

BG77xA-GL&BG95xA-GL

AT Commands Manual

LPWA Module Series

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About the Document

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1 Introduction

1.1. Scope of the Document

This document presents the AT commands set supported by Quectel BG77xA-GL and BG95xA-GL modules.

Table 1: Applicable Modules

Module Series	Model
BG77xA-GL	BG770A-GL
	BG772A-GL
BG95xA-GL	BG950A-GL
	BG951A-GL
	BG952A-GL

1.2. Special Mark

Table 2: Special Mark

Mark	Definition
*	Unless otherwise specified, when an asterisk (*) is used after a function, feature, interface, pin name, command, or argument, it indicates that the function, feature, interface, pin, AT command, or argument is under development and currently not supported; and the asterisk (*) after a model indicates that the sample of the model is currently unavailable.

1.3. Definitions

- **<CR>** Carriage return character.
- **<LF>** Line feed character.
- **<...>** Parameter name. Angle brackets do not appear on the command line.
- **[...]** Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on the command line. When an optional parameter is not given in a command, the new value equals its previous value or the default settings, unless otherwise specified.
- **Underline** Default setting of a parameter.

1.4. AT Command Syntax

All command lines must start with **AT** or **at** and end with **<CR>**. Information responses and result codes always start and end with a carriage return character and a line feed character: **<CR><LF><response><CR><LF>**. In tables presenting commands and responses throughout this document, only the commands and responses are presented, and **<CR>** and **<LF>** are deliberately omitted.

The AT command set implemented by the modules is a combination of *3GPP TS 27.007*, *3GPP TS 27.005* and *ITU-T recommendation V.25ter*, as well as the AT Commands developed by Quectel.

All these AT commands fall into three categories syntactically: “Basic”, “S parameter”, and “Extended”, as listed below:

- **Basic**

Basic command format is **AT<x><n>**, or **AT&<x><n>**, where **<x>** is the command, and **<n>** is/are the argument(s) of the command. For example, **ATE<n>** tells the DCE (Data Circuit-terminating Equipment) whether received characters should be echoed back to the DTE (Data Terminal Equipment) according to the value of **<n>**. **<n>** is optional and the default value will be used if it is omitted.

- **S Parameter**

S Parameter command format is **ATS<n>=<m>**, where **<n>** is the index of the **S** register to be set, and **<m>** is the value to be assigned to it.

- **Extended**

There are several types of extended commands as shown in the following table:

Table 3: Types of AT Commands

Command Type	Syntax	Description
Test Command	AT+<cmd>=?	Test the existence of the corresponding command and return information about the type, value, or range of its parameter.
Read Command	AT+<cmd>?	Check the current parameter value of the corresponding command.
Write Command	AT+<cmd>=<p1>[,<p2>[,<p3>[...]]]	Set user-definable parameter value.
Execution Command	AT+<cmd>	Return a specific information parameter or perform a specific action.

Multiple commands can be placed on a single line using a semi-colon (;) between commands. In such cases, only the first command should have **AT** prefix. Commands can be in upper or lower case.

Spaces should be ignored when you enter AT commands, except in the following cases:

- Within quoted strings, where spaces are preserved;
- Within an unquoted string or numeric parameter;
- Within an IP address;
- Within the AT command name up to and including a =, ? or =?.

On input, at least a carriage return is required. The carriage return (CR) value is defined by **ATS3** parameter and its factory default value is **13** (0x0D). The line feed (LF) parameter value is defined by **ATS4** parameter and its factory default value is **10** (0x0A).

If no command is entered after the **AT** token, **OK** will be returned. If an invalid command is entered, **ERROR** will be returned.

Optional parameters, unless explicitly stated, need to be provided up to the last parameter to be entered.

1.5. AT Command Responses

When the AT command processor has finished processing a line, it will output **OK**, **ERROR** or **+CME ERROR: <err>** to indicate that it is ready to accept a new command. Solicited informational responses are outputted before the final **OK**, **ERROR** or **+CME ERROR: <err>**.

Responses will be in the format of:

```
<CR><LF>+CMD:<space><parameters><CR><LF>
<CR><LF>OK<CR><LF>
```

Or

```
<CR><LF><parameters><CR><LF>  
<CR><LF>OK<CR><LF>
```

1.6. Supported Character Sets

The module AT command interface uses the GSM character set by default. The module supports the following character sets:

- GSM format
- UCS2
- IRA

The character set can be configured and interrogated with **AT+CSCS** (3GPP TS 27.007) and it is defined in 3GPP TS 27.005. The character set affects transmission and reception of SMS and SMS Cell Broadcast Messages, as well as the entry and display of phone book entry text fields.

1.7. AT Command Interface

The AT commands are implemented via main UART port. The main UART port supports AT command communication and data transfer.

1.8. Unsolicited Result Code

Unsolicited Result Code (URC) is a report message that is not issued in response to an executed AT command. URC is automatically issued by the module in response to a certain event. Typical URC triggering events include data server connection/disconnection, PSM response, (U)SIM detection, etc.

1.9. Turn-off Procedure

The safest and best way to turn off the module is to execute **AT+QPOWD** and then set PON_TRIG pin to 'low' state. This procedure is performed by letting the module log off from the network and allowing the software to enter a secure and safe data state before disconnecting power supply.

After setting the PON_TRIG to 'low' state, do not enter any other AT commands. The module outputs **POWERED DOWN** and set the STATUS pin low to enter power-off state. To avoid data loss, it is suggested to wait at least 10 s to disconnect the power supply after the STATUS pin is set low, the VDD_EXT goes low and the URC **POWERED DOWN** is outputted.

1.10. Declaration of AT Command Examples

The AT command examples in this document are provided to help you learn about the use of the AT commands introduced herein. The examples, however, should not be taken as Quectel's recommendations or suggestions about how to design a program flow or what status to set the module into. Sometimes multiple examples may be provided for one AT command. However, this does not mean that there is a correlation among these examples, or that they should be executed in a given sequence.

2 General Commands

2.1. ATI Display Product Identification Information

This command returns the product identification information.

ATI Display Product Identification Information	
Execution Command ATI	Response Quectel <objectID> Revision: <revision> OK
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<objectID>	String type. Product type identifier.
<revision>	String type. Identification information of product firmware version

Example

```
ATI
Quectel
BG770A-GL
Revision: BG770AGLAAR01A04

OK
```

2.2. AT+GMI Request Manufacturer Identification

This command returns the manufacturer identification. It is identical to **AT+CGMI** in *Chapter 2.5*.

AT+GMI Request Manufacturer Identification	
Test Command AT+GMI=?	Response OK
Execution Command AT+GMI	Response TA reports one or more lines of information text that permit the user to identify the manufacturer. Quectel OK
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

2.3. AT+GMM Request Model Identification

This command returns the product model identification. It is identical to **AT+CGMM** in *Chapter 2.6*.

AT+GMM Request Model Identification	
Test Command AT+GMM=?	Response OK
Execution Command AT+GMM	Response <objectID> OK
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<objectID>	String type. Product type identifier.
-------------------------	---------------------------------------

2.4. AT+GMR Request Firmware Version Identification

This command returns the product firmware version identification. It is identical to **AT+CGMR** in *Chapter 2.7*.

AT+GMR Request Firmware Version Identification	
Test Command AT+GMR=?	Response OK
Execution Command AT+GMR	Response TA reports one line of information text that permits the user to identify the firmware version. <revision> OK
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<revision>	String type. Identification information of product firmware version.
-------------------------	----------------------------------------------------------------------

Example

```
AT+GMR
BG770AGLAAR01A04
OK
```

2.5. AT+CGMI Request Manufacturer Identification

This command returns the manufacturer identification. It is identical to **AT+GMI** in *Chapter 2.2*.

AT+CGMI Request Manufacturer Identification	
Test Command AT+CGMI=?	Response OK
Execution Command	Response

AT+CGMI	Quectel
	OK
Maximum Response Time	300 ms
Characteristics	/
Reference	
3GPP TS 27.007	

2.6. AT+CGMM Request Model Identification

This command returns the product model identification. It is identical to **AT+GMM** in *Chapter 2.3*.

AT+CGMM Request Model Identification	
Test Command AT+CGMM=?	Response OK
Execution Command AT+CGMM	Response <objectID> OK
Maximum Response Time	300 ms
Characteristics	/
Reference	
3GPP TS 27.007	

Parameter

<objectID>	String type. Product model identifier.
------------	----------------------------------------

2.7. AT+CGMR Request Firmware Version Identification

This command returns the product firmware version. It is identical to **AT+GMR** in *Chapter 2.4*.

AT+CGMR Request Firmware Version Identification	
Test Command AT+CGMR=?	Response OK

Execution Command AT+CGMR	Response <revision> OK
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<revision> String type. Identification information of product firmware version.

2.8. AT+GSN Request International Mobile Equipment Identity (IMEI)

This command returns the International Mobile Equipment Identity (IMEI) number of the product in information text, which permits the user to identify the individual ME device. It is identical to **AT+CGSN** in *Chapter 2.9*.

AT+GSN Request International Mobile Equipment Identity (IMEI)	
Test Command AT+GSN=?	Response OK
Execution Command AT+GSN	Response <IMEI> OK
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<IMEI> IMEI number of ME.

NOTE

IMEI can be used to identify ME since it is unique to each ME.

2.9. AT+CGSN Request International Mobile Equipment Identity (IMEI)

This command returns the International Mobile Equipment Identity (IMEI) of ME. It is identical to **AT+GSN** above.

AT+CGSN Request International Mobile Equipment Identity (IMEI)	
Test Command AT+CGSN=?	Response OK
Execution Command AT+CGSN	Response <IMEI> OK
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<IMEI> String type. IMEI number of ME.

NOTE

IMEI can be used to identify ME since it is unique to each ME.

2.10. AT&F Reset All AT Command Settings to Factory Settings

This command resets the configuration parameters to their default values specified by the manufacturer. See **Table 25** for the list of supported AT command configurations restorable with **AT&F0**.

AT&F Reset All AT Command Settings to Factory Settings

Execution Command AT&F[<value>]	Response OK
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<value>	Integer type.
<u>0</u>	Set only the user profile parameters to factory default settings
1	Restore all configuration parameters to factory default settings (full factory profile)

NOTE

If **<value>** is omitted, the command performs the same actions as **AT&F0**.

2.11. AT&V Display Current Configuration

This command displays the current settings of some AT command parameters (see **Table 4** for the default command response before any change), including the one-letter AT command parameters that are not otherwise readable.

AT&V Display Current Configuration

Execution Command AT&V	Response OK
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Table 4: Default AT&V Response

AT&V
&C: 1
&D: 2
&F: 0
&W: 0
Q: 0
V: 1X: 4
Z: 0
E: 1S0: 0
S4: 10
S5: 8
S6: 2
S7: 0
S8: 2
S10: 15
S3: 13
OK

2.12. AT&W Store Current AT Command Settings to User-defined Profile

This command stores the current AT command settings to a user-defined profile in non-volatile memory. The AT command settings will be automatically restored from the user-defined profile during power-up or if ATZ is executed. See **Table 26** for the list of supported AT commands.

AT&W Store Current AT Command Settings to User-defined Profile	
Execution Command	Response
AT&W[<n>]	OK
Maximum Response Time	300 ms
Characteristics	/
Reference	
V.25ter	

Parameter

<n> Integer type.
0 Profile number to store the current AT command settings

2.13. ATZ Restore All AT Command Settings from User-defined Profile

This command first resets the AT command settings to factory settings, which is similar to what **AT&F** does. Afterwards, the AT command settings are restored from the user-defined profile in the non-volatile memory if they have been stored with **AT&W** before.

Any additional AT command on the same command line may be ignored. See Table 27 **Table 27** for the list of supported AT commands.

ATZ Restore All AT Command Settings from User-defined Profile	
Execution Command ATZ[<value>]	Response OK
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<value> Integer type.
0 Reset to profile number 0

2.14. ATQ Set Result Code Presentation Mode

This command controls whether the result code is transmitted to TE. Other information text transmitted as response is not affected by this setting.

ATQ Set Result Code Presentation Mode	
Execution Command ATQ<n>	Response If <n>=0: OK If <n>=1:

	(none)
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with AT&W .
Reference V.25ter	

Parameter

<n>	Integer type.
<u>0</u>	TA transmits result code
1	Result codes are suppressed and not transmitted

2.15. ATV TA Response Format

This command determines the contents of header and trailer transmitted with AT command result codes and information responses.

The numeric equivalents and brief descriptions of result codes are listed in the table below.

ATV TA Response Format	
Execution Command ATV<value>	Response When <value>=0: 0 When <value>=1: OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with AT&W .
Reference V.25ter	

Parameter

<value>	Integer type.
0	Information response: <text><CR><LF> Short result code format: <numeric code><CR>
<u>1</u>	Information response: <CR><LF><text><CR><LF>

Long result code format: <CR><LF><verbose code><CR><LF>

Example

```

ATV1 //Set <value>=1.
OK
AT+CSQ
+CSQ: 30,99

OK //When <value>=1, the result code is OK.
ATV0 //Set <value>=0.
0
AT+CSQ
+CSQ: 30,99
0 //When <value>=0, the result code is 0.
    
```

Table 5: Numeric Equivalents and Brief Descriptions of ATV0 and ATV1 Result Codes

ATV1	ATV0	Description
OK	0	Acknowledges execution of a command.
CONNECT	1	A connection has been established. The DCE is switching from the command mode to the data mode.
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.
BUSY	7	Engaged (busy) signal detected.

2.16. ATE Set Command Echo Mode

This command controls whether or not the module echoes characters received from TE in AT command mode.

ATE Set Command Echo Mode	
Execution Command ATE<value>	Response OK
Maximum Response Time	300 ms

Characteristics	The command takes effect immediately. The configuration can be saved with AT&W .
Reference V.25ter	

Parameter

<value>	Integer type. Whether to echo the characters received from TE.
0	Echo mode OFF
<u>1</u>	Echo mode ON

2.17. A/ Repeat Previous Command Line

This command repeats the previous AT command line, and “/” acts as the line termination character.

A/ Repeat Previous Command Line	
Execution Command A/	Response Repeat the previous command
Characteristics	/
Reference V.25ter	

Example

```

ATI
Quectel
BG770A-GL
Revision: BG770AGLAAR01A04

OK
A/ //Repeat the previous command.
Quectel
BG770A-GL
Revision: BG770AGLAAR01A04

OK
    
```

2.18. ATS3 Set Command Line Termination Character

This command determines the character that terminates an incoming command line, which is recognized by the module. It is also generated by the module for result codes and information text, along with character value set via **ATS4**.

ATS3 Set Command Line Termination Character	
Read Command ATS3?	Response <n> OK
Write Command ATS3=<n>	Response OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference V.25ter	

Parameter

<n>	Integer type. Command line termination character. Range: 0–127. Default value: 13 (13=<CR>).
-----	-------------------------------------------------------------------------------------------------

2.19. ATS4 Set Response Formatting Character

This command determines the character generated by the module for result code and information text, along with the command line termination character set via **ATS3**.

ATS4 Set Response Formatting Character	
Read Command ATS4?	Response <n> OK
Write Command ATS4=<n>	Response OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Reference
V.25ter

Parameter

<n> Integer type. Response formatting character.
Range: 0–127. Default value: 10 (10=<LF>).

2.20. ATS5 Set Command Line Editing Character

This command determines the character value used by the module to delete the immediately preceding character from the AT command line (i.e., equates to backspace key).

ATS5 Set Command Line Editing Character

Read Command ATS5?	Response <n> OK
Write Command ATS5=<n>	Response OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference V.25ter	

Parameter

<n> Integer type. Command line editing character.
Range: 0–127. Default value: 8 (8=<Backspace>).

NOTE

Values 10 (10=<LF>) and 13 (13=<CR>) cannot be set as a parameter <n> value.

2.21. AT+CFUN Set UE Functionality

This command controls the UE functionality level. It can also be used to reset the UE.

AT+CFUN Set UE Functionality	
Test Command AT+CFUN=?	Response +CFUN: (list of supported <fun>s),(list of supported <rst>s) OK
Read Command AT+CFUN?	Response +CFUN: <fun> OK
Write Command AT+CFUN=<fun>[,<rst>]	Response OK If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error: ERROR
Maximum Response Time	15 s, determined by the network.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<fun>	Integer type. 0 Minimum functionality <u>1</u> Full functionality (RF front-end and SIM card is enabled) 4 Disable RF front-end ((U)SIM card is enabled)
<rst>	Integer type. <u>0</u> Do not reset the UE before setting it to <fun> functionality level. 1 Reset the UE before setting it to <fun> functionality level. The device is fully functional after the reset.
<err>	Error code. See Table 28 for possible <err> values.

Example

```

AT+CFUN=0 //Switch the UE to minimum functionality.
OK
AT+COPS?
+COPS: 2 //No operator is registered.

OK
AT+CPIN?
+CME ERROR: 13 //(U)SIM failure.
AT+CFUN=1 //Switch the UE to full functionality.
OK

+CPIN: SIM PIN
AT+CPIN=1234
OK

+CPIN: READY

+QUSIM: 1

+QIND: SMS DONE

AT+CPIN?
+CPIN: READY

OK
AT+COPS?
+COPS: 0,0,"CHINA MOBILE CMCC",8 //Operator is registered.

OK
    
```

2.22. AT+CMEE Error Message Format

This command controls the format of error result codes: **ERROR**, error numbers or verbose messages as **+CME ERROR: <err>** and **+CMS ERROR: <err>**.

AT+CMEE Error Message Format	
Test Command	Response
AT+CMEE=?	+CMEE: (range of supported <n>s)
	OK

Read Command AT+CMEE?	Response +CMEE: <n> OK
Write Command AT+CMEE=<n>	Response TA disables or enables the use of result code +CME ERROR: <err> or +CMS ERROR: <err> as an indication of an error related to the functionality of ME. OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.007	

Parameter

- <n>** Integer type.
 - 0 Disable result code and use **ERROR** instead
 - 1 Enable result code and use numeric values
 - 2 Enable result code and use verbose values
- <err>** Error code. See **Table 28** and **Table 29** for possible **<err>** values.

Example

```

AT+CMEE=0 //Disable result code.
OK
AT+CPIN?
ERROR //Only ERROR will be displayed.
AT+CMEE=1 //Enable error result code with numeric values.
OK
AT+CPIN?
+CME ERROR: 10
AT+CMEE=2 //Enable error result code with verbose (string) values.
OK
AT+CPIN?
+CME ERROR: SIM not inserted
    
```

2.23. AT+CSCS Select TE Character Set

The command informs the module which character set is used by the TE. This enables the UE to convert

character strings correctly between TE and UE character sets.

AT+CSCS Select TE Character Set	
Test Command AT+CSCS=?	Response +CSCS: (list of supported <chset>s) OK
Read Command AT+CSCS?	Response +CSCS: <chset> OK
Write Command AT+CSCS=<chset>	Response OK If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.007	

Parameter

<chset>	String type. Character set "GSM" GSM 7 bit default alphabet "IRA" International reference alphabet "UCS2" UCS2 alphabet
<err>	Error code. See Table 28 for possible <err> values.

Example

```

AT+CSCS? //Query the current character set.
+CSCS: "GSM"

OK
AT+CSCS="UCS2" //Set the character set to "UCS2".
OK

AT+CSCS?
    
```



```
+CSCS: "UCS2"
```

```
OK
```

2.24. AT+QURCCFG Configure URC Indication Option

This command configures URC output port.

AT+QURCCFG Configure URC Indication Option	
Test Command AT+QURCCFG=?	Response +QURCCFG: "urcport",(list of supported <URC_port>s) OK
Write Command AT+QURCCFG="urcport"[,<URC_port>]	Response If the optional parameter is omitted, the command returns the current setting. +QURCCFG: "urcport",<URC_port> OK If the optional parameter is specified, the command sets the URC output port. OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<URC_port>	String type. URC output port.
"main"	MAIN UART
"aux"	AUX UART port on BG77xA-GL and Debug UART on BG95xA-GL
"emux"	EMUX port (see AT+QCFG="emux/urcport" in document [20])

Example

```
AT+QURCCFG=?
+QURCCFG: "urcport",("main","aux","emux")
```

```

OK
AT+QURCCFG="urcport","main"
OK
AT+QURCCFG="urcport"
+QURCCFG: "urcport","main"

OK
    
```

2.25. +++ Switch from Data Mode to Command Mode

The **+++** character sequence causes the TA to cancel the data flow over the AT interface and switch to command mode. It allows inputting AT commands while maintaining the data connection with the remote device.

This command is only available when TA is in data mode.

+++ Switch from Data Mode to Command Mode	
Execution Command	Response
+++	OK
Maximum Response Time	300 ms
Characteristics	/
Reference	
V.25ter	

NOTE

- Input **+++** or pull the MAIN_DTR pin up to make the COM port exit the data mode. To prevent the **+++** escape sequence from being misinterpreted as data, the following sequence should be followed:
 - Do not input any character for at least 1 s before and after inputting **+++**.
 - Input **+++** within 1 s, and wait until **OK** is returned.
Once **OK** is returned, the the COM port exits the data mode and switches to AT command mode.
- To switch back to data mode from AT command mode, enter **AT00**.
- Another way to exit data mode is to pull the MAIN_DTR pin up, after setting **AT&D**. See **AT&D** for more information.

2.26. ATO Switch from Command Mode to Data Mode

This command resumes the connection and switches back to data mode from command mode.

