



L501_AT_Command_User_Guide

LTE-GSM Module Series

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1.Introduction

1.1 Overview

This document introduces the supported AT command set of L501 project.

We don't suggest using proprietary command in a multiple command. There might be abnormal situation occurs.

1.2 References

- [1] 3GPP TS 27.007 V3.13.0 (2003-03)
- [2] ETSITS 27.005 V3.1.0 (2000-01)
- [3] ITU-T V.25 ter(07/1997)

2.V.25ter AT Commands

2.1 AT

Return to online command state from online data state

Execution Command AT	Response OK
--------------------------------	-----------------------

2.2 ATE

This setting determines whether or not the TA echoes characters received from TE during command state.

Execution Command ATE[<value>]	Response OK
Reference V.25ter	Note

Parameters are defined below:

Parameters	Description
<value>	0 Echo mode off 1 Echo mode on Default parameter is 1,so echo mode is on

2.3 ATI

Set result code format mode

Execution Command ATI	Response <text> OK
Reference text	Note Product information Model Revision

2.4 +++

Switch from Data Mode or PPP Online Mode to Command Mode

Execution Command +++	Response The +++character sequence causes the TA to cancel the data flow over the AT interface and switch to Command mode. This allows you to enter AT Command while maintaining the data connection to the remote server. OK To prevent the +++escape sequence from being misinterpreted as data, it should comply to following sequence: 1. No characters entered for T1 time (1 second) 2. "+++" characters entered with no characters in between (0.5 second) 3. No characters entered for T1 timer (0.5 second) 4. Switch to Command mode, otherwise go to step 1.
Preference	Note To return from Command mode back to data mode: Enter ATO0

2.5 ATO

Switch from Data mode/ppp Online to command mode

Execution Command ATO<value>	Response CONNECT
Preference	Note
ATO0	CONNECT

Parameters are defined below:

Parameters	Description
value	0 Switch from command mode to data mode.

2.6 ATQ

Set result code suppression mode

Read Command ATQ[<value>]	Response OK If value is 0 . (none) If value is 1 (because result codes are suppressed). ERROR For unsupported values (if previous value was Q0). (none) For unsupported values (if previous value was Q1). Note
---	--

Example:

AT Command	Response
ATQ0	OK
ATQ1	
ATQ	OK

Parameters are defined below:

Parameters	Description
value	0 DCE transmits result code 1 Result codes are suppressed and not transmitted.

2.7 ATS3

Command line termination character

This S-parameter represents the decimal IA5 value of the character recognized by the DCE from the DTE to terminate an incoming command line. It is also generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the S4 parameter (see the description of the V parameter for usage).

Execution Command ATS3=<value>	Response OK or +CME ERROR:<err>
Read Command ATS3?	Response <value> OK

Parameters are defined below:

Parameters	Description
value	13 Carriage return character(CR IA5 0/13) 0-31 Set Command line termination character to this value

2.8 ATS4

Response formatting character

This S-parameter represents the decimal IA5 value of the character generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the S3 parameter(see the description of the V parameter for usage).

Execution Command ATS4=<value>	Response OK or +CME ERROR:<err>
Read Command ATS4?	Response Value OK or +CME ERROR:<err>
Parameters value	Description 10 Line feed character(LF,IA50/10) 0-31 Set response formatting character to this value

2.9 ATS5

Command line editing character.

This S-parameter represents the decimal IA5 value of the character recognized by the DCE as are quest to delete from the command line the immediately preceding character.

Execution Command ATS5=<value>	Response OK or +CME ERROR:<err>
Read Command ATS5?	Response Value OK or +CME ERROR:<err>
Reference V.25ter	Note

Parameters are defined below:

Parameters	Description
<value>	8 Backspace character(BS,IA50/8)
	0-31 Set command line editing character to this value

2.10 ATV

Set DCE response format

Execution Command ATV[<value>]	Response OK or +CME ERROR:<err>
Parameter <value>	Note 0: Information response:<text><CR><LF>Short result code format:<numric code><CR> 1: Information response:<CR><LF><text><CR><LF>Long result code format:<CR><LF><verbose code><CR><LF>

2.11 ATX

The setting of this parameter determines whether or not the DCE transmits particular result codes to the DTE. It also controls whether or not the DCE verifies the presence of dial tone when it first goes off-hook to begin dialing, and whether or not engaged tone (busy signal) detection is enabled. However, this setting has no effect on the operation of the W dial modifier, which always checks for dial tone regardless of this setting, nor on the busy signal detection capability of the W and @dialmodifiers. See Table.

Execution Command ATX[<value>]	Response OK or +CME ERROR:<err>
--	--

Parameters are defined below:

Parameters	Description
------------	-------------

<value>	<p>0 CONNECT result code is given upon entering online data state. Dial tone and busy detection are disabled.</p> <p>1CONNECT<text> result code is given upon entering online data state. Dial tone and busy detection are disabled.</p> <p>2 CONNECT<text> result code is given upon entering online data state. Dial tonedetection is enabled, and busy detection is disabled.</p> <p>3 CONNECT<text> result code is given upon entering online data state. Dial tonedetection is disabled, and busy detection is enabled.</p> <p>4CONNECT<text> result code is given upon entering online data state. Dial tone and busydetection are both enabled.</p>
----------------------	---

2.12 ATZ

Reset to default configuration

Execution Command ATZ[<value>]	Response OK or +CME ERROR:<err>
Reference V.25ter	Note

Parameters are defined below:

Parameters	Description
<value>	0 The default configure of the manufacturer.

2.13 AT&W

This command stores the currently set parameters to a user defined profile in the non-volatile memory

Execution Command AT&W[<n>]	Response TA stores the current parameter setting in the user defined profile OK or +CME ERROR:<err>
Parameters <n>	Description 0 Store the current configuration in profile 0

2.14 AT&F

Set to factory-defined configuration

Execution Command AT&F[<n>]	Response OK or +CME ERROR:<err>
Parameters <n>	Description 0 Set all parameters to manufacturer default value

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3. General Commands

3.1 AT+CGMI Request Manufacturer Identification

The command causes the phone to return one or more lines of information text< manufacturer > which is intended to permit the user of the ITAE/ETAE to identify the manufacturer of the phone to which it is connected to

Test Command AT+CGMI=?	Response +CGMI:< manufacturer > OK
Execution Command AT+CGMI	Response +CGMI:"< manufacturer>" OK

Parameters are defined below:

Parameter note	Description
<manufacturer>	Product brand text

3.2 AT+CGMM Request model identification

The command causes the phone to return one or more lines of information text <model> which is intended to permit the user of the ITAE/ETAE to identify the specific model of phone to which it is connected to

Test Command AT+CGMM=?	Response +CGMM:<module> OK
Execution Command AT+CGMM	Response +CGMM:"<module>" OK

Parameter are defined below:

Parameter note	Description
----------------	-------------

<module>	Product module id text
-----------------------	------------------------

3.3 AT+CGMR Request revision identification

This command causes the phone to return a string containing information regarding SW version

Test Command AT+CGMR=?	Response +CGMR:<revision>,<build_time> OK
Execution Command AT+CGMR	Response +CGMR:"<revision>,<build_time>" OK

Parameters are defined below:

Parameter note:	Description
<revision>	Product revision
<build_time>	Compile soft time

3.4 AT+CGSN Request product serial number identification

Returns the IMEI number of the phone

Execution Command AT+CGSN	Response "<IMEI>" OK
Test Command AT+CGSN=?	Response OK

3.5 AT+CIMI Request international mobile subscriber identity

Execution Command AT+CIMI	Response <IMSI> OK
Test Command AT+CIMI=?	Response OK

3.6 AT+GSN Request TA Serial Number Identification

This command is used to request TA Serial Number Identification(serialNumber)

Execution Command AT+GSN	Response "<SN>" OK
Test Command AT+GSN=?	Response OK

3.7 AT+CSCS Select TE character set

Set command informs TA which character set <chset>is used by the TE. TA is then able to convert character strings correctly between TE and MT character sets..

Execution Command AT+CSCS=<chset>	Response OK or +CME ERROR:<err>
Test Command AT+CSCS=?	Response +CSCS: (list of supproted<chset>s) OK
Read Command AT+CSCS?	Response +CSCS:<chset> OK

Parameters are defined below:

Parameters	Description
<chset>	" GSM " GSM 7 bit default alphabet (3GPP TS 23.038); this setting causes easily software flow control (XON/XOFF) problems. " IRA " international Reference alphabet (ITU-T T.50) " UCS2 " 16-bit universal multiple-octet coded character set (ISO/IEC10646 [32]);

3.8 AT+GMI Request manufacturer identification

The command causes the phone to return one or more lines of information text< manufacturer > which is intended to permit the user of the ITAE/ETAE to identify the manufacturer of the phone to which it is connected to

Test Command AT+GMI=?	Response +GMI:< manufacturer > OK
Execution Command AT+GMI	Response +GMI:"< manufacturer >" OK

Parameters are defined below:

Parameter note:	Description
<manufacturer >	Product manufacturer text

3.9 AT+GMM Request TA model identification

This command requests TA model identification (may equal to +CGMM)

Test Command AT+GMM=?	Response +GMM:<module> OK
Execution Command AT+GMM	Response +GMM:"<module identification>" OK

3.10 AT+GMR Request revision identification

This command request TA revision identification(may equal to +CGMR)

Test Command AT+GMR=?	Response +GMR:<revision>,<build_time> OK
Execution Command AT+GMR	Response +GMR:"Revision:<version>,build_time: <load file compile_time>" OK

3.11 AT+IPR UART BAUD rate setting

Specifies the data rate, in addition to 115200 bits/s or 9600 bits/s, at which the DCE will accept commands. May be used to select operation at rates at which the DCE is not capable of automatically detecting the data rate being used by the DTE.

Test Command AT+IPR=?	Response +IPR:(list of supported<rate>s) OK
Execution Command AT+IPR=<rate>	Response OK
Read Command	Response +IPR:<rate> OK

Parameters are defined below:

Parameters	Description
<rate>	The rate, in bits per second, at which the DTE-DCE interface should operate. Currently, the following rates are supported: 0,9600, 14400, 19200,28800,38400,56000, 57600,115200. If unspecified, Default rate is 115200 bps.

3.12 AT+CME Error Report Mobile Equipment Error

Set command disables or enables the use of result code +CME ERROR: <err>as an indication of an error relating to the functionality of the MT. When enabled, MT related errors cause +CME ERROR: <err>final result code instead of the regular ERROR final result code. ERROR is returned normally when error is related to syntax, invalid parameters, or TA functionality.

Test command returns values supported as a compound value.

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

Parameters are defined below:

Parameters	Description
<n>	0 disable +CME ERROR: <err> result code and use ERROR instead 1enable +CME ERROR: <err> result code and use numeric <err> values (refer next subclause) 2enable +CME ERROR: <err> result code and use verbose <err> values (refer next subclause)

3.13 AT+ICCID Read ICCID of SIM Card

This command is used to read SIM card ICCID if SIM inserted. If SIM not inserted, return +CME ERROR: 10

Execution Command AT+ICCID	Response +ICCID: <iccid> OK or +CME ERROR: <err>
--------------------------------------	---

Parameters are defined below:

Parameters	Description
<iccid>	String type

4.Call Control Commands

4.1 ATD Mobile Originated Call to Dial a Number

Causes the MT to transition from the command state to the online state

Execution Command ATD<dial string>;	Response OK Or +CME ERROR:<err>
Reference	Note: The <dial string> is optional. For circuit switched data services, the dial string may contain the following characters: Digits 0 to 9, *, #;

4.2 ATH Disconnect Existing Connection

Causes the MT to transition from online command state to command state; use of the digit '0' is optional.

Execution Command ATH[<value>]	Response OK Or +CME ERROR:<err>
Reference	Note: <value> 0: Disconnect from line and terminate call.

4.3 ATA Answer

Instructs the modem to immediately go off-hook and attempt to establish a connection without waiting for a ring, this is used to answer an incoming call if auto answer (s0) is disabled.

Execution Command ATA	Response OK Or +CME ERROR:<err>
Reference	Note: Answer a call

4.4 AT*DIALE emergency call

This command is used to make an emergency call

Execution Command AT*DIALE=<dial string>,<server type>;	Response OK Or +CME ERROR:<err>
Test Command AT*DIALE=?	Response *DIALE: <number>, (0-31) OK

Parameter are defined below:

Parameters <dial string>	Description The <dial string> is optional. For circuit switched data services, the dial string may contain the following characters: Digits 0 to 9, *, #;
<server type>	Bit mask indicating the required emergency call service category. Bit 0: POLICE Bit 1: AMBULANCE Bit 2: FIRE_BRIGADE Bit 3: MARINE_GUARD Bit 4: MOUNTAIN_RESCUE

4.5 AT+ CNUM Subscriber Number

The MS ISDN related to the subscriber

Test Command AT+CNUM=?	Response OK
Execute Command AT+CNUM	Response +CNUM:[<alpha>],<number1>,<type>[<CR><LF>] OK

Parameter are defined below:

Parameters	Description
<alpha>	Optional alphanumeric string associated with number used character set should be the one selected with command Select TE Character Set +CSCS

<number>	String type phone number of format specified by <typex>
<typex>	Type of address octet in integer format
<text>	Field of maximum length<length>;character set as specified by command+CSCS.The display of text depending to the storage format in the sim card.If we store the pbk entry with usc2 format,we show Chinese string here,otherwise,we show NON-Chinese string.We do not care about charsets.it is decided by command +CSCS setting when we store them

Example:

AT command	Response
AT+CPBS="ON"	+CPBS:"ON",2,2 OK
AT+CPBW=1,"1060000000",129,"test1"	OK
AT+CPBR=1	+CPBR:1,"1060000000",129,"test1" OK
AT+CNUM	+CNUM:"test1","1060000000",129 OK

4.6 AT+CCFC Call Forwarding Number and Conditions

This command allows control of the call forwarding supplementary service according to 3GPP TS 22.082. Registration, erasure, activation, deactivation, and status query are supported.

Write Command AT+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]	Response OK or +CME ERROR:<err>
Test Command AT+CCFC=?	Response +CCFC: (0,1,2,3,4,5) OK

Parameters are defined below:

Parameters	Description
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<reason>	0: unconditional 1: mobile busy 2: no reply 3: not reachable 4: all call forwarding (refer 3GPP TS 22.030) 5: all conditional call forwarding
<mode>	0: disable 1: enable 2: query status 3: registration 4: erasure
<number>	string type phone number of forwarding address in format specified by <type>
<type>	type of address octet in integer format (refer TS 24.008 subclause 10.5.4.7); default 145 when dialling string includes international access code character "+", otherwise 129
<subaddr>	string type subaddress of format specified by <satype>
<satype>	type of subaddress octet in integer format (refer TS 24.008 subclause 10.5.4.8); default 128

<class>	<p>is a sum of integers each representing a class of information (default 7):</p> <p>1: voice (telephony)</p> <p>2: data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64)</p> <p>OK/+CME ERROR: <err></p> <p>Note:</p> <p>when <mode>=2 and command successful:</p> <p>+CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]][<CR><LF>+CCFC:</p> <p><status>,<class2>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]</p> <p>[...]]</p> <p>Copyright ? 2018 ASR Confidential August 6, 2019, Draft ASR micro Page 63 and 128)</p> <p>4: fax (facsimile services)</p> <p>8: short message service</p> <p>16: data circuit sync</p> <p>32: data circuit async</p> <p>64: dedicated packet access</p> <p>128: dedicated PAD access</p>
<time>	<p>1...30: when "no reply" is enabled or queried, this gives the time in seconds to wait before call is forwarded,default value is 20</p>
<status>	<p>0: not active</p> <p>1: active</p>

4.7 AT+CCWA Call waiting

This command allows control of the Call Waiting supplementary service according to 3GPP TS 22.083.

<p>Write Command</p> <p>AT+CCWA=[<n>[,<mode>[,<class>]]]</p>	<p>Response</p> <p>OK</p> <p>or</p> <p>+CME ERROR:<err></p>
---	---

Test Command AT+CCWA=?	Response +CCWA: (0-1) OK
Read Command AT+CCWA?	Response +CCWA: <n> OK

Parameter are defined below:

Parameters	Description
<n>	<n> (sets/shows the result code presentation status to the TE) 0: disable 1: enable
<mode>	integer type (when <mode> parameter is not given, network is not interrogated) 0:disable 1:enable 2:query status

<class>

is a sum of integers each representing a class of information (default 7):
1: voice (telephony)
2: data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64)
OK/+CME ERROR: <err>
Note:
when <mode>=2 and command successful:
+CCFC: <status>,<class1>[,<number>,<type> [,<subaddr>,<satype>[,<time>]]][<CR><LF>
+CCFC:
<status>,<class2>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]
[...]]
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4: fax (facsimile services)
8: short message service
16: data circuit sync
32: data circuit async
64: dedicated packet access
128: dedicated PAD access

4.8 AT+CHLD Call Holding Services

This command allows the control of the following call related services:

Write Command AT+CHLD=<n>	Response OK or +CME ERROR:<err>
Test Command AT+CHLD=?	Response +CHLD: (0, 1, 1x, 2, 2x, 3, 4) OK

Parameter are defined below:

Parameters	Description
------------	-------------

<n>	<p>Call hold operation:</p> <p>0 - Release all held calls or set User Determined User Busy (UDUB) for a waiting call</p> <p>1 - Release all active calls (if any exist) and accept the other (held or waiting) call</p> <p>1x - Release specific active call x, where x is the serial number of a call participating in an active Multiparty call.</p> <p>2- Place all active calls (if any exist) on hold and accept other (held or waiting) call</p> <p>2x - In the case of an active Multiparty call, places all active calls on hold, except for call x. Call x remains active.</p> <p>3 - Add a held call to the conversation (Multiparty)</p> <p>4 - Connects the two calls and disconnects the subscriber from both calls (ECT)</p>
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4.9 AT+VTS DTMF tones

This command allows the transmission of DTMF tones

<p>Write Command</p> <p>AT+VTS=<DTMF>[,<duration>]</p> <p>Note:</p>	<p>Response</p> <p>OK</p> <p>or</p> <p>+CME ERROR:<err></p>
<p>Test Command</p> <p>AT+VTS=?</p>	<p>Response</p> <p>+VTS: <DTMF>, (300-600)</p> <p>OK</p>

Parameters are define below:

Parameters	Description
<DTMF>	DTMF string, up to 32 characters, valid character: (0, 1, ..., 9, A, B, C, D, *, #).
<duration>	(300-600)

5. Network Service related Commands

5.1 AT+COPS Operator Selection

Set command forces an attempt to select and register the GSM/UMTS/NB-IOT network operator. If the selected operator is not available, ERROR is returned. Read command returns the current mode, the currently selected operator. Test command returns operator list present in the network

Test Command AT+COPS=?	Response +COPS: list of supported (<mode>,<format>s,<oper>),[<long alphanumeric<oper>,short alphanumeric <oper>,numeric <oper>] OK or +CME ERROR: <err>
Write Command AT+COPS=<mode>[,<format>,<oper>[,<Act>]]	Response OK or +CME ERROR: <err>
Read Command AT+COPS?	Response +COPS: <mode>[,<format>,<oper>,<Act>] OK or +CME ERROR: <err>

Reference	<p>Note</p> <p>+COPS? response is not alphanumeric format when setting with alphanumeric format</p> <p>example: +COPS: 0,0," KG Telecom Co." If you got +COPS: 0,0,"46688"</p> <p>This is possibly due to there is no alphanumeric format name mapping to the operator id</p> <p>You can define operator name table in the following file under custom folder.</p> <p>mcu\custom\common\customer_operator_name.c</p> <p>Please check if there is operator name mapping in the name table.</p> <p>If not , Please add your operator name and operator id</p> <p>There is comment information in the file to guide you .</p> <p>Please read the guide before modification.</p>
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Parameter are defined below:

Parameters	Description
<mode>	0 automatic (<oper> field is ignored) 1 manual (<oper> field shall be present) 2 deregister from network 3 set only <format> (for read command +COPS?), do not attempt registration/deregistration 4 manual/automatic (<oper> field shall be present); if manual selection fails, automatic mode (<mode>=0) is entered
<format>	0 long format alphanumeric <oper> 1 short format alphanumeric <oper> 2 numeric <oper>
<oper>	string type
<stat>	0 unknown 1 available 2 current 3 forbidden

