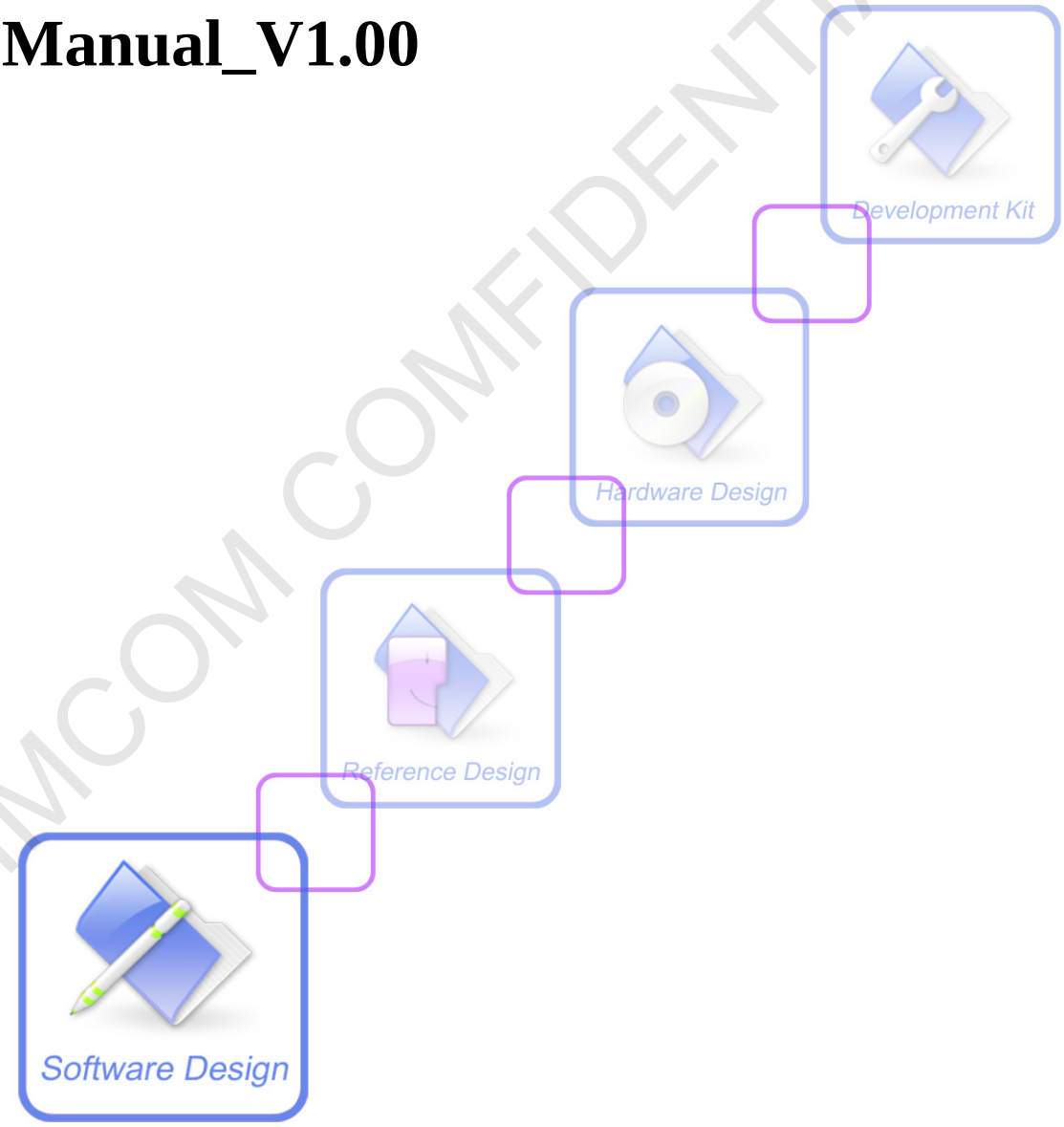
SIM7020 Series_AT Command Manual_V1.00



Document Title	**SIM7020 Series AT Command Manual**
Version	**1.00**
Date	**2018-04-10**
Status	**Release**
Document Control ID	**SIM7020 Series_AT Command Manual_V1.00**

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Version History

Version	Date	Chapter	What is new
V1.00	2018-04-10		New version

1 Introduction

1.1 Scope of the document

This document presents the AT Command Set for SIMCom SIM7020 Series, including SIM7020.

1.1 Related documents

You can visit the SIMCom Website using the following link:
http://www.simcomm2m.com

1.2 Conventions and abbreviations

In this document, the GSM engines are referred to as following term:
ME (Mobile Equipment);
MS (Mobile Station);
TA (Terminal Adapter);
DCE (Data Communication Equipment) or facsimile DCE (FAX modem, FAX board);

In application, controlling device controls the GSM engine by sending AT Command via its serial interface. The controlling device at the other end of the serial line is referred to as following term:
TE (Terminal Equipment);
DTE (Data Terminal Equipment) or plainly "the application" which is running on an embedded system;

1.3 AT Command syntax

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

The AT Command set implemented by SIM7020 Series is a combination of 3GPP TS 27.005, 3GPP TS 27.007 and ITU-T recommendation V.25ter and the AT commands developed by SIMCom.
Note: Only enter AT Command through serial port after SIM7020 Series is powered on and Unsolicited Result Code "RDY" is received from serial port. If auto-bauding is enabled, the Unsolicited Result Codes "RDY"

and so on are not indicated when you start up the ME, and the "AT" prefix, or "at" prefix must be set at the beginning of each command line.

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

1.3.1 Basic syntax

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

1.3.2 S Parameter syntax

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

1.3.3 Extended Syntax

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

Table 1: Types of AT commands and responses

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

1.3.4 Combining AT commands on the same Command line

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

The Command line buffer can accept a maximum of 4200 characters (counted from the first command without "AT" or "at" prefix). If the characters entered exceeded this number then none

of the Command will executed and TA will return "**ERROR**".

1.3.5 Entering successive AT commands on separate lines

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

1.4 Supported character sets

The SIM7020 Series AT Command interface defaults to the **IRA** character set. The SIM7020 Series supports the following character sets:
GSM format
UCS2
IRA
The character set can be set and interrogated using the "**AT+CSCS**" Command (3GPP TS 27.007). The character set is defined in GSM specification 3GPP TS 27.005.

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

1.5 Flow control

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

There are basically two approaches to achieve data flow control: software flow control and hardware flow control. SIM7020 Series support both two kinds of flow control.
In Multiplex mode, it is recommended to use the hardware flow control.

1.5.1 Software flow control (XON/XOFF flow control)

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

The default flow control approach of SIM7020 Series is hardware flow control (RTS/CTS flow control), to enable software flow control in the DTE interface and within GSM engine, type the following AT Command:
AT+IFC=1, 1

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

control.

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

1.5.2 Hardware flow control (RTS/CTS flow control)

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

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

1.6 Definitions

1.6.1 Parameter Saving Mode

For the purposes of the present document, the following syntactical definitions apply:

- **NO_SAVE**: The parameter of the current AT command will be lost if module is rebooted or current AT command doesn't have parameter.
- **AUTO_SAVE**: The parameter of the current AT command will be kept in NVRAM automatically and take in effect immediately, and it won't be lost if module is rebooted.
- **AUTO_SAVE_REBOOT**: The parameter of the current AT command will be kept in NVRAM automatically and take in effect after reboot, and it won't be lost if module is rebooted.
- -: "-" means this AT command doesn’t care the parameter saving mode.

1.6.2 Max Response Time

Max response time is estimated maximum time to get response, the unit is seconds.
"-" means this AT command doesn’t care the response time.

2 AT Commands According to V.25TER

These AT Commands are designed according to the ITU-T (International Telecommunication Union, Telecommunication sector) V.25ter document.

2.1 Overview of AT Commands According to V.25TER

Command	Description
ATE	Set command echo mode
ATI	Display product identification information
ATL	Set monitor speaker loudness
ATM	Set monitor speaker mode
ATN1	Some PC modem driver initial setting to handshake at highest speed larger than S37
ATO	Switch from command mode to data mode
ATP	Select pulse dialling
ATQ	Set result code presentation mode
ATS0	Set number of rings before automatically answering the call
ATS1	Ring counter
ATS2	Set escape sequence character
ATS3	Set command line termination character
ATS4	Set response formatting character
ATS5	Set command line editing character
ATS6	Pause before blind dialling
ATS7	Set number of seconds to wait for connection completion
ATS8	Set number of seconds to wait for comma dial modifier encountered in dial string of D command
ATS10	Set disconnect delay after indicating the absence of data carrier
ATS12	Set escape code guard time
ATS25	Set DTR change time
ATS95	Some PC modem driver initial setting to enable extended result codes
ATT	Select Tone Dialing
ATV	TA response format
ATX	Set connect result code format and monitor call progress
ATZ	Reset default configuration
AT&C	Set DCD function mode
AT&D	Set DTR function mode

AT&F	Factory defined configuration
AT&K	Flow control setting
AT&V	Display current configuration
AT&W	Store Active Profile
AT+DR	V.42bis data compression reporting control
AT+DS	V.42bis data compression control
AT+GCAP	Request complete TA capabilities list
AT+GMI	Request manufacturer identification
AT+GMM	Request TA model identification
AT+GMR	Request TA revision identification of software release
AT+GOI	Request global object identification
AT+GSN	Request TA serial number identification (IMEI)
AT+ICF	Set TE-TA control character framing
AT+IFC	Set TE-TA local data flow control
AT+ILPR	Set TE-TA Local rate reporting mode
AT+IPR	Set TE-TA fixed local rate
AT+FCLASS	Set Fax Class

2.1 Detailed Description of AT Commands According to V.25TER

2.1.1 ATE Set Command Echo Mode

ATE Set Command Echo Mode	
Execution Command **ATE<value>**	Response This setting determines whether or not the TA echoes characters received from TE during Command state. **OK**
	Parameters **<value>** 0 Echo mode off 1 Echo mode on
Parameter Saving Mode	
Max Response Time	-
Reference V.25ter	Note

2.1.2 ATI Display Product Identification Information

ATI Display Product Identification Information

Execution Command **ATI**	Response TA issues product information text Example: **SIM7020 R1752** **OK**
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.3 ATL Set Monitor speaker loudness

ATL Set Monitor speaker loudness	
Execution Command **ATL<value>**	Response **OK**
	Parameters **<value>** 0..3 Volume
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note No effect in GSM

2.1.4 ATM Set Monitor Speaker Mode

ATM Set Monitor Speaker Mode	
Execution Command **ATM<value>**	Response **OK**
	Parameters **<value>** 0..2 Mode
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note No effect in GSM

2.1.5 ATN1 some PC modem driver initial setting to handshake at highest speed larger than S37

ATN1 Some PC modem driver initial setting to handshake at highest speed larger than S37	
Execution Command **ATN1**	Response **OK**
	Parameters
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.6 ATO Switch from Command Mode to Data Mode

ATO Switch from Command Mode to Data Mode	
Execution Command **ATO[n]**	Response TA resumes the connection and switches back from command mode to data mode. **CONNECT** If connection is not successfully resumed **ERROR** else TA returns to data mode from command mode **CONNECT <text>** Note: <**text**> only if parameter setting **ATX>0**
	Parameter **<n>** 0 Switch from command mode to data mode.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.7 ATP Select Pulse Dialling

ATP Select Pulse Dialling

Execution Command **ATP**	Response **OK**
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note No effect in GSM

2.1.8 ATQ Set Result Code Presentation Mode

ATQ Set Result Code Presentation Mode	
Execution Command **ATQ<n>**	Response This parameter setting determines whether or not the TA transmits any result code to the TE. Information text transmitted in response is not affected by this setting. If <**n**>=0: **OK** If <**n**>=1: (none)
	Parameters **<n>** 0 TA transmits result code 1 Result codes are suppressed and not transmitted
Parameter Saving Mode	
Max Response Time	-
Reference V.25ter	Note This command only affects V.250 AT commands and not all other AT commands in this specification (either 3GPP or MediaTek proprietary).

2.1.9 ATS0 Set Number of Rings before Automatically Answering the Call

ATS0 Set Number of Rings before Automatically Answering the Call	
Read Command **ATS0?**	Response **<n>** **OK**
	Parameters See Write Command
Write Command	Response

ATS0=<n>	This parameter setting determines the number of rings before auto-answer. **OK** **ERROR**
	Parameters **<n>** 0 Automatic answering is disable. 1-255 Number of rings the modem will wait for before answering the phone if a ring is detected.
Parameter Saving Mode	-
Max Response Time	-
Reference V.25ter	Note If <**n**> is set too high, the calling party may hang up before the call can be answered automatically. If using cmux port, **ATH** and **AT+CHUP** can hang up the call (automatically answering) only in the CMUX channel 0. If using dual-physical serial port, **ATH** and **AT+CHUP** can hang up the call (automatically answering) only in UART1.

2.1.10 ATS1 Ring counter

ATS1 Ring counter	
Read Command **ATS1?**	Response **<n>** **OK**
	Parameters See Write Command
Write Command **ATS1=<n>**	Response This command will not alert the RING counter,but simply display **OK** **ERROR**
	Parameters **<n>** The number of “RING” strings sent to the TE as a result of receiving an incoming call. 0-255
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-

Reference V.25ter	Note If “RING” is not displayed on a particular channel due to other settings (such as suppression of all unsolicited events (ATQ)) then this value should not be incremented. This value is reset to 0 when receiving a new incoming call. Note that this command should also be made channel specific as with other ATS<x> commands.

2.1.11 ATS2 Set escape sequence character

ATS3 Set escape sequence character	
Read Command **ATS2?**	Response **<n>** **OK**
	Parameters See Write Command
Write Command **ATS2=<n>**	Response This parameter setting determines the character recognized by the TA to indicate the escape sequence. **OK** **ERROR**
	Parameters **<n>** 0-43-255 escape sequence character Note: default 43 = ‘+’
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.12 ATS3 Set Command Line Termination Character

ATS3 Set Command Line Termination Character	
Read Command **ATS3?**	Response **<n>** **OK**
	Parameters See Write Command
Write Command **ATS3=<n>**	Response This parameter setting determines the character recognized by TA to

	terminate an incoming command line. The TA also returns this character in output. **OK** **ERROR**
	Parameters **<n>** 0-13-127 Command line termination character
Parameter Saving Mode	-
Max Response Time	-
Reference V.25ter	Note Default 13 = CR. It only supports default value.

2.1.13 ATS4 Set Response Formatting Character

ATS4 Set Response Formatting Character	
Read Command **ATS4?**	Response **<n>** **OK**
	Parameters See Write Command
Write Command **ATS4=<n>**	Response This parameter setting determines the character generated by the TA for result code and information text. **OK** **ERROR**
	Parameters **<n>** 0-10-127 Response formatting character
Parameter Saving Mode	-
Max Response Time	-
Reference V.25ter	Note Default 10 = LF. It only supports default value.

2.1.14 ATS5 Set Command Line Editing Character

ATS5 Set Command Line Editing Character	
Read Command **ATS5?**	Response **<n>**

	OK
	Parameters See Write Command
Write Command **ATS5=<n>**	Response This parameter setting determines the character recognized by TA as a request to delete from the command line the immediately preceding character. **OK** **ERROR**
	Parameters **<n>** 0-8-127 Response formatting character
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note Default 8 = Backspace.

2.1.15 ATS6 Pause Before Blind Dialling

ATS6 Pause Before Blind Dialling	
Read Command **ATS6?**	Response **<n>** **OK**
Write Command **ATS6=<n>**	Response **OK** **ERROR**
	Parameters **<n>** 0-2-10 Time
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note No effect in GSM

2.1.16 ATS7 Set Number of Seconds to Wait for Connection Completion

ATS7 Set Number of Seconds to Wait for Connection Completion

Read Command **ATS7?**	Response **<n>** **OK**
	Parameters See Write Command
Write Command **ATS7=<n>**	Response This parameter setting determines the amount of time to wait for the connection completion in case of answering or originating a call. **OK** **ERROR**
	Parameters **<n>** 1-60-255 Number of seconds to wait for connection completion
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note If called party has specified a high value for **ATS0=<n>**, call setup may fail. The correlation between **ATS7** and **ATS0** is important Example: Call may fail if **ATS7=30** and **ATS0=20**. **ATS7** is only applicable to data call.

2.1.17 ATS8 Set Number of Seconds to Wait for Comma Dial Modifier Encountered in Dial String of D Command

ATS8 Set Number of Seconds to Wait for Comma Dial Modifier Encountered in Dial String of D Command	
Read Command **ATS8?**	Response **<n>** **OK**
	Parameters See Write Command
Write Command **ATS8=<n>**	Response **OK** **ERROR**
	Parameters **<n>** 0 no pause when comma encountered in dial string 1-2-255 The value of this register determines how long the modem should pause when it sees a comma in the dialing string.

Parameter Saving Mode	-
Max Response Time	-
Reference V.25ter	Note No effect in GSM

2.1.18 ATS10 Set Disconnect Delay after Indicating the Absence of Data Carrier

ATS10 Set Disconnect Delay after Indicating the Absence of Data Carrier	
Read Command **ATS10?**	Response **<n>** **OK**
	Parameters See Write Command
Write Command **ATS10=<n>**	Response This parameter setting determines the amount of time that the TA will remain connected in absence of data carrier. If the data carrier is once more detected before disconnecting, the TA remains connected. **OK** **ERROR**
	Parameters **<n>** 1-15-254 Number of tenths seconds of delay
Parameter Saving Mode	-
Max Response Time	-
Reference V.25ter	Note This command is not used, as there have been issues with in-band DCD dropping unexpectedly for CSD calls on some networks.

2.1.19 ATS12 Set Escape Code Guard Time

This command sets the escape code guard time in fiftieths of a second. The escape guard time is used to measure when to detect the +++ escape sequence has been entered by the PC in order to drop out of data mode back to AT command mode.

The guard time determines the time that forms a guard period before and after three escape sequence characters. In order to distinguish an escape sequence from just three escape sequence characters in the data stream there is timing associated to the three escape sequence characters of an escape sequence.

The time between the last byte of the data stream and the first escape sequence character must be at least the guard time and the time between each escape sequence character of the escape

sequence must be less than the guard time and no other byte is received after the third escape sequence character for the time of the guard time. If an escape sequence is detected, the OK result code will be sent to the DTE. Otherwise, the DCE will stay in data mode.
For example: "<Guard time>+++<Guard time>"

ATS12 Set Escape Code Guard Time	
Read Command **ATS12?**	Response **<n>** **OK** NB: <n> is in 3 decimal digits format (e.g. Default value is given as 050). If error is related to wrong AT syntax: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **ATS12=<n>**	Response **OK** **ERROR**
	Parameters **<n>** 0-50-255 Number of 20 ms.
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.20 ATS25 Set DTR change time

This command sets the S-register 25 Detect DTR change time that contain the threshold for noticing a change in DTR. This time permits to the modem to ignore DTR before taking action specified by &Dn (See AT&D Circuit 108 behavior).
The value unit is in 1/100 seconds. Default value is set to 5 (50ms delay after a DTR drop before the modem acts on it).

ATS25 Set DTR change time	
Read Command **ATS25?**	Response **<n>** **OK** NB: <n> is in 3 decimal digits format (e.g. Default value is given as 000). If error is related to wrong AT syntax:

	+CME ERROR: <err>
	Parameters See Write Command
Write Command **ATS25=<n>**	Response **OK** **ERROR**
	Parameters **<n>** 0-5-255 Number of 10 ms.
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.21 ATS95 Some PC modem driver initial setting to enable extended result codes

ATS95 Some PC modem driver initial setting to enable extended result codes	
Read Command **ATS95?**	Response **OK**
	Parameters See Write Command
Write Command **ATS95=<n>**	Response **OK** Some standard PC modem drivers will send this AT command to initialize the setting, but it is meaningless in the 3gpp standard. So we just return OK and no effect for the setting.
	Parameters **<n>** 0-255 meaningless for the GSM, and GPRS/Packet Domain setting .
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.22 ATT Select Tone Dialing

ATT Select Tone Dialing

Execution Command **ATT**	Response **OK**
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.23 ATV TA Response Format

ATV TA Response Format	
Execution Command **ATV<value>**	Response This parameter setting determines the contents of the header and trailer transmitted with result codes and information responses. When <**value**>=0 **0** When <**value**>=1 **OK**
	Parameters **<value>** 0 Information response: **<text><CR><LF>** Short result code format: **<numeric code><CR>** 1 Information response: **<CR><LF><text><CR><LF>** Long result code format: **<CR><LF><verbose code><CR><LF>** The result codes, their numeric equivalents and brief descriptions of the use of each are listed in the following table.
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note

ATV1	**ATV0**	**Description**
OK	0	Acknowledges execution of a Command
CONNECT	1	A connection has been established; the DCE is moving from Command state to online data state
RING	2	The DCE has detected an incoming call signal from network

NO CARRIER	3	The connection has been terminated or the attempt to establish a connection failed
ERROR	4	Command not recognized, Command line maximum length exceeded, parameter value invalid, or other problem with processing the Command line
NO DIALTONE	6	No dial tone detected
BUSY	7	Engaged (busy) signal detected
NO ANSWER	8	"@" (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer (S7)
PROCEEDING	9	An AT command is being processed
CONNECT <text>	Manufacturer-specific	Same as CONNECT, but includes manufacturer-specific text that may specify DTE speed, line speed, error control, data compression, or other status

2.1.24 ATX Set CONNECT Result Code Format and Monitor Call Progress

ATX Set CONNECT Result Code Format and Monitor Call Progress	
Execution Command **ATX<value>**	Response This parameter setting determines whether or not the TA detected the presence of dial tone and busy signal and whether or not TA transmits particular result codes. **OK** **ERROR**
	Parameters **<value>** 0 **CONNECT** result code only returned, dial tone and busy detection are both disabled. 1 **CONNECT<text>** result code only returned, dial tone and busy detection are both disabled. 2 **CONNECT<text>** result code returned, dial tone detection is enabled, busy detection is disabled. 3 **CONNECT<text>** result code returned, dial tone detection is disabled, busy detection is enabled. 4 **CONNECT<text>** result code returned, dial tone and busy detection are both enabled.
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.25 ATZ Reset Default Configuration

ATZ Reset Default Configuration	
Execution Command **ATZ[<value>]**	Response TA sets all current parameters to the user defined profile. **OK** **ERROR**
	Parameters **<value>** 0 Restore profile 0
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

Parameter impacted by Z command: refer to AT&W

NOTE:

Parameters related to uart operation, like csclk, ipr, icf and ifc, will not be reset to default configuration.