ATO Switch from Command Mode to Data Mode

Execution Command ATO[n]	Response If connection is not successfully resumed: NO CARRIER If connection is successfully resumed, TA returns to data mode from command mode: CONNECT [<text>]
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<n> Integer type.
0 Switch from command mode to data mode

NOTE

When TA returns to data mode from command mode successfully, **CONNECT [<text>]** is returned. Note that **<text>** is output only when **<value>** is greater than 0 in **ATX<value>** parameter setting.

3 Serial Interface Control Commands

3.1. AT&C Set MAIN_DCD Behavior

This command controls the behavior of the UE’s MAIN_DCD line. It determines how the state of circuit 109 (DCD) relates to the detection of received line signal from the distant end.

AT&C Set MAIN_DCD Behavior	
Execution Command AT&C[<value>]	Response OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with AT&W .
Reference V.25ter	

Parameter

<value>	Integer type.
0	MAIN_DCD function is always ON
1	MAIN_DCD function is ON only in the presence of data carrier

3.2. AT&D Set MAIN_DTR Behavior

This command determines how the TA responds when circuit 108/2 (DTR) is changed from low to high level in data mode.

AT&D Set MAIN_DTR Behavior	
Execution Command AT&D[<value>]	Response OK
Maximum Response Time	300 ms

Characteristics	The command takes effect immediately. The configuration can be saved with AT&W .
Reference V.25ter	

Parameter

<value>	Integer type.
0	TA ignores status on MAIN_DTR.
1	Low to High on MAIN_DTR: Change to command mode while the call is still connected.
2	Low to High on MAIN_DTR: Disconnect data call and change to command mode. When MAIN_DTR is at high level, auto-answer function is disabled.

3.3. AT+IFC Set TE-TA Local Flow Control

This command sets the serial port (main UART) flow control.

AT+IFC Set TE-TA Local Flow Control	
Test Command AT+IFC=?	Response +IFC: (list of supported <DCE_by_DTE>s),(list of supported <DTE_by_DCE>s) OK
Read Command AT+IFC?	Response +IFC: <DCE_by_DTE> , <DTE_by_DCE> OK
Write Command AT+IFC=<DCE_by_DTE>,<DTE_by_DCE>	Response This parameter setting determines the data flow control on the main UART interface in data mode. OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference V.25ter	

Parameter

<DCE_by_DTE>	Integer type. Specifies the method to be used by TE when receiving data from TA. 0 None 2 RTS flow control
<DTE_by_DCE>	Integer type. Specifies the method to be used by TA when receiving data from TE. 0 None 2 CTS flow control

Example

```

AT+IFC=2,2 //Enable hardware flow control.
OK
AT+IFC?
+IFC: 2,2
OK
    
```

3.4. AT+ICF Set TE-TA Character Framing

This command determines the serial interface character framing format and parity received by TA from TE.

AT+ICF Set TE-TA Character Framing	
Test Command AT+ICF=?	Response +ICF: (list of supported <format>s),(range of supported <parity>s) OK
Read Command AT+ICF?	Response +ICF: <format> , <parity> OK
Write Command AT+ICF=<format>[,<parity>]	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference	

V.25ter

Parameter

<format> Integer type.
3 8 data; 0 parity; 1 stop

<parity> Integer type.
 0 Odd
 1 Even
 2 Mark (always 1)
3 Space (always 0)

NOTE

1. This command is valid only in command mode.
2. The **<parity>** field is ignored if no parity is specified in the **<format>** field.

3.5. AT+IPR Set TE-TA Fixed Local Rate

This command queries and sets UART baud rate. The specified rate takes effect following the issuance of any result code(s) associated with the current command line.

AT+IPR Set TE-TA Fixed Local Rate	
Test Command AT+IPR=?	Response +IPR: (list of supported <rate>s) OK
Read Command AT+IPR?	Response +IPR: <rate> OK
Write Command AT+IPR=<rate>	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations can be saved with AT&W .

Reference
V.25ter

Parameter

<rate>	Integer type. Baud rate per second. Unit: bps.
0	Enable auto baud rate detection (up to 115200 bps) ¹⁾
2400	
4800	
9600	
19200	
38400	
57600	
115200	
230400	
460800	
921600	
3000000	

NOTE

1. ¹⁾ If **<rate>=0**, auto baud rate detection is enabled. In this case, you must send **AT** continuously until successful auto baud rate lock is confirmed by **OK** response.
2. If a fixed baud rate is set, please make sure that both TE (DTE, usually the external processor) and TA (DCE, Quectel module) are configured to the same rate.
3. The value of **AT+IPR** cannot be restored with **AT&F** and **ATZ**, but it is still storable with **AT&W**.
4. In multiplex mode, the baud rate cannot be changed with **AT+IPR=<rate>**, and the setting will be invalid and cannot be stored even if **AT&W** is executed after the **AT+IPR=<rate>**.

Example

```

AT+IPR=115200           //Specify the fixed baud rate as 115200 bps.
OK
AT&W                   //Store the current setting, i.e., keep the default baud rate per second
                        as 115200 bps after module resetting.
OK
AT+IPR?
+IPR: 115200
OK
AT+IPR=115200;&W       //Specify the fixed baud rate as 115200 bps and store the current setting.
OK
    
```


3.6. AT+QRIR Restore MAIN_RI Behavior to Inactive

If the MAIN_RI (ring indication signal) behavior is set to "always", it can be restored to being inactive with the Execution Command. The MAIN_RI behavior is controlled by **AT+QCFG**. For more information, see **AT+QCFG="urc/ri/ring"**, **AT+QCFG="urc/ri/smsincoming"**, and **AT+QCFG="urc/ri/other"** in *document [20]*.

AT+QRIR Restore MAIN_RI Behavior to Inactive	
Test Command AT+QRIR=?	Response OK
Execution Command AT+QRIR	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	/

4 Status Control Commands

4.1. AT+QINDCFG URC Indication Configuration

This command controls URC indication.

AT+QINDCFG URC Indication Configuration	
Test Command AT+QINDCFG=?	Response +QINDCFG: "all",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) +QINDCFG: "csq",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) +QINDCFG: "smsfull",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) +QINDCFG: "ring",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) +QINDCFG: "smsincoming",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) OK
Write Command AT+QINDCFG=<URC_type>[,<enable>[,<save_to_NVRAM>]]	Response If the optional parameters are omitted, return the current setting: +QINDCFG: <URC_type>,<enable> OK If any of the optional parameters is specified, set the URC indication configurations: OK If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error: ERROR

Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. <save_to_NVRAM> determines whether to save the configuration.

Parameter

<URC_type>	String type. URC type. "all" Main switch of all URCs. <enable> is 1 (ON) by default. "csq" Indication of signal strength and channel bit error rate change. <enable> is 0 (OFF) by default. If this configuration is ON, present: +QIND: "csq",<rsssi>,<ber> . For explanations of <rsssi> and <ber>, see AT+CSQ . "smsfull" SMS storage full indication. <enable> is 0 (OFF) by default. If this configuration is ON, present: +QIND: "smsfull",<storage> <storage> String type. SMS storage location. "SM" (U)SIM card "ME" ME "ring" RING indication. <enable> is 1 (ON) by default. "smsincoming" Incoming message indication. <enable> is 1 (ON) by default. Related URC list: +CMTI, +CMT, +CDS . For more information on the URCs, see Table 30 .
<enable>	Integer type. Whether URC indication is enabled. 0 OFF 1 ON
<save_to_NVRAM>	Integer type. Whether to save the configurations into NVRAM. 0 Do not save 1 Save
<err>	Error code. See Table 28 for possible <err> values.

5 (U)SIM-Related Commands

5.1. AT+CIMI Request International Mobile Subscriber Identity (IMSI)

This command requests the International Mobile Subscriber Identity (IMSI) which is intended to permit the TE to identify the individual SIM card or active application in the UICC (GSM or SIM) that is attached to MT.

AT+CIMI Request International Mobile Subscriber Identity (IMSI)	
Test Command AT+CIMI=?	Response OK
Execution Command AT+CIMI	Response <IMSI> OK If there is an error related to ME functionality: +CME ERROR: <err>
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<IMSI>	International Mobile Subscriber Identity (string without double quotes).
<err>	Error code. See Table 28 for possible <err> values.

Example

```

AT+CIMI //Query IMSI number of the (U)SIM attached to MT.
460023210226023 //The IMSI number of the (U)SIM attached to MT.

OK
    
```

5.2. AT+CLCK Facility Lock

This command locks, unlocks or interrogates an MT or a network facility **<fac>**. Password is normally needed to perform 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 the service is not active for any **<class>**. The command can be aborted when network facilities are being set or interrogated. The factory default password of PF, PN, PU, PP and PC lock is "12341234".

AT+CLCK Facility Lock	
Test Command AT+CLCK=?	Response +CLCK: (list of supported <fac>s) OK
Write Command AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	Response If <mode> is not 2 and the command is executed successfully: OK If <mode>=2 and the command is executed successfully: +CLCK: <status>[,<class1>] [+CLCK: <status>[,<class2>]] [...] OK
Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference	3GPP TS 27.007

Parameter

<fac>	String type. Facility lock type. "SC" (U)SIM (lock SIM/UICC card installed in the currently selected card slot) (SIM/UICC asks password at MT power-up and when this lock command is issued). "PS" PH-SIM (lock PHone to SIM/UICC card installed in the currently selected card slot) (MT asks password when other than the current SIM/UICC card is inserted; MT may remember certain amount of previously used cards thus not requiring password when they are inserted) "PN" Network Personalization (see 3GPP TS 22.022). "PU" Network sUbset Personalization (see 3GPP TS 22.022).
<mode>	Integer type. Operation mode.

	0	Unlock
	1	Lock
	2	Query status
<passwd>	String type. Password. This parameter can be omitted when <mode>=2 .	
<class>	Integer type. A sum of integers each representing a class of information.	
	1	Voice
	2	Data
	4	Fax
	7	All telephony except SMS
	8	Short message service
	16	Data circuit synchronization
	32	Data circuit asynchronization
<status>	Integer type. Current status of the specified <class> .	
	0	Not active
	1	Active

Example

```

AT+CLCK="SC",2 //Query the status of (U)SIM card.
+CLCK: 0 //The (U)SIM card is not active.

OK
AT+CLCK="SC",1,"1234" //Lock (U)SIM card, and the password is 1234.
OK
AT+CLCK="SC",2 //Query the status of (U)SIM card.
+CLCK: 1 //The (U)SIM card is active.

OK
AT+CLCK="SC",0,"1234" //Unlock (U)SIM card, and the password is "1234".
OK
    
```

5.3. AT+CPIN Enter PIN

This command sends to the MT a password that is necessary before it can be operated, or queries whether the MT requires a password before it can be operated. The password may be (U)SIM PIN, (U)SIM PUK, PH-SIM PIN, etc.

If the PIN is to be entered twice, the TA automatically repeats the PIN. If no PIN request is pending, no action is taken towards MT and an error message, **+CME ERROR**, is returned to TE.

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

AT+CPIN Enter PIN	
Test Command AT+CPIN=?	Response OK
Read Command AT+CPIN?	Response +CPIN: <code> OK
Write Command AT+CPIN=<pin>[,<newpin>]	Response OK +CPIN: READY If there is an error related to ME functionality: +CME ERROR: <err>
Maximum Response Time	5 s
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<code>	String without double quotes. Indicates whether or not a password is required.
READY	MT is not pending for any password
SIM PIN	MT is waiting (U)SIM PIN to be given
SIM PUK	MT is waiting (U)SIM PUK to be given
SIM PIN2	MT is waiting (U)SIM PIN2 to be given
SIM PUK2	MT is waiting (U)SIM PUK2 to be given
PH-SIM PIN	MT is waiting phone-to-(U)SIM card password to be given
PH-NET PIN	MT is waiting network personalization password to be given
<pin>	String type. Password. If the requested password is a PUK, such as (U)SIM PUK1, PH-FSIM PUK etc., then <pin> must be followed by <newpin> .
<newpin>	String type. New password required if the requested code is a PUK.
<err>	Error code. See Table 28 for possible <err> values.

Example

```
//Enter PIN
AT+CPIN?
+CPIN: SIM PIN //Waiting (U)SIM PIN to be given

OK
```

```

AT+CPIN="1234" //Enter PIN
OK

+CPIN: READY
AT+CPIN? //PIN has already been entered
+CPIN: READY

OK

//Enter PUK and PIN
AT+CPIN?
+CPIN: SIM PUK //Waiting (U)SIM PUK to be given

OK
AT+CPIN="26601934","1234" //Enter PUK and the new password
OK

+CPIN: READY
AT+CPIN?
+CPIN: READY //PUK has already been entered

OK
    
```

5.4. AT+CPWD Change Password

The Write Command sets a new password for the facility lock function defined by **AT+CLCK**.

The Test Command returns a list of pairs that present the available facilities and the maximum length of their passwords.

AT+CPWD Change Password	
Test Command AT+CPWD=?	Response +CPWD: list of supported (<fac>,<pwdlength>)s OK
Write Command AT+CPWD=<fac>,<oldpwd>,<newpwd>	Response OK If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error:

	ERROR
Maximum Response Time	5 s
Characteristics	/
Reference	
3GPP TS 27.007	

Parameter

<fac>	String type. Facility lock type. "SC" (U)SIM (lock SIM/UICC card) (SIM/UICC asks for the password at MT power-up and the time when this lock command is issued) "PS" PH-SIM (lock PHone to SIM/UICC card installed in the currently selected card slot) (MT asks for the password when a card other than the current SIM/UICC card is inserted; MT may remember a certain amount of previously used cards thus not requiring a password when they are inserted) "PN" Network Personalization (see <i>3GPP TS 22.022</i>). "PU" Network sUbsset Personalization (see <i>3GPP TS 22.022</i>). "P2" (U)SIM PIN2
<pwdlength>	Integer type. Maximum password length.
<oldpwd>	String type. Password specified for the facility from the user interface or with command.
<newpwd>	String type. New password.
<err>	Error code. See Table 28 for possible <err> values.

Example

```

AT+CPIN?
+CPIN: READY

OK
AT+CPWD="SC","1234","4321" //Change (U)SIM card password to "4321".
OK
//Restart the module or re-activate the (U)SIM card.
AT+CPIN?
+CPIN: SIM PIN //Waiting (U)SIM PIN to be given.

OK
AT+CPIN="4321" //PIN must be entered to define a new password "4321".
OK
+CPIN: READY
    
```

5.5. AT+CRSM Restricted (U)SIM Access

This command offers easy and limited access to the (U)SIM database. It transmits the (U)SIM command number (<command>) and its required parameters to the MT.

AT+CRSM Restricted (U)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 If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<command>	Integer type. (U)SIM command number. 176 READ BINARY 178 READ RECORD 192 GET RESPONSE 214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS
<fileid>	Integer type. Identifier of an elementary datafile on (U)SIM, if used by <command>.
<P1>/<P2>/<P3>	Integer type. Parameters passed on by the MT to the (U)SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. Their values are described in 3GPP TS 51.011.
<data>	Information to be written to the (U)SIM (hexadecimal character format; see AT+CSCS).
<pathid>	String type. The directory path of an elementary file on the SIM/UICC in hexadecimal format.

<sw1>/<sw2>	Integer type. Information from the (U)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.
<response>	Response of a successful completion of the command previously issued (hexadecimal character format; see AT+CSCS). STATUS and GET RESPONSE return data, which gives information about the current elementary datafield. The information includes the type of file and its size (see 3GPP TS 51.011). The requested data are returned after a successful READ BINARY or READ RECORD command. <response> is not returned after a successful UPDATE BINARY or UPDATE RECORD command.
<err>	Error code. See Table 28 for possible <err> values.

5.6. AT+QCCID Show ICCID

This command returns the ICCID (Integrated Circuit Card Identifier) number of the (U)SIM card.

AT+QCCID Show ICCID	
Test Command AT+QCCID=?	Response OK
Execution Command AT+QCCID	Response +QCCID: <ICCID> OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	/

Parameter

<ICCID>	ICCID number of the current (U)SIM card.
----------------------	------------------------------------------

Example

```

AT+QCCID //Query ICCID of the (U)SIM card
+QCCID: 89860025128306012474

OK
    
```

5.7. AT+QPINC Display PIN Remainder Counter

This command queries the number of attempts left to enter the password of (U)SIM PIN/PUK.

AT+QPINC Display PIN Remainder Counter	
Test Command AT+QPINC=?	Response +QPINC: (list of supported <facility>s) OK
Read Command AT+QPINC?	Response +QPINC: "SC",<PIN_counter>,<PUK_counter> +QPINC: "P2",<PIN_counter>,<PUK_counter> OK
Write Command AT+QPINC=<facility>	Response +QPINC: <facility>,<PIN_counter>,<PUK_counter> OK If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	/

Parameter

<facility>	String type. "SC" (U)SIM PIN "P2" (U)SIM PIN2
<PIN_counter>	Integer type. Number of attempts left to enter PIN.
<PUK_counter>	Integer type. Number of attempts left to enter PUK
<err>	Error code. See Table 28 for possible <err> values.

5.8. AT+QINISTAT Query Initialization Status of (U)SIM Card

This command queries the initialization status of (U)SIM card.

AT+QINISTAT Query Initialization Status of (U)SIM Card	
Test Command AT+QINISTAT=?	Response +QINISTAT: (range of supported <status>s) OK
Execution Command AT+QINISTAT	Response +QINISTAT: <status> OK
Maximum Response Time	300 ms
Characteristics	/

Parameter

<status>	Integer type. Initialization status of (U)SIM card. Actual value is the sum of several of the following three states (3 = 1 + 2 means CPIN READY & SMS initialization completed).
0	Initial state
1	CPIN READY. Operation like PIN locking/unlocking is allowed.
2	SMS DONE. SMS initialization completed.

5.9. AT+QSIMDET (U)SIM Card Detection

This command enables (U)SIM card hot-swap function. (U)SIM card is detected by GPIO interrupt. The level of (U)SIM card detection pin should also be set when the (U)SIM card is inserted.

AT+QSIMDET (U)SIM Card Detection	
Test Command AT+QSIMDET=?	Response +QSIMDET: (list of supported <enable>s),(list of supported <insert_level>s) OK
Read Command AT+QSIMDET?	Response +QSIMDET: <enable>,<insert_level> OK

Write Command AT+QSIMDET=<enable>,<insert_level> >	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	This command takes effect after rebooting. The configuration is saved automatically.

Parameter

<enable>	Integer type. Enables or disables (U)SIM card detection. 0 Disable 1 Enable
<insert_level>	Integer type. The level of (U)SIM card detection pin when a (U)SIM card is inserted. 0 Low level 1 High level

NOTE

Hot-swap function is invalid if the configured value of **<insert_level>** is inconsistent with hardware design.

Example

```
AT+QSIMDET=1,0 //Set (U)SIM card detection pin level as low when (U)SIM card is inserted
OK
//Remove (U)SIM card
+CPIN: NOT READY
//Insert (U)SIM card and if PIN1 of the (U)SIM card is unlocked and you will get:
+CPIN: READY
```

5.10. AT+QSIMSTAT (U)SIM Card Insertion Status Report

This command queries (U)SIM card insertion status or determines whether (U)SIM card insertion status report is enabled.

AT+QSIMSTAT (U)SIM Card Insertion Status Report

Test Command AT+QSIMSTAT=?	Response +QSIMSTAT: (list of supported <enable>s)
--------------------------------------	-------------------------------------------------------------------

	OK
Read Command AT+QSIMSTAT?	Response +QSIMSTAT: <enable>,<inserted_status>
	OK
Write Command AT+QSIMSTAT=<enable>	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting; The configuration is saved automatically.

Parameter

<enable>	Integer type. Enables or disables (U)SIM card insertion status report. If it is enabled, the URC +QSIMSTAT: <enable>,<inserted_status> is reported when (U)SIM card is removed or inserted. 0 Disable 1 Enable
<inserted_status>	Integer type. (U)SIM card is inserted or removed. 0 Removed 1 Inserted 2 Unknown, before (U)SIM initialization

Example

```

AT+QSIMSTAT? //Query (U)SIM card insertion status
+QSIMSTAT: 0,1

OK
AT+QSIMDET=1,0
OK
AT+QSIMSTAT=1 //Enable (U)SIM card insertion status report
OK
AT+QSIMSTAT?
+QSIMSTAT: 1,1

OK
//Remove (U)SIM card
+QSIMSTAT: 1,0 //Report on (U)SIM card insertion status: removed
    
```

+CPIN: NOT READY

AT+QSIMSTAT?

+QSIMSTAT: 1,0

OK

//Insert (U)SIM card

+QSIMSTAT: 1,1

//Report on (U)SIM card insertion status: inserted

+CPIN: READY

6 Network Service Commands

6.1. AT+CREG Network Registration Status

The Write Command controls the presentation of an unsolicited result code **+CREG: <stat>** when **<n>=1** and there is a change in the MT's circuit mode network registration status in E-UTRAN, or unsolicited result code **+CREG: <stat>,[<lac>],[<ci>],[<AcT>]** when **<n>=2** and there is a change of the network cell in E-UTRAN.