<Act>	0 GSM
	1 GSM_COMPACT
	2 UTRAN
	3 GSM_EGPRS
	4 UTRAN_HSDPA
	5 UTRAN_HSUPA
	6 UTRAN_HSDPA_HSUPA
	7 EUTRAN
	8 ECGSM

5.2 AT+CREG Network Registration

This command be used to query the register status

Test Command AT+CREG=?	Response +CREG: list of supported (<n>s) OK or +CME ERROR: <err>
Write Command AT+CREG=<n>	Response OK or +CME ERROR: <err>
Read Command AT+CREG?	Response +CREG:<n>,<stat>[,<lac>,<ci>,<Act>] OK or +CME ERROR: <err>

Parameters are defined below:

Parameters	Description
<n>	0 disable network registration unsolicited result code 1 enable network registration unsolicited result code+CREG:<stat> 2 enable network registration and location information unsolicited result code+CREG:<stat>[,<lac>,<ci>] 3enable network registration, location information and cause value information unsolicited result code +CREG: <stat>[,<lac>],[<ci>],[<AcT>],[<cause_type>,<reject_cause]]

<stat>	<p>0 not registered,MT is not currently searching a new operator to register to</p> <p>1 registered,home work</p> <p>2 not registered,but MT is currently searching a new operator to register to</p> <p>3 registration denied</p> <p>4 unkown</p> <p>5 registered,romaing</p> <p>6registered for "SMS only", home network (applicable only when <AcT> indicates E-UTRAN)</p> <p>7 registered for "SMS only", roaming (applicable only when <AcT> indicates E-UTRAN)</p> <p>8attached for emergency bearer services only (see NOTE 2) (not applicable)</p> <p>9 registered for "CSFB not preferred", home network (applicable only when <AcT> indicates E-UTRAN)</p> <p>10registered for "CSFB not preferred", roaming (applicable only when <AcT> indicates E-UTRAN)</p> <p>11only emergency services are available.</p> <p><lac>: string type; two byte location area code in hexadecimal format</p> <p>12registration denied in roaming</p> <p>13 sync done in LTE roaming network</p> <p>14 ecall inactive</p>
<lac>	String type,two byte location area code
<ci>	string type,two byte cell ID in hexadecimal format
<Act>	<p>0: GSM</p> <p>1: GSM Compact</p> <p>2: UTRAN</p> <p>3: GSM w/EGPRS</p> <p>4: UTRAN w/HSDPA</p> <p>5: UTRAN w/HSUPA</p> <p>6: UTRAN w/HSDPA and HSUPA</p> <p>7: E-UTRAN</p> <p>8: UTRAN w/HSPA+</p> <p>9: E-UTRAN CA</p>

5.3 AT+CLCK Facility Lock

Execute command is used to lock, unlock or interrogate a ME or a network facility <fac>

Write Command AT+CLCK=<fac>,<mode> >[,<passwd>,<class>]]	Response +CME ERROR: <err> when <mode>=2 and command successful: +CLCK: <status>[,<class1> [<CR><LF>+CLCK: <status>,<class2> [...]] OK or +CME ERROR: <err>
Test Command AT+CLCK=?	Response +CLCK: (list of supported <fac>s) OK or +CME ERROR: <err>

Parameters are defined below:

Parameters	Description
<fac>	"CS","PS","PF","SC","AO","OX","OI","AI","IR","NT","NM","NS","NA" "AB","AG","AC","FD","PN","PU","PP","PC"
<mode>	0 unlock 1 lock 2 query status (only "SC" support query mode)
<status>	0 not active
<passwd>	1 active string type
<classx>	is a sum of integers each representing a class of information (default 7) 1 voice (telephony) 2 data (refers to all bearer services) 4 fax (facsimile services) 8 short message service 16 data circuit sync 32 data circuit async 64 dedicated packet access 128 dedicated PAD access

The <fac>"AB", "AG" and "AC" are applicable only for <mode>=0

5.4 AT+CPWD Change Password

Action command sets a new password for the facility lock function defined by command Facility Lock +CLCK.

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

Parameters are defined below:

Parameters	Description
<fac>	"SC" SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command issued) Correspond to PIN1 code. "P2" SIM PIN2
<oldpwd>	String type
<newpwd>	String type
<pwdlength>	integer type maximum length of the password for the facility

5.5 AT+CPOL Preferred operator list

This command is used to edit the SIM preferred list of networks. Execute command writes an entry in the SIM list of preferred operators (EFPLMNsel). If <index> is given but <oper> is left out, entry is deleted. If <oper> is given but <index> is left out, <oper> is put in the next free location. If only <format> is given, the format of the <oper> in the read command is changed.

Test Command AT+CPOL=?	Response +CPOL: (list of supported <index>s), (list of supported <format>s) OK or +CME ERROR: <err>
Execution Command AT+CPOL=<index>[,<format>[,<oper>[<GSM_AcT>,<GSM_compact_AcT>,<UTRAN_AcT>]]]	Response OK or +CME ERROR: <err>

Read Command AT+CPOL?	Response +CPOL: <index1>,<format>,<oper1>[,<GSM_Act1>,<GSM_Compact_Act1>,<UTRAN_Act1>] [<CR><LF>+CPOL: <index2>,<format>,<oper2>[,<GSM_Act2>,<GSM_Compact_Act2>,<UTRAN_Act2>] [...]] OK or +CME ERROR: <err>
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Parameter are defined below:

Parameters	Description
<indexn>	the order number of operator in the SIM/USIM preferred operator list
<format>	0 long format alphanumeric <oper> 1 short format alphanumeric <oper> 2 numeric <oper>
<opern>	string type; <format> indicates if the format is alphanumeric or numeric (see +COPS)
<GSM_Actn>	0 access technology not selected 1 access technology selected
<GSM_Compact_Actn>	0 access technology not selected 1 access technology selected
<UTRAN_Act>	0 access technology not selected 1 access technology selected
Reference	Note: when adding preferred operator, <format> can only be 2

Example:

AT Commands	Response
AT+CPOL=?	+CPOL: (1-8),(0,1,2) OK
AT+CPOL?	+CPOL: 1,2,"46000" OK
AT+CPOL=2,2,"46001"	OK <Note:>Add a preferred operator If perator is full, then report ERROR
AT+CPOL?	+CPOL: 1,2,"46000" +CPOL: 2,2,"46001" OK

AT+CPOL=,0	OK <Note :>Set the display format as long format alphanumeric <oper>
AT+CPOL?	+CPOL: 1,0,"China Mobile" +CPOL: 2,0,"China Unicom" OK
AT+CPOL=1 AT+CPOL?	OK <Note :>Delete the preferred operator with index of 1 +CPOL: 2,0,"China Unicom"

5.6 AT+CGREG GPRS network registration status

This command is used to controls the presentation of an unsolicited result for package network

Write Command AT+CGREG=<n>	Response OK or +CME ERROR:<err>
Test Command AT+CGREG=?	Response +CEREG: (list of supported <n>s) OK
Read Command AT+CGREG?	Response +CGREG: <n>,<stat>[,<lac>],[<ci>],[<AcT>],[<rac>] [,<cause_type>,<reject_cause>]] OK or +CME ERROR: <err>

Parameters are defined below:

Parameters	Description
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<n>	integer type 0 disable network registration unsolicited result code 1 enable network registration unsolicited result code +CGREG: <stat> 2 enable network registration and location information unsolicited result code +CGREG: <stat>[,<tac>,<ci>,<AcT>,<rac>] 3 enable network registration, location information and cause value information unsolicited result code +CEREG: <stat>[,<tac>],<ci>,<AcT>[,<cause_type>,<reject_cause>]]
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5.7 AT+CEREG EPS network registration status

The set command controls the presentation of an unsolicited result code +CEREG: <stat> when <n>=1 and there is a change in the MT's EPS network registration status in E-UTRAN, or unsolicited result code +CEREG: <stat>[,<tac>],<ci>,<AcT>]] when <n>=2 and there is a change of the network cell in E-UTRAN. The parameters <AcT>, <tac> and <ci> are provided only if available. The value <n>=3 further extends the unsolicited result code with [,<cause_type>,<reject_cause>], when available, when the value of <stat> changes. If the UE wants to apply PSM for reducing its power consumption, see +CPSMS command and 3GPP TS 23.682 [149], the set command controls the presentation of an unsolicited result code +CEREG:

<stat>[,<tac>],<ci>,<AcT>[,<cause_type>],<reject_cause>][,<Active-Time>],<Periodic-TAU>]]]. When <n>=4 the unsolicited result code will provide the UE with additional information for the Active Time value and the extended periodic TAU value if there is a change of the network cell in E-UTRAN. The value <n>=5 further enhances the unsolicited result code with <cause_type> and <reject_cause> when the value of <stat> changes. The parameters <AcT>, <tac>, <ci>, <cause_type>, <reject_cause>, <Active-Time> and <Periodic-TAU> are provided only if available. Refer subclause 9.2 for possible <err> values.

NOTE 1: If the EPS MT in GERAN/UTRAN/E-UTRAN also supports circuit mode services and/or GPRS services, the +CREG command and +CREG: result codes apply to the registration status and location information for those services.

The read command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. Location information elements <tac>, <ci> and <AcT>, if available, are returned only when <n>=2 and MT is registered in the network. The parameters [,<cause_type>,<reject_cause>], if available, are returned when <n>=3.

Test command returns values supported as a compound value.

Write Command AT+CEREG=<n>	Response OK or +CME ERROR:<err>
--	--

Test Command AT+CEREG=?	Response +CEREG: (list of supported <n>s) OK
Read Command AT+CEREG?	Response when <n>=0, 1, 2 or 3 and command successful: +CEREG: <n>,<stat>[,<tac>], [<ci>],[<AcT>[,<cause_type>], <reject_cause>]]] OK

Parameter are defined below:

Parameters	Description
<n>	integer type 0 disable network registration unsolicited result code 1 enable network registration unsolicited result code +CEREG: <stat> 2 enable network registration and location information unsolicited result code +CEREG: <stat>[,<tac>],[<ci>],[<AcT>]] 3 enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,<tac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]]
<stat>	integer type; indicates the EPS registration status 0 not registered, MT is not currently searching an operator to register to 1 registered, home network 2 not registered, but MT is currently trying to attach or searching an operator to register to 3 registration denied 4 unknown (e.g. out of E-UTRAN coverage) 5 registered, roaming 6 registered for “SMS only”, home network (not applicable) 7 registered for “SMS only”, roaming (not applicable) 8 attached for emergency bearer services only (See NOTE 2) 9 registered for “CSFB not preferred”, home network (not applicable) 10 registered for “CSFB not preferred”, roaming (not applicable) NOTE 2: 3GPP TS 24.008 [8] and 3GPP TS 24.301 [83] specify the condition when the MS is considered as attached for emergency bearer services. 11 attached for emergency bearer services only

<tac>	string type; two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)
<ci>	string type; four byte E-UTRAN cell ID in hexadecimal format
<AcT>	integer type; indicates the access technology of the serving cell 0 GSM (not applicable) 1 GSM Compact (not applicable) 2 UTRAN (not applicable) 3 GSM w/EGPRS (see NOTE 3) (not applicable) 4 UTRAN w/HSDPA (see NOTE 4) (not applicable) 5 UTRAN w/HSUPA (see NOTE 4) (not applicable) 6 UTRAN w/HSDPA and HSUPA (see NOTE 4) (not applicable) 7 E-UTRAN 8 EC-GSM-IoT 9 E-UTRAN(NB-S1 mode) NOTE 3: 3GPP TS 44.060 [71] specifies the System Information messages which give the information about whether the serving cell supports EGPRS. NOTE 4: 3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.
<cause_type>	integer type; indicates the type of <reject_cause>. 0 Indicates that <reject_cause> contains an EMM cause value, see 3GPP TS 24.301 [83] Annex A. 1 Indicates that <reject_cause> contains a manufacturer-specific cause.
<reject_cause>	integer type; contains the cause of the failed registration. The value is of type as defined by<cause_type>.

5.8 AT+CPSI Inquiring UE System Information

This command is used to return the UE system information.

Test Command	Response
AT+CPSI=?	+CPSI: (scope of <time>) OK

<p>Read Command AT+CPSI?</p>	<p>Response +CPSI:<system mode> OK</p> <p>If camping on a GSM cell: +CPSI:<System Mode>,<MCC>-<MNC>,<LAC>,<Cell ID>,<Absolute RF Ch Num>,<RxLev>,<C1-C2> OK</p> <p>If camping on a LTE cell: +CPSI:<System Mode>,<MCC><MNC>,<TAC>,<SCellID>,<PCellID>,<Frequency Band>,<dlbw>,<ulbw><RSRQ>,<RSRP>,<RSSI>,<SINR> OK</p>
<p>Write Command AT+CPSI=<time></p>	<p>Response OK or ERROR</p> <p>Note: When AT + CPSI = 0 is executed or AT + CPSI=? is executed Or AT + CPSI ? is executed, will stop reporting.</p>

Parameters are defined below:

Parameters	Description
<time>	Mandatory parameter. The range is 0-255, unit is second, after set <time> will report the system information every the seconds.

AT+CPSI? Defined values:

Parameters	Description
<System Mode>	System mode, values: "NO SERVICE", "GSM", "LTE", "ERROR"...
<MCC>	Mobile Country Code (first part of the PLMN code)
<MNC>	Mobile Network Code (second part of the PLMN code)
<LAC>	Location Area Code (hexadecimal digits)
<Cell ID>	Service-cell ID.

<Absolute RF Ch Num>	AFRCN for service-cell.
<C1>	Coefficient for base station selection
<C2>	Coefficient for Cell re-selection
<Frequency Band>	Frequency Band of active set
<RxLev>	RX level value for base station selection
<TAC>	Tracing Area Code
<PCellID>	Physical Cell ID
<dlbw>	Transmission bandwidth configuration of the serving cell on the downlink
<ulbw>	Transmission bandwidth configuration of the serving cell on the uplink
<RSRP>	Current reference signal receive power in dBm x10, Range: -44 to -140.
<RSRQ>	Current reference signal receive quality, The quantities are in dB x10. Range: -20.0 to -3.0 dB.
<RSSI>	Received signal strength indicator, values are in dBm x10. Range: -120.0 to 0.
<SINR>	Serving cell SINR information, Values are in 1/5th of a dB. Range 0-250 which translates to -20dB - +30dB.

Example:

Commands	Response
AT+CPSI=?	+CPSI: (0-255) OK
AT+CPSI=5	OK

AT+CPSI?	+CPSI:LTE,1120,0,33033,20487,305,40,5,34,36,0,16
	OK

5.9 AT+CNMP Preferred Mode Selection

This command is used to preferred mode selection

Test Command AT+CNMP=?	Response +CNMP: (list of supported <n>s) OK
Read Command AT+CNMP?	Response +CNMP:<mode> OK
Write Command AT+CNMP=<mode>	Response This command is used to select or set the state of the mode preference, The read command return the current preferred mode that may differ from the setting because of other network operations. OK If <mode> not supported by module, this command will return ERROR: ERROR Note: Currently, CNMP=2 is not supported to switch to CNMP=1. Please switch to CNMP=0 before switching back to CNMP=1

Parameters are defined below:

Parameters	Description
<mode>	integer type 0 GSM 1 LTE

5.10 AT+BAND GSM/UMTS/LTE mode and optionally band settings

This command is used to controls parameters for GSM/UMTS/LTE user mode and optionally band settings.

The new parameters will be saved in NVM, UE will be reset to apply the new settings.

The default value of <bandPriorityFlag> is 0, it only works if <mode> is LTE.

<p>Write Command AT+BAND=<mode>,<gsmband>,<umtsband>,<ltebandh>,<ltebandl>[,<roamingConfig>[,<srvDomain>,<bandPriorityFlag>]]]</p>	<p>Response OK or +CME ERROR:<err></p>
<p>Test Command AT+BAND=?</p>	<p>Response +BAND: (list of supported<mode>s),<gsm_band>,<umts_band>,<ltebandh>,<ltebandl> OK/+CME ERROR: <err></p>
<p>Read Command AT+BAND?</p>	<p>Response +BAND :<mode>,<gsmband>,<umtsband>,<ltebandh>,<ltebandl>,<roamingConfig>,<srvDomain>,<bandPriorityFlag>,<isLTEDualLink> OK Note: If has used set command to set GSM band in GSM mode(AT+BAND=0,<gsm_band>), and current is in GSM mode, the queried GSM band will mask a GSM band lock 0x200.</p>

Parameters are defined below:

Parameters	Description
------------	-------------

<mode>	<p>integer type</p> <ul style="list-style-type: none"> 0 GSM network 1 UMTS network 2 Dual mode(auto) 3 Dual mode(GSM preferred) 4 Dual mode(UMTS preferred) 5 LTE network 6 Dual mode(2G/4G)(auto) 7 Dual mode(2G/4G)(GSM preferred) 8 Dual mode(2G/4G)(LTE preferred) 9 Dual mode(3G/4G)(auto) 10 Dual mode(3G/4G)(UMTS preferred) 11 Dual mode(3G/4G)(LTE preferred) 12 Triple mode(2G/3G/4G) (auto) 13 Triple mode(2G/3G/4G) (GSM preferred) 14 Triple mode(2G/3G/4G) (UMTS preferred) 15 Triple mode(2G/3G/4G) (LTE preferred) 16 Dual link (GSM/LTE) 17 Dual link(UMTS/LTE) 18 Dual link(GSM/UMTS/LTE) (UMTS preferred for 2/3G link)
<gsmband>	<p>integer type;GSM network band</p> <p>If <mode> is set to GSM network, gsmband is a sum of integers each representing a GSM band (in other words bit mask)</p> <ul style="list-style-type: none"> 1 PGSM 900 (standard or primary) 2 DCS GSM 1800 4 PCS GSM 1900 8 EGSM 900 (extended) 16 GSM 450 32 GSM 480 64 GSM 850 78 DCS GSM 1800PCS GSM 1900EGSM 900GSM 850 <p>Note: now only support PGSM 900 and DCS GSM 1800</p>
<umtsband>	<p>integer type; UMTS network band</p> <p>If <mode> is set to UMTS network, umtsband is a sum of integers each representing a UMTS band (in other words bit mask)</p> <ul style="list-style-type: none"> 1 UMTS_BAND_1 2 UMTS_BAND_2 4 UMTS_BAND_3 8 UMTS_BAND_4 16 UMTS_BAND_5 32 UMTS_BAND_6 64 UMTS_BAND_7 128 UMTS_BAND_8 256 UMTS_BAND_9

<ltebandh>	<p>integer type; TD LTE network band</p> <p>If <mode> is set to TD LTE network, ltebandh is a sum of integers each representing a TD LTE band (in other words bit mask)</p> <p>32 TDLTE_BAND_38 64 TDLTE_BAND_39 128 TDLTE_BAND_40 256 TDLTE_BAND_41</p>
<ltebandl>	<p>integer type;FDD LTE network band</p> <p>If <mode> is set to FDD LTE network, ltebandl is a sum of integers each representing a FDD LTE band (in other words bit mask)</p> <p>1 FDDLTE_BAND_1 2 FDDLTE_BAND_2 4 FDDLTE_BAND_3 8 FDDLTE_BAND_4 16 FDDLTE_BAND_5 64 FDDLTE_BAND_7 4096 FDDLTE_BAND_13 65536 FDDLTE_BAND_17 524288 FDDLTE_BAND_20</p>
<roamingConfig>	<p>integer type;</p> <p>0 not support 1 support 2 no change</p>
<srvDomain>	<p>integer type;</p> <p>0 CS only 1 PS only 2 CS and PS 3 ANY 4 no change</p>
<bandPriorityFlag>	<p>integer type;</p> <p>0: default 1: TD-LTE 2: FDD-LTE</p>
<isLteDualLink>	<p>integer type;</p> <p>0: single link 1: dual link</p>

6.MT control and status Commands

6.1 AT+CFUN Set Phone Functionality

Set command selects the level of functionality <fun> in the MT.

