EG06xK&Ex120K&EM06xK Series AT Commands Manual

LTE-A 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 command set supported by Quectel EG06xK, Ex120K and EM06xK family modules.

Table 1: Applicable Modules

Module Family	Module
EG06xK	EG060K Series
	EG065K Series
Ex120K	EM120K-GL
	EG120K Series
EM06xK	EM060K Series
	EM061K-GL

1.2. 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 to its previous value or the default settings, unless otherwise specified.
- **Underline** Default setting of a parameter.

1.3. 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 EG06xK, Ex120K and EM060K series 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.

AT commands implemented by EG06xK, Ex120K and EM06xK family modules fall into three categories syntactically: "Basic", "S Parameter" and "Extended", as listed below:

- **Basic Command**

  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 a default will be used if it is omitted.

- **S Parameter Syntax**

  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 Command**

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

Table 2: 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.

- 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. A newline character is ignored so it is permissible to use carriage return/line feed pairs on the input.

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 being entered.

1.4. 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 information responses are sent before the final **OK**, **ERROR** or **+CME ERROR: <err>**.

Responses will be in the format of:

<CR><LF>+CMD1:<parameters><CR><LF>
<CR><LF>OK<CR><LF>

Or

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

1.5. Supported Character Sets

The AT command interface of the module defaults to the **GSM** character set. The module supports the following character sets:

- GSM format
- UCS2
- IRA

The character set can be configured and interrogated by using the **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 entries text field.

1.6. AT Command Interface

The AT command interface of the module includes two USB ports (USB MODEM port and USB AT port) and one main UART port. The main UART port and two USB ports support AT command communication and data transfer.

1.7. Unsolicited Result Code

Unsolicited Result Code (URC) is not issued as a part of the response related to an executed AT command, but as a report message issued by the module without being requested by the TE. It is issued automatically when a certain event occurs. Typical events leading to URCs are incoming calls (**RING**), received short messages, high/low voltage alarm, high/low temperature alarm, etc.

1.8. Turn off Procedure

It is recommended to execute **AT+QPOWD** to turn off the module, since it is the safest and best method through which the powering off is realized by letting the module log off from the network and allowing the software to enter a secure and safe data state before disconnecting the power supply.

After sending **AT+QPOWD**, please do not enter any other AT commands. When the command is executed successfully, the module will output message **POWERED DOWN** and then enter the power down mode. In order to avoid data loss, it is suggested to wait for 1 s to disconnect the power supply after the URC **POWERED DOWN** is outputted. If **POWERED DOWN** cannot be received within 65 s, the power supply shall be disconnected compulsorily.

1.9. 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. The URLs, domain names, IP addresses, usernames/accounts, and passwords (if any) in the AT command examples are provided for illustrative and explanatory purposes only, and they should be modified to reflect your actual usage and specific needs.

2 General Commands

2.1. ATI Display Module Identification Information

This command delivers the module identification information.

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

Parameter

<objectID>	String type. Identifier of device type.
<revision>	String type. Identification text of module firmware version.

Example

```
ATI
Quectel
EG060K-EA
Revision: EG060KEAAAR01A03M2G

OK
```

2.2. AT+GMI Request Manufacturer Identification

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

AT+GMI Request Manufacturer Identification	
Test Command **AT+GMI=?**	Response **OK**
Execution Command **AT+GMI**	Response **Quectel** **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

2.3. AT+GMM Request Module Model Identification

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

AT+GMM Request Module 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. Identification text of the module model.

2.4. AT+GMR Request Module Firmware Version Identification

This command delivers the module firmware version identification. It is identical with **AT+CGMR** in ***Chapter 2.7***.

AT+GMR Request Module Firmware Version Identification	
Test Command **AT+GMR=?**	Response **OK**
Execution Command **AT+GMR**	Response **<revision>** **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Parameter

<revision>	String type. Identification text of module firmware version with line terminators included, which should not exceed 2048 characters in the information text.

Example

```
AT+GMR
EG060KEAAAR01A03M2G

OK
```

2.5. AT+CGMI Request Manufacturer Identification

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

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

	OK
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

2.6. AT+CGMM Request Module Model Identification

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

AT+CGMM Request Module 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. Identification text of the module model.

2.7. AT+CGMR Request Module Firmware Version Identification

This command delivers the module firmware version identification. It is identical with **AT+GMR** in ***Chapter 2.4***.

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

AT+CGMR	**<revision>** **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<revision>	String type. Identification text of module firmware version with line terminators included, which should not exceed 2048 characters in the information text.

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

This command returns International Mobile Equipment Identity (IMEI) number of the module. It is identical with **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>	String type. IMEI number of the module.

NOTE

An IMEI number can be used to identify a module because each IMEI is unique.

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

This command returns International Mobile Equipment Identity (IMEI) number of the module. It is identical with **AT+GSN** in ***Chapter 2.8***.

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>	Sting type. IMEI number of the module.

NOTE

An IMEI number can be used to identify a module because each IMEI is unique.

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

This command resets AT command settings to the default values specified by the manufacturer (See ***Table 8***).

AT&F Reset 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. 0 Reset all AT command settings to factory settings

NOTE

Executing **AT&F** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

2.11. AT&V Display Current Configuration

This command displays the current configurations of some AT command parameters (see ***Table 3***), even including the single-letter AT command parameters which are not readable.

AT&V Display Current Configuration	
Execution Command **AT&V**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Table 3: AT&V Response

AT&V
&C: 1 &D: 2 &F: 0 &W: 0 E: 1 Q: 0 V: 1 X: 4 Z: 0 S0: 0

```
S3: 13
S4: 10
S5: 8
S6: 2
S7: 0
S8: 2
S10: 15

OK
```

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

This command stores the current AT command settings to a user-defined profile in non-volatile memory (See ***Table 9***). The AT command settings will be automatically restored from the user-defined profile during power-up or if **ATZ** is executed.

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

Parameter

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

NOTE

Executing **AT&W[<n>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

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

This command first resets the AT command settings to their manufacturer defaults, which is similar to **AT&F**. 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 (See ***Table 9***).

Any additional AT command on the same command line may be ignored.

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 the module. Other information text transmitted as response is not affected.

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 is saved only if you execute **AT&W** after this command.
Reference	

V.25ter	

Parameter

<n>	Integer type. 0 Result codes are transmitted 1 Result codes are suppressed and not transmitted

2.15. ATV Module Response Format

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

The numeric equivalents and brief descriptions of results code are listed in the following ***Table 4***.

ATV Module 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 is saved only if you execute **AT&W** after this command.
Reference V.25ter	

Parameter

<value>	Integer type. 0 Information response: **<text><CR><LF>** Short result code format: **<numeric code><CR>** 1 Information response: **<CR><LF><text><CR><LF>** Long result code format: **<CR><LF><verbose code><CR><LF>**

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 4: The Numeric Equivalents and Brief Description of ATV0&ATV1 Result Codes

ATV1	ATV0	Description
OK	0	Acknowledges execution of a command.
CONNECT	1	A connection has been established; the DCE is moving from command state to data state.
RING	2	The DCE has detected an incoming call signal from network.
NO CARRIER	3	The connection has been terminated or the attempt to establish a connection failed.
ERROR	4	Command not recognized, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line.
NO DIALTONE	6	No dial tone detected.
BUSY	7	Engaged (busy) signal detected.
NO ANSWER	8	@ (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer (S7).

2.16. ATE Set Command Echo Mode

This command controls whether TA echoes characters received from the module or not during 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 is saved only if you execute **AT&W** after this command.
Reference V.25ter	

Parameter

<value>	Integer type. Whether to echo the characters received from TE. 0 DCE does not echo characters during command state and online command state. 1 DCE echoes characters during command state and online command state.

2.17. A/ Repeat Previous Command Line

This command repeats previous AT command line, and "/" acts as the line terminating character.

A/ Repeat Previous Command Line	
Execution Command **A/**	Response Repeat the previous command
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Example

```
ATI
Quectel
EG060K-EA
Revision: EG060KEAAAR01A03M2G

OK
A/                                  //Repeat the previous command.
Quectel
EG060K-EA
Revision: EG060KEAAAR01A03M2G

OK
```

2.18. ATX Set CONNECT Result Code Format and Monitor Call Progress

This command determines whether or not the module transmits particular result codes to the TE. It also controls whether or not the module verifies the presence of a dial tone when it begins dialing, and whether or not engaged tone (busy signal) detection is enabled.

ATX Set CONNECT Result Code Format and Monitor Call Progress	
Execution Command **ATX<value>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference V.25ter	

Parameter

<value>	0	**CONNECT** result code only returned, dial tone and busy detection are both disabled
	1	**CONNECT<text>** result code only returned, dial tone and busy detection are both disabled
	2	**CONNECT<text>** result code returned, dial tone detection is enabled, busy detection is disabled
	3	**CONNECT<text>** result code returned, dial tone detection is disabled, busy detection is enabled
	4	**CONNECT<text>** result code returned, dial tone and busy detection are both enabled

2.19. AT+CFUN Set UE Functionality

This command controls the UE functionality. 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 any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	15 s, determined by the network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<fun>	Integer type.	
	0	Minimum functionality
	1	Full functionality
	4	Disable the UE from both transmitting and receiving RF signals
<rst>	Integer type.	
	0	Do not reset the ME before setting it to **<fun>** power level (Default value when **<rst>** is not given)
	1	Reset the ME. The device is fully functional after the reset. This value is available only for **<fun>**=1
<err>	Error codes. For more details, see ***Chapter 14.5***.	

NOTE

When the module searches or registers the network, it may write data to NVM (Non-Volatile Memory) if you execute **AT+CFUN=1**. Please operate with caution.

Example

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

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

```
+CPIN: SIM PIN
AT+CPIN=1234
OK

+CPIN: READY

+QUSIM: 1

+QIND: PB DONE

+QIND: SMS DONE
AT+CPIN?
+CPIN: READY

OK
AT+COPS?
+COPS: 0,0,"CHINA MOBILE CMCC",7              //Operator is registered.

OK
```

2.20. AT+CMEE Error Message Format

This command disables or enables the use of final result code **+CME ERROR: <err>** as the indication of an error. When enabled, errors cause **+CME ERROR: <err>** final result code instead of **ERROR**.

AT+CMEE Error Message Format	
Test Command **AT+CMEE=?**	Response **+CMEE: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CMEE?**	Response **+CMEE: <n>** **OK**
Write Command **AT+CMEE=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Whether to enable result code. 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 codes. For more details, see ***Chapter 14.5***.

NOTE

Executing **AT+CMEE** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

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
```

2.21. AT+CSCS Select TE Character Set

This Write Command informs TA which character set **<chset>** is used by the TE. This enables TA to convert character strings correctly between TE and MT 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**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<chset>	String type.	
	"GSM"	GSM default alphabet
	"IRA"	International reference alphabet
	"UCS2"	UCS2 alphabet

Example

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

OK
AT+CSCS="UCS2"              //Set the character set to "UCS2".
OK
AT+CSCS?
+CSCS: "UCS2"               //The character set is UCS2 after the configuration.

OK
```

2.22. AT+QURCCFG Configure URC Indication Option

This command configures the output port of URC.

AT+QURCCFG Configure URC Indication Option	
Test Command **AT+QURCCFG=?**	Response **+QURCCFG: "urcport",(**list of supported **<URC_port_value>**s**)** **OK**
Write Command **AT+QURCCFG="urcport"[,<URC_port_value>]**	Response If the optional parameter is omitted, query the current configuration: **+QURCCFG: "urcport",<URC_port_value>**

	OK If the optional parameter is specified, configure the output port of URC: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<URC_port_value>	String type. Set URC output port.	
	"usbat"	USB AT port
	"usbmodem"	USB modem port
	"uart1"	Main UART
	"all"	All ports

NOTE

Executing **AT+QURCCFG="urcport",<URC_port_value>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QURCCFG=?
+QURCCFG: "urcport",("usbat","usbmodem","uart1","all")

OK
AT+QURCCFG="urcport"                    //Query the current configuration of URC output port.
+QURCCFG: "urcport","usbat"

OK
AT+QURCCFG="urcport","usbmodem"         //Configure the URC output port to USB modem port.
OK
AT+QURCCFG="urcport"
+QURCCFG: "urcport","usbmodem"

OK
```

2.23. AT+QMBNCFG MBN File Configuration Setting

AT+QMBNCFG MBN File Configuration Setting	
Test Command **AT+QMBNCFG=?**	Response **+QMBNCFG: "List"** **+QMBNCFG: "Select",<MBN_name>** **+QMBNCFG: "Deactivate"** **+QMBNCFG: "AutoSel",(**list of supported **<enable>**s**)** **+QMBNCFG: "Delete",<MBN_name>** **+QMBNCFG: "Add",<file_name>** **OK**
Maximum Response Time	300 ms
Characteristics	-

2.23.1. AT+QMBNCFG="List" List All the MBN Files

This command queries all the imported MBN files list.

AT+QMBNCFG="List" List All the MBN Files	
Write Command **AT+QMBNCFG="List"**	Response **+QMBNCFG: "List",<index>,<selected>,<activate>,<MBN_name>,<MBN_version>,<MBN_release_date>** **…** **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<index>	Integer type. The MBN index indicates which imported MBN file is current listed.
<selected>	Integer type. Whether the MBN file is selected. The selected but unactivated MBN file will be activated in the next module restart. 0 Unselected 1 Selected
<activate>	Integer type. Whether the MBN file is activated. 0 Not activated 1 Activated

<MBN_name>	String type. The name of the imported MBN file.
<MBN_version>	String type. The version of the imported MBN file.
<MBN_release_date>	String type. The release date of the imported MBN file.

Example

```
AT+QMBNCFG="list"
+QMBNCFG: "List",0,0,1,"ROW_Generic_3GPP",0x06010821,201706061
+QMBNCFG: "List",1,0,0,"Volte_OpenMkt-Commercial-CMCC",0x06012064,201706061
+QMBNCFG: "List",2,0,0,"OpenMkt-Commercial-CU",0x06011510,201706062
+QMBNCFG: "List",3,0,0,"Telstra-Commercial_VoLTE",0x0680010F,201710261
+QMBNCFG: "List",4,1,0,"hVoLTE-Verizon",0x060101A0,201801081

OK
```

2.23.2. AT+QMBNCFG="Select" Select the MBN File to Be Activated

This command selects a certain MBN file that has been loaded, and when the module is restarted, the selected MBN file will be activated.

AT+QMBNCFG="Select" Select the MBN File to Be Activated	
Write Command **AT+QMBNCFG="Select"[,<MBN_name>]**	Response If the optional parameter is omitted, query the current configuration: **+QMBNCFG: "Select",<MBN_name>** **OK** If the optional parameter is specified, select a certain MBN file to activate: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted.

Parameter

<MBN_name>	String type. MBN file name to be selected.

NOTE

Executing **AT+QMBNCFG="Select"[,<MBN_name>]** indicates to write data to NVM (Non-Volatile

Memory). Please operate with caution.

2.23.3. AT+QMBNCFG="Deactivate" Deactivate MBN File

This command deactivates the MBN file which is working in the module. After the MBN file is deactivated, the currently activated MBN file will become unactivated.

AT+ QMBNCFG="Deactivate" Deactivate MBN File	
Write command **AT+QMBNCFG="Deactivate"**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

NOTE

Executing **AT+QMBNCFG="Deactivate"** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QMBNCFG="LIST"
+QMBNCFG: "List",0,1,1,"ROW_Commercial",0x05010800,201801051

OK
AT+QMBNCFG="Deactivate"
OK
AT+QMBNCFG="List"
+QMBNCFG: "List",0,0,0,"ROW_Commercial",0x05010800,201801051

OK
```

2.23.4. AT+QMBNCFG="AutoSel" Auto Select Whether to Activate MBN File

The command configures whether MBN file can be automatically activated by (U)SIM card.

AT+QMBNCFG="AutoSel" Auto Select Whether to Activate MBN File	
Write Command **AT+QMBNCFG="AutoSel"[,<enable>]**	Response If the optional parameter is omitted, query the current configuration: **+QMBNCFG: "AutoSel",<enable>**

	OK If the optional parameter is specified, configure whether MBN file can be automatically activated by (U)SIM card: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<enable>	Integer type. Enable or disable to automatically activate MBN files by (U)SIM card. 0 Disable 1 Enable

NOTE

Executing **AT+QMBNCFG="AutoSel"[,<enable>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

2.23.5. AT+QMBNCFG="Delete" Delete MBN File

This command deletes a MBN file from CEFS.