AT+CREG Network Registration Status	
Test Command AT+CREG=?	Response +CREG: (range of supported <n>s) OK
Read Command AT+CREG?	Response +CREG: <n>,<stat>,[<lac>],[<ci>],[<AcT>] OK
Write Command AT+CREG[=<n>]	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with AT&W .
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type.
0	Disable network registration unsolicited result code
1	Enable network registration unsolicited result code: +CREG:<stat>

	2	Enable network registration and location information unsolicited result code: +CREG: <stat>[,<lac>],[<ci>],[<AcT>]]
<stat>		Integer type. Circuit mode registration status.
	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 trying to attach to the network or searching a new operator to register to
	3	Registration denied
	4	Unknown
	5	Registered, roaming
<lac>		String type. Two-byte location area code in hexadecimal format.
<ci>		String type. Four-byte E-UTRAN cell ID in hexadecimal format.
<AcT>		Integer type. Access technology of the serving cell.
	7	eMTC
	9	NB-IoT

6.2. AT+COPS Operator Selection

This command returns the current operators and their status, and allows automatic or manual network selection.

The Test Command returns a set of five parameters, each representing an operator present in the network. The set consists of an integer indicating operator availability **<stat>**, long and short alphanumeric format of operator's name, numeric format representation of the operator and access technology. Any of the formats may be unavailable and should be an empty field in that case. The list of operators shall be in the order of: home network, networks referenced in (U)SIM and other networks.

The Read Command returns the current mode and the currently selected operator. If no operator is selected, then **<format>**, **<oper>** and **<Act>** are omitted.

The Write Command forces an attempt to select and register the LTE network operator. If the selected operator is not available, no other operator shall be selected (except **<mode>=4**). The format of selected operator name shall apply to further Read Commands (**AT+COPS?**).

AT+COPS Operator Selection	
Test Command AT+COPS=?	Response +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

	<p>If there is an error related to ME functionality: +CME ERROR: <err></p> <p>If there is any other error: ERROR</p>
<p>Read Command AT+COPS?</p>	<p>Response +COPS: <mode>[,<format>,<oper>[,<Act>]]</p> <p>OK</p> <p>If there is an error related to ME functionality: +CME ERROR: <err></p>
<p>Write Command AT+COPS=[<mode>[,<format>[,<oper>[,<Act>]]]]</p>	<p>Response OK</p> <p>If there is an error related to ME functionality: +CME ERROR: <err></p>
Maximum Response Time	180 s, determined by the network.
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.007	

Parameter

<stat>	Integer type.
0	Unknown
1	Operator available
2	Current operator
3	Operator forbidden
<oper>	String type. Operator in format as per <mode>
<mode>	Integer type.
0	Automatic (<oper> field is ignored)
1	Manual (<oper> field is present, and <Act> optionally)
2	Deregister from network
3	Set only <format> (for AT+COPS? Read Command), and do not attempt registration/deregistration (<oper> and <Act> fields are ignored). This value is not applicable in Read Command response.
4	Manual/automatic (<oper> field is present). If manual selection fails, automatic mode (<mode>=0) is entered.
<format>	Integer type.
0	Long format alphanumeric <oper> that can be up to 16 characters.
1	Short format alphanumeric <oper>

	2	Numeric <oper>
<Act>		Integer type. Access technology selected parameters.
	7	eMTC
	9	NB-IoT
<err>		Error code. See Table 28 for possible <err> values.

Example

```

AT+COPS=? //List all network operators present in the network.
+COPS: (1,"CHN-CT","CT","46011",8),(1,"CHINA MOBILE","CMCC","46000",9),(1,"CHN-CT","CT",
"46011",9),(0,1,2,3,4),(0,1,2)

OK
AT+COPS? //Query the currently selected network operator
+COPS: 0,0,"CHINA MOBILE",9

OK
    
```

NOTE

AT+COPS=? scans all set bands. Scanning time depends on the number of set bands. If timeout is less than scanning time, **AT+COPS=?** will return an empty list. In that case, timeout must be adjusted with **AT+QCFGEXT="copstout"**.

6.3. AT+CSQ Signal Quality

The Execution Command returns the received signal strength indication **<rssi>** and the channel bit error rate **<ber>** from the ME.

AT+CSQ Signal Quality	
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 there is an error related to ME functionality: +CME ERROR: <err>

Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<rsqi>	Integer type. Received signal strength indication.
0	-113 dBm or less
1	-111 dBm
2...30	-109...-53 dBm
31	-51 dBm or greater
99	Not known or not detectable
<ber>	Integer type. Channel bit error rate (in percent)
0-7	As RxQual values in the table in <i>3GPP TS 45.008 subclause 8.2.4</i>
99	Not known or not detectable
<err>	Error code. See Table 28 for possible <err> values.

Example

```

AT+CSQ=?
+CSQ: (0-31,99),(0-7,99)

OK
AT+CSQ
+CSQ: 28,99           //The received signal strength is 28 (-57 dBm) and channel bit error rate is
                       99 (not known or not detectable).

OK
    
```

6.4. AT+CPOL Preferred Operator List

This command edits the PLMN selector with Access Technology lists in the SIM card or active application in the UICC.

AT+CPOL Preferred Operator List	
Test Command AT+CPOL=?	Response +CPOL: (list of supported <index>s),(range of supported <format>s) OK

<p>Read Command AT+CPOL?</p>	<p>Response +CPOL: <index>,<format>,<oper>[,<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>] [+CPOL: <index>,<format>,<oper>[,<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>] [...]]</p> <p>OK</p>
<p>Write Command AT+CPOL=<index>[,<format>[,<oper>[,<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>]]]</p>	<p>Response</p> <p>If the optional parameters are omitted, delete the specified entry: OK</p> <p>If the optional parameters are specified, edit the list of preferred operators: OK</p> <p>If there is an error related to ME functionality: +CME ERROR: <err></p> <p>If there is any other error: ERROR</p>
<p>Maximum Response Time</p>	<p>300 ms</p>
<p>Characteristics</p>	
<p>Reference 3GPP TS 27.007</p>	

Parameter

<index>	Integer type. The order number of operator in the (U)SIM preferred operator list.
<format>	Integer type. Format of operator name. 0 Long format alphanumeric <oper> 1 Short format alphanumeric <oper> 2 Numeric <oper>
<oper>	String type. Operation name. <format> indicates if the format is alphanumeric or numeric (see AT+COPS)
<GSM>	Integer type. GSM access technology. 0 Access technology is not selected 1 Access technology is selected
<GSM_compact>	Integer type. GSM compact access technology. 0 Access technology is not selected 1 Access technology is selected

<UTRAN>	Integer type. UTRAN access technology. 0 Access technology is not selected 1 Access technology is selected
<E-UTRAN>	Integer type. E-UTRAN access technology. 0 Access technology is not selected 1 Access technology is selected
<err>	Error code. See Table 28 for possible <err> values.

NOTE

1. The access technology selection parameters **<GSM>**, **<GSM_compact>**, **<UTRAN>** and **<E-UTRAN>** are required for SIM cards or UICCs containing PLMN selector with access technology.
2. **<GSM>**, **<GSM_compact>** and **<UTRAN>** are invalid.

6.5. AT+COPN Read Operator Names

This command returns the list of operator names from the MT. Each operator code **<numericn>** that has an alphanumeric equivalent **<alphan>** in the MT memory is returned.

AT+COPN Read Operator Names	
Test Command AT+COPN=?	Response OK
Execution Command AT+COPN	Response +COPN: <numeric1>,<alpha1> [+COPN: <numeric2>,<alpha2> [...]] OK If there is an error related to ME functionality: +CME ERROR: <err>
Maximum Response Time	Depends on the number of operator names.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<numericn>	String type. Operator in numeric format (see AT+COPS).
<alphan>	String type. Operator in long alphanumeric format (see AT+COPS).

<err> Error code. See **Table 28** for possible **<err>** values.

6.6. AT+CTZU Automatic Time Zone Update

This command enables/disables automatic time zone update via NITZ.

AT+CTZU Automatic Time Zone Update	
Test Command AT+CTZU=?	Response +CTZU: (list of supported <onoff>s) OK
Read Command AT+CTZU?	Response +CTZU: <onoff> OK
Write Command AT+CTZU=<onoff>	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.007	

Parameter

<onoff>	Integer type. Enable/disable automatic time zone update.
0	Disable automatic time zone update via NITZ
<u>1</u>	Enable automatic time zone update via NITZ
3	Enable automatic time zone update via NITZ and update local time to RTC

Example

```

AT+CTZU?
+CTZU: 0

OK
AT+CTZU=?
+CTZU: (0,1,3)
    
```



```
OK
AT+CTZU=1
OK
AT+CTZU?
+CTZU: 1
OK
```

6.7. AT+CPSMS Power Saving Mode Setting

This command controls the setting of the UE Power Saving Mode (PSM) parameters.

AT+CPSMS Power Saving Mode Setting	
Test Command AT+CPSMS=?	Response +CPSMS: (list of supported <mode>s),,(list of supported <Requested_Periodic-TAU>s),(list of supported <Requested_Active-Time>s) OK
Read Command AT+CPSMS?	Response +CPSMS: <mode>,,[<Requested_Periodic-TAU>],[<Requested_Active-Time>] OK
Write Command AT+CPSMS=[<mode>,,[<Requested_Periodic-TAU>],[<Requested_Active-Time>]]	Response OK If there is any other error: ERROR
Maximum Response Time	4000 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. Disable or enable the use of PSM in the UE. 0 Disable the use of PSM 1 Enable the use of PSM
--------	------------------------------------------------------------------------------------------------------------------

<Requested_Periodic-TAU>

String type. One byte in 8-bit format. Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN (e.g., "00001010" equals 100 minutes). In the Write Command, when **<mode>** is 1 and **<requested_periodicTAU>** is omitted, the last configured value is used.

Bits 5 to 1 represent the binary coded timer value.

Bits 6 to 8 define the timer value unit as follows:

Bits 8 7 6

- 0 0 0 value is incremented in multiples of 10 minutes
- 0 0 1 value is incremented in multiples of 1 hour
- 0 1 0 value is incremented in multiples of 10 hours
- 0 1 1 value is incremented in multiples of 2 seconds
- 1 0 0 value is incremented in multiples of 30 seconds
- 1 0 1 value is incremented in multiples of 1 minute

<Requested_Active-Time>

String type. One byte in 8-bit format. Requested Active Time value (T3324) to be allocated to UE (e.g., "00001111" equals 1 minute).

Bits 5 to 1 represent the binary coded timer value.

Bits 6 to 8 define the timer value unit as follows:

Bits 8 7 6

- 0 0 0 value is incremented in multiples of 2 seconds
- 0 0 1 value is incremented in multiples of 1 minute
- 0 1 0 value is incremented in multiples of decihours
- 1 1 1 value indicates that the timer is deactivated.

Example

```
AT+CPSMS=1,,"0000100","00001111" //Set the requested T3412 value to 40 minutes, and set the
requested T3324 value to 30 seconds.
OK
```

6.8. AT+QPSMS Extended Power Saving Mode Setting

This is an extended AT command, developed by Quectel, for setting PSM parameters. A special form of the command can be given as **AT+QPSMS=** (with all parameters omitted). In this form, the use of PSM is disabled (**<mode>=0**) and data for all parameters in the command are removed. It is similar to **AT+CPSMS**.

AT+QPSMS Extended Power Saving Mode Setting	
Test Command AT+QPSMS=?	Response +QPSMS: (list of supported <mode>s),,(list of supported <Requested_Periodic-TAU>s),(list of supported <Reques

	ted_Active-Time>s)
	OK
Read Command AT+QPSMS?	Response +QPSMS: <mode>,,,<Network_Periodic-TAU>,<Network_Active-Time>]
	OK
Write Command AT+QPSMS=[<mode>,,,<Requested_Periodic-TAU>,<Requested_Active-Time>]]]	Response OK If there is any other error: ERROR
Maximum Response Time	4000 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<mode>	Integer type. Disable or enable the use of PSM in UE. 0 Disable the use of PSM 1 Enable the use of PSM
<Requested_Periodic-TAU>	String type. One byte in 8-bit format. Requested extended periodic TAU value (T3412) to be allocated to UE in E-UTRAN (e.g., "00001010" equals 100 minutes). Bits 5 to 1 represent the binary coded timer value. Bits 6 to 8 define the timer value unit as follows: Bits 8 7 6 0 0 0 value is incremented in multiples of 10 minutes 0 0 1 value is incremented in multiples of 1 hour 0 1 0 value is incremented in multiples of 10 hours 0 1 1 value is incremented in multiples of 2 seconds 1 0 0 value is incremented in multiples of 30 seconds 1 0 1 value is incremented in multiples of 1 minute
<Requested_Active-Time>	String type. One byte in 8-bit format. Requested Active Time value (T3324) to be allocated to UE (e.g., "00001111" equals 1 minute). Bits 5 to 1 represent the binary coded timer value. Bits 6 to 8 define the timer value unit as follows: Bits 8 7 6 0 0 0 value is incremented in multiples of 2 seconds 0 0 1 value is incremented in multiples of 1 minute 0 1 0 value is incremented in multiples of decihours

<Network_Periodic-TAU>	1 1 1 value indicates that the timer is deactivated. Integer type. Extended periodic TAU value (T3412) to be allocated to UE in E-UTRAN. The value is specified by the network.
<Network_Active-Time>	Integer type. Active timer value (T3324) to be allocated to UE in E-UTRAN. The value is specified by the network.

Example

```

AT+QPSMS=1,,,"0000100","00001111" //Set the requested T3412 value to 40 minutes, and set the
requested T3324 value to 30 seconds.
OK
AT+QPSMS? //Query the PSM mode and the periodic-TAU and active
time specified by the network.
+QPSMS: 1,,,"86400","2"
OK
    
```

WARNING

After entering PSM, all digital logic is powered down, therefore, it is prohibited to provide any external voltage to the module's I/O ports that are not defined as a wake-up source. VDD_EXT pin can be used to monitor PSM activity and control the external logic.

NOTE

If the debugging mode is enabled (**AT+QCFGEXT="debug"**), depending on the logging activity, the module can refuse to enter PSM mode.

6.9. AT+QPSMCFG PSM Feature and Minimum Threshold Value Setting

The Write Command enables or disables the PSM feature and sets the minimum threshold value of the PSM cycle. **AT+QPSMCFG=** (with all parameters omitted) is the special form of the command that can also be given. In this form, **<threshold>** is set to 20 and **<PSM_version>** is set to 2 (default values).

AT+QPSMCFG PSM Feature and Minimum Threshold Value Setting

Test Command AT+QPSMCFG=?	Response +QPSMCFG: (range of supported <threshold> s),(range of
-------------------------------------	----------------------------------------------------------------------------------------

	supported <PSM_version>s) OK
Read Command AT+QPSMCFG?	Response +QPSMCFG: <threshold>,<PSM_version> OK
Write Command AT+QPSMCFG=[<threshold>[,<PSM_version>]]	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<threshold>	Integer type. Minimum threshold value of the PSM cycle. Condition to enter PSM: <threshold> less than PSM cycle (= T3412 - T3324). Range: 20-4294967295. Unit: second.
<PSM_version>	Integer type. Bitmask to indicate the PSM feature (1: Enable; 0: Disable). Each bit is configured independently. Range: 0-2 ¹⁵ . Bit 0 PSM without network coordination Bit 1 Rel-12 PSM without context retention Bit 2 Rel-12 PSM with context retention Bit 3 PSM in-between e-I-DRX cycles

Example

```

AT+QPSMCFG=100 //Set the threshold to 100 seconds.
OK
AT+QPSMCFG? //Query the threshold value and PSM mode.
+QPSMCFG: 100,5
OK
    
```

6.10. AT+CEDRXS e-I-DRX Setting

This command controls the setting of the UE's e-I-DRX (extended Idle-mode DRX) parameters.

AT+CEDRXS e-I-DRX Setting	
Test Command AT+CEDRXS=?	Response +CEDRXS: (range of supported <mode>s),(list of supported <AcT-type>s),(list of supported <Requested_eDRX_value>s) OK
Write Command AT+CEDRXS=[<mode>[,<AcT-type>[,<Requested_eDRX_value>]]]	Response OK If there is any other error: ERROR
Read Command AT+CEDRXS?	Response [+CEDRXS: <AcT-type>,<Requested_eDRX_value> [+CEDRXS: <AcT-type>,<Requested_eDRX_value> [...]]] OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. Disable or enable the use of e-I-DRX in the UE.
0	Disable the use of e-I-DRX
1	Enable the use of e-I-DRX
2	Enable the use of e-I-DRX and enable the unsolicited result code +CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]
3	Disable the use of e-I-DRX and discard all parameters for e-I-DRX or, reset to the default values
<AcT-type>	Integer type. Type of access technology.
4	eMTC
5	NB-IoT
<Requested_eDRX_value>	String type. Half a byte in a 4-bit format.
	Bit
	4 3 2 1 E-UTRAN e-I-DRX cycle
	0 0 0 0 5.12 seconds
	0 0 0 1 10.24 seconds

0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	0	61.44 seconds
0	1	0	1	81.92 seconds
0	1	1	0	102.4 seconds
0	1	1	1	122.88 seconds
1	0	0	0	143.36 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655,36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

<NW-provided_eDRX_value> String type. Half a byte in a 4-bit format.

Bit				
4	3	2	1	E-UTRAN e-I-DRX cycle
0	0	0	0	5.12 seconds
0	0	0	1	10.24 seconds
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	0	61.44 seconds
0	1	0	1	81.92 seconds
0	1	1	0	102.4 seconds
0	1	1	1	122.88 seconds
1	0	0	0	143.36 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655,36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

<Paging_time_window> String type. Half a byte in a 4-bit format.

Bit				
4	3	2	1	Paging Time Window length
0	0	0	0	1.28 seconds
0	0	0	1	2.56 seconds
0	0	1	0	3.84 seconds
0	0	1	1	5.12 seconds
0	1	0	0	6.4 seconds
0	1	0	1	7.68 seconds
0	1	1	0	8.96 seconds

0	1	1	1	10.24 seconds
1	0	0	0	11.52 seconds
1	0	0	1	12.8 seconds
1	0	1	0	14.08 seconds
1	0	1	1	15.36 seconds
1	1	0	0	16.64 seconds
1	1	0	1	17.92 seconds
1	1	1	0	19.20 seconds
1	1	1	1	20.48 seconds
NB-IoT mode				
Bit				
4	3	2	1	Paging Time Window length
0	0	0	0	2.56 seconds
0	0	0	1	5.12 seconds
0	0	1	0	7.68 seconds
0	0	1	1	10.24 seconds
0	1	0	0	12.8 seconds
0	1	0	1	15.36 seconds
0	1	1	0	17.92 seconds
0	1	1	1	20.48 seconds
1	0	0	0	23.04 seconds
1	0	0	1	25.6 seconds
1	0	1	0	28.16 seconds
1	0	1	1	30.72 seconds
1	1	0	0	33.28 seconds
1	1	0	1	35.84 seconds
1	1	1	0	38.4 seconds
1	1	1	1	40.96 seconds

Example

```
AT+CEDRXS=1,5,"0000" //Set the requested e-I-DRX value to 5.12 seconds.
OK
```

6.11. AT+CEDRXRDP Read Dynamic Parameters

The Execution Command returns **<AcT-type>**, **<Requested_eDRX_value>**, **<NW-provided_eDRX_value>** and **<Paging_time_window>** if e-I-DRX is used for the cell that the MS is currently registered to.

AT+CEDRXRDP Read Dynamic Parameters

Test Command AT+CEDRXRDP=?	Response OK
Execution Command AT+CEDRXRDP	Response +CEDRXRDP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]] OK
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<AcT-type> Integer type. Type of access technology.
 0 Access technology is not using e-I-DRX
 4 eMTC
 5 NB-IoT

<Requested_eDRX_value> String type. Half a byte in a 4-bit format.
 bit

4	3	2	1	E-UTRAN e-I-DRX cycle
0	0	0	0	5.12 seconds
0	0	0	1	10.24 seconds
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	0	61.44 seconds
0	1	0	1	81.92 seconds
0	1	1	0	102.4 seconds
0	1	1	1	122.88 seconds
1	0	0	0	143.36 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655.36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

<NW-provided_eDRX_value> String type. Half a byte in a 4-bit format.
 bit

4	3	2	1	E-UTRAN e-I-DRX cycle
0	0	0	0	5.12 seconds

0	0	0	1	10.24 seconds
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	0	61.44 seconds
0	1	0	1	81.92 seconds
0	1	1	0	102.4 seconds
0	1	1	1	122.88 seconds
1	0	0	0	143.36 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655.36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

<Paging_time_window>

String type. Half a byte in a 4-bit format.

eMTC mode

bit

4	3	2	1	Paging Time Window length
0	0	0	0	1.28 seconds
0	0	0	1	2.56 seconds
0	0	1	0	3.84 seconds
0	0	1	1	5.12 seconds
0	1	0	0	6.4 seconds
0	1	0	1	7.68 seconds
0	1	1	0	8.96 seconds
0	1	1	1	10.24 seconds
1	0	0	0	11.52 seconds
1	0	0	1	12.8 seconds
1	0	1	0	14.08 seconds
1	0	1	1	15.36 seconds
1	1	0	0	16.64 seconds
1	1	0	1	17.92 seconds
1	1	1	0	19.20 seconds
1	1	1	1	20.48 seconds

NB-IoT mode

bit

4	3	2	1	Paging Time Window length
0	0	0	0	2.56 seconds
0	0	0	1	5.12 seconds
0	0	1	0	7.68 seconds
0	0	1	1	10.24 seconds
0	1	0	0	12.8 seconds
0	1	0	1	15.36 seconds

0	1	1	0	17.92 seconds
0	1	1	1	20.48 seconds
1	0	0	0	23.04 seconds
1	0	0	1	25.6 seconds
1	0	1	0	28.16 seconds
1	0	1	1	30.72 seconds
1	1	0	0	33.28 seconds
1	1	0	1	35.84 seconds
1	1	1	0	38.4 seconds
1	1	1	1	40.96 seconds

6.12. AT+CTZR Time Zone Reporting

This command controls the time zone change event reporting. If reporting is enabled, the MT returns the unsolicited result code **+CTZV: <tz>** or **+CTZE: <tz>,<dst>,<time>** whenever the time zone is changed.