2.1.26 AT&C Set DCD Function Mode

AT&C Set DCD Function Mode	
Execution Command **AT&C<value>**	Response This parameter determines how the state of circuit 109 (DCD) relates to the detection of received line signal from the distant end. **OK** **ERROR**
	Parameters **<value>** 0 DCD line is always ON 1 DCD line is ON only in the presence of data carrier
Parameter Saving Mode	-
Max Response Time	-
Reference V.25ter	Note

2.1.27 AT&D Set DTR Function Mode

AT&D Set DTR Function Mode

Execution Command **AT&D[<value>]**	Response This parameter determines how the TA responds when circuit 108/2 (DTR) is changed from the ON to the OFF condition during data mode. **OK** or **ERROR**
	Parameters **<value>** 0 TA ignores status on DTR. 1 ON->OFF on DTR: Change to Command mode with remaining the connected call. 2 ON->OFF on DTR: Disconnect call, change to Command mode. During state DTR = OFF is auto-answer off.
Parameter Saving Mode	-
Max Response Time	-
Reference V.25ter	Note

2.1.28 AT&F Factory Defined Configuration

AT&F Factory Defined Configuration	
Execution Command **AT&F[<value>]**	Response TA sets all current parameters to the manufacturer defined profile. **OK**
	Parameters **<value>** 0 Set all TA parameters to manufacturer defaults.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

Parameter impacted by &F command: refer to AT&W

NOTE:

Parameters related to uart operation, like csclk, ipr, icf and ifc, will not be reset to default configuration.

2.1.29 AT&K Flow control setting

AT&K Flow control setting	
Execution Command	Response **OK**

AT&K[<value>]	Parameters **<value>** 0 No flow control 3 RTS /CTS flow control (hardware) 4 XON/XOFF flow control (software)
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note This command does not store anything in the profile data because it sets the AT+IFC settings when used: ● AT&K0 is equivalent of entering AT+IFC=0,0 ● AT&K3 is equivalent of entering AT+IFC=2,2 ● AT&K4 is equivalent of entering AT+IFC=1,1

2.1.30 AT&V Display Current Configuration

AT&V Display Current Configuration	
Execution Command **AT&V[<n>]**	Response TA returns the current parameter setting. <**current configurations text**> **OK** or **ERROR**
	Parameters **<n>** 0 Responses in numeric format
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.31 AT&W Store Active Profile

AT&W Store Active Profile	
Execution Command **AT&W[<n>]**	Response TA stores the current parameter setting in the user defined profile. **OK** or **ERROR**
	Parameters **<n>** 0 Store the current configuration in profile 0

Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note The user defined profile is stored in non volatile memory.

Parameter stored by &W

Command	Parameter name	Displayedby &V
ATS0	<num>	Y
ATS3	<char>	Y
ATS4	<char>	Y
ATS5	<char>	Y
ATS6	<short>	Y
ATS7	<time>	Y
ATS8	<time>	Y
ATS10	<time>	Y
ATV	<format>	Y
ATE	<echo>	Y
ATQ	<result>	Y
ATX	<result>	Y
AT&C	<behavior>	Y
AT&D	<behavior>	Y
AT+CLTS	<timestamp>	Y
AT+CREG	<n>	Y
AT+CGREG	<n>	Y
AT+CMEE	<n>	Y
AT+CSCLK	<n>	Y
AT+CSCS	<chest>	Y
AT+CSMINS	<n>	Y
AT+EXUNSOL	<exunsol>	Y
AT+IPR	<n>	Y
AT+IFC	<TA_by_TE>, <TE_by_TA>	Y

2.1.32 AT+DR V.42bis data compression reporting control

AT+DR V.42bis data compression reporting control	
Test Command **AT+DR=?**	Response **+DR: (list of supported <value>s)**

	OK
	Parameters
Read Command **AT+DR?**	Response **+DR: <value>** **OK**
	Parameters See Write Command
Write Command **AT+DR=<value>**	Response This parameter setting determines whether the intermediate result code of the current data compressing is reported by TA to TE after a connection establishment. **OK**
	Parameters **<value>** 0 reporting disabled 1 reporting enabled
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.33 AT+DS V.42bis data compression control

AT+DS V.42bis data compression control	
Test Command **AT+DS=?**	Response **+DS: (list of supported <p0>s), (list of supported <n>s), (list of supported <p1>s), (list of supported <p2>s)** **OK**
	Parameters See Write Command
Read Command **AT+DS?**	Response **+DS: <p0>,<n>,<p1>,<p2>** **OK**
	Parameters See Write Command
Write Command **AT+DS=[<p0>,[<**	Response This parameter setting determines the possible data compression mode by TA at

n>,[<p1>,[<p2>]]]	the compression negotiation with the remote TA after a call set up.
]	**OK**
	Parameters **<p0>** 0 NONE 1 transmit only 2 receive only 3 both direction, but allow negotiation **<n>** 0 allow negotiation of p0 down 1 do not allow negotiation of p0 - disconnect on difference **<p1>** 512-1024 dictionary size Note: default determined by manufacturer **<p2>** 6-20-64 maximum string size (default 20)
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note only for data call GSM transmits the data transparent. The remote TA may support this compression.

2.1.34 AT+GCAP Request Complete TA Capabilities List

AT+GCAP Request Complete TA Capabilities List	
Execution Command **AT+GCAP**	Response TA reports a list of additional capabilities. **+GCAP:** list of supported **<name>**s **OK**
	Parameters **<name>** +CGSM GSM function is supported
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.35 AT+GMI Request Manufacturer Identification

AT+GMI Request Manufacturer Identification	
Test Command **AT+GMI=?**	Response **OK**

	Parameters
Execution Command **AT+GMI**	TA reports one or more lines of information text which permit the user to identify the manufacturer. **SIMCOM_Ltd** **OK**
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.36 AT+GMM Request TA Model Identification

AT+GMM Request TA Model Identification	
Test Command **AT+GMM=?**	Response **OK**
Execution Command **AT+GMM**	TA reports one or more lines of information text which permit the user to identify the specific model of device. **<model>** **OK**
	Parameters **<model>** Product model identification text
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.37 AT+GMR Request TA Revision Identification of Software Release

AT+GMR Request TA Revision Identification of Software Release	
Test Command **AT+GMR=?**	Response **OK**
Execution	TA reports one or more lines of information text which permit the user to

Command **AT+GMR**	identify the revision of software release. **Revision: <revision>** **OK**
	Parameters **<revision>** Revision of software release
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.38 AT+GOI Request Global Object Identification

AT+GOI Request Global Object Identification	
Test Command **AT+GOI=?**	Response **OK**
Execution Command **AT+GOI**	Response TA reports one or more lines of information text which permit the user to identify the device, based on the ISO system for registering unique object identifiers. **<Object Id>** **OK**
	Parameters **<Object Id>** Identifier of device type see X.208, 209 for the format of <Object Id>
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.39 AT+GSN Request TA Serial Number Identification (IMEI)

AT+GSN Request TA Serial Number Identification(IMEI)	
Test Command **AT+GSN=?**	Response **OK**
Execution	Response

Command **AT+GSN**	TA reports the IMEI (international mobile equipment identifier) number in information text which permit the user to identify the individual ME device. **<sn>** **OK**
	Parameters **<sn>** IMEI of the telephone(International Mobile station Equipment Identity)
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference V.25ter	Note The serial number (IMEI) is varied by individual ME device.

2.1.40 AT+ICF Set TE-TA Control Character Framing

AT+ICF Set TE-TA Control Character Framing	
Test Command **AT+ICF=?**	Response **+ICF: (**list of supported **<format>**s**),(**list of supported **<parity>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+ICF?**	Response **+ICF: <format>,<parity>** **OK**
	Parameters See Write Command
Write Command **AT+ICF=<format>[,<parity>]**	Response This parameter setting determines the serial interface character framing format and parity received by TA from TE. **OK**
	Parameters **<format>** 1 8 data 0 parity 2 stop 2 8 data 1 parity 1 stop 3 8 data 0 parity 1 stop 4 7 data 0 parity 2 stop 5 7 data 1 parity 1 stop 6 7 data 0 parity 1 stop **<parity>** 0 odd

	1 even 2 mark(1) 3 space (0)
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note The Command is applied for Command state; In **<format>** parameter, "0 parity" means no parity; The **<parity>** field is ignored if the **<format>** field specifies no parity and string "**+ICF: <format>,255**" will be response to "**AT+ICF**? " Command.

2.1.41 AT+IFC Set TE-TA Local Data Flow Control

AT+IFC Set TE-TA Local Data Flow Control	
Test Command **AT+IFC=?**	Response **+IFC: (**list of supported **<dce_by_dte>**s**),(**list of supported **<dte_by_dce>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+IFC?**	Response **+IFC: <dce_by_dte>,<dte_by_dce>** **OK**
	Parameters See Write Command
Write Command **AT+IFC=<dce_by_dte>[,<dte_by_dce>]**	Response This parameter setting determines the data flow control on the serial interface for data mode. **OK**
	Parameters **<dce_by_dte>** Specifies the method will be used by TE at receive of data from TA 0 No flow control 1 Software flow control 2 Hardware flow control **<dte_by_dce>**Specifies the method will be used by TA at receive of data from TE 0 No flow control 1 Software flow control

	2 Hardware flow control
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note

2.1.42 AT+ILRR Set TE-TA Local rate reporting mode

AT+ILRR Set TE-TA Local rate reporting mode	
Test Command **AT+ILRR=?**	Response **+ILRR: (list of supported <value>s** **OK**
	Parameters See Write Command
Read Command **AT+ILRR?**	Response **+ILRR: <value>** **OK**
	Parameters See Write Command
Write Command **AT+ILRR=<value>**	Response This parameter setting determines whether an intermediate result code of local rate is reported at connection establishment. The rate is applied after the result code of the connection is transmitted to TE. **OK**
	Parameters **<value>** 0 Disables reporting of local port rate 1 Enables reporting of local port rate
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	

2.1.43 AT+IPR Set TE-TA Fixed Local Rate

AT+IPR Set TE-TA Fixed Local Rate

Test Command **AT+IPR=?**	Response **+IPR: (**list of supported auto detectable <**rate**>s**),(**list of supported fixed-only <**rate**>s**)** **OK**
	Parameters See Write Command
Read Command **AT+IPR?**	Response **+IPR: <rate>** **OK**
	Parameters See Write Command
Write Command **AT+IPR=<rate>**	Response This parameter setting determines the data rate of the TA on the serial interface. The rate of Command takes effect following the issuance of any result code associated with the current Command line. **OK**
	Parameters **<rate>** Baud rate per second 0 110 300 1200 2400 4800 9600 19200 38400 57600 115200 230400 460800 921600 3000000
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note Factory setting is "**AT+IPR=0**"(auto-bauding).

2.1.44 AT+FCLASS Set Fax Class

AT+FCLASS Set Fax Class	
Test Command **AT+FCLASS=?**	Response **+FCLASS:** (list of supported <**n**>s) **OK**
	Parameters See Write Command
Read Command **AT+FCLASS?**	Response **+FCLASS: <n>** **OK**
	Parameters See Write Command
Write Command **AT+FCLASS=<n>**	Response This command has no effect in NB-IoT and is supported for compatibility reasons. **OK**
	Parameters **<n>** 0 Data 1 Fax class 1 (TIA-578-A)
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference V.25ter	Note

3 AT Commands According to 3GPP TS 27.007

3.1 Overview of AT Command According to 3GPP TS 27.007

Command	Description
AT+CEER	Extended error report
AT+CGMI	Request manufacturer identification
AT+CGMM	Request model identification
AT+CGMR	Request TA revision identification of software release
AT+CGOI	Request global object identification
AT+CGSN	Request product serial number identification (identical with +GSN)
AT+CIMI	Request international mobile subscriber identity
AT+CLCK	Facility lock
AT+CMAR	Master reset
AT+CMEE	Report mobile equipment error
AT+COPS	Operator selection
AT+CPIN	Enter PIN
AT+CPWD	Change password
AT+CR	Service reporting control
AT+CREG	Network registration
AT+CRSM	Restricted SIM access
AT+CSCS	Select TE character set
AT+CSQ	Signal quality report
AT+CMUX	Multiplexer control
AT+CNUM	Subscriber number
AT+CPOL	Preferred operator list
AT+CFUN	Set phone functionality
AT+CCLK	Clock
AT+CSIM	Generic SIM access
AT+CBC	Battery charge
AT+CTZR	Time zone reporting
AT+CTZU	Automatic time zone update
AT+CPLS	Selection of preferred PLMN list
AT+CPSMS	Power saving mode selection
AT+CIPCA	Enable/disable activation of PDN connection on attach.
AT+CEDRXS	eDRX setting

AT+CEDRXRDP	eDRX read dynamic parameters
AT+CCHO	Open UICC logical channel
AT+CCHC	Close UICC logical channel
AT+CGLA	Generic UICC logical channel access
AT+CPINR	Remaining PIN retries
AT+CGATT	GPRS/Packet Domain attach or detach
AT+CGDCONT	Define PDP context
AT+CGACT	PDP context activate or deactivate
AT+CGPADDR	Show PDP address
AT+CGEREP	Packet Domain Event Reporting
AT+CGREG	Network registration status
AT+CGCONTRDP	PDP Context Read Dynamic Parameters
AT+CGPIAF	Printing IP Address Format
AT+CGDEL	Delete Non-Active PDP Contexts
AT+CGAUTH	Define PDP Context Authentication Parameters
AT*MCGDEFCONT	Set Default PSD Connection Settings
AT*MSACL	Enable/Disable ACL feature
AT*MLACL	Display ACL List
AT*MWACL	Write an ACL entry
AT*MDACL	Delete an ACL entry
AT+CNBIOTDT	NB-IOT Data Type

3.2 Detailed Descriptions of AT Command According to 3GPP TS 27.007

3.2.1 AT+CEER Extended Error Report

AT+CEER Extended Error Report	
Test Command **AT+CEER=?**	Response **+CEER: (**list of supported **<n>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CEER?**	Response **+CEER: <n>** **OK**
	Parameters

	See Write Command
Write Command **AT+CEER=<n>**	Response **OK**
	Parameter **<n>** 0 The reason for last call release as text code 1 The reason for last call release as number code
Execution Command **AT+CEER**	Response TA returns an extended report of the reason for the last call release. **+CEER: <report>** **OK**
	Parameters **<report>** If **AT+CEER=0**, return **<s>** **<s>** a string that represents the Cause If **AT+CEER=1**, return **Cause: <c>** **<c>** number representing the Cause
	Parameters **<c>(number)** **<s>(string)** 0 (No cause) 1 (unassigned (unallocated) number) 3 (no route to destination) 6 (channel unacceptable) 8 (operator determined barring) 16 (normal call clearing) 17 (user busy) 18 (no user responding) 19 (user alerting, no answer) 21 (call rejected) 22 (number changed) 26 (non-selected user clearing) 27 (destination out of order) 28 (invalid number format (incomplete number)) 29 (facility rejected) 30 (response to STATUS ENQUIRY) 31 (normal, unspecified) 34 (emergency call not possible) 38 (network out of order)

	41 (temporary failure) 42 (switching equipment congestion) 43 (access information discarded) 44 (requested circuit/channel not available) 47 (resource unavailable, unspecified) 49 (quality of service unavailable) 50 (Requested facility not subscribed) 55 (Incoming calls barred within the CUG) 57 (bearer capability not authorized) 58 (bearer capability not presently available) 63 (service or option not available, unspecified) 68 (ACM equal to or greater than ACMmax) 65 (bearer service not implemented) 69 (Requested facility not implemented) 70 (only restricted digital information bearer capability is available) 79 (service or option not implemented,unspecified) 81 (invalid transaction identifier value) 87 (user not member of CUG) 88 (incompatible destination) 91 (invalid transit network selection) 95 (semantically incorrect message) 96 (invalid mandatory information) 97 (message type non-existent or not implemented) 98 (message type not compatible with protocol state) 99 (information element non-existent or not implemented) 100 (conditional IE error) 101 (message not compatible with protocol state) 102 (recovery on timer expiry) 111 (protocol error, unspecified) 127 (interworking, unspecified)
Parameter Saving Mode	NO_SAVE
Max Response	-

Time	
Reference 3GPP TS 27.007 [13]	Note

3.2.2 AT+CGMI Request Manufacturer Identification

AT+CGMI Request Manufacturer Identification	
Test Command **AT+CGMI=?**	Response **OK**
Execution Command **AT+CGMI**	Response TA returns manufacturer identification text. **<manufacturer>** **OK**
	Parameters **<manufacturer>** The ID of manufacturer
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.3 AT+CGMM Request Model Identification

AT+CGMM Request Model Identification	
Test Command **AT+CGMM=?**	Response **OK**
Execution Command **AT+CGMM**	Response TA returns product model identification text. **<model>** **OK**
	Parameters **<model>** Product model identification text
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007	Note

[13]	

3.2.4 AT+CGMR Request TA Revision Identification of Software Release

AT+CGMR Request TA Revision Identification of Software Release	
Test Command **AT+CGMR=?**	Response **OK**
Execution Command **AT+CGMR**	Response TA returns product software version identification text. **Revision: <revision>** **OK**
	Parameters **<revision>** Product software version identification text
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.5 AT+CGOI Request global object identification

AT+CGOI Request global object identification	
Test Command **AT+CGOI=?**	Response **OK**
Execution Command **AT+CGOI**	Response TA returns global object id. **<Object Id>** **OK**
	Parameters <**Object Id**> identifier of device type
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.6 AT+CGSN Request Product Serial Number Identification

AT+CGSN Request Product Serial Number Identification (Identical with +GSN)	
Test Command **AT+CGSN=?**	Response **OK**
Execution Command **AT+CGSN**	Response see +GSN **<sn>** **OK**
	Parameters **<sn>** International mobile equipment identity (IMEI)
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.7 AT+CIMI Request International Mobile Subscriber Identity

AT+CIMI Request International Mobile Subscriber Identity	
Test Command **AT+CIMI=?**	Response **OK**
Execution Command **AT+CIMI**	Response TA returns <**IMSI**>for identifying the individual SIM which is attached to ME. **<IMSI>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<IMSI>** International Mobile Subscriber Identity (string without double quotes)
Parameter Saving Mode	NO_SAVE
Max Response Time	20s
Reference 3GPP TS 27.007	Note

[13]	

3.2.8 AT+CLCK Facility Lock

AT+CLCK Facility Lock	
Test Command **AT+CLCK=?**	Response **+CLCK: (**list of supported <**fac**>s**)** **OK**
	Parameters See Write Command
Write Command **AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]**	Response This Command is used to lock, unlock or interrogate a ME or a network facility <**fac**>. Password is normally needed to do such actions. When querying the status of a network service (<**mode**>=2) the response line for 'not active' case (<**status**>=0) should be returned only if service is not active for any <**class**>. If <**mode**>≠2 and Command is successful **OK** If <**mode**>=2 and Command is successful **+CLCK: <status>[,<class1>[<CR><LF>+CLCK: <status>,<class2>[…]]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<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. **<mode>** 0 unlock 1 lock 2 query status **<passwd>** String type (Shall be the same as password specified for the facility from the MT user interface or with command Change Password +CPWD) **<class>** Field not required for NB-IOT, so will be ignored **<status>** 0 Not active 1 Active
Parameter Saving Mode	NO_SAVE
Max Response	15s

Time	
Reference 3GPP TS 27.007 [14]	Note ● CME errors if SIM not inserted or PIN is not entered.