AT+QMBNCFG="Delete" Delete MBN File	
Write Command **AT+QMBNCFG="Delete",<MBN_name>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<MBN_name>	String type. The name of the MBN file to be deleted.

NOTE

Executing **AT+QMBNCFG="Delete",<MBN_name>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

2.23.6. AT+QMBNCFG="Add" Add a New MBN File

This command adds a new MBN file.

AT+QMBNCFG="Add" Add a New MBN File	
Write Command **AT+QMBNCFG="Add",<file_name>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<file_name>	String type. The name of the MBN file to be added. The MBN file needs to be uploaded to the UFS space in advance.

NOTE

Executing **AT+QMBNCFG="Add",<file_name>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
//See Quectel_EG06xK&Ex120K&EM06xK_Series_FILE_Application_Note for details about AT+QFUPL.
AT+QFUPL="test.mbn",9436
CONNECT
<send MBN file,its files size is 9436Bytes>
+QFUPL: 9436,657c

OK
AT+QMBNCFG="Add","test.mbn"
OK
```

3 Serial Interface Control Commands

3.1. AT&C Set DCD Function Mode

This command controls the behavior of the UE's DCD (data carrier detection) line.

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

Parameter

<value>	Integer type. It determines how the state of circuit (DCD) relates to the detection of received line signal from the distant end. 0 DCD line is always ON 1 DCD line is ON only in the presence of data carrier

3.2. AT&D Set DTR Function Mode

This command determines how the UE responds if DTR line is changed from low to high level in data mode.

AT&D Set DTR Function Mode	
Execution Command **AT&D[<value>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

	The configurations can be saved with **AT&W**.
Reference V.25ter	

Parameter

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

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

This command queries and sets the UART baud rate.

AT+IPR Set TE-TA Fixed Local Rate	
Test Command **AT+IPR=?**	Response **+IPR: (**list of supported auto detectable **<rate>**s**),(**list of supported fixed-only **<rate>**s**)** **OK**
Read Command **AT+IPR?**	Response **+IPR: <rate>** **OK**
Write Command **AT+IPR=<rate>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations can be saved with **AT&W**.
Reference V.25ter	

Parameter

<rate>	String type. Baud rate per second. 600 1200 2400

	4800 9600 19200 38400 57600 115200 230400

NOTE

1. If a fixed baud rate is set, make sure that both TE (DTE, usually external processor) and TA (DCE, Quectel module) are configured to the same rate.
2. **AT+IPR** value cannot be restored with **AT&F** and **ATZ**; but it is still storable with **AT&W**.
3. In multiplex mode, the baud rate cannot be changed with the Write Command **AT+IPR=<rate>**; and the setting is invalid and cannot be stored even if **AT&W** is executed after the Write Command.
4. A selected baud rate takes effect after the Write Commands are executed and acknowledged by **OK**.
5. After the baud rate is changed, it is necessary to wait for 500 ms to send the next command.

Example

```
AT+IPR=115200                   //Set fixed baud rate to 115200 bps
OK
AT&W                            //Store current setting, that is, the serial communication speed is
                                  115200 bps after restarting module
OK
AT+IPR?
+IPR: 115200
OK
AT+IPR=115200;&W                //Set fixed baud rate to 115200 bps and store current setting
OK
```

4 Status Control Commands

4.1. AT+CPAS Module Activity Status

This command queries the activity status of the module.

AT+CPAS Module Activity Status	
Test Command **AT+CPAS=?**	Response **+CPAS: (**list of supported **<pas>**s**)** **OK**
Execution Command **AT+CPAS**	Response TA returns the activity status of module: **+CPAS: <pas>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<pas>	Integer type. Module activity status. 0 Ready 3 Ringing 4 Call in progress or call hold
<err>	Error codes. For more details, see ***Chapter 14.5***.

Example

```
AT+CPAS
+CPAS: 0                                    //The module is ready.

OK
RING
AT+CLCC
+CLCC: 1,1,4,0,0,"15695519173",161

OK
AT+CPAS
+CPAS: 3                                    //The module is ringing.

OK
AT+CLCC
+CLCC: 1,0,0,0,0,"10010",129

OK
AT+CPAS
+CPAS: 4                                    //Call in progress.

OK
```

4.2. AT+CEER Extended Error Report

This command queries an extended error and report the cause of the last failed operation, such as:

- the failure to release a call
- the failure to set up a call (both mobile originated or terminated)
- the failure to modify a call by using supplementary services
- the failure to activate, register, query, deactivate or deregister a supplementary service
- the failure to attach GPRS or the failure to activate PDP context
- the failure to detach GPRS or the failure to deactivate PDP context

The release cause **<text>** is a text to describe the cause information given by the network.

AT+CEER Extended Error Report	
Test command **AT+CEER=?**	Response **OK**
Execution command **AT+CEER**	Response **+CEER: <text>**

	OK If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<text>	Release cause text. Reason for the last call failure to setup or release (listed in ***Chapter 14.9***). Both CS and PS domain call types are reported. Cause data is captured from Call Manager events and cached locally to later use by this command.
<err>	Error codes. For more details, see ***Chapter 14.5***.

4.3. AT+QCFG Extended Configuration Settings

This command queries and configures various settings of UE.

AT+QCFG Extended Configuration Settings	
Test Command **AT+QCFG=?**	Response **…** **+QCFG: "hsdpacat",(**list of supported **<HSDPA_cat>**s**)** **+QCFG: "hsupacat",(**list of supported **<HSUPA_cat>**s**)** **+QCFG: "rrc",(**list of supported **<rrcr>**s**)** **+QCFG: "sgsn",(**list of supported **<sgsnr>**s**)** **+QCFG: "pdp/duplicatechk",(**list of supported **<enable>**s**)** **+QCFG: "usbspeed",(**list of supported **<speed>**s**)** **+QCFG: "usbnet",(**list of supported **<protocol>**s**)** **…** **OK**
Maximum Response Time	300 ms
Characteristics	-

4.3.1. AT+QCFG="hsdpacat" HSDPA Category Configuration

This command specifies the HSDPA category.

AT+QCFG="hsdpacat" HSDPA Category Configuration	
Write Command **AT+QCFG="hsdpacat"[,<HSDPA_cat>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "hsdpacat",<HSDPA_cat>** **OK** If the optional parameter is specified, configure the HSDPA category: **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<HSDPA_cat>	Integer type. HSDPA category. 6 Category 6 8 Category 8 10 Category 10 12 Category 12 14 Category 14 18 Category 18 20 Category 20 24 Category 24
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

Executing **AT+QCFG="hsdpacat"[,<HSDPA_cat>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

4.3.2. AT+QCFG="hsupacat" HSUPA Category Configuration

This command specifies the HSUPA category.

AT+QCFG="hsupacat" HSUPA Category Configuration	
Write Command **AT+QCFG="hsupacat"[,<HSUPA_cat>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "hsupacat",<HSUPA_cat>** **OK** If the optional parameter is specified, configure the HSUPA category: **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<HSUPA_cat>	Integer type. HSUPA category. 5 Category 5 6 Category 6
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

Executing **AT+QCFG="hsupacat"[,<HSUPA_cat>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

4.3.3. AT+QCFG="rrc" RRC Release Version Configuration

This command specifies the RRC release version.

AT+QCFG="rrc" RRC Release Version Configuration	
Write Command **AT+QCFG="rrc"[,<rrcr>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "rrc",<rrcr>** **OK** If the optional parameter is specified, configure the RRC release version: **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<rrcr>	Integer type. RRC release version. 0 R99 1 R5 2 R6 3 R7 4 R8 5 R9
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

Executing **AT+QCFG="rrc"[,<rrcr>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

4.3.4. AT+QCFG="sgsn" UE SGSN Release Version Configuration

This command specifies the UE SGSN release version.

AT+QCFG="sgsn" UE SGSN Release Version Configuration	
Write Command **AT+QCFG="sgsn"[,<sgsnr>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "sgsn",<sgsnr>** **OK** If the optional parameter is specified, configure the SGSN release version: **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<sgsnr>	Integer type. SGSN release version. 0 R97 1 R99 2 Dynamic
<err>	Error codes. For more details, see ***Chapter 14.5***.

4.3.5. AT+QCFG="pdp/duplicatechk" Establish Multi PDNs with the Same APN

This command allows/refuses establishing multi PDNs with the same APN profile.

AT+QCFG="pdp/duplicatechk" Establish Multi PDNs with the Same APN	
Write Command **AT+QCFG="pdp/duplicatechk"[,<enable>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "pdp/duplicatechk",<enable>**

	OK If the optional parameter is specified, allow/refuse establishing multiple PDNs with the same APN profile: **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<enable>	Integer type. 0 Refuse to establish multi PDNs with the same APN profile 1 Allow to establish multi PDNs with the same APN profile
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

Executing **AT+QCFG="pdp/duplicatechk"[,<enable>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

4.3.6. AT+QCFG="usbspeed" Set USB Speed Mode

This command sets USB speed mode when device is inserted in a USB 3.0 port.

AT+QCFG="usbspeed" Set USB Speed Mode	
Write Command **AT+QCFG="usbspeed"[,<speed>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "usbspeed",<speed>** **OK** If the optional parameter is specified, set USB speed mode: **OK** If there is any error:

	ERROR
Maximum Response Time	300 ms
Characteristics	This command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<speed>	String type. The default value varies from different modules. "20" USB 2.0 high speed "30" USB 3.0 super speed

NOTE

Executing **AT+QCFG="usbspeed"[,<speed>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QCFG="usbspeed"    //Query the current configuration.
+QCFG: "usbspeed","30"

OK
AT+QCFG="usbspeed","20"
OK
```

4.3.7. AT+QCFG="usbnet" Set USBnet Call Method

This command configures USBnet call method.

AT+QCFG="usbnet" Set USBnet Call Method	
Write Command **AT+QCFG="usbnet"[,<protocol>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "usbnet",<protocol>** **OK** If the optional parameter is specified, set USBnet call method: **OK** If there is any error:

	ERROR
Maximum Response Time	300 ms
Characteristics	This command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<protocol>	Integer type. The USBnet call method. The default value varies from different modules. 0 RmNet 1 ECM 2 MBIM 3 RNDIS

NOTE

Executing **AT+QCFG="usbnet",<protocol>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QCFG="usbnet"        //Query the current configuration.
+QCFG: "usbnet",2

OK
AT+QCFG="usbnet",1      //Set the USBnet call method to ECM.
OK
```

4.4. 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**)** **+QINDCFG: "act",(**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, query the current configuration: **+QINDCFG: <URC_type>,<enable>** **OK** If any of the optional parameters is specified, set the URC indication configurations: **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. Whether to save configuration depends on **<save_to_nvram>**.

Parameter

<URC_type>	String type. URC type.	
	"all"	Master switch of all URCs. Default: ON.
	"csq"	Indication of signal strength and channel bit error rate change (similar to **AT+CSQ**). Default: OFF. If this configuration is ON, **+QIND: "csq",<rssi>,<ber>** is present.
	"smsfull"	SMS storage full indication. Default: ON. If this configuration is ON, **+QIND: "smsfull",<storage>** is present.
	"ring"	**RING** indication. Default: ON.
	"smsincoming"	Incoming message indication, Default: ON. Related URCs list: **+CMTI**, **+CMT**, **+CDS**
	"act"	Indication of network access technology change. Default: OFF. If this configuration is ON, **+QIND: "act",<actvalue>** is present. **<actvalue>** is string format. The values are as below: "WCDMA"

	"HSDPA" "HSUPA" "HSDPA&HSUPA" "LTE" "UNKNOWN" The examples of URC are as below: **+QIND: "act","HSDPA&HSUPA"** **+QIND: "act","UNKNOWN"** The description of "act" is as below: 1. If MT does not register on network, the **<actvalue>** would be "UNKNOWN". 2. If this configuration is ON, the URC of "act" will be reported immediately. Only when the network access technology changes, will a new URC be reported.
<enable>	Integer type. URC indication is ON or OFF. 0 OFF 1 ON
<save_to_nvram>	Integer type. Whether to save configuration into NVRAM. 0 Not save 1 Save
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

Executing **AT+QINDCFG=<URC_type>,<enable>,1** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

4.5. AT+QMAP Configure QMAP Related Parameters

This command configures QMAP related parameters.

AT+QMAP Configure QMAP Related Parameters	
Test Command **AT+QMAP=?**	Response **…** **+QMAP: "WWAN",(**list of supported **<status>**s**),(**list of supported **<profileID>**s**),<IP_family>,<IP_address>** **+QMAP: "LANIP",<LAN_IP_start_address>,<LAN_IP_end_address>,<GW_IP_address>,<effect>** **+QMAP: "VLAN",(**list of supported **<VLAN_ID>**s**),(**list of supported **<enable>**s**),(**list of supported **<VLAN_type>**s**)** **+QMAP: "MPDN_rule",(**list of supported **<rule_num>**s**),(**list of

	supported **<profileID>**s),(list of supported **<VLAN_ID>**s),(list of supported **<IPPT_mode>**s),(list of supported **<auto_connect>**s),**<ippt_info>** **+QMAP: "IPPT_NAT",**(list of supported **<IPPT_NAT>**s) **+QMAP: "connect",**(list of supported **<rule_num>**s),(list of supported **<connect>**s) **+QMAP: "auto_connect",**(list of supported **<rule_num>**s),(list of supported **<auto_connect>**s),(list of supported **<profileID>**s) **+QMAP: "MPDN_status"** **+QMAP: "SFE",**(list of supported **<status>**s) **+QMAP: "domain",<domain_name>** **…** **OK**
Maximum Response Time	300 ms
Characteristics	-

4.5.1. AT+QMAP="WWAN" Query IP Address of Default QMAP Data Call

This command queries the status and IP address of the default QMAP data call.

AT+QMAP="WWAN" Query IP Address of Default QMAP Data Call	
Write Command **AT+QMAP="WWAN"**	Response **+QMAP: "WWAN",<status>,<profileID>,<IP_family>,<IP_address>** **+QMAP: "WWAN",<status>,<profileID>,<IP_family>,<IP_address>** **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<status>	String type. Status of the default QMAP data call. 0 Disconnected 1 Connected
<profileID>	Integer type. Profile ID of the default QMAP data call. Range: 1–16.
<IP_family>	String type. IP type. "IPV4" IPv4

	"IPV6" IPv6
<IP_address>	String type. IP address of the default QMAP data call. If IPv4 network is not connected, the address is "0.0.0.0". If IPv6 network is not connected, the address is "0:0:0:0:0:0:0:0".

Example

```
AT+QMAP="WWAN"
+QMAP: "WWAN",1,1,"IPV4","10.125.252.107"
+QMAP: "WWAN",1,1,"IPV6","2001:db8:1111:2222:3333:4444:5555:6666"

OK
```

4.5.2. AT+QMAP="LANIP" Query/Modify DHCP Address Pool of Default LAN Interface

This command queries or modifies DHCP address pool of the default LAN interface (VLAN0).

AT+QMAP="LANIP" Query/Modify DHCP Address Pool of Default LAN Interface	
Write Command **AT+QMAP="LANIP"[,<LAN_IP_start_address>,<LAN_IP_end_address>,<GW_IP_address>[,<effect>]]**	Response If the optional parameters are omitted, query the current setting: **+QMAP: "LANIP",<LAN_IP_start_address>,<LAN_IP_end_address>,<GW_IP_address>** **OK** If the optional parameters are specified, configure DHCP address pool of the default LAN interface: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	Whether the command takes effect immediately depends on **<effect>**. The configurations are saved automatically.

Parameter

<LAN_IP_start_address>	String type. Start address of DHCP address pool of the default LAN interface. Format: Dotted decimal IPv4 address without double quotes.
<LAN_IP_end_address>	String type. End address of DHCP address pool of the default LAN interface. Format: Dotted decimal IPv4 address without double quotes.
<GW_IP_address>	String type. Gateway address of DHCP address pool of the default LAN

	interface. Format: Dotted decimal IPv4 address without double quotes.
<effect>	Integer type. Whether the command takes effect immediately or not. 0 Take effect after the module is rebooted 1 Take effect immediately

NOTE

Executing **AT+QMAP="LANIP"[,<LAN_IP_start_address>,<LAN_IP_end_address>,<GW_IP_address>[,<effect>]]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QMAP="LANIP"    //Query the current setting of DHCP address pool.
+QMAP: "LANIP",192.168.225.40,192.168.225.60,192.168.225.1

OK
//Configure the DHCP address pool and the configuration takes effect immediately.
AT+QMAP="LANIP",192.168.111.20,192.168.111.60,192.168.111,1
OK
//Configure the DHCP address pool and the configuration takes effect after the module is rebooted.
AT+QMAP="LANIP",192.168.111.20,192.168.111.60,192.168.111.1,0
OK
```

4.5.3. AT+QMAP="VLAN" Query/Configure VLAN

This command queries or configures VLAN of the module, including enabling or disabling VLAN and querying current enabled VLAN.