Test Command AT+ CFUN=?	Response +CFUN: (list of supported <fun>s), (list of supported <rst>s) OK or +CME ERROR: <err>
Write Command AT+CFUN=<fun>[,<rst>]	Response OK or +CME ERROR: <err> Note: Currently, CFUN=5 is not supported to switch to CFUN=1. Please switch to CFUN=0 before switching back to CFUN=1
Read Command AT+CFUN?	Response +CFUN:<fun> OK Or +CME ERROR: <err>

Parameters are defined below:

Parameters	Description
<fun>	0 minimum functionality 1 full functionality 3 disable phone receive RF circuits 4 disable phone both transmit and receive RF circuits (supported only for module solution) 5 disable SIM
<rst>	0 do not reset the MT before setting it to <fun> power level 1 reset the MT before setting it to <fun> power level

6.2 AT+CPIN Enter PIN

Set command sends to the ME a password which is necessary before it can be operated (SIM PIN, SIM PUK, PH-SIM PIN, etc.). If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken towards ME and an error message, +CME ERROR, is returned to TE. Refer [1] 9.2 for possible <err> values.

If the PIN required is SIM PUK or SIM PUK2, the second pin is required. This second pin, <newpin>, is used to replace the old pin in the SIM.

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

Parameters are defined below:

Parameters	Description
<pin>	String type values
<newpin>	String type values,new pin after <pin> check pass

<code>

<code>values reserved by the present document:

READY MT is not pending for any password

SIM PIN MT is waiting SIM PIN to be given

SIM PUK MT is waiting SIM PUK to be given

PH-SIM PIN MT is waiting phone to SIM card password to be given

PH-FSIM PIN MT is waiting phone-to-very first SIM card password to be given

PH-FSIM PUK MT is waiting phone-to-very first SIM card unblocking password to be given

SIM PIN2 MT is waiting SIM PIN2 to be given

SIM PUK2 MT is waiting SIM PUK2 to be given

PH-NET PIN MT is waiting network personalization password to be given

PH-NET PUK MT is waiting network personalization unblocking password to be given

PH-NETSUB PIN MT is waiting network subset personalization password to be given

PH-NETSUB PUK MT is waiting network subset personalization unblocking password to be given

PH-SP PIN MT is waiting service provider personalization password to be given

PH-SP PUK MT is waiting service provider personalization unblocking password to be given

PH-CORP PIN MT is waiting corporate personalization password to be given

PH-CORP PUK MT is waiting corporate personalization unblocking password to be given

6.3 AT+CSQ Signal Quality

The command returns received signal strength indication<rssi> and channel bit error rate <ber> from the ME

Execution Command

AT+ CSQ

Response

+CSQ: <rssi>,<ber>

OK

or

+CME ERROR:<err>

Test Command AT+CSQ=?	Response +CSQ: (0-31),(0-7) OK
---------------------------------	--

Parameters are defined below:

Parameters	Description
<rssI>	0-113dBm or less 1 -111dBm 2...30 -109... -53dBm 31-51dBm or greater 99 not known or not detectable
<ber>	0...7 as RXQUAL values in the table in TS 45.008 [20] subclause 8.2.4 99 not known or not detectable

6.4 AT+CIND Indicator control

Displays the value of ME indicators

Test Command AT+CIND=?	Response +CIND: ("service",(0-1)) OK or +CME ERROR: <err>
Read Command AT+CIND?	Response +CIND: <ind>[,<ind>[,...]] OK or +CME ERROR: <err>
Write Command AT+CIND=[<ind>[,<ind>[,...]]	Response OK or +CME ERROR: <err>
Reference note:	Note "call setup" is proprietary defined in MTK solution and only used when BT supported.

Parameters are defined below:

Parameters	Description
<ind>	integer type value, which shall be in range of corresponding <descr> <descr> values reserved by the present document and their <ind> ranges: "battchg" battery charge level (0-5) "signal" signal quality (0-5) "service" service availability (0-1) "sounder" (0-1) "message" message received (0-1) "call" call in progress (0-1) "roam" roaming indicator (0-1) "smsfull" a short message memory storage in the MT has become full(1) or memory locations are available (0)

6.5 AT+CCLK Clock

Set command sets the real-time clock of the MT.

Read command returns the current setting of the clock.

Test Command AT+CCLK=?	Response OK
Read Command AT+CCLK?	Response +CCLK: <time> OK or +CME ERROR: <err>
Write Command AT+CCLK=<time>	Response OK or +CME ERROR:<err>

Parameters are defined below:

Parameters	Description
<time>	string type value; format is "yy/MM/dd,hh:mm:ss+timezone", where characters indicate year (two last digits), month, day, hour, minutes, seconds.If does not support timezone,the<time> format is "yy/MM/dd,hh:mm:ss"or"yy/MM/dd,hh:mm:ss+"

6.6 AT+CTZR Time Zone Reporting

Enable/Disable the time zone change event reporting. If the reporting is enabled the MT returns the unsolicited result code +CTZV: <tz> whenever the time zone is changed.

Write Command AT+CTZR=<mode>	Response OK or +CME ERROR:<err>
Read Commands AT+CTZR?	Response +CTZR: <mode> OK or +CME ERROR: <err>
Test Command AT+CTZR=?	Response +CTZR: (list of supported <mode>s) OK
Reference note	Note China Mobile card only. Send AT+CTZR=1 command immediately when modem starting up; or send the following commands in order AT+CTZR=1、AT+CFUN=0、 AT+CFUN=1.

Parameters are defined below:

Parameters	Description
<mode>	Integer type value indicating: 0 Disable automatic time zone update via NITZ. 1 Enable automatic time zone update via NITZ(default).

7.GPRS Commands(27.007)

7.1 AT+CGDCONT Define PDP Context

This command is used to Specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>.

<p>Test Command AT+CGDCONT=?</p>	<p>Response +CGDCONT: (range of supported <cid>s), <PDP_type>,,(list of supported <d_comp>s), (list of supported <h_comp>s),(list of supported <pd1>s)[,...[(list of supported <pdN>s)]]] [<CR><LF>+CGDCONT: (range of supported <cid>s), <PDP_type>,,(list of supported <d_comp>s), (list of supported <h_comp>s),(list of supported <pd1>s)[,...[(list of supported <pdN>s)]]] [...] OK</p>
<p>Read Command AT+CGDCONT?</p>	<p>Response +CGDCONT: <cid>, <PDP_type>, <APN>, <PDP_addr>, <d_comp>, <h_comp>[,<pd1>[,...[,pdN]]] [<CR><LF>+CGDCONT: <cid>, <PDP_type>, <APN>,<PDP_addr>, <d_comp>, <h_comp>[,<pd1>[,...[,pdN]]] [...] OK</p>
<p>Write Command AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<pd1>[,...[,pdN]]]]]]]]]</p>	<p>Response OK or +CME ERROR:<err></p>

Reference	Note
	Only set 1 PDP channel parameter(APN,pdptype,cid etc..) to execute AT+CGACT=1 ,1 and active PDP context.

Parameters are defined below:

Parameters	Description
<cid>	(PDP Context Identifier) a numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1) is returned by the test form of the command.
<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. If the value is null or omitted, then the subscription value will be requested.
<PDP_address>	a string parameter that identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The read form of the command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using the +CGPADDR command.
<d_comp>	a numeric parameter that controls PDP data compression (applicable for SNDTCP only) 0 - off (default if value is omitted)
<h_comp>	a 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>

7.2 AT+CGQREQ Quality of Service Profile(Requested)

This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network.

Test Command AT+CGQREQ=?	Response +CGQREQ: <PDP_type>, (list of supported<precedence>s), (list of supported<delay>s), (list of supported<reliability>s) , (list of supported<peak>s), (list of supported<mean>s) [<CR><LF>+CGQREQ: <PDP_type>, (list of supported<precedence>s), (list of supported<delay>s), (list of supported<reliability>s) , (list of supported<peak>s), (list of supported<mean>s)[...]] OK
Read Command AT+CGQREQ?	Response +CGQREQ: <cid>, <precedence>,<delay>, <reliability>, <peak>, <mean>[<CR><LF>+CGQREQ: <cid>, <precedence>, <delay>, <reliability.>, <peak>,<mean>[...]] OK or +CME ERROR:<err>
Write Command AT+CGQREQ=[<cid>[,<precedence>[,<delay>[,<reliability.>[,<peak>[,<mean>]]]]]]	Response +CGQREQ: <cid>, <precedence>,<delay>, <reliability>, <peak>, <mean>[<CR><LF> OK or +CME ERROR:<err>

Parameters are defined follow:

Parameters	Description
<cid>	a numeric parameter which specifies a particular PDP context definition
<precedence>	a numeric parameter which specifies the precedence class
<delay>	a numeric parameter which specifies the delay class
<reliability>	a numeric parameter which specifies the reliability class
<peak>	a numeric parameter which specifies the peak throughput class
<mean>	a numeric parameter which specifies the mean throughput class

7.3 AT +CGQMIN Quality of Service Profile(Minimum acceptable)

This command allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile returned in the Activate PDP Context Accept message.

Test Command AT+CGQMIN=?	Response +CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s) [<CR><LF>+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s)[...]] OK
Read Command AT+CGQMIN?	Response +CGQMIN: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>[<CR><LF>+CGQMIN: <cid>, <precedence>, <delay>, <reliability>., <peak>, <mean>[...]] OK
Write Command AT+CGQMIN=[<cid>[,<precedence>[,<delay>[,<reliability>., <peak> [,<mean>]]]]]	Response OK or +CME ERROR:<err>

Parameters are defined below:

Parameter	Description
PDP_type	IP Internet Protocol IPV6 Internet Protocol IPV4V6 Virtual introduced to handle dual IP stack UE capability PPP Point to Point Protocol
<cid>	a numeric parameter which specifies a particular PDP context definition
<precedence>	a numeric parameter which specifies the precedence class
<delay>	a numeric parameter which specifies the delay class
<reliability>	a numeric parameter which specifies the reliability class
<peak>	a numeric parameter which specifies the peak throughput class
<mean>	a numeric parameter which specifies the mean throughput class

7.4 AT+CGATT PS attach or detach

The execution command is used to attach the MT to, or detach the MT from, the Packet Domain service. After the command has completed, the MT remains in V.250 command state

Test Command AT+CGATT=?	Response +CGATT: (list of supported <state>s) OK
Read Command AT+CGATT?	Response +CGATT: <state> OK or +CME ERROR:<err>
Write Command AT+CGATT= <state>	Response +CGATT: <state> OK or +CME ERROR:<err>

Parameters are defined below:

Parameters	Description
<state>	indicates the state of PS attachment 0 detached 1 attached

7.5 AT+CGACT PDP Context activate or deactivate

Test Command AT+CGACT=?	Response +CGACT: (list of supported <state>s) OK
Read Command AT+CGACT?	Response +CGACT: <cid>, <state>[<CR><LF>+CGACT: <cid>, <state>[...]] OK
Write Command AT+CGACT=<state>[,<c id>]	Response OK or +CME ERROR:<err>

Parameters are defined below:

Parameters	Description
<state>	indicates the state of PDP context activation 0 deactivated 1 activated Other values are reserved and will result in an ERROR response to the execution command.
<cid>	a numeric parameter which specifies a particular PDP context definition. If no <cid> is specified, then UE will return ERROR. The usage of omitted <cid> to activate/deactivate.

7.6 AT+CGDATA Enter data state

The execution command causes the MT to perform whatever actions are necessary to establish communication between the TE and the network using one or more Packet Domain PDP types.

Write Command AT+CGDATA=<L2P> ,<cid>	Response CONNECT or +CME ERROR:<err>
Test Command AT+CGDATA=?	Response +CGDATA: (list of supported <L2P>s),(1-16) OK

Parameters are defined below:

Parameters	Description
<L2P>	a string parameter that indicates the layer 2 protocol to be used between the TE and MT PPP Point-to-point protocol for a PDP such as IP Other values will result in an ERROR response. PPP Point-to-point protocol for a PDP such as IP
<cid>	a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT command). Range from 1 to 16.

7.7 AT+CGPADDR Show PDP address

The execution command returns a list of PDP addresses for the specified context identifiers. The test command returns a list of defined <cid>s.

Write Command AT+CGPADDR=<cid>[,<cid>[,]]	Response +CGPADDR: <cid>,<PDP_addr>[<CR><LF>+CGPADDR:<cid>,<PDP_addr>[...]] OK Or +CME ERROR:<err>
Test Command AT+CGPADDR=?	Response +CGPADDR: (list of defined <cid>s) OK

Parameters are defined below:

Parameters	Description
<cid>	a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT command). If no <cid> is specified, an ERROR result code will be returned. Multiple <cid> field is not supported. For a dynamic address it will be the one
<PDP_address>	a string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT and assigned during the last PDP context activation that used the context definition referred to by <cid>. <PDP_address> is omitted if none is available.

7.8 AT+CGCLASS GPRS mobile station class

The set command is used to set the MT to operate according to the specified GPRS mobile class. If the requested class is not supported, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command. The read command returns the current GPRS mobile class.

The test command is used for requesting information on the supported GPRS mobile classes.

Write Command AT+CGCLASS=<class>	Response OK or +CME ERROR:<err>
Read Command AT+CGCLASS?	Response +CGCLASS:<class> OK

Test Command AT+CGCLASS=?	Response +CGCLASS: (list of supported <class>s) OK
-------------------------------------	--

Parameters are defined below:

Parameters	Description
<class>	<p>A string parameter which indicates the GPRS mobile class (in descending order of functionality) (not support)</p> <p>A class-A mode of operation(A/Gb mode),or CS/PS mode of operation(lu mode)(highest mode of operation)</p> <p>B class-B mode of operation(A/Gb mode),(not application in lu mode)</p> <p>CG class-C mode of operation in PS only mode(A/Gb mode),or PS mode of operation(lu mode)</p> <p>CC class-C mode of operation in CS only mode(A/Gb mode),or CS(lu mode)(lowest mode of operation)</p> <p>NOTE:<class>A means that the MT would operate simultaneous PS and CS service <class> B means that the MT would operate PS and CS Services but not simultaneously <class>CG means that the MT would only operate PS services<class>CC means that the MT would only operate CS services Other values are reserved and will result in an ERROR response to the set command</p> <p>If the MT is attached to the PS domain when the set command is issued with a <class> = CC specified,a PS detach shall be performed by the MT.</p>

7.9 AT+CGSMS Select service for MO SMS messages

The set command is used to specify the service or service preference that the MT will use to send MO SMS messages.

The read command returns the currently selected service or service preference.

The test command is used for requesting information on the currently available services and service preferences.

Write Command AT+CGSMS=<service>	Response OK or +CME ERROR:<err>
Read Command AT+CGSMS?	Response +CGSMS: <service> OK

Parameters are defined below:

Parameters	Description
<service>	0 Packet Domain 1 circuit switched 2 Packet Domain preferred (use circuit switched if GPRS not available) 3 circuit switched preferred (use Packet Domain if circuit switched not available)

7.10 AT+CGEREP Control Unsolicited GPRS Event Reporting

This command is used to control unsolicited GPRS event reporting.

Write Command AT+CGEREP=<mode>	Response OK or +CME ERROR:<err>
Read Command AT+CGEREP?	Response +CGEREP: <mode>,<bfr> OK
Test Command AT+CGEREP=?	Response +CGEREP: (0-2),(0-1) OK

Parameters are defined below:

Parameters	Description
<mode>	0 buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE 1 discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE 2 buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE
<bfr>	0 MT buffer of unsolicited result codes defined within this command is cleared when <mode>1 or 2 is entered. 1 MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes).

8.AT commands for Lock

8.1 AT+MLKSTA Get Lock State

This command is used to get lock state.

Read Command	Response
AT+MLKSTA?	+MLKSTA:0 // No lock OK or +MLKSTA:1,<lock_type> // Lock to <lock_type> OK

Parameters are defined below:

Parameters	Description
<lock_type>	+MLKBAND Lock band +MLKNET Lock network +MLKSIM Lock Sim card +MLKCELL Lock cell

Example:

Commands	Response
AT+MLKSTA?	+MLKSTA:0 // Lock is closed OK
AT+MLKSTA?	+MLKSTA:1,+MLKBAND // Lock band OK

8.2 AT+CELLINFO Get Nearby Cell Information

This command is used to get Nearby cell information

Read Command AT+CELLINFO?	Response +CELLINFO:<net_mode>,<net> <nmr_1>...<nmr_n> <nmr_1>...<nmr_n> OK Nearby cell information for GSM For current and nearby cell <lac>,<cell_id>,<rssi> Nearby cell information for LTE For current cell: <tac>,<cell_id>,<rssi> For nearby cell: <earfcn>,<pci>,<rssi>
-------------------------------------	--

Parameter are defined below:

Parameters	Description
<net_mode>	0 GSM 1 LTE

8.3 AT+MLKBAND Lock to Band

This command is used to lock band

Execute Command AT+MLKBAND	Response +MLKBAND 0:<band_1>, ... ,<band_n> // Support general bands 1:<band_1>, ... ,<band_n> // Support LTE bands 2:<band_1>, ... ,<band_n> // Support TDS bands OK
Read Command AT+MLKBAND?	Response +MLKBAND 0:<band_1>, ... ,<band_n> // Locked general bands 1:<band_1>, ... ,<band_n> // Locked LTE bands 2:<band_1>, ... ,<band_n> // Locked TDS bands OK or AT+MLKBAND? +MLKBAND:0 // Band lock is closed OK

Write Command AT+MLKBAND=<state>, <band_type>,<band>	Response OK Or ERROR
--	---

Parameter are defined below:

Parameters <state>	Descripton 0 Unlock from band 1 Lock to band
<band_type>	0 Generalband 1 GSM band 2 LTE band
<band>	<gsm_band>: /*GSM, 0~1*/ 0 PGSM 900 1 DCS GSM 1800 <LTE_band>: /*FDD LTE:0~30, TDD LTE:31~43*/ 0-63: Band1~Band64

8.4 AT+MLKNET Lock to network

This command is used to lock network

Write Command AT+MLKNET=<state1>	Response This command is used to lock to network. Take effect after reboot +CFUN. OK ERROR
Read Command AT+MLKNET?	Response AT+MLKNET? +MLKNET:0 // Network lock is closed OK or AT+MLKNET? +MLKNET:1,<net_1>, ... ,<net_n> // Locked networks OK

Parameter are defined below:

Parameters <state1>	Descripton 0 Unlock from network 1 Lock to network
-------------------------------------	--

8.5 AT+MLKSIM Lock to SIM Card

This command is used to lock sim card

Write Command AT+MLKSIM=<state>[,<imsi>]	Response This command is used to lock to sim card. Take effect after reboot +CFUN. OK ERROR
Read Command AT+MLKSIM?	Response AT+MLKSIM? +MLKSIM:0 // SIM lock is closed OK or AT+MLKSIM? +MLKSIM:1,<imsi> // Locked sim card by IMSI OK

Parameter are defined below:

Parameters <state1>	Description 0 Unlock from sim 1 Lock to sim
<imsi>	The IMSI of sim card.The length of IMSI is 15.This only set when <state> is 1

8.6 AT+MLKCELL Lock to CELL

This command is used to lock to cell

Execute Command AT+MLKCELL	Response +MLKCELL:<net_type>,<net_string> <data_1_1>[,<data_1_2>]; ... ;<data_n_1>[,<data_n_2>] OK
Read Command AT+MLKCELL?	Response +MLKCELL:0 // Lock cell is closed OK or +MLKCELL:1 // Lock cell is opened 1,0/arfcn // GSM 2,0/earfdn,pci // LTE OK

Write Command AT+MLKCELL=<state>[, <net_type>[,<data1>[,<d ata2>]]]	Response This command is used to lock to cell. OK ERROR
---	---

Parameters are defined below:

Parameters <state>	Description 0 Unlock from cell 1 Lock to cell
<net_type>	1 GSM 2 UMTS 3 LTE (Take effect only for "LTE only" mode)

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9.SMS AT Commands

9.1 AT+CSMS Select Message Service

Selects the message service and returns the type of messages supported by the ME. If chosen service is not supported by the ME (but supported by the TA), +CME ERROR is returned.