3.2.9 AT+CMAR Master reset

AT+CMAR Master reset	
Test Command **AT+CMAR=?**	Response **OK**
	Parameters See Write Command
Write Command **AT+CMAR=<phone lock code>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**phone lock code**> string type; Security code (Phone Lock code) must be verified before performing the master reset.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.10 AT+CMEE Report Mobile Equipment Error

AT+CMEE Report Mobile Equipment Error	
Test Command **AT+CMEE=?**	Response **+CMEE: (**list of supported **<n>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CMEE?**	Response **+CMEE: <n>** **OK**
	Parameters See Write Command
Write Command	Response

AT+CMEE=[<n>]	TA disables or enables the use of result code **+CME ERROR: <err>** as an indication of an error relating to the functionality of the ME. **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<n>** 0 Disable **+CME ERROR: <err>** result code and use ERROR instead. 1 Enable **+CME ERROR: <err>** result code and use numeric <**err**> 2 Enable **+CME ERROR: <err>** result code and use verbose <**err**> values
Parameter Saving Mode	-
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.11 AT+COPS Operator Selection

AT+COPS Operator Selection	
Test Command **AT+COPS=?**	Response TA returns a list of quadruplets, each representing an operator present in the network. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in order: home network, networks referenced in SIM, and other networks. **+COPS: (**list of supported**<stat>,**long alphanumeric**<oper>,**short alphanumeric**<oper>,**numeric **<oper>**[,<AcT>]**)s[,,(**list of supported **<mode>**s**),(**list of supported **<format>**s**)]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Read Command **AT+COPS?**	Response TA returns the current mode and the currently selected operator. If no operator is selected,<**format**> and <**oper**> are omitted. **+COPS: <mode>[,<format>,<oper>,<AcT>]**

	OK If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+COPS=<mode>,[<format>[,<oper>[,<AcT>]]]**	Response TA forces an attempt to select and register the GSM network operator. If the selected operator is not available, no other operator shall be selected (except <**mode**>=4). The selected operator name format shall apply to further read commands (**AT+COPS?**). **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<stat>** 0 Unknown 1 Operator available 2 Operator current 3 Operator forbidden **<oper>** Refer to [27.007] operator in format as per <**format**> **<mode>** 0 Automatic mode; <**oper**> field is ignored 1 Manual (<**oper**> field shall be present, and <**AcT**> optionally) 2 manual deregister from network 3 set only <**format**> (for read Command **+COPS?**) - not shown in Read Command response 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**>; GSM Location Area Identification number <**AcT**> 9 NB-IoT
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [14]	Note

3.2.12 AT+CPIN Enter PIN

AT+CPIN Enter PIN	
Test Command **AT+CPIN=?**	Response **OK**
Read Command **AT+CPIN?**	Response TA returns an alphanumeric string indicating whether some password is required or not. **+CPIN: <code>** **OK**
	Parameters **<code>** READY MT is not pending for any password SIM PIN MT is waiting SIM PIN to be given SIM PUK MT is waiting for SIM PUK to be given PH_SIM PIN ME is waiting for phone to SIM card (antitheft) PH_SIM PUK ME is waiting for SIM PUK (antitheft) SIM PIN2 PIN2, e.g. for editing the FDN book possible only if preceding Command was acknowledged with +CME ERROR:17 SIM PUK2 Possible only if preceding Command was acknowledged with error +CME ERROR: 18. PH-SIM PIN ME is waiting for phone to SIM card (antitheft) PH-NET PIN Network personalization password is required. PH-NETSUB PIN Network subset is required. PH-SP PIN Service provider personalization password is required. PH-CORP PIN Corporate personalization password is required.
Write Command **AT+CPIN=<pin>[,<new pin>]**	Response TA stores a required password (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 and an error message, +CME ERROR, is returned to TE. If the PIN required is SIM PUK or SIM PUK2, the second pin is required. This second pin,<**new pin**>, is used to replace the old pin in the SIM. When a new password is set, a third optional parameter may also be specified. This extra parameter is compared to the new password to check they are equivalent as an additional security feature. **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters

	<pin> String type; password **<new pin>** String type; If the PIN required is SIM PUK or SIMPUK2: new password
Parameter Saving Mode	NO_SAVE
Max Response Time	5s
Reference 3GPP TS 27.007 [13]	Note

3.2.13 AT+CPWD Change Password

AT+CPWD Change Password	
Test Command **AT+CPWD=?**	Response TA returns a list of pairs which present the available facilities and the maximum length of their password. **+CPWD: (**list of supported **<fac>**s, list of supported **<pwdlength>**s**)** **OK**
	Parameters **<fac>** See Write Command **<pwdlength>** Integer max. length of password
Write Command **AT+CPWD=<fac>,<oldpwd>,<newpwd>**	Response TA sets a new password for the facility lock function. **OK**
	Parameters **<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. **<oldpwd>** String type (string should be included in quotation marks): password specified for the facility from the user interface or with command. If an old password has not yet been set, <oldpwd> is not to enter. **<newpwd>** String type (string should be included in quotation marks): new password
Parameter Saving Mode	NO_SAVE
Max Response Time	15s
Reference 3GPP TS 27.007 [13]	Note

3.2.14 AT+CR Service Reporting Control

AT+CR Service Reporting Control	
Test Command **AT+CR=?**	Response **+CR: (**list of supported **<mode>**s) **OK**
	Parameters See Write Command
Read Command **AT+CR?**	Response **+CR: <mode>** **OK**
	Parameters See Write Command
Write Command **AT+CR=[<mode>]**	Response TA controls whether or not intermediate result code **+CR: <serv>** is returned from the TA to the TE at a call set up. **OK**
	Parameters **<mode>** 0 Disable 1 Enable
	2 Enable MediaTek proprietary intermediate result code Intermediate result code If enabled, an intermediate result code is transmitted at the point during connect negotiation at which the TA has determined which speed and quality of service will be used, before any error control or data compression reports are transmitted, and before any final result code (e.g. **CONNECT**) is transmitted. **+CR: <serv>**
	Parameters **<serv>** GPRS[<L2P>] GPRS / Packet Switched connection <**L2P**> M-PT Packet Transport mechanism protocol for a PDP such as IP
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note <L2P> value M-PT is MTK proprietary and represents no <L2p> but raw IP packet transfer.

3.2.15 AT+CREG Network Registration

AT+CREG Network Registration	
Test Command **AT+CREG=?**	Response **+CREG: (**list of supported **<n>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CREG?**	Response TA returns the status of result code presentation and an integer **<stat>** which shows whether the network has currently indicated the registration of the ME. Location information elements **<lac>** and **<ci>** are returned only when **<n>**=2 and ME is registered in the network. **+CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
Write Command **AT+CREG[=<n>]**	Response TA controls the presentation of an unsolicited result code **+CREG: <stat>** when **<n>**=1 and there is a change in the ME network registration status. **OK**
	Parameters **<n>** 0 Disable network registration unsolicited result code 1 Enable network registration unsolicited result code **+CREG:** <**stat**> 2 Enable network registration unsolicited result code with location information **+CREG: <stat>[,<lac>,<ci>[,<AcT>]]** **<stat>** 0 Not registered, MT is not currently searching a new operator to register to 1 Registered, home network 2 Not registered, but MT is currently searching a new operator to register to 3 Registration denied 4 Unknown 5 Registered, roaming 6 registered for “SMS only”, home network (applicable only when <Act> indicates NB-IOT 7 registered for “SMS only”, roaming (applicable only when <**Act**> indicates NB-IOT **<lac>** String type (string should be included in quotation marks);

	two byte location area code in hexadecimal format **<ci>** String type (string should be included in quotation marks); four byte cell ID in hexadecimal format <**AcT**> Access technology of the registered network 9 NB-IoT
	Unsolicited Result Code If <**n**>=1 and there is a change in the MT network registration status **+CREG: <stat>** If <**n**>=2 and there is a change in the MT network registration status or a change of the network cell: **+CREG: <stat>[,<lac>,<ci> [,<AcT>]]**
	Parameters See Write Command
Parameter Saving Mode	-
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.16 AT+CRSM Restricted SIM Access

AT+CRSM Restricted SIM Access	
Test Command **AT+CRSM=?**	Response **OK**
Write Command **AT+CRSM=<Command>[,<fileId>[,<P1>,<P2>,<P3>[,<data>[,<pathid>]]]]**	Response **+CRSM: <sw1>,<sw2>[,<response>]** **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<Command>** 176 READ BINARY 178 READ RECORD 192 GET RESPONSE 214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS All other values are reserved; refer GSM 11.11. **<fileId>** Integer type; this is the identifier for an elementary data file on SIM. Mandatory for every Command except STATUS

	<P1>,<P2>,<P3> Integer type, range 0 – 255 Parameters to be passed on by the ME to the SIM; refer GSM 11.11. **<data>** Information which shall be written to the SIM (hex-decimal character format) **<sw1>,<sw2>** Integer type, range 0 - 255 Status information from the SIM about the execution of the actual Command. These parameters are delivered to the TE in both cases, on successful or failed execution of the Command; refer GSM 11.11. **<response>** Response of a successful completion of the Command previously issued (hexadecimal character format) <**pathid**> String type; contains the path of an elementary file on the SIM/UICC in hexadecimal format as defined in ETSI TS 102.211 (e.g. “7F205F70” in SIM and UICC case). The <pathid> only used in the mode “select path from MF” as defined in ETSI TS 102.211.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 GSM 11.11	Note

3.2.17 AT+CSCS Select TE Character Set

AT+CSCS Select TE Character Set	
Test Command **AT+CSCS=?**	Response **+CSCS: (**list of supported **<chset>**s**)** **OK**
	Parameters **<chset>** "GSM" GSM 7 bit default alphabet (3GPP TS 23.038); "UCS2" 16-bit universal multiple-octet coded character set (ISO/IEC10646); UCS2 character strings are converted to hexadecimal numbers from 0000 to FFFF; e.g. "004100620063" equals three 16-bit characters with decimal values 65, 98 and 99 "IRA" International reference alphabet (ITU-T T.50) "HEX" Character strings consist only of hexadecimal ers from 00 to FF; "PCCP" PC character set Code "PCDN" PC Danish/Norwegian character set "8859-1" ISO 8859 Latin 1 character set

Read Command **AT+CSCS?**	Response **+CSCS: <chset>** **OK**
	Parameters See Test Command
Write Command **AT+CSCS=<chset>**	Response Sets which character set **<chset>** are used by the TE. The TA can then convert character strings correctly between the TE and ME character sets. **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Test Command
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.18 AT+CSQ Signal Quality Report

AT+CSQ Signal Quality Report	
Test Command **AT+CSQ=?**	Response **+CSQ: (**list of supported **<rssi>**s**),(**list of supported **<ber>**s**)** **OK**
Execution Command **AT+CSQ**	Response **+CSQ: <rssi>,<ber>** **OK** If error is related to ME functionality: **+CME ERROR: <err>** Execution Command returns received signal strength indication <**rssi**> and channel bit error rate <**ber**> from the ME. Test Command returns values supported by the TA.
	Parameters **<rssi>** Integer type. Rx signal strength level 0 -110 dBm or less 1 -109 dBm <= rssi < -107 dBm 2 -107 dBm <= rssi < -105 dBm

	3…30 -105dBm <= rssi < -48 dBm 31 -48dBm <= rssi 99 Not known or not detectable **<ber>** (in percent): 0...7 As RXQUAL values in the table in GSM 05.08 [20] subclause 7.2.4 99 Not known or not detectable
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.19 AT+CMUX Multiplexer Control

AT+CMUX Multiplexer Control	
Test Command **AT+CMUX=?**	Response **+CMUX:** (list of supported <**mode**>s),(list of supported <**subset**>s),(list of supported<**port_speed**>s),(list of supported<**N1**>s),(list of supported<**T1**>s),(list of supported<**N2**>s),(list if supported<**T2**>s),(list of supported <**T3**>s),<list of supported <**k**>s) **OK**
	Parameters See Write Command
Read Command **AT+CMUX?**	Response: **+CMUX:** **[<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]]** **OK** or **ERROR**
	Parameters **<mode>** 1 Multiplexer not active 0 27.010 multiplexer **<subset>** The way in which the multiplexer control channel is set up 0 UIH frames used only **<port_speed>** Transmission rate 1 9600 bits/t

	2 19200 bits/t 3 38400 bits/t 4 57600 bits/t 5 115200 bit/s 6 230400 bits/t 7 460800 bits/t Proprietary values, available if MUX NEW PORT SPEED FTR is activated **<N1>** Maximum frame size 1-4096 (default value 31 for basic option) **<T1>** Acknowledgement timer in units of ten milliseconds 1-255 Default:10 (100 ms) **<N2>** Maximum number of re-transmissions 0-100 Default:3 **<T2>** Max Response Timer for the multiplexer control channel in units of ten milliseconds 2-255 Default:30 **<T3>** Wake up Max Response Timers in seconds 1-255 Default:10 **<k>** Window size, for Advanced operation with Error Recovery options 1-7 Default:2
Write Command **AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]**	Response If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<mode>** Multiplexer transparency mechanism 0 Basic option
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note ● The values of <<subset>, <port_speed>, <N1>,<T>,<N2>,<T2>, <T3>,<k> are only relevent to the 27.010 MUX control channel. ● <port_speed> set to 0 will set the MUX port rate at whatever the AT+IPR setting is for the channel.

3.2.20 AT+CNUM Subscriber Number

AT+CNUM Subscriber Number	
Test Command	Response

AT+CNUM=?	**OK**
Execution Command **AT+CNUM**	Response **+CNUM: [<alpha1>],<number1>,<type1>** **[<CR><LF>+CNUM:[<alpha2>],<number2>,<type2>** **[...]]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**alpha*x***> Optional alphanumeric string associated with <**number*x***>; used character set should be the one selected with Command Select TE Character Set **+CSCS**. <**number*x***> String type (string should be included in quotation marks) phone number of format specified by <**type*x***> <**type*x***> Type of address octet in integer format (refer GSM04.08[8] subclause 10.5.4.7)
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.21 AT+CPOL Preferred Operator List

AT+CPOL Preferred Operator List	
Test Command **AT+CPOL=?**	Response **+CPOL: (**list of supported **<index>**s**),(**list of supported **<format>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CPOL?**	Response **+CPOL:** **<index1>,<format>,<oper1>[,<GSM_AcT1>,<GSMcomp_AcT1>,<UTRAN_AcT1>,<E-UTRAN_Act1]** **[<CR><LF>+CPOL: <index2>,<format>,<oper2>** **[,<GSM_AcT2>,<GSMcomp_AcT2>,<UTRAN_AcT2,<E-UTRAN_AcT2>** **]** **OK**

	If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CPOL=<index>[,<format>,<oper>]**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<index>** Integer type: order number of operator in SIM preferred operator list **<format>** Indicates whether alphanumeric or numeric format used (see **+COPS** Command) 0 Long format alphanumeric <**oper**> 1 Short format alphanumeric <**oper**> 2 Numeric <**oper**> **<oper>** String type(string should be included in quotation marks) <**GSM_AcTn**> GSM Access technology; 0 Access technology not selected 1 Access technology selected <**GSM_Comp_AcTn**> GSM compact Access technology; 0 Access technology not selected 1 Access technology selected <**UTRAN_AcTn**> UTRA Access technology; 0 Access technology not selected 1 Access technology selected <**E-UTRAN_AcTn**> E-UTRAN Access technology; 0 Access technology not selected 1 Access technology selected
Parameter Saving Mode	-
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note Not all USIMs support the preferred operator list.

3.2.22 AT+CFUN Set Phone Functionality

AT+CFUN Set Phone Functionality	
Test Command **AT+CFUN=?**	Response **+CFUN: (**list of supported **<fun>**s**),(**list of supported **<rst>**s**)**

	OK If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Read Command **AT+CFUN?**	Response **+CFUN: <fun>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CFUN=<fun>[,<rst>]**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<fun>** 0 Minimum functionality 1 Full functionality (Default) 4 Disable phone both transmit and receive RF circuits. 7 Disable phone SIM only. Transmit and receive circuits still active <**rst**> 0 Set it to <fun> power level now, but do not reset the MT 1 Do not set it to <fun> power level, either do not reset the MT before rebooting 2 Set it to <fun> power level now, and reset the MT after rebooting
Parameter Saving Mode	-
Max Response Time	10s
Reference 3GPP TS 27.007 [13]	Note

3.2.23 AT+CCLK Clock

AT+CCLK Clock	
Test Command **AT+CCLK=?**	Response **OK**
Read Command	Response

AT+CCLK?	**+CCLK: <time>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CCLK=<time>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<time>** String type(string should be included in quotation marks) value; format is "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits),month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -47...+48). E.g. 6th of May 2010, 00:01:52 GMT+2 hours equals to "10/05/06,00:01:52+08".
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note If MT does not support time zone information then the three last characters of <time> are not returned by +CCLK?.

3.2.24 AT+CSIM Generic SIM Access

AT+CSIM Generic SIM Access	
Test Command **AT+CSIM=?**	Response **OK**
Write Command **AT+CSIM=<length>,<Command>**	Response **+CSIM: <length>,<response>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<length>** Integer type: length of characters sent to the TE in <**Command**> or <**response**> (i.e. twice the number of octets in the raw data).

	<Command> String type (string should be included in quotation marks): hex format: GSM 11.11 SIM Command sent from the ME to the SIM. **<response>** String type(string should be included in quotation marks): hex format: GSM 11.11 response from SIM to <**Command**>.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.25 AT+CBC Battery Charge

AT+CBC Battery Charge	
Test Command **AT+CBC=?**	Response **+CBC: (list of supported <bcl>),(<voltage>)** **OK**
	Parameters See Execution Command
Execution Command **AT+CBC**	Response **+CBC: <bcl>,<voltage>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<bcl>** Battery connection level 1...100 battery has 1-100 percent of capacity remaining vent **<voltage>** Battery voltage(mV)
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.26 AT+CTZR Time Zone Reporting

AT+CTZR Time Zone Reporting

Test Command **AT+CTZR=?**	Response **+CTZR: (list of supported <onoff>s)** **OK**
	Parameters See Execution Command
Read Command **AT+CTZR?**	Response **+CTZR: <onoff>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CTZR=<onoff>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**onoff**> 0 Disable time zone event reporting 1 Enable time zone event reporting
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.27 AT+CTZU Automatic Time update

AT+CTZU Automatic Time Update	
Test Command **AT+CTZU=?**	Response **+CTZU: (list of supported <onoff>s)** **OK**
	Parameters See Execution Command
Read Command **AT+CTZU?**	Response **+CTZU: <onoff>**

	OK If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CTZU=<onoff>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**onoff**> 0 Disable automatic time update via NITZ 1 Automatic time update via NITZ
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.28 AT+CPLS Selection of preferred PLMN list

AT+CPLS Selection of Preferred PLMN List	
Test Command **AT+CPLS=?**	Response **+CPLS: (list of supported <list>s)** **OK**
	Parameters See Execution Command
Read Command **AT+CPLS?**	Response **+CPLS: <list>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CPLS=<list>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**

	Parameters **<list>:** 0 (Default). User controlled PLMN selector with Access Technology EFPLMNwAcT, if not found in the SIM/UICC then PLMN preferred list EFPLMNSel (this file is only on SIM card or GSM application in UICC. 1 Operator controlled PLMN selector with Access Technology EFOPLMNwAcT 2 HPLMN selector with Access Technology EFHPLMNwACT
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.29 AT+CPSMS Power saving mode setting

AT+CPSMS Power Saving Mode Setting	
Test Command **AT+CPSMS=?**	Response **+CPSMS: (list of supported <mode>s),(list of supported <Requested_Periodic-RAU>s),(list of supported <Requested_GPRS-READY-timer>s),(list of supported <Requested_Periodic-TAU>s),(list of supported <Requested_Active-Time>s)** **OK**
	Parameters See Execution Command
Read Command **AT+CPSMS?**	Response **+CPSMS: <mode>,[<Requested_Periodic-RAU>],[<Requested_GPRS-READY-timer>],[<Requested_Periodic-TAU>],[<Requested_Active-Time>]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CPSMS=[<mode>[,<Requested_Periodic-RA**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**

U>[,<Requested_GPRS-READY-timer>[,<Requested_Periodic-TAU>[,<Requested_Active-Time>]]]]	Parameters <**mode**>: integer type. Indication to disable or enable the use of PSM in the UE. 0 Disable the use of PSM 1 Enable the use of PSM 2 Disable the use of PSM and discard all parameters for PSM or, if available reset to the manufacturer specific default values. <**Requested_Periodic-RAU**>: N/A for NB-IoT <**Requested_GPRS-READY-timer**>: N/A for NB-IoT <**Requested_Periodic-TAU**>: string type; one byte in an 8-bit format. Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN. The requested extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer 3 IE in 3GPP TS 24.008 Table 10.5.163a/3GPP TS 24.008. See also 3GPP TS 23.682 and 3GPP TS 23.401. The default value, if available, is manufacturer specific. <**Requested_Active-Time**>: string type; one byte in an 8-bit format. Requested Active Time value (T3324) to be allocated to the UE. The requested Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008 Table 10.5.163/3GPP TS 24.008. See also 3GPP TS 23.682, 3GPP TS 23.060 and 3GPP TS 23.401. The default value, if available, is manufacturer specific.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.30 AT+CCIOTOPT CIoT optimization configuration

AT+CCIOTOPT CIoT Optimization Configuration	
Test Command **AT+CCIOTOPT=?**	Response **+CCIOTOPT: (list of supported <n>s),(list of supported <supported_UE_opt>s),(list of supported <preferred_UE_opt>s)** **OK**
	Parameters See Execution Command