AT+QMAP="VLAN" Query/Configure VLAN	
Write Command **AT+QMAP="VLAN"[,<VLAN_ID>,<enable>[,<VLAN_type>]]**	Response If the optional parameters are omitted, query the enabled VLAN: **+QMAP: "VLAN",0** **+QMAP: "VLAN",<VLAN_ID>,<VLAN_type>** **…** **OK** If the optional parameters are specified, enable or disable the specified VLAN: **OK** If there is any error: **ERROR**

Maximum Response Time	5 s
Characteristics	See the note below for whether the command takes effect immediately or not. The configurations are saved automatically.

Parameter

<VLAN_ID>	Integer type. VLAN ID. Range: 0, 2–255. 0 is displayed only in the response string and indicates the physical default LAN interface rather than a VLAN ID. You cannot disable it.
<enable>	String type. Enable or disable VLAN specified by **<VLAN_ID>**. "enable" Enable "disable" Disable
<VLAN_type>	Integer type. VLAN type. It is valid only when **<enable>** is "enable". 1 ETH 2 ECM 3 RNDIS

NOTE

Executing **AT+QMAP="VLAN"[,<VLAN_ID>,<enable>[,<VLAN_type>]]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

a) If **<VLAN_type>**=1/2/3, the module reboots automatically when you enable the first VLAN of any type or disable the last exist VLAN of specified type.

b) In other conditions, the configuration of enabling or disabling VLAN takes effect immediately and the module does not reboot automatically.

Example

```
AT+QMAP="VLAN"                  //Query the list of the enabled VLAN IDs.
+QMAP: "VLAN",0
+QMAP: "VLAN",2,1               //VLAN 2 (eth0.2) of ETH is enabled.
+QMAP: "VLAN",3,1               ///VLAN 3 (eth0.3) of ETH is enabled.

OK
AT+QMAP="VLAN",4,"enable",1     //Enable VLAN 4 (eth0.4) of ETH.
OK
AT+QMAP="VLAN",4,"disable"      //Disable VLAN 4 (eth0.4) of ETH.
OK
```

4.5.4. AT+QMAP="MPDN_rule" Query/Modify QMAP Multiple Data Call Rules

This command queries or modifies the QMAP multiple data call rules.

AT+QMAP="MPDN_rule" Query/Modify QMAP Multiple Data Call Rules	
Write Command **AT+QMAP="MPDN_rule"[,<rule_num>[,<profileID>,<VLAN_ID>,<IPPT_mode>,<auto_connect>[,<IPPT_info>]]]**	Response If the optional parameters are omitted, query the current setting: **+QMAP: "MPDN_rule",<rule_num>,<profileID>,<VLAN_ID>,<IPPT_mode>,<auto_connect>** **…** **OK** If only **<rule_num>** is specified, disable a specified QMAP data call rule: **OK** If the optional parameters are specified, configure the specified QMAP data call rule: **OK** If there is any error: **ERROR**
Maximum Response Time	5 s
Characteristics	See the note below for whether the command takes effect immediately or not. The configurations are saved automatically.

Parameter

<rule_num>	Integer type. Rule ID of QMAP multiple data call. Range: 0–3.
<profileID>	Integer type. APN profile ID used by the QMAP data call rule. Range: 1–16.
<VLAN_ID>	Integer type. VLAN ID used by the QMAP data call rule. Range: 0, 2–4095. 0 is displayed only in the response string and indicates the physical default LAN interface rather than a VLAN ID.
<IPPT_mode>	Integer type. Enable or disable IPPT mode (IP Passthrough mode) in the QMAP data call rule. 0 Disable IPPT mode 1 Enable IPPT mode (ETH) 2 Enable IPPT mode (Wi-Fi)

	3 Enable IPPT mode (USB-ECM/RNDIS) 4 Enable IPPT mode (Any Device)
<auto_connect>	Integer type. Enable or disable automatic connecting in the QMAP data call rule. 1 Enable 0 Disable
<IPPT_info>	String type. If **<IPPT_mode>** is 0, **<IPPT_info>** does not need to be filled in. If **<IPPT_mode>** is 1, **<IPPT_info>** is the peer NIC MAC address bound in IPPT mode. ● If **<IPPT_info>** is set to "FF:FF:FF:FF:FF:FF", the module will always deliver the public network address to the newly connected ETH device. ● If **<IPPT_info>** is set to "00:00:00:00:00:00", the module will only deliver the public network address to the first connected ETH device ● If **<IPPT_info>** is set to the MAC address of an ethernet device, the module will only deliver the public network address to the ETH device. If **<IPPT_mode>** is 2, **<IPPT_info>** is the peer NIC MAC address bound in IPPT mode. ● If **<IPPT_info>** is set to "FF:FF:FF:FF:FF:FF", the module will always deliver the public network address to the newly connected Wi-Fi device. ● If **<IPPT_info>** is set to "00:00:00:00:00:00", the module will only deliver the public network address to the first connected Wi-Fi device ● If **<IPPT_info>** is set to the MAC address of an ethernet device, the module will only deliver the public network address to the Wi-Fi device. If **<IPPT_mode>** is 3, **<IPPT_info>** is the peer host name bound in IPPT mode. ● If **<IPPT_info>** is set to "FF:FF:FF:FF:FF:FF", the module will always deliver the public network address to the newly connected USB device. ● If **<IPPT_info>** is set to "00:00:00:00:00:00", the module will only deliver the public network address to the first connected USB device. ● When using the first two methods, please ensure that the NIC MAC address of the host's USB network card [ECM/RNDIS] remains unchanged, otherwise the module will consider it as a different device. ● If **<IPPT_info>** is set to the hostname of a USB device, the module will only deliver the public network address to the USB device. If **<IPPT_mode>** is 4, **<IPPT_info>** means that the module can deliver the public IP address to any device with any interface type. The value can only be set to the following two values. ● If **<IPPT_info>** is set to "FF:FF:FF:FF:FF:FF", the module will always deliver the public IP address to the latest connected device of any interface type. ● If **<IPPT_info>** is set to "00:00:00:00:00:00", the module will only deliver the public network address to the first connected device of any interface type. ● At this time, **<IPPT_info>** cannot be set to other values.

When IPPT mode is enabled,

- If the IPPT NAT working mode is WithNAT (**AT+QMAP="IPPT_NAT",1**), the LAN device specified by **<IPPT_info>** will obtain the public network address, other LAN devices will obtain the private network address, and the module will perform network address translation on all LAN device data.

- If the IPPT NAT working mode is WithoutNAT (**AT+QMAP="IPPT_NAT",0**), the LAN device specified by **<IPPT_info>** will obtain the public network address, and the module will not perform network address translation on the data of the LAN device, and other LAN devices will not obtain any IP address. In addition, in this mode, the function of IPPT taking effect on the latest devices will be invalid, and "FF:FF:FF:FF:FF:FF" is equivalent to "00:00:00:00:00:00".

NOTE

1. If only the physical default LAN interface is required to access network and there is no need to support QMAP multiple data call, you should set **<rule_num>**=0 and **<VLAN_ID>**=0.
2. The QMAP multiple data call is implemented by binding the WAN interfaces obtained from data calls of different APNs to the LAN/VLAN interface, and implementing the NAT configuration between the corresponding WAN and LAN/VLAN. In this way, the devices under different LAN/VLAN interfaces can access different network through the corresponding WAN interface.
3. When configuring QMAP data call rule, if you need to use a VLAN interface (**<VLAN_ID>** is not 0), you need to create a corresponding VLAN interface through **AT+QMAP="VLAN"** first.
4. IPPT mode (IP Passthrough mode), is a function of transparently transmitting the IP address (Public IP) assigned by the operator to the LAN device.
5. By default, when using a USB (ECM/RNDIS) interface to start a QMAP data call, if the IPPT mode is enabled, you need to set **<IPPT_mode>** to 3, and set the hostname of the LAN device in **<IPPT_info>**. Because in most cases, the MAC address of the USB virtual Ethernet interface (ECM/RNDIS) is not fixed. But the module supports IPPT mode by setting **<IPPT_mode>** to 1 and setting the MAC address of the LAN USB device in **<IPPT_info>** in actual use.
6. WLAN interface does not support VLAN function, WLAN belongs to VLAN0. In actual use, to assign the public IP to the WLAN device, you need to set **<IPPT_mode>** to 2, and **<VLAN_ID>** can only be 0.
7. By default, the data call initiated with the first rule (**<rule_num>**=0) is the default QMAP data call.
8. The default QMAP data call is bound to the physical LAN interface (VLAN0) by default. If you change the bound LAN/VLAN interface of the default QMAP data call, the module reboots automatically. For example, execute **AT+QMAP="MPDN_rule",0,1,2,0,1** (bind the default QMAP data call rule to **<VLAN_ID>**=2). If **AT+QMAP="MPDN_rule",0** is executed at this time to disable the default QMAP data call rule, the LAN/VLAN interface bound to the default QMAP data call rule automatically changes the physical LAN interface from **<VLAN_ID>**=2, and the module reboots automatically.
9. The module access network through the data connection initiated by the default QMAP data call rule. That is, if **<rule_num>**=0 has not initiated a data connection, the module cannot access network.
10. Executing **AT+QMAP="MPDN_rule"[,<rule_num>[,<profileID>,<VLAN_ID>,<IPPT_mode>,<au**

to_connect>[,<IPPT_info>]]] indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QMAP="MPDN_rule"                    //Query the current QMAP data call rules.
+QMAP: "MPDN_rule",0,0,0,0,0
+QMAP: "MPDN_rule",1,0,0,0,0
+QMAP: "MPDN_rule",2,0,0,0,0
+QMAP: "MPDN_rule",3,0,0,0,0

OK
AT+QMAP="MPDN_rule",0,1,0,0,1          //Configure and enable QMAP data call rule 0
OK
AT+QMAP="MPDN_rule",1,5,2,0,1          //Configure and enable QMAP data call rule 1.
OK
AT+QMAP="MPDN_rule"                    //Query the current QMAP data call rules.
+QMAP: "MPDN_rule",0,1,0,0,1
+QMAP: "MPDN_rule",1,5,2,0,1
+QMAP: "MPDN_rule",2,0,0,0,0
+QMAP: "MPDN_rule",3,0,0,0,0

OK
AT+QMAP="MPDN_rule",1                  //Disable QMAP data call rule 1.
OK
AT+QMAP="MPDN_rule"                    //Query the current QMAP data call rules.
+QMAP: "MPDN_rule",0,1,0,0,1
+QMAP: "MPDN_rule",1,0,0,0,0
+QMAP: "MPDN_rule",2,0,0,0,0
+QMAP: "MPDN_rule",3,0,0,0,0

OK
```

4.5.5. AT+QMAP="IPPT_NAT" Query/Configure IPPT NAT Working Mode of QMAP Data Call

This command queries or configures whether to use NAT (Network Address Translation) in IPPT mode.

AT+QMAP="IPPT_NAT" Query/Configure IPPT NAT Working Mode of QMAP Data Call	
Write Command **AT+QMAP="IPPT_NAT"[,<IPPT_NAT**	Response If the optional parameter is omitted, query the current setting:

>]	**+QMAP: "IPPT_NAT",<IPPT_NAT>** **OK** If the optional parameter is specified, configure IPPT NAT working mode: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<IPPT_NAT>	Integer type. IPPT NAT working mode. 0 WithoutNAT. Not using NAT in IPPT mode. 1 WithNAT. Using NAT in IPPT mode.

NOTE

1. Changing IPPT NAT working mode disconnects all QMAP data call connections. The disconnected QMAP data call can be reconnected automatically if the automatic connecting is enabled. If automatic connecting is disabled, you should manually execute **AT+QMAP="connect"** to start a QMAP data call after changing IPPT NAT working mode.
2. If you change the IPPT NAT working mode to WithoutNAT from WithNAT, the IPPT modes configured in all QMAP data call rules change to WithoutNAT automatically. If you change the IPPT NAT working mode to WithNAT from WithoutNAT, the IPPT modes configured in all QMAP data call rules change to WithNAT automatically.

Example

```
AT+QMAP="IPPT_NAT"                  //Query current configuration
+QMAP: "IPPT_NAT",0

OK
AT+QMAP="IPPT_NAT",1                //Configure to using NAT in IPPT mode
OK
```

4.5.6. AT+QMAP="connect" Start/Stop QMAP Data Call

This command starts or stops a QMAP data call.

AT+QMAP="connect" Start/Stop QMAP Data Call	
Write Command **AT+QMAP="connect",<rule_num>,<connect>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<rule_num>	Integer type. Rule ID of QMAP multiple data call. Range: 0–3.
<connect>	Integer type. Start or stop QMAP data call. 0 Stop 1 Start

NOTE

If **<auto_connect>**=1 (see **AT+QMAP="MPDN_rule"**), the specified QMAP data call rule starts automatic data call, and you cannot start or stop this data connection over **AT+QMAP="connect"**. If you want to control QMAP data call manually with **AT+QMAP="connect"**, you should disable automatic connecting in the rule with **AT+QMAP="MPDN_rule"**.

4.5.7. AT+QMAP="auto_connect" Query/Modify Automatic Connecting Configuration of QMAP Data Call

This command queries or modifies automatic connecting configuration of QMAP data call.

AT+QMAP="auto_connect" Query/Modify Automatic Connecting Configuration of QMAP Data Call	
Write Command **AT+QMAP="auto_connect"[,<rule_num>[,<auto_connect>[,<profileID>]]]**	Response If the optional parameters are omitted, query the current settings of all QMAP data call rules: **+QMAP: "auto_connect",<rule_num>,<auto_connect>** **…** **OK**

	If only **<rule_num>** is specified, query the current setting of the specified QMAP data call rule: **+QMAP: "auto_connect",<rule_num>,<auto_connect>** **OK** If only **<rule_num>** and **<auto_connect>** are specified, enable or disable automatic connecting for the specified QMAP data call rule: **OK** If all optional parameters are specified, enable automatic connecting and configure the APN Profile ID, or disable automatic connecting for the specified QMAP data call rule: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<rule_num>	Integer type. Rule ID of QMAP multiple data call. Range: 0–3.
<auto_connect>	Integer type. Enable or disable automatic connecting in the QMAP data call. 0 Disable 1 Enable
<profileID>	Integer type. APN Profile ID used by the QMAP data call rule. Range: 1–16.

NOTE

1. Before modifying **<auto_connect>** of the specified QMAP data call rule, you need to ensure that the specified rule was configured and enabled with **AT+QMAP="MPDN_rule"**.
2. Executing **AT+QMAP="auto_connect"[,<rule_num>[,<auto_connect>[,<profileID>]]]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QMAP="auto_connect"          //Query the current setting.
+QMAP: "auto_connect",0,1
+QMAP: "auto_connect",1,0
```

```
+QMAP: "auto_connect",2,0
+QMAP: "auto_connect",3,0

OK
AT+QMAP="auto_connect",0          //Query automatic connecting configuration of rule 0.
+QMAP: "auto_connect",0,1

OK
AT+QMAP="auto_connect",1,1        //Configure automatic connecting of rule 2.
OK
AT+QMAP="auto_connect",2,1,6      //Configure automatic connecting of rule 2 and modify
                                  <profileID> to 6.
OK
```

4.5.8. AT+QMAP="MPDN_status" Query Status of QMAP Multiple Data Call

This command queries status of QMAP multiple data call.

AT+QMAP="MPDN_status" Query Status of QMAP Multiple Data Call	
Write Command **AT+QMAP="MPDN_status"**	Response **+QMAP: "MPDN_status",<rule_num>,<profileID>,<IPPT_status>,<connect_status>** **…** **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<rule_num>	Integer type. Rule ID of QMAP multiple data call. Range: 0–3.
<profileID>	Integer type. APN profile ID used by the QMAP data call rule. Range: 1–16.
<IPPT_status>	Integer type. Whether IPPT mode is enabled in the QMAP data call rule. 0 Enabled 1 Disabled
<connect_status>	Integer type. Status of the QMAP data call. 0 Disconnected 1 Connected

Example

```
AT+QMAP="MPDN_status"          // Query status of QMAP multiple data call.
+QMAP: "MPDN_status",0,1,1,1
+QMAP: "MPDN_status",1,2,0,1
+QMAP: "MPDN_status",2,3,0,0
+QMAP: "MPDN_status",3,0,0,0

OK
```

4.5.9. AT+QMAP="SFE" Query/Configure SFE Software Acceleration

This command queries or configures SFE software acceleration of the module.