AT+CTZR Time Zone Reporting	
Test Command AT+CTZR=?	Response +CTZR: (range of supported <reporting>s) OK
Read Command AT+CTZR?	Response +CTZR: <reporting> OK
Write Command AT+CTZR=<reporting>	Response OK If there is any error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.007	

Parameter

<reporting>	Integer type. Indicates the mode of time zone reporting.
0	Disable time zone change event reporting
1	Enable time zone change event reporting by unsolicited result code +CTZV: <tz>

2 Enable extended time zone and local time reporting by unsolicited result code:

+CTZE: <tz>,<dst>,<time>

<tz>

String type. Represents the sum of the local time zone (difference between the local time and GMT expressed in quarters of an hour) plus daylight saving time. The format is " \pm zz", expressed as a fixed width, two-digit integer within the range -48 to +56. To maintain a fixed width, numbers in the range -9 to +9 are expressed with a leading zero, e.g., "-09", "+00" and "+09".

<dst>

Integer type. Indicates whether **<tz>** includes daylight saving adjustment.

0 **<tz>** includes no adjustment for daylight saving time

1 **<tz>** includes +1 hour (equals 4 quarters in **<tz>**) adjustment for daylight saving time

2 **<tz>** includes +2 hours (equals 8 quarters in **<tz>**) adjustment for daylight saving time

<time>

String type. Represents the local time. The format is "YYYY/MM/DD, hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date (DD), hour (hh), minute (mm) and second (ss). The local time can be derived by the MT from the information provided by the network at the time of delivery of time zone information and will be present in the unsolicited result code for extended time zone and local time reporting if the universal time is provided by the network.

Example

```
AT+CTZR=2
OK
AT+CTZR?
+CTZR: 2

OK

+CTZE: "+32",0,"2013/08/23,06:51:13"
```

6.13. AT+QNWINFO Query Network Information

This command indicates network information such as the access technology selected, the operator, and the band selected.

AT+QNWINFO Query Network Information	
Test Command AT+QNWINFO=?	Response OK
Execution Command AT+QNWINFO	Response +QNWINFO: <AcT>,<oper>,<band>,<channel>

	OK
Maximum Response Time	300 ms
Characteristics	/

Parameter

<AcT>	String type. Selected access technology . "No Service" No service "eMTC" eMTC mode "NB-IoT" NB-IoT mode
<oper>	String type. Operator in numeric format.
<band>	String type. Selected band . "LTE BAND 1" – "LTE BAND 66"
<channel>	Integer type. Channel ID.

Example

```
AT+QNWINFO=?
OK
AT+QNWINFO
+QNWINFO: "eMTC","46011","LTE BAND 3",1850
OK
```

6.14. AT+QCSQ Query and Report Signal Strength

This command queries and reports the signal strength of the current service network. Regardless of whether the MT is registered on a network or not, the command can be run to query signal strength. If the MT is not using any service network or the service mode is uncertain, "NOSERVICE" is returned as the query result.

AT+QCSQ Query and Report Signal Strength

Test Command AT+QCSQ=?	Response +QCSQ: (list of supported <sysmode>s) OK
Execution Command AT+QCSQ	Response +QCSQ: <sysmode>,[,<value1>,<value2>,<value3>,<value4>]

	OK
Maximum Response Time	300 ms
Characteristics	/

Parameter

<sysmode>	String type. Indicates the service mode in which the MT will send an unsolicited report about signal strength. "NOSERVICE" No service mode "eMTC" eMTC mode "NBloT" NB-IoT mode																				
<value1>/ <value2>/ <value3>/ <value4>	The following table lists the signal strength type corresponding to each service mode. <table border="1"> <thead> <tr> <th><sysmode></th> <th><value1></th> <th><value2></th> <th><value3></th> <th><value4></th> </tr> </thead> <tbody> <tr> <td>"NOSERVICE"</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>"eMTC"</td> <td><LTE_RSSI></td> <td><LTE_RSRP></td> <td><LTE_SINR></td> <td><LTE_RSRQ></td> </tr> <tr> <td>"NBloT"</td> <td><LTE_RSSI></td> <td><LTE_RSRP></td> <td><LTE_SINR></td> <td><LTE_RSRQ></td> </tr> </tbody> </table>	<sysmode>	<value1>	<value2>	<value3>	<value4>	"NOSERVICE"	-	-	-	-	"eMTC"	<LTE_RSSI>	<LTE_RSRP>	<LTE_SINR>	<LTE_RSRQ>	"NBloT"	<LTE_RSSI>	<LTE_RSRP>	<LTE_SINR>	<LTE_RSRQ>
<sysmode>	<value1>	<value2>	<value3>	<value4>																	
"NOSERVICE"	-	-	-	-																	
"eMTC"	<LTE_RSSI>	<LTE_RSRP>	<LTE_SINR>	<LTE_RSRQ>																	
"NBloT"	<LTE_RSSI>	<LTE_RSRP>	<LTE_SINR>	<LTE_RSRQ>																	
<LTE_RSSI>	Integer type. Received signal strength indicator (RSSI).																				
<LTE_RSRP>	Integer type. Reference signal received power (RSRP).																				
<LTE_SINR>	Integer type. Signal-to-interference-plus-noise-ratio (SINR). Logarithmic value of SINR. Values are in 1/5th of a dB. Range: 0–250, which translates to -20 dB to +30 dB.																				
<LTE_RSRQ>	Integer type. Reference signal received quality (RSRQ). Unit: dB.																				

Example

```

AT+QCSQ //Execute the command to query signal strength
+QCSQ: "eMTC",-52,-81,195,-10

OK

AT+QCSQ=? //List of supported <sysmode>s
+QCSQ: "NOSERVICE","eMTC","NBloT"

OK
    
```

6.15. AT+QCSCON Signaling Connection Status

This command gives details of the terminal’s perceived radio connection status. It returns an indication of the current state. Note that this state is only updated when radio events, such as sending and receiving,

take place. This means that the current state may be out of date. The terminal may think it is "Connected" yet cannot currently use a base station due to a change in connection quality.

AT+QCSCON Signaling Connection Status	
Test Command AT+QCSCON=?	Response +QCSCON: (list of supported <n>s) OK
Read Command AT+QCSCON?	Response +QCSCON: <n>,<mode> OK If there is any error: +CME ERROR: <err>
Write Command AT+QCSCON=<n>	Response OK If there is any error: +CME ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<n>	Integer type. Enables or disables reporting URC +QCSCON: <n>,<mode> . 0 Disable 1 Enable
<mode>	Integer type. Indicates the signaling connection status. 0 Idle 1 Connected
<err>	Error code. See Table 28 for possible <err> values.

Example

```
AT+QCSCON=?
+QCSCON: (0,1)

OK
```

```

AT+QCSCON?
+QCSCON: 0,0

OK
AT+QCSCON=1
OK
AT+QIOPEN=1,0,"TCP","220.180.239.212",8433,0,1
OK

+QCSCON: 1,1 //RRC connection setup

+QIOPEN: 0,0

+QCSCON: 1,0 //RRC connection release
    
```

6.16. AT+QLTS Obtain the Latest Time Synchronized Through Network

The Execution Command returns the latest time synchronized through network.

AT+QLTS Obtain the Latest Time Synchronized Through Network	
Test Command AT+QLTS=?	Response +QLTS: (range of supported <mode>s) OK
Execution Command AT+QLTS	Response +QLTS: <time>,<dst> OK
Write Command AT+QLTS=<mode>	Response +QLTS: <time>,<dst> OK If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	/

Parameter

<mode>	Integer type. Query network time mode 0 Query the last time that has been synchronized through network 1 Query the current GMT time calculated from the last time that has been synchronized through network 2 Query the current local time calculated from the last time that has been synchronized through network
<time>	String type. The format is "yy/MM/dd,hh:mm:ss±zz", expressed as integers representing the last two digits of year (yy), month (MM), day (dd), hour (hh), minute (mm), second (ss) and the sum of the local time zone (±zz, which indicates the difference between the local time and GMT expressed in quarters of an hour; range: -48 to +48). For example, 6th of May 2004, 22:10:00 GMT+2 hours equals "04/05/06,22:10:00+08".
<dst>	Integer type. Daylight saving time. 0 No adjustment for daylight saving time 1 Plus one hour 2 Plus two hours
<err>	Error code. See Table 28 for possible <err> values.

NOTE

If the time has not been synchronized through network, the command will return a null time string: **+QLTS: ""**.

Example

```

AT+QLTS=? //Query supported network time modes
+QLTS: (0-2)

OK
AT+QLTS //Query the last time synchronized through network
+QLTS: "2020/06/02,01:47:33+32,0"

OK
AT+QLTS=0 //Query the last time synchronized through network. It offers the same function
as Execution Command AT+QLTS.
+QLTS: "2020/06/02,01:47:33+32,0"

OK
AT+QLTS=1 //Query the current GMT time calculated from the last time that has been
synchronized through network.
+QLTS: "2020/06/02,01:48:36+32,0"

OK
    
```

AT+QLTS=2 //Query the current local time calculated from the last time that has been synchronized through network.

+QLTS: "2020/06/02,09:48:51+32,0"

OK

7 Short Message Service Commands

7.1. AT+CSMS Select Message Service

This command selects message service and returns the types of messages supported by the MT.

AT+CSMS Select Message Service	
Test Command AT+CSMS=?	Response +CSMS: (list of supported <service>s) OK
Read Command AT+CSMS?	Response +CSMS: <service>,<mt>,<mo>,<bm> OK
Write Command AT+CSMS=<service>	Response +CSMS: <mt>,<mo>,<bm> OK If there is an error related to ME functionality: +CMS ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference	3GPP TS 27.005

Parameter

<service> Integer type. Type of message service.

	<u>0</u>	3GPP TS 23.040 and 3GPP TS 23.041 (the syntax of SMS AT commands is compatible with 3GPP TS 27.005 Phase 2 version 4.7.0; Phase 2+ features that do not require new command syntax can be supported, e.g., correct routing of messages with new Phase 2+ data coding schemes).
	<u>1</u>	3GPP TS 23.040 and 3GPP TS 23.041 (the syntax of SMS AT commands is compatible with 3GPP TS 27.005 Phase 2+ version; the requirement of <service> setting 1 is mentioned under corresponding command descriptions).
<mt>	Integer type. Mobile terminated messages.	
	0	Type not supported
	<u>1</u>	Type supported
<mo>	Integer type. Mobile originated messages.	
	0	Type not supported
	<u>1</u>	Type supported
<bm>	Integer type. Broadcast type messages.	
	0	Type not supported
	<u>1</u>	Type supported
<err>	Error code..	

Example

```

AT+CSMS=? //Query the type of message services supported by the module
+CSMS: (0,1)

OK
AT+CSMS=1 //Set the type of message service to 1.
+CSMS: 1,1,1

OK
AT+CSMS? //Read the current setting.
+CSMS: 1,1,1,1

OK
    
```

7.2. AT+CMGF Message Format

This command specifies the input and output formats of short messages. **<mode>** indicates the format of messages used with send, list, read and write commands and unsolicited result codes resulting from received messages.

The format of messages can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters). Text mode uses the value of **<chset>** specified by

AT+CSCS to inform the character set to be used in the message body in the TA-TE interface.

AT+CMGF Message Format	
Test Command AT+CMGF=?	Response +CMGF: (list of supported <mode> s) OK
Read Command AT+CMGF?	Response +CMGF: <mode> OK
Write Command AT+CMGF[=<mode>]	Response OK If there is an error related to ME functionality: +CMS ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.005	

Parameter

<mode>	Integer type. <ul style="list-style-type: none"> <u>0</u> PDU mode 1 Text mode
<err>	Error code. See Table 29 for possible <err> values.

7.3. AT+CSCA Service Center Address

The Write Command updates the SMSC address when mobile originated SMS are transmitted. In text mode, the setting is used by Write Command. In PDU mode, the setting is used by the same command, but only when the length of the SMSC address is coded into the **<pdu>** parameter that is equal to zero.

AT+CSCA Service Center Address	
Test Command AT+CSCA=?	Response OK
Read Command AT+CSCA?	Response +CSCA: <sca>,<tosca> OK
Write Command AT+CSCA=<sca>[,<tosca>]	Response OK If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.005	

Parameter

<sca>	Service center address. <i>3GPP TS 24.011</i> RP SC address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (see AT+CSCS in <i>3GPP TS 27.007</i>); the type of address is given by <tosca> .
<tosca>	Type of service center address. <i>3GPP TS 24.011</i> RP SC address Type-of-Address octet in integer format (default see <toda>).
<err>	Error code. See Table 28 for possible <err> values.

Example

```

AT+CSCA="+8613800210500",145 //Set SMSC address
OK
AT+CSCA? //Query SMSC address
+CSCA: "+8613800210500",145
OK
    
```

7.4. AT+CPMS Preferred Message Storage

This command selects memory storages <mem1>, <mem2> and <mem3> to be used for reading, writing, etc.

AT+CPMS Preferred Message Storage	
Test Command AT+CPMS=?	Response +CPMS: (list of supported <mem1>s),(list of supported <mem2>s),(list of supported <mem3>s) OK
Read Command AT+CPMS?	Response +CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> OK
Write Command AT+CPMS=<mem1>[,<mem2>[,<mem3>]]	Response +CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK If there is an error related to ME functionality: +CMS ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference	3GPP TS 27.005

Parameter

<mem1>	String type. Messages to be read and deleted from this memory storage. "SM" (U)SIM message storage "ME" Mobile equipment message storage "MT" The same as "ME" storage
<mem2>	String type. Messages will be written and sent to this memory storage. "SM" (U)SIM message storage "ME" Mobile equipment message storage

	"MT"	Same as "ME" storage
<mem3>		String type. Received messages will be placed in this memory storage if routing to PC is not set (AT+CNMI).
	"SM"	(U)SIM message storage
	"ME"	Mobile equipment message storage
	"MT"	Same as "ME" storage
<usedx>		Integer type. Number of current messages in <memx>.
<totalx>		Integer type. Total number of messages that can be stored in <memx>.
<err>		Error code. See Table 29 for possible <err> values.

Example

```

AT+CPMS? //Query the current SMS message storage
+CPMS: "ME",0,23,"ME",0,23,"ME",0,23

OK
AT+CPMS="SM","SM","SM" //Set SMS message storage as "SM"
+CPMS: 0,50,0,50,0,50

OK
AT+CPMS? //Query the current SMS message storage
+CPMS: "SM",0,50,"SM",0,50,"SM",0,50

OK
    
```

7.5. AT+CMGD Delete Message

This command deletes short messages from preferred message storage <mem1> (see **AT+CPMS**) location <index>. If <delflag> is present and not set to 0, the ME ignores <index> and follows the rules of <delflag> shown below.

AT+CMGD Delete Message	
Test Command AT+CMGD=?	Response +CMGD: (list of supported <index>s),(list of supported <delflag>s) OK
Write Command AT+CMGD=<index>[,<delflag>]	Response OK If there is an error related to ME functionality: +CMS ERROR: <err>

	If there is any other error: ERROR
Maximum Response Time	300 ms. Operation of <delflag> depends on the storage of deleted messages.
Characteristics	/
Reference	3GPP TS 27.005

Parameter

<index>	Integer type. A value in the range of location numbers supported by the associated memory.
<delflag>	Integer type. Flag indicating message deletion request.
0	Delete the message specified in <index>
1	Delete all read messages from <mem1> , leaving unread messages and stored mobile originated messages (whether sent or not) untouched
2	Delete all read messages and sent mobile originated messages from <mem1> , leaving unread messages and unsent mobile originated messages untouched
3	Delete all read messages, sent and unsent mobile originated messages from <mem1> , leaving unread messages untouched
4	Delete all messages from <mem1> including unread messages
<err>	Error code. See Table 29 for possible <err> values.

Example

```

AT+CMGD=1 //Delete the message specified in <index>=1
OK
AT+CMGD=1,4 //Delete all messages from <mem1>
OK
    
```

7.6. AT+CMGL List Messages

The Write Command returns messages with status value **<stat>** from preferred message storage **<mem1>** (see **AT+CPMS**) to the TE. If the status of the message is "REC UNREAD", the status in the storage changes to "REC READ". When executing **AT+CMGL** without status value **<stat>**, it will report the list of SMS with "REC UNREAD" status.

AT+CMGL List Messages	
Test Command	Response

<p>AT+CMGL=?</p>	<p>+CMGL: (list of supported <stat>s)</p> <p>OK</p>
<p>Write Command AT+CMGL[=<stat>]</p>	<p>Response</p> <p>If in text mode (AT+CMGF=1) and the command is executed successfully:</p> <p>For SMS-SUBMITs and/or SMS-DELIVERs:</p> <p>+CMGL: <index>,<stat>,<oa/da>,<[alpha]>,<[scts]>,<[too a/toda]>,<length><CR><LF><data></p> <p>[+CMGL: <index>,<stat>,<da/oa>,<[alpha]>,<[scts]>,<[too oa/toda]>,<length><CR><LF><data></p> <p>[...]</p> <p>OK</p> <p>For SMS-STATUS-REPORTs:</p> <p>+CMGL: <index>,<stat>,<fo>,<mr>,<[ra]>,<[tora]>,<[scts]>,<dt>,<st></p> <p>[+CMGL: <index>,<stat>,<fo>,<mr>,<[ra]>,<[tora]>,<[scts]>,<dt>,<st></p> <p>[...]</p> <p>OK</p> <p>For SMS-COMMANDs:</p> <p>+CMGL: <index>,<stat>,<fo>,<ct></p> <p>[+CMGL: <index>,<stat>,<fo>,<ct></p> <p>[...]</p> <p>OK</p> <p>For CBM storage:</p> <p>+CMGL:<index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data></p> <p>[+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data></p> <p>[...]</p> <p>OK</p> <p>If in PDU mode (AT+CMGF=0) and the command is executed successfully:</p> <p>+CMGL: <index>,<stat>,<[alpha]>,<length><CR><LF><pdu></p>

	<p>[+CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu> [...]]</p> <p>OK</p> <p>If there is an error related to ME functionality: +CMS ERROR: <err></p>
Maximum Response Time	<p>300 ms. Operation of <stat> depends on the storage of listed messages.</p>
Characteristics	/
Reference	3GPP TS 27.005

Parameter

<stat>	<p>Integer type in PDU mode, or string type in text mode. The status of message in memory; Defined values:</p> <table border="1"> <thead> <tr> <th>PDU mode</th> <th>Text mode</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>"REC UNREAD"</td> <td>Received unread messages</td> </tr> <tr> <td>1</td> <td>"REC READ"</td> <td>Received read messages</td> </tr> <tr> <td>2</td> <td>"STO UNSENT"</td> <td>Stored unsent messages</td> </tr> <tr> <td>3</td> <td>"STO SENT"</td> <td>Stored sent messages</td> </tr> <tr> <td>4</td> <td>"ALL"</td> <td>All messages</td> </tr> </tbody> </table>	PDU mode	Text mode	Explanation	0	"REC UNREAD"	Received unread messages	1	"REC READ"	Received read messages	2	"STO UNSENT"	Stored unsent messages	3	"STO SENT"	Stored sent messages	4	"ALL"	All messages
PDU mode	Text mode	Explanation																	
0	"REC UNREAD"	Received unread messages																	
1	"REC READ"	Received read messages																	
2	"STO UNSENT"	Stored unsent messages																	
3	"STO SENT"	Stored sent messages																	
4	"ALL"	All messages																	
<index>	Integer type. A value in the range of location numbers supported by the associated memory.																		
<da>	Destination Address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS in 3GPP TS 27.007). The type of address is given by <toda>.																		
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS in 3GPP TS 27.007). The type of address is given by <tooa>.																		
<alpha>	String type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook. The used character set should be the one selected with AT+CSCS (see definition of this command in 3GPP TS 27.007).																		
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (see <dt> in AT+CMGR).																		
<toda>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.																		
<tooa>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-																		

<length>	Address octet in integer format (default see <toda>). Integer type. Message length. In the text mode (AT+CMGF=1) the length of the message body <data> in characters; or in PDU mode (AT+CMGF=0) the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<data>	In the case of SMS: <i>3GPP TS 23.040</i> TP-User-Data in text mode responses; format: <ul style="list-style-type: none"> - If <dcs> indicates that <i>3GPP TS 23.038</i> GSM 7 bit default alphabet is used and <fo> indicates that <i>3GPP TS 23.040</i> TP-User-Data-Header-Indication is not set: <ul style="list-style-type: none"> - If TE character set other than "HEX" (see AT+CSCS in <i>3GPP TS 27.007</i>): ME/TA converts GSM alphabet into current TE character set according to rules in <i>3GPP TS 27.005 Annex A</i>. - If TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character (GSM 7 bit default alphabet 23) is presented as 17 (IRA 49 and 55)). - If <dcs> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that <i>3GPP TS 23.040</i> TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: <i>3GPP TS 23.041</i> CBM Content of Message in text mode responses; format: <ul style="list-style-type: none"> - If <dcs> indicates that <i>3GPP TS 23.038</i> GSM 7 bit default alphabet is used: <ul style="list-style-type: none"> - If TE character set other than "HEX" (see AT+CSCS in <i>3GPP TS 27.007</i>): ME/TA converts GSM alphabet into current TE character set according to rules in <i>3GPP TS 27.005 Annex A</i>. - If TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7-bit default alphabet into two IRA character long hexadecimal number. - If <dcs> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number. <pdu> In the case of SMS: <i>3GPP TS 24.011</i> SC address followed by <i>3GPP TS 23.040</i> TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g., octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<pdu>	In case of SMS: <i>3GPP TS 24.011</i> SC address followed by <i>3GPP TS 23.040</i> TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<fo>	Depending on the command or result code: First octet of <i>3GPP TS 23.040</i> SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, SMS-COMMAND in integer format.
<mr>	Message reference used to identify a message. <i>3GPP TS 23.040</i> TP-Message-Reference in integer format.