Write Command AT+CSMS=<service>	Response +CSMS:<service>,<mt>,<mo>,<bm> OK or +CMS ERROR: <err>
Read Command AT+ CSMS?	Response +CSMS: <service>,<mt>,<mo>,<bm> OK
Test Command AT+ CSMS=?	Response +CSMS: (list of supported <service>s) OK

Parameters are defined below:

Parameters	Description
<service>	0 3GPP TS 23.040 [3] and 3GPP TS 23.041 [4] 1 3GPP TS 23.040 [3] and 3GPP TS 23.041 [4] the requirement of <service> setting 1 is mentioned under corresponding commanddescriptions)
<mt>	0 type not supported 1 type supported
<mo>	0 type not supported 1 type supported
<bm>	0 type not supported 1 type supported

9.2 AT+CPMS Preferred Message Storage

Selects memory storage spaces to be used for reading, writing, etc. If chosen storage is not

appropriate for the ME (but is supported by the TA), +CME ERROR is returned.

Write Command AT+CPMS=<mem1>[,<mem2>[,<mem3>]]	Response +CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK or +CMS ERROR: <err>
Read Command AT+ CPMS?	Response +CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> OK or +CMS ERROR: <err>
Test Command AT+ CPMS=?	Response +CPMS: ("SM"),("SM"),("SM") OK

Parameters are defined below

Parameters	Description
<mem1>	SM SIM card ME modem SM_P SIM priority(not support) ME_P Modem NV priority(not support) MT Modem terminal
<mem2>	SM SIM card ME modem SM_P SIM priority(not support) ME_P Modem NV priority(not support) MT Modem terminal
<mem3>	SM SIM card ME modem SM_P SIM priority(not support) ME_P Modem NV priority(not support) MT Modem terminal
<usedX>	Num of memX used

9.3 AT+CMGF Message Format

Sets the input and output format to be used by the TA

Write Command AT+CMGF=[<mode>]	Response OK
Read Command AT+CMGF?	Response +CMGF: <mode> OK
Test Command AT+CMGF=?	Response +CMGF: (list of supported <mode>s) OK

Parameters are defined below:

Parameters	Description
<mode>	0 PDU mode (default when implemented) 1 TEXT mode

9.4 AT+CMGS Send Message

This command send SMS message from TE to network in text or PDU mode

Write Command If PDU mode(+CMGF=0) AT+CMGS=<length><C R> PDU is given<ctrl+z/ESC> if text mode (+CMGF=1): AT+CMGS=<da>[,<today>] <CR> Text entered<ctrl-Z/ESC>	Response +CMGS:<length> OK
Test Command AT+CMGS=?	Response +CMGS: OK

9.5 AT+CMGW Stores Message

This command stores a message in memory storage

<p>Write Command</p> <p>if text mode (+CMGF=1): AT+CMGW=<oa/da>[,<tooa/toda>[,<stat>]]<CR> > Text is entered<ctrl-Z/ESC></p> <p>if PDU mode (+CMGF=0): AT+CMGW=<length>[,<stat>]<CR> PDU is given<ctrl-Z/ESC></p>	<p>Response</p> <p>+CMGW:<index> OK Or +CMS ERROR:<err></p>
<p>Test Command</p> <p>AT+CMGW=?</p>	<p>Response</p> <p>+CMGW: OK</p>

Parameters are defined below:

Parameters	Description
<length>	Length of the PDU to be sent in bytes
<stat>	Message status 0 new message 1 read message 2 stored message not yet sent 3 stored message already sent
<index>	Message location index in the memory<memw>
<da>	Destination address, string type represented in the currently selected character set if the network is UMTS.
<toda>	Type of destination address 129- number in national format 145-number in international format
<Text mode> <stat>	Message status "REC UNREAD"-new received message unread "REC READ"-received message read "STO UNSENT"-message stored not yet sent(default) "STO SENT"-message stored already sent

9.6 AT+CMGD Delete Message

This command deletes message from preferred message storage<mem1> location

Write Command AT+CMGD=<index>[,<deflag>]	Response OK Or +CMS ERROR:<err>
Test Command AT+CMGD=?	Response +CMGD: (list of valid <index>s),(list of valid<deflag>s) OK

Parameters are defined below:

Parameters	Description
<index>	message index in the selected storage <memr>
<deflag>	0 (or omitted) - delete message specified in <index> 1 Deletes all read messages 2 Deletes all read messages and sent MO messages 3 Deletes all read messages,sent and unsent MO messages 4 Deletes all messages

9.7 AT+CMGL List messages

This command is used to returns messages with status value <stat> from preferred message storage <mem1> to the TE.

<p>Write Command</p> <p>AT+CMGL=[<stat>]</p>	<p>Response</p> <p>if PDU mode(+CMGF=0), command successful +CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu> [<CR><LF>+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu> >[...]] OK</p> <p>if text mode (+CMGF=1), command successful and SMS-DELIVERs: +CMGL:<stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>[<CR><LF>+CMGL:<stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>[...]] OK</p> <p>if text mode (+CMGF=1), command successful and SMS-SUBMITs: +CMGL: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>[<CR><LF>+ CMGL: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>[...]] OK</p> <p>Or +CMS ERROR:<err></p>
<p>Test Command</p> <p>AT+CMGL=?</p>	<p>Response</p> <p>if PDU mode (+CMGF=0) +CMGL: (0-4) OK</p> <p>if text mode (+CMGF=1) +CMGL: "REC UNREAD","REC READ","STO UNSENT","STO SENT","ALL" OK</p>

Parameters are defined below:

Parameters	Description
<stat>	0 - new message 1 - read message 2 - stored message not yet sent 3 - stored message already sent 4 - all messages.

9.8 AT+CMGR Read Message

This command retrieves a message from the short message storage. The short message storage being used is defined by the command +CPMS

<p>Write Command AT+CMGR=<index></p>	<p>Response</p> <p>if PDU mode (+CMGF=0) , command successful: +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu></p> <p>OK</p> <p>if text mode (+CMGF=1), command successful and SMS-DELIVER: +CMGR:<stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>]<CR><LF><data></p> <p>OK</p> <p>if text mode (+CMGF=1), command successful and SMS-SUBMIT: +CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dc>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data></p> <p>OK</p> <p>Or</p> <p>+CMS ERROR:<err></p>
<p>Test Command AT+CMGR=?</p>	<p>Response</p> <p>OK</p>
<p>Parameters are defined below:</p>	
<p>Parameters</p>	<p>Description</p>

<index>

(PDU Mode)
 The output has the following format:
 +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> Where:
 <stat> - status of the message
 0 - new message
 1 - read message
 2 - stored message not yet sent
 3 - stored message already sent
 <alpha> - string type alphanumeric representation of <da> or <oa>, corresponding to an entry found in the phonebook; used character set is the one selected with command +CSCS.
 <length> - the length of the actual TP data unit in octets.(i.e. the RP layer SMSC address octets are not counted in the length)
 <pdu> - message in PDU format according to 3GPP TS 3.40/23.040.

(Text Mode)
 Output format for received messages (the information written in italics will be present depending on +CSDH last setting):
 +CMGR: <stat>,<oa>,[<alpha>],<scts>[,<toa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>]<CR><LF><data>
 Output format for message delivery confirm:
 +CMGR: <stat>,<fo>,<mr>,,,<scts>,<dt>,<st>

9.9 AT+CSCA Service Center Address

Updates the SMCS address, through which mobile-originated SMSs are transmitted. In text mode, the setting is used by send (AT+CMGS) and write (AT+CMGW) commands. In PDU mode, the setting is used by the same commands, but only when the length of the SMCS address (coded into <pdu> parameter) equals zero..

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

Test Command AT+ CSCA=?	Response OK
Reference	Note This AT is related to local operators,CTCC dont support it for the moment.

Parameters are defined below:

Parameters	Description
<sca>	GSM 04.11 RP SC address Address-Value filed in string format
<tosca>	GSM 04.11 RP SC address Type-of-address octet in integer format

Example:

AT Command	Response
AT+CSCA="+8613800100500"	OK
AT+CSCA?	+CSCA:"8613800100500",145 OK

9.10 AT+CSMP Set Text Mode Parameters

Setting Text Mode Parameters. Set command is used to select values for additional parameters needed when SM is sent to the network or placed in a storage when text format message mode is selected. It is possible to set the validity period starting from when the SM is received by the SMSC (<vp> is in range 0... 255) or define the absolute time of the validity period termination (<vp> is a string). The format of <vp> is given by <fo>.

Write Command AT+CSMP=<fo>[,<vp>[,<pid>[,<dc>]]]	Response OK or +CMS ERROR:<err>
Read Command AT+ CSMP?	Response +CSMP:<fo>,<vp>,<pid>,<dc> OK Or +CMS ERROR:<err>
Test Command AT+ CSMP=?	Response OK or +CMS ERROR:<err>

9.11 AT+CSCB Select Cell Broadcast Message Types

Selects which types of CBMs are to be received by the ME.

Write Command AT+CSCB=[<mode>[,<mids>[,<dcss>]]]	Response TA selects which types of CBMs are to be received by the ME. Note: The Command writes the parameters in NON-VOLATILE memory. OK If error is related to ME functionality: +CMS ERROR: <err>
Read Command AT+ CSCB?	Response +CSCB: <mode>,<mids>,<dcss> OK
Test Command AT+ CSCB=?	Response +CSCB: (0,1) OK

Parameters are defined below:

Parameters	Description
<mode>	0 message types specified in <mids> and <dcss> are accepted 1 message types specified in <mids> and <dcss> are not accepted
<mids>	We support 10 message identifiers at most. String type (string should be included in quotation marks); all different possible combinations of CBM message identifiers (refer <mid>) (default is empty string); e.g. "0,1,5,320,922". Total 15 different <mids> values can be supported. <mids> values cannot be written consecutively, such as "100-200"
String type	all different possible combinations of CBM message identifiers (refer <mid>) (default is empty string);
<dcss>	string type; all different possible combinations of CBM data coding schemes (refer <dc>) (default is empty string);e.g. "0-3,5"

Example:

AT Command	Response
AT+CSCB=?	+CSCB:(0,1) OK
AT+CSCB?	+CSCB:1,"5","3"
AT+CSCB=1,"5","3"	OK

9.12 AT+CMSS Sends message with location value

This command sends message with location value <index> from preferred message storage to the network.

Write Command AT+CMSS=<index>[,<da>[,<total>]]	Response OK or +CMS ERROR: <err>
Test Command AT+CMSS=?	Response OK

Parameters are defined below:

Parameters	Description
<index>	Message location index in the memory<memw>
<da>	Destination address,string type represented in the currently selected character set if the network is UMTS.
< toda>	Type of destination address 129- number in national format 145-number in international format

9.13 AT+CNMI New Message Indications to TE

Set command selects the procedure,how receiving of new messages from the network is indicated to The TE when TE is active

Write Command AT+CNMI=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]	Response OK or +CMS ERROR: <err>
Read Command AT+CNMI?	Response +CNMI: <mode>,<mt>,<bm>,<ds>,<bfr> OK

Test Command AT+CNMI=?	Response +CNMI: (list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s) OK
----------------------------------	---

Parameters are defined below:

Parameters	Description
<mode>	<p>0 disable unsolicited result code</p> <p>1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.</p> <p>2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.</p> <p>3 Forward unsolicited result codes directly to the TE. TA-TE link specific in band technique used to embed result codes and data when TA is in on-line data mode</p>
<mt>	<p>0 No SMS-DELIVER indications are routed to the TE.</p> <p>1 If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index></p> <p>2 SMS-DELIVERs (except class 2 messages and messages in the message waiting indication group(store message)) are routed directly to the TE using unsolicited result code: +CMT: [<alpha>],<length><CR><LF><pdu> (PDU mode enabled); or +CMT: <oa>, [<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>] <CR><LF><data> (text mode enabled; about parameters in italics, refer command Show Text Mode Parameters +CSDH)</p> <p>3 Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in <mt>=2. Messages of other data coding schemes result in indication as defined in <mt>=1</p>

<bm>	<p>0No CBM indications are routed to the TE.</p> <p>2New CBMs are routed directly to the TE using unsolicited result code: +CBM: <length><CR><LF><pdu> (PDU mode enabled); or +CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (text mode enabled)If ME supports data coding groups which define special routing also for messages other than class 3 (e.g. (U)SIM specific messages), ME may choose not to route messages of such data coding schemes into TE (indication of a stored CBM may be given as defined in <bm>=1).</p>
<ds>	<p>0No SMS-STATUS-REPORTs are routed to the TE.</p> <p>1SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: <length><CR><LF><pdu> (PDU mode enabled); or +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled)</p>
<bfr>	<p>0TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode>1 is entered (OK response shall be given before flushing the codes).</p> <p>1TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered.</p>

10. Hardware Testing AT Commands

10.1 AT+CGDRT Set the Direction of Specified GPIO

This Command is used to Set the direction of specified GPIO

Write Command AT+CGDRT=<gpio_num>,<gpio_io>	Response This command is used to set the specified GPIO to input or output state. If setting to input state, then this GPIO can not be set to high or low value. OK
Write Command AT+CGDRT=<gpio_num>	Response When only one parameter is used to read the configuration of the current GPIO port +CGDRT: <gpio_num>,<gpio_io> OK or +CME ERROR:<err>
Test Command AT+CGDRT=?	Response +CGDRT: (list of supported< gpio_num >s),(list of supported< gpio_io >s) OK

Parameters are defined below:

Parameters	Description
<gpio_num>	supported operating gpio num
<gpio_io>	0 – in 1 – out

10.2 AT+CGSETV Set the Value of Specified GPIO

This Command is used to Set the Value of Specified GPIO

Write Command AT+CGSETV=<gpio_num>,<gpio_hl>	Response This command is used to set the value of the specified GPIO to high or low. GPIO should first be set to output mode with +CGDRT OK
Test Command AT+CGSETV=?	Response +CGSETV: (list of supported< gpio_num >s),(list of supported< gpio_hl >s) OK

Parameters are defined below:

Parameters	Description
<gpio_num>	supported operating gpio num
<gpio_hl>	0 – low 1 – high

10.3 AT+CGGETV Get the Value of Specified GPIO

This Command is used to Get the Value of Specified GPIO

Write Command AT+CGGETV=<gpio_num>	Response This command is used to get the value (high or low) of the specified GPIO. GPIO should first be set to input mode with +CGDRT +CGGETV: <gpio_num>,<gpio_hl> OK
Test Command AT+CGGETV=?	Response +CGDRT: list of supported< gpio_num >s OK

Parameters are defined below:

Parameters	Description
<gpio_num>	supported operating gpio num
<gpio_hl>	0 – low 1 – high

10.4 AT+CGFLY Flight Mode Control

This command is used to set flight mode control

Write Command AT+CGFLY=<mode>	Response This command is used to enable or disable FLIGHT GPIO port state, When enabled, the gpio port can control entry or exit flight mode OK
Test Command AT+CGFLY=?	Response +CGFLY: (list of supported <mode>s) OK
Read Command AT+CGFLY?	Response +CGFLY: <mode> OK

Parameters are defined below:

Parameters	Description
<mode>	0 – disable 1 – enable

10.5 AT+CGNETLED Network LED Control

This command is used to set the Network LED state to enable or disable

Write Command AT+CGNETLED=<mode> >	Response OK
Test Command AT+CGNETLED=?	Response +CGNETLED: (list of supported <mode>s) OK
Read Command AT+CGNETLED?	Response +CGNETLED: <mode> OK

Parameters are defined below:

Parameters	Description
<mode>	0 – disable 1 – enable

10.6 AT+SDTEST Read SD Card Volume

This command is used to read SD Card volume

Execute Command	Response
AT+SDTEST	+SDVOLUME: XXMB OK

10.7 AT+CSCLK Configure Slow Clock

This Command is used to Configure Slow Clock.

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

Parameters are defined below:

Parameters	Description
------------	-------------

<n>	<p>0 Disable slow clock, module will not enter sleep mode.</p> <p>1 Enable slow clock, it is controlled by DTR. When DTR is high, module can enter sleep mode. When DTR changes to low level, module can quit sleep mode.</p> <p>2 Enable slow clock automatically. When there is no interrupt (on air and hardware such as GPIO interrupt or data in serial port), module can enter sleep mode. Otherwise, it will quit sleep mode.</p>
------------------	---

10.8 AT+POWEROFF Poweroff

This Command is used to poweroff .the module

Write Command AT+POWEROFF	Response OK
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10.9 AT+SPKSWITCH switch speaker mode and receiver mode

The command is used to switch speaker mode and receiver mode

Write Command AT+SPKSWITCH=<mode>	Response SPK MODE or REC MODE OK
Read Command AT+SPKSWITCH?	Response OK
Test Command AT+SPKSWITCH=?	Response +SPKSWITCH: (0-1) OK

Parameters are defined below:

Parameters	Description
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<mode>	0: SPKEAKER MODE 1: RECEIVER MODE
--------	--

10.10 AT+ MSPKVOL set speaker volume

The command is used to set speaker volume

Write Command AT+MSPKVOL=<value>	Response OK Or ERROR
Read Command AT+ MSPKVOL?	Response OK
Test Command AT+ MSPKVOL =?	Response +SPSWITCH: (0-11) OK

Parameters are defined below:

Parameters	Description
<value>	0-11

10.11 AT+GTPOS Get Station Positioning

The command is used to retrieve information base stationg positioning (not support CDMA network).

Write Command AT+GTPOS=<mode>	Response <mode>=0: OK <mode>=1: CONNECT OK CONNECT FAILED ERROR <mode>=2: OK +GTPOS: <precision>,<latitude>
Read Command AT+GTPOS?	Response +GTPOS:<mode> OK
Test Command AT+GTPOS=?	Response +GTPOS: (list of supported <mode>s) OK

Parameters are defined below:

Parameters	Description
<mode>	0 - Close the base station positioning function 1 - Open the base station positioning function 2 - Get the base station positioning function

Example:

Commands	Response
AT+GTPOS=1	OK CONNECT OK
AT+GTPOS=2	+GTPOS:104.0553231,30.5497824 OK
AT+GTPOS=0	OK

11. TTS AT Commands

11.1 AT+MTTSP Set voice broadcast parameters

This command is used to set voice broadcast parameters

Test Command AT+MTTSP=?	Response +MTTSP: (1-2),(0-32768),(50-200),(50-200) OK
Read Command AT+MTTSP?	Response +MTTSP: <speaker>,<volume>,<speed>,<pitch> OK
Write Command AT+MTTSP=[<speaker>[,<volume>[,<speed>[,<pitch>]]]]]	Response OK or ERROR

Parameters are defined below:

Parameters	Description
<speaker>	voice speaker 1 - female voice (default 1) 2 - male voice
<volume>	Speech size 0 - 32768 (default 32000)
<speed>	Speech speed 50 - 200 (default 100) 50 is the fastest speed while 200 is the slowest one
<pitch>	Speech speed 50 - 200 (default 100) 50 is the lowest pitch while 200 is the highest one

11.2 AT+MTTS Audio Play

This command is used to play Audio

Test Command AT+MTTS=?	Response +MTTS: (1-2),"text" OK
Write Command AT+MTTS=<encode>,<text>	Response OK Play success/Play failure or ERROR
Reference	Note After the instruction is executed, the sen.pcm audio file is generated in the file system.

Parameters are defined below:

Parameters	Description
<encode>	Text encoding format 1 : the beginning of the GBK encoded text broadcast (default 1) 2 : the beginning of the UTF16 encoded text broadcast
<text>	Broadcast text content is encoded format Encode=1, feed text in MBCS/ANSI to TTS engine.A maximum of 128 characters can be input. Encode=2, feed text in UTF16 to TTS engine.Amaximum of 512 characters can be input.

Example:

AT Commands	Response
AT+MTTS=1,"我是小智"	OK Play success

12. Proprietary AT Commands For PS

12.1 AT+CESQ Received signal level indication

Set command to enable +ECSQ unsolicited result code .to indicate the received signal level.