AT+QMAP="SFE" Query/Configure SFE Software Acceleration	
Write Command **AT+QMAP="SFE"[,<status>]**	Response If the optional parameter is omitted, query the current setting: **+QMAP: "SFE",<status>** **OK** If the optional parameter is specified, enable or disable SFE software acceleration: **OK** If there is any error: **ERROR**
Maximum Response Time	500 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<status>	String type. Enable or disable SFE software acceleration. "enable" Enable "disable" Disable

NOTE

Only when the module does not support hardware acceleration (IPA), can the SFE function provide limited performance optimization. If the module supports hardware acceleration (IPA), this function is invalid.

Example

```
AT+QMAP="SFE"                 //Query the current setting.
+QMAP: "SFE","disable"

OK
AT+QMAP="SFE","enable"        //Enable SFE software acceleration.
OK
```

4.5.10. AT+QMAP="domain" Query/Configure Gateway Domain Name of LAN/VLAN Interface

This command queries or configures gateway domain name of LAN/VLAN interface.

AT+QMAP="domain" Query/Configure Gateway Domain Name of LAN/VLAN Interface	
Write Command **AT+QMAP="domain"[,<domain_name>]**	Response If the optional parameter is omitted, query the current setting: **+QMAP: "domain",<domain_name>** **OK** If the optional parameter is specified, configure gateway domain name of LAN/VLAN Interface: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<domain_name>	String type. LAN/VLAN gateway domain name. For example, "example.com".

NOTE

Executing **AT+QMAP="domain"[,<domain_name>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QMAP="domain"                                  //Query gateway domain name.
+QMAP: "domain","example.com"

OK
AT+QMAP="domain","example.com"  //Configure gateway domain name.
OK
```

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 (U)SIM card or active application in the UICC (GSM or (U)SIM) that is attached to the module.

AT+CIMI Request International Mobile Subscriber Identity (IMSI)	
Test Command **AT+CIMI=?**	Response **OK**
Execution Command **AT+CIMI**	Response TA returns **<IMSI>** for identifying the individual (U)SIM which is attached to the module. **<IMSI>** **OK** If there is any error: **+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 codes. For more details, see ***Chapter 14.5***.

Example

```
AT+CIMI
460023210226023          //Query IMSI number of (U)SIM which is attached to the module.
```

OK

5.2. AT+CLCK Facility Lock

This command locks/unlocks or interrogates a module or a network facility **<fac>**. Password is normally needed to do such actions. When querying the status of network service (**<mode>**=2) the response line for 'not active' case (**<status>**=0) should be returned only if service is not active for any **<class>**.

It can be aborted when network facilities are being set or interrogated.

AT+CLCK Facility Lock	
Test Command **AT+CLCK=?**	Response **+CLCK: (**list of supported **<fac>**s**)** **OK**
Write Command **AT+CLCK=<fac>,<mode>[,<password>[,<class>]]**	Response If **<mode>** is not 2 and command is set successfully: **OK** If **<mode>**=2 and the command is set successfully: **+CLCK: <status>[,<class>]** **[+CLCK: <status>[,<class>]]** **[…]** **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<fac>	String type. "SC" (U)SIM (lock (U)SIM/UICC card installed in the currently selected card slot) ((U)SIM/UICC asks password in MT power-up when this lock command is issued). "AO" BAOC (Bar All Outgoing Calls) (Refer to *3GPP TS 22.088*).

	"OI"	BOIC (Bar Outgoing International Calls) (Refer to *3GPP TS 22.088*).
	"OX"	BOIC-exHC (Bar Outgoing International Calls except to Home Country) (Refer to *3GPP TS 22.088*).
	"AI"	BAIC (Bar All Incoming Calls) (Refer to *3GPP TS 22.088*).
	"IR"	BIC-Roam (Bar Incoming Calls when Roaming outside the home country) (Refer to *3GPP TS 22.088*).
	"AB"	All Barring services (Refer to *3GPP TS 22.030*) (applicable only for **<mode>**=0).
	"AG"	All outgoing barring services (Refer to *3GPP TS 22.030*) (applicable only for **<mode>**=0).
	"AC"	All incoming barring services (Refer to *3GPP TS 22.030*) (applicable only for **<mode>**=0).
	"FD"	(U)SIM card or active application in the UICC (GSM or (U)SIM) fixed dialing memory feature (If PIN2 authentication has not been done during the current session, PIN2 is required as **<password>**).
	"PF"	Lock Phone to the very first inserted (U)SIM/UICC card (also referred in the present document as PH-FSIM) (MT asks password when other SIM/UICC cards are inserted).
	"PN"	Network Personalization (Refer to *3GPP TS 22.022*)
	"PU"	Network Subset Personalization (Refer to *3GPP TS 22.022*)
	"PP"	Service Provider Personalization (Refer to *3GPP TS 22.022*)
	"PC"	Corporate Personalization (Refer to *3GPP TS 22.022*)
<mode>	Integer type.	
	0	Unlock
	1	Lock
	2	Query status
<password>	String type. Password.	
<class>	Integer type.	
	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. Lock status.	
	0	OFF
	1	ON

NOTE

Executing **AT+CLCK=<fac>,<mode>[,<password>[,<class>]]** and **<mode>** is not 2 indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+CLCK="SC",2                  //Query the status of (U)SIM card.
+CLCK: 0                        //The (U)SIM card is unlocked (OFF).

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 locked (ON).

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

5.3. AT+CPIN Enter PIN

This command sends to the MT a password which is necessary before it can be operated or queries whether TA requires a password or not before it can be operated. The password may be (U)SIM PIN, (U)SIM PUK, PH-SIM PIN, etc.

AT+CPIN Enter PIN	
Test Command **AT+CPIN=?**	Response **OK**
Read Command **AT+CPIN?**	Response TA returns an alphanumeric string indicating whether or not some password is required. **+CPIN: <code>** **OK** If there is any error: **+CME ERROR: <err>**
Write Command **AT+CPIN=<pin>[,<new_pin>]**	Response TA stores a password, such as (U)SIM PIN, (U)SIM PUK, etc., which is necessary before it can be operated. If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken and an error message **+CME ERROR** is returned to TE.

	If the PIN required is (U)SIM PUK or (U)SIM PUK2, the second pin is required. This second pin, **<new_pin>**, is used to replace the old pin in the (U)SIM. **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<code>	String without double quotes.	
	READY	MT is not pending for any password
	SIM PIN	MT is waiting for (U)SIM PIN to be given
	SIM PUK	MT is waiting for (U)SIM PUK to be given
	SIM PIN2	MT is waiting for (U)SIM PIN2 to be given
	SIM PUK2	MT is waiting for (U)SIM PUK2 to be given
	PH-NET PIN	MT is waiting for network personalization password to be given
	PH-NET PUK	MT is waiting for network personalization unblocking password to be given
	PH-NETSUB PIN	MT is waiting for network subset personalization password to be given
	PH-NETSUB PUK	MT is waiting for network subset personalization unblocking password to be given
	PH-SP PIN	MT is waiting for service provider personalization password to be given
	PH-SP PUK	MT is waiting for service provider personalization unblocking password to be given
	PH-CORP PIN	MT is waiting for corporate personalization password to be given
	PH-CORP PUK	MT is waiting for corporate personalization unblocking password to be given
<pin>	String type. Password. If the requested password was a PUK, such as (U)SIM PUK1, PH-FSIM PUK or another password, then **<pin>** must be followed by **<new_pin>**.	
<new_pin>	String type. New password required if the requested code was a PUK.	
<err>	Error codes. For more details, see ***Chapter 14.5***.	

Example

```
//Enter PIN
```

```
AT+CPIN?
+CPIN: SIM PIN                          //MT is waiting for (U)SIM PIN to be given.

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

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

OK
//Enter PUK and PIN
AT+CPIN?
+CPIN: SIM PUK                          //MT is waiting for (U)SIM PUK to be given.

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

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

OK
```

5.4. AT+CPWD Change Password

This command sets a new password for the facility lock function defined by **AT+CLCK**.

AT+CPWD Change Password	
Test Command **AT+CPWD=?**	Response TA returns a list of pairs which present the available facilities and the maximum length of their password. **+CPWD: (**list of supported **<fac>**s**),<pwdlength>** **OK**
Write Command **AT+CPWD=<fac>,<oldpwd>,<newpwd>**	Response TA sets a new password for the facility lock function. **OK**

Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<fac>	String type.	
	"SC"	(U)SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command is issued.)
	"AO"	BAOC (Bar All Outgoing Calls, refer to *3GPP TS 22.088*)
	"OI"	BOIC (Bar Outgoing International Calls, refer to *3GPP TS 22.088*)
	"OX"	BOIC-exHC (Bar Outgoing International Calls except to Home Country, refer to *3GPP TS 22.088*)
	"AI"	BAIC (Bar All Incoming Calls, refer to *3GPP TS 22.088*)
	"IR"	BIC-Roam (Bar Incoming Calls when Roaming outside the home country, refer to *3GPP TS 22.088*)
	"AB"	All barring services (Refer to *3GPP TS 22.030*, applicable only for **<mode>**=0)
	"AG"	All outgoing barring services (Refer to *3GPP TS 22.030*, applicable only for **<mode>**=0)
	"AC"	All incoming barring services (Refer to *3GPP TS 22.030*, applicable only for **<mode>**=0)
	"P2"	(U)SIM PIN2
<pwdlength>	Integer type. Maximum length of password.	
<oldpwd>	String type. Password specified for the facility from the user interface or with command.	
<newpwd>	String type. New password.	

Example

```
AT+CPIN?
+CPIN: READY

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

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

+CPIN: READY

5.5. AT+CSIM Generic (U)SIM Access

This command allows a direct control of the (U)SIM that is installed in the currently selected card slot by a distant application on the TE. The TE shall then keep the processing of (U)SIM information within the frame specified by GSM/UMTS.

AT+CSIM Generic (U)SIM Access	
Test Command **AT+CSIM=?**	Response **OK**
Write Command **AT+CSIM=<length>,<command>**	Response **+CSIM: <length>,<response>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.
Reference 3GPP TS 27.007	

Parameter

<length>	Integer type. Length of **<command>** or **<response>** string.
<command>	String type in hexadecimal format. Command transferred by the MT to the (U)SIM in the format as described in *3GPP TS 51.011*.
<response>	String type in hexadecimal format. Response to the command transferred by the (U)SIM to the MT in the format as described in *3GPP TS 51.011*.
<err>	Error codes. For more details, see ***Chapter 14.5***.

5.6. 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 any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.
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 for an elementary data file on (U)SIM, if used by **<command>**.
<P1>, <P2>, <P3>	Integer type. Parameters transferred by the MT to the (U)SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in *3GPP TS 51.011*.
<data>	String type. Information to be written to the (U)SIM in hex string (Refer to **AT+CSCS**).
<pathId>	String type. The directory path of an elementary file on a (U)SIM/UICC in hex string.

<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>	String type. Response of a successful completion of the command previously issued in hex string (Refer to **AT+CSCS**). STATUS and GET RESPONSE return data, which gives information about the current elementary data field. The information includes the type of file and its size (Refer to *3GPP TS 51.011*). After READ BINARY, READ RECORD or RETRIEVE DATA command, the requested data will be returned. **<response>** is not returned after a successful UPDATE BINARY, UPDATE RECORD or SET DATA command.
<err>	Error codes. For more details, see ***Chapter 14.5***.

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",<pincounter>,<pukcounter>** **+QPINC: "P2",<pincounter>,<pukcounter>** **OK**
Write Command **AT+QPINC=<facility>**	Response **+QPINC: <facility>,<pincounter>,<pukcounter>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<facility>	String type. "SC" (U)SIM PIN "P2" (U)SIM PIN2
<pincounter>	Integer type. Number of attempts left to enter the password of PIN.
<pukcounter>	Integer type. Number of attempts left to enter the password of PUK.
<err>	Error codes. For more details, see ***Chapter 14.5***.

Example

```
AT+QPINC?
+QPINC: "SC",3,10
+QPINC: "P2",3,10

OK
```

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: (**list 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 four states (e.g. 7=1+2+4 means CPIN READY + SMS DONE + PB DONE). 0 Initial state 1 CPIN READY. Operation like lock/unlock PIN is allowed. 2 SMS DONE. SMS initialization completed.

4	PB DONE. Phonebook initialization completed.

Example

```
AT+QINISTAT
+QINISTAT: 7

OK
```

5.9. AT+QSIMDET (U)SIM Card Detection

This command enables or disables (U)SIM card detection. (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** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configurations are saved automatically.

Parameter

<enable>	Integer type. Enable or disable (U)SIM card detection. The default value varies from different modules. 0 Disable 1 Enable
<insert_level>	Integer type. The level of (U)SIM detection pin when a (U)SIM card is inserted. The default value varies from different modules.

0	Low level
1	High level

NOTE

1. (U)SIM card detection is invalid if the configured value of **<insert_level>** is inconsistent with hardware design.
2. The configuration of **<insert_level>** is valid only when (U)SIM card detection is enabled.
3. Executing **AT+QSIMDET=<enable>,<insert_level>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QSIMDET=1,0          //Set (U)SIM card detection pin level low when (U)SIM card is inserted.
OK

//Remove (U)SIM card

+CPIN: NOT READY

//Insert (U)SIM card

+CPIN: READY
```

5.10. AT+QSIMSTAT (U)SIM 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 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**

	Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<enable>	Integer type. Enable or disable (U)SIM inserted status report. If it is enabled, the URC **+QSIMSTAT: <enable>,<inserted_status>** will be reported when (U)SIM card is inserted or removed. 0 Disable 1 Enable
<inserted_status>	Integer type. (U)SIM card is inserted or removed. This parameter is not allowed to be set. 0 Removed 1 Inserted 2 Unknown (before (U)SIM initialization)

NOTE

Executing **AT+QSIMSTAT=<enable>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

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

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

OK
//Remove the (U)SIM card.
+QSIMSTAT: 1,0                  //Report of (U)SIM card inserted status: removed.

+CPIN: NOT READY
AT+QSIMSTAT?
```

+QSIMSTAT: 1,0

OK
//Insert a (U)SIM card.
+QSIMSTAT: 1,1 //Report of (U)SIM card inserted status: inserted.

+CPIN: READY

5.11. AT+QUIMSLOT Switch (U)SIM Slot

This command queries the slot currently used by the (U)SIM and configures the (U)SIM slot to be used.

AT+QUIMSLOT Switch (U)SIM Slot	
Test Command **AT+QUIMSLOT=?**	Response **+QUIMSLOT:** (list of supported **<slot>**s) **OK**
Read Command **AT+QUIMSLOT?**	Response **+QUIMSLOT: <slot>** **OK**
Write Command **AT+QUIMSLOT=<slot>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<slot>	Integer type. Physical (U)SIM slot. 1 (U)SIM slot 1 2 (U)SIM slot 2

NOTE

Executing **AT+QUIMSLOT=<slot>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QUIMSLOT?                //Query the (U)SIM slot currently used.
+QUSIMSLOT: 1

OK
AT+QUIMSLOT=2               //Switch to (U)SIM slot 2.
OK
```

5.12. AT+ICCID Get ICCID

This command gets ICCID if a (U)SIM card is inserted.

AT+ICCID Query ICCID	
Test Command **AT+ICCID=?**	Response **OK**
Read Command **AT+ICCID**	Response **+ICCID: <ICCID>** **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<ICCID>	String without double quotes. ICCID of the (U)SIM card.
<err>	Error codes. For more details, see ***Chapter 14.5***.

Example

```
AT+ICCID
+ICCID: 89148000000000000002       //Query ICCID of the (U)SIM card.