Read Command **AT+CCIOTOPT?**	Response **+CCIOTOPT: <n>,<supported_UE_opt>,<preferred_UE_opt>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CCIOTOPT=[<n>,[<supported UE_opt>[,<preferred_UE_opt>]]]**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**n**>: integer type, enables or disables reporting of unsolicited result code +CCIOTOPTI. 0 Disable reporting. 1 Enable reporting. 3 Disable reporting and reset the parameters for CIoT EPS optimization to the default values. <**supported_UE_opt**>: integer type; indicates the UE's support for CIoT EPS optimizations. 0 No support 1 Support for control plane CIoT EPS optimization. 2 Support for user plane CIoT EPS optimization. 3 Support for both control plane CIoT EPS optimization and user plane CIoT EPS optimization. <**preferred_UE_opt**>: integer type; indicates the UE's preference for CIoT EPS optimizations. 0 No preference 1 Preference for control plane CIoT EPS optimization 2 Preference for user plane CIoT EPS optimization <**supported_Network_opt**>: integer type; indicates the Network support for CIoT EPS optimizations. 0 No support 1 Support for control plane CIoT EPS optimization. 2 Support for user plane CIoT EPS optimization. 3 Support for both control plane CIoT EPS optimization and user plane CIoT EPS optimization.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

3GPP TS 27.007 [13]	

3.2.31 AT+CEDRXS eDRX setting

AT+CEDRXS eDRX Setting	
Test Command **AT+CEDRXS=?**	Response **+CEDRXS: (list of supported <mode>s),(list of supported <AcT-type>s),(list of supported <Requested_eDRX_value>s)** **OK**
	Parameters See Execution Command
Read Command **AT+CEDRXS?**	Response **[+CEDRXS: <AcT-type>,<Requested_eDRX_value>** **[<CR><LF>+CEDRXS: <AcT-type>,<Requested_eDRX_value>** **[...]]]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CEDRXS=[<mode>,[,<AcT-type>[,<Requested_eDRX_value>]]]**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**mode**> Integer type, indicates to disable or enable the use of eDRX in the UE. This parameter is applicable to all specified types of access technology, i.e. the most recent setting of <mode> will take effect for all specified values of <AcT>. 0 Disable the use of eDRX 1 Enable the use of eDRX 2 Enable the use of eDRX and enable the unsolicited result code +CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]] 3 Disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the manufacturer specific default values. <**AcT-type**> Integer type, indicates the type of access technology. This AT- command is used to specify the relationship between the type of access technology and the requested eDRX value. 4 E-UTRAN (NB-S1 mode)

	<**Requested_eDRX_value**> String type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008. The default value, if available, is manufacturer specific. <**NW-provided_eDRX_value**> String type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see sub- clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008. <**Paging_time_window**> String type; half a byte in a 4-bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.32 AT+CEDRXRDP eDRX Read Dynamic Parameters

AT+CEDRXRDP eDRX Read Dynamic Parameters	
Test Command **AT+CEDRXRDP=?**	Response **OK**
	Parameters See Execution Command
Execution Command **AT+CEDRXRDP**	Response **+CEDRXRDP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**AcT-type**> Integer type, indicates the type of access technology. This

	AT-command is used to specify the relationship between the type of access technology and the requested eDRX value. 0 Access technology is not using eDRX 4 E-UTRAN (NB-S1 mode) <**Requested_eDRX_value**> String type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008. <**NW-provided_eDRX_value**> String type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008. <**Paging_time_window**> String type; half a byte in a 4-bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.33 AT+CCHO Open UICC logical channel

AT+CCHO Open UICC Logical Channel	
Write Command **AT+CCHO=<dfname>**	Response **+CCHO: <sessionid>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**dfname**> String type in hexadecimal character format. All selectable applications in the UICC are referenced by a DF name coded on 1 to 16 bytes

	<**sessionid**> Integer type; a session Id to be used to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.34 AT+CCHC Close UICC logical channel

AT+CCHC Close UICC Logical Channel	
Write Command **AT+CCHC=<sessionid>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**sessionid**> Integer type; the session used to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.35 AT+CGLA Generic UICC logical channel access

AT+CGLA Generic UICC Logical Channel Access	
Write Command **AT+CGLA=<sessionid>,<length>,<command>**	Response **+CGLA: <length>,<response>** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**sessionid**> Integer type; this is the identifier of the session used to send the APDU commands to the UICC. It is mandatory to send commands to the UICC when targeting applications on the smart card using a logical

	channel other than the default channel (channel "0"). <**length**> Integer type; length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response) <**command**> Command passed on by the MT to the UICC in the format as described in 3GPP TS 31.101 (hexadecimal character format) <**response**> Response to the command passed on by the UICC to the MT in the format as described in 3GPP TS 31.101 (hexadecimal character format)
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference 3GPP TS 27.007 [13]	Note

3.2.36 AT+CPINR Remaining PIN retries

AT+CPINR Remaining PIN Retries	
Test Command **AT+CPINR=?**	Response **OK**
	Parameters See Execution Command
Write Command **AT+CPINR[=<sel_code>]**	Response **[+CPINR: <code>,<retries>,[<default_retries>]** **[<CR>,<LF>:CPINR: <code>,<retries>,[default_retries>]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters <**sel_code**> String type. Same values as for the <code> parameter. These values are strings and shall be indicated within double quotes. Wildcard match by '*', meaning match any (sub-)string, or '?' meaning an character can be used. <**retries**> Integer type. Number of remaining retries per PIN. <**default_retries**> Integer type. Number of default/initial retries per PIN. <**code**> Type of PIN. All values listed under the description of the AT+CPIN Command, <code> parameter except "READY".
Parameter Saving Mode	NO_SAVE
Max Response	-

Time	
Reference 3GPP TS 27.007 [13]	Note

3.2.37 AT+CGATT GPRS/Packet Domain attach or detach

AT+CGATT GPRS/Packet Domain attach or detach	
Test Command **AT+CGATT=?**	Response **+CGATT: (**list of supported **<state>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CGATT?**	Response **+CGATT: <state>** **OK**
	Parameters See Write Command
Write Command **AT+CGATT=<state>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<state>** Indicates the state of GPRS/Packet Domain attachment 0 Detached 1 Attached Other values are reserved and will result in an ERROR response to the Write Command.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

3.2.38 AT+CGDCONT Define PDP Context

AT+CGDCONT Define PDP Context	
Test Command **AT+CGDCONT=?**	Response **+CGDCONT: (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported**

	<IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) ,(list of supported <NSLPI>s),(list of supported <securePCO>s),(list of supported <IPv4_MTU_discovery>s),(list of supported <Local_Addr_Ind>s),(list of supported <Non-IPMTUdiscovery>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 <IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) ,(list of supported <NSLPI>s),(list of supported <securePCO>s,(list of supported <IPv4_MTU_discovery>s),(list of supported <Local_Addr_Ind>s),** **,(list of supported <Non-IP_MTU_discovery>s)[...]]** **OK**
	Parameters See Write Command
Read Command **AT+CGDCONT?**	Response **+CGDCONT:** **<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>]]]]]]]]]** **[<CR><LF>** **+CGDCONT:** **<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>]]]]]]]]** **OK**
	Parameters See Write Command
Write Command **AT+CGDCONT=<cid>[,<PDP_type>[,APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]**	Response **OK** or **ERROR**
	Parameters **<cid>** (PDP Context Identifier) a numeric parameter that specifies a particular PDP context definition. The parameter is local to the UE-TE interface and is used in other PDP

context-related commands.

The range of permitted values (minimum value = 1 or if the initial PDP context is supported minimum value = 0) is returned by the test form of the command.

<PDP_type> (Packet Data Protocol type) a string parameter which specifies the type of packet data protocol :

IP Internet Protocol (IETF STD 5)

IPV6 Internet Protocol, version 6 (IETF RFC 2460)

IPV4V6 Virtual <PDP_type>) introduced to handle dual IP stack UE capability (see 3GPP Technical Specifications 24.301).

Non-IP Transfer of Non-IP data to external packet data Network (see 3GPP Technical Specifications 24.301).

<APN> (Access Point Name) a string parameter, a logical name 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_addr> A string parameter that identifies the UE 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.

NOTE: For EPS, this field is omitted.

<d_comp> A numeric parameter that controls PDP data compression (applicable for SNDCP only) (refer 3GPP TS 04.65)

0 off (default if value is omitted)

1 on (manufacturer preferred compression)

2 V.42bis

Other values are reserved.

<h_comp> A numeric parameter that controls PDP header compression (refer 3GPP TS 04.65)

0 off (default if value is omitted)

1 on (manufacturer preferred compression)

2 RFC1144 (applicable for SNDCP only)

3 RFC 2507

4 RFC 3095 (ROHC) (applicable for PDCP only)

Other values are reserved.

<IPv4_MTU_discovery> Integer type; influences how the MT/TA requests to get the IPv4 MTU size, see 3GPP TS 24.008 sub-clause 10.5.6.3.

0 Preference of IPv4 MTU size discovery not influenced by +CGDCONT

1 Preference of IPv4 MTU size discovery through NAS signaling

<Non-IP_MTU_discovery> Integer type; influences how the MT/TA

	requests to get the Non-IP MTU size, see 3GPP TS 24.008 sub-clause 10.5.6.3. 0 Preference of Non-IP MTU size discovery not influenced by +CGDCONT 1 Preference of Non-IP MTU size discovery through NAS signaling
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-
Reference	Note

3.2.39 AT+CGACT PDP Context Activate or Deactivate

AT+CGACT PDP Context Activate or Deactivate	
Test Command **AT+CGACT=?**	Response **+CGACT: (**list of supported **<state>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CGACT?**	Response **+CGACT: <cid>,<state>[<CR><LF>+CGACT: <cid>,<state>…]** **OK**
	Parameters See Write Command
Write Command **AT+CGACT=<state>[,<cid>]**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<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 Write Command. **<cid>** A numeric parameter which specifies a particular PDP context definition (see +CGDCONT Command). If the <cid> is omitted, it only affects the first cid.
Parameter Saving Mode	NO_SAVE

Max Response Time	150 seconds
Reference	Note If context is deactivated successfully, NO CARRIER is returned If **<cid>=0** for PDN activated during attach is enabled, then AT+CGACT=<0 or 1>,0 will cause ERROR response.

3.2.40 AT+CGPADDR Show PDP Address

AT+CGPADDR	**Show PDP Address**
Test Command **AT+CGPADDR=?**	Response **+CGPADDR: (**list of defined **<cid>**s**)** **OK** or **OK**
	Parameters See Write Command
Write Command **AT+CGPADDR=[<cid>[,<cid>[,…]]]**	Response **+CGPADDR: <cid>,<PDP_addr>** **[<CR><LF>+CGPADDR: <cid>,<PDP_addr>[…]]** **OK** or **OK** or **ERROR**
	Parameters **<cid>** a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command). If no <cid> is specified, the addresses for all defined contexts are returned. **<PDP_addr>** 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 command when the context was defined. For a dynamic address, it will be the one assigned during the last PDP context activation that used the context definition referred to by **<cid>**. **<PDP_address>** is omitted if none is available.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

	Write command returns address provided by the network if a connection has been established.

3.2.41 AT+CGEREP Packet Domain Event Reporting

AT+CGEREP Packet Domain Event Reporting	
Test Command **AT+CGEREP=?**	Response **+CGEREP: (list of supported <mode>s) ,(list of supported <bfr>s)** **OK**
	Parameters See Write Command
Read Command **AT+CGEREP?**	Response **+CGEREP: <mode>,<bfr>** **OK**
	Parameters See Write Command
Write Command **AT+CGEREP=<mode>**	Response **OK** or **ERROR**
	Parameters **<mode>** 0 buffer unsolicited result codes in the UE; if UE result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE. 1 discard unsolicited result codes when UE-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 UE when UE-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when UE-TE link becomes available; otherwise forward them directly to the TE **<bfr>** 0 UE buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered 1 UE 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)
	Unsolicited Result Codes supported: **For network attachment, the following unsolicited result codes and the corresponding events are defined:** **+CGEV: NW DETACH** The network has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

+CGEV: ME DETACH
The mobile termination has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

For PDP context activation, the following unsolicited result codes and the corresponding events are defined:
+CGEV: NW PDN ACT <cid>
The network has activated a context. The context represents a Primary PDP context in GSM/UMTS. The <cid> for this context is provided to the TE. The format of the parameter <cid> is found in command +CGDCONT.
NOTE 1: This event is not applicable for EPS.
+CGEV: ME PDN ACT <cid>[,<reason>[,<cid_other>]]
The mobile termination has activated a context. The context represents a PDN connection in NB-IOT. The <cid> for this context is provided to the TE. This event is sent either in result of explicit context activation request (+CGACT), or in result of implicit context activation request associated to attach request (+CGATT=1). The format of the parameter <cid> and <cid other> are found in command +CGDCONT.

For PDP context deactivation, the following unsolicited result codes and the corresponding events are defined:
+CGEV: NW PDN DEACT <cid>
The network has deactivated a context. The context represents a PDN connection in NB-IOT. The associated <cid> for this context is provided to the TE. The format of the parameter <cid> is found in command +CGDCONT.
NOTE 2: Occurrence of this event replaces usage of the event
+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]
+CGEV: ME PDN DEACT <cid>
The mobile termination has deactivated a context. The context represents a PDN connection in NB-IOT. The <cid> for this context is provided to the TE. The format of the parameter <cid> is found in command +CGDCONT.
NOTE 3: Occurrence of this event replaces usage of the event **+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]**

For other PDP context handling, the following unsolicited result codes and the corresponding events are defined:
+CGEV: REJECT <PDP_type>, <PDP_addr>
A network request for context activation occurred when the UE was unable to report it to the TE with a +CRING unsolicited result code and was automatically rejected. The format of the parameters <PDP_type> and <PDP_addr> are found in command +CGDCONT.
NOTE 6: This event is not applicable for EPS.
+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]

	The network has requested a context reactivation. The <cid> that was used to reactivate the context is provided if known to the UE. The format of the parameters <PDP_type>, <PDP_addr> and <cid> are found in command +CGDCONT. NOTE 7: This event is not applicable for EPS.
	Parameters **<PDP_addr>** Packet Data Protocol address (see +CGDCONT command} **<cid>** Context Id (see +CGDCONT command) Note: <cid> only given if known to the UE. **<class>** GPRS mobile class (see +CGCLASS command) **<event_type>** Integer type parameter indicates whether this is an informational event of whether the TE as acknowledged it. 0 Informational event 1 Information request: Acknowledgement required. The Acknowledgement can be accept or reject, see AT+CGANS. **<change_reason>** Integer type parameter indicates what kind of change occurred. 1 TFT only changed 2 QoS only changed 3 Both TFT and QoS changed **<reason>** Integer type parameter indicates the reason why the context activation request for PDP type IPV4V6 was not granted. This parameter is only included if the requested PDP type associated with <cid> is IPV4V6, and the PDP type assign by the network for <cid> is either IPV4 or IPV6 0 IPV4 only allowed 1 IPV6 only allowed 2 single address bearers only allowed 3 single address bearers only allowed and MT initiated context activation for a second address type bearer was not successful **<cid_other>** Indicated the context identifier allocated by MT for an MT initiated context of a second address type. MT shall only include this parameter if <reason> parameter indicates single address bearers only allowed, and MT support MT initiated context activation of a second address type without additional commands from the TE, and MT has activated the PDN connection or PDP context associated with <cid_other>.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

3.2.42 AT+CGREG Network Registration Status

AT+CGREG Network Registration Status	
Test Command **AT+CGREG=?**	Response **+CGREG: (**list of supported **<n>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CGREG?**	Response **+CGREG: <n>,<stat>[,<lac>,<ci>,<AcT>,<rac>]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CGREG=<n>**	Response **OK** or **ERROR**
	Parameters **<n>** 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>[,<lac>,<ci>,<AcT>,<rac>]** **<stat>** 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 5 Registered, roaming 6 registered for “SMS only”, home network (applicable only when <Act> indicates E-UTRAN 7 registered for “SMS only”, roaming (applicable only when <Act> indicates E-UTRAN **<lac>** String type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal) **<ci>** String type; four byte UTRAN/GERAN/E-UTRAN cell ID in

	hexadecimal format **<AcT>** Access technology of the registered network 9 NB-IoT **<rac>** String type; one byte routing area code in hexadecimal format
Parameter Saving Mode	-
Max Response Time	-
Reference	Note

3.2.43 AT+CGCONTRDP PDP Context Read Dynamic Parameters

AT+CGCONTRDP PDP Context Read Dynamic Parameters	
Test Command **AT+CGCONTRDP=?**	Response **+CGCONTRDP: (list of <cid>s associated with active contexts)** **OK**
	Parameters See Write Command
Write Command **AT+CGCONTRDP=[<cid>]**	Response **+CGCONTRDP: <cid>, <bearer_id>, <apn>[, <local address and subnet mask>[, <gw_addr>[, <DNS_prim_addr>[, <DNS_sec_addr> [,<Serving_PLMN_rate_control_value>]]]]]** **[<CR><LF>+CGCONTRDP: <cid>, <bearer_id>, <apn>[, <local address and subnet mask>[, <gw_addr>[, <DNS_prim_addr>[, <DNS_sec_addr> [,<Serving_PLMN_rate_control_value>]]]]]** **[…]]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<cid>** A numeric parameter which specifies a particular primary PDP context definition. The parameter is local to the TE-UE interface and is used in other PDP context-related commands. **<bearer_id>** A numeric parameter which identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS. **<APN>** A string parameter which is a logical name that was used to select the GGSN or the external packet data network. **<local address and subnet mask>** A string parameter which shows the IP Address and subnet mask of the UE. The string is given as dot-separated numeric (0-255) parameters on the form:

	"a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16", for IPv6. **<gw_addr>** A string parameter which shows the Gateway Address of the UE. The string is given as dot-separated numeric (0-255) parameters. **<DNS_prim_addr>** A string parameter which shows the IP Address of the primary DNS Server. **<DNS_sec_addr>** A string parameter which shows the IP address of the secondary DNS Server. **<Serving_PLMN_rate_control_value>** Integer type; indicates the maximum number of uplink messages the UE is allowed to send in a 6-minute interval. This refers to octet 3 to 4 of the Serving PLMN rate control IE as specified in 3GPP TS 24.301 sub-clause 9.9.4.28.
Parameter Saving Mode	-
Max Response Time	-
Reference	Note

3.2.44 AT+CGPIAF Printing IP Address Format

AT+CGPIAF Printing IP Address Format	
Test Command **AT+CGPIAF=?**	Response **+CGPIAF: (list of supported <IPv6_AddressFormat>s), (list of supported <IPv6_SubnetNotation>s), (list of supported IPv6_LeadingZeros>s), (list of supported IPv6_CompressZeros>s)** **OK**
	Parameters See Write Command
Read Command **AT+CGPIAF?**	Response **+CGPIAF: <IPv6_AddressFormat>,<IPv6_SubnetNotation>,<IPv6_LeadingZeros>, <IPv6_CompressZeros>** **OK** or **+CME ERROR: <err>**
	Parameters See Write Command
Write Command **AT+CGPIAF=[I**	Response OK

Pv6_AddressFormat>[,<IPv6_SubnetNotation>[,<IPv6_LeadingZeros>[,<IPv6_CompressZeros>]]]]	If error is related to ME functionality: **+CME ERROR: <err>** Parameters **<IPv6_AddressFormat>** Integer type, decides the IPV6 address format. Relevant for all AT command parameters that can hold an IPV6 address. 0 Use IPV4-like dot-notation. IP address, and Subnetwork mask if applicable, are dot-separated. Example: For <source address and subnet mask>: "32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.255.255.255.255.255.255.240.0.0.0.0.0.0.0.0" For other IP address parameters: "32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.0" 1 Use IPV6-like colon notation. IP address, and subnetwork mask if applicable and when given explicitly, are separated by a space. Example: For <source address and subnet mask>: "2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000" For other IP address parameters: "2001:0DB8:0000:CD80:0000:0000:0000:0000" **<IPv6_SubnetNotation>** Integer type, decides the subnet-notation for <source Address and subnet mask>. Setting does not apply If <IPVv6_AddressFormat>=0. 0 Both IP Address and subnet mask are stated.Explicitly, separated by a space. Example: "2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000" 1 The printout format is applying / (forward slash) subnet-prefix Classless Inter-Domain Routing (CIDR) notation: Example: "2001:0DB8:0000:CD30:0000:0000:0000:0000/60" **<IVv6_LeadingZeros>** Integer type, decides whether leading zeros are Omitted or not. Setting does not apply if <IPv6_AddressFormat>=0. 0 Leading zeros are omitted. Example: "2001:DB8:0:CD30:0:0:0:0" 1 Leading zeros are included. Example: "2001:0DB8:0000:CD30:0000:0000:0000:0000" **<IPv6_CompressZeros>** Integer type, decides whether 1-n instances of

	16 bit zero-values are replaced by only "..". This applies only once. Setting does not apply if <IPv6_AddressFormat>=0. 0 No zero compression. Example: "2001:DB8:0:CD30:0:0:0:0" 1 Use zero compression. Example: "2001:DB8:0:CD30::"
Parameter Saving Mode	-
Max Response Time	-
Reference	Note