Execute Command AT+CESQ	Response +CESQ: <rsssi>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp> OK or +CME ERROR:<err>
Test Command AT+CESQ=?	Response +CESQ: (range of supported <rsssi>s),(range of supported <ber>s), (range of supported <rscp>s), (range of supported <ecno>s), (range of supported <rsrq>s), (range of supported <rsrp>s) OK

Parameters are defined below:

Parameters	Description
rsssi	Received signal strength indication 0 <rsssi>< -110dBm 1 -110dBm ≤ <rsssi>< -109dBm 2 -109dBm ≤ <rsssi>< -108dBm ... 61 -50dBm ≤ <rsssi>< -49dBm 62 -49dBm ≤ <rsssi>< -48dBm 63 -48dBm ≤ <rsssi> 99 not known or not detectable
ber	integer type; channel bit error rate (in percent) 0...7 as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99 not known or not detectable

<rscp>	<p>integer type, received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3).</p> <p>0 rscp < -120 dBm 1 -120 dBm ? rscp < -119 dBm 2 -119 dBm ? rscp < -118 dBm 94 -27 dBm ? rscp < -26 dBm 95 -26 dBm ? rscp < -25 dBm 96 - 25 dBm ? rscp 255 not known or not detectable</p>
<ecno>	<p>integer type, ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [95] subclause).</p> <p>0 Ec/lo < -24 dB 1 -24 dB ? Ec/lo < -23.5 dB 2 -23.5 dB ? Ec/lo < -23 dB 47 -1 dB ? Ec/lo < -0.5 dB 48 -0.5 dB ? Ec/lo < 0 dB 49 0 dB ? Ec/lo 255 not known or not detectable</p>
<rsrq>	<p>integer type, reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7).</p> <p>0 rsrq < -19.5 dB 1 -19.5 dB ? rsrq < -19 dB 2 -19 dB ? rsrq < -18.5 dB 32 -4 dB ? rsrq < -3.5 dB 33 -3.5 dB ? rsrq < -3 dBC</p>
<rsrp>	<p>integer type, reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4).</p> <p>0 rsrp < -140 dBm 1 -140 dBm ? rsrp < -139 dBm 2 -139 dBm ? rsrp < -138 dBm 95 -46 dBm ? rsrp < -45 dBm 96 -45 dBm ? rsrp < -44 dBm 97 -44 dBm ? rsrp 255 not known or not detectable</p>

12.2 AT+CCID Read CCID of SIM Card

This command is used to read SIM card ICCID if SIM inserted. If SIM not inserted, return +CME ERROR: 10

Execution Command AT+CCID	Response +CCID: <iccid> OK or +CME ERROR: <err>
-------------------------------------	--

Parameters are defined below:

Parameters	Description
<iccid>	String type

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13. Proprietary Unsolicited Result Code

13.1 URC:+CESQ

This URC is to report signal strength

Execution Command	Response Unsolicited result code +CESQ: <rssi>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>
-------------------	--

Parameters are defined below:

Parameters	Description
<rssi>	0-255 Received signal strength indication level
<ber>	integer type; channel bit error rate (in percent) 0...7 as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99 not known or not detectable
<rscp>	integer type, received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3). 0 rscp < -120 dBm 1 -120 dBm ? rscp < -119 dBm 2 -119 dBm ? rscp < -118 dBm 94 -27 dBm ? rscp < -26 dBm 95 -26 dBm ? rscp < -25 dBm 96 - 25 dBm ? rscp 255 not known or not detectable
<ecno>	integer type, ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [95] subclause). 0 Ec/lo < -24 dB 1 -24 dB ? Ec/lo < -23.5 dB 2 -23.5 dB ? Ec/lo < -23 dB 47 -1 dB ? Ec/lo < -0.5 dB 48 -0.5 dB ? Ec/lo < 0 dB 49 0 dB ? Ec/lo 255 not known or not detectable

<rsrq>	integer type, reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7). 0 rsrq< -19.5 dB 1 -19.5 dB ? rsrq< -19 dB 2 -19 dB ? rsrq< -18.5 dB 32 -4 dB ? rsrq<-3.5 dB 33 -3.5 dB ? rsrq< -3 dBC
<rsrp>	integer type, reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4). 0 rsrp< -140 dBm 1 -140 dBm ? rsrp< -139 dBm 2 -139 dBm ? rsrp< -138 dBm 95 -46 dBm ? rsrp< -45 dBm 96 -45 dBm ? rsrp< -44 dBm 97 -44 dBm ? rsrp 255 not known or not detectable

13.2 URC:*ATREADY

AT command to indicate that AT command server is ready to handler AT commands

Execution Command	Response *ATREADY: <bReady>
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Parameters are defined below:

Parameters	Description
<bReady>	1 ready 0 not ready

13.3 URC:+NITZ

NITZ, or Network Identity and Time Zone, is a mechanism for provisioning local time and date information to mobile devices via a wireless network

Execution Command	Response +NITZ:<DST>[,<sign><timezone>[,<year>/<month>/<day>,<hour>:<minute>:<second>]]
-------------------	---

Parameters are defined below:

Parameters	Description
<year>	The integer value is in range [00...99]
<month>	The integer value is in range [1...12].
<day>	The integer value is in range [1...31]
<hour>	The integer value is in range [0...24]
<minute>	The integer value is in range [0...59]
<second>	The integer value is in range [0...59]
<sign>	a char value '+' – local time zone is passive. '-' – local time zone is negative.
<DST>	Daylight Saving Time (DST),also summer time. 0 no adjustment 1 +1 hour 2 +2 hour
Example:	+NITZ: 0,"+32","11/08/02","09:27:39"

13.4 URC:^MODE

Indicates that system mode has changed

Execution Command	Response
	^MODE: <sys_mode>

Parameters are defined below:

Parameter	Description
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<sys_mode>	system mode 0 no service 1 reserved 2 reserved 3 GSM/GPRS 4 WCDMA 5 TD_SCDMA
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13.5 URC:+CGEV

Indication from MT to TE in the case of certain events occurring in the Packet Domain MT or the network. Refer to the details in AT+CGEREP

Execution Command	Response +CGEV:XXX
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14.TCPIP AT Commands

14.1 AT+QICSGP Configure APN

This command is used to configure apn,username ,password

Read Command AT+QICSGP?	Response OK
Write Command AT+QICSGP=<CID>,<CONTEXTTYPE>,<APN>,<username>,<password> >	Response OK or ERROR
Test Command AT+QICSGP=?	Response +QICSGP: (list of supported <cid>s), (list of supported <context_type>s,<APN>,<username>,<password>,<authentication >) OK
Reference	Note

Parameters are defined below:

Parameters	Description
<cid>	1-6
<context_type>	Connect type 1: IPV4 2: IPV6
<APN>	string
<username>	string

<password>	string
<authentication>	Int type 0 none 1 PAP 2 CHAR

14.2 AT+NETOPEN Open packet network

This command is used to open packet network.

Read Command AT+NETOPEN?	Response + NETOPEN:<net_state> OK
Write Command AT+NETOPEN	Response OK +NETOPEN:<err> or ERROR
Reference	Note

Parameters are defined below:

Parameters	Description
<err>	Indicate the result of operation. SUCCESS: is success ONGOING: is open in progress FAIL: is failure
<net_state>	Indicate the current network state 0: network close (deactivated) 1: network open(activated)

14.2 AT+NETCLOSE Close network

This command is used to closes network.

Read Command AT+NETCLOSE?	Response OK ERROR
Execution Command AT+NETCLOSE	Response OK +NETCLOSE:<err>
Reference	Note

Parameters are defined below:

Parameters	Description
<err>	Indicate the result of operation. SUCCESS: is success ONGOING: is open in progress FAIL: is failure

14.3 AT+CIOPEN Establish Connection in Multi-socket Mode

This command is used to establish a connection with TCP server and UDP server, The sum of all of connections is 6.

Test Command AT+CIOPEN=?	Response +CIOPEN: (list of supported <link_num>s), (list of supported <type>s) OK
Read Command AT+CIOPEN?	Response +CIOPEN: <link_num>[,<type>,<serverIP>,<serverPort>,<index>] OK Or ERROR
Write Command AT+CIOPEN= <link_num>,<type>,<serverIP>,<serverPort>[,<localPort>]	Response OK +CIOPEN: <err>,<link_num> > OK ERROR

Reference	Note
-----------	------

Parameters are defined below:

Parameters	Description
<link_num>	Identifies a connection , from 0 to 5, and default value is 0. If AT+CIPMODE=<mode> is set, the <link_num> is restricted to be only 0, +++ is exit send and receive mode.
<type>	Identifies the type of transmission protocol. TCP: Transfer Control Protocol UDP: User Datagram Protocol If AT+CIPMODE=<mode> is set, the <type> is restricted to be only "TCP"
<serverIP>	Identifies the IP address of server. If type is UDP serverIP set to empty
<serverPort>	Identifies the port of TCP server, from 0 to 65535, and default value is 0. If type is UDP serverPort set to empty
<localPort>	Identifies the port of local socket, from 0 to 65535, and default value is 0.
<err>	Indicate the result of operation. SUCCESS: is success FAIL: is failure if AT+CIPMODE=1: >: connect establish and can be send or receive data. OK: exit online data send and receive mode.

14.4 AT+CIPSEND Send Data Through TCP or UDP Connection

This command is used to send data through TCP or UDP connection on non_transparent mode

Test Command AT+CIPSEND=?	Response +CIPSEND: (list of supported <link_num>s), (list of supported <length>s) OK
Read Command AT+CIPSEND?	Response OK Or ERROR

<p>Write Command</p> <p>AT+CIPSEND= <link_num>, [<length>]</p> <p>AT+CIPSEND= <link_num>,,,, <data></p> <p>AT+CIPSEND= <link_num>, [<length>], <serverIP>, <serverPort> (This format is for UDP connect)</p>	<p>Response</p> <p>OK +CIPSEND: <err>,<link_num>,<reqSendLength>,<cnfSendLength> ERROR</p> <p>This command is used to send data to remote side on non_transparent mode. Single <Ctrl+Z>is start send. Single <ESC> is used to cancel the sending. Single<Ctrl+D>means exit the sending mode. <Ctrl+Z> is 0x1A, <ESC> is 0x1B, <Ctrl+D> is x04. These signals take effect when no length is specified Note 1.In transparent mode <length> will be ignore or the <length> is empty, when input data length reach to 1500 will trigger send out. 2.Small data can be sent as follows: TCP type: AT+CIPSEND=<link_num>,,,<data> UDP type: AT+CIPSEND=<link_num>,,<serverIP>,<serverPort>,<data></p>
---	---

Parameters are defined below:

Parameters	Description
<link_num>	Identifies a connection , from 0 to 5, and default value is 0.
<length>	Indicates the length of sending data, from 1 to 1500, and default value is 0. TCP: Transfer Control Protocol UDP: User Datagram Protocol Identifies the IP address of server.The IP address format consists of 4 octets,separated by decimal point:"AAA.BBB.CCC.DDD"
<serverPort>	Identifies the port of UDP server, from 0 to 65535, and default value is 0.
<data>	Identifies the contents for sending,and The maximum length is 512
<reqSendLength>	a numeric parameter that requested number of data bytes to be transmitted.

<cnfSendLength>	a numeric parameter that confirmed number of data bytes to be transmitted. PS: When set to hexadecimal by the MCIPCFGPL, <cnfSendLength>=<reqSendLength>/2.
<err>	Indicate the result of operation. SUCCESS: is success FAIL: is failure

14.5 AT+CIPRXGET Get the Network Data Manually

This command is used to Get the Network Data Manually

Test Command AT+CIPRXGET=?	Response +CIPRXGET: (list of supported <mode >s), (list of supported <cid>s), (list of supported<len>s) OK
Read Command AT+CIPRXGET?	Response +CIPRXGET:<link0_mode>...,<link9_mode> OK Or ERROR
Write Command AT+CIPRXGET= <mode >, <cid>[,<len>]	Response <mode> = 2: +CIPRXGET:SUCCESS,<mode>,<cid>,<read_len>,<remaining data len>, <data> OK Others: +CIPRXGET:SUCCESS,<mode>,<cid>[,<read_len>, <data>] OK ERROR

Parameters are defined below:

Parameters	Description
<mode>	Indicate how to get the network data , from 0 to 4, and default value is 0. 0: set the way to get the network data automatically. 1: set the way to get the network data manually. 2: read data, the max read length is 1500. 3: read data in HEX form, the max read length is 750. 4: get the rest data length

<cid>	Identifies a connection, from 0 to 5, and default value is 0.
<len>	The data length to be read.
<read_len>	The length of the data that have read.
<remaining data len>	The length of remaining data.
<data>	The read data.
<err>	Indicate the result of operation. SUCCESS: is success FAIL: is failure

14.6 AT+CIPCLOSE Close TCP or UDP Socket

This command is used to Close TCP or UDP Socket

Test Command AT+CIPCLOSE=?	Response +CIPCLOSE: (list of supported <link_num>s) OK
Write Command AT+CIPCLOSE=<link_num>	Response OK +CIPCLOSE: <err>,<link_num> or ERROR

Parameters are defined below:

Parameters	Description
<link_num>	Identifies a connection .from 0 to 5, and default value is 0. Indicate the result of operation. SUCCESS: is success FAIL: is failure

14.7 AT+CIPMODE Select TCP/IP Application Mode

This command is used to select transparent mode (data mode) or non-transparent mode (command mode) before network open.

Execution Command AT+CIPMODE	Response OK Execute command will set the parameter to default value.
Write Command AT+CIPMODE=<mode>	Response OK Or ERROR
Read Command AT+CIPMODE?	Response + CIPMODE: <mode> OK
Test Command AT+CIPMODE=?	Response + CIPMODE: (list of supported<mode>s) OK
Reference	Note when set to transparent mode, the ACK and HEX set by MCIPCFGPL will not take effect.

Parameters are defined below:

Parameters	Description
<mode>	Indicates to select transparent mode or non-transparent mode. from 0 to 1, and default value is 0. 0: non-transparent mode 1: transparent mode(similar to the data entry pattern)

14.8 AT+MCIPCFGPL Configure parameters of TCP/IP

This command is used to configure parameters of socket.

Test Command AT+MCIPCFGPL=?	Response +MCIPCFGPL:(list of supported <link_num>s), (list of supported <hex_support>s),(list of supported <ack_support>s), (list of supported <ssl_support>s, (list of supported <ignore_cert>s) OK
---------------------------------------	--

Write Command AT+MCIPCFGPL=<link_num>,[<hex_support>],[<ack_support>],[<ssl_support>],[<ignore_cert>]	Response OK or ERROR Ps. If would like to change hex/ack/ssl/ support. all sockets must be disconnected before
Read Command AT+MCIPCFGPL?	Response +MCIPCFGPL: (<hex_support>,<ack_support>,<ssl_support>,<ignore_cert>),... OK

Parameters are defined below:

Parameters	Description
<link_num>	Identifies a connection. The range of permitted values is 0 to 5.
<hex_support>	Indicates the form of sending data, 0 - normal, 1 – HEX.
<ack_support>	Indicates the form of sending ACK, default ACKfunction is not supported. 0 – not wait for server ACK, 1 – need to wait for server ACK
<ssl_support>	Indicates used to set the SSL function for TCP connection only, maximum support three SSL TCP connections, and default SSL function is not supported. 0: Not support SSL, 1: Support SSL
<ignore_cert>	Indicates whether the SSL connection ignores the certificate, and default is 0. 0 - ignores certificate 1 - use certificate

14.9 AT+MCIPCFG Configure parameters of TCP/IP

Configure parameters of TCP/IP

Test Command AT+MCIPCFG=?	Response +MCIPCFG: (list of supported <heartbeat_time>s), (list of supported <delay_time>ms) OK
-------------------------------------	---

Write Command AT+MCIPCFG= [<heartbeat_time>], [<delay_time>]	Response OK or ERROR Ps.If need to read/write value of heartbeat/delay time, all sockets must be disconnected before.
Read Command AT+MCIPCFG?	Response +MCIPCFG: <heartbeat_time><,delay_time> OK

Parameters are defined below:

Parameters	Description
<heartbeat_time>	Indicates keepalive time,the time depends on the network(test eg:GSMcan not exceed 10min . It takes at least about 12 minutes to recognize that TCP has been disconnected.) Range:0-7200 sencod, and default value is 0 sencod . Ps. When heartbeat_time set to 0, the function of keepalive will be closed
<DelayTm>	a numeric parameter which is number of milliseconds to delay to output data of Receiving.The default value is 0.

15.HTTP AT Commands

15.1 AT\$HTTPOPEN Open HTTP Service

The command is used to open HTTP service

Execution Command AT\$HTTPOPEN	Response OK The command is used to open HTTP service. To use HTTP, you must execute the command in the first. In the last, execute \$HTTPCLOSE to close HTTP service.
Read Command AT\$HTTPOPEN?	Response \$HTTPOPEN:<opened_or_not> OK Return HTTP service is opened or not. 1: HTTP service is opened. 0: HTTP service is not opened.

15.2 AT\$HTTPCLOSE Close HTTP Service

The command is used to close http service

Execution Command AT\$HTTPCLOSE	Response OK The command is used to close HTTP service. After executing this command, HTTP will be closed after 1 minute and the http will be unavailable.
Read Command AT\$HTTPCLOSE?	Response \$HTTPCLOSE:<closed_or_not> OK Return HTTP service is closed or not. 1: HTTP service is closed. 0: HTTP service is not closed.

15.3 AT\$HTTTPARA Set HTTP Request URL And Port

The command is used to Set HTTP Request URL And Port

Write Command AT\$HTTTPARA=<url>,<port>[,<type>][,<cert>]	Response OK or ERROR
Test Command AT\$HTTTPARA=?	Response \$HTTTPARA="" ,(0-65535),(0-1), (0-1) OK
Read Command AT\$HTTTPARA?	Response Return current HTTP request's host,uri,and port,such as: AT\$HTTTPARA? Host : "182.150.28.206" URI : "/httpdemo/http" Port : 8182. Cert : 1

Parameters are defined below:

Parameters	Description
<url>	<Mandatory Parameter> 0-255 HTTP client URL:"http://server'/path':tcpPort
<port>	The HTTP request's port.The HTTP default port is 80,and HTTPS is 443.
<type>	HTTP request type.Default is HTTP. 0: HTTP request 1: HTTPS request
<cert>	Indicates whether the SSL connection ignores the certificate,and default is 0. 0 - ignores certificate 1 - use certificate

14.4 AT\$HTTTPACTION Send HTTP Request

The command is used to send HTTP Request.Support request include GET,POST and HEAD.

<p>Write Command</p> <p>AT\$HTTPACTION=<request></p>	<p>Response</p> <p>\$HTTPRCV:DATA,<len></p> <p>.....</p> <p>\$HTTPRCV:DATA,2</p> <p><lr><ln></p> <p>\$HTTPRCV:DATA,<len></p> <p>or</p> <p>\$HTTPERROR:<errno></p> <p>ERROR</p> <p>This command will return HTTP response header fields and file path which storage HTML text or download file if request success. If request fail ,this command just return response header fields. Specially, the HEAD request only return response header fields. For POST,must set Content-Length header item and POST's content data.</p> <p>Note</p> <p>If a 202 error code appears and the request fails, execute the AT\$HTTPOPEN instruction after the AT\$HTTPCLOSE command.</p>
<p>Test Command</p> <p>AT\$HTTPACTION=?</p>	<p>Response</p> <p>\$HTTPACTION:(0-3)</p> <p>OK</p>

Parameters are defined below:

Parameters	Description
<request>	<p>HTTP request type ,available data include 0,1,2,3.</p> <p>0: GET request</p> <p>1: POST request</p> <p>2: HEAD request</p> <p>3: POST request (Content length must be less than 500 and set content in the first.)</p>

15.5 AT\$HTTPDATA Set HTTP Post Request's Data

This command is used to set http post request's data

<p>Write Command</p> <p>AT\$HTTPDATA=<data></p> <p>_len></p>	<p>Response</p> <p>The command is used to set HTTP post request's content.</p> <p>This command is effective only to POST.</p>
---	---

Test Command AT\$HTTPDATA=?	Response \$HTTPDATA:(0-1024) OK
Read Command AT\$HTTPDATA?	Response \$HTTPDATA:<data_len> OK

Parameters are defined below:

Parameters	Description
<data_len>	The post request's content length.The length is between 0 and 1024. 0 mean data write end. When data length reach <data_len>,it's auto exit inputing. After this,must use \$HTTPSEND to send data every time.

15.6 AT\$HTTPSEND Send HTTP Post Content Data

This command is used to Send HTTP Post Content Data

Execute Command AT\$HTTPSEND	Response The command is used to send HTTP post request's content. This command effective only to POST.After data send complete,will receive response. OK
--	---

15.7 AT\$HTTPDATAEX Set HTTP Post Request's Data

This command is used to Set HTTP Post Request's Data

Write Command AT\$HTTPDATAEX=<data_len>,<data>	Response OK or ERROR
Test Command AT\$HTTPDATAEX=?	Response \$HTTPDATAEX:(0-500) , "" OK

Read Command AT\$HTTPDATAEX?	Response \$HTTPDATAEX:<data_len> OK
--	---

Parameters are defined below:

Parameters	Description
<data_len>	The post request's content length.The length is between 0 and 500. Before this must be set "Content-Length" request head,and must be the same as the value.
<data>	The post request's content.The length must be same as the <data_len>.