OK
```

6 Network Service Commands

6.1. AT+COPS Operator Selection

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

This Test Command returns a set of five parameters, each representing an operator presenting in the network. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in the order of: home network, networks referenced in (U)SIM and other networks.

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

This Write Command forces an attempt to select and register the GSM/UMTS/EPS 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>**s**[,<AcT>])**s**][,,(**list of supported **<mode>**s**),(**list of supported **<format>**s**)]** **OK** If there is any error: **+CME ERROR: <err>**
Read Command **AT+COPS?**	Response **+COPS: <mode>[,<format>[,<oper>][,<AcT>]]** **OK** If there is any error: **+CME ERROR: <err>**

Write Command **AT+COPS=<mode>[,<format>[,<oper>[,<AcT>]]]**	Response **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	180 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<stat>	Integer type. Availability of operators. 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 mode. Operator selection (**<oper>** field is ignored). 1 Manual operator selection. **<oper>** field shall be present and **<AcT>** optionally. 2 Manually 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 invalid in the response of Read Command. 4 Manual/automatic selection. **<oper>** field shall be presented. If manual selection fails, automatic mode (**<mode>**=0) is entered.
<format>	Integer type. 0 Long format alphanumeric **<oper>** which can be up to 16 characters long 1 Short format alphanumeric **<oper>** 2 Numeric **<oper>**. GSM location area identification number
<AcT>	Integer type. Access technology selected. Values 4, 5, 6 occur only in the response of Read Command while MS is in data service state and is not intended for the **AT+COPS** Write Command. 2 UTRAN 4 UTRAN W/HSDPA 5 UTRAN W/HSUPA 6 UTRAN W/HSDPA and HSUPA 7 E-UTRAN
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

Executing **AT+COPS=<mode>[,<format>[,<oper>[,<AcT>]]]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+COPS=?                                   //List all current network operators
+COPS: (1,"CHN-UNICOM","UNICOM","46001",2),(2,"CHN-UNICOM","UNICOM","46001",7),(3,"46011","46011","46011",7),(3,"CHINA MOBILE","CMCC","46000",7),,(0-4),(0-2)

OK
AT+COPS?                                    //Query the currently selected network operator
+COPS: 0,0,"CHN-UNICOM",7

OK
```

6.2. AT+CREG Network Registration Status

This Read Command returns the network registration status and returns the status of result code presentation and an integer **<stat>** which shows whether the network has currently indicated the registration of MT. Location information parameters **<lac>** and **<ci>** are returned only when **<n>**=2 and MT is registered on the network.

This Write Command sets whether to present URC or not and controls the presentation of an unsolicited result code **+CREG: <stat>** when **<n>**=1 and there is a change in the MT network registration status.

AT+CREG Network Registration Status	
Test Command **AT+CREG=?**	Response **+CREG: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CREG?**	Response **+CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]]** **OK** If there is any error: **+CME ERROR: <err>**
Write Command **AT+CREG[=<n>]**	Response **OK**

Maximum Response Time	300 ms
Characteristics	-
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 unsolicited result code with location information: **+CREG: <stat>[,<lac>,<ci>[,<AcT>]]**
<stat>	Integer type. Indicate the 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 searching a new operator to register to 3 Registration denied 4 Unknown 5 Registered, roaming
<lac>	Two bytes location area code in hexadecimal format.
<ci>	28-bit (UMTS/LTE) cell ID in hexadecimal format.
<AcT>	Integer type. Access technology selected. 2 UTRAN 4 UTRAN W/HSDPA 5 UTRAN W/HSUPA 6 UTRAN W/HSDPA and HSUPA 7 E-UTRAN
<err>	Error codes. For more details, see ***Chapter 14.5***.

Example

```
AT+CREG=1
OK

+CREG: 1                                  //URC reports that ME has registered on network
AT+CREG=2                                 //Activate extended URC mode
OK

+CREG: 1,"D509","80D413D",7               //URC reports that operator has found location area code and
                                            cell ID
```

6.3. AT+CGREG Network Registration Status

This command queries the network registration status and controls the presentation of an unsolicited result code **+CGREG: <stat>** when **<n>**=1 and there is a change in the MT's GPRS network registration status in GERAN/UTRAN, or unsolicited result code **+CGREG: <stat>[,[<lac>],[<ci>],[<AcT>],[<rac>]]** when **<n>**=2 and there is a change of the network cell in GERAN/UTRAN.

AT+CGREG Network Registration Status	
Test Command **AT+CGREG=?**	Response **+CGREG:** (list of supported **<n>**s) **OK**
Read Command **AT+CGREG?**	Response **+CGREG: <n>,<stat>[,[<lac>],[<ci>],[<AcT>],[<rac>]]** **OK**
Write Command **AT+CGREG=[<n>]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations 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 **+CGREG: <stat>**
	2	Enable network registration and location information unsolicited result code **+CGREG: <stat>[,<lac>,<ci>[,<AcT>],[<rac>]]**
<stat>	Integer type. Indicate the GPRS registration status.	
	0	Not registered, MT is not currently searching an operator to register to. The UE is in GMM state GMM-NULL or GMM-DEREGISTERED-INITIATED. The GPRS service is disabled; the UE is allowed to attach for GPRS if requested by the user.
	1	Registered, home network. The UE is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED INITIATED on the home PLMN.
	2	Not registered, but MT is currently trying to attach or searching an operator to register to. The UE is in GMM state GMM-DEREGISTERED or GMM-REGISTERED-INITIATED. The GPRS service is enabled, but an allowable

		PLMN is currently not available. The UE will start a GPRS attach as soon as an allowable PLMN is available.
	3	Registration denied. The UE is in GMM state GMM-NULL. The GPRS service is disabled; and the UE is not allowed to attach for GPRS if requested by the user.
	4	Unknown
	5	Registered, roaming
<lac>	String type. Two-byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal).	
<ci>	String type. Four-byte (UMTS/LTE) cell ID in hexadecimal format.	
<AcT>	Integer type. Access technology selected.	
	2	UTRAN
	4	UTRAN W/HSDPA
	5	UTRAN W/HSUPA
	6	UTRAN W/HSDPA and HSUPA
<rac>	One-byte routing area code in hexadecimal format.	

Example

```
AT+CGREG=2
OK
AT+CGATT=0
OK

+CGREG: 2
AT+CGATT=1
OK

+CGREG: 2,1,"D5D5","8054BBF",6,"0"
```

6.4. AT+CEREG EPS Network Registration Status

This command queries the 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.

AT+CEREG EPS Network Registration Status	
Test Command **AT+CEREG=?**	Response **+CEREG: (**list of supported **<n>**s**)** **OK**

Read Command **AT+CEREG?**	Response **+CEREG: <n>,<stat>[,<tac>,<ci>[,<AcT>]]** **OK**
Write Command **AT+CEREG=[<n>]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations 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 **+CEREG: <stat>**
	2	Enable network registration and location information unsolicited result code **+CEREG: <stat>[,<lac>,<ci>[,<AcT>]]**
<stat>	Integer type. Indicate the EPS registration status.	
	0	Not registered, MT is not currently searching an operator to register to
	1	Registered, home network
	2	Not registered, but MT is currently trying to attach or searching an operator to register to
	3	Registration denied
	4	Unknown
	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 selected.	
	7	E-UTRAN

6.5. AT+CSQ Signal Quality Report

This command indicates the received signal strength **<RSSI>** and the channel bit error rate **<ber>**. This Test Command returns values supported by MT. This Execution Command returns received signal strength indication **<RSSI>** and channel bit error rate **<ber>** from MT.

AT+CSQ Signal Quality Report	
Test Command **AT+CSQ=?**	Response **+CSQ: (**list of supported **<RSSI>**s**),(**list of supported **<ber>**s**)** **OK**
Execution Command **AT+CSQ**	Response **+CSQ: <RSSI>,<ber>** **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<RSSI>	Integer type. Received signal strength indication.	
	0	-113 dBm or less
	1	-111 dBm
	2...–30	-109 dBm to -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 *3GPP TS 45.008 subclause 8.2.4*
	99	Not known or not detectable
<err>	Error codes. For more details, see ***Chapter 14.5***.	

Example

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

OK
AT+CSQ
+CSQ: 28,99          //The current signal strength indication is 28 and channel bit error rate is not known
                       or not detectable.

OK
```

NOTE

After using network related commands such as **AT+CCWA** and **AT+CCFC**, it is recommended to wait for 3 s before entering **AT+CSQ** so as to ensure that any network access required for the preceding command has been finished.

6.6. AT+CPOL Preferred Operator List

This command edits and queries the list of preferred operators.

AT+CPOL Preferred Operator List	
Test Command **AT+CPOL=?**	Response **+CPOL: (**list of supported **<index>**s**),(**list of supported **<format>**s**)** **OK**
Read Command **AT+CPOL?**	Response **+CPOL: <index>,<format>,<oper>[,<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>]** **[…]** **OK**
Write Command **AT+CPOL=<index>[,<format>[,<oper>[<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>]]]**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>** If the **<index>** is given but the **<oper>** is omitted, the entry will be deleted.
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<index>	Integer type. The order number of operators in the (U)SIM preferred operator list.

<format>	Integer type. 0 Long format alphanumeric **<oper>** 1 Short format alphanumeric **<oper>** 2 Numeric **<oper>**
<oper>	**<format>** indicates 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 codes. For more details, see ***Chapter 14.5***.

NOTE

The access technology selection parameters **<GSM>**, **<GSM_compact>**, **<UTRAN>** and **<E-UTRAN>** are required for (U)SIM cards or UICC's containing PLMN selector with access technology.

6.7. AT+CPLS Selection of Preferred PLMN List

This command selects one PLMN selector with Access Technology list in the SIM card or active application in the UICC (GSM or USIM), that is used by **AT+CPOL**.

AT+CPLS Selection of Preferred PLMN List	
Test Command **AT+CPLS=?**	Response **+CPLS: (**list of supported **<list>**s**)** **OK**
Read Command **AT+CPLS?**	Response **+CPLS: <list>** **OK**
Write Command **AT+CPLS=<list>**	Response **OK** If there is any error: **ERROR**

	Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<list>	Integer type. 0 User controlled PLMN selector with Access Technology $EF_{PLMNwAcT}$, if not found in the SIM/UICC then PLMN preferred list $EF_{PLMNsel}$ (this file is only available in SIM card or GSM application selected in UICC) 1 Operator controlled PLMN selector with Access Technology $EF_{OPLMNwAcT}$ 2 HPLMN selector with Access Technology $EF_{HPLMNwAcT}$

6.8. AT+COPN Read Operator Names

This command returns the list of operator names from the ME. Each operator code **<numericn>** that has an alphanumeric equivalent **<alphan>** in the ME 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 any error: **+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 codes. For more details, see ***Chapter 14.5***.

6.9. AT+CTZU Automatic Time Zone Update

This Write 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** Or **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. Indicates the mode of automatic time zone update. 0 Disable automatic time zone update via NITZ. 1 Enable automatic time zone update via NITZ

NOTE

Executing **AT+CTZU=<onoff>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+CTZU?          //Read command.
```

```
+CTZU: 0

OK
AT+CTZU=?           //Test command.
+CTZU: (0,1)

OK
AT+CTZU=1           //Enable automatic time zone update.
OK
AT+CTZU?
+CTZU: 1

OK
```

6.10. AT+CTZR Time Zone Reporting

This command controls the time zone reporting of changed event. 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: (**list of supported **<reporting>**s**)** **OK**
Read Command **AT+CTZR?**	Response **+CTZR: <reporting>** **OK**
Write Command **AT+CTZR=<reporting>**	Response **OK** Or **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 reporting of changed event 1 Enable time zone reporting of changed event by unsolicited result code **+CTZV: <tz>** 2 Enable extended time zone reporting by unsolicited result code **+CTZE: <tz>,<dst>,<time>**
<tz>	String type. Indicates the sum of the local time zone (difference between the local time and GMT is expressed in quarters of an hour) plus daylight saving time. The format is "±zz", expressed as a fixed width, two-digit integer with the range -48...+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 savings 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). This parameter can be provided by the network when delivering time zone information and will be presented in the unsolicited result code of extended time zone reporting if provided by the network.

NOTE

Executing **AT+CTZR=<reporting>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

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

OK

+CTZE: "+32",0,"2018/03/23,06:51:13"          //Extended time zone and local time reporting by URC.
```

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

This Execution Command returns the latest time that has been synchronized through network.

AT+QLTS Obtain the Latest Time Synchronized Through Network	
Test Command **AT+QLTS=?**	Response **+QLTS: (**list of supported **<mode>**s**)** **OK**
Write Command **AT+QLTS=<mode>**	Response **+QLTS: <time>,<ds>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Execution Command **AT+QLTS**	Response **+QLTS: <time>,<ds>** **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<mode>	Integer type. Query network time mode. 0 Query the latest time that has been synchronized through network 1 Query the current GMT time calculated from the latest time that has been synchronized through network 2 Query the current LOCAL time calculated from the latest time that has been synchronized through network
<time>	String type. Format is "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -48...+48). E.g. 6th of May 2004, 22:10:00 GMT+2 hours equals “04/05/06,22:10:00+08”
<ds>	Integer type. Daylight saving time. 0 No adjustment 1 Plus one hour 2 Plus two hours

<err>	Error codes. For more details, see ***Chapter 14.5***.

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 latest time synchronized through network.
+QLTS: "2017/01/13,03:40:48+32,0"
OK
AT+QLTS=0                  //Query the latest time synchronized through network. It offers the same function
                             as Execution Command AT+QLTS.
+QLTS: "2017/01/13,03:40:48+32,0"

OK
AT+QLTS=1                  //Query the current GMT time calculated from the latest time that has been
                             synchronized through network.
+QLTS: "2017/01/13,03:41:22+32,0"

OK
AT+QLTS=2                  //Query the current LOCAL time calculated from the latest time that has been
                             synchronized through network
+QLTS: "2017/01/13,11:41:23+32,0"

OK
```

6.12. AT+QNWINFO Query Network Information

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

AT+QNWINFO Query Network Information	
Test Command **AT+QNWINFO=?**	Response **OK**
Execution Command	Response

AT+QNWINFO	+QNWINFO: <AcT>,<oper>,<band>,<channel> OK
Maximum Response Time	300 ms
Characteristics	-

Parameter

<AcT>	String type. Access technology selected. "NONE" "WCDMA" "TDD LTE" "FDD LTE"
<oper>	Integer type. Operator name.
<band>	String type. Band selected. "WCDMA_I_2100" "WCDMA_II_1900" "WCDMA_III_1800" "WCDMA_IV_1700_US" "WCDMA_V_850" "WCDMA_VI_800" "WCDMA_VII_2600" "WCDMA_VIII_900" "WCDMA_IX_1700_JAPAN" "WCDMA_XI_1500" "WCDMA_XIX_850_JAPAN" "LTE BAND 1" – "LTE BAND 66"
<channel>	Integer type. Channel ID.

NOTE

If the devices have not been registered on a network, the command will return **+QNWINFO: No Service**.

Example

```
AT+QNWINFO=?
OK
AT+QNWINFO
+QNWINFO: "FDD LTE",46001,"LTE BAND 3",1650

OK
```

6.13. AT+QSPN Query the Service Provider Name

This command queries the service provider name.

AT+QSPN Query the Service Provider Name	
Test Command **AT+QSPN=?**	Response **OK**
Execution Command **AT+QSPN**	Response **+QSPN: <FNN>,<SNN>,<SPN>,<alphabet>,<RPLMN>** **OK**
Characteristics	-

Parameter

<FNN>	String type. Full name of network.
<SNN>	String type. Shortened name of network.
<SPN>	String type. Service provider name.
<alphabet>	Integer type. Alphabet of full and shortened network name. 0 GSM 7-bit default alphabet 1 UCS2
<RPLMN>	String type. Registered PLMN.

NOTE

1. If **<alphabet>** is 0, **<FNN>** and **<SNN>** will be shown in GSM 7-bit default alphabet string.
2. If **<alphabet>** is 1, **<FNN>** and **<SNN>** will be shown in UCS2 hexadecimal string.

Example

```
AT+QSPN                    //Query the service provider name
+QSPN: "CHN-UNICOM","UNICOM","",0,"46001"

OK
```

6.14. AT+QENG Query Network Information

This command queries the network information.