<ra>	Recipient address. <i>3GPP TS 23.040</i> TP-Recipient-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (see AT+CSCS); type of address given by <tora> .
<tora>	Type of recipient address. <i>3GPP TS 24.011</i> TP-Recipient-Address Type-of-Address octet in integer format (default see <toda>).
<scts>	Service center time stamp. <i>3GPP TS 23.040</i> TP-Service-Centre-Time-Stamp in time-string format (see <dt>).
<dt>	<i>3GPP TS 23.040</i> TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g., 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08".
<st>	<i>3GPP TS 23.040</i> TP-Status in integer format.
<ct>	<i>3GPP TS 23.040</i> TP-Command-Type in integer format (default 0).
<sn>	<i>3GPP TS 23.041</i> CBM Serial Number in integer format.
<mid>	<i>3GPP TS 23.041</i> CBM Message Identifier in integer format.
<page>	<i>3GPP TS 23.041</i> CBM Page Parameter bits 4–7 in integer format.
<pages>	<i>3GPP TS 23.041</i> CBM Page Parameter bits 0–3 in integer format.
<err>	Error code. See Table 29 for possible <err> values.

Example

```

AT+CMGF=1 //Set SMS message format as text mode
OK
AT+CMGL="ALL" //List all messages from message storage
+CMGL: 1,"STO UNSENT","",,
<This is a test from Quectel>
+CMGL: 2,"STO UNSENT","",,
<This is a test from Quectel>

OK
    
```

7.7. AT+CMGR Read Message

The Write Command returns messages with location value **<index>** from message storage **<mem1>** (see **AT+CPMS**) to the TE. If status of the message is "REC UNREAD", status in the storage changes to "REC READ".

AT+CMGR Read Message	
Test Command	Response
AT+CMGR=?	OK
Write Command	Response

<p>AT+CMGR=<index></p>	<p>If in text mode (AT+CMGF=1) and the command is executed successfully: For SMS-DELIVER: +CMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dc>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data></p> <p>OK</p> <p>For SMS-SUBMIT: +CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,<vp>],<sca>,<tosca>,<length>]<CR><LF><data></p> <p>OK</p> <p>For SMS-STATUS-REPORTs: +CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st></p> <p>OK</p> <p>For SMS-COMMANDs: +CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length>]<CR><LF><cdata></p> <p>OK</p> <p>For CBM storage: +CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data></p> <p>OK</p> <p>If in PDU mode (AT+CMGF=0) and the command is executed successfully: +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu></p> <p>OK</p> <p>If there is an error related to ME functionality: +CMS ERROR: <err></p>
<p>Maximum Response Time</p>	<p>Depends on the length of message content.</p>
<p>Characteristics</p>	<p>/</p>
<p>Reference</p>	<p></p>

Parameter

<index>	Integer type. A value in the range of location numbers supported by the associated memory.																		
<stat>	Integer type in PDU mode, or string type in text mode. The status of message in memory; Defined values: <table border="0" style="margin-left: 20px;"> <thead> <tr> <th style="text-align: left;">PDU mode</th> <th style="text-align: left;">Text mode</th> <th style="text-align: left;">Explanation</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>"REC UNREAD"</td> <td>Received unread messages</td> </tr> <tr> <td>1</td> <td>"REC READ"</td> <td>Received read messages</td> </tr> <tr> <td>2</td> <td>"STO UNSENT"</td> <td>Stored unsent messages</td> </tr> <tr> <td>3</td> <td>"STO SENT"</td> <td>Stored sent messages</td> </tr> <tr> <td>4</td> <td>"ALL"</td> <td>All messages</td> </tr> </tbody> </table>	PDU mode	Text mode	Explanation	0	"REC UNREAD"	Received unread messages	1	"REC READ"	Received read messages	2	"STO UNSENT"	Stored unsent messages	3	"STO SENT"	Stored sent messages	4	"ALL"	All messages
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3	"STO SENT"	Stored sent messages																	
4	"ALL"	All messages																	
<alpha>	String type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook. The used character set should be the one selected with AT+CSCS (see the definition of this command in <i>3GPP TS 27.007</i>).																		
<da>	Destination address. <i>3GPP TS 23.040</i> TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS in <i>3GPP TS 27.007</i>). The type of address is given by <toda> .																		
<oa>	Originating address. <i>3GPP TS 23.040</i> TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS in <i>3GPP TS 27.007</i>). The type of address is given by <tooa> .																		
<scts>	Service center time stamp. <i>3GPP TS 23.040</i> TP-Service-Centre-Time-Stamp in time-string format (see <dt>).																		
<fo>	Depending on the command or result code: First octet of <i>3GPP TS 23.040</i> SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND in integer format.																		
<pid>	Protocol identifier. <i>3GPP TS 23.040</i> TP-Protocol-Identifier in integer format. Default: 0.																		
<dcS>	Data coding scheme. Depending on the command or result code: <i>3GPP TS 23.038</i> SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format.																		
<vp>	Validity period. Depending on SMS-SUBMIT <fo> setting: <i>3GPP TS 23.040</i> TP-Validity-Period either in integer format or in time-string format (see <dt>).																		
<mn>	Message number. <i>3GPP TS 23.040</i> TP-Message-Number in integer format.																		
<mr>	Message reference. <i>3GPP TS 23.040</i> TP-Message-Reference in integer format.																		
<ra>	Recipient address. <i>3GPP TS 23.040</i> TP-Recipient-Address Address-Value field in string format. BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (see AT+CSCS). The type of address is given by <tora> .																		

<tora>	Type of recipient address. <i>3GPP TS 24.011</i> TP-Recipient-Address Type-of-Address octet in integer format (default see <toda>).
<toda>	Type of destination address. <i>3GPP TS 24.011</i> TP-Destination-Address Type-of-Address octet in integer format.
<tooa>	Type of originating address. <i>3GPP TS 24.011</i> TP-Originating-Address Type-of-Address octet in integer format (default see <toda>).
<sca>	Service center address. <i>3GPP TS 24.011</i> RP SC address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS in <i>3GPP TS 27.007</i>). The type of address is given by <tosca> .
<tosca>	Type of service center address. <i>3GPP TS 24.011</i> RP SC address Type-of-Address octet in integer format (default see <toda>).
<length>	Integer type. Message length. In the text mode (AT+CMGF=1) the length of the message body <data> (or <cdata>) in characters; or in PDU mode (AT+CMGF=0) the length of the actual TP data unit in octets (i.e., the RP layer SMSC address octets are not counted in the length).
<data>	In the case of SMS: <i>3GPP TS 23.040</i> TP-User-Data in text mode responses; format: <ul style="list-style-type: none"> - If <dcs> indicates that <i>3GPP TS 23.038</i> GSM 7 bit default alphabet is used and <fo> indicates that <i>3GPP TS 23.040</i> TP-User-Data-Header-Indication is not set: <ul style="list-style-type: none"> - If TE character set other than "HEX" (see AT+CSCS in <i>3GPP TS 27.007</i>): ME/TA converts GSM alphabet into current TE character set according to rules in <i>3GPP TS 27.005 Annex A</i>. - If TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character (GSM 7 bit default alphabet 23) is presented as 17 (IRA 49 and 55)). - If <dcs> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that <i>3GPP TS 23.040</i> TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). <p>In the case of CBS: <i>3GPP TS 23.041</i> CBM Content of Message in text mode responses; format:</p> <ul style="list-style-type: none"> - If <dcs> indicates that <i>3GPP TS 23.038</i> GSM 7 bit default alphabet is used: <ul style="list-style-type: none"> - If TE character set other than "HEX" (see AT+CSCS in <i>3GPP TS 27.007</i>): ME/TA converts GSM alphabet into current TE character set according to rules in <i>3GPP TS 27.005 Annex A</i>. - If TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7-bit default alphabet into two IRA character long hexadecimal number. - If <dcs> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number.
<pdu>	In the case of SMS: <i>3GPP TS 24.011</i> SC address followed by <i>3GPP TS 23.040</i> TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character

	long hexadecimal number (e.g., an octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<dt>	3GPP TS 23.040 TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g., 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08".
<st>	3GPP TS 23.040 TP-Status in integer format.
<ct>	3GPP TS 23.040 TP-Command-Type in integer format (default 0).
<cdata>	3GPP TS 23.040 TP-Command-Data in text mode responses; ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g., octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<sn>	3GPP TS 23.041 CBM Serial Number in integer format.
<mid>	3GPP TS 23.041 CBM Message Identifier in integer format.
<page>	3GPP TS 23.041 CBM Page Parameter bits 4-7 in integer format.
<pages>	3GPP TS 23.041 CBM Page Parameter bits 0-3 in integer format.
<err>	Error code. See Table 29 for possible <err> values.

Example

```
+CMTI: "SM",3 //Indicate that a new message has been received and saved
to <index>=3 of "SM"
AT+CSDH=1
OK
AT+CMGR=3 //Read the message
+CMGR: "REC UNREAD","+8615021012496",,"13/12/13,15:06:37+32",145,4,0,0,"+861380021050
0",145,27
<This is a test from Quectel>
OK
```

7.8. AT+CMGS Send Message

This Write Command sends a short message from TE to the network (SMS-SUBMIT). The message reference value **<mr>** is returned to the TE on successful message delivery. Optionally (when **AT+CSMS <service>** value is 1 and network supports) **<scts>** is returned. The values can be used to identify message upon unsolicited delivery of status report result code.

AT+CMGS Send Message	
Test Command	Response
AT+CMGS=?	OK
Write Command	Response

<p>If in text mode (AT+CMGF=1): AT+CMGS=<da>[,<toda>]</p>	<p>></p> <p>After > is returned, input the text message. After that, tap ctrl-Z [Hex: 1A] to send the message. Sending can be cancelled by tapping ESC, and the abortion is acknowledged with OK, though the message will not be sent.</p> <p>If the message is sent successfully: +CMGS: <mr>[,<scts>]</p> <p>OK</p> <p>If there is an error related to ME functionality: +CMS ERROR: <err></p>
<p>Write Command If in PDU mode (AT+CMGF=0): AT+CMGS=<length></p>	<p>Response</p> <p>></p> <p>After > is returned, input the PDU. After that, tap ctrl-Z [Hex: 1A] to indicate the ending of PDU and begin to send the message. Sending can be cancelled by tapping ESC, and the abortion is acknowledged with OK, though the message will not be sent.</p> <p>If the message is sent successfully: +CMGS: <mr>[,<scts>]</p> <p>OK</p> <p>If there is an error related to ME functionality: +CMS ERROR: <err></p>
<p>Maximum Response Time</p>	<p>120 s, determined by the network.</p>
<p>Characteristics</p>	<p>/</p>
<p>Reference 3GPP TS 27.005</p>	

Parameter

<p><da></p>	<p>Destination address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS in 3GPP TS 27.007). The type of address is given by <toda>.</p>
<p><toda></p>	<p>Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.</p>
<p><length></p>	<p>Integer type. Message length. In the text mode (AT+CMGF=1) the length of the text</p>

message in characters; or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e., the RP layer SMSC address octets are not counted in the length).

- <mr>** Message reference. *3GPP TS 23.040* TP-Message-Reference in integer format.
- <scts>** Service center time stamp. *3GPP TS 23.040* TP-Service-Centre-Time-Stamp in time-string format (see **<dt>** in **AT+CMGL**).
- <err>** Error code. See **Table 29** for possible **<err>** values.

Example

```

AT+CMGF=1 //Set SMS message format to text mode
OK
AT+CSCS="GSM" //Set character set to "GSM" that is used by the TE
OK
AT+CMGS="15021012496"
> <This is a test from Quectel> //Enter the text. Tap ctrl-Z [Hex: 1A] to send the
message.
+CMGS: 247
OK
    
```

7.9. AT+CMMS Send More Messages

This command controls the continuity of SMS relay protocol link. When the feature is enabled (and supported by the network) multiple messages can be sent much faster as the link is kept open.

AT+CMMS Send More Messages	
Test Command AT+CMMS=?	Response +CMMS: (range of supported<n>s) OK
Read Command AT+CMMS?	Response +CMMS: <n> OK
Write Command AT+CMMS=<n>	Response OK If there is an error related to ME functionality: +CMS ERROR: <err>

	If there is any other error: ERROR
Maximum Response Time	120 s, determined by the network.
Characteristics	/
Reference	
3GPP TS 27.005	

Parameter

- <n>** Integer type
- 0 Feature disabled
 - 1 Keep enabled until the time between the response of the latest message send command (**AT+CMGS**, **AT+CMSS**, etc.) and the next send command exceeds 1–5 s (the exact value is up to ME implementation); then ME closes the link and TA switches **<n>** automatically back to 0.
 - 2 Feature enabled. If the time between the response of the latest message send command and the next send command exceeds 1–5 s (the exact value is up to ME implementation), ME closes the link but TA does not switch **<n>** automatically back to 0.
- <err>** Error code. See **Table 29** for possible **<err>** values.

NOTE

After the execution of Read Command, a delay of 5–10 s is required before issuing the Write Command. Otherwise **+CMS ERROR: 500** may be returned.

7.10. AT+CMGW Write Message to Memory

This command stores a short message (either SMS-DELIVER or SMS-SUBMIT) to memory storage **<mem2>** (see **AT+CPMS** for details), and then the memory location **<index>** of the stored message is returned. The message status is set to 'stored unsent' by default, but the parameter **<stat>** allows also other status values to be given.

The entering of text is done similarly as specified in **AT+CMGS** Write Command.

AT+CMGW Write Message to Memory

Test Command	Response
AT+CMGW=?	OK
Write Command	Response
If in text mode (AT+CMGF=1):	>
AT+CMGW[=<oa/da>[,<tooa/toda>[,<	After > is returned, input the text message. After that, tap ctrl-

<p>stat>]]]</p>	<p>Z [Hex: 1A] to transmit the message to memory storage <mem2>. Transmitting can be cancelled by tapping ESC, and the abortion is acknowledged with OK, though the message will not be transmitted.</p> <p>If message writing is successful: +CMGW: <index></p> <p>OK</p> <p>If there is an error related to ME functionality: +CMS ERROR: <err></p>
<p>Write Command If in PDU mode (AT+CMGF=0): AT+CMGW=<length>[,<stat>]</p>	<p>Response ></p> <p>After > is returned, input the PDU. After that, tap ctrl-Z [Hex: 1A] to indicate the ending of PDU and begin to transmit the message to memory storage <mem2>. Transmitting can be cancelled by tapping ESC, and the abortion is acknowledged with OK, though the message will not be transmitted.</p> <p>If message writing is successful: +CMGW: <index></p> <p>OK</p> <p>If there is an error related to ME functionality: +CMS ERROR: <err></p>
<p>Maximum Response Time</p>	<p>300 ms</p>
<p>Characteristics</p>	<p>/</p>
<p>Reference 3GPP TS 27.005</p>	

Parameter

<p><da></p>	<p>Destination address. <i>3GPP TS 23.040</i> TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS in <i>3GPP TS 27.007</i>). The type of address is given by <toda>.</p>
<p><oa></p>	<p>Originating address. <i>3GPP TS 23.040</i> TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS in <i>3GPP TS 27.007</i>). The type of address is given by <toa>.</p>

<tooa>	Type of originating address. <i>3GPP TS 24.011</i> TP-Originating-Address Type-of-Address octet in integer format (default see <toda>).																		
<stat>	Integer type in PDU mode, or string type in text mode. The status of message in memory; Defined values: <table border="0" style="margin-left: 20px;"> <thead> <tr> <th style="text-align: left;">PDU mode</th> <th style="text-align: left;">Text mode</th> <th style="text-align: left;">Explanation</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>"REC UNREAD"</td> <td>Received unread messages</td> </tr> <tr> <td>1</td> <td>"REC READ"</td> <td>Received read messages</td> </tr> <tr> <td>2</td> <td>"STO UNSENT"</td> <td>Stored unsent messages</td> </tr> <tr> <td>3</td> <td>"STO SENT"</td> <td>Stored sent messages stored</td> </tr> <tr> <td>4</td> <td>"ALL"</td> <td>All messages</td> </tr> </tbody> </table>	PDU mode	Text mode	Explanation	0	"REC UNREAD"	Received unread messages	1	"REC READ"	Received read messages	2	"STO UNSENT"	Stored unsent messages	3	"STO SENT"	Stored sent messages stored	4	"ALL"	All messages
PDU mode	Text mode	Explanation																	
0	"REC UNREAD"	Received unread messages																	
1	"REC READ"	Received read messages																	
2	"STO UNSENT"	Stored unsent messages																	
3	"STO SENT"	Stored sent messages stored																	
4	"ALL"	All messages																	
<toda>	Type of destination address. <i>3GPP TS 24.011</i> TP-Destination-Address Type-of-Address octet in integer format.																		
<length>	Integer type. Message length. In the text mode (AT+CMGF=1) the length of the text message in characters; or in PDU mode (AT+CMGF=0), the length of the actual TP data unit in octets (i.e., the RP layer SMSC address octets are not counted in the length).																		
<pdu>	In the case of SMS: <i>3GPP TS 24.011</i> SC address followed by <i>3GPP TS 23.04</i> TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g., octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).																		
<index>	Integer type. Index of message in selected storage <mem2> .																		
<err>	Error code. See <i>Table 29</i> for possible <err> values.																		

Example

```

AT+CMGF=1 //Set SMS message format to text mode
OK
AT+CSCS="GSM" //Set the character set used by the TE to "GSM"
OK
AT+CMGW="15021012496"
> <This is a test from Quectel> //Enter the text, and tap ctrl-Z [Hex: 1A] to transmit the
message to memory storage <mem2>.
+CMGW: 4
OK
AT+CMGF=0 //Set SMS message format to PDU mode
OK
AT+CMGW=18
> 0051FF00000008000A0500030002016D4B8BD5
+CMGW: 5
OK
    
```

7.11. AT+CMSS Send Message from Storage

This command sends a message with location value **<index>** from message storage **<mem2>** (see **AT+CPMS**) to the network (SMS-SUBMIT or SMS-COMMAND). If a new destination address **<da>** is given for SMS-SUBMIT, it should be used instead of the one stored with the message. Reference value **<mr>** is returned to the TE on successful message delivery. Values can be used to identify message upon unsolicited delivery of status report result code.

AT+CMSS Send Message from Storage	
Test Command AT+CMSS=?	Response OK
Write Command AT+CMSS=<index>[,<da>[,<toda>]]	Response If in text mode (AT+CMGF=1) and the message is sent successfully: +CMSS: <mr>[,<scts>] OK If in PDU mode (AT+CMGF=0) and the message is sent successfully: +CMSS: <mr>[,<ackpdu>] OK If there is an error related to ME functionality: +CMS ERROR: <err>
Maximum Response Time	120 s, determined by the network.
Characteristics	/
Reference	3GPP TS 27.005

Parameter

<index>	Integer type. A value in the range of location numbers supported by the associated memory.
<da>	Destination Address. <i>3GPP TS 23.040</i> TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS in <i>3GPP TS 27.007</i>). The type of address is given by <toda> .
<toda>	Type of destination address. <i>3GPP TS 24.011</i> TP-Destination-Address Type-of-Address octet in integer format.

<mr>	Message reference used to identify a message. <i>3GPP TS 23.040</i> TP-Message-Reference in integer format.
<scts>	Service center time stamp. <i>3GPP TS 23.040</i> TP-Service-Centre-Time-Stamp in time-string format (see <dt> in AT+CMGR).
<ackpdu>	<i>3GPP TS 23.040</i> RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without <i>3GPP TS 24.011</i> SC address field and parameter is bound by double quote characters like a normal string type parameter.
<err>	Error code. See Table 29 for possible <err> values.

Example

```

AT+CMGF=1 //Set SMS message format to text mode
OK
AT+CSCS="GSM" //Set character set to "GSM" that is used by the TE
OK
AT+CMGW="15021012496"
> Hello //Enter the text. Tap ctrl-Z [Hex: 1A] to send the message.
+CMGW: 4

OK
AT+CMSS=4 //Send the message of index 4 from memory storage.
+CMSS: 54

OK
    
```

7.12. AT+CNMA New Message Acknowledgement to UE/TE

The Write and Execution Commands confirm successful reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) that is routed directly to the TE. If the UE does not get acknowledgement within required time (network timeout), it sends an **RP-ERROR** message to the network. The UE automatically disables routing to the TE by setting both **<mt>** and **<ds>** values of **AT+CNMI** to 0.