15.8 AT\$HTTPRQH Set HTTP header fields

Set HTTP header fields

Test Command AT\$HTTPRQH=?	Response \$HTTPRQH="","" OK
Read Command AT\$HTTPRQH?	Response Return current HTTP request header fields and entity header fields.
Write Command AT\$HTTPRQH=<Param Key>,<ParamValue>	Response The command is used to set HTTP request header fields and entity header fields. The common request header: "Host" : The server's host.Must be matched with URL,If not set,will get from URL. "Content-Length" : The content length which will be send.This only for POST. Refer to : " IETP-RFC 2616 "

Parameters are defined below:

Parameters	Description
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<ParamKey>	HTTP request or entity header field's Key. If there are special characters, please add quotes. The max length is 50. Support parameter: "accept","accept-charset","accept-encoding","accept-language","authorization","expect","from","host","if-match","if-modified-since","if-none-match","if-range","if-unmodified-since","max-forwards","proxy-authorization","range","referer","te","user-agent","allow","content-encoding","content-language","content-length","content-location","content-md5","content-range","content-type","expires","last-modified","user-agent","connection"
<ParamValue>	HTTP request or entity header field's Value. If there are special characters, please add quotes. The max length is 255.

15.9 HTTP Error Code

Numeric Format	Verbose Format General errors:
200	Subsystem established and available
201	Subsystem establishment in progress.
202	Network subsystem unavailable.
203	PPP is closing.
204	Existing net subsystem resources.
205	Physlink going dormant.
300	HTTP service is not opened.
301	HTTP service has opened.
302	URL resolve fail.
303	DNS error.
304	Action error.
305	Request timeout.
306	Downloading file
307	URL not set.
308	Header fields's number exceeds the limit.
309	Header fields error,such as not set "Content-Length" for POST request
310	Header response error(Exception).
311	Is sending post data.
312	Post request not started,only for \$HTTPACTION=1
313	The value of "Content-Length" not same as the content's length.
314	Request fail and should close socket.
315	Connection to server failed
350	Unknown HTTP error

16.FTP AT Commands

16.1 AT+CFTPPORT Set FTP Server Port

This command is used to set ftp server port

Write Command AT+CFTPPORT=<port>	Response OK or ERROR
Test Command AT+CFTPPORT=?	Response +CFTPPORT: (list of supported <port>s) OK or ERROR
Read Command AT+CFTPPORT?	Response +CFTPPORT: <port> OK

Parameters are defined below:

Parameters	Description
<port>	The FTP server port, from 1 to 65535, and default value is 21.

Example:

AT Command	Response
AT+CFTPPORT=21	OK

16.2 AT+CFTPUN Set User Name for FTP Access

Write Command AT+CFTPUN="<name>"	Response This command is used to set user name for FTP server access. OK Note: A single input no more than 1535 bytes
Read Command AT+CFTPUN?	Response +CFTPUN: "<name>" OK
Test Command AT+CFTPUN=?	Response OK

Parameters are defined below:

Parameters	Description
<name>	The user name for FTP server access. The maximum length is 30

16.3 AT+CFTPPW Set User Password for FTP Access

This command is used to Set User Password for FTP Access

Write Command AT+CFTPPW="<password>"	Response OK or ERROR
Test Command AT+CFTPPW=?	Response OK
Read Command AT+CFTPPW?	Response +CFTPPW: "<password>" OK

Parameters are defined below:

Parameters	Description
<password>	The user password for FTP server access. The maximum length is 40.

Example:

AT Command	Response
AT+CFTPPW="mypass"	OK
AT+CFTPPW?	+CFTPPW: "mypass" OK

16.4AT+CFTPTLS Set FTP Security Mode

Set FTP Security Mode

Write Command AT+CFTPTLS=<mode>[,<cert>]	Response This command is used to set FTP Security Mode. OK or ERROR
Test Command AT+CFTPTLS=?	Response +CFTPTLS: (0-2),(0-1) OK
Read Command AT+CFTPTLS?	Response +CFTPTLS: < mode>,<cert> OK

Parameters are defined below:

Parameters	Description
<mode>	Default is 0. When mode is non 0, FTP will over TLS use SSL. 0 - None 1 - Implicit 2 - Explicit
<cert>	Whether to ignore a certificate, Default is 0 0 - Ignore 1 - Don't ignore

Example:

AT Command	Response
------------	----------

AT+ CFTPTLS=2,0	OK
AT+ CFTPTLS?	+ CFTPTLS:2,0 OK
AT+ CFTPTLS=?	+CFTPTLS: (0-2),(0-1) OK

16.5 AT+CFTPTYPE Set FTP type

This command is used to Set FTP Type

Write Command AT+CFTPTYPE=<type>	Response This command is used to set FTP type. Default is binary type. OK or ERROR
Test Command AT+CFTPTYPE=?	Response +CFTPTYPE: (list of supported <type>s) OK
Read Command AT+CFTPTYPE?	Response +CFTPTYPE: <type> OK

Parameters are defined below:

Parameters	Description
<type>	I – binary type. A – ASCII type

Example:

AT Command	Response
AT+CFTPTYPE="A"	OK
AT+CFTPTYPE="I"	OK
AT+CFTPTYPE?	+CFTPTYPE: "I" OK
AT+CFTPTYPE=?	+CFTPTYPE: ("I","A") OK

16.6 AT+CFTPGETFILE Get a File from FTP Server to EFS

This command is used to Get a File from FTP Server to EFS

Write Command AT+CFTPGETFILE= " <remote_path> ", " <local_path> "[, <rest_size>]	Response OK +CFTPGETFILE: SUCCESS,<length> or +CFTPGETFILE: FAIL,<err> ERROR
Test Command AT+CFTPGETFILE=?	Response +CFTPGETFILE: ,(0-2147483647) OK
Read Command AT+CFTPGETFILE?	Response +CFTPGETFILE:"remote_path", "local_path" ,<rest_size> OK

Parameters are defined below:

Parameters	Description
<remote_path>	The remote file path. The maximum length is 512. If the directory contains non-ASCII characters, the <remote_path> parameter should contain a prefix of {non-ascii}.
<local_path>	The efs file path. The maximum length is 512. Local file name string not support non-ascii and cannot contain: / \ : , * ? " > < Note : local_path root directory "/" is default "C: / " in EFS
<rest_size>	The value for FTP "REST" command which is used for broken transfer when transferring failed last time. The range is from 0 to 2147483647.
<length>	The size of the download file

Example:

AT Command	Response
------------	----------

AT+CFTPGETFILE= "/test/CXL/abc.txt", "/mydir/test1.txt"	OK ... +CFTPGETFILE: SUCCESS,10245 AT+CFTPGETFILE= "/test/CXL/abc.txt", "/mydir/test1.txt",10 AT+CFTPGETFILE={non-ascii}"2F746573742F63584C2F616263 2E747874", "/mydir/test1.txt",10 OK ... +CFTPGETFILE: SUCCESS,10235
--	--

16.7 AT+CFTPPUTFILE Upload a File from Module EFS to FTP Server

This command is used to Upload a File from Module EFS to FTP Server

Write Command AT+CFTPPUTFILE="<remote_path>","<local_path>",<rest_size>]	This command is used to upload a file from module EFS to FTP server. Response OK +CFTPPUTFILE: SUCCESS or +CFTPPUTFILE: FAIL,<err> ERROR
Read Command AT+CFTPPUTFILE?	Response +CFTPGETFILE:"remote_path", "local_path" ,<rest_size> OK
Test Command AT+CFTPPUTFILE=?	Response +CFTPPUTFILE: ,(0-2147483647) OK

Parameters are defined below:

Parameters	Description
<remote_path>	The remote file path. The maximum length is 512. If the directory contains non-ASCII characters, the <remote_path> parameter should contain a prefix of {non-ascii}
<local_path>	The efs file path. The maximum length is 512. Note : local_path root directory "/" is default"C: / " in EFS

<rest_size>	The value for FTP "REST" command which is used for broken transfer when transferring failed last time. The range is from 0 to 2147483647.
--------------------------	---

Example:

AT Command	Response
AT+CFTPPUTFILE ="/test/CXL/abc.txt" , "/mydir/test1.txt"	OK ... +CFTPPUTFILE: SUCCESS
AT+CFTPPUTFILE= {non-ascii}"2F7465 73742F63584C2F61 62632E747874", "/mydir/test1.txt",10	OK ... +CFTPPUTFILE: SUCCESS

16.8 AT+CFTPLIST List the Items in the Directory on FTP Server

This command is used to List the Items in the Directory on FTP Server

Write Command AT+CFTPLIST="<dir>"	Response This command is used to list the items in the specified directory on FTP server OK +CFTPLIST: ...] +CFTPLIST: SUCCESS CFTPLIST:FAIL,<err> ERROR
Test Command AT+CFTPLIST=?	Response OK
Read Command AT+CFTPLIST?	Response +CFTPGETFILE:"dir" OK

Parameters are defined below:

Parameters	Description
<dir>	The directory to be listed, The maximum length is 128. If the directory contains non-ASCII characters, the <remote_path> parameter should contain a prefix of {non-ascii}

Example:

AT Command	Response
AT+CFTPLIST="/test/CXL"	OK +CFTPLIST: drw-rw-rw- 1 user group 0 Sep 1 18:01 . drw-rw-rw- 1 user group 0 Sep 1 18:01 .. -rw-rw-rw- 1 user group 2017 Sep 1 17:24 19800106_000128.jpg +CFTPLIST: SUCCESS
AT+CFTPLIST={non-ascii}"2F746573742F43584C"	OK +CFTPLIST: drw-rw-rw- 1 user group 0 Sep 1 18:01 . drw-rw-rw- 1 user group 0 Sep 1 18:01 .. -rw-rw-rw- 1 user group 2017 Sep 1 17:24 19800106_000128.jpg +CFTPLIST: SUCCESS

16.9 AT+CFTPGET Get a File from FTP Server and Output it to SIO

This command is used to Get a File from FTP Server and Output it to SIO

Write Command AT+CFTPGET = "<remote_path>" [,<rest_size>]	Response This command is used to get a file from FTP server and output it to serial port. OK +CFTPGET: DATA,<len> ... +CFTPGET: DATA, <len> ... +CFTPGET: SUCCESS, <length> or +CFTPGET: FAIL,<err> ERROR
Test Command AT+CFTPGET=?	Response +CFTPGET: ,(0-2147483647) OK
Read Command AT+CFTPGET?	Response +CFTPGET:"remote_path", <rest_size> OK

Parameters are defined below:

Parameters	Description
<remote_path>	The remote file path. The maximum length is 512. If the directory contains non-ASCII characters, the < remote_path > parameter should contain a prefix of {non-ascii}.
<rest_size>	The value for FTP "REST" command which is used for broken transfer when transferring failed last time. The range is from 0 to 2147483647.
<len>	Every time the length of the read from the server
<length>	The size of the download file

Example:

AT Command	Response
AT+CFTPGET="/test/CXL/abc.txt", 10	OK +CFTPGET: DATA, 1020 AT+CFTPGET={non-ascii}"2F746573742F63584C2F6162632E747874", 10 OK +CFTPGET: DATA, 1058 ... +CFTPGET: SUCCESS,1246792

16.10 AT+CFTPMKD Create a New Directory on FTP Server

This command is used to Create a New Directory on FTP Server

Write Command AT+CFTPMKD="<dir>"	Response This command is used to create a new directory on the FTP server. OK or +CFTPMKD:FAIL,<err> ERROR
Test Command AT+CFTPMKD=?	Response OK

Read Command AT+CFTPMKD?	Response +CFTPMKD: "dir" OK
------------------------------------	---

Parameters are defined below:

Parameters	Description
<dir>	The directory to be created, The maximum length is 128. If the directory contains non-ASCII characters, the <remote_path> parameter should contain a prefix of {non-ascii}.

Example:

AT Command	Response
AT+CFTPMKD="/test/CXL"	OK
AT+CFTPMKD={non-ascii}"2F746573742F43584C"	OK

16.11 AT+CFTPRMD Delete a Directory on FTP Server

This command is used to Delete a Directory on FTP Server

Write Command AT+CFTPRMD ="<dir>"	Response This command is used to delete directory on the FTP server. OK + CFTPRMD:FAIL,<err> or ERROR
Test Command AT+CFTPRMD =?	Response OK
Read Command AT+CFTPRMD?	Response + CFTPRMD:"dir" OK

Parameters are defined below:

Parameters	Description
------------	-------------

<dir>	The directory to be deleted, The maximum length is 128. If the directory contains non-ASCII characters, the <remote_path> parameter should contain a prefix of {non-ascii}.
--------------------	--

Example:

AT Command	Response
AT+CFTPMD="/test/CXL"	OK
AT+CFTPMD={non-ascii}"2F746573742F43584C"	OK

16.12 AT+CFTPDELE Delete a File on FTP Server

This command is used to Delete a File on FTP Server

Write Command AT+CFTPDELE="<filename>"	Response This command is used to delete file on the FTP server. OK + CFTPDELE:FAIL,<err> ERROR
Test Command AT+CFTPDELE=?	Response OK
Read Command AT+CFTPDELE?	Response + CFTPDELE:"filename" OK

Parameters are defined below:

Parameters	Description
<filename>	The file to be deleted, The maximum length is 128. If the directory contains non-ASCII characters, the <remote_path> parameter should contain a prefix of {non-ascii}.

Example:

AT Command	Response
AT+CFTPDELE="/test/CXL/abc.txt"	OK

AT+CFTPDELE={non-ascii}"2F746573742F63584C2F6162632E747874"	OK
--	-----------

16.13 AT+CFTPSERV Set FTP Server Domain Name or IP Address

This command is used to Set FTP Server Domain Name or IP Address

Write Command AT+CFTPSERV="<address>"	Response This command is used to set FTP server domain name or IP address. OK or ERROR
Test Command AT+CFTPSERV=?	Response OK
Read Command AT+CFTPSERV?	Response +CFTPSERV: "address" OK

Parameters are defined below:

Parameters	Description
<address>	The FTP server domain name or IP address. The maximum length is 100.

Example:

AT Command	Response
AT+CFTPSERV="58.246.1.50"	OK
AT+CFTPSERV?	+CFTPSERV:58.246.1.50 OK
AT+CFTPSERV=?	OK

16.14 AT+CFTPFILE Read File from Local File to SIO

This command is used to Read file from local file to SIO

Write Command AT+CFTPRDFILE="<local_file>" ,<read_pos>,<read_len>	Response This command is used to read file from local file to SIO. + CFTPRDFILE:DATA,<len> + CFTPRDFILE:SUCCESS,<length> + CFTPRDFILE: FAIL,<err_code>
Test Command AT+CFTPRDFILE=?	Response +CFTPRDFILE:,(0-2147483647),(1-2147483647) OK
Read Command AT+CFTPRDFILE?	Response +CFTPRDFILE: "local_file",read_pos,read_len OK

Parameters are defined below:

Parameters	Description
<local_file>	The local file name. The maximum length is 512. Note : local path root directory "/" is default "C: / " in EFS
<read_pos>	Start read file position,The range is from 0 to 2147483647.
<read_len>	Read file length,The range is from 1 to 2147483647.
<len>	Every time the length of the read from the server
<length>	The size of the download file

Example:

AT Command	Response
AT+CFTPRDFILE="/p.txt",10,100	+CFTPRDFILE:DATA,100 aa aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa aaaaaaaaaaaaaaaaaaaa +CFTPRDFILE:SUCCESS,100

16.15 AT+CFTPPUT Upload the DATA from SIO to FTP server

Upload the DATA from SIO to FTP Server

Write Command AT+CFTPPUT = "<remote_path>" [,<rest_size>][,<put_len >]	Response This command is used to upload the DATA from serial port to FTP server as a file . Single <Ctrl+Z> means end of the FTP data. <Ctrl+Z> is 0x1A. Note: A single input no more than 1536 bytes Note: In <put_len> mode, all characters can be transferred +CFTPPUT: BEGIN ... OK +CFTPPUT:SUCCESS +CFTPPUT: FAIL,<err_code>
--	--

Test Command AT+CFTPPUT=?	Response +CFTPPUT: ,(0-2147483647),(1-1500) OK
-------------------------------------	--

Read Command AT+CFTPPUT?	Response +CFTPPUT:"remote_path", <rest_size>,<put_len> OK
------------------------------------	---

Parameters are defined below:

Parameters	Description
<remote_path>	The remote file path. The maximum length is 512. If the directory contains non-ASCII characters, the < remote_path > parameter should contain a prefix of {non-ascii}.
<rest_size>	The value for FTP "REST" command which is used for broken transfer when transferring failed last time. The range is from 0 to 2147483647.
<put_len>	The length is 1~1500.In this mode, all characters can be transferred. Must enter the specified data length before exiting the mode. In this mode <rest_size> cannot be omitted.

Example:

AT Command	Response
AT+CFTPPUT="/test/CXL/abc.txt", 20	+CFTPPUT: BEGIN<Ctrl+Z> OK

AT+CFTPPUT={non-ascii}"2F746573742F63584C2F6162632E747874", 20	+CFTPPUT: BEGIN<Ctrl+Z> OK
AT+CFTPPUT="/test/test.txt",0,16	+CFTPPUT: BEGIN<000102030405060708090a0b0c0d0e0f> OK

16.16 Unsolicited FTP Codes (Summary of CME ERROR codes)

Parameters	Description
201	Unknown error for FTP
202	FTP task is busy
203	Failed to resolve server address
204	FTP timeout
205	Failed to read file
206	Failed to write file
207	Not allowed in current state
208	Failed to login
209	Failed to logout
210	Failed to transfer data
211	FTP command rejected by server
212	Memory error
213	Invalid parameter
214	Network error
215	Failed to connect socket

216	Failed to send data using socket
217	Failed to receive data using socket
218	Failed to verify user name and password
219	Socket connect timeout
220	File does not exist

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17.MQTT AT Commands

17.1 AT+MCONFIG Related Parameters Configuration for MQTT

This command is used to set parameters configuration

Test Command AT+MCONFIG=?	Response +MCONFIG: ,,,(0-1),(0-2),(0-1),, OK
Write Command AT+MCONFIG=<clientid>[, <username>],[<password>][,< will_flag>,<will_qos>,<will_ retain>,<will_topic>,<will_ message>]]	Response OK Or ERROR
Read Command AT+MCONFIG?	Response +MCONFIG:<clientid>[,<username>,<password> [,<will_flag>,<will_qos>,<will_retain>,<will_topic>,<will_ _message>]] OK
Reference	Note This command you should send before "AT+MCONNECT" cmmand.If the server is not a user name and password, please do not enter the user name and password, otherwise will logon failure.

Parameters are defined below:

Parameters	Description
<clientid>	This parameter is used to allow the server to identify the client identity information. The maximum length of 256
<username>	This parameter is used to login server. The maximum length of 256
<password>	This parameter is used to login server. The maximum length of 256

<will_flag>	Value of will flag: 1 If the Will flag is set 1, the Will QoS and Will Retain fields must be present in the Connect flags byte, and the Will Topic and Will Message fields must be present in the payload. 0 Without using will Qos, will retain, will topic, will message, please set 0.
<will_qos>	Quality of Service: 0 At most once delivery for will message 1 At least once delivery for will message 2 Exactly once delivery for will message
<will_retain>	Retain Flag: 0 the Server must not store the will message and must not remove or replace any existing retained message. 1 the Server must store the will Message and its QoS.
<will_topic>	The will topic of the will message. The maximum length is 256.
<will_message>	The will message content. The maximum length is 1024.

17.2 AT+MIPSTART Set address and port and version

Test Command AT+MIPSTART=?	Response +MIPSTART:,(0-65535),(3-4) OK
Write Command AT+MIPSTART=<address>,<port>[,<version>]	Response OK Or ERROR
Read Command AT+MIPSTART?	Response +MIPSTART:<address>,<port>,<version> OK
Reference	Note If server no response,module will return "+CME ERROR: 151" about 30 seconds

Parameters are defined below:

Parameters	Description
------------	-------------

<ipaddress>	Server IP address.
<port>	Server port.
<version>	The MQTT version.The value is between 3 and 4,default value is 3. 3 stands for mqtt version 3.1, 4 stands for mqtt version 3.1.1.