AT+QENG Query Network Information	
Test Command **AT+QENG=?**	Response **+QENG: (**list of supported **<cell_type>**s**)** **OK**
Write Command Query the information of serving cell **AT+QENG="servingcell"**	Response In LTE mode: **+QENG: "servingcell",<state>,"LTE",<is_tdd>,<MCC>,<MNC>,<cellID>,<PCID>,<earfcn>,<freq_band_ind>,<UL_bandwidth>,<DL_bandwidth>,<TAC>,<RSRP>,<RSRQ>,<RSSI>,<SINR>,<tx_power>,<srxlev>** In WCDMA mode: **+QENG: "servingcell",<state>,"WCDMA",<MCC>,<MNC>,<LAC>,<cellID>,<uarfcn>,<PSC>,<RAC>,<RSCP>,<ecio>,<phych>,<SF>,<slot>,<speech_code>,<comMod>** **OK**
Write Command Query the information of neighbour cells **AT+QENG="neighbourcell"**	Response In LTE mode: **[+QENG: "neighbourcell intra","LTE",<earfcn>,<PCID>,<RSRQ>,<RSRP>,<RSSI>,<SINR>,<srxlev>,<cell_resel_priority>,<s_non_intra_search>,<thresh_serving_low>,<s_intra_search>** **…]** **[+QENG: "neighbourcell inter","LTE",<earfcn>,<PCID>,<<RSRQ>,<RSRP>,<RSSI>,<SINR>,<srxlev>,<cell_resel_priority>,<threshX_low>,<threshX_high>** **…]** **[+QENG:"neighbourcell","WCDMA",<uarfcn>,<cell_resel_priority>,<thresh_Xhigh>,<thresh_Xlow>,<PSC>,<RSCP><ecno>,<srxlev>** **…]** In WCDMA mode: **[+QENG:"neighbourcell","WCDMA",<uarfcn>,<srxqual>,<PSC>,<RSCP>,<ecno>,<set>,<rank>,<srxlev>** **…]**

	[+QENG: "neighbourcell","LTE",<earfcn>,<cellID>,<RSRP>,<RSRQ>,<s_rxlev> **…]** **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<cell_type>	String type. The information of different cells. "servingcell" The information of 3G/4G serving cells "neighbourcell" The information of 3G/4G neighbor cells
<state>	String type. UE state. "SEARCH" UE is searching but could not (yet) find a suitable 3G/4G cell. "LIMSRV" UE is camping on a cell but has not registered on the network. "NOCONN" UE is camping on a cell and has registered on the network, and it is in idle mode. "CONNECT" UE is camping on a cell and has registered on the network, and a call is in progress.
<is_tdd>	String type. LTE network mode. "TDD" TDD mode "FDD" FDD mode
<MCC>	16-bit unsigned integer. Mobile Country Code (first part of the PLMN code).
<MNC>	16-bit unsigned integer. Mobile Network Code (second part of the PLMN code).
<LAC>	String type in hexadecimal format. Location Area Code. The parameter determines the two bytes location area code in hexadecimal format (e.g. 00C1 equals 193 in decimal) of the cell that was scanned. Range: 0–65535.
<cellID>	String type in hexadecimal format. Cell ID. The parameter determines the 16-bit (GSM) or 28-bit (UMTS) cell ID. Range: 0–0xFFFFFFF.
<PCID>	Integer type. Physical cell ID.
<uarfcn>	Integer type. The parameter determines the UTRA-ARFCN of the cell that was scanned.
<earfcn>	Integer type. The parameter determines the E-UTRA-ARFCN of the cell that was scanned.
<freq_band_ind>	Integer type. E-UTRA frequency band (see *3GPP 36.101*).
<UL_bandwidth>	Integer type. UL bandwidth. 0 1.4 MHz 1 3 MHz 2 5 MHz 3 10 MHz 4 15 MHz

	5 20 MHz
<DL_bandwidth>	Integer type. DL bandwidth. 0 1.4 MHz 1 3 MHz 2 5 MHz 3 10 MHz 4 15 MHz 5 20 MHz
<TAC>	Tracking Area Code (see *3GPP 23.003*)
<PSC>	Integer type. The parameter determines the primary scrambling code of the cell that was scanned
<RAC>	Integer type. Routing Area Code. Range 0–255.
<RSCP>	Integer type. The parameter determines the Received Signal Code Power level of the cell that was scanned
<ecio>	Integer type. Carrier to noise ratio in dB = measured Ec/Io value in dB.
<RSRP>	Reference Signal Received Power (see *3GPP 36.214*).
<RSRQ>	Reference Signal Received Quality (see 3GPP *36.214*).
<RSSI>	Integer type. The parameter shows the Received Signal Strength Indication
<SINR>	Integer type. LTE Signal-to-Interface plus Noise Ratio. The conversion formula for actual SINR is **Y** = (**1/5**) × **X** × **10** - **20** (**X** is **<SINR>** queried by **AT+QENG**. **Y** is the actual value of LTE SINR after calculating with the formula). Range: -20 to 30 dB.
<tx_power>	TX power value in 1/10 dBm. It is the maximum of all UL channel TX power. The **<tx_power>** value is only meaningful when the device is in traffic.
<phych>	Integer type. Physical channel. 0 DPCH 1 FDPCH
<SF>	Integer type. Spreading factor. 0 SF_4 1 SF_8 2 SF_16 3 SF_32 4 SF_64 5 SF_128 6 SF_256 7 SF_512 8 UNKNOWN
<slot>	Integer type. 0–16 slot format for DPCH 0–9 slot format for FDPCH
<speech_code>	Destination number on which call is to be deflected.
<comMod>	Integer type. Number format. Compress mode. 0 Not support compress mode 1 Support compress mode
<srxqual>	Receiver automatic gain control on the camped frequency.

<ecno>	Integer type. Carrier to noise ratio in dB = measured Ec/Io value in dB.
<set>	Integer type. 3G neighbor cell set 1 Active set 2 Synchronous neighbor set 3 Asynchronous neighbor set
<rank>	Rank of this cell as neighbor for inter-RAT cell reselection.
<s_rxlev>	Suitable receive level for inter frequency cell.
<threshX_low>	To be considered for re-selection. The suitable receive level value of an evaluated lower priority cell must be greater than this value.
<threshX_high>	To be considered for re-selection. The suitable receive level value of an evaluated higher priority cell must be greater than this value.
<thresh_Xhigh>	Re-selection threshold for high priority layers.
<thresh_Xlow>	Re-selection threshold for low priority layers.
<srxlev>	Integer type. Select reception level value for base station in dB (see *3GPP 25.304*).
<cell_resel_priority>	Integer type. Cell reselection priority. Range: 0–7.
<s_non_intra_search>	Threshold to control non-intra frequency searches.
<thresh_serving_low>	Specifies the suitable reception level threshold (in dB) used by the UE on the serving cell when reselecting towards a lower priority RAT/frequency.
<s_intra_search>	Cell selection parameter for the intra frequency cell.

NOTE

"-" or - indicates the parameter is invalid under current condition.

Example

```
AT+QENG="servingcell"
+QENG: "servingcell","LIMSRV","LTE","FDD",460,11,6935932,30,1825,3,4,4,6934,-115,-13,-83,13,0

OK
AT+QENG="neighbourcell"
+QENG: "neighbourcell intra","LTE",38950,276,-3,-88,-65,0,37,7,16,6,44
+QENG: "neighbourcell inter","LTE",39148,-,-,-,-,-,37,0,30,7,-,-,-,-
+QENG: "neighbourcell inter","LTE",37900,-,-,-,-,-,0,0,30,6,-,-,-,-

OK
```

6.15. AT+QCSQ Report Signal Quality

This command queries and reports the signal strength of the current service network. If the MT is registered with multiple networks in different service modes, users can query the signal strength of networks in each mode. No matter whether the MT is registered with a network or not, users can run this command to query the signal strength or allow the MT to unsolicitedly report the detected signal strength if the MT camps on the network. If the MT is not using any service network or the service mode is uncertain, **"NOSERVICE"** will be returned as the result.

AT+QCSQ Report Signal Quality	
Test Command **AT+QCSQ=?**	Response **+QCSQ: (**list of supported **<sysmode>**s**)** **OK**
Read Command **AT+QCSQ?**	Response **+QCSQ: <enable>** **OK**
Execution Command **AT+QCSQ**	Response **+QCSQ: <sysmode>[,<value1>[,<value2>[,<value3>[,<value4>]]]]** **OK**
Write Command **AT+QCSQ=<enable>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<sysmode>	String type value indicating the service mode in which the MT will unsolicitedly report the signal strength. "NOSERVICE" NOSERVICE mode "WCDMA" WCDMA mode "LTE" LTE mode
<value1>,<vaule2>,<value3>,<value4>	The signal strength type corresponding to each service mode, please refer to ***Table 5*** for details.
<enable>	Integer type. URC report. 0 Disable URC report 1 Enable URC report
<WCDMA_RSSI>	Integer type. Received signal strength indication (RSSI) in dBm.
<WCDMA_RSCP>	Integer type. Received signal code power, which is available for WCDMA mode.
<WCDMA_ECIO>	Integer type. Downlink carrier-to-interference ratio, which are available for WCDMA

	mode.
<LTE_RSSI >	Integer type. Received signal strength indication (RSSI) in dBm.
<LTE_RSRP>	Integer type. Reference signal received power (RSRP) in dBm, which is available for LTE mode.
<LTE_SINR>	Integer type. Signal to interference plus noise ratio (SINR) in dB, which is available for LTE mode.
<LTE_RSRQ>	Integer type. Reference signal received quality (RSRQ) in dB.

Table 5: Signal Strength Type Corresponding to Different Service Modes

<sysmode>	<value1>	<value2>	<value3>	<value4>
"NOSERVICE"	Null	Null	Null	Null
"WCDMA"	**<WCDMA_RSSI>**	**<WCDMA_ RSCP>**	**<WCDMA_ECIO>**	Null
"LTE"	**<LTE_RSSI>**	**<LTE_RSRP>**	**<LTE_SINR>**	**<LTE_RSRQ>**

NOTE

1. URC reporting format is **+QCSQ: <sysmode>[,<value1>[,<value2>[,<value3>[,<value4>]]]]**, which allows the MT to unsolicitedly report the current signal strength when the strength changes.
2. This Write Command controls URC indication which is disabled by default (**<enable>**=0). If **<enable>**=1, the MT can unsolicitedly report the current signal strength when the strength changes.

Example

```
AT+QCSQ                    //Query signal.
+QCSQ: "LTE",-52,-81,195,-10

OK
AT+QCSQ?                   //Query URC configuration.
+QCSQ: 0

OK
AT+QCSQ=?                  //List of supported <sysmode>s.
+QCSQ: "NOSERVICE","WCDMA","LTE"

OK
```

6.16. AT+QCAINFO Query Carrier Aggregation Parameters

This command queries carrier aggregation parameters.

AT+QCAINFO Query Carrier Aggregation Parameters	
Test Command **AT+QCAINFO=?**	Response **OK**
Execution Command **AT+QCAINFO**	Response **+QCAINFO: "PCC",<freq>,<bandwidth>,<band>,<pcell_state>,<PCID>,<RSRP>,<RSRQ>,<RSSI>,<SNR>** **+QCAINFO: "SCC",<freq>,<bandwidth>,<band>,<scell_state>,<PCID>,<RSRP>,<RSRQ>,<RSSI>,<SNR>** **[+QCAINFO: "SCC",<freq>,<bandwidth>,<band>,<scell_state>,<PCID>,<RSRP>,<RSRQ>,<RSSI>,<SNR>[…]]** **OK** If no second cell was active: **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<freq>	EARFCN (E-UTRA Absolute Radio Frequency Channel Number).
<bandwidth>	Integer type. Bandwidth. 6 1.4 MHZ 15 3 MHZ 25 5 MHZ 50 10 MHZ 75 15 MHZ 100 20 MHZ
<band>	String type. Band information.
<pcell_state>	String type. Primary cell state. 0 No serving 1 Registered
<scell_state>	Integer type. Secondary cell state. 0 De-configured 1 Configured deactivated 2 Configured activated
<PCID>	Integer type. Physical Cell ID.
<RSRP>	Integer type. Reference Signal Received Power (see *3GPP 36.214*).

<RSRQ>	Integer type. Reference Signal Received Quality (see *3GPP 36.214*).
<RSSI>	Integer type. The parameter shows the Received Signal Strength Indication.
<SNR>	Integer type. Average reference signal signal-to-noise ratio of the serving cell. Range: -10 to 30 dB.

6.17. AT+QNWPREFCFG Configure Network Searching Preferences

This command configures the network searching preferences.

AT+QNWPREFCFG Configure Network Searching Preferences	
Test Command **AT+QNWPREFCFG=?**	Response **+QNWPREFCFG: "gw_band",(**list of supported **<gw_band>**s**)** **+QNWPREFCFG: "lte_band",(**list of supported **<LTE_band>**s**)** **+QNWPREFCFG: "mode_pref",(**list of supported **<mode_pref>**s**)** **+QNWPREFCFG: "srv_domain",(**list of supported **<srv_domain>**s**)** **+QNWPREFCFG: "voice_domain",(**list of supported **<voice_domain>**s**)** **+QNWPREFCFG: "roam_pref",(**list of supported **<roam_pref>**s**)** **+QNWPREFCFG: "ue_usage_setting",(**list of supported **<setting>**s**)** **+QNWPREFCFG: "policy_band"** **+QNWPREFCFG: "ue_capability_band"** **OK**
Maximum Response Time	300 ms
Characteristics	-

6.17.1. AT+QNWPREFCFG="gw_band" WCDMA Band Configuration

This command specifies the preferred WCDMA bands to be searched by UE.

AT+QNWPREFCFG="gw_band" WCDMA Band Configuration	
Write Command **AT+QNWPREFCFG="gw_band"[,<gw_band>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "gw_band",<gw_band>** **OK** If the optional parameter is specified, configure the preferred WCDMA bands to be searched: **OK**

	If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<gw_band>	String type. Use the colon as a separator to list the WCDMA Bands to be configured. The parameter format is **B1:B2:…:BN**.

NOTE

1. The module supports the following WCDMA bands:
   B1 WCDMA 2100 band
   B2 WCDMA 1900 band
   B3 WCDMA 1800 band
   B4 WCDMA 1700 band
   B5 WCDMA 850 band
   B6 WCDMA 800 band
   B8 WCDMA 900 band
   B19 WCDMA Japan 850 band
2. Executing **AT+QNWPREFCFG="gw_band"[,<gw_band>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QNWPREFCFG="gw_band"          //Query the currently configured WCDMA bands of the UE.
+QNWPREFCFG: "gw_band",1:2:3:4:5:6:7:8:9:19

OK
AT+QNWPREFCFG="gw_band",1:2      //Set WCDMA B1 and B2.
OK
```

6.17.2. AT+QNWPREFCFG="lte_band" LTE Band Configuration

This command specifies the preferred LTE bands to be searched by UE.

AT+QNWPREFCFG="lte_band" LTE Band Configuration	
Write Command **AT+QNWPREFCFG="lte_band"[,<LTE_**	Response If the optional parameter is omitted, query the current

band>]	configuration: **+QNWPREFCFG: "lte_band",<LTE_band>** **OK** If the optional parameter is specified, configure the preferred LTE bands to be searched: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<LTE_band>	String type. Use the colon as a separator to list the LTE bands to be configured. The parameter format is **B1:B2:…:BN**.

NOTE

1. The LTE bands supported by the module are: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B48, B66 and B71.
2. Executing **AT+QNWPREFCFG="lte_band",<LTE_band>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QNWPREFCFG="lte_band"          //Query the currently configured LTE bands of the UE.
+QNWPREFCFG:  "lte_band",1:2:3:4:5:7:8:12:13:14:17:18:19:20:25:26:28:29:30:32:34:38:39:40:41:
42:66:71

OK
AT+QNWPREFCFG="lte_band",1:2      //Set LTE B1 and LTE B2.
OK
```

6.17.3. AT+QNWPREFCFG="mode_pref" Network Search Mode Configuration

This command specifies the network search mode.

AT+QNWPREFCFG="mode_pref"	Network Search Mode Configuration
Write Command **AT+QNWPREFCFG="mode_pref"[,<mode_pref>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "mode_pref",<mode_pref>** **OK** If the optional parameter is specified, configure the network search mode: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<mode_pref>	String type. The network modes supported by the module are as follows:	
	AUTO	WCDMA & LTE
	WCDMA	WCDMA only
	LTE	LTE only

NOTE

Executing **AT+QNWPREFCFG="mode_pref"[,<mode_pref>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QNWPREFCFG="mode_pref"                  //Query the current configuration.
+QNWPREFCFG: "mode_pref",AUTO

OK
AT+QNWPREFCFG="mode_pref",LTE              //Set network mode to LTE only.
OK
```

6.17.4. AT+QNWPREFCFG="srv_domain" Service Domain Configuration

This command specifies the registered service domain.

AT+QNWPREFCFG="srv_domain"	Service Domain Configuration
Write Command **AT+QNWPREFCFG="srv_domain"[,<srv_domain>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "srv_domain",<srv_domain>** **OK** If the optional parameter is specified, configure the service domain of UE: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<srv_domain>	Integer type. Service domain of UE.	
	0	CS only
	1	PS only
	2	CS & PS

NOTE

Executing **AT+QNWPREFCFG="srv_domain"[,<srv_domain>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QNWPREFCFG="srv_domain"          //Query the current configuration.
+QNWPREFCFG: "srv_domain",2

OK
AT+QNWPREFCFG="srv_domain",1        //Set PS only.
OK
```

6.17.5. AT+QNWPREFCFG="voice_domain" Voice Domain Configuration

This command specifies the voice domain of UE.