AT+CNMA New Message Acknowledgement to UE/TE	
Test Command AT+CNMA=?	Response +CNMA: (list of supported <n>s) OK
Execution Command AT+CNMA	Response OK If there is an error related to ME functionality: +CMS ERROR: <err>

	If there is any other error: ERROR
Write Command AT+CNMA=<n>	Response OK If there is an error related to ME functionality: +CMS ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	/
Reference	
3GPP TS 27.005	

Parameter

<n>	Integer type. Parameter required only for PDU mode. 0 Command operates similarly as in text mode 1 Send positive (RP-ACK) acknowledgement to the network. Accepted only in PDU mode. 2 Send negative (RP-ERROR) acknowledgement to the network. Accepted only in PDU mode.
<err>	Error code. See Table 29 for possible <err> values.

NOTE

The Execution and Write Commands should only be used when **AT+CSMS** parameter **<service>** is 1 (phase 2+) and an appropriate URC has been issued by the module, i.e.:

- +CMT** for **<mt>**=2 incoming message classes 0, 1, 3 and none;
- +CMT** for **<mt>**=3 incoming message classes 0 and 3;
- +CDS** for **<ds>**=1.

Example

```
AT+CSMS=1
+CSMS:1,1,1

OK
AT+CNMI=1,2,0,0,0
OK
```

```
+CMT: "+8615021012496", "13/03/18,17:07:21+32",145,4,0,0,"+8613800551500",145,28
This is a test from Quectel. //A short message is outputted directly when SMS is incoming.
AT+CNMA //Send ACK to the network
OK
AT+CNMA
+CMS ERROR: 340 // Returned error the second time. It needs ACK only once.
```

7.13. AT+CNMI New Message Indications to TE

This command selects the procedure on how receiving of new messages from the network is indicated to the TE when TE is active, e.g., MAIN_DTR is at low level (ON). If TE is inactive (e.g., MAIN_DTR is at high level (OFF)), message receiving should be done as specified in 3GPP TS 23.038.

AT+CNMI New Message Indications to TE	
Test Command AT+CNMI=?	Response +CNMI: (range of supported <mode>s),(range of supported <mt>s),(list of supported <bm>s),(range of supported <ds>s),(list of supported <bfr>s) OK
Read Command AT+CNMI?	Response +CNMI: <mode> , <mt> , <bm> , <ds> , <bfr> OK
Write Command AT+CNMI[=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	Response OK If there is an error related to ME functionality: +CMS ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.005	

Parameter

<mode>	Integer type.
---------------------	---------------

1	Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g., in data mode). Otherwise forward them directly to the TE.
<u>2</u>	Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g., in data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.
<mt>	Integer type. The rules for storing received SMSs depend on its data coding scheme (refer to 3GPP TS 23.038), preferred memory storage (AT+CPMS) setting and this value.
0	No SMS-DELIVER indications are routed to the TE.
<u>1</u>	If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE by using unsolicited result code: +CMTI: <mem>,<index>
2	SMS-DELIVERs (except class 2 messages) are routed directly to the TE using unsolicited result code: +CMT: [<alpha>,<length><CR><LF><pdu> (PDU mode enabled); or +CMT: <oa>,<alpha>,<scts>,<toa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> (text mode enabled; about parameters in italics, see AT+CSDH). Class 2 messages result in indication as defined in <mt>=1 .
<bm>	Integer type. The rules for managing the received Cell Broadcast messages (CBM).
<u>0</u>	No CBM indications are routed to the TE.
1	If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CBMI: <mem>,<index>
2	New CBMs are routed directly to the TE using unsolicited result code: +CBM: <length><CR><LF><pdu> (PDU mode); or +CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (text mode)
<ds>	Integer type.
<u>0</u>	No SMS-STATUS-REPORTs are routed to the TE.
1	SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: <length><CR><LF><pdu> (PDU mode) ; or +CDS: <fo>,<mr>,<ra>,<tora>,<scts>,<st> (text mode)
2	If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CDSI: <mem>,<index>
<bfr>	Integer type.
<u>0</u>	TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response should be given before flushing the codes).
1	TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered.
<err>	Error code. See Table 29 for possible <err> values.

NOTE

Unsolicited result code:

+CMTI: <mem>,<index>	Indicates that a new message has been received
+CMT: [<alpha>],<length><CR><LF><pdu>	A short message is outputted directly
+CBM: <length><CR><LF><pdu>	Cell broadcast message is outputted directly

Example

```

AT+CMGF=1 //Set SMS message format to text mode
OK
AT+CSCS="GSM" //Set the character set used by the TE to "GSM"
OK
AT+CNMI=1,2,0,1,0 //Set SMS-DELIVERs are routed directly to the TE
OK
+CMT: "+8615021012496",,"13/03/18,17:07:21+32",145,4,0,0,"+8613800551500",145,28
This is a test from Quectel. //A short message is outputted when an SMS is incoming.
    
```

7.14. AT+CSDH Show Text Mode Parameters

This command controls whether detailed header information is shown in text mode result codes.

AT+CSDH Show Text Mode Parameters	
Test Command AT+CSDH=?	Response +CSDH: (list of supported <show> s) OK
Read Command AT+CSDH?	Response +CSDH: <show> OK
Write Command AT+CSDH[=<show>]	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.005	

Parameter

<show>	Integer type.
0	Do not show header values defined in commands AT+CSCA , AT+CSMP (<sca> , <tosca> , <fo> , <vp> , <pid> , <dc>) nor <length> , <toda> or <tooa> in +CMT , +CMGL , +CMGR result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in +CMGR result code, do not show <pid> , <mn> , <da> , <toda> , <length> or <cdata> .
1	Show the values in result codes.

Example

```

AT+CSDH=0 //Set to disable the presenting of text mode parameters
OK
AT+CMGR=2
+CMGR: "STO UNSENT" ,"",
<This is a test from Quectel>
OK
AT+CSDH=1 //Set to enable the presenting of text mode parameters
OK
AT+CMGR=2
+CMGR: "STO UNSENT" ,"",128,17,0,0,143,"+8613800551500",145,18
<This is a test from Quectel>
OK
    
```

7.15. AT+CSMP Set Text Mode Parameters

This command selects values for additional parameters needed when SM is sent to the network or placed in a storage when text mode is selected (**AT+CMGF=1**). It is possible to set the validity period starting from when the SM is received by the SMSC (**<vp>** is in range 0 to 255) or define the absolute time of the validity period termination (**<vp>** is a string).

AT+CSMP Set Text Mode Parameters	
Test Command AT+CSMP=?	Response OK
Read Command AT+CSMP?	Response +CSMP: <fo>,<vp>,<pid>,<dc> OK
Write Command	Response

AT+CSMP=<fo>[,<vp>[,<pid>[,<dcs>]]]	OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference	
3GPP TS 27.005	

Parameter

<fo>	First octet. Depending on the command or result code: first octet of <i>3GPP TS 23.040</i> SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, SMS-COMMAND in integer format.
<vp>	Validity period. Depending on SMS-SUBMIT <fo> setting: <i>3GPP TS 23.040</i> TP-Validity-Period either in integer format (default 167) or in time-string format (see <dt>).
<pid>	Protocol identifier. <i>3GPP TS 23.040</i> TP-Protocol-Identifier in integer format (default 0).
<dcs>	Data coding scheme. Depending on the command or result code: <i>3GPP TS 23.038</i> SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format.

7.16. AT+QCMGS Send Concatenated Messages

This command sends concatenated messages. Different from **AT+CMGS**, when sending a concatenated message via this command, each segment of the concatenated message must be identified by the additional parameters <uid>, <msg_seg> and <msg_total>. When sending all segments of the message one by one, **AT+QCMGS** must be executed multiple times (equal to <msg_total>) for each segment.

This command is only applicable in text mode (**AT+CMGF=1**).

AT+QCMGS Send Concatenated Messages	
Test Command AT+QCMGS=?	Response OK
Write Command Valid only in text mode (AT+CMGF=1): AT+QCMGS=<da>[,<toda>][,<uid>,<msg_seg>,<msg_total>]<CR>	Response > After > is returned, input the text message. After that, tap ctrl-Z [Hex: 1A] to send the message. Sending can be cancelled by tapping ESC . If the message is sent successfully: +QCMGS: <mr>

	<p>OK</p> <p>If there is an error related to ME functionality: +CMS ERROR: <err></p> <p>If there is any other error: ERROR</p>
Maximum Response Time	120 s, determined by the network.
Characteristics	/

Parameter

<uid>	Integer type. Message identification in the user data header (UDH). Range: 0–255. This parameter is defined and inputted by the user. All segments of a same concatenated message must have the same <uid> . Different concatenated messages should have different <uid> .
<msg_seg>	Integer type. Sequence number of a concatenated message. Range: 0–7. <msg_seg>=0 means: ignore the value and regard it as a non-concatenated message.
<msg_total>	Integer type. The total number of the segments of one concatenated message. Range: 0–7. <msg_total>=0 or 1 means: ignore the value and regard it as a non-concatenated message.
<da>,<tda>,<mr>	See AT+CMGS .
<err>	Error code. See Table 29 for possible <err> values.

NOTE

- For concatenated messages, the maximum length is reduced by the length of the user data header (UDH). *3GPP TS 23.040* defines two kinds of UDH lengths: 6 bytes and 7 bytes, so the two kinds of **<uid>** are 8-bit (6 bytes) and 16-bit (7 bytes). **AT+QCMGS** uses 8-bit **<uid>**.
 - In case of GSM 7 bit default alphabet data coding scheme, the maximum length of each segment of a concatenated message is $(140 \text{ octets} - 6) \times 8 / 7 = 153$ characters.
 - In case of 16-bit UCS2 data coding scheme, the maximum length of each segment is $(140 - 6) / 2 = 67$ characters.
 - In case of 8-bit data coding scheme, the maximum length of each segment is $140-6=134$ characters.
- <mr>** Message-Reference field gives an integer representation of a reference number of the SMS-SUBMIT or SMS-COMMAND submitted to the SC by the MS, and it is used to confirm whether the SMS-DELIVER has been received from SC duplicate or not.

<uid> The field of UDH, is message identification of the concatenated SMS, which is different from **<mr>**. Each segment in a concatenated message should have the same **<uid>**, but **<mr>** must be incremented for each segment of a concatenated message.

3. **AT+QCMGS** does not support sending messages in PDU mode (**AT+CMGF=0**).

Example

```

AT+CMGF=1 //Set SMS message format to text mode
OK
AT+CSCS="GSM" //Set the character set used by the TE to "GSM"
OK
AT+QCMGS="15056913384",120,1,2<CR> //Input 120 for <uid>, and send the first segment of the
concatenated SMS
>ABCD<ctrl-Z> // [Hex: 1A]
+QCMGS: 190

OK
AT+QCMGS="15056913384",120,2,2<CR> //Send the second segment of the concatenated SMS.
>EFGH<ctrl-Z>
+QCMGS: 191

OK
    
```

7.17. AT+QCMGR Read Concatenated Messages

The function of this command is similar to **AT+CMGR**, except that the message to be read is a segment of concatenated messages, and parameters **<uid>**, **<msg_seg>** and **<msg_total>** would be shown in the result. Several segments should be concatenated to a whole concatenated message according to these three parameters.

Similar to **AT+QCMGS**, **AT+QCMGR** is only applicable in text mode (**AT+CMGF=1**).

AT+QCMGR Read Concatenated Messages	
Test Command AT+QCMGR=?	Response OK
Write Command Valid only in text mode (AT+CMGF=1): AT+QCMGR=<index>	Response If the command is executed successfully: For SMS-DELIVER: +QCMGR: <stat>,<oa>,[<alpha>],<scts>[,<toa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>][,<uid>,<msg_seg>,<msg_total>]<CR><LF><data> OK

	<p>For SMS-SUBMIT: +QCMGR: <stat>,<da>,[<alpha>],[<toda>,<fo>,<pid>,<dc s>],[<vp>],<sca>,<tosca>,<length>],[<uid>,<msg_seg>,<msg_total>]<CR><LF><data></p> <p>OK</p> <p>For SMS-STATUS-REPORTs: +QCMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>,<scts>,<dt>,<st></p> <p>OK</p> <p>For SMS-COMMANDs: +QCMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]</p> <p>OK</p> <p>If there is an error related to ME functionality: +CMS ERROR: <err></p>
Maximum Response Time	Depends on the length of message content.
Characteristics	/

Parameter

<index>	Integer type. A value in the range of location numbers supported by the associated memory.
<uid>	Integer type. Message identification in the user data header (UDH). Range: 0–65535 (see NOTE). All segments of a same concatenated message have the same <uid> . Different concatenated messages should have different <uid> .
<msg_seg>	Integer type. Sequence number of a concatenated message. Range: 1–7.
<msg_total>	Integer type. The total number of the segments of one concatenated message. Range: 2–7.
<err>	Error code. See Table 29 for possible <err> values. See AT+CMGR for other parameters.

NOTE

- The **<uid>** in **AT+QCMGR** is different from the **<uid>** in **AT+QCMGS**. It is possible that UE receives concatenated messages with 8-bit or 16-bit **<uid>**. So, its maximum value is 255 in 8-bit and 65535 in 16-bit.

2. If the message to be read is not a concatenated message, then `<uid>`, `<msg_seg>` and `<msg_total>` would not be shown in the result.

Example

```

+CMTI: "SM",3           //Incoming first segment of a concatenated message

+CMTI: "SM",4           //Incoming second segment of a concatenated message

AT+QCMGR= 3           //Read the first segment of the concatenated message
+QCMGR: "REC UNREAD","+8615056913384",,"13/07/30,14:44:37+32",120,1,2
ABCD

OK

AT+QCMGR= 4           //Read the second segment of the concatenated message
+QCMGR: "REC UNREAD","+8615056913384",,"13/07/30,14:44:37+32",120,2,2
EFGH

OK
    
```

8 Packet Domain Commands

8.1. AT+CGATT PS Attach or Detach

This command attaches the MT to, or detaches the MT from, the Packet Domain service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the **OK** response is returned. If the requested state cannot be achieved, an **ERROR** or **+CME ERROR** response is returned.

AT+CGATT PS Attach or Detach	
Test Command AT+CGATT=?	Response +CGATT: (list of supported <state> s) OK
Read Command AT+CGATT?	Response +CGATT: <state> OK
Write Command AT+CGATT=<state>	Response OK If there is an error related to ME functionality: +CME ERROR: <err>
Maximum Response Time	140 s, determined by the network.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<state>	Integer type. State of PS attachment. 0 Detached 1 Attached
<err>	Error code. See Table 28 for possible <err> values.

Example

```

AT+CGATT=1 //Attach to PS service
OK
AT+CGATT=0 //Detach from PS service
OK
AT+CGATT? //Query the current PS service state
+CGATT: 0
OK
    
```

8.2. AT+CGDCONT Define PDP Context

This command specifies PDP context parameters for a specific context **<cid>**. A special form of the Write Command (**AT+CGDCONT=<cid>**) causes the values for context **<cid>** to become undefined. It is not allowed to change the definition of an already activated context.

This Read Command returns the current settings for each defined PDP context.

AT+CGDCONT Define PDP Context	
Test Command AT+CGDCONT=?	Response +CGDCONT: (range of supported <cid>s), <PDP_type> , <APN> , <PDP_addr> , (list of supported <data_comp>s), (list of supported <head_comp>s), (list of supported <IPv4AddrAlloc>s) OK
Read Command AT+CGDCONT?	Response +CGDCONT: <cid> , <PDP_type> , <APN> , <PDP_addr> , <data_comp> , <head_comp> , <IPv4AddrAlloc> [...] OK
Write Command AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<data_comp>[,<head_comp>[,<IPv4AddrAlloc>]]]]]]]	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Reference
3GPP TS 27.007

Parameter

<cid>	Integer type. PDP context identifier, which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value is 1) is returned by the test form of the command. Range: 1–15.
<PDP_type>	String type. The type of packet data protocol. "IP" IPv4 "PPP" PPP "IPV6" IPv6 "IPV4V6" IPv4v6 "Non-IP" Non-IP
<APN>	String type. Access point name, a logical name used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.
<PDP_addr>	String type. Identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The allocated address may be read using AT+CGPADDR .
<data_comp>	Integer type. Controls PDP data compression (applicable for SNDCP only) (refer to <i>3GPP TS 44.065</i>). <u>0</u> OFF 1 ON 2 V.42bis
<head_comp>	Integer type. Controls PDP header compression (refer to <i>3GPP TS 44.065</i> and <i>3GPP TS 25.323</i>). <u>0</u> OFF 1 ON 2 RFC 1144 3 RFC 2507 4 RFC 3095
<IPv4AddrAlloc>	Integer type. Controls how the MT/TA requests to get the IPv4 address information. <u>0</u> IPv4 address allocation through NAS signaling

8.3. AT+CGACT PDP Context Activate or Deactivate

This command activates or deactivates the specified PDP context(s). Once the command is executed, the MT remains in V.250 command state. If any PDP context is already in the requested state, the state for

that context remains unchanged. If the MT is not PS attached when the activation form of the command is executed, the MT first performs a PS attach and then attempts to activate the specified contexts. If no **<cid>**s are specified, the activation/deactivation form of the command activates/deactivates all defined contexts.

AT+CGACT PDP Context Activate or Deactivate	
Test Command AT+CGACT=?	Response +CGACT: (list of supported <state> s) OK
Read Command AT+CGACT?	Response +CGACT: <cid> , <state> [+CGACT: <cid> , <state> [...]] OK
Write Command AT+CGACT=<state> , <cid>	Response OK Or ERROR If there is an error related to ME functionality: +CME ERROR: <err>
Maximum Response Time	150 s, determined by the network.
Characteristics	/
Reference	3GPP TS 27.007

Parameter

<state>	Integer type. Indicates the state of PDP context activation. 0 Deactivated 1 Activated
<cid>	Integer type. Specifies a particular PDP context definition (see AT+CGDCONT).
<err>	Error code. See Table 28 for possible <err> values

Example

```

AT+CGDCONT=1,"IP","UNINET" //Define a PDP context
OK
AT+CGACT=1,1 //Activate the PDP
OK
    
```

```
AT+CGACT=0,1 //Deactivate the PDP
OK
```

8.4. AT+CGPADDR Show PDP Address(es)

This command returns a list of PDP addresses for the specified context identifiers. If no **<cid>** is specified, the addresses for all defined contexts are returned.

AT+CGPADDR Show PDP Address(es)	
Test Command AT+CGPADDR=?	Response +CGPADDR: (list of defined <cid> s) OK
Write Command AT+CGPADDR[=<cid>[,<cid>[,...]]]	Response +CGPADDR: <cid>[,<PDP_addr>] [+CGPADDR: <cid>[,<PDP_addr>] [...]] OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	/
Reference	3GPP TS 27.007

Parameter

<cid>	Integer type. Specifies a particular PDP context definition (see AT+CGDCONT).
<PDP_addr>	String type. 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 AT+CGDCONT 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.

Example

```
AT+CGDCONT=1,"IP","UNINET" //Define a PDP context
OK
```

```

AT+CGACT=1,1 //Activate the PDP
OK
AT+CGPADDR=1 //Show the PDP address
+CGPADDR: 1,10.76.51.180
OK
    
```

8.5. AT+CGEREP Packet Domain Event Reporting

This command enables or disables sending of unsolicited result codes **+CGEV: XXX** from MT to TE in the case of certain events occurring in the Packet Domain MT or the network. **<mode>** controls the processing of unsolicited result codes specified within this command. **<bfr>** controls the effect on buffered codes when **<mode>** 1 or 2 is entered.

AT+CGEREP Packet Domain Event Reporting	
Test Command AT+CGEREP=?	Response +CGEREP: (range of supported <mode> s),(list of supported <bfr> s) OK
Read Command AT+CGEREP?	Response +CGEREP: <mode> , <bfr> OK
Write Command AT+CGEREP=<mode>[,<bfr>]	Response OK If there is any error: ERROR
Execution Command AT+CGEREP	Response OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference	3GPP TS 27.007

Parameter

<mode>	Integer type. <u>0</u> Buffer unsolicited result codes in the MT. If MT result code buffer is full, the oldest
---------------------	-------------------------------------------------------------------------------------------------------------------

ones can be discarded. No codes are forwarded to the TE.

- 1 Discard unsolicited result codes when MT-TE link is reserved (e.g., in on-line data mode); otherwise forward them directly to the TE.
- 2 Buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g., in data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE.

<bfr>

Integer type.

- 0 MT buffer of unsolicited result codes defined within this command is cleared when **<mode>** 1 or 2 is entered.
- 1 MT buffer of unsolicited result codes defined within this command is flushed to the TE when **<mode>** 1 or 2 is entered (**OK** response should be given before flushing the codes).