3.2.45 AT+CGDEL Delete Non-Active PDP Contexts

AT+CGDEL Delete Non-Active PDP Contexts	
Test Command **AT+CGDEL=?**	Response **OK**
	Parameters See Write Command
Write Command **AT+CGDEL=<cid>**	Response **+CGDEL: <cid>[,<cid>[,…]]** **OK** If error is related to wrong AT syntax: **+CME ERROR: <err>**
	Parameters **<cid>** A numeric parameter which specifies a particular PDP context Definition.
Parameter Saving Mode	-
Max Response Time	-
Reference	Note

3.2.46 AT+CGAUTH Define PDP Context Authentication Parameters

AT+CGAUTH Define PDP Context Authentication Parameters	
Test Command **AT+CGAUTH=?**	Response **+CGAUTH: (range of supported <cid>s),(list of supported <auth_prot>s),(range of supported <userid>s),(range of supported <password>s)**

	OK
	Parameters See Write Command
Read Command **AT+CGAUTH?**	Response **[+CGAUTH: <cid>,<auth_prot>,<userid>,<password>]** **[<CR><LF>+CGAUTH: <cid>,<auth_prot>,<userid>,<password>** **[…]]** **OK**
	Parameters See Write Command
Write Command **AT+CGAUTH=<cid>[,<auth_prot>[,<userid>[,<password>]]]**	Response When <auth_prot>/<username>/<password> set: **OK** When no <auth_prot>/<username>/<password> set displays current auth_prot username and password for <cid>: **+CGAUTH: <cid>,<auth_prot>,<username>,<password>** **OK** If error is related to wrong AT syntax: **+CME ERROR: <err>**
	Parameters **<cid>** A numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands). **<auth_prot>** Numeric parameter. Authentication protocol used for this PDP context. 0 None. Used to indicate that no authentication protocol is used for this PDP context. Username and password are removed if previously specified. 1 PAP **<userid>** String type. User name for access to the IP network. **<password>** String type. Password for access to the IP network.
Parameter Saving Mode	-
Max Response Time	-
Reference	Note

3.2.47 AT*MCGDEFCONT Set Default PSD Connection Settings

AT*MCGDEFCONT Set Default PSD Connection Settings	
Test Command **AT*MCGDEFCONT**=?	Response ***MCGDEFCONT: (List of supported <PDP_type>)**

	OK
	Parameters See Write Command
Read Command **AT*MCGDEFCONT?**	Response ***MCGDEFCONT: <PDP_type>,<APN>,<username>,<password>** **OK**
	Parameters See Write Command
Write Command **AT*MCGDEFCONT=<PDP_type>[,<APN>[,<username>[,<password>]]]**	Response **OK** If error is related to wrong AT syntax: **+CME ERROR: <err>**
	Parameters **<PDP_type>** (Packet Data Protocol type) a string parameter which specifies the type of packet data protocol : IP Internet Protocol (IETF STD 5) IPV6 Internet Protocol, version 6 (IETF RFC 2460) IPV4V6 Virtual <PDP_type) introduced to handle dual IP stack UE capability(see 3GPP TS 24.301). Non-IP Transfer of Non-IP data to external packet data Network (see 3GPP TS 24.301). **<APN>** (Access Point Name) a string parameter that 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. **<username>** String value. Username for the connection to the service provider. **<password>** String value. Password for the connection to the service provider
Parameter Saving Mode	AUTO_SAVE_REBOOT
Max Response Time	-
Reference	Note

3.2.48 AT*MSACL Enable/Disable ACL feature

AT*MSACL Enable/Disable ACL feature	
Test Command **AT*MSACL=?**	Response ***MSACL: (0-1)** **OK**
	Parameters

	See Write Command
Read Command **AT*MSACL?**	Response ***MSACL: <supported><enabled>** **OK**
	Parameters See Write Command
Write Command **AT*MSACL=<mode>, [<PIN2>]**	Response **OK** If error is related to wrong AT syntax: **+CME ERROR: <err>**
	Parameters **<mode>** Action selected 0 ACL to be disabled 1 ACL to be enabled **<supported>** 0 ACL not supported by SIM 1 ACL supported by SIM **<enabled>** 0 ACL disabled by user 1 ACL enabled by user
Parameter Saving Mode	-
Max Response Time	-
Reference	Note Enables/disables ACL feature for the mobile unit. If enabled and supported by the SIM, PDP Activations are only possible with APNs which are present in the ACL list. If PIN2 is not confirmed before the command is issued, the PIN2 should be supplied as a second parameter.

3.2.49 AT*MLACL Display ACL List

AT*MSACL Display ACL List	
Test Command **AT*MLACL=?**	Response ***MLACL: (0-255),(0-255)** **OK**
	Parameters See Write Command
Write Command **AT*MLACL=<f**	Response ***MLACL: <index>,<APN>**

rom>, [<to>]	**OK** If error is related to wrong AT syntax: **+CME ERROR: <err>**
	Parameters **<from>** Start index **<to>** End index **<index>** Entry index **<APN>** APN in textual format
Parameter Saving Mode	-
Max Response Time	-
Reference	Note Only applies to USIM (3G).

3.2.50 AT*MWACL Write an ACL entry

AT*MWACL	**Write an ACL entry**
Test Command **AT*MWACL=?**	Response ***MWACL: (0-255)** **OK**
	Parameters See Write Command
Write Command **AT*MWACL=<index>,<APN>, [<PIN2>]**	Response **OK** If error is related to wrong AT syntax: **+CME ERROR: <err>**
	Parameters **<index>** Entry index **<APN>** APN in textual format
Parameter Saving Mode	-
Max Response Time	-
Reference	Note Only applies to USIM (3G).

3.2.51 AT*MDACL Delete an ACL entry

AT*MDACL	**Delete an ACL entry**
Test Command	Response

AT*MDACL=?	***MDACL: (0-255)** **OK**
	Parameters See Write Command
Write Command **AT*MDACL=<index>, [<PIN2>]**	Response OK If error is related to wrong AT syntax: **+CME ERROR: <err>**
	Parameters **<index>** Entry index
Parameter Saving Mode	-
Max Response Time	-
Reference	Note Deletes an ACL entry from the specific index in the list. The entry will be deleted, and all the following entries moved to the previous index to cover the deleted entry, leaving the continuous list. If PIN2 is not confirmed before the command is issued, PIN2 should be supplied as a second parameter.

3.2.52 AT+CNBIOTDT NB-IOT Data Type

AT+CNBIOTDT	**NB-IOT Data Type**
Test Command **AT+CNBIOTDT=?**	Response **+CNBIOTDT: (list of supported <types>s)** **OK**
	Parameters See Write Command
Read Command **AT+CNBIOTDT?**	Response Displays <type> for all active PDP contexts: **[+CNBIOTDT: <cid>,type]** **[<CR><LF>+CNBIOTDT: <cid>,<type>]** **[…]]** **OK**
	Parameters See Write Command
Write Command **AT+CNBIOTDT**	Response **OK**

=<type>[,<cid>[,<cid>[,…]]]	If error is related to wrong AT syntax: **+CME ERROR: <err>**
	Parameters **<type>** Integer type 0 Normal data (default) 1 Exceptional data **<cid>** Integer type. Specifies a particular PDP context definition. If no <cid>s are specified the command sets <type> for all active PDP contexts.
Parameter Saving Mode	-
Max Response Time	-
Reference	Note The UE will not remember this setting over sleep cycles (i.e. the UE will fall back to default setting after sleep)

4 AT Commands Special for SIMCom

4.1 Overview

Command	Description
AT+CPOWD	Power off
AT+CADC	Read ADC
AT+CLTS	Get local timestamp
AT+CBAND	Get and set mobile operation band
AT+CENG	Switch on or off engineering mode
AT+CCID	Show ICCID
AT+EXUNSOL	Enable or disable proprietary unsolicited indications
AT+GSV	Display product identification information
AT*CELLLOCK	Set the list of ARFCN which needs to be locked
AT+SLEDS	Set the timer period of net light
AT+CNETLIGHT	Close the net light or open it to shining
AT+CSMINS	SIM inserted status reporting
AT+CSPCHSC	Set Scrambling Algorithm for NPDSCH
AT+CATWAKEUP	Enable Deep Sleep Wakeup Indication
AT+CSCLK	Configure Slow Clock

4.2 Detailed Descriptions of Commands

4.2.1 AT+CPOWD Power off

AT+CPOWD Power Off	
Write Command **AT+CPOWD=<n>**	Response **[NORMAL POWER DOWN]** **OK**
	Parameter **<n>** 0 Power off urgently (Will not send out NORMAL POWER DOWN) 1 Normal power off (Will send out NORMAL POWER DOWN)
Parameter Saving Mode	NO_SAVE
Max Response	-

Time	
Reference	Note

4.2.2 AT+CADC Read ADC

AT+CADC Read ADC	
Test Command **AT+CADC=?**	Response **+CADC: (**list of supported **<status>**s**),(**list of supported **<value>**s**)** **OK**
	Parameters **<status>** 1 Success 0 Fail **<value>** Integer 0-1400
Read Command **AT+CADC?**	Response **+CADC: <status>,<value>** **OK**
	Parameters See Test Command
Parameter Saving Mode	NO_SAVE
Max Response Time	2s
Reference	Note

4.2.3 AT+CLTS Get Local Timestamp

AT+CLTS Get Local Timestamp	
Test Command **AT+CLTS=?**	Response **+CLTS: "yy/MM/dd,hh:mm:ss+/-zz"** **OK**
Read Command **AT+CLTS?**	Response **+CLTS: <mode>** **OK**
Write Command **AT+CLTS=<mode>**	Response **OK** If error is related to wrong AT syntax: **+CME ERROR: <err>**

	Parameters **<mode>** 0 Disable 1 Enable
	Unsolicited Result Code **+CLTS: <year>,<month>,<day>,<hour>,<min>,<sec>,"<time zone>"**
	Parameters <**year**> Year (from network) <**month**> Month (from network) <**day**> Day (from network) <**hour**> Hour (from network) <**min**> Minute (from network) <**sec**> Second (from network) <**time zone**> String type; network time zone.
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference	Note

4.2.4 AT+CBAND Get and Set Mobile Operation Band

AT+CBAND Get and Set Mobile Operation Band	
Test Command **AT+CBAND=?**	Response **+CBAND: (**list of supported <**op_band**>s**)** **OK**
	Parameter See Write Command
Read Command **AT+CBAND?**	Response **+CBAND: <op_band>[,<ALL_BAND>]** **OK**
	Parameter See Write Command
Write Command **AT+CBAND=<op_band>[,<ALL_BAND>]**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameter **<op_band>** Integer value indicating current selected NB-IOT band

	Valid values: ,2,3,5,8,11,12,13,17,18,19,20,25,26,28, 31,66,70,21
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-
Reference	Note

4.2.5 AT+CENG Report Network State

AT+CENG Report Network State	
Test Command **AT+CENG=?**	Response TA returns the list of supported modes. **+CENG: (**list of supported **<mode>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CENG?**	Response <mode> = 0 display serving cell and up to 4 neighbor cell information: +**CENG**: **<sc_earfcn>,<sc_earfcn_offset>,<sc_pci>,<sc_cellid>,[<sc_rsrp>],[<sc_rsrq>],[<sc_rssi>],[<sc_snr>],<sc_band>,<sc_tac>,[<sc_ecl>],[<sc_tx_pwr>]** **[<CR><LF>+CENG:** **<nc_earfcn>,<nc_earfcn_offset>,<nc_pci>,<nc_rsrp>** **[…]]** **OK** <mode> = 1 display data transfer information only if modem in RRC-CONNECTED state: +**CENG**: **<RLC_UL_BLER>,<RLC_DL_BLER>,<MAC_UL_BLER>,<MAC_DL_BLER>,<MAC_UL_total_bytes>,<MAC_DL_total_bytes>,<MAC_UL_total_HARQ_TX>,<MAC_DL_total_HARQ_TX>,<MAC_UL_HARQ_re_TX>,<MAC_DL_HARQ_re_TX>,<RLC_UL_tput>,<RLC_DL_tput>,<MAC_UL_tput>,<MAC_DL_tput>** **OK** If error is related to wrong AT syntax or incorrect <mode> or UE in incorrect state **+CME ERROR: <err>**
	Parameters

	See Write Command
Write Command **AT+CENG=<mode>**	Response **OK** **ERROR**
	Parameters **<mode>** Integer value indicating requested engineering information. 0 Radio information for serving and neighbor cells 1 Serving Cell/Neighbor Cell information: **<sc_earfcn>** Integer value indicating the EARFCN for serving cell. Range 0- 262143 **<sc_earfcn_offset>** Integer value indicating the EARFCN offset for serving cell: 0 Offset of -2 1 Offset of -1 2 Offset of -0.5 3 Offset of 0 4 Offset of 1 **<sc_pci>** Integer value indicating the serving cell physical cell ID. Range 0 – 503. **<sc_cellid>** String type; four byte (28 bit) cell ID in hexadecimal format for serving cell. **<sc_rsrp>** Signed integer indicating serving cell RSRP value in units of dBm (can be negative value). Available only in RRC-IDLE state. **<sc_rsrq>** Signed integer indicating serving cell RSRQ value in units of dB (can be negative value). Available only in RRC-IDLE state. **<sc_rssi>** Signed integer indicating serving cell RSSI value in units of dBm (can be negative value). Available only in RRC-IDLE state. **<sc_snr>** Signed integer value. Last SNR value for serving cell in units of dB. Available only in RRC-IDLE state. **<sc_band>** Integer value; current serving cell band **<sc_tac>** String type; two byte tracking area code (TAC) in hexadecimal format (e.g. "00C3" equals 195 in decimal). **<sc_ecl>** Integer value. Last Enhanced Coverage Level (ECL) value for serving cell. Range 0-2. **<sc_tx_pwr>** Signed integer value indicating current UE transmit power. Units of cBm Centibels relative to one milliwatt (can be negative value). **<nc_earfcn>** Integer value indicating the EARFCN for neighbor cell. Range 0-262143 **<nc_earfcn_offset>** Integer value indicating the EARFCN offset for neighbor cell: 0 Offset of -2 1 Offset of -1 2 Offset of -0.5

	3 Offset of 0 4 Offset of 1 **<nc_pci>** Integer value indicating the neighbor cell physical cell ID. Range 0-503. **<nc_rsrp>** Signed integer indicating neighbor cell RSRP value in units of dBm (can be negative value). Data Transfer Information: **<RLC_UL_BLER>** Integer value. Represented in % value (range 0 to 100). UL block error rate (as per IRQ) in RLC. Calculated over all established RLC AM radio bearers. Calculated from the beginning of successfully established/resumed RRC connection or since previous AT+CENG query with <mode>=1, whichever is later. Only valid in RRC-CONNECTED state. **<RLC_DL_BLER>** Integer value Represented in % value (range 0 to 100). DL block error rate (as per ARQ) in RLC. Calculated over all established RLC AM radio bearers. Calculated from the beginning of successfully established / resumed RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. **<MAC_UL_BLER>** Integer value. Represented in % value (range 0 to 100). UL block error rate (as per HARQ) in MAC for UL-SCH. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. **<MAC_DL_BLER>** Integer value. Represented in % value (range 0 to 100). DL block error rate (as per HARQ) in MAC for DL-SCH, excluding BCCH. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. <MAC_UL_total_bytes> Integer value. Total number of transport block bytes (re)transmitted on UL-SCH. Calculated for UL-SCH over all HARQ transmissions and retransmissions. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: bytes **<MAC_DL_total_bytes>** Integer value. Total number of transport block bytes (re)transmitted on DL-SCH, excluding BCCH. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: bytes **<MAC_UL_total_HARQ_TX>** Integer value. Total number of HARQ (re)transmissions for transport blocks on UL-SCH. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous AT+CENG query

	with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: (re)transmissions **<MAC_DL_total_HARQ_TX>** Integer value. Total number of HARQ (re)transmissions for transport blocks on DL-SCH, excluding BCCH. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: (re)transmissions **<MAC_UL_HARQ_re_TX>** Integer value. Number of HARQ retransmissions for transport blocks on UL-SCH. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: retransmissions **<MAC_DL_HARQ_re_TX>** Integer value. Number of HARQ retransmissions for transport blocks on DL-SCH, excluding BCCH. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: retransmissions. **<RLC_UL_tput>** Integer value. RLC uplink throughput. Calculated over all established RLC AM radio bearers. Calculated from the beginning of successfully established / resumed RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: kbits / s **<RLC_DL_tput>** Integer value. RLC downlink throughput. Calculated over all established RLC AM radio bearers Calculated from the beginning of successfully established / resumed RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: kbits / s **<MAC_UL_tput>** Integer value. UL throughput in MAC for UL-SCH. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: kbits / s **<MAC_DL_tput>** Integer value. DL throughput in MAC for DL-SCH, excluding BCCH. Calculated from the beginning of successfully established / resumed / re-established RRC connection, or since previous **AT+CENG** query with <mode>=1, whichever is later. Available only in RRC-CONNECTED state. Unit: kbits / s
Parameter Saving Mode	NO_SAVE
Max Response	-

Time	
Reference	Note If modem is not in RRC-CONNECTED state then +**CENG** will not be generated for <mode> = 1. Only OK response will be generated.

4.2.6 AT+CCID Show ICCID

AT+CCID Show ICCID	
Test Command **AT+CCID=?**	Response **OK**
Execution Command **AT+CCID**	Response **Ccid data** [ex. 898600810906F8048812] **OK**
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

4.2.7 AT+EXUNSOL Enable or Disable Proprietary Unsolicited Indications

AT+EXUNSOL Enable or Disable Proprietary Unsolicited Indications	
Test Command **AT+EXUNSOL=?**	Response **+EXUNSOL: (**list of supported **<exunsol>**s**)** **OK**
	Parameters See Write Command
Write Command **AT+EXUNSOL=<exunsol>,<mode>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
	Parameters **<exunsol>** String type(string should be included in quotation marks). values are currently reserved by the present document "SQ" Signal Quality Report Displays signal strength and channel bit error rate (similar to **AT+CSQ**) in form **+CSQN: <rssi>,<ber>**when values change. **<mode>** 0 Disable

	1 Enable 2 Query
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference	Note

4.2.8 AT+GSV Display Product Identification Information

AT+GSV Display Product Identification Information	
Execution Command **AT+GSV**	Response TA returns product information text Example: **SIMCOM_Ltd** **SIMCOM_SIM7020** **Revision: 1752B01SIM7020** **OK**
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

4.2.9 AT*CELLLOCK Set the List of ARFCN Which Needs to Be Locked

AT*CELLLOCK Set the List of ARFCN Which Needs to Be Locked	
Test Command **AT*CELLLOCK=?**	Response **OK**
	Parameter See Write Command
Read Command **AT*CELLLOCK?**	Response **OK**
	Parameter See Write Command
Write Command **AT*CELLLOCK=<lock>[,<earf**	Response **OK** If error is related to wrong AT syntax or incorrect parameters.

cn>,<earfcn_offset>[,<pci>]]	**ERROR**
	Parameter **<lock>** Integer value indicating whether to activate lock, or remove lock: 0: Remove lock 1: Activate lock **<earfcn>** Integer value indicating requested EARFCN on which to lock. Range 0- 262143. Value of 0 indicates to remove any lock for EARFCN and Cell **<earfcn_offset>** Integer value indicating requested EARFCN offset: 0: Offset of -2 1: Offset of -1 2: Offset of -0.5 3: Offset of 0 4: Offset of 1 **<pci>** Integer value: Physical cell ID. Range: 0-503
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-
Reference	Note

4.2.10 AT+SLEDS Set the Timer Period of Net Light

AT+SLEDS Set the Timer Period of Net Light	
Test Command **AT+SLEDS=?**	Response **+SLEDS: (1-3),(0,40-65535),(0,40-65535)** **OK**
	Parameters See Write Command
Read Command **AT+SLEDS?**	Response **+SLEDS: <mode>,<timer_on>,<timer_off>** **OK**
	Parameters See Write Command
Write Command **AT+SLEDS=<mode>,<timer_on>**	Response **OK** **ERROR**

,<timer_off>	Parameters **<mode>** 1 Set the timer period of net light while SIM7020 series does not register to the network 2 Set the timer period net light while SIM7020 series has already registered to the network 3 Set the timer period net light while SIM7020 series is in the state of PPP communication <**timer_on**> Timer period of "LED ON" in decimal format which range is 0 or 40-65535(ms) <**timer_off**> Timer period of “LED OFF” in decimal format which range is 0 or 40-65535(ms)
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-
Reference	Note The default value is : **<mode>,<timer_on>,<timer_off>** 1,64,800 2,64,3000 3,64,300

4.2.11 AT+CNETLIGHT Close the Net Light or Open It to Shining

AT+CNETLIGHT Close the Net Light or Open It to Shining	
Test Command **AT+CNETLIGHT=?**	Response **+CNETLIGHT: (0,1)** **OK**
	Parameters See Write Command
Read Command **AT+CNETLIGHT?**	Response **+CNETLIGHT: <mode>** **OK**
	Parameters See Write Command
Write Command **AT+CNETLIGHT=<mode>**	Response **OK** **ERROR**

	Parameters **<mode>** 0 Close the net light 1 Open the net light to shining
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-
Reference	Note

4.2.12 AT+CSMINS SIM Inserted Status Reporting

AT+CSMINS SIM Inserted Status Reporting	
Test Command **AT+CSMINS=?**	Response **+CSMINS: (**list of supported **<n>**s**)** **OK**
	Parameter See Write Command
Read Command **AT+CSMINS?**	Response **+CSMINS: <n>,<SIM inserted>** **OK**
	Parameters See Write Command
Write Command **AT+CSMINS=<n>**	Response **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
	Unsolicited Result Code **+CSMINS: <n>,<SIM inserted>**
	Parameters **<n>** A numeric parameter to show an unsolicited event code indicating whether the SIM has been inserted or removed. 0 Disable 1 Enable **<SIM inserted>** A numeric parameter which indicates whether SIM card has been inserted. 0 Not inserted 1 Inserted

Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference	Note

4.2.13 AT+CSPCHSC Set Scrambling Algorithm for NPDSCH

AT+CSPCHSC Set Scrambling Algorithm for NPDSCH	
Test Command **AT+CSPCHSC=?**	Response **+CSPCHSC: (0-1)** **OK**
	Parameter See Write Command
Read Command **AT+CSPCHSC?**	Response **+CSPCHSC: <mode>** **OK**
	Parameter See Write Command
Write Command **AT+CSPCHSC=<mode>**	Response **OK** If error is related to wrong AT syntax or incorrect parameters. **ERROR**
	Parameter **<mode>** 0 New algorithm 1 Old algorithm (default)
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-
Reference	Note

4.2.14 AT+CATWAKEUP Enable Deep Sleep Wakeup Indication

AT+CATWAKEUP Enable Deep Sleep Wakeup Indication	
Test Command **AT+CATWAKEUP=?**	Response ***CATWAKEUP: (0-1)**

	OK
	Parameter See Write Command
Read Command **AT+CATWAKEUP?**	Response **+CATWAKEUP: <enable>** **OK**
	Parameter See Write Command
Write Command **AT+CATWAKEUP=<enable>**	Response **OK** If error is related to wrong AT syntax or incorrect parameters. **ERROR**
	Parameter **<enable>** 0 Disable indication on this channel when modem wakes up from deep sleep 1 Enable indication on this channel when modem wakes up from Deep sleep
Parameter Saving Mode	AT&W_SAVE
Max Response Time	-
Reference	Note

4.2.15 AT+CSCLK Configure Slow Clock

AT+CSCLK Configure Slow Clock	
Test Command **AT+CSCLK=?**	Response **+CSCLK: (**list of supported **<n>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CSCLK?**	Response **+CSCLK: <n>** **OK**
	Parameters See Write Command
Write Command	Response

AT+CSCLK=<n>	**OK** or **ERROR**
	Parameters **<n>** 0 Disable slow clock, module will not enter sleep mode. 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. 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.
Parameter Saving Mode	
Max Response Time	-
Reference	Note ● There are two caveats when you want to quit sleep mode in mode 2: 1, You should input some characters (at least one) to awake module 2, An interval time of 100ms more is necessary between waking characters and following AT commands,otherwise the waking characters will not be discarded completely,and messy codes will be produced which may leads to UART baudrate re-adaptation. ● The **+CSCLK** value can not be reset by **AT&F** or **ATZ** command.