AT+QNWPREFCFG="voice_domain" Voice Domain Configuration	
Write Command **AT+QNWPREFCFG="voice_domain"[,<voice_domain>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "voice_domain",<voice_domain>** **OK** If the optional parameter is specified, configure the voice domain of UE: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<voice_domain>	Integer type. Service domain of UE.	
	0	CS voice only
	1	IMS PS voice only
	2	CS voice preferred
	3	IMS voice preferred

NOTE

Executing **AT+QNWPREFCFG="voice_domain"[,<voice_domain>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QNWPREFCFG="voice_domain"          //Query the current configuration
+QNWPREFCFG: "voice_domain",2

OK
AT+QNWPREFCFG="voice_domain",3        //Set IMS voice preferred
OK
```

6.17.6. AT+QNWPREFCFG="roam_pref" Roaming Preference Configuration

This command specifies the roaming preference of UE.

AT+QNWPREFCFG="roam_pref"	Roaming Preference Configuration
Write Command **AT+QNWPREFCFG="roam_pref"[,<roam_pref>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "roam_pref",<roam_pref>** **OK** If the optional parameter is specified, configure the roaming preference of UE: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<roam_pref>	Integer type. Roaming preference of UE.	
	1	Roam only on home network
	3	Roam on affiliate network
	255	Roam on any network

NOTE

Executing **AT+QNWPREFCFG="roam_pref"[,<roam_pref>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QNWPREFCFG="roam_pref"          //Query the current configuration
+QNWPREFCFG: "roam_pref",255

OK
AT+QNWPREFCFG="roam_pref",1        // Roam only on home network
OK
```

6.17.7. AT+QNWPREFCFG="ue_usage_setting" UE Usage Setting Configuration

This command specifies the usage setting of UE.

AT+QNWPREFCFG="ue_usage_setting" UE Usage Setting Configuration	
Write Command **AT+QNWPREFCFG="ue_usage_setting"[,<setting>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "ue_usage_setting",<setting>** **OK** If the optional parameter is specified, configure the usage setting of UE: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<setting >	Integer type. Roaming preference of UE. 0 Voice centric 1 Data centric

NOTE

Executing **AT+QNWPREFCFG="ue_usage_setting"[,<setting>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QNWPREFCFG="ue_usage_setting"          //Query the current configuration
+QNWPREFCFG: "ue_usage_setting",1

OK
AT+QNWPREFCFG="ue_usage_setting",0        //Set voice centric
OK
```

6.17.8. AT+QNWPREFCFG="policy_band" Read Carrier Policy Band

This command queries the band configured in the carrier policy.

AT+QNWPREFCFG="policy_band"	Read Carrier Policy Band
Write Command **AT+QNWPREFCFG="policy_band"**	Response **+QNWPREFCFG: "gw_band",<gw_band>** **+QNWPREFCFG: "lte_band",<LTE_band>** **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<gw_band>	String type. Use the colon as a separator to list the WCDMA bands to be configured. The parameter format is **B1:B2:…:BN**.
<LTE_band>	String type. Use the colon as a separator to list the LTE bands to be configured. The parameter format is **B1:B2:…:BN**.

NOTE

1. The module supports the following WCDMA bands:
   B1 WCDMA 2100 band
   B2 WCDMA 1900 band
   B3 WCDMA 1800 band
   B4 WCDMA 1700 band
   B5 WCDMA 850 band
   B6 WCDMA 800 band
   B8 WCDMA 900 band
   B19 WCDMA Japan 850 band
2. The LTE bands supported by the module are: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B48, B66 and B71.

Example

```
AT+QNWPREFCFG="policy_band"
+QNWPREFCFG: "gw_band",1:8
+QNWPREFCFG: "lte_band",1:3:8

OK
```

6.17.9. AT+QNWPREFCFG="ue_capability_band" Query UE Capability Band

This command queries the band configured in the UE capability information.

AT+QNWPREFCFG="ue_capability_band" Query UE Capability Band	
Write Command **AT+QNWPREFCFG="ue_capability_band"**	Response **+QNWPREFCFG: "gw_band",<gw_band>** **+QNWPREFCFG: "lte_band",<LTE_band>** **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<gw_band>	String type. Use the colon as a separator to list the WCDMA bands to be configured. The parameter format is **B1:B2:…:BN**.
<LTE_band>	String type. Use the colon as a separator to list the LTE bands to be configured. The parameter format is **B1:B2:…:BN**.

NOTE

1. The module supports the following WCDMA bands:
   B1 WCDMA 2100 band
   B2 WCDMA 1900 band
   B3 WCDMA 1800 band
   B4 WCDMA 1700 band
   B5 WCDMA 850 band
   B6 WCDMA 800 band
   B8 WCDMA 900 band
   B19 WCDMA Japan 850 band
2. The LTE bands supported by the module are: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B48, B66 and B71.

Example

```
AT+QNWPREFCFG="ue_capability_band"
+QNWPREFCFG: "gw_band",1:8
+QNWPREFCFG: "lte_band",1:3:8

OK
```

6.18. AT+QNWCFG="up/down" Get Average UL and DL Rate

This commands queries and configures the average uplink rate and downlink rate in delta time.

AT+QNWCFG="up/down" Get Average UL and DL Rate	
Test Command **AT+QNWCFG=?**	Response **+QNWCFG: "up/down",<uplink_rate>,<downlink_rate>,(**list of supported **<time_interval>s)** **…** **OK**
Write Command **AT+QNWCFG="up/down"[, <time_interval>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWCFG: "up/down",<uplink_rate>,<downlink_rate>,<time_interval>** **OK** If the optional parameter is specified, set the average uplink rate and downlink rate in delta time: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<uplink_rate>	Integer type. Average rate of uplink in delta time. Unit: bit/s.
<downlink_rate>	Integer type. Average rate of downlink in delta time. Unit: bit/s.
<time_interval>	Integer type. Time interval to calculate the average rate automatically. Range: 1–60. Default: 2. Unit: second.

NOTE

Executing **AT+QNWCFG="up/down"[, <time_interval>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QNWCFG=?                  //Test command
+QNWCFG: "up/down",<uplink_rate>,<downlink_rate>,(1-60)

OK
AT+QNWCFG="up/down"          //Query the current setting.
+QNWCFG: "up/down",2056,384,2

OK
AT+QNWCFG="up_down",5        //Configure the time interval to 5 seconds.
OK
AT+QNWCFG="up/down"          //Query the current setting.
+QNWCFG: "up/down",2056,384,5

OK
```

7 Call Related Commands

NOTE

Call related AT commands are not supported on EG065K series, EM120K-GL, EM060K series and EM061K-GL modules.

7.1. ATA Answer an Incoming Call

This command connects the MT to an incoming voice or data call indicated by a **RING** URC.

ATA Answer an Incoming Call	
Execution Command **ATA**	Response MT sends off-hook to the remote station. In case of data call, if successfully connected: **CONNECT<text>** And MT switches to data mode. **CONNECT<text>** outputs only when **<value>** is greater than 0 in **ATX<value>** parameter setting. When MT returns to command mode after call release: **OK** Response in case of voice call, if successfully connected: **OK** Response if there is no connection: **NO CARRIER**
Maximum Response Time	90 s, determined by the network.
Characteristics	-
Reference V.25ter	

NOTE

1. Any additional commands on the same command line are ignored.
2. This command may be aborted generally when the module receives a character during command execution. However, the command will not be aborted during some connection establishments such as handshaking.

Example

```
RING                                    //Incoming call.
AT+CLCC
+CLCC: 1,0,0,1,0,"",129                 //PS call in LTE mode.
+CLCC: 2,1,4,0,0,"1234567890",129       //Incoming call.

OK
ATA                                     //Accept the voice call with ATA.
OK
```

7.2. ATD Originate a Call

This command sets up outgoing voice and data calls. Supplementary services can also be controlled with this command.

ATD Originate a Call	
Execution Command **ATD<n>[<mgsm>][;]**	Response If no dial tone and **ATX2** or **ATX4** is set: **NO DIALTONE** If busy and **ATX3** or **ATX4** is set: **BUSY** If a connection cannot be established: **NO CARRIER** If connection is successful and there is a non-voice call: **CONNECT<text>** And MT switches to data mode. Note: **<text>** outputs only when **<value>** is greater than 0 in **ATX<value>** parameter setting. When MT returns to command mode after call release: **OK**

	If connection is successful and there is a voice call: **OK**
Maximum Response Time	5 s, determined by the network.
Characteristics	-
Reference V.25ter	

Parameter

<n>	String of dialing digits and optionally V.25ter modifiers. Dialing digits: 0–9, *, #, +, A, B, C Following V.25ter modifiers are ignored: ,(comma), T, P, !, W, @
<mgsm>	String of GSM modifiers: I Activate **CLIR** (Disable presentation of own number to the called party) i Deactivate **CLIR** (Enable presentation of own number to the called party) G Activates closed user group invocation for this call only g Deactivates closed user group invocation for this call only
[;]	Only required to set up voice call, return to command state.

NOTE

1. When being executed, this command may be aborted generally by the module's receiving of an **ATH** or a character. However, the command will not be aborted during some connection establishments such as handshaking.
2. Parameter "**I**" and "**i**" are only valid when no "*" or "**#**" code is within the dial string.
3. "**;**" in the Execution Command is required when setting up voice call, and will return to command state after the call.
4. See **ATX** for setting result code and call monitoring parameters.
5. Responses returned after dialing with **ATD**:
   For voice call, two different response modes can be determined. MT returns **OK** immediately either after dialing was completed or after the call was established. The setting is controlled by **AT+COLP**, of which default is **AT+COLP=0** which causes the MT to return **OK** immediately after the dialing was completed. Otherwise, MT returns **OK**, **BUSY**, **NO DIAL TONE**, or **NO CARRIER**.
6. Using **ATD** during an active voice call:
   - When a user originates a second voice call while there is already an active voice call, the first call will be automatically put on hold.
   - The current states of all calls can be easily checked at any time with **AT+CLCC**.

Example

```
ATD1234567890;                    //Dialing out the party's number.
OK
```

7.3. ATH Disconnect Existing Connection

This command disconnects data calls or voice calls. **AT+CHUP** is also used to disconnect the voice call.

ATH Disconnect Existing Connection	
Execution Command **ATH[<n>]**	Response **OK**
Maximum Response Time	90 s, determined by the network.
Characteristics	-
Reference V.25ter	

Parameter

<n>	Integer type.	
	0	Disconnect existing call from command line and terminate the call

7.4. AT+CVHU Voice Hang up Control

This command controls whether **ATH** can be used to disconnect the voice call.

AT+CVHU Voice Hang up Control	
Test Command **AT+CVHU=?**	Response **+CVHU: (**list of supported **<mode>**s**)** **OK**
Read Command **AT+CVHU?**	Response **+CVHU: <mode>** **OK**
Write Command **AT+CVHU=<mode>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. 0 **ATH** can be used to disconnect the voice call 1 **ATH** is ignored with the response **OK** returned only

7.5. AT+CHUP Hang up Calls

This command cancels all voice calls in the state of Active, Waiting and Held. For data disconnections, use **ATH**.

AT+CHUP Hang up Calls	
Test Command **AT+CHUP=?**	Response **OK**
Execution Command **AT+CHUP**	Response **OK** Or **ERROR**
Maximum Response Time	90 s, determined by the network.
Characteristics	-
Reference 3GPP 27.007	

Example

```
RING                    //Incoming call.
AT+CHUP                 //Hang up the call.
OK
```

7.6. ATS0 Set Number of Rings Before Automatic Answering

This command controls automatic answering mode for the incoming calls.

ATS0 Set Number of Rings Before Automatic Answering	
Read Command **ATS0?**	Response **<n>** **OK**

Write Command **ATS0=<n>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Parameter

<n>	Integer type.	
	0	Automatic answering is disabled
	1–255	Enable automatic answering on the ring number specified

NOTE

If **<n>** is set too high, the calling party may hang up before the call is answered automatically.

Example

```
ATS0=3                          //Set three rings before automatically answering a call.
OK

RING                            //A call is coming.
##0

RING
##0

RING                            //Automatically answering the call after three rings.
##0
```

7.7. ATS6 Set Pause Before Blind Dialing

This command is implemented for compatibility reasons only, and has no effect.

ATS6 Set Pause Before Blind Dialing	
Read Command **ATS6?**	Response **<n>** **OK**
Write Command **ATS6=<n>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Parameter

<n>	Integer type. Number of seconds to wait before blind dialing. Range: 2–10. Default: 2.

7.8. ATS7 Set Time to Wait for Connection Completion

This command specifies the duration (unit: second) to wait for the connection completion in case of answering or originating a call. If no connection is established during the time, MT will be disconnected from the line.

ATS7 Set Time to Wait for Connection Completion	
Read Command **ATS7?**	Response **<n>** **OK**
Write Command **ATS7=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-

Reference V.25ter	

Parameter

<n>	Integer type.	
	0	Disabled
	1–255	Duration of seconds to wait for connection completion

7.9. ATS8 Set the Time to Wait for Comma Dial Modifier

This command is implemented for compatibility reasons only, and has no effect.

ATS8 Set the Time to Wait for Comma Dial Modifier	
Read Command **ATS8?**	Response **<n>** **OK**
Write Command **ATS8=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Parameter

<n>	Integer type.	
	0	No pause when comma encountered in dial string
	1–2–255	Number of seconds to wait for comma dial modifier

7.10. ATS10 Set Disconnection Delay After Indicating the Absence of Data Carrier

This command determines the duration (unit: tenths of a second) during which the UE remains connected in absence of a data carrier. This parameter setting determines the amount of time (unit: tenths of a second)

during which the MT will remain connected in absence of a data carrier. If the data carrier is once more detected before disconnection, the MT remains connected.

ATS10 Set Disconnection Delay after Indicating the Absence of Data Carrier	
Read Command **ATS10?**	Response **<n>** **OK**
Write Command **ATS10=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Parameter

<n>	Integer type. 1–15–254 Duration of tenths of seconds to wait before disconnecting after UE has indicated the absence of received line signal

7.11. AT+CSTA Select Type of Address

This command selects the type of number for further dialing command **ATD** according to 3GPP Specifications. This Test Command returns values supported a compound value.

AT+CSTA Select Type of Address	
Test Command **AT+CSTA=?**	Response **+CSTA: (**list of supported **<type>**s**)** **OK**
Read Command **AT+CSTA?**	Response **+CSTA: <type>** **OK**
Write Command/Execution Command **AT+CSTA[=<type>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

	The configuration is not saved.
Reference 3GPP TS 27.007	

Parameter

<type>	Integer type. Current address type setting.	
	129	Unknown type
	145	International type (contains the character "+")

7.12. AT+CLCC List Current Calls of MT

This command returns the list of all current calls. If the command is executed successfully, but no calls existed, then no information will be responded but **OK** will be sent to TE.

AT+CLCC List Current Calls of MT	
Test Command **AT+CLCC=?**	Response **OK**
Execution Command **AT+CLCC**	Response **[+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>]]]** **...** **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<idx>	Integer type. The call identification number as described in *3GPP TS 22.030* can be used in **AT+CHLD** operations.	
<dir>	Integer type.	
	0	Mobile originated (MO) call
	1	Mobile terminated (MT) call
<stat>	Integer type. State of the call.	
	0	Active

	1	Held
	2	Dialing (MO call)
	3	Alerting (MO call)
	4	Incoming (MT call)
	5	Waiting (MT call)
<mode>	Integer type. Bearer/teleservice.	
	0	Voice
	1	Data
	2	FAX
<mpty>	Integer type.	
	0	Call is not one of multiparty (conference) call parties
	1	Call is one of multiparty (conference) call parties
<number>	Phone number in string type in format specified by **<type>**.	
<type>	Type of address of octet in integer format (See *3GPP TS 24.008 subclause 10.5.4.7* for details). Usually, it has three kinds of values:	
	129	Unknown type
	145	International type (contains the character "+")
	161	National type
<alpha>	Alphanumeric representation for **<number>** corresponding to the entry found in phonebook.	
<err>	Error codes. For more details, see ***Chapter 14.5***.	