17.3 AT+MCONNECT Client requests a connection to a Server

Test Command AT+MCONNECT=?	Response +MCONNECT:(0-1),(30-1800) OK
Write Command AT+MCONNECT=<clean_session>,<keepalive>	Response OK Or ERROR
Read Command AT+MCONNECT?	Response +MCONNECT:<clean_session>,<keepalive> OK
Reference	Note If server no response,module will return "+CME ERROR: 151" about 30 seconds

Parameters are defined below:

Parameters	Description
------------	-------------

<clean_session>	<p>This parameter specifies the handling of the Session state.</p> <p>0 If CleanSession is set to 0, the Server must resume communications with the Client based on state from the current Session (as identified by the Client identifier). If there is no Session associated with the Client identifier the Server must create a new Session. The Client and Server MUST store the Session after the Client and Server are disconnected. After the disconnection of a Session that had CleanSession set to 0, the Server MUST store further QoS 1 and QoS 2 messages that match any subscriptions that the client had at the time of disconnection as part of the Session state. It may also store QoS 0 messages that meet the same criteria.</p> <p>1 If CleanSession is set to 1, the Client and Server must discard any previous Session and start a new one. This Session lasts as long as the Network Connection. State data associated with this Session must not be reused in any subsequent Session.</p>
<keepalive>	30-1800 The Keep Alive is a time interval measured in seconds.

17.4 AT+MPUB Publish message

This command is used to publish message

<p>Test Command AT+MPUB=?</p>	<p>Response +MPUB: ,(0-2),(0-1), OK</p>
<p>Write Command AT+MPUB=<topic>,<qos> ,<retain>,<message></p>	<p>Response OK or ERROR</p>
<p>Read Command AT+MPUB?</p>	<p>Response +MPUB:<topic> ,<qos>,<retain>,<message> OK</p>
<p>Reference</p>	<p>Note This command is sent from a Client to a Server or from Server to a Client to transport an Application Message. If server no response,module will return "+CME ERROR: 151" about 30 seconds</p>

Parameters are defined below:

Parameters	Description
<topic>	The topic of the Application message. The maximum length is 256
<qos>	Quality of Service: 0 At most once delivery for Application message 1 At least once delivery for Application message 2 Exactly once delivery for Application message
<retain>	Retain Flag: 0 the Server must not store the Application message and must not remove or replace any existing retained message. 1 the Server must store the Application Message and its QoS.
<message>	The Application message content. The maximum length of 1024.

17.5 AT+MPUBEX Publish a long message

This command is used to publish message

Test Command AT+MPUBEX=?	Response +MPUBEX: ,(0-2),(0-1),(1-65535) OK
Write Command AT+MPUBEX=<topic>,<qos> ,<retain>,<msgLen>	Response +MPUBEX:<result> Or ERROR
Read Command AT+MPUBEX?	Response +MPUBEX:<topic> ,<qos>,<retain>,<msgLen> OK
Reference	Note Input mode will not sent keepalive, so the input data interval cannot be longer than keepalive, or the connection may be disconnected. Input mode should not exceed 4096 bytes at a time or some data will be lost, and each input should be at least 25 milliseconds apart.

Parameters are defined below:

Parameters	Description
------------	-------------

<topic>	The topic of the Application message. The maximum length is 256
<qos>	Quality of Service: 0 At most once delivery for Application message 1 At least once delivery for Application message 2 Exactly once delivery for Application message
<retain>	Retain Flag: 0 the Server must not store the Application message and must not remove or replace any existing retained message. 1 the Server must store the Application Message and its QoS.
<msgLen>	The message content length. The maximum length of 65535.
<result>	The result of publishing operation: SUCCESS FAILURE

17.6 AT+MSUB Subscribe to topics

This command is used to Subscribe to topics

Test Command AT+MSUB=?	Response +MSUB: ,(0-2) OK
Write Command AT+MSUB=<topic>,<qos> s>	Response OK Or ERROR For single IP connection If AT+MSUB="111",0 is sent,while client publish on the 111 topic. +MSUB: <topic>,<len> bytes,<message> The maximum data received in this mode is less than 4000 bytes, and the excess is discarded.
Reference	Note This command is sent from the Client to the Server to create one or more Subscriptions. If server no response,module will return "+CME ERROR: 151" about 30 seconds

Parameters are defined below:

Parameters	Description
<topic>	The topic of the Application message. The maximum length is 256
<qos>	Quality of Service: 0 At most once delivery for Application message 1 At least once delivery for Application message 2 Exactly once delivery for Application message
<len>	The received message size.
<message>	Message content.Max length is 1024.

17.7 AT+MUNSUB UnSubscribe from topics

This command is used to Unsubscribe from topic

Test Command AT+MUNSUB=?	Response +MUNSUB: <"topic"> OK
Write Command AT+MUNSUB=<topic>	Response OK Or ERROR
Reference	Note If server no response,module will return "+CME ERROR: 151" about 30 seconds

Parameters are defined below:

Parameters	Description
<topic>	The topic of the will message. The maximum length is 256

17.8 AT+MDISCONNECT Close MQTT connection

This command is used to close MQTT connection.

Execution Command AT+MDISCONNECT	Response +MDISCONNECT: <result> OK Or Already disconnect ERROR
Reference	Note If server no response,module will return "+CME ERROR: 151" about 30 seconds

Parameters are defined below:

Parameters	Description
<result>	The result of publishing operation: SUCCESS FAILURE

17.9 AT+MIPCLOSERelease MQTT resources

This command is used to close TCP connection.

Execution Command AT+MIPCLOSE	Response +MIPCLOSE:<result> OK Or ERROR
Reference	Note If server no response,module will return "+CME ERROR: 151" about 30 seconds

Parameters are defined below:

Parameters	Description
<result>	The result of publishing operation: SUCCESS FAILURE

17.10 AT+MQTTSTATU Query the MQTT connection status

This command is used to Query the MQTT connection status.

Execution Command AT+MQTTSTATU	Response +MQTTSTATU:<statu> OK
Reference	Note

Parameters are defined below:

Parameters	Description
<statu>	0 MQTT connection is not established 1 The MQTT connection is successful 2 The TCP connection is established but the MQTT connection is not established

17.11 AT+MQTTSSL MQTTSSL support switch

This command is used to Query the MQTT connection status.

Test Command AT+MQTTSSL=?	Response +MQTTSSL: (0-1),(0-1) OK
Read Command AT+MQTTSSL?	Response +MQTTSSL: <action>,<cert> OK
Write Command AT+MQTTSSL=<action>[,cert]	Response OK Or ERROR

Reference	Note
	The command must be used before AT+MCONNECT

Parameters are defined below:

Parameters	Description
<action>	The switch for SSL support. 0 close SSL support 1 open SSL support The default value is 0.
<cert>	Whether to use the certificate. 0 Ignore the certificate 1 Use the certificate

17.12 URC: Pair indication+MDISCON:

This URC indicates that the MQTT client is disconnected.

URC Information
+MDISCON: <mqttid>
<mqttid> Client register ID0 default value

18.FILESYSTEM Commands

18.1 AT+MFSCD Select directory as current directory

The command is used to select a directory.

Write Command AT+MFSCD=<path>	Response +MFSCD:<curr_path> OK or ERROR
Read Command AT+MFSCD?	Response +MFSCD:<curr_path> OK
Test Command AT+MFSCD=?	Response OK

Parameters are defined below:

Parameters	Description
<path>	String with double quotes,directory for selection.
<curr_path>	Current directory without double quotes

Example:

AT Commands	Response
AT+MSFCD="/test1/test2"	+MSFCD:/test1/test2 OK
AT+MSFCD=".."	+MFSCD:/test1 OK

18.2 AT+MFSMKDIR Make new directory in current directory

This command is used to create a new directory in current directory.

Write Command AT+MFSMKDIR=<dirname>	Response OK or ERROR
Test Command AT+MFSMKDIR=?	Response OK

Parameters are defined below:

Parameters	Description
<dirname>	String with double quotes, directory name which does not already exist in current directory. Maximum name length is 128 name string not support non-ascii and cannot contain: / \ : , * ? ">< Note: dirname length out the range 126, MFSLS can't display dir.

Example:

AT Commands	Response
AT+MFSMKDIR="Test"	OK
AT+MFSLS=1	+MFSLS: SUBDIRECTORIES: Test OK
AT+MFSMKDIR=?	OK

18.3 AT+MFSLS List directories/files in current directory

This command is used to list informations of directories and/or files in current directory.

Execution Command AT+MFSL	Response [+MFSL: SUBDIRECTORIES:<list of subdirectories> <CR><LF>] [+MFSL: FILES:<list of files> <CR><LF>] OK
Test Command AT+MFSL=?	Response +MFSL: (list of supported <type>s) OK
Read Command AT+MFSL?	Response +MFSL: SUBDIRECTORIES:<dir_num>,FILES:<file_num> OK
Write Command AT+MFSL=<type>	Response [+MFSL: SUBDIRECTORIES: <list of subdirectories> <CR><LF>] [+MFSL: FILES: <list of files> <CR><LF>] OK or ERROR

Parameters are defined below:

Parameters	Description
<type>	0 – list both subdirectories and files 1 – list subdirectories only 2 – list files only
<dir_num>	Integer type, the number of subdirectories in current directory.
<file_num>	Integer type, the number of files in current directory.

Example:

AT Commands	Response
AT+MFSL?	+MFSL: SUBDIRECTORIES:2,FILES:2 OK

AT+MFSLS	+MFSLS: SUBDIRECTORIES: FirstDir SecondDir +MFSLS: FILES: test_0.txt test_1.txt OK
AT+MFSLS=2	+MFSLS: FILES: test_0.txt test_1.txt OK

18.4 AT+MFSRMDIR Delete directory in current directory

Delete directory in current directory

Write Command AT+MFSRMDIR=<dirname>	Response This command is used to delete existing directory and its subdirectories in current directory OK Or ERROR
Test Command AT+MFSRMDIR=?	Response OK

Parameters are defined below:

Parameters	Description
<dirname>	String with double quotes. Directory name to be deleted which already exist in current directory. name string not support non-ascii. Maximum name length is 128.

Example:

AT Commands	Response
-------------	----------

AT+MFSLS=1	+MFSLS: SUBDIRECTORIES: Test1 Test2 OK
AT+MFSRMDIR="Test2"	OK
AT+MFSLS=1	+MFSLS: SUBDIRECTORIES: Test1 OK
AT+MFSRMDIR=?	OK

18.5 AT+MFSDEL Delete file in current directory

This command is used to delete a file in current directory. Before do that, it needs to use AT+MFSCD select the father directory as current directory

Write Command AT+MFSDEL=<filename> >	Response OK or ERROR
Test Command AT+MFSDEL=?	Response OK

Parameters are defined below:

Parameters	Description
<filename>	String with double quotes, file name which is relative and already existing. If <filename> is *.* , it means delete all files in current directory. Maximum name length is 128, name string not support non-ascii

Example:

AT Commands	Response
-------------	----------

AT+MFSL=2	+MFSL: FILES: test_0.txt test_1.txt OK OK
AT+MFSD="test_0.txt"	OK
AT+MFSL=2	+MFSL: FILES: test_1.txt OK
AT+MFSD=?	OK

18.6 AT+MFSATTRI Request file attributes

This command is used to request the attributes of file which exists in current directory

Write Command AT+MFSATTRI=<filename>	Response +MFSATTRI: <file_size> OK or ERROR
Test Command AT+MFSATTRI=?	Response OK

Parameters are defined below:

Parameters	Description
<filename>	String with double quotes, file name which is in current directory. Maximum name length is 128, name string not support non-ascii
<filesize>	The size of specified file, and the unit is in Byte.

Example:

AT Commands	Response
-------------	----------

AT+MFSATTRI="image_0.jpg"	+MFSATTRI: 8604,2017/04/11 10:24:46 Tue OK
AT+MFSATTRI=?	OK

18.7 AT+MFSREAD Read File content

This command is used to create a file in absolute path or current path

Write Command AT+MFSREAD=<file>,<offset>,<size>	Response +MFSREAD: DATA: <data_size>, <data> OK or ERROR
Test Command AT+MFSREAD=?	Response OK

Parameters are defined below:

Parameters	Description
<file>	String with double quotes, file should already exist, Maximum file name length is 128
<offset>	offset from the file beginning, <offset> should be less than file size.
<size>	0-1024 Size of data to be read, Reads the entire file when set to 0.

Example:

AT Commands	Response
AT+MFSREAD="Testfile",0,10	+MFSREAD: DATA: 10, 1234567890 OK
AT+MFSREAD=?	OK

18.8 AT+MFSCREATE Create a new file

This command is used to create a file in absolute path or current path

Write Command AT+MFSCREATE=<file>	Response OK or ERROR
Test Command AT+MFSCREATE=?	Response OK

Parameters are defined below:

Parameters	Description
<file>	ing with double quotes, file name which does not already exist in directory. Max file name string length is 128 and max whole path length is 1024 name string not support non-ascii and cannot contain: / \ : , * ? " < >

Example:

AT Commands	Response
AT+MFSCREATE="Testfile"	OK
AT+MFSL=2	+MFSL: FILES: Testfile OK OK
AT+MFSCREATE=?	OK

18.9 AT+MFSMEM Check the size of available memory

This command is used to check the size of total memory and available memory

Write Command AT+MFSMEM	Response +MFSMEM: C:(<total>, <available>) OK or ERROR
Test Command AT+MFSMEM=?	Response OK

Parameters are defined below:

Parameters	Description
<total>	The total size of local storage space.
<available>	The available size of local storage space.

Example:

AT Commands	Response
AT+MFSMEM	+MFSMEM: C:(1348480, 221600) OK
AT+MFSMEM=?	OK

18.10 AT+MFSRENAME Rename file or subdirectory in current directory

This command is used to rename a file or subdirectory in current directory.

Write Command AT+MFSRENAME=<old_name>, <new_name>	Response OK or ERROR
---	---

Test Command AT+MFSRENAME=?	Response OK
---------------------------------------	-----------------------

Parameters are defined below:

Parameters	Description
<old_name>	String with double quotes, name which is existed in current directory.
<new_name>	New name of specified file, string with double quotes. Maximum name string length is 128. Name string not support non-ascii and cannot contain: / \ : , * ? "><

Example:

AT Commands	Response
AT+MFSRENAME="image_0.jpg","image_1.jpg"	OK
AT+MFSRENAME=?	OK

18.11 AT+MFSCOPY Copy an appointed file

This command is used to copy an appointed file on / to an appointed directory on /, the new file name should give in parameter.

Test Command AT+MFSCOPY=?	Response OK
-------------------------------------	-----------------------

<p>Write Command</p> <p>AT+MFSCOPY=<file1>,<file2>[,<sync_mode>]</p>	<p>Response</p> <p>synchronous mode(sync_mode = 0):</p> <p>+MFSCOPY:<percent> [+MFSCOPY:<percent>] OK or BUSY or +MFSCOPY:FAIL ERROR</p> <p>asynchronous mode(sync_mode = 1):</p> <p>OK +MFSCOPY:<percent> +MFSCOPY:[<percent>] +MFSCOPY:100.0 or BUSY or OK +MFSCOPY:FAIL</p>
<p>Reference</p>	<p>Note</p> <ol style="list-style-type: none"> 1.The<file1> and <file2> should give the whole path and name, if only given file name, it will refer to current path(AT+MFSCD) and check the file's validity. 2. If <file2> is a whole path and name, make sure the directory exists, make sure that the file name does not exist or the file name is not the same name as the sub folder name, otherwise return error. 3. <percent> report refer to the copy file size. The big file maybe report many times, and little file report less. 4. If <sync_mode> is 1, the command will return OK immediately, and report final result with +MFSCOPY:END. If not set<sync_mode>, use the default value. <p>Multiple asynchronous copy operations are not supported at the same time, the busy state is returned</p>

Parameters are defined below:

Parameters	Description
------------	-------------

<file1>	The sources file name or the whole path name with sources file name
<file2>	The destination file name or the whole path name with destination file name. name string not support non-ascii and cannot contain: / \ , : * ? " > < Max file name string length is 128 and max whole path length is 1024
<percent>	The percent of copy done. The range is 0.0 to 100.0
<sync_mode>	The execution mode of the command: 0 - synchronous mode (default 0) 1 - asynchronous mode
<error code>	1 - NEW FILE NAME ALREADY EXIST 2 - SOURCE FILE NOT EXIST 3 - DIRECTORY NOT EXIST 4 - INVALID PATH NAME 5 - INVALID FILE NAME 6 - EFS HAVE NO ENOUGH MEMORY 7 - FILE CREATE ERROR 8 - READ FILE ERROR 9 - WRITE FILE ERROR

Example:

AT Commands	Response
AT+MFSCD?	+MFSCD:/ OK
AT+MFSCOPY="testfile","copyfile"	+MFSCOPY: 1.0 +MFSCOPY: 19.4 ... +MFSCOPY: 100.0 OK
AT+MFSCOPY="C:/testfile","C:/copyfile",1	OK +MFSCOPY: 1.0 +MFSCOPY: 19.4 ... +MFSCOPY: 100.0

18.12AT+MFSWRITE Write data to file

This command is used to write data to file.

Transparent transmission mode will last 5 seconds. Please input data within 5 seconds, or it will be quitted automatically when timeout and return ERROR.

Test Command AT+MFSWRITE=?	Response OK
Write Command AT+MFSWRITE=<file>,<mode>,<size>	Response OK or ERROR

Parameters are defined below:

Parameters	Description
<file>	String with double quotes, files should already exist,.Maximum file name length is 128.
<mode>	0 - write data at the beginning of the file 1 - write data at the end of the file
<size>	1-1024 Size of data to be written

Example:

AT+MFSWRITE="Testfile",0,10	>>1234567890 // enter +++ to terminate input OK
AT+MFSWRITE="Testfile",0,10	>> ERROR // timeout

19.AT Commands for Heartbeat

19.1 AT+MHEARTSRV Heartbeat Service Config

This command is used to set heartbeat server address ,port number , default use TCP protocol

Test Command AT+MHEARTSRV=?	Response +MHEARTSRV: "server address",(1-65535) OK
Read Command AT+MHEARTSRV?	Response +MHEARTSRV: <serveraddr>,<port> OK
Write Command AT+MHEARTSRV=<serveraddr>,<port>	Response OK or ERROR Note : serveraddrstring minimum length 2 and max length100,Command configuration parameters before start or restart heartbeat pack

Parameters are defined below:

Parameters	Description
<serveraddr>	Range: server ipv4 address or domain address
<port>	Range:1-65535

19.2 AT+MHEARTEN Heartbeat Enable and Disable

This command is used to enable or disable heartbeat function

Test Command AT+MHEARTEN=?	Response +MHEARTEN: (0-1) OK
--------------------------------------	--

Read Command AT+MHEARTEN?	Response +MHEARTEN: <state> OK
Write Command AT+MHEARTEN =<state>	Response OK or BUSY or ERROR +MHEARTEN: <code>

Parameters are defined below:

Parameters	Description
<state>	0 : disable heartbeat (default 0) 1 : enable heartbeat
<code>	0 - heartbeat end 1 - heartbeat connected 2 - PDP profile not activated 3 - NETLIB end open error 4 - DNS parsing error 5 - Socket create error 6 - Network connect error 7 - heartbeat send or rcv error 8 - heartbeat timeout

19.3 AT+MHEARTTIME Set Heartbeat Times

This command is used to set the times of heartbeat

Test Command AT+MHEARTTIME=?	Response +MHEARTTIME: (1-30),(1-30),(0-1) OK
Read Command AT+MHEARTTIME?	Response +MHEARTTIME: <timer>,<timerout>,<reconnect> OK

Write Command AT+MHEARTTIME=[<timer>[,<timerout>[,<reconnect>]]]	Response OK or ERROR Note : Command configuration parameters before start or restart heartbeat pack
--	---

Parameters are defined below:

Parameters	Description
<timer>	heartbeat interval time (unit 10s) 1 – 30 (default 6)
<timerout>	heartbeat timeout time(unit 10s) 1 – 30 (default 12)
<reconnect>	automatic reconnection 0 – 1 (default 1)

19.4 AT+MHEARTMODE Set Heartbeat Mode

This command is used to set Heartbeat mode

Test Command AT+MHEARTMODE=?	Response +MHEARTMODE: (0-1) OK
Read Command AT+MHEARTMODE?	Response +MHEARTMODE: <mode> OK
Write Command AT+MHEARTMODE=<mode >	Response OK or ERROR Note : Command configuration parameters before start or restart heartbeat pack

Parameters are defined below:

Parameters	Description
------------	-------------

<mode>	Heartbeat mode 0 – heartbeat to server ,this mode not support control sleep and wakeup(default 0) 1 – heartbeat from server
---------------------	---

19.5 AT+MHEARTDATA Set Heartbeat Packet Data

This command is used to set Heartbeat packet data type and data, different types of data can not be the same.