NOTE

The unsolicited result codes and the corresponding events are defined as follows:

1. **+CGEV: REJECT <PDP_type>,<PDP_addr>**: A network request for PDP context activation occurred when the MT was unable to report it to the TE with a **+CRING** unsolicited result code and was automatically rejected.
 Note: This event is not applicable to EPS.
2. **+CGEV: NW REACT <PDP_type>,<PDP_addr>,[<cid>]**: The network has requested a context reactivation. The **<cid>** used to reactivate the context is provided if known to the MT.
 Note: This event is not applicable to EPS.
3. **+CGEV: NW DEACT <PDP_type>,<PDP_addr>,[<cid>]**: The network has forced a context deactivation. The **<cid>** used to activate the context is provided if known to the MT.
4. **+CGEV: ME DEACT <PDP_type>,<PDP_addr>,[<cid>]**: The mobile equipment has forced a context deactivation. The **<cid>** used to activate the context is provided if known to the MT.
5. **+CGEV: NW DETACH**: The network has forced a Packet Domain detach. This implies that all active contexts have been deactivated. These are not reported separately.
6. **+CGEV: ME DETACH**: The mobile equipment has forced a Packet Domain detach. This implies that all active contexts have been deactivated. These are not reported separately.

Parameter

<PDP_type>	Packet data protocol type. A string parameter which specifies the type of packet data protocol. "IP" IPv4 "PPP" PPP "IPV6" IPv6 "IPV4V6" IPv4v6
<PDP_addr>	A string parameter identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP.

<cid>	PDP context identifier. A numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value=1) is returned by the test form of AT+CGDCONT .
--------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Example

```

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

OK
AT+CGEREP?
+CGEREP: 0,0

OK
    
```

8.6. AT+CGSMS Select Service for MO SMS Messages

This command specifies the service or service preference that the MT will use to send MO (mobile originated) SMS messages.

AT+CGSMS Select Service for MO SMS Messages	
Test Command AT+CGSMS=?	Response +CGSMS: (range of currently available <service> s) OK
Read Command AT+CGSMS?	Response +CGSMS: <service> OK
Write Command AT+CGSMS=[<service>]	Response OK If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

	The configuration is saved automatically.
Reference 3GPP TS 27.007	

Parameter

<service>	Integer type. Indicates the service or service preference to be used. 0 Packet domain 1 Circuit switch<err>
<err>	Error code. See Table 28 for possible <err> values.

8.7. AT+CEREG EPS Network Registration Status

This command queries the LTE network registration status and controls the presentation of an unsolicited result code **+CEREG: <stat>** when **<n>=1** and there is a change in the MT's EPS network registration status in E-UTRAN, or unsolicited result code **+CEREG: <stat>,[<tac>],[<ci>],[<AcT>]** when **<n>=2** and there is a change of the network cell in E-UTRAN.

If the UE wants to apply PSM for reducing its power consumption, see **AT+CPSMS** and 3GPP TS 23.682, this command controls the presentation of an unsolicited result code **+CEREG: <stat>,[<tac>],[<ci>],[<AcT>],[<Active-Time>],[<Periodic-TAU>]** when **<n>=4** and there is a change of the network cell in E-UTRAN.

AT+CEREG EPS Network Registration Status	
Test Command AT+CEREG=?	Response +CEREG: (list of supported <n>s) OK
Read Command AT+CEREG?	Response When <n>=0, 1, or 2 and the command is executed successfully: +CEREG: <n>,<stat>,[<tac>],[<ci>],[<AcT>],[<cause_type>,<reject_cause>] When <n>=4 and the command is executed successfully: +CEREG: <n>,<stat>,[<tac>],[<ci>],[<AcT>],[<Active-Time>],[<Periodic-TAU>] OK
Write Command	Response

AT+CEREG[=<n>]	OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with AT&W .
Reference	
3GPP TS 27.007	

Parameter

<n>	Integer type. <ul style="list-style-type: none"> 0 Disable network registration unsolicited result code 1 Enable network registration unsolicited result code: +CEREG: <stat> 2 Enable network registration and location information unsolicited result code: +CEREG: <stat>[,<tac>],<ci>,<AcT>]] 4 For a UE that has applied PSM and network assigns T3324 to UE, enable network registration and location information unsolicited result code: +CEREG: <stat>[,<tac>],<ci>,<AcT>][,],[<Active-Time>],[<Periodic-TAU>]]]]
<stat>	Integer type. Indicates the EPS registration status. <ul style="list-style-type: none"> 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
<tac>	String type. Two-byte tracking area code in hexadecimal format.
<ci>	String type. Four-byte E-UTRAN cell ID in hexadecimal format.
<AcT>	Access technology selection <ul style="list-style-type: none"> 7 eMTC 9 NB-IoT
<Active-Time>	String type. One byte in an 8-bit format. Active Time value (T3324) to be allocated to the UE. (e.g., "00001111" equals 1 minute) Bits 5 to 1 represent the binary coded timer value. Bits 6 to 8 define the timer value unit as follows: Bits 8 7 6 0 0 0 value is incremented in multiples of 2 seconds 0 0 1 value is incremented in multiples of 1 minute 0 1 0 value is incremented in multiples of decihours

1 1 1 value indicates that the timer is deactivated.

<Periodic-TAU> String type. One byte in an 8-bit format. Extend periodic TAU value (T3412_ext) to be allocated to the UE in E-UTRAN.

(e.g., "00001010" equals 100 minutes)

Bits 5 to 1 represent the binary coded timer value.

Bits 6 to 8 define the timer value unit as follows:

Bits

8 7 6

0 0 0 value is incremented in multiples of 10 minutes

0 0 1 value is incremented in multiples of 1 hour

0 1 0 value is incremented in multiples of 10 hours

0 1 1 value is incremented in multiples of 2 seconds

1 0 0 value is incremented in multiples of 30 seconds

1 0 1 value is incremented in multiples of 1 minute

9 Hardware-Related Commands

9.1. AT+QPOWD Power Down

This command powers off the module. Utilization of PON_TRIG pin is mandatory. The UE will return **OK** immediately when the command is executed successfully. After setting the PON_TRIG pin to 'low' state, the UE will deactivate the network, set STATUS and VDD_EXT pins low, output **POWERED DOWN** and enter power-off state. The maximum time for unregistering from the network is 60 s. To avoid data loss, the module power supply must not be disconnected before the module's STATUS pin is set low and the URC **POWERED DOWN** is outputted.

AT+QPOWD Power Down	
Test Command AT+QPOWD=?	Response +QPOWD: (list of supported <n>s) OK
Write Command AT+QPOWD[=<n>]	Response OK POWERED DOWN
Maximum Response Time	300 ms
Characteristics	/

Parameter

<n>	Integer type. Power down mode.
0	Immediate power-down
1	Normal power-down

Example

```

AT+QPOWD //Perform normal power-down of the module
OK
PON_TRIG: OFF //Do de-assert of PON_TRIG (low)
    
```

```

POWERED DOWN //The module is powered off, and serial ports are not accessible
PON_TRIG: ON //Do assert of PON_TRIG (high)
PWRKEY: ON //Do assert of PWRKEY (low ~ 500 ms)
//The module will power on, transmitting the boot URCs
    
```

9.2. AT+CCLK Clock

This command sets or queries the real time clock (RTC) of the module. The current setting is retained until the module is totally disconnected from power supply.

AT+CCLK Clock	
Test Command AT+CCLK=?	Response OK
Read Command AT+CCLK?	Response +CCLK: <time> OK
Write Command AT+CCLK=<time>	Response OK If there is an error related to ME functionality: +CME ERROR: <err> If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	/
Reference	3GPP TS 27.007

Parameter

<time>	String type. The format is “yy/MM/dd,hh:mm:ss±zz”, indicating year (last two 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: -48...+56). E.g., May 6, 1994, 22:10:00 GMT+2 hours equals “94/05/06,22:10:00+08”.
<err>	Error code. See Table 28 for possible <err> values.

Example

```
AT+CCLK? //Query the local time
+CCLK: "08/01/04,00:19:43+00"

OK
```

9.3. AT+CBC Battery Charge

This command returns battery charge status (<bcs>) and battery charge level (<bcl>) of the MT.

AT+CBC Battery Charge	
Test Command AT+CBC=?	Response +CBC: (range of supported <bcs>s),(range of supported <bcl>s),<voltage> OK
Execution Command AT+CBC	Response +CBC: <bcs>,<bcl>,<voltage> OK If there is an error related to ME functionality: +CME ERROR: <err>
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<bcs>	Integer type. Battery charge status. 0 ME is not charging 1 ME is charging 2 Charging has been finished
<bcl>	Integer type. Battery charge level. 0–100 Battery has 0–100 percent of capacity remaining
<voltage>	Battery voltage. Unit: mV.
<err>	Error code. See Table 28 for possible <err> values.

9.4. AT+QADC Read ADC Value

The command reads the voltage value of ADC channel.

AT+QADC Read ADC Value	
Test Command AT+QADC=?	Response +QADC: (list of supported <port>s) OK
Read Command AT+QADC=<port>	Response +QADC: <status>,<value> OK
Maximum Response Time	300ms

Parameter

<port>	Integer type. ADC channel number. 0 ADC Channel 0 1 ADC Channel 1
<status>	Integer type. Indicates whether the ADC value has been read successfully. 0 Fail 1 Success
<value>	Voltage of specified ADC channel. Unit: mV.

9.5. AT+QSCLK Enable/Disable Sleep Mode

This command controls whether to enable the UE to enter sleep mode. It is mandatory to control sleep mode with MAIN_DTR and PON_TRIG pins.

AT+QSCLK Enable/Disable Sleep Mode	
Test Command AT+QSCLK=?	Response +QSCLK: (list of supported <n>s) OK
Read Command AT+QSCLK?	Response +QSCLK: <n>

	OK
Write Command AT+QSCLK=<n>	Response OK If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<n>	Integer type.
0	Disable sleep mode
1	Enable sleep mode level 1. It is controlled by MAIN_DTR and PON_TRIG
2	Enable sleep mode level 2. It is controlled by MAIN_DTR and PON_TRIG

NOTE

Sleep mode level 2 has lower power consumption than sleep mode level 1.

Example

```

AT+CFUN=0 //Switch the UE to minimum functionality mode
OK
MAIN_DTR: ON //Do assert of MAIN_DTR pin (low)
AT+QSCLK=2 //Enable sleep mode level 2
OK
MAIN_DTR: OFF //Do de-assert of MAIN_DTR (high)
PON_TRIG: OFF //Do de-assert of PON_TRIG (low)
//The module is in sleep mode, and serial ports are not accessible.
PON_TRIG: ON //Do assert of PON_TRIG (high)
MAIN_DTR: ON //Do assert of MAIN_DTR (low)
AT+QSCLK=0 //Disable sleep mode
OK
AT+CFUN=1 //Switch the UE to full functionality mode
OK
    
```

9.6. AT+QTEMP Read Temperature

This command read the temperature of PMIC, XO and PA.

AT+QTEMP Read Temperature	
Test Command AT+QTEMP=?	Response OK
Execution Command AT+QTEMP	Response +QTEMP: <pmic_temp>,<xo_temp>,<pa_temp> OK If there is any error: ERROR
Maximum Response Time	300 ms

Parameter

<pmic_temp>	PMIC temperature. Unit: degrees Celsius.
<xo_temp>	XO temperature. Unit: degrees Celsius.
<pa_temp>	PA temperature. Unit: degrees Celsius.

10 DFOTA-Related AT Commands

For more information on the DFOTA function, see *document [4]*.

Table 6: DFOTA-Related AT Commands

Command	Description
AT+QFOTADL	Update firmware via DFOTA
AT+QCFGEXT="fota_apn"	Configure IP family and APN for DFOTA

11 FTP(S)-Related AT Commands

For more information on the FTP(S) function, see *document [5]*.

Table 7: FTP(S)-Related AT Commands

Command	Description
AT+QFTPCFG	Configure parameters for FTP(S) server
AT+QFTPOPEN	Login to FTP(S) server
AT+QFTPCWD	Configure the current directory on FTP(S) server
AT+QFTPPWD	Get the current directory on FTP(S) server
AT+QFTPPUT	Upload a file to FTP(S) server
AT+QFTPGET	Download a file from FTP(S) server
AT+QFTPSIZE	Get file size on FTP(S) server
AT+QFTPDEL	Delete a file on FTP(S) server
AT+QFTPMKDIR	Create a folder on FTP(S) server
AT+QFTPRMDIR	Delete a folder on FTP(S) server
AT+QFTPLIST	List content of a directory on FTP(S) server
AT+QFTPNLIST	List file names of a directory on FTP(S) server
AT+QFTPMLSD	List standardized file and directory information
AT+QFTPMDTM	Get the file modification time on FTP(S) server
AT+QFTPRENAME	Rename a file or folder on FTP(S) server
AT+QFTPLEN	Get the length of transferred data
AT+QFTPSTAT	Get the status of FTP(S) server
AT+QFTPCLOSE	Log out from FTP(S) server

12 HTTP(S)-Related AT Commands

For more information on the HTTP(S) function, see *document [6]*.

Table 8: HTTP(S)-Related AT Commands

Command	Description
AT+QHTTPCFG	Configure parameters for HTTP(S) server
AT+QHTTPURL	Set URL of HTTP(S) server
AT+QHTTPGET	Send GET request to HTTP(S) server
AT+QHTTPPOST	Send POST request to HTTP(S) server via UART/USB
AT+QHTTPPOSTFILE	Send POST request to HTTP(S) server via file
AT+QHTTPPUT*	Send PUT request to HTTP(S) server via UART/USB
AT+QHTTPPUTFILE*	Send PUT request to HTTP(S) server via file
AT+QHTTPREAD	Read response from HTTP(S) server via UART/USB
AT+QHTTPREADFILE	Store the response from HTTP(S) server to file

13 TCP/IP-Related AT Commands

For more information on the TCP/IP function, see [document \[7\]](#).

Table 9: TCP/IP-Related AT Commands

Command	Description
AT+QICSGP	Configure parameters of a TCP/IP context
AT+QICFG	Configure optional parameters
AT+QIACT	Activate a PDP context
AT+QIDEACT	Deactivate a PDP context
AT+QIOPEN	Open a socket service
AT+QICLOSE	Close a socket service
AT+QISTATE	Query socket service status
AT+QISEND	Send data
AT+QIRD	Retrieve the received TCP/IP data
AT+QPING	Ping a remote host
AT+QIDNSGIP	Get IP address by domain name
AT+QISENDEX	Send hex string data
AT+QISWTMD	Switch data access mode
AT+QNTP	Synchronize local time with NTP server
AT+QIDNSCFG	Configure address of DNS server
AT+QISDE	Control whether to echo the data for AT+QISEND
AT+QIGETERROR	Query the last result code

14 GNSS-Related AT Commands

For more information on GNSS function, see [document \[8\]](#).

Table 10: GNSS-Related AT Commands

Command	Description
AT+QGPSCFG	Configure GNSS
AT+QGPS	Turn on GNSS
AT+QGSEND	Turn off GNSS
AT+QGPSLOC	Acquire positioning information
AT+QGPSGNMEA	Acquire NMEA sentences
AT+QCFGEXT	Query and configure extended settings
AT+QGPSXTRA	Enable/Disable XTRA function
AT+QGPSXTRATIME*	Inject XTRA time
AT+QGPSXTRADATA	Check XTRA file validity
AT+QCFGEXT	Query and configure extended settings for GNSS
AT+QGPSDEL	Delete assistance data
AT+QGPSADATA	Query and Configure LLE data query and configure LLE data
AT+QGPSRM	Enable/disable RF mute
AT+QGPSPPS	Enable/disable 1PPS output
AT+QGPSFW	Update GNSS firmware
AT+QGPSRST	Reset GNSS
AT+QGPSPSM	Sleep and wake up GNSS

NOTE

AT+QGPSADATA, AT+QGPSRM, AT+QGSPSPS, AT+QGPSFW, AT+QGPSRST, AT+QGSPSPM are BG951A-GL-Specific AT Commands.

15 QuecLocator[®] AT Commands

For more information on the QuecLocator[®] function, see document [9].

Table 11: QuecLocator[®]-Related AT Commands

Command	Description
AT+QLBSCFG	Configure parameters for QuecLocator
AT+QLBS	Get location information by QuecLocator

16 FILE-Related AT Commands

For more information on the FILE function, see *document [10]*.

Table 12: FILE-Related AT Commands

Command	Description
AT+QFLDS	Get the space information of storage medium
AT+QFLST	List file information on storage medium
AT+QFDEL	Delete file(s) on storage medium
AT+QFUPL	Upload file to storage medium
AT+QFDWL	Download file from storage medium
AT+QFOPEN	Open a file
AT+QFREAD	Read a file
AT+QFWRITE	Write to a file
AT+QFSEEK	Set file pointer to a position
AT+QFPOSITION	Get offset of file pointer
AT+QFTUCAT	Truncate file from file pointer
AT+QFCLOSE	Close a file
AT+QFCRC	Calculate CRC of a specified UFS file
AT+QFCPY	Make a copy of a specified file

17 MQTT-Related AT Commands

For more information on the MQTT function, see *document [11]*.

Table 13: MQTT-Related AT Commands

Command	Description
AT+QMTCFG	Configure optional parameters of MQTT
AT+QMTOPEN	Open a network connection for MQTT client
AT+QMTCLOSE	Close a network connection for MQTT client
AT+QMTCONN	Connect a client to MQTT server
AT+QMTDISC	Disconnect a client from MQTT server
AT+QMTSUB	Subscribe to topics
AT+QMTUNS	Unsubscribe from topics
AT+QMTPUB	Publish messages (Data Mode)
AT+QMTPUBEX	Publish messages (Command Mode)
AT+QMTRECV	Read messages from buffer

18 CoAP-Related AT Commands

For more information on CoAP, see *document [12]*.

Table 14: CoAP-Related AT Commands

Command	Description
AT+QCOAPCFG	Configure optional parameters of CoAP client
AT+QCOAPOPEN	Create a CoAP session
AT+QCOAPCLOSE	Disconnect from CoAP server
AT+QCOAPHEADER	Configure CoAP message header
AT+QCOAPOPTION	Configure CoAP message options
AT+QCOAPSEND	Send CoAP message

19 LwM2M-Related AT Commands

For more information on LwM2M function, see *document [13]*.

Table 15: LwM2M-Related AT Commands

Command	Description
AT+QLWCFG	Configure LwM2M Client
AT+QLWSVC	Manage LwM2M Session

20 FTM-Related AT Commands

For more information on the FTM function, see *document [14]*.

Table 16: FTM-Related AT Commands

Command	Description
AT+QRFTESTMODE	Enter/exit FTM
AT+QRFTEST	Transmit in FTM
AT+QRXFTM	Receive in FTM

21 PSM-Related AT Commands

For more information on the PSM function, see *document [15]*.

Table 17: PSM-Related AT Commands

Command	Description
AT+CPSMS	Power saving mode setting
AT+QPSMS	Extended power saving mode setting
AT+QPSMCFG	PSM feature and minimum threshold value setting
AT+QCFG="psm/enter"	Trigger the module into PSM immediately
AT+QCFG="psm/urc"	Enable/disable PSM entering indication

22 SSL-Related AT Commands

For more information on the SSL function, see *document [16]*.

Table 18: SSL-Related AT Commands

Command	Description
AT+QSSLCFG	Configure parameters of an SSL context
AT+QSSLOPEN	Open an SSL socket to connect to a remote server
AT+QSSLSEND	Send data via SSL connection
AT+QSSLRECV	Retrieve data via SSL connection
AT+QSSLCLOSE	Close an SSL connection
AT+QSSLSTATE	Query the state of SSL connections
AT+QSSLCRYPT	Encrypt/decrypt data with a specified algorithm

23 NIDD-Related AT Commands

For more information on the NIDD function, see *document [17]*.

Table 19: NIDD-Related AT Commands

Command	Description
AT+QCFGEXT="nipdcfg"	Configure NIDD connection
AT+QCFGEXT="nipd"	Open/close NIDD connection
AT+QCFGEXT="nipds"	Send MO non-IP data
AT+QCFGEXT="nipdr"	Retrieve MT non-IP data

24 EMUX-Related AT Commands

For more information on the EMUX function, see *document [18]*.

