+CEER ERROR:68	+CEER ERROR: ACM equal or great ACMMAX
33	+CEER ERROR:69	+CEER ERROR: request facility not implement
34	+CEER ERROR:70	+CEER ERROR: only restrict digital available
35	+CEER ERROR:79	+CEER ERROR: service option not implement
36	+CEER ERROR:81	+CEER ERROR: invalid ti
37	+CEER ERROR:87	+CEER ERROR: user not in CUG
38	+CEER ERROR:88	+CEER ERROR: incompatibility destination
39	+CEER ERROR:91	+CEER ERROR: invalid transit net
40	+CEER ERROR:95	+CEER ERROR: invalid message semantic
41	+CEER ERROR:96	+CEER ERROR: mandatory IE error
42	+CEER ERROR:97	+CEER ERROR: message nonexistent
43	+CEER ERROR:98	+CEER ERROR: message uncompatbility error
44	+CEER ERROR:99	+CEER ERROR: IE nonexistent
45	+CEER ERROR:100	+CEER ERROR: invalid condition IE
46	+CEER ERROR:101	+CEER ERROR: message incompatibility state
47	+CEER ERROR:102	+CEER ERROR: recover on timer
48	+CEER ERROR:111	+CEER ERROR: protocol error
49	+CEER ERROR:127	+CEER ERROR: interworking
50	+CEER ERROR:150	+CEER ERROR: authentication rejected
51	+CEER ERROR:151	+CEER ERROR: emergency call only
52	+CEER ERROR:152	+CEER ERROR: IMSI detach
53	+CEER ERROR:153	+CEER ERROR: T3230 expiry
54	+CEER ERROR:154	+CEER ERROR: rr connection error
55	+CEER ERROR:171	+CEER ERROR: no network service
56	+CEER ERROR:172	+CEER ERROR: emergency call only
57	+CEER ERROR:173	+CEER ERROR: normal disconnect
58	+CEER ERROR:174	+CEER ERROR: remote disconnect
59	+CEER ERROR:175	+CEER ERROR: low failure
60	+CEER ERROR:176	+CEER ERROR: network reject
61	+CEER ERROR:177	+CEER ERROR: no cell
62	+CEER ERROR:202	+CEER ERROR: supplement not provide



Error codes might be duplicated in above tables.

B Reference Process of AT Command Programming

B.1 Content of PDU SMS Messages

<PDU> SMS message sending format:

1>: 0891

08: indicates the length of the SMSC address information

91: indicates the format of the SMSC address

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

3>: 0100

01: Indicates basic parameters

00: indicates message baseline value

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

5>: 81 (Receiving mode) there are multiple receiving modes.

81 indicates that the receiving mode is unknown.

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

7>: 0008

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

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

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



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

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

0891683110808805F001000B813124819396F300080A00680065006C006C006F

Wherein,

0891

683108705505F0: SMSC number of China Unicom

0100

0B: the length of the recipient number

81: Receiving mode

3124819396F3: The number of recipient

0008

0A: The length of the content

00680065006C006C006F: SMS message content

Message content: hello



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

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

0001000B813124819396F300080A00680065006C006C006F

Wherein,

00: SMSC address information length

SMSC number is not needed.

0100

0B: the length of the recipient number

81: Receiving mode

3124819396F3: The number of recipient

0008

0A: The length of the content

00680065006C006C006F: SMS message content

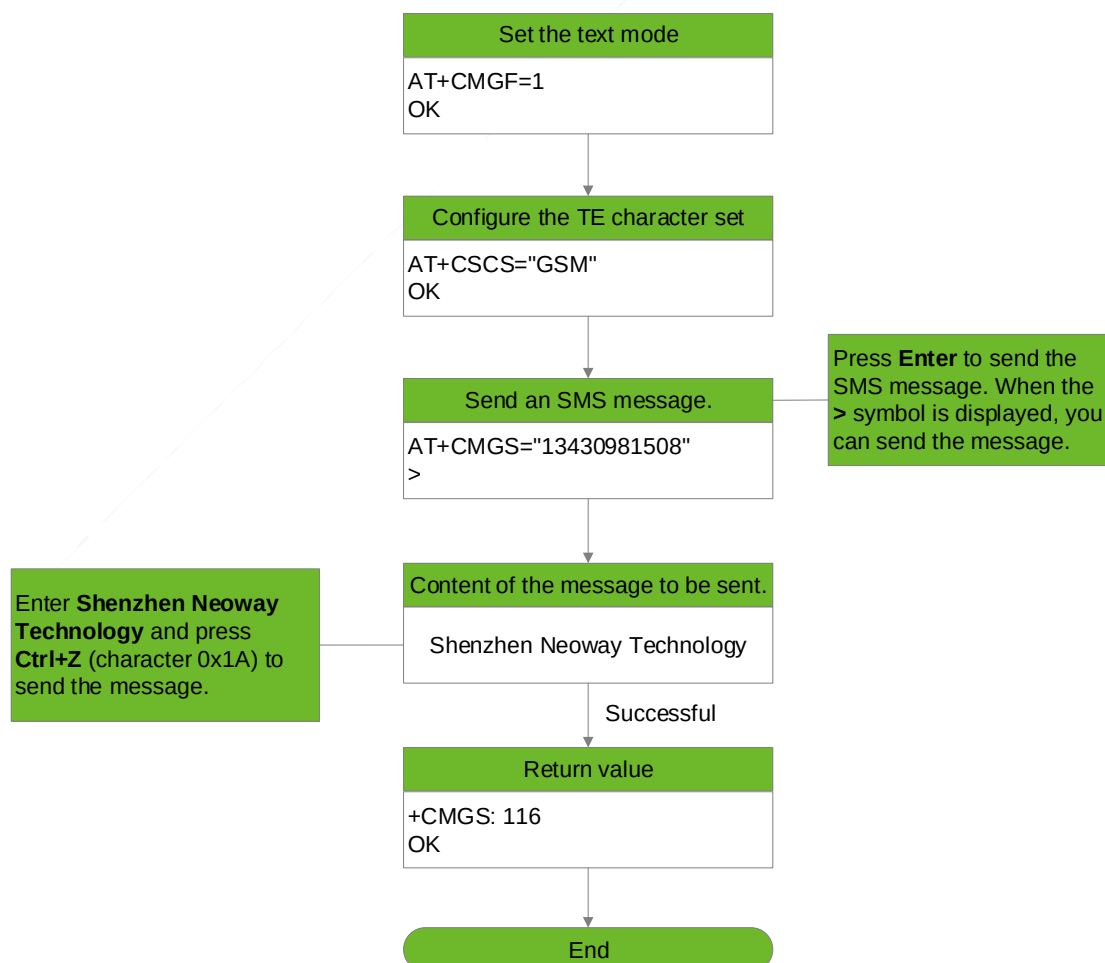
SMS message content: hello



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

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

Figure B-1 Flowchart of sending text format SMS messages



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

Figure B-2 Flowchart of Sending PDU SMS messages