Test Command AT+MHEARTDATA=?	Response +MHEARTDATA: (0-2),"data" OK
Read Command AT+MHEARTDATA?	Response +MHEARTDATA: <type>,<data> OK
Write Command AT+MHEARTDATA=<type>,<data>	Response OK or ERROR Note : Command configuration parameters before start or restart heartbeat pack The use of sleep and wakeup data should sleep function support

Parameters are defined below:

Parameters	Description
<type>	data type 0 – heart data 1 – sleep data (Sleep module) 2 – wakeup data (Wakeup module)
<data>	heartbeat data Data string can not be empty and max length:100, yes quote, The default values for each type of data are "0","sleep","wakeup"

20.FOTA Commands

20.1 AT+FOTA download fota package and run upgrade process

This command is used to download fota package and start upgrade process

Write Command AT+FOTA=<channel>,<mode>,<destination_ip/url>,<username>,<password>	Response OK or +CME ERROR:<err>
Read Command AT+FOTA?	Response \$MYFOTA:<Status> OK

Parameters are defined below:

Parameters	Description
<channel>	Connect id
<mode>	0: ftp 1:http
<destination ip/url>	Server ip or address or url
<username>	User name
<password>	password
<status>	Download progress: 0-99 download file and progress bar 100: download and save fota package success 1001:domain is not exist 1002: parse timeout

21. Application Examples

21.1 TCP/UDP Example

1: TCP Example

Step	Command	Response	Description
1	AT+QICSGP=1,1,"cmnbiot",",","	OK	
2	AT+NETOPEN	OK	
3	AT+CIPOPEN=1,"TCP", "182.148.114.87",6600	OK +CIPOPEN: SUCCESS ,1	
4	AT+CIPSEND=1	>2233 OK	
5	AT+CIPRXGET=0,1	OK +CIPRXGET: SUCCESS,0,1,11,ddd ddddddd	
6	AT+CIPRXGET=1,1	OK +CIPRXGET: SUCCESS,1,1	
7	AT+CIPRXGET=2,1, 3	+CIPRXGET: SUCCESS,2,1,3,7, 333 OK	
8	AT+CIPSEND=1,5	>12345 OK	
9	AT+CIPCLOSE=1	OK +CIPCLOSE: SUCCESS,1	

2: TCP Multiple Example

Step	Command	Response	Description
1	AT+QICSGP=1,1,"cmnbiot",",","	OK	

2	AT+NETOPEN	OK	
3	AT+CIPOPEN=1,"TCP","182.148.114.87",6600	OK +CIPOPEN: SUCCESS,1	
4	AT+CIPOPEN=2,"TCP","182.148.114.87",6600	OK +CIPOPEN: SUCCESS,2	
5	AT+CIPOPEN=3,"TCP","182.148.114.87",6600	OK +CIPOPEN: SUCCESS,3	
6	AT+CIPSEND=1	>2233 OK +CIPSEND:SUCCESS, 1,4,4	
7	AT+CIPSEND=2	>1234 OK +CIPSEND:SUCCESS, 2,4,4	
8	AT+CIPSEND=3	>12345 OK +CIPSEND:SUCCESS, 3,5,5	
9	AT+CIPRXGET=0,1	OK +CIPRXGET: SUCCESS,0,1,11,ddd ddddddd	
10	AT+CIPRXGET=1,1	OK +CIPRXGET: SUCCESS,1,1	
11	AT+CIPRXGET=2,1, 3	+CIPRXGET: SUCCESS,2,1,3,7, 333 OK	
12	AT+CIPSEND=1,5	>12345 OK	
13	AT+CIPCLOSE=1	OK +CIPCLOSE: SUCCESS,1	

14	AT+CIPCLOSE=2	OK +CIPCLOSE: SUCCESS,2	
15	AT+CIPCLOSE=3	OK +CIPCLOSE: SUCCESS,3	

3: UDP Example

Step	Command	Response	Description
1	AT+QICSGP=1,1,"cmnbiot",",","	OK	
2	AT+NETOPEN	OK	
3	AT+CIPOPEN=1,"UDP",,,	OK +CIPOPEN: SUCCESS,1	
4	AT+CIPSEND=1,5,"182.148.114.87",6600	>ABCDE OK	
5	AT+CIPCLOSE=1	OK +CIPCLOSE: SUCCESS,1	

4: UDP Multiple Example

Step	Command	Response	Description
1	AT+QICSGP=1,1,"cmnbiot",",","	OK	
2	AT+NETOPEN	OK	
3	AT+CIPOPEN=1,"UDP",,,	OK +CIPOPEN: SUCCESS,1	
4	AT+CIPOPEN=2,"UDP",,,	OK +CIPOPEN: SUCCESS,2	
5	AT+CIPOPEN=3,"UDP",,,	OK +CIPOPEN: SUCCESS,3	
6	AT+CIPSEND=1,5,"182.148.114.87",6600	>ABCDE OK +CIPSEND:SU CESS,1,5,5	

7	AT+CIPSEND=2,5,"182.148.114.87",6600	>123 OK +CIPSEND:SUCCESS,2,5,5	
8	AT+CIPSEND=3,5,"182.148.114.87",6600	>123 OK +CIPSEND:SUCCESS,3,5,5	
9	AT+CIPCLOSE=1	OK +CIPCLOSE:SUCCESS,1	
10	AT+CIPCLOSE=2	OK +CIPCLOSE:SUCCESS,2	
11	AT+CIPCLOSE=3	OK +CIPCLOSE:SUCCESS,3	

21.2 HTTP Example

1:GET Example

Step	Command	Response	Description
1	AT+QICSGP=1,1,"cmnet","", ""	OK	
2	AT+QIACT=1	OK	
3	AT\$HTTPOPEN	OK	
4	AT\$HTTPPARA=http://182.148.114.87/file/zip-aa,6600,0	OK	
5	AT\$HTTPACTION=0	\$HTTPRECV:DATA,2048 HTTP/1.1 200 OK Accept-Ranges: bytes Cache-Control: no-cache Connection: keep-alive Content-Length: 14615 Content-Type: text/html	GET
6	AT\$HTTPCLOSE	OK	

2:POST Example

1	AT+QICSGP=1,1,"cmnet", "", ""	OK	
2	AT+QIACT=1	OK	
3	AT\$HTTPOPEN	OK	
4	AT\$HTTTPARA=http://182.148.114.87/file/zip-aa,6600,0	OK	
5	AT\$HTTTPRQH=Content-Length,26	OK	
6	AT\$HTTTPRQH=Connection,keep-alive	OK	
7	AT\$HTTTPACTION=1	OK	POST
8	AT\$HTTTPDATA=13	>> name=mobilete OK	
9	AT\$HTTTPSEND	OK	
10	AT\$HTTTPDATA=13	>>k&pass=123456 OK	
11	AT\$HTTTPSEND	OK	
12	AT\$HTTTPDATA=0	OK	
13	AT\$HTTTPSEND	\$HTTPRECV:DATA,153 HTTP/1.1 200 OK Server: ... Date: Tue, 20 Sep 2016 05:37:48 GMT \$HTTPRECV:DATA,2 \$HTTPRECV:DATA,195 ... OK	
11	AT\$HTTTPCLOSE	OK	

3:POST Example

Step	Command	Response	Description
1	AT+QICSGP=1,1,"cmnet", "", ""	OK	
2	AT+QIACT=1	OK	

3	AT\$HTTPOPEN	OK	
4	AT\$HTTPPARA=http://182.148.114.87/file/zip-aa,6600,0	OK	
5	AT\$HTTQRH=Content-Length,26	OK	
6	AT\$HTTPDATAEX=26,"name=mobiletek&password=123456"	OK	
7	AT\$HTTPACTION=3	\$HTTPRECV:DATA,2048 HTTP/1.1 200 OK Accept-Ranges: bytes Cache-Control: no-cache Connection: keep-alive Content-Length: 14615 Content-Type: text/html OK	
8	AT\$HTTPCLOSE	OK	

21.3 FTP Example

Step	Command	Response	Description
1	AT+CFTPPORT=6521	OK	
2	AT+CFTPSERV="58.246.1.50"	OK	
3	AT+CFTPUN="FTP_TST"	OK	
4	AT+CFTPPW="FTPTST_0320"	OK	

5	AT+CFTPLIST="/"	OK +CFTPLIST: -rw-rw-rw- 1user group 10 Jan 7 18:47 11.txt -rw-rw-rw- 1 user group 1360 Jan 2 13:31 12.txt ... +CFTPLIST:S UCCESS	//List Directory
6	AT+CFTPGETFILE="/jiang/test1.txt", "/1.txt",0	OK +CFTPGETFILE: SUCCESS, 31	// Get file
6	AT+CFTPGET="/zs.txt",0	OK +CFTPGET:D ATA,15 qwertyqwerqe rq +CFTPGET:S UCCESS,15	
8	AT+MFSLs=2	+MFSLs:FILE S: Log_Cfg.nvm COMCfg.csv platform.nvm psm.dat Res 1.txt OK	List Local file

9	AT+CFTPPUTFILE="/zyqqq.txt", "/1.txt", 0	OK +CFTPPUTFILE:SUCCESS	//put file to ftp server
10	AT+CFTPDELE="/zyqqq.txt"	OK	//del ftp server file
11	AT+CFTPPUT="/Z1.txt", 0, 10	+CFTPPUT:BEGIN 1111111111 OK +CFTPPUT:SUCCESS	

21.4FTPS Example

Step	Command	Response	Description
1	AT+CFTPPORT=6988	OK	
2	AT+CFTPSERV="182.148.114.87"	OK	
3	AT+CFTPUN="jingbin"	OK	
4	AT+CFTPPW="jingbin"	OK	
5	AT+CFTPTLS=2,1	OK	
6	AT+CFTPMKD="ZYQQQ11"	OK	
7	AT+CFTPRMD="ZYQQQ11"	OK	

8	AT+CFTPLIST="/"	OK +CFTPLIST: -rw-rw-rw- 1user group 10 Jan 7 18:47 11.txt -rw-rw-rw- 1 user group 1360 Jan 2 13:31 12.txt ... +CFTPLIST:S UCCESS	
9	AT+CFTPGETFILE="/jiang/test1.txt", "/1.txt",0	OK +CFTPGETFILE: SUCCESS, 31	
10	AT+CFTPPUTFILE="/z2.txt", "/1.txt",0	OK +CFTPPUTFILE:SUCCESS	
11	AT+CFTPGET="/zs.txt",0	OK +CFTPGET:D ATA,15 qwertyqwerqe rq	
12	AT+CFTPPUT="/Z1.txt",0,10	+CFTPPUT:BEGIN 1111111111 OK	
13	AT+CFTPDELE="/Z1.txt"	OK	

21.5 MQTT Example

Step	Command	Response	Description
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1	AT+CEREG?	+CEREG: 1,1,"19a5","0e88db1d",9 OK	
2	AT+QICSGP=1,1,"cmnbiot","web","password",0	OK	
3	AT+QIACT=1	OK	Active PDP
4	AT+MCONFIG="rdatest"	OK	Configure
5	AT+MIPSTART="test.mosquitto.org",1883,3	OK	CreateTCP connection
6	AT+MCONNECT=1,60	OK	Create MQTT connection
7	AT+MSUB="/111",0	OK +MSUB:"/111",5 types,"hello"	//SubscribeMQTT topic
8	AT+MPUB="/111",0,0,"hello"	OK	//Publish MQTT message
9	AT+MPUBEX="/111",0,0,2	>ab +MPUBEX:SUC CESS	Publish MQTT a long message
10	AT+MUNSUB="/111"	OK	UnsubscribeMQTT topic
11	AT+MDISCONNECT	+MDISCONNECT: SUCCESS OK	CloseMQTT connection
10	AT+MIPCLOSE	+MIPCLOSE: SUCCESS OK	Release mqtt resources

21.6 File System Example

Step	Command	Response	Description
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1	AT+MFSL=0	+MFSL:SUBDIRECTORIES: +MFSL:FILES: Log_Cfg.nvm COMCfg.csv platform.nvm OK	
2	AT+MFMSKDIR="test"	OK	
3	AT+MFSL=1	+MFSL:SUBDIRECTORIES: test OK	
4	AT+MFSCD="test"	+MFSCD:/test/ OK	
5	AT+MFSCREATE="test.txt"	OK	
6	AT+MFSL=2	+MFSL:FILES: test.txt OK	
7	AT+MFSRENAME="test.txt","test1.txt"	OK	
8	AT+MFSL=2	+MFSL:FILES: test1.txt OK	
9	AT+MFSDEL="test1.txt"	OK	
10	AT+MFSCD=".."	+MFSCD:/ OK	
11	AT+MFSRMDIR="test"	OK	
12	AT+MFSREAD="/COMCfg.csv",0,10	+MFSREAD: DATA: 10, TYPE,VALID OK	

13	AT+MFSCOPY="/COMCfg.csv", "/2.txt"	+MFSCOPY:99.01 +MFSCOPY:100.0 OK	Sync copy file
14	AT+MFSCOPY="/COMCfg.csv", "/3.txt", 1	OK +MFSCOPY:99.01 +MFSCOPY:100.0	Async copy file

21.7 Fota Example

1.HTTP Example

Step	Command	Response	Description
1	AT+QICSGP=1,1,"cmnbiot", "", ""	OK	
2	AT+QIACT=1	OK	
3	AT+FOTA=1,1,"58.246.1.50:60881/fbf_dfota.bin", "", ""	OK	
4	AT+FOTA?	\$MYFOTA:100 OK	
5	Reboot module		

2:FTP Example

Step	Command	Response	Description
1	AT+QICSGP=1,1,"cmnbiot", "", ""	OK	
2	AT+QIACT=1	OK	
3	AT+FOTA=1,0,"58.246.1.50:6521/fbf_dfota.bin", "FTP_TST", "FTPTST_0320"	OK	
4	AT+FOTA?	\$MYFOTA:100 OK	
5	Reboot module		

22.Error Code

Description	Error Code
CME_PHONE_FAILURE	0 // phone failure
CME_NO_CONNECTION	1 // no connection to phone
CME_PHONE_ADP_LINK_RSVD	2 // phone adaptor link reserved
CME_OPERATION_NOT_ALLOWED	3 // operation not allowed
CME_OPERATION_NOT_SUPPORTED	4 // operation not supported
CME_PH_SIM_PIN_REQUIRED	5 // PH SIM PIN required
CME_PH_FSIM_PIN_REQUIRED	6 // PH-FSIM PIN required
CME_PH_FSIM_PUK_REQUIRED	7 // PH-FSIM PUK required
CME_NO_SIM	10 // SIM not inserted
CME_SIM_PIN_REQUIRED	11 // SIM PIN required
CME_SIM_PUK_REQUIRED	12 // SIM PUK required
CME_SIM_FAILURE	13 // SIM failure
CME_SIM_BUSY	14 // SIM busy
CME_SIM_WRONG	15 // SIM wrong
CME_INCORRECT_PASSWD	16 // incorrect password
CME_SIM_PIN2_REQUIRED	17 //SIM PIN2 required
CME_SIM_PUK2_REQUIRED	18 //SIM PUK2 required
CME_MEMORY_FULL	20 //memory full

CME_INVALID_INDEX	21 //invalid index
CME_NOT_FOUND	22 //not found
CME_MEMORY_FAILURE	23 //memory failure
CME_TEXT_STRING_TOO_LONG	24 //text string too long
CME_INVALID_CHAR_IN_STRING	25 //invalid characters in text string
CME_DIAL_STRING_TOO_LONG	26 //dial string too long
CME_INVALID_CHAR_IN_DIAL_STRING	27 //invalid characters in dial string
CME_NO_NW_SERVICE	30 //no network service
CME_NW_TIMEOUT	31 //network timeout
CME_NW_NOT_ALLOWED	32 //network not allowed emergency calls only
CME_NW_PIN_REQUIRED	40 //network personalization PIN required
CME_NW_PUK_REQUIRED	41 //network personalization PUK required
CME_NW_SUB_PIN_REQUIRED	42 //network subset personalization PIN required
CME_NW_SUB_PUK_REQUIRED	43 //network subset personalization PUK required
CME_SP_PIN_REQUIRED	44 //service provider personalization PIN required
CME_SP_PUK_REQUIRED	45 //service provider personalization PUK required
CME_CP_PIN_REQUIRED	46 //corporate personalization PIN required
CME_CP_PUK_REQUIRED	47 //corporate personalization PUK required
CME_HD_KEY_REQUIRED	48 //hidden key required
CME_INVALID_PARAM	50 //Invalid Param
CME_UNKNOWN	100 //unknown

CME_ILLEGAL_MS	103 //Illegal MS (#3)
CME_ILLEGAL_ME	106 //Illegal ME (#6)
CME_GPRS_NOT_ALLOWED	107 //GPRS services not allowed (#7)
CME_PLMN_NOT_ALLOWED	111 //PLMN not allowed (#11)
CME_LA_NOT_ALLOWED	112 //Location area not allowed (#12)
CME_ROAMING_NOT_ALLOWED	113 //Roaming not allowed in this location area (#13)
CME_SERVICE_OP_NOT_SUPPORTED	132 //service option not supported (#32)
CME_SERVICE_OP_NOT_SUBSCRIBED	133 //requested service option not subscribed (#33)
CME_SERVICE_OP_OUT_OF_ORDER	134 //service option temporarily out of order (#34)
CME_UNSPECIFIED_GPRS_ERR	148 //unspecified GPRS error
CME_PDP_AUTH_FAILURE	149 //PDP authentication failure
CME_INVALID_MOBILE_CLASS	150 //invalid mobile class
CME_COMMAND_TIMEOUT_ERR	151 //AT command timeout
CME_IMS_SRV_FAILURE	170 //IMSSRV failure
CMS_ME_FAILURE	300 //ME failure
CMS_SMS_SERVICE_RESV	301 //SMS service of ME reserved
CMS_OPERATION_NOT_ALLOWED	302 //operation not allowed
CMS_OPERATION_NOT_SUPPORTED	303 //operation not supported
CMS_INVALID_PDU_MODE_PARA	304 //invalid PDU mode parameter
CMS_INVALID_TEXT_MODE_PARA	305 //invalid text mode parameter
CMS_NO_SIM	310 //(U)SIM not inserted
CMS_SIM_PIN_REQUIRED	311 //(U)SIM PIN required

CMS_PH_SIM_PIN_REQUIRED	312 //PH-(U)SIM PIN required
CMS_SIM_FAILURE	313 //(U)SIM failure
CMS_SIM_BUSY	314 //(U)SIM busy
CMS_SIM_WRONG	315 //(U)SIM wrong
CMS_SIM_PUK_REQUIRED	316 //(U)SIM PUK required
CMS_SIM_PIN2_REQUIRED	317 //(U)SIM PIN2 required
CMS_SIM_PUK2_REQUIRED	318 //(U)SIM PUK2 required
CMS_MEMORY_FAILURE	320 //memory failure
CMS_INVALID_MEMORY_INDEX	321 //invalid memory index
CMS_MEMORY_FULL	322 //memory full
CMS_SMSC_ADDR_UNKNOWN	330 //SMSC address unknown
CMS_NO_NW_SERVICE	331 //no network service
CMS_NW_TIMEOUT	332 //network timeout
CMS_NO_CNMA_ACK_EXPECTED	340 //no +CNMA acknowledgement expected
CMS_UNKNOWN_ERROR	500 //unknown error