Example

```
ATD1234567890;                                  //Establish a call.
OK
AT+CLCC
+CLCC: 1,0,0,1,0,"",129                         //PS call in LTE mode.
+CLCC: 2,0,0,0,0,"1234567890",129               //Establish a call, and the call has been answered.

OK
```

7.13. AT+CR Service Reporting Control

This command controls whether the MT to transmit an intermediate result code **+CR: <serv>** to the TE or not when a call is set up.

If it is enabled, the intermediate result code is transmitted at the point during connect negotiation at which the MT has determined which speed and quality of service will be used, before any error control or data compression reports and before any final result code (e.g., **CONNECT**) is transmitted.

AT+CR Service Reporting Control	
Test Command **AT+CR=?**	Response **+CR: (**list of supported **<mode>**s**)** **OK**
Read Command **AT+CR?**	Response **+CR: <mode>** **OK**
Write Command **AT+CR=[<mode>]**	Response MT controls whether intermediate result code **+CR: <serv>** is returned from TA to TE or not when a call is set up. **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type.	
	0	Disable
	1	Enable
<serv>	String type.	
	ASYNC	Asynchronous transparent
	SYNC	Synchronous transparent
	REL ASYNC	Asynchronous non-transparent
	REL SYNC	Synchronous non-transparent

7.14. AT+CRC Set Extended Format of Incoming Call Indication

This command controls whether to use the extended format of incoming call indication or not. When it is enabled, an incoming call is indicated to TE with unsolicited result code **+CRING: <type>** instead of the normal **RING**.

AT+CRC Set Extended Format of Incoming Call Indication	
Test Command **AT+CRC=?**	Response **+CRC: (**list of supported **<mode>**s**)**

	OK
Read Command **AT+CRC?**	Response **+CRC: <mode>** **OK**
Write Command **AT+CRC=[<mode>]**	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.	
	0	Disable extended format
	1	Enable extended format
<type>	String type.	
	ASYNC	Asynchronous transparent
	SYNC	Synchronous transparent
	REL ASYNC	Asynchronous non-transparent
	REL SYNC	Synchronous non-transparent
	FAX	Facsimile
	VOICE	Voice

Example

```
AT+CRC=1                    //Enable extended format.
OK

+CRING: VOICE               //Indicate incoming call of voice type to TE.
ATH
OK
AT+CRC=0                    //Disable extended format.
OK

RING                        //Indicate incoming call to TE.
ATH
OK
```

7.15. AT+CRLP Select Radio Link Protocol Parameter

This command selects radio link protocol (RLP) parameters used when non-transparent data calls are originated.

This Test Command returns values supported. RLP versions 0 and 1 share the same parameter set. MT returns only one line for this set (during which **<ver>** is not presented).

This Read Command returns current configurations for RLP version. RLP versions 0 and 1 share the same parameter set. TA returns only one line for this set (during which **<ver>** is not presented).

AT+CRLP Select Radio Link Protocol Parameter	
Test Command **AT+CRLP=?**	Response **+CRLP: (**list of supported **<iws>**s**),(**list of supported **<mws>**s**),(**list of supported **<T1>**s**),(**list of supported **<N2>**s**),0** **+CRLP: (**list of supported **<iws>**s**),(**list of supported **<mws>**s**),(**list of supported **<T1>**s**),(**list of supported **<N2>**s**),1** **+CRLP: (**list of supported **<iws>**s**),(**list of supported **<mws>**s**),(**list of supported **<T1>**s**),(**list of supported **<N2>**s**),2** **OK**
Read Command **AT+CRLP?**	Response **+CRLP: <iws>,<mws>,<T1>,<N2>,<ver>** **...** **OK**
Write Command **AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>]]]]]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS27.007	

Parameter

<iws>	Integer type. Interworking window size (IWF to MS window size).	
	0–61	For **<ver>**=0, 1
	0–240–488	For **<ver>**=2
<mws>	Integer type. Mobile window size (MS to IWF window size).	
	0–61	For **<ver>**=0, 1

	0–240–488	For **<ver>**=2
<T1>	Integer type.	
	38–48–255	For **<ver>**=0, 1
	42–52–255	For **<ver>**=2
<N2>	Integer type.	
	1–6–255	Retransmission attempts N2
<ver>	Integer type. RLP version number.	
	0–2	RLP version number

7.16. AT+QECCNUM Configure Emergency Call Numbers

This command queries, adds and deletes ECC phone numbers (emergency call numbers).

AT+QECCNUM Configure Emergency Call Numbers	
Test Command **AT+QECCNUM=?**	Response **+QECCNUM: (**list of supported **<mode>**s**)** **OK**
Write Command **AT+QECCNUM=<mode>[,<type>[,<eccnum1>[,<eccnum2>[,…[,<eccnumN>]]]]]**	Response If **<mode>**=0, **<type>** is specified and **<eccnumN>** is omitted, query the current ECC number type: **+QECCNUM: <type>,<eccnum1>,<eccnum2>[,…]** **OK** If **<mode>**=1, **<type>**=0 or 1, and at least one **<eccnumN>** is specified, add ECC numbers with (U)SIM card or ECC numbers without (U)SIM card: **OK** Or **ERROR** If **<mode>**=2, **<type>**=0 or 1, and at least one **<eccnumN>** is specified, delete ECC numbers with (U)SIM card or ECC numbers without (U)SIM card: **OK** or **ERROR** If **<mode>**=3, **<type>** and **<eccnumN>** are both omitted, reset ECC numbers and the reset will take effect after

	rebooting: **OK** Or **ERROR**
Write Command **AT+QECCNUM=<mode>[,<type>,<eccnum1>,<category>]**	Response If **<mode>**=4, **<type>**, **<eccnumN>** and **<category>** are specified, add an ECC number with assigned category: **OK** Or **ERROR** If **<mode>**=5, **<type>**, **<eccnumN>** and **<category>** are omitted, query all the ECC numbers and their categories: **+QECCNUM: 0,<eccnum1>,<category>[,…]** **+QECCNUM: 1,<eccnum1>,<category>[,…]** **+QECCNUM: 2,<eccnum1>,<category>[,…]** **+QECCNUM: 3,<eccnum1>,<category>[,…]** **OK** Or **ERROR**
Read Command **AT+QECCNUM?**	Response **+QECCNUM: 0,<eccnum1>,<eccnum2>[,…]** **+QECCNUM: 1,<eccnum1>,<eccnum2>[,…]** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<mode>	Integer type. ECC number operations. 0 Query ECC numbers 1 Add ECC numbers with default category 2 Delete ECC numbers 3 Reset the ECC number list 4 Add an ECC number with specified category 5 Query all emergency call numbers and the category
<type>	Integer type. ECC number type. 0 ECC numbers stored in the module without (U)SIM card 1 ECC numbers stored in the module with (U)SIM card

	2	ECC numbers from the network
	3	ECC numbers from the (U)SIM card
<category>	Integer type. ECC number category.	
	0	Default
	1	Police
	2	Ambulance
	4	Fire Brigade
	8	Marine Guard
	16	Mountain Rescue
	32	Manually initiated eCall
	64	Automatically initiated eCall
<eccnumN>	String type. ECC numbers (e.g.,"110", "119").	

NOTE

1. Only the ECC numbers stored in the module with/without (U)SIM card can be modified.
2. If a number to be added into the type of ECC numbers with (U)SIM card exists in the module, or has gotten from network and (U)SIM card, it cannot be added.
3. The priority for reading ECC number list: ECC numbers from the network > ECC numbers from the (U)SIM card > ECC numbers stored in the module with/without (U)SIM card.
4. Executing **AT+QECCNUM=<mode>[,<type>[,<eccnum1>[,<eccnum2>[,…[,<eccnumN>** or **AT+QECCNUM=<mode>[,<type>,<eccnum1>,<category>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QECCNUM=?                    //Query the supported ECC number operation mode.
+QECCNUM: (0-5)

OK
AT+QECCNUM?                     //Query the ECC numbers with or without (U)SIM card.
+QECCNUM: 0,"911","112","00","08","110","999","118","119"
+QECCNUM: 1,"911","112"

OK
AT+QECCNUM=0,1                  //Query the ECC numbers with (U)SIM card.
+QECCNUM: 1,"911","112"
OK
AT+QECCNUM=1,1,"110","234"      //Add "110" and "234" into ECC numbers with (U)SIM card.
OK
AT+QECCNUM=0,1                  //Query the ECC numbers with (U)SIM card.
+QECCNUM: 1,"911","112","110","234"

OK
```

```
AT+QECCNUM=2,1,"110"          //Delete "110" from ECC numbers with (U)SIM card.
OK
AT+QECCNUM=0,1                //Query the ECC numbers with (U)SIM card.
+QECCNUM: 1,"911","112","234"

OK
AT+QECCNUM=5                  //Query all emergency call numbers and corresponding category.
+QECCNUM: 0,"911",0,"112",0,"00",0,"08",0,"110",0,"999",0,"118",0,"119",0
+QECCNUM: 1,"911",0,"112",0,"234",0
+QECCNUM: 2,"110",1,"120",2,"119",4,"122",8,"999",16
+QECCNUM: 3,"112",0,"000",0,"08",0,"118",0,"122",0,"911",0,"999",0,"119",0,"120",0,"110",0

OK
AT+QECCNUM=4,1,"123",1        //Add ECC number "123" of the Police category into ECC numbers
OK                              with (U)SIM card.
AT+QECCNUM=5                  //Query all emergency call numbers and corresponding category.
+QECCNUM: 0,"911",0,"112",0,"00",0,"08",0,"110",0,"999",0,"118",0,"119",0
+QECCNUM: 1,"911",0,"112",0,"234",0,"123",1
+QECCNUM: 2,"110",1,"120",2,"119",4,"122",8,"999",16
+QECCNUM: 3,"112",0,"000",0,"08",0,"118",0,"122",0,"911",0,"999",0,"119",0,"120",0,"110",0

OK
AT+QECCNUM=3                  //Reset the ECC number list, and such reset will take effect after rebooting.
OK
```

7.17. AT^DSCI Call Status Indication

This command indicates the call status.

AT^DSCI Call Status Indication	
Test Command **AT^DSCI=?**	Response **^DSCI: (**list of supported **<n>**s**)** **OK**
Read Command **AT^DSCI?**	Response **^DSCI: <n>** **OK**
Write Command **AT^DSCI=[<n>]**	Response **OK**
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<n>	Integer type. Enable/disable the following URC: **^DSCI: <id>,<dir>,<stat>,<type>,<number>,<num_type>**. 0 Disable 1 Enable
<id>	Integer type. Call ID
<dir>	Integer type. Call direction 0 Mobile originated call 1 Mobile terminated call
<stat>	Integer type. Call state 1 CALL_LOCAL_HOLD 2 CALL_ORIGINAL 3 CALL_CONNECT 4 CALL_INCOMING 5 CALL_WAITING 6 CALL_END 7 CALL_ALERTING
<type>	Integer type. Call type. 0 Voice call 1 PS call
<number>	String type. Phone number.
<num_type>	Integer type. Type of address of octet in integer format (See *3GPP TS 24.008*). Usually, it has three kinds of values: 129 Unknown type 145 International type (contains the character "+") 161 National type

Example

```
//Dial a call
AT^DSCI=1                                   //Enable DSCI.
OK
ATD1234567890;                              //Dial 1234567890.
OK

^DSCI: 1,0,2,0,1234567890,129               //A call is originated.

^DSCI: 1,0,7,0,1234567890,129               //The call is alerting.

^DSCI: 1,0,3,0,1234567890,129               //The call is connected.

ATH
OK
```

```
^DSCI: 1,0,6,0,1234567890,129                    //The call is ended.

//Incoming call
RING

^DSCI: 1,1,4,0,13022100000,129                   //A call is coming.

RING

^DSCI: 1,1,6,0,13022100000,129                   //The call is ended.

NO CARRIER
```

7.18. 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>** outputs only when **<value>** is greater than 0 in **ATX<value>** parameter setting.

8 Phonebook Commands

8.1. AT+CNUM Subscriber Number

This command gets the subscribers' own number(s) from the (U)SIM.

AT+CNUM Subscriber Number	
Test Command **AT+CNUM=?**	Response **OK**
Execution Command **AT+CNUM**	Response **[+CNUM: [<alpha>],<number>,<type>]** **[…]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP 27.007	

Parameter

<alpha>	Optional alphanumeric string associated with **<number>**. The used character set should be the one selected with **AT+CSCS**.
<number>	String type. Phone number in format specified by **<type>**.
<type>	Type of address of octet in integer format (see *3GPP TS 24.008*). Usually, it has three kinds of values: 129 Unknown type 145 International type (contains the character "+") 161 National type
<err>	Error codes. For more details, see ***Chapter 14.5***.

8.2. AT+CPBF Find Phonebook Entries

This command searches the phonebook entries starting with the given **<findtext>** string from the current phonebook memory storage selected with **AT+CPBS**, and returns all found entries sorted in alphanumeric order.

AT+CPBF Find Phonebook Entries	
Test Command **AT+CPBF=?**	Response **+CPBF: <nlength>,<tlength>** **OK**
Write Command **AT+CPBF=<findtext>**	Response **[+CPBF: <index>,<number>,<type>,<text>]** **[…]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	Depends on the storage of phonebook entries.
Characteristics	-
Reference 3GPP 27.007	

Parameter

<nlength>	Integer type. Indicates the maximum length of field **<number>**.
<tlength>	Integer type. Indicates the maximum length of field **<text>**.
<findtext>	String type. The field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**.
<index>	Integer type. In the range of location numbers of phone book memory.
<number>	String type. Phone number in format specified by **<type>**.
<type>	Type of address of octet in integer format (see *3GPP TS 24.008*). Usually, it has three kinds of values: 129 Unknown type 145 International type (contains the character “+”) 161 National type
<text>	Integer type. The field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**.

<err>	Error codes. For more details, see ***Chapter 14.5***.

8.3. AT+CPBR Read Phonebook Entries

This command reads phonebook entries in location number range **<index1>... <index2>** from the current phonebook memory storage selected with **AT+CPBS**. If **<index2>** is omitted, only location **<index1>** will be returned.

AT+CPBR Read Phonebook Entries	
Test Command **AT+CPBR=?**	Response **+CPBR: (**list of supported **<index>**s**),<nlength>**,**<tlength>** **OK**
Write Command **AT+CPBR=<index1>[,<index2>]**	Response **+CPBR: <index1>,<number>,<type>,<text>** **[…]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	Depends on the storage of phonebook entries.
Characters	-
Reference 3GPP 27.007	

Parameter

<index>	Integer type. Location numbers of phonebook memory.
<nlength>	Integer type. Indicates the maximum length of field **<number>**.
<tlength>	Integer type. Indicates the maximum length of field **<text>**.
<index1>	Integer type. The first phonebook record to read.
<index2>	Integer type. The last phonebook record to read.
<number>	String type. Phone number in format specified by **<type>**.
<type>	Type of address of octet in integer format (see *3GPP TS 24.008*). Usually, it has three kinds of values: 129 Unknown type 145 International type (contains the character “+”)

	161 National type
<text>	String type. The field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**.
<err>	Error codes. For more details, see ***Chapter 14.5***.

8.4. AT+CPBS Select Phonebook Memory Storage

This command selects phonebook memory storage, which is used by other phonebook commands. The Read Command returns currently selected memory, the number of used locations and the total number of locations in the memory when supported by manufacturer. This Test Command returns supported storages as compound value.

AT+CPBS Select Phonebook Memory Storage	
Test Command **AT+CPBS=?**	Response **+CPBS: (**list of supported **<storage>**s**)** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CPBS?**	Response **+CPBS: <storage>,<used>,<total>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Write Command **AT+CPBS=<storage>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Reference 3GPP 27.007	

Parameter

<storage>	String type. "SM" (U)SIM phonebook "DC" ME dialed calls list (**AT+CPBW** may not be applicable to this storage) "FD" (U)SIM fix dialing-phone book (**AT+CPBW** operation need the authority of PIN2) "LD" (U)SIM last-dialing-phone book (**AT+CPBW** may not be applicable to this storage) "MC" ME missed (unanswered) calls list (**AT+CPBW** may not be applicable to this storage) "ME" Mobile equipment phonebook "RC" ME received calls list (**AT+CPBW** may not be applicable to this storage) "EN" (U)SIM (or ME) emergency number (**AT+CPBW** may not be applicable to this storage) "ON" (U)SIM own numbers (MSISDNs) list
<used>	Integer type. Indicates the total number of used locations in selected memory.
<total>	Integer type. indicates the total number of locations in selected memory.
<err>	Error codes. For more details, see ***Chapter 14.5***.

8.5. AT+CPBW Write Phonebook Entry

This command writes phonebook entry