5 AT Commands for TCPIP Application Toolkit

5.1 Overview of AT Commands for TCPIP Application Toolkit

Command	Description
AT+CSGACT	Activate or deactivate a PDN context
AT+CSOC	Create a TCP/UDP socket
AT+CSOCON	Connect socket to remote address and port
AT+CSOSEND	Send data to remote via socket
AT+CSOCL	Close socket
AT+CSOSENDFLAG	Set TCP send flag
AT+CSOSTATUS	Get socket status
AT+CSOACK	Query Previous Connection Data Transmitting State
+CSONMI	Socket message arrived indicator
+CSOERR	Socket error indicator

5.2 Detailed Descriptions of AT Commands for TCPIP Application Toolkit

5.2.1 AT+CSGACT Activate or deactivate a PDN context

AT+CSGACT	Activate or deactivate a PDN context
Write Command **AT+CSGACT=<op>,<pdp_type/cid>[,<apn>[,<user_name>,<pwd>[,<bearer_type>[,<sim_id>]]]]**	Response 1) For activation/deactivation requirement **OK** **If set Success:** **+CSGACT: <cid>, 1** **If set Failed:** **+CSGACT: <cid>,0** 2) For some errors，such as invalid parameter(s) **ERROR** 3）Automatically reported URC for network reasons **+CSGACT: <cid>,2** 4）If the PDN context is active/inactive **+CSGACT: <cid> ,<result>** **OK** will return immediately for activate or deactivate requirement.

Parameters

<op> Integer type

0 deactivation requirement

1 activation requirement

<pdp_type/cid> Integer type

If <op> is 1, it is pdp_type. Otherwise, it is cid.

pdp_type It is the pdp_type wanted to activate

1 IPv4

2 IPv6

3 IPv4v6

4 Non-IP

cid It is a numeric parameter specifying a particular PDP context. Here it should be equal to the <cid> returned by the activation response.

<apn> String type

It is the access point name which is mandatory for the activation requirement and should be omitted for the deactivation requirement.

<user_name> String type

It is the user name for access to the IP network which is mandatory for the activation requirement and should be omitted for the deactivation requirement.

<pwd> String type

It is the password for access to the IP network which is mandatory for the activation requirement and should be omitted for the deactivation requirement.

<bearer_type> Integer type

It is the type of bearer wanted to activate which is optional for the activation requirement and should be omitted for the deactivation requirement.

1 NBIOT (Only NBIOT is supported currently)

<sim_id> Integer type

It is the id of the SIM Card wanted to use which is optional for the activation requirement and should be omitted for the deactivation requirement.

1 SIM Card 1 (Only SIM Card 1 is supported currently).

<cid> Integer type

It is a numeric parameter specifying a particular PDP context.

<type> Integer type;

0 Result/URC for deactivation requirement

1 Result/URC for activation requirement

2 URC for passive deactivation

<result> Integer type;

0 Failure

	1 Success **<activated_pdp_type>** Integer type; It is the pdp_type actually activated. 1 IPv4 2 IPv6 3 IPv4v6 4 Non-IP
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

5.2.2 AT+CSOC Create a TCP/UDP socket

AT+CSOC Create a TCP/UDP socket	
Test Command **AT+CSOC=?**	Response +CSOC: (1-2),(1-3),(1-3) **OK**
	Parameters See Write Command
Read Command **AT+CSOC?**	Response **OK**
	Parameters See Write Command
Write Command **AT+CSOC=<domain>,<type>,<protocol>[,<cid>]**	Response **+CSOC: <socket_id>** **OK**
	Parameters **<socket_id>** Integer socket_id **<domain>** Integer 1 IPv4 2 IPv6 **<type>** Integer 1 TCP 2 UDP 3 RAW **<protocol>** Integer 1 IP 2 ICMP 3 UDP_LITE

	<cid> Integer, PDP context ID, AT+CGACT response. [option]
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

5.2.3 AT+CSOCON Connect socket to remote address and port

AT+CSOCON	**Connect socket to remote address and port**
Test Command **AT+CSOCON=?**	Response **+CSOCON: <socket_id>,<remote_port>,<remote_address>** **OK**
	Parameters See Write Command
Read Command **AT+CSOCON?**	Response If connection exist. **+CSOCON: <socket_id>,<type>,1** **OK**
	Parameters See Write Command
Write Command **AT+CSOCON=<socket_id>,<remote_port>,<remote_address>**	Response **OK**
	Parameters **<socket_id>** Integer socket_id **<remote_port>** Integer, remote port. **<remote_address>** String, remote address.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

5.2.4 AT+CSOSEND Send data to remote via socket

AT+CSOSEND	**Send data to remote via socket**
Test Command **AT+CSOSEND=?**	Response **+CSOSEND: <socket_id>,<data_len>,<data>** **OK**

	Parameters See Write Command
Read Command **AT+CSOSEND?**	Response **OK**
	Parameters See Write Command
Write Command **AT+CSOSEND=<socket_id>,<data_len>,<data>**	Response If CSOSENDFLAG is 0. **OK** If CSOSENDFLAG is 1. **OK** **SEND: <socket_id>,<len>**
	Parameters **<socket_id>** Integer socket_id, AT+CSOC's response. **<data_len>** Integer, length of data **<data>** Raw_data, data context. Maximum data size is 512 character. If <data_len> is 0 you can send str to remote socket with Double quotation,otherwise the format of data should be Hex and the lenth must be Equal to the <data_len>. **<len>** Integer, length of data
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

5.2.5 AT+CSOCL Close socket

AT+CSOCL Close socket	
Test Command **AT+CSOCL=?**	Response **OK**
	Parameters See Write Command
Read Command **AT+CSOCL?**	Response **+CSOCL: <socket_id>** **OK**
	Parameters See Write Command
Write Command	Response

AT+CSOCL=<socket_id>	**OK**
	Parameters **<socket_id>** Integer socket_id
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

5.2.6 AT+CSOSENDFLAG Set TCP send flag

AT+CSOSENDFLAG Set TCP send flag	
Test Command **AT+CSOSENDFLAG=?**	Response **+CSOSENDFLAG: (0,1)** **OK**
	Parameters See Write Command
Read Command **AT+CSOSENDFLAG?**	Response **+CSOSENDFLAG: <flag>** **OK**
	Parameters See Write Command
Write Command **AT+CSOSENDFLAG=<flag>**	Response **OK**
	Parameters **<flag>** TCP send flag
Parameter Saving Mode	AUTO_SAVE
Max Response Time	-

5.2.7 AT+CSOSTATUS Get socket status

AT+CSOSTATUS Get socket status	
Test Command **AT+CSOSTATUS=?**	Response **+CSOSTATUS: (0,10)** **OK**
	Parameters

	See Write Command
Read Command **AT+CSOSTATUS?**	Response **OK**
	Parameters See Write Command
Write Command **AT+CSOSTATUS=<socket_id>**	Response **+CSOSTATUS: <socket_id>,<status>** **OK**
	Parameters **<socket_id>** Integer, socket id, AT+CSOC's response. **<status>** Integer 1 None socket 2 Socket create but not connect. 3 Connected.

5.2.8 AT+CSOACK Query Previous Connection Data Transmitting State

AT+CSOACK Query Previous Connection Data Transmitting State	
Test Command **AT+CSOACK=?**	Response **+CSOACK: (0,10)** **OK**
	Parameters See Write Command
Read Command **AT+CSOACK?**	Response **OK**
	Parameters See Write Command
Write Command **AT+CSOACK=<socket_id>**	Response **+CSOACK: <socket_id>,<txlen>, <acklen>, <nacklen>** **OK**
	Parameters **<socket_id>** Integer, socket id, AT+CSOC's response. **<txlen>** The data amount which has been sent **<acklen>** The data amount confirmed successfully by the server **<nacklen>** The data amount without confirmation by the server

5.2.9 +CSONMI Socket message arrived indicator

+CSONMI Socket message arrived indicator
Indicated there is received some data from network.

	Response **+CSONMI: <socket_id>,<data_len>,<data>**
	Parameters **<socket_id>** Integer socket_id **<data_len>** Integer, length of data **<data>** Raw_data, data context.

5.2.10 +CSOERR Socket error indicator

+CSOERR Socket error indicator	
Indicated there is some error.	
	Response **+CSOERR: <socket_id>,<error_code>**
	Parameters **<socket_id>** Integer, socket id, AT+CSOC's response. <**error_code**> -1 common error 1 route error 2 conn abort error 3 reset error 4 connected error 5 value error 6 buffer error 7 block error 8 addr in use error 9 alr connecting error 10 alr connected error 11 NETIF error

6 AT Commands for HTTP/HTTPS Client

6.1 Overview of AT Commands for HTTP/HTTPS Client

Command	Description
AT+CHTTPCREATE	Create a HTTP/HTTPS client instance
AT+CHTTPCON	Establish the HTTP/HTTPS connection
AT+CHTTPDISCON	Close the HTTP/HTTPS connection
AT+CHTTPDESTROY	Destroy the HTTP/HTTPS client instance
AT+CHTTPSEND	Send HTTP/HTTPS package
+CHTTPNMIH	Header of the response from host
+CHTTPNMIC	Content of the response from host
+CHTTPERR	HTTP/HTTPS client connection error indicator

6.2 Detailed Descriptions of AT Commands for HTTP/HTTPS Client

6.2.1 AT+CHTTPCREATE Create a HTTP/HTTPS client instance

AT+CHTTPCREATE Create a HTTP/HTTPS client instance **Create an HTTP or HTTPS client instance and set configuration. If the <host> is start with "https://", our device will create an HTTPS client**	
Read Command **AT+CHTTPCREATE?**	Response **+CHTTPCREATE: <httpclient_id>,<state>,<host>[<CR><LF>** **+CHTTPCREATE: <httpclient_id>,<state>,<host>** **[...]]** **OK**
	Parameters See Write Command
Write Command **AT+CHTTPCREATE=<host>[<auth_user>,<auth_password>,<server_cert>,<client_cert>,<client_pk>]**	Response **+CHTTPCREATE: <httpclient_id>** **OK** or **ERROR**
	Parameters <**host**> Http server host <**auth_user**> Authorization name [option] <**auth_password**> Authorization password [option] <**server_cert**> Server certification, for https [option]

	<**client_cert**> Client certification, for https [option] <**client_pk**> Client private key, for https [option] All optional parameter should be exist or not exist in one command. <**httpclient_id**> An indicator of http client instance created by the command. <**state**> The create state of the httpclient_id 1 sucessfully 0 Failed
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

6.2.2 AT+CHTTPCON Establish the HTTP/HTTPS connection

AT+CHTTPCON Establish the HTTP/HTTPS connection **Use the created http instance to connect to target host.**	
Test Command **AT+CHTTPCON=?**	Response **+CHTTPCON: (0-4)** **OK**
	Parameters See Write Command
Read Command **AT+CHTTPCON?**	Response **+CHTTPCON: <httpclient_id>,<con_state>,<host>[<CR><LF>** **+CHTTPCON: <httpclient_id>,<con_state>,<host>** **[...]]** **OK**
	Parameters See Write Command
Write Command **AT+CHTTPCON=<httpclient_id>**	Response **OK** or **ERROR**
	Parameters <**httpclient_id**> The indicator of http client instance created by the AT+CHTTPCREATE command **<con_state>** The connected state of the httpclient_id 1 OK

	0 FAIL <**host**> Http server host
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● **AT+CHTTPCREATE** should be set before this command.

6.2.3 AT+CHTTPDISCON Close the HTTP/HTTPS connection

AT+CHTTPDISCON Close the HTTP/HTTPS connection **Use the created http instance to disconnect the connection with host. After disconnected and before detroy the http instance, you can use AT+CHTTPCON to connect it again.**	
Test Command **AT+CHTTPDISCON=?**	Response **+CHTTPDISCON: (0-4)** **OK**
	Parameters See Write Command
Write Command **AT+CHTTPDISCON=<httpclient_id>**	Response **OK** or **ERROR**
	Parameters <**httpclient_id**> The indicator of http client instance created by the AT+CHTTPCREATE command.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● **AT+CHTTPCON** should be set before this command

6.2.4 AT+CHTTPDESTROY Destroy the HTTP/HTTPS client instance

AT+CHTTPDESTROY Destroy the HTTP/HTTPS client instance **Use the created http instance to disconnect the connection with host.**	
Test Command **AT+CHTTPDESTROY=?**	Response **+CHTTPDESTROY: (0-4)** **OK**
	Parameters

	See Write Command
Read Command **AT+CHTTPDESTROY?**	Response **+CHTTPDESTROY: <httpclient_id>,<state>,<host>[<CR><LF>** **+CHTTPDESTROY: <httpclient_id>,<state>,<host>** **[...]]** **OK**
	Parameters See Write Command
Write Command **AT+CHTTPDESTROY=<httpclient_id>**	Response **OK** or **ERROR**
	Parameters <**httpclient_id**> The indicator of http client instance created by the AT+CHTTPCREATE command. <**state**> The create state of the httpclient_id 1 sucessfully 0 Failed <**host**> Http server host
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● **AT+CHTTPCREATE** should be set before this command

6.2.5 AT+CHTTPSEND Send HTTP/HTTPS package

AT+CHTTPSEND Send HTTP/HTTPS package	
Test Command **AT+CHTTPSEND=?**	Response **+CHTTPSEND: (0-4),(0-3),"path","http header","http content type","http content"** **OK**
	Parameters See Write Command
Write Command **AT+CHTTPSEND=<httpclient_id>,<method>,<path>,<customer_header>,<content_t**	Response **OK** or **ERROR**
	Parameters

ype>,<content_string>	<**httpclient_id**> The indicator of http client instance created by the AT+CHTTPCREATE command. <**method**> Http method, HTTPCLIENT_GET = 0, HTTPCLIENT_POST = 1, HTTPCLIENT_PUT = 2, HTTPCLIENT_DELETE =3 <**path**> The resource path on server, ex. "/html/login/index.html" means the url full path is "<host>/html/login/index.html" <**customer_header**> The string converted from customer header hex data. <**content_type**> A string indicate the content type of the content, if the method is not POST and PUT, it must be empty. <**content_string**> The string converted from content hex data.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● **AT+CHTTPCON** should be set before this command

6.2.6 +CHTTPNMIH Header of the response from host

+CHTTPNMIH Header of the response from host	
The response from host have 2 parts. This is the header part and content part will follow this URC.	
	Response **+CHTTPNMIH:** **<httpclient_id>,<flag>,<header_max_length>,<header>**
	Parameters <**httpclient_id**> The indicator of http client instance created by the AT+CHTTPCREATE command <**flag**> The flag to indicate if there are more data of the HTTP header <**header_max_length**> The maximum length (buffer size) of the header string <**header**> header data of response

6.2.7 +CHTTPNMIC Content of the response from host

+CHTTPNMIC Content of the response from host	
The response from host have 2 parts. This is the content part and follow by the header part URC. And there are multi content URC follow one header URC.	
	Response **+CHTTPNMIC:**

	<httpclient_id>,<flag>,<total_length><content_packge_len>,<content_package_string>
	Parameters <**httpclient_id**> The indicator of http client instance created by the AT+CHTTPCREATE command <**flag**> The flag to indicate if there are more data of the HTTP header <**total_length**> The total length of the content. It is get from header "Content-Length : xxx", so if the response is not 200 OK, maybe the value is -1 <**content_packge_len**> content data length of current URC <**content_package_string**> Content data string which is converted from content hex data.The length must be original content hex data size * 2

6.2.8 +CHTTPERR HTTP client connection error indicator

+CHTTPERR HTTP client connection error indicator	
When the URC send, there is some error happen on the http client. Normally is TCP connection is disconnected.	
	Response **+CHTTPERR: <httpclient_id>[,<error_code>]**
	Parameters **<httpclient_id>** The indicator of http client instance created by the AT+CHTTPCREATE command **<error_code>** normally is -1, means disconnected -2 Connection was closed by a remote host. -3 An unknown error occurred. -4 A protocol error occurred. -5 Could not resolve the hostname. -6 A URL parse error occurred. If the URC send out, the HTTP client will be disconnected automatically. If user want to send HTTP message to server, he must use AT+CHTTPCON command to connect.

7 AT Commands for PING Support

7.1 Overview of AT Commands for PING Support

Command	Description
AT+CIPPING	Test IP network connectivity to a remote host

7.2 Detailed Descriptions of AT Commands for PING Support

7.2.1 AT+CIPPING Test IP network connectivity to a remote host

AT+CIPPING Test IP network connectivity to a remote hos	
Test Command **AT+CIPPING=?**	Response **+CIPPING: (**list of supported **<retryNum>**s**),(**list of supported <**dataLen**>s**),(**list of supported <**timeout**>s**)** **OK**
	Parameters See Write Command
Read Command **AT+CIPPING?**	Response **+CIPPING: <retryNum>,<dataLen>,<timeout>** OK
	Parameters See Write Command
Write Command **AT+CIPPING=<IPaddr>[,<retryNum>[,<dataLen>[,<timeout>]]]**	Response **OK** **+CIPPING**: **<replyId>,<Ip Address>,<replyTime>,<ttl>[<CR><LF>** **+CIPPING**: **<replyId>,<Ip Address>,<replyTime>,<ttl>** **[...]]** or **ERROR** or **+CME ERROR: <err>**
	Parameters <**IPaddr**> Address of the remote host,string type.This parameter can be either: - IP address in the format:"xxx.xxx.xxx.xxx"

	- Host name solved by a DNS query **<retryNum>** The number of Ping Echo Requset to send 1-100 Default: 4 **<dataLen>** The length of Ping Echo Request data 0-1024 Default: 32 <**timeout**> The timeout,in units of 100 ms,waiting for a single Echo Reply 1-600 Default: 100(10 seconds) <**replyId**> Echo Reply number <**IP Address**> IP Address of the remote host <**replyTime**> Time,in units of 100 ms, required to receive the Response <**ttl**> Time to live
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● Before sending PING Request the PDP context must be activated. ● When the Echo Request timeout expires (no reply received on time), the response will contains **<replyTime>** setting to 100(default timeout)

8 AT Commands for Network Command – LwM2M

8.1 Overview of AT Commands for Network Command – LwM2M

Command	Description
AT+CLMCONF	Configuration LwM2M instance and create the connection
AT+CLMADDOBJ	Add LwM2M object
AT+CLMDELOBJ	Delete LwM2M object
AT+CLMREAD	Read notification and command
AT+CLMWRITE	Write notification and command
AT+CLMEXECUTE	Execute notification and command
AT+CLMNOTIFY	Notify data change
AT+CLMDEL	Delete LwM2M instance
+CLMOBSERVE	Observed command
+CLMPARAMETER	Observed command
+CLMERR	Indicated there is some error

8.2 Detailed Descriptions of AT Commands for Network Command – LwM2M

8.2.1 AT+CLMCONF Configuration LwM2M instance and create the connection

AT+CLMCONF Configuration LwM2M instance and create the connection	
Write Command **AT+CLMCONF=<configuration>[,<cid>]**	Response **+CLMCONF: <lwm2m_id>** **OK**
	Parameters **<size>** integer, configuration file size **<configuration>** string (TLV), configuration file. **<cid>** Integer, PDP context ID, AT+CSGACT response. [option]
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

8.2.2 AT+CLMADDOBJ Add LwM2M object

AT+CLMADDOBJ Add LwM2M object	
Write Command **AT+CLMADDOBJ=<lwm2m_id>,<object_id>,<instance_id>,<resource_count>,<resource_id>,<resource_id>,…**	Response **OK** Parameters **<lwm2m_id>** Integer, LwM2M id, AT+CLMCONF's response. **<object_id>** Integer, object id. **<instance_id>** Integer, instance id <**resource_count**> Integer, resource count. <**resource_id**> Integer, resource id
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● AT+CLMCONF should be set before this command.