Table 20: EMUX-Related AT Commands

Command	Description
AT+EMUX	Multiplexing mode
AT+QCFG="emux/urcport"	Configure URC output channel in EMUX mode

25 Extended-Configuration Commands

For more information on the extended configuration commands, see the following two documents:

- [document \[20\]](#)
- [document \[21\]](#)

Table 21: Extended Configuration Commands

Command	Description
AT+QCFG="servicedomain"	Configure service domain
AT+QCFG="nwscanseq"	Configure RATs searching sequence
AT+QCFG="band"	Configure frequency band
AT+QCFG="iotopmode"	Configure network category to be searched under LTE RAT
AT+QCFG="celevel"	Query NB-IoT coverage enhancement level
T+QCFG="psm/enter"	Trigger the module into PSM immediately
AT+QCFG="psm/urc"	Enable/disable PSM entering indication
T+QCFG="lapiconf"	Set LAPI value (low access priority indicator)
AT+QCFG="urc/ri/ring"	Configure MAIN_RI behavior in case of RING URC
AT+QCFG="urc/ri/smsincoming"	Configure MAIN_RI behavior in case of incoming SMS URCs
AT+QCFG="urc/ri/other"	Configure MAIN_RI behavior in case of other URCs
AT+QCFG="risignaltpe"	Configure MAIN_RI signal output carrier
AT+QCFG="urc/delay"	Configure URC output time
AT+QCFG="gpio"	Configure GPIO status
AT+QCFG="airplanecontrol"	Enable/disable airplane mode control via W_DISABLE#
AT+QCFG="emux/urcport"	Configure URC output port in EMUX Mode

AT+QCFG="apready"*	Configure AP_READY behavior
AT+QCFG="apn/display"	Enable/disable showing APN
AT+QCFG="lwm2m"	Enable/disable LWM2M
AT+QCFG="nwoper"	Configure network operator mode of the modem
AT+QCFG="netupd"	Enable/disable network override for specified LTE parameters
AT+QCFG="edrxusimact"	Activate/deactivate (U)SIM in eDRX mode
AT+QCFG="setcfg"	Set configuration field to the NV memory
AT+QCFG="setsyscfg"	Set value(s) to system configuration files
AT+QCFG="uartmapping"	Show port and function mapping
AT+QCFG="usb"	Activate/deactivate USB interface
AT+QCFG="usb/urcport"	Configure URC output port in USB interface mode
AT+QCFG="lte/bandprior"	Configure band scan priority under LTE
AT+QCFG="stored/cell"	Delete Stored Cell Acquisition DB
AT+QCFGEXT="nipdcfg"	Configure NIDD connection
AT+QCFGEXT="nipd"	Open/close NIDD connection
AT+QCFGEXT="nipds"	Send MO non-IP data
AT+QCFGEXT="nipdr"	Retrieve MT non-IP data
AT+QCFGEXT="fota_apn"	Configure IP family and APN for DFOTA
AT+QCFGEXT="stats"	Return counters per LTE protocol layer/sub-system
AT+QCFGEXT="quecopen"*	Enable/disable QuecOpen function
AT+QCFGEXT="ver"	Display SW/FW version information
AT+QCFGEXT="debug"	Configure debug mode
AT+QCFGEXT="devinfo"	Query device identification values
AT+QCFGEXT="meas"	Return the measurement for the specified measurement type
AT+QCFGEXT="setbdelay"	Set u-boot delay
AT+QCFGEXT="copstout"	Set maximum timeout for AT+COPS=? command

AT+QCFGEXT="rpm"	Set RPM modem mode
AT+QCFGEXT="lbs"	Get LBS related information from the LTE modem
AT+QCFGEXT="addgeo"	Add a geo-fence
AT+QCFGEXT="deletegeo"	Delete a geo-fence
AT+QCFGEXT="querygeo"	Query the position relative to geo-fence
AT+QCFGEXT="xonoff"	Enable software flow control

26 Polte-Related AT Commands

For more information on Polte function, see *document [22]*.

Table 22: Polte-Related AT Commands

Command	Description
AT+QPOLTECFG	Configure parameters of Polte SR service
AT+QPOLTE	Trigger Polte SR functionality
AT+QPOLTECRCFG	Configure parameters of Polte CR feature
AT+QPOLTECR	Send Polte CR location request

27 Appendix References

27.1. References

Table 23: Related Documents

Document Name
[1] V.25ter: Serial asynchronous automatic dialing and control
[2] 3GPP TS 27.007: Digital cellular telecommunications (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; AT command set for User Equipment (UE)
[3] 3GPP TS 27.005: Digital cellular telecommunications (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE-DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)
[4] Quectel_BG770A-GL&BG95xA-GL_DFOTA_Application_Note
[5] Quectel_BG770A-GL&BG95xA-GL_FTP(S)_Application_Note
[6] Quectel_BG770A-GL&BG95xA-GL_HTTP(S)_Application_Note
[7] Quectel_BG770A-GL&BG95xA-GL_TCP(IP)_Application_Note
[8] Quectel_BG770A-GL&BG95xA-GL_GNSS_Application_Note
[9] Quectel_BG770A-GL&BG95xA-GL_QuecLocator_Application_Note
[10] Quectel_BG770A-GL&BG95xA-GL_FILE_Application_Note
[11] Quectel_BG770A-GL&BG95xA-GL_MQTT_Application_Note
[12] Quectel_BG770A-GL&BG95xA-GL_CoAP_Application_Note
[13] Quectel_BG770A-GL&BG95xA-GL_LwM2M_Application_Note
[14] Quectel_BG770A-GL&BG95xA-GL_RF_FTM_Application_Note

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- [15] Quectel_BG770A-GL&BG95xA-GL_PSM_Application_Note
-
- [16] Quectel_BG770A-GL&BG95xA-GL_SSL_Application_Note
-
- [17] Quectel_BG770A-GL&BG95xA-GL_NIDD_Application_Note
-
- [18] Quectel_BG77xA-GL&BG95xA-GL_EMUX_Application_Note
-
- [19] Quectel_BG770A-GL&BG95xA-GL_Network_Searching_Scheme_Introduction
-
- [20] Quectel_BG77xA-GL&BG95xA-GL_QCFG_AT_Commands_Manual
-
- [21] Quectel_BG77xA-GL&BG95xA-GL_QCFGEXT_AT_Commands_Manual
-
- [22] Quectel_BG77xA-GL&BG95xA-GL_Positioning_Over_LTE_Application_Note
-

Table 24: Terms and Abbreviations

Abbreviation	Description
AMR	Adaptive Multi-Rate
APN	Access Point Name
ADC	Analog-to-Digital Converter
AP	Access Point/Application Processor
BCD	Binary-Coded Decimal
CBM	Cell Broadcast Message
CLIR	Calling Line Identification Restriction
CoAP	Constrained Application Protocol
CSD	Circuit Switch Data
DCD	Data Carrier Detection
DCE	Data Communication Equipment
DFOTA	Delta Firmware Upgrade Over-The-Air
DNS	Domain Name Server
DTE	Data Terminal Equipment

DTR	Data Terminal Ready
ECT	Explicit Call Transfer
e-I-DRX	Extended Idle Discontinuous Reception
eMTC	enhanced Machine Type Communication
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
FTM	Factory Test Mode
FTP	File Transfer Protocol
FTPS	File Transfer Protocol Secure
GGSN	Gateway GPRS Support Node
GMT	Greenwich Mean Time
GNSS	Global Navigation Satellite System
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HEX	Hexadecimal
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
IMS	IP Multimedia Subsystem
IRA	International Reference Alphabet
LTE	Long-Term Evolution
LwM2M	Lightweight Machine to Machine
ME	Mobile Equipment
MQTT	Message Queuing Telemetry Transport
MS	Mobile Station
MT	Mobile Termination
NAS	Non-Access Stratum

NB-IoT	Narrowband Internet of Things
NITZ	Network Identity and Time Zone / Network Informed Time Zone.
NTP	Network Time Protocol
NVRAM	Non-Volatile Random Access Memory
OoS	Out of Service
PA	Power Amplifier
PC	Personal Computer
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PMIC	Power Management IC
PoLTE	Positioning Over LTE
PSC	Primary Synchronization Code
PSM	Power Saving Mode
PTW	Paging Time Window
RAT	Radio Access Technology
RAU	Routing Area Update
RRC	Radio Resource Control
RSRQ	Reference Signal Received Quality
RTS/CTS	Request To Send/Clear To Send
SINR	Signal-to-interference-plus-noise-ratio
SC	Service Center
SGSN	Serving GPRS Support Node
SM	Session Management
SMS	Short Message Service
SMSC	Short Message Service Center

SSL	Secure Sockets Layer
TA	Terminal Adapter
TAU	Tracking Area Update
TCIP/IP	Transmission Control Protocol / Internet Protocol
TCP	Transmission Control Protocol
TE	Terminal Equipment
TP	Touch Panel
UCS	Universal Coded Character Set
UDH	User Data Header
UDP	User Datagram Protocol
UE	User Equipment
UFS	User File System/ Universal Flash Storage
URC	Unsolicited Result Code
(U)SIM	Universal Subscriber Identity Module
VoLTE	Voice over LTE (Long Term Evolution)
XO	Crystal Controlled Clock Oscillator

27.2. Factory Default Settings Restorable with AT&F0

Table 25: Factory Default Settings Restorable with AT&F0

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATS3	<n>	13
ATS4	<n>	10

ATS5	<n>	8
ATV	<value>	1
AT&C	<value>	1
AT&D	<value>	2
AT+CREG	<n>	0
AT+CMEE	<n>	1
AT+CSCS	<chset>	"GSM"
AT+CSMS	<service>	0
AT+CMGF	<mode>	0
AT+CSMP	<fo>,<vp>,<pid>,<dc>	17,167,0,0
AT+CSDH	<show>	0
AT+CPMS	<mem1>,<mem2>,<mem3>	"ME","ME","ME"
AT+CNMI	<mode>,<mt>,<bm>,<ds>,<bfr>	2,1,0,0,0
AT+CMMS	<n>	0
AT+CTZR	<reporting>	0
AT+CGEREP	<mode>,<brf>	0,0
AT+CEREG	<n>	0

27.3. AT Command Settings Storable with AT&W

Table 26: AT Command Settings Storable with AT&W

AT Command	Parameter	Display with AT&V
ATE	<value>	Yes
ATQ	<n>	Yes
ATV	<value>	Yes

AT&C	<value>	Yes
AT&D	<value>	Yes
AT+IPR	<rate>	No
AT+CREG	<n>	No
AT+CEREG	<n>	No

27.4. AT Command Settings Restorable with ATZ

Table 27: AT Command Settings Restorable with ATZ

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATV	<value>	1
AT&C	<value>	1
AT&D	<value>	2
AT+CREG	<n>	0
AT+CEREG	<n>	0

27.5. Summary of CME ERROR Codes

Final result code **+CME ERROR: <err>** indicates an error related to mobile equipment or network. The operation of **+CME ERROR: <err>** final result code is similar to the regular **ERROR** result code: if **+CME ERROR: <err>** is the result code for any of the commands in a command line, none of the following commands in the same command line is executed (neither **ERROR** nor **OK** result code will be returned as a result of a completed command line execution). The format of **<err>** can be either numeric or verbose. This is set with **AT+CMEE**.

The following table lists some general errors.

Table 28: Summary of General +CME ERROR Codes

Numeric <err> Value	Verbose <err> Value
0	phone failure
1	no connection to phone
2	phone-adaptor link reserved
3	operation not allowed
4	operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string

26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout
32	network not allowed - emergency calls only
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
46	corporate personalization PIN required
47	corporate personalization PUK required

27.6. Summary of CMS ERROR Codes

Final result code **+CMS 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 will be returned.

The following table lists some of the **<err>** values used by common messaging commands.

Table 29: Summary of General +CMS ERROR Codes

Numeric <err> Value	Verbose <err> Value
300	ME failure
301	SMS service of ME reserved
302	operation not allowed

303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	(U)SIM not inserted
311	(U)SIM PIN required
312	PH-(U)SIM PIN required
313	(U)SIM failure
314	(U)SIM busy
315	(U)SIM wrong
316	(U)SIM PUK required
317	(U)SIM PIN2 required
318	(U)SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network timeout
500	unknown error
512	(U)SIM not ready
513	message length exceeds
514	invalid request parameters
515	ME storage failure
517	invalid service mode
528	more message to send state error

529	MO SMS is not allowed
531	ME storage full

27.7. Summary of URC

Table 30: Summary of URC

Index	URC Display	Meaning	Condition
1	+CREG: <stat>	Indicate registration status of the ME	AT+CREG=1
2	+CREG: <stat>[,<lac>],[<ci>],[<AcT>]]	After cell neighborhood change, shows whether the network has currently indicated the registration of the ME, with location area code	AT+CREG=2
3	+CTZV: <tz>	Time zone reporting	AT+CTZR=1
4	+CTZE: <tz>,<dst>,<time>	Extended time zone reporting	AT+CTZR=2
5	+CMTI: <mem>,<index>	New message is received, and saved to memory	See AT+CNMI
6	+CMT: [<alpha>],<length><CR><LF><pdu>	New short message is received and output directly to TE (PDU mode)	See AT+CNMI
7	+CMT: <oa>,<alpha>,<scts> [<tooa>,<fo>,<pid>,<dcsc>,<sc a>,<tosca>,<length>]<CR><LF><data>	New short message is received and output directly to TE (Text mode)	See AT+CNMI
8	+CBM: <length><CR><LF><pdu>	New CBM is received and output directly (PDU mode)	See AT+CNMI
9	+CBM: <sn>,<mid>,<dcsc>,<page>,<pages><CR><LF><data>	New CBM is received and output directly to TE (Text mode)	See AT+CNMI
10	+CDS: <length><CR><LF><pdu>	New CDS is received and output directly (PDU mode)	See AT+CNMI
11	+CDS: <fo>,<mr>,<ra>,<tora>,<scts>,<st>	New CDS is received and output directly to TE (Text mode)	See AT+CNMI
12	+CDSI: <mem>,<index>	New message status report is received, and saved to memory	See AT+CNMI
13	APP RDY	AP core initialization is successful	N/A

14	RDY	ME initialization is successful	N/A
15	+CFUN: 1	All function of the ME is available	N/A
16	+CPIN: <state>	(U)SIM card pin state	N/A
17	+QIND: SMS DONE	SMS initialization finished	N/A
18	POWERED DOWN	Module power down	AT+QPOWD
19	+CGEV: REJECT <PDP_type>,<PDP_addr>	A network request for PDP activation, and was automatically rejected	AT+CGEREP=2,1
20	+CGEV: NW REACT <PDP_type>,<PDP_addr>,<cid>	The network request PDP reactivation	AT+CGEREP=2,1
21	+CGEV: NW DEACT <PDP_type>,<PDP_addr>,<cid>	The network has forced a context deactivation	AT+CGEREP=2,1
22	+CGEV: ME DEACT <PDP_type>,<PDP_addr>,<cid>	The ME has forced a context deactivation	AT+CGEREP=2,1
23	+CGEV: NW DETACH	The network has forced a Packet Domain detach	AT+CGEREP=2,1
24	+CGEV: ME DETACH	The mobile equipment has forced a Packet Domain detach	AT+CGEREP=2,1
27	+QIND: "csq",<rsqi>,<ber>	Indicates signal strength and channel bit error rate change	AT+QINDCFG="csq",1
28	+QIND: "smsfull",<storage>	Indicates the specified SMS storage is full	AT+QINDCFG="smsfull",1
29	+QSIMSTAT: <enable>,<inserted_status>	Indicates (U)SIM card status (inserted or removed)	AT+QSIMSTAT=1
30	+QCSCON: <n>,<mode>	Indicates the signaling connection status	AT+QCSCON=1

27.8. SMS Character Sets Conversions

In 3GPP TS 23.038 DCS (Data Coding Scheme) defined three kinds of alphabets in SMS: GSM 7 bit default alphabet, 8-bit data and UCS2 (16-bit). **AT+CSMP** can set the DCS in text mode (**AT+CMGF=1**). In text mode, DCS (Data Coding Scheme) and **AT+CSCS** determine the way of SMS text input or output.

Table 31: The Manner of SMS Text Input or Output

DCS	AT+CSCS	The Way of SMS Text Input or Output
GSM 7 bit	GSM	Input or output GSM character sets.
GSM 7 bit	IRA	Input or output IRA character sets. Input: UE will convert IRA characters to GSM characters. Output: UE will convert GSM characters to IRA characters.
GSM 7 bit	UCS2	Input or output a hex string similar to PDU mode. Supported character range: '0'-'9' and 'A'-'F'. Input: UE will convert the UCS2 hex string to GSM characters. Output: UE will convert the GSM characters to UCS2 hex string.
UCS2	-	Ignore the value of AT+CSCS, input or output a hex string similar to PDU mode. Supported character range: '0'-'9' and 'A'-'F'.
8 bit	-	Ignore the value of AT+CSCS, input or output a hex string similar to PDU mode. Supported character range: '0'-'9' and 'A'-'F'.

When DCS=GSM 7 bit, the input or output needs conversion. The detailed conversion tables are shown below.

Table 32: Input Conversions Table (DCS=GSM 7 bit and AT+CSCS="GSM")

	0	1	2	3	4	5	6	7
0	00	10	20	30	40	50	60	70
1	01	11	21	31	41	51	61	71
2	02	12	22	32	42	52	62	72
3	03	13	23	33	43	53	63	73
4	04	14	24	34	44	54	64	74
5	05	15	25	35	45	55	65	75
6	06	16	26	36	46	56	66	76
7	07	17	27	37	47	57	67	77
8	08	18	28	38	48	58	68	78
9	09	19	29	39	49	59	69	79
A	0A	Submit	2A	3A	4A	5A	6A	7A

B	0B	Cancel	2B	3B	4B	5B	6B	7B
C	0C	1C	2C	3C	4C	5C	6C	7C
D	0D	1A	2D	3D	4D	5D	6D	7D
E	0E	1E	2E	3E	4E	5E	6E	7E
F	0F	1F	2F	3F	4F	5F	6F	7F

Table 33: Output Conversions Table (DCS=GSM 7 bit and AT+CSCS="GSM")

	0	1	2	3	4	5	6	7
0	00	10	20	30	40	50	60	70
1	01	11	21	31	41	51	61	71
2	02	12	22	32	42	52	62	72
3	03	13	23	33	43	53	63	73
4	04	14	24	34	44	54	64	74
5	05	15	25	35	45	55	65	75
6	06	16	26	36	46	56	66	76
7	07	17	27	37	47	57	67	77
8	08	18	28	38	48	58	68	78
9	09	19	29	39	49	59	69	79
A	0D0A		2A	3A	4A	5A	6A	7A
B	0B		2B	3B	4B	5B	6B	7B
C	0C	1C	2C	3C	4C	5C	6C	7C
D	0D	1A	2D	3D	4D	5D	6D	7D
E	0E	1E	2E	3E	4E	5E	6E	7E
F	0F	1F	2F	3F	4F	5F	6F	7F

Table 34: GSM Extended Characters (GSM Encode)

	0	1	2	3	4	5	6	7
0					1B40			
1								
2								
3								
4		1B14						
5								
6								
7								
8			1B28					
9			1B29					
A								
B								
C				1B3C				
D				1B3D				
E				1B3E				
F			1B2F					

Table 35: Input Conversions Table (DCS=GSM 7 bit and AT+CSCS="IRA")

	0	1	2	3	4	5	6	7
0		20	20	30	00	50	20	70
1	20	20	21	31	41	51	61	71
2	20	20	22	32	42	52	62	72
3	20	20	23	33	43	53	63	73
4	20	20	02	34	44	54	64	74

5	20	20	25	35	45	55	65	75
6	20	20	26	36	46	56	66	76
7	20	20	27	37	47	57	67	77
8	backspace	20	28	38	48	58	68	78
9	20	20	29	39	49	59	69	79
A	0A	Submit	2A	3A	4A	5A	6A	7A
B	20	Cancel	2B	3B	4B	1B3C	6B	1B28
C	20	20	2C	3C	4C	1B2F	6C	1B40
D	0D	20	2D	3D	4D	1B3E	6D	1B29
E	20	20	2E	3E	4E	1B14	6E	1B3D
F	20	20	2F	3F	4F	11	6F	20

Table 36: IRA Extended Characters

	A	B	C	D	E	F
0	20	20	20	20	7F	20
1	40	20	20	5D	20	7D
2	20	20	20	20	20	08
3	01	20	20	20	20	20
4	24	20	5B	20	7B	20
5	03	20	0E	20	0F	20
6	20	20	1C	5C	1D	7C
7	5F	20	09	20	20	20
8	20	20	20	0B	04	0C
9	20	20	1F	20	05	06
A	20	20	20	20	20	20
B	20	20	20	20	20	20

C	20	20	20	5E	07	7E
D	20	20	20	20	20	20
E	20	20	20	20	20	20
F	20	60	20	1E	20	20

Table 37: Output Conversions Table (DCS=GSM 7 bit and AT+CSCS="IRA")

	0	1	2	3	4	5	6	7
0	40	20	20	30	A1	50	BF	70
1	A3	5F	21	31	41	51	61	71
2	24	20	22	32	42	52	62	72
3	A5	20	23	33	43	53	63	73
4	E8	20	A4	34	44	54	64	74
5	E9	20	25	35	45	55	65	75
6	F9	20	26	36	46	56	66	76
7	EC	20	27	37	47	57	67	77
8	F2	20	28	38	48	58	68	78
9	C7	20	29	39	49	59	69	79
A	0D0A		2A	3A	4A	5A	6A	7A
B	D8		2B	3B	4B	C4	6B	E4
C	F8	C6	2C	3C	4C	D6	6C	F6
D	0D	E6	2D	3D	4D	D1	6D	F1
E	C5	DF	2E	3E	4E	DC	6E	FC
F	E5	C9	2F	3F	4F	A7	6F	E0

Table 38: GSM Extended Characters (ISO-8859-1/Unicode)

	0	1	2	3	4	5	6	7
0					7C			
1								
2								
3								
4		5E						
5								
6								
7								
8			7B					
9			7D					
A								
B								
C				5B				
D				7E				
E				5D				
F			5C					

Because the low 8-bit of UCS2 character is the same as the IRA character:

- The conversion table of DCS=GSM 7 bit and **AT+CSCS="UCS2"** is similar to **AT+CSCS="IRA"**.
- The conversion table of fmt=GSM 7 bit and **AT+CSCS="GSM"** is similar to **AT+CSCS="GSM"**.
- The conversion table of fmt= GSM 7 bit and **AT+CSCS="IRA"** is similar to **AT+CSCS="IRA"**.
- The conversion table of fmt=GSM 7 bit and **AT+CSCS="UCS2"** is similar to **AT+CSCS="IRA"**.