8.2.3 AT+CLMDELOBJ Delete LwM2M object

AT+CLMDELOBJ Delete LwM2M object	
Write Command **AT+CLMDELOBJ=<lwm2m_id>,<object_id>**	Response **OK** Parameters **<lwm2m_id>** Integer, LwM2M id, AT+CLMCONF's response. **<object_id>** Integer, object id.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● AT+CLMADDOBJ should be set before this command.

8.2.4 AT+CLMREAD Read notification and command

AT+CLMREAD Read notification and command	
Write Command **AT+CLMREAD=<lwm2m_id>,<object_id>,<instance_id>,<resource_cnt>,<resource**	Response This command used to indicated there is received a read operation. And then using this command to send the read operation result. **OK** **+CLMREAD:**

_id>,<value_type>,<len>,<value>,<resource_id>,<value_type>,<len>,<value>,<resource_id>,<value_type>,<len>,<value>,…	**<lwm2m_id>,<object_id>,<instance_id>,<count>,<resource_id>,<resource_id>,<resource_id>**
	Parameters **<lwm2m_id>** Integer, LwM2M id, AT+CLMCONF's response. **<object_id>** Integer, object id. **<instance_id>** Integer, instance id. **<resource_cnt>** Integer, if it is 0, means all readable resources of the instance. **<resource_id>** Integer, if count is 0, the resource id is not exsit. **<value_type>** Char, value type. I: Integer, F: Float, B: Boolean, D: UINT8 array data, S: String **<len>** Integer, value length. **<value>** Value type, value context.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

8.2.5 AT+CLMWRITE Write notification and command

AT+CLMWRITE Write notification and command	
Write Command **AT+CLMWRITE=<lwm2m_id>,<result>**	Response This command used to indicated there is received a write operation. And then using this command to send the write operation result. **OK** **+CLMWRITE:** **<lwm2m_id>,<object_id>,<instance_id>,<resource_cnt>,<resource_id>,<value_type>,<len>,<value>,<resource_id>,<value_type>,<len>,<value>,<resource_id>,<value_type>,<len>,<value>,...**
	Parameters **<lwm2m_id>** Integer, LwM2M id, AT+CLMCONF's response. <**result**> Integer, write result, result of write command, error code. 0 is success, other value is error code in Spec. **<object_id>** integer, object id. **<instance_id>** integer, instance id. <**resource cnt**> integer, if resource_id == -1, there will be set count. <**resource_id**> integer, resource id, -1: all of resource about the instance. <**value_type**> char, value type. I: Integer, F: Float, B: Boolean, D: UINT8 array data, S: String <**len**> integer, value length.

	<**value**> value type, value context.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

8.2.6 AT+CLMEXECUTE Execute notification and command

AT+CLMEXECUTE Execute notification and command	
Write Command **AT+CLMEXECUTE=<lwm2m_id>,<result>**	Response This command used to indicated there is received a execute operation. And then using this command to send the execute operation result. **OK** **+CLMEXECUTE: <lwm2m_id>,<object_id>,<instance_id>,<resource_id>,<len>,<buffer>**
	Parameters **<lwm2m_id>** Integer, LwM2M id, AT+CLMCONF's response. <**result**> Integer, result of write command, error code. 0 is success, other value is error code in Spec. **<object_id>** integer, object id. **<instance_id>** integer, instance id. <**resource_id**> integer, resource id, -1: all of resource about the instance. <**len**> integer, data size. <**buffer**> raw data in hex value but char format, execute command.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

8.2.7 AT+CLMNOTIFY Notify data change

AT+CLMNOTIFY Notify data change	
Write Command **AT+CLMNOTIFY=<lwm2m_id>,<object_id>,<instance_id>,<resource_id>**	Response **OK**
	Parameters <**lwm2m_id**> Integer, LwM2M id, AT+CLMCONF's response <**object_id**> Integer, object id <**instance_id**> Integer, instance id

	<**resource_id**> Integer, resource id
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

8.2.8 AT+CLMDEL Delete LwM2M instance

AT+CLMDEL Delete LwM2M instance	
Write Command **AT+CLMDEL=<lwm2m_id>**	Response **OK**
	Parameters <**lwm2m_id**> Integer, LwM2M id, AT+CLMCONF's response
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● AT+CLMCONF should be set before this command.

8.2.9 +CLMOBSERVE Observed command

+CLMOBSERVE Observed command	
This command used to indicated there is received a observe command.	
	Response **+CLMOBSERVE:** **<lwm2m_id>,<code>,<object_id>[,<instance_id>],<resource_id>**
	Parameters **<lwm2m_id>** integer, LwM2M id, AT+CLMCONF's response. <**code**> integer, 0 - add observe, 1 - cancel observe. **<object_id>** integer, object id. **<instance_id>** integer, instance id, -1: all of instances of the object. <**resource_id**> integer, resource id, -1: all of resource about the instance.

8.2.10 +CLMPARAMETER Observed command

+CLMPARAMETER Observed command	
This command used to indicated there is received an observer's parameter command.	
	Response **+CLMPARAMETER:** **<lwm2m_id>,<object_id>,<instance_id>,<resource_id>,<toSet>,<toCl**

	ear>,<minPeriod>,<maxPeriod>,<greaterThan>,<lessThan>,<step>
	Parameters <**lwm2m_id**> AT+CLMCONF result <**object_id**> object id <**instance_id**> instance id; -1:all of instances and resources <**resource_id**> resource id; -1: all of resource about the instance <**toSet**> toSet value, interger <**toClear**> toClear value, interger <**minPeriod**> min Period interger <**maxPeriod**> max Period interger <**greaterThan**> greater than, float <**lessThan**> less than, float <**step**> step, float

8.2.11 +CLMERR Indicated there is some error

+CLMERR Indicated there is some error	
This command Indicated there is some error.	
	Response **+CLMERR: <lwm2m_id>,<error_code>**
	Parameters <**lwm2m_id**> Integer, LwM2M id, AT+CLMCONF's response. <**error_code**> Integer, error code. 1 Reset by peer point. 2 Network disconnect.

9 AT Commands for Network Command – MQTT

9.1 Overview of AT Commands for Network Command-MQTT

Command	Description
AT+CMQNEW	New MQTT
AT+CMQCON	Send MQTT connection packet
AT+CMQDISCON	Disconnect MQTT
AT+CMQSUB	Send MQTT subscribe packet
AT+CMQUNSUB	Send MQTT unsubscribe packet
AT+CMQPUB	Send MQTT publish packet

9.2 Detailed Descriptions of AT Commands for Network Command-MQTT

9.2.1 AT+CMQNEW New MQTT

AT+CMQNEW	**New MQTT**
Test Command **AT+CMQNEW=?**	Response **+CMQNEW: "server","port",** (list of supported **<command_timeout_ms>**s**),** (list of supported **<bufsize>**s**)** **OK**
	Parameters See Write Command
Read Command **AT+CMQNEW?**	Response **+CMQNEW: <mqtt_id>, <used_state>,<server>** **OK**
	Parameters See Write Command
Write Command **AT+CMQNEW=<server>,<port>,<command_timeout_ms>,<bufsize>[,<cid>]**	Response **+CMQNEW: <mqtt_id>** **OK**
	Parameters <**mqtt_id**> Integer, MQTT id, from 0 to 4 <**used_state**> The used result of mqtt_id,0 not used,1 used. <**server**> String, null or MQTT server IP address

	<**port**> String, MQTT server port. <**command_timeout_ms**> Integer, AT command timeout (ms) <**bufsize**> Integer, send buffer and read buffer size <**cid**> Integer, PDP context ID, AT+CSGACT response. [option]
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

9.2.2 AT+CMQCON Send MQTT connection packet

AT+CMQCON Send MQTT connection packet	
Test Command **AT+CMQCON=?**	Response **+CMQCON: <mqtt_id>,<version>,<client_id>,<keepalive_interval>,<cleansession>,<will_flag>** **OK**
	Parameters See Write Command
Read Command **AT+CMQCON?**	Response **+CMQCON: <mqtt_id>, <connected_state>,<server>** **OK**
	Parameters See Write Command
Write Command **AT+CMQCON=<mqtt_id>,<version>,<client_id>,<keepalive_interval>,<cleansession>,<will_flag>[,<will_options>][,<username>,<password>]**	Response **OK**
	Parameters <**mqtt_id**> Integer, MQTT id, AT+CMQNEW's response.from 0 to 4 <**connected_state**> The conneted result of mqtt_id,0 not connected, 1 connected. <**server**> String, null(not connect) or MQTT server IP address <**version**> Integer , MQTT version, can be 3 or 4 <**client_id**> String, client ID, should be unique <**keepalive_interval**> Integer , keep alive interval, don't suggest to set it to a small value because server may disconnect the device for some reason <**cleansession**> Integer , clean session, can be 0 or 1 <**will_flag**> Integer , will flag, can be 0 or 1 <**will_options**> String, will options, mandatory if will_flag is 1, the format is as follows:

	topic=xxx,QoS=xxx,retained=xxx,message_len=xxx,message=xxx <**username**> String , user name (option) <**password**> String , password (option)
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● **AT+CMQNEW** should be set before this command.

9.2.3 AT+CMQDISCON Disconnect MQTT

AT+CMQDISCON Disconnect MQTT	
Test Command **AT+CMQDISCON=?**	Response **+CMQDISCON: <mqtt_id>** **OK**
	Parameters See Write Command
Write Command **AT+CMQDISCON=<mqtt_id>**	Response This command is used to receive MQTT disconnect indication. This is probably because the MQTT server has disconnected the device for some reasons. **OK** **+CMQDISCON: <mqtt_id>**
	Parameters <**mqtt_id**> Integer, MQTT id, AT+CMQNEW's response.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note ● **AT+CMQCON** should be set before this command.

9.2.4 AT+CMQSUB Send MQTT subscribe packet

AT+CMQSUB Send MQTT subscribe packet	
Test Command **AT+CMQSUB=?**	Response **+CMQSUB: <mqtt_id>,<topic>,<QoS>** **OK**
	Parameters

	See Write Command
Write Command **AT+CMQSUB=<mqtt_id>,<topic>,<QoS>**	Response **OK**
	Parameters <**mqtt_id**> Integer, MQTT id, AT+CMQNEW's response. <**topic**> String, topic of subscribe message. <**Qos**> Integer, message QoS, can be 0, 1 or 2.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

9.2.5 AT+CMQUNSUB Send MQTT unsubscribe packet

AT+CMQUNSUB Send MQTT unsubscribe packet	
Test Command **AT+CMQUNSUB=?**	Response **+CMQUNSUB: <mqtt_id>,<topic>** **OK**
	Parameters See Write Command
Write Command **AT+CMQUNSUB=<mqtt_id>,<topic>**	Response **OK**
	Parameters <**mqtt_id**> Integer, MQTT id, AT+CMQNEW's response. <**topic**> String, topic of subscribe message.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

9.2.6 AT+CMQPUB Send MQTT publish packet

AT+CMQPUB Send MQTT publish packet t	
Test Command **AT+CMQPUB=?**	Response **+CMQPUB:** **<mqtt_id>,<topic>,<QoS>,<retained>,<dup>,<message_len>,<message>**

	OK
	Parameters See Write Command
Write Command **AT+CMQPUB=<mqtt_id>,<topic>,<QoS>,<retained>,<dup>,<message_len>,<message>**	Response **OK** **+CMQPUB:** **<mqtt_id>,<topic>,<QoS>,<retained>,<dup>,<message_len>,<message>**
	Parameters <**mqtt_id**> Integer, MQTT id, AT+CMQNEW's response. <**topic**> String, topic of publish message. <**Qos**> Integer, message QoS, can be 0, 1 or 2. <**retained**> Integer, retained flag, can be 0 or 1. <**dup**> Integer, duplicate flag, can be 0 or 1. <**message_len**> Integer, length of publish message. <**message**> String, publish message.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

10 AT Commands for Network Command – CoAP

10.1 Overview of AT Commands for Network Command-CoAP

Command	Description
AT+CCOAPSTA	Start CoAP server
AT+CCOAPNEW	Create a CoAP client instance
AT+CCOAPSEND	Send data to CoAP server with the created CoAP client instance.
AT+CCOAPDEL	Destory the CoAP client instance
+CCOAPNMI	Content from CoAP server

10.2 Detailed Descriptions of AT Commands for Network Command-CoAP

10.2.1 AT+CCOAPSTA Start CoAP server

AT+CCOAPSTA Start Coap server	
Write Command **AT+CCOAPSTA=<ip_addr>,<port>,<cid>**	Response **+CCOAPSTA: <coap_id>** **OK**
	Parameters <**ip_addr**> String, CoAP server IP address. <**port**> Integer, CoAP server port(spec default 5683). <**cid**> Integer, PDP context ID, AT+CSGACT response. <**coap_id**> Integer, CoAP server instance id created by the command.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

10.2.2 AT+CCOAPNEW Create a CoAP client instance

AT+CCOAPNEW Create CoAP client	
Write Command **AT+CCOAPNEW=<ip_addr>,<port>,<cid>**	Response **+CCOAPNEW: <coap_id>** **OK**

	Parameters <**ip_addr**> String, CoAP server IP address. <**port**> Integer, CoAP server port(spec default 5683). <**cid**> Integer, PDP context ID, AT+CSGACT response. <**coap_id**> Integer, CoAP client instance id created by the command.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

10.2.3 AT+CCOAPSEND Send CoAP data

AT+CCOAPSEND Send CoAP data	
Write Command **AT+CCOAPSEND=<coap_id>,<data_len>,<data>**	Response **OK**
	Parameters <**coap_id**> Integer, CoAP client instance id created by the AT+CCOAPNEW command. <**data_len**> Integer, Send data length(by byte). <**data**> String, the hex data streaming.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note AT+CCOAPNEW should be set before this command.

10.2.4 AT+CCOAPDEL Destory the CoAP client instance

AT+CCOAPDEL Free created CoAP client instance	
Write Command **AT+CCOAPDEL=<coap_id>**	Response **OK**
	Parameters <**coap_id**> Integer, CoAP client instance id created by the AT+CCOAPNEW command.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note AT+CCOAPNEW should be set before this command.

10.2.5 +CCOAPNMI Content from CoAP server

+CCOAPNMI	**Indicate content from CoAP server**
Write Command **+CCOAPNMI**	Response **+CCOAPNMI: <coap_id>,<data_len>,<data>**
	Parameters <**coap_id**> Integer, CoAP client instance id created by the AT+CCOAPNEW command. <**data_len**> Integer, data length(by byte). <**data**> String, the hex data streaming.

11 AT Commands for Network Command – SNTP

11.1 Overview of AT Commands for Network Command-SNTP

Command	Description
AT+CSNTPSTART	Start to query network time
AT+CSNTPSTOP	Stop querying network time
+CSNTP	Received network time.

11.2 Detailed Descriptions of AT Commands for Network Command-SNTP

11.2.1 AT+CSNTPSTART Start to query network time

AT+CSNTPSTART Start to query network time	
Write Command **AT+CSNTPSTART =<url>**	Response **OK**
	Parameters <**url**> A string of SNTP server name or IP address.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

11.2.2 AT+CSNTPSTOP Stop querying network time

AT+CSNTPSTOP Stop querying network time	
Write Command **AT+CSNTPSTOP**	Response **OK**
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

11.2.3 +CSNTP Received network time

+CSNTP Received network time	
Indicated there is received some data from network.	
	Response **+CSNTP:** **<year>,<month>,<day>,<hour>,<minute>,<second>,<millisecond>**
	Parameters **<year>** Year **<month>** Month **<day>** Day **<hour>** Hour **<minute>** Minute **<second>** Second **<millisecond>** Millisecond

12 AT Commands for Network Command – TLS

12.1 Overview of AT Commands for Network Command- TLS

Command	Description
AT+CTLSCFG	Configure TLS parameters
AT+CTLSONN	Create a TLS connection
AT+CTLSCLOSE	Close a TLS connection.
AT+CTLSSEND	Send data
AT+CTLSRECV	Receive data.

12.2 Detailed Descriptions of AT Commands for Network Command-TLS

12.2.1 AT+CTLSCFG Configure TLS parameters

AT+CTLSCFG Configure TLS parameters	
Write Command **AT+CTLSCFG=<tid>,<type>,<value>[,<type>,<value>[,<type>,<value>[…]]]**	Response **OK** Parameters <**tid**> Integer type.It is the identifier of the TLS connection to be created. <**type**> Integer type.It is the type of the parameter to be configured. 1 Server name (string); 2 Port (int, default value is 443); 3 Socket type (0-tcp, tcp supported only, default value is 0); 4 Auth_mode (int, 0-none, 1-optional, 2-required, default value is 2); 5 Debug level (int, 0~4, 0-no log, 4-all log enabled, default value is 0); 6 Server CA (<size><more><certificate>, size (int)-total size of the certificate without the terminate null; more(int)-is there more certificate content needed to be sent, 1-yes, 0-no; certificate (string)-the total or particial of the certificate content. default value for type 6 is null); 7 Client certificate (same as 6-server CA, default value for type 7 is null); 8 Client private key (<size><more><private-key>, size and more is the same as 6-server CA, private-key (string)-the total or partical of the private-key, default value for type 8 is null) <**value**> Integer type.It is the value of the parameter to be configured.
Parameter Saving Mode	NO_SAVE

Max Response Time	-
Reference	Note

12.2.2 AT+CTLSONN Create a TLS connection

AT+CTLSONN Create a TLS connection	
Write Command **AT+CTLSONN=<tid>,<cid>**	Response **OK** **+CTLSONN: <tid>,<ret>**
	Parameters <**tid**> Integer type. It is the identifier of the TLS connection to be created.It shoud be the same as the one in CTLSCFG. <**cid**> Integer type.It is a numeric parameter specifying a particular PDP context returned by CSGACT. <**ret**> Integer type.It tells the result of the TLS connection.If the connection succeeds, it is 1.Otherwise,it is the error code.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

12.2.3 AT+CTLSCLOSE Close a TLS connection

AT+CTLSCLOSE Close a TLS connection	
Write Command **AT+CTLSCLOSE=<tid>**	Response **OK** **+CTLSCLOSE: <tid>,<ret>**
	Parameters <**tid**> Integer type.It is the identifier of the TLS connection to be created.It shoud be the same as the one in ETLSCFG. <**cid**> integer type.It is a numeric parameter specifying a particular PDP context returned by CSGACT. <**ret**> integer type.It tells the result of the TLS connection closure.If the closure succeeds, it is 1.Otherwise, it is the error code.
Parameter Saving Mode	NO_SAVE
Max Response	-

Time	
Reference	Note

12.2.4 AT+CTLSSEND Send data

AT+CTLSSEND Send data	
Write Command **AT+CTLSSEND=<tid>,<data_len>,<data>[,<encod_method>]**	Response **OK** **+CTLSSEND: <tid>,<ret>** Parameters <**tid**> Integer type.It is the identifier of the TLS connection to be created.It shoud be the same as the one in CTLSCFG. <**data_len**> Integer type.It is the length of the encoded <data>. <**data**> It is the length of the encoded <data>. <**encod_method**> Integer type.It is the encode method used for <data>. 801 is for string encoding and it is the default value which can be omitted. 802 is for hex encoding. And 803 is for base64 encoding. <**ret**> Integer type.It tells the result of the data sending.If it is greater than 0, it is the actual number of data send.Otherwise, it is the error code.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

12.2.5 AT+CTLSRECV Receive data

AT+CTLSRECV Send data	
Write Command **AT+CTLSRECV=<tid>,<max_num>[,<encod_method>]**	Response **OK** **+CTLSRECV: <tid>,<ret>[,<data>[,<encode_method>]]** Parameters <**tid**> Integer type. It is the identifier of the TLS connection to be created.It shoud be the same as the one in ETLSCFG. <**max_num**> Integer type. It is the maximum number of plain data without encoding that could be received. <**encod_method**> Integer type. It is the encode method used for <data>.801 is for string encoding and it is the default value which can be omitted. 802 is for hex encoding. And 803 is for base64 encoding.

	<**ret**> Integer type.If it is greater than 0, it is the length of data received after encoding .Otherwise, it is the error code. <**data**> It is the data received with encoding.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

13 AT Commands for Network Command –OneNET

13.1 Overview of AT Commands for Network Command- OneNet

Command	Description
AT+MIPLCREATE	Create a OneNET instance
AT+MIPLDELETE	Delete a OneNET instance
AT+MIPLOPEN	Register to OneNET.
AT+MIPLCLOSE	Deregister to OneNET
AT+MIPLADDOBJ	Add an object
AT+MIPLDELOBJ	Delete an object
AT+MIPLUPDATE	Update registration
AT+MIPLREADRSP	Read response from user
AT+MIPLWRITERSP	Write response from user
AT+MIPLEXECUTERSP	Execute response from user
AT+MIPLOBSERVERSP	Observe response from user
AT+MIPLDISCOVERRSP	Discover response from user
AT+MIPLPARAMETERRSP	Set parameter from to user
AT+MIPLNOTIFY	Notify data value change from user
AT+MIPLVER	Read version
+MIPLREAD	Read request to user
+MIPLWRITE	Write request to user
+MIPLEXECUTE	Execute request to user
+MIPLOBSERVE	Observe request to user
+MIPLDISCOVER	Discover request to user
+MIPLPARAMETER	Set parameter request to user
+MIPEVENT	Event indication to user

13.2 Detailed Descriptions of AT Commands for Network Command-OneNet

13.2.1 AT+MIPLCREATE Create a OneNET instance

AT+MIPLCREATE Create a OneNET instance	
Test Command **AT+MIPLCREATE =?**	Response **+MIPLCREATE:** (list of supported **<totalsize>),**(list of supported **<config>),**(list of supported **<index>),**(list of supported **<currentsize>),(0-2)** **OK**
	Parameters See Write Command
Read Command **AT+MIPLCREATE?**	Response **+MIPLCREATE: <ref>,<used_state>** **OK**
	Parameters See Write Command
Write Command **AT+MIPLCREATE =<totalsize>, <config>,<index>, <currentsize>, <flag>**	Response **OK** --message received correctly if index not equals to 0 **<ref>** --message received correctly and return OneNET instance **+CIS ERROR: <errid>**
	Parameters <**totalsize**> Integer, configuration file total size <**config**> Hex string, configuration file, ex: 130033f1…… <**index**> Integer, configuration file index, from N-1 to 0 <**currentsize**> Integer, configuration file size in current AT command <**flag**> Integer, message flag --1 first message; 2 middle message; 0 last message **<used_state>** The used result of AT+MIPLCREATE 0 not used; 1 used <**errid**> 651 Memory error 652 Paramter error 653 Unsupported format 654 SDK error 655 Not find
Parameter Saving Mode	NO_SAVE
Max Response	-

Time	
Reference	

13.2.2 AT+MIPLDELETE Delete a OneNET instance

AT+MIPLDELETE Delete a OneNET instance	
Test Command **AT+MIPLDELETE=?**	Response **+MIPLDELETE:** (list of supported **<ref>)** **OK**
	Parameters See Write Command
Read Command **AT+MIPLDELETE?**	Response **+MIPLDELETE: <ref>,<used_state>** **OK**
	Parameters See Write Command
Write Command **AT+MIPLDELETE=<ref>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters <**ref**> integer, OneNET instance returned by AT+MIPLCREATE **<used_state>** The used result of <**ref**> 0 not used; 1 used
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.3 AT+MIPLOPEN Register to OneNET.

AT+MIPLOPEN Register to OneNET	
Test Command **AT+MIPLOPEN=?**	Response **+MIPLOPEN:** (list of supported <**ref**>),(list of supported < **lifetime** >),(list of supported <**param** >) **OK**
	Parameters See Write Command
Read Command **AT+MIPLOPEN?**	Response **+MIPLOPEN: <ref >,<connected_state>** **OK**

	Parameters See Write Command
Write Command **AT+MIPLOPEN=<ref>,<lifetime>[,< param >]**	Response **OK** **+CIS ERROR: <errid>**
	Parameters <**ref**> Integer, OneNET instance returned by AT+MIPLCREATE <**lifetime**> Integer, lifetime to register ONENET server <**param**> Reserved **<connected_state>** The connected result of AT+MIPLOPEN 0 not connected; 1 connected
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.4 AT+MIPLCLOSE Deregister to OneNET.

AT+MIPLCLOSE Deregister to OneNET	
Test Command **AT+MIPLCLOSE=?**	Response **+MIPLCLOSE:** (list of supported **<ref >)** **OK**
	Parameters See Write Command
Read Command **AT+MIPLCLOSE?**	Response **+MIPLCLOSE: <ref >,<connected_state>** **OK**
	Parameters See Write Command
Write Command **AT+MIPLCLOSE=<ref>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters <**ref**> Integer, OneNET instance returned by AT+MIPLCREATE **<connected_state>** The connected result of < **ref** > 0 not connected; 1 connected
Parameter Saving Mode	NO_SAVE

Max Response Time	-
Reference	

13.2.5 AT+MIPLADDOBJ Add an object

AT+MIPLADDOBJ Add an object	
Test Command **AT+MIPLADDOBJ=?**	Response **+MIPLADDOBJ:** (list of supported **<ref>),**(list of supported **<objectid >),**(list of supported **<instancecount>),**(list of supported **<instancebitmap >),**(list of supported **<attributecount>),**(list of supported **<actioncount>)** **OK**
	Parameters See Write Command
Write Command **AT+MIPLADDOBJ=<ref>,<objectid>,<instancecount>,<instancebitmap>,<attributecount>,<actioncount>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters <**ref**> integer, OneNET instance returned by AT+MIPLCREATE **<objectid>** integer, object id **<instancecount>** integer, instance count **<instancebitmap>** Binary string, instance bitmap, ex: “00101” (5 instances, only instance 1 & 3 are available) **<attributecount>** integer, attribute count(The Object that has read or write operation, has the attribute) **<actioncount>** integer, action count(The Object that has execute operation, has the action)
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.6 AT+MIPLDELOBJ Delete an object.

AT+MIPLDELOBJ Delete an object.	
Test Command **AT+MIPLDELOBJ =?**	Response **+MIPLDELOBJ:** (list of supported **<ref>),**(list of supported **<objectid >)** **OK**

	Parameters See Write Command
Write Command **AT+MIPLDELOBJ=<ref>,<objectid>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters <**ref**> integer, OneNET instance returned by AT+MIPLCREATE **<objectid>** integer, object id
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.7 AT+MIPLUPDATE Update registration

AT+MIPLUPDATE Update registration	
Test Command **AT+MIPLUPDATE=?**	Response **+MIPLUPDATE:** (list of supported **<ref>),**(list of supported < **lifetime >),(0-1)** **OK**
	Parameters See Write Command
Write Command **AT+MIPLUPDATE=<ref>,<lifetime>,<withObjectFlag>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters <**ref**> integer, OneNET instance returned by AT+MIPLCREATE **<lifetime>** integer, lifetime to update registration **<withObjectFlag>** integer, whether to update objects 0 not upate objects; 1 update objects
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.8 AT+MIPLREADRSP Read response from user

AT+MIPLREADRSP Read response from user

Test Command **AT+MIPLREADRSP=?**	Response **+MIPLREADRSP:** (list of supported **<ref>),**(list of supported **<msgid >),**(list of supported **<result>),** (list of supported **<objectid>),**(list of supported **<instanceid>),**(list of supported **<resourceid),**(1-5**),** (list of supported **<len>),**(list of supported **<value>),**(list of supported **<index>),(0-2)** **OK**
	Parameters See Write Command
Write Command **AT+MIPLREADRSP=<ref>,<msgid>,<result>[,<objectid>,<instanceid>,<resourceid>,<valuetype>,<len>,<value>,<index>,<flag>]**	Response **OK** **+CIS ERROR: <errid>**
	Parameters <**ref**> integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** integer, message id,the same to +MIPLREAD <**result**> integer, read result, 1 indicates read success, should provide read content in the same time 1 Read/Observe/Discover OK 2 Write/Execute/ Set parameter OK 11 400 Bad request 12 401 Unauthorized 13 404 Not Found 14 405 Method Not Allowed 15 406 Not Acceptable **<objectid>** integer, object id **<instanceid >** integer, instance id **<resourceid>** integer, resource id <**valuetype**> integer, read data value type -- 1 string; 2 opaque; 3 integer; 4 float; 5 bool **<len>** integer, read data length **<value>** integer, read data value **<index>** integer, message index, from N-1 to 0 **<flag>** integer, message flag -- 1 first message; 2 middle message; 0 last message
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.9 AT+MIPLWRITERSP Write response from user

AT+MIPLWRITERSP Write response from user	
Test Command **AT+MIPLWRITERSP=?**	Response **+MIPLWRITERSP:** (list of supported **<ref>),**(list of supported **<msgid >),**(list of supported **<result>)** **OK**
	Parameters See Write Command
Write Command **AT+MIPLWRITERSP=<ref>,<msgid>,<result>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters **<ref>** integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** integer, message id, the same to +MIPLWRITE **<result>** integer, write result, 2 indicates write success
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.10 AT+MIPLEXECUTERSP Execute response from user

AT+MIPLEXECUTERSP Execute response from user	
Test Command **AT+MIPLEXECUTERSP=?**	Response **+MIPLEXECUTERSP:** (list of supported **<ref>),**(list of supported **<msgid >),** (list of supported **<result>)** **OK**
	Parameters See Write Command
Write Command **AT+MIPLEXECUTERSP=<ref><msgid>,<result>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters **<ref>** integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** integer, message id, the same to +MIPLEXECUTE **<result>** integer, execute result, 2 indicates execute success
Parameter Saving	NO_SAVE

Mode	
Max Response Time	-
Reference	

13.2.11 AT+MIPLOBSERVERSP Observe response from user

AT+MIPLOBSERVERSP Observe response from user	
Test Command **AT+MIPLOBSERVERSP=?**	Response **+MIPLOBSERVERSP:** (list of supported **<ref>),**(list of supported **<msgid >),**(list of supported **<result>)** **OK**
	Parameters See Write Command
Write Command **AT+MIPLOBSERVERSP=<ref><msgid>,<result>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters **<ref>** integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** integer, message id, the same to +MIPLOBSERVE **<result>** integer, (cancel) observe result, 1 indicates (cancel) observe success
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.12 AT+MIPLDISCOVERRSP Discover response from user

AT+MIPLDISCOVERRSP Discover response from user	
Test Command **AT+MIPLDISCOVERRSP=?**	Response **+MIPLDISCOVERRSP:** (list of supported **<ref>),**(list of supported **<msgid >),**(list of supported **<result>),** (list of supported **<length>),**(list of supported **<valuestring>)** **OK**
	Parameters See Write Command
Write Command **AT+MIPLDISC**	Response **OK**

OVERRSP=<ref>,<msgid>,<result><length>,<valuestring>	**+CIS ERROR: <errid>**
	Parameters <**ref**> integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** integer, message id, the same to +MIPLDISCOVER <**result**> integer, discover result, 1 indicates discover success **<length>** integer, length of valuestring **<valuestring>** string, value string (attribute; attribute; …; attribute; action; …; action), must start with " and end with " attribute + action count in valuestring is the same to attributecount + actioncount in **AT+MIPLADDOBJ**
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.13 AT+MIPLPARAMETERRSP Set parameter from user

AT+MIPLPARAMETERRSP Set parameter from user	
Test Command **AT+MIPLPARAMETERRSP=?**	Response **+MIPLPARAMETERRSP:** (list of supported **<ref>),**(list of supported < **msgid** >**),**(list of supported **<result>)** **OK**
	Parameters See Write Command
Write Command **AT+MIPLPARAMETERRSP=<ref>,<msgid>,<result>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters <**ref**> Integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** Integer, message id, the same to +**MIPLPARAMETER** **<result>** Integer, set parameter result, 1 indicates set parameter success
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.14 AT+MIPLNOTIFY Notify data value change from user

AT+MIPLNOTIFY Notify data value change from user	
Test Command **AT+MIPLNOTIFY=?**	Response **+MIPLNOTIFY:** (list of supported **<ref>),**(list of supported **<msgid>),**(list of supported **<objectid>),**(list of supported **<instanceid>),**(list of supported **<resourceid>),**(1-5**),** (list of supported **<len>),**(list of supported **<value>),**(list of supported **<index>),(0-2)** **OK**
	Parameters See Write Command
Write Command **AT+MIPLNOTIFY=<ref>,<msgid>,<objectid>,<instanceid>,<resourceid>,<valuetype>,<len>,<value>,<index>,<flag>**	Response **OK** **+CIS ERROR: <errid>**
	Parameters <**ref**> Integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** Integer, message id **<objectid>** Integer, object id **<instanceid >** Integer, instance id **<resourceid>** Integer, resource id <**valuetype**> Integer, read data value type -- 1 string; 2 opaque; 3 integer; 4 float; 5 bool **<len>** Integer, write data length **<value>** Integer, write data value **<index>** Integer, message index, from N-1 to 0 **<flag>** Integer, message flag -- 1 first message; 2 middle message; 0 last message
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.15 AT+MIPLVER Read version

AT+MIPLVER Read version	
Read Command **AT+MIPLVER?**	Response <**version**> **OK**
	Parameters

	<**version** > Onenet version, such as 2.1.1
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	

13.2.16 +MIPLREAD Read request to user

+MIPLREAD Read request to user	
	Response **+MIPLREAD: <ref>, <msgid>, <objectid>, <instanceid>,<resourceid>**
	Parameters **<ref>** Integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** Integer, message id **<objectid >** Integer, object id **<instanceid>** Integer, instance id, read all resources of all instances of the object if instanceid equals -1 **<resourceid>** Integer, resource id, read all resources of the instance if resourceid equals -1

13.2.17 +MIPLWRITE Write request to user

+MIPLWRITE Write request to user	
	Response **+ MIPLWRITE: <ref>, <msgid>, <objectid>, <instanceid>, <resourceid>, <valuetype>, <len>, <value>, <flag>, <index>**
	Parameters **<ref>** Integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** Integer, message id **<objectid >** Integer, object id **<instanceid>** Integer, instance id **<resourceid>** Integer, resource id **<valuetype>** Integer, write data value type 1 string; 2 opaque; 3 integer; 4 float; 5 bool **<len>** Integer, write data length **<value>** Integer, write data value <**flag**> Integer, message flag 1 first message; 2 middle message; 0 last message <**index**> Integer, message index, from N-1 to 0

13.2.18 +MIPLEXECUTE Execute request to user

+MIPLEXECUTE Execute request to user	
	Response **+MIPLEXECUTE: <ref>, <msgid>, <objectid>, <instanceid>, <resourceid>[, <len>, <arguments>]**
	Parameters **<ref>** Integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** Integer, message id **<objectid >** Integer, object id **<instanceid>** Integer, instance id **<resourceid>** Integer, resource id **<len>** Integer, parameter length **<arguments>** String, parameter string

13.2.19 +MIPLOBSERVE Observe request to user

+MIPLOBSERVE Observe request to user	
	Response **+ MIPLOBSERVE: <ref>, <msgid>, <flag>,<objectid>, <instanceid>, [<resourceid>]**
	Parameters **<ref>** Integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** Integer, message id <**flag**> Integer, observe flag, 1 indicates observe, 0 indicates cancel observe **<objectid >** Integer, object id **<instanceid>** Integer, instance id, observe all resources of all instances of the object if instanceid equals -1 **<resourceid>** Integer, resource id, observe all resources of the instance if resourceid equals -1

13.2.20 +MIPLDISCOVER Discover request to user

+MIPLDISCOVER Discover request to user	
	Response **+MIPLDISCOVER: <ref>, <msgid>, <objectid>**
	Parameters **<ref>** Integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** Integer, message id

	<objectid > Integer, object id

13.2.21 +MIPLPARAMETER Set parameter request to user

+ MIPLPARAMETER Set parameter request to user	
	Response **+MIPLPARAMETER: <ref>, <msgid>, <objectid>, <instanceid>, <resourceid>, <len>, <parameter>**
	Parameters **<ref>** Integer, OneNET instance returned by AT+MIPLCREATE **<msgid>** Integer, message id **<objectid >** Integer, object id **<instanceid>** Integer, instance id, observe all resources of all instances of the object if instanceid equals -1 **<resourceid>** Integer, resource id, observe all resources of the instance if resourceid equals -1 <**len**> Integer, parameter length <**parameter** > String, parameter string, must start with "and end with" pmin=xxx; pmax=xxx; gt=xxx; lt=xxx; stp=xxx

13.2.22 +MIPEVENT Event indication to user

+MIPEVENT Event indication to user	
	Response **+ MIPEVENT: <ref>, <evtid>[,<extend>]**
	Parameters **<ref>** Integer, OneNET instance returned by AT+MIPLCREATE **<evtid>** Integer, event id 1 BOOTSTRAP_START 2 BOOTSTRAP_SUCCESS 3 BOOTSTRAP_FAILED 4 CONNECT_SUCCESS 5 CONNECT_FAILED 6 REG_SUCCESS 7 REG_FAILED 8 REG_TIMEOUT 9 LIFETIME_TIMEOUT 10 STATUS_HALT 11 UPDATE_SUCCESS 12 UPDATE_FAILED 13 UPDATE_TIMEOUT

	14 UPDATE_NEED 15 UNREG_DONE 20 RESPONSE_FAILED 21 RESPONSE_SUCCESS 25 NOTIFY_FAILED 26 NOTIFY_SUCCESS <**extend** > Integer, extend parameter The events of RESPONSE_FAILED and NOTIFY_FAILED can take msgid The events of UPDATE_NEED can take LIFETIME(unit is second)

14 AT Commands for DNS

14.1 Overview of AT Commands for DNS Command

Command	Description
AT+CDNSCFG	Configure Domain Name Server
AT+CDNSGIP	Query the IP Address of Given Domain Name

14.2 Detailed Descriptions of AT Commands for DNS Command

14.2.1 AT+CDNSCFG Configure Domain Name Server

AT+CDNSCFG	Configure Domain Name Server
Test Command **AT+CDNSCFG=?**	Response **+CDNSCFG: ("Primary DNS"),("Secondary DNS")** **OK**
	Parameters See Write Command
Read Command **AT+CDNSCFG?**	Response **PrimaryDns: <pri_dns>** **SecondaryDns: <sec_dns>** **OK**
	Parameter See Write Command
Write Command **AT+CDNSCFG=<pri_dns>[,<sec_dns>]**	Response **OK** **ERROR**
	Parameters **<pri_dns>** A string parameter which indicates the IP address of the primary domain name server. Default value is 208.67.222.222 or 218.4.4.4. **<sec_dns>** A string parameter which indicates the IP address of the secondary domain name server. Default value is 0.0.0.0.
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

14.2.2 AT+CDNSGIP Query the IP Address of Given Domain Name

AT+CDNSGIP	**Query the IP Address of Given Domain Name**
Test Command **AT+CDNSGIP=?**	Response **ERROR**
Write Command **AT+CDNSGIP=<domain name>**	Response **OK** **ERROR** If successful, return: **+CDNSGIP: <IP>** If fail, return: **ERROR**
	Parameters **<IP>** A string parameter which indicates the first IP address corresponding to the domain name
Parameter Saving Mode	NO_SAVE
Max Response Time	-
Reference	Note

15 Supported Unsolicited Result Codes

15.1 Summary of CME ERROR Codes

Final result code **+CME ERROR: <err>** indicates an error related to mobile equipment or network. The operation is similar to ERROR result code. None of the following commands in the same Command line is executed. Neither ERROR nor OK result code shall be returned.
<**err**> values used by common messaging commands:

Code of <err>	Meaning
0	phone failure

15.2 Summary of CMS ERROR Codes

Final result code **+CMS ERROR: <err>** indicates an error related to message service or network. The operation is similar to ERROR result code. None of the following commands in the same Command line is executed. Neither ERROR nor OK result code shall be returned.
<**err**> values used by common messaging commands:

Code of <err>	Meaning
1	Unassigned(unallocated) number

15.3 Summary of Unsolicited Result Codes

URC	Description	AT Command
*MATREADY: 1		

16 AT Commands Examples

16.1 CoAP command

Demonstration	Syntax	Expect Result
Start CoAP server	AT+CCOAPSTA="10.161.11.104",5683,1	+CCOAPSTA:6 OK
Create CoAP client and get CoAP client ID	AT+CCOAPNEW="10.161.11.104",5683,1	+CCOAPNEW:1 OK
Get CoAP server counter	AT+CCOAPSEND=1,12,"400141C7B7636F756E746572"	OK
Nnotify CoAP server counter "024" via URC		+CCOAPNMI: 1,11,"60457233c02105ff303234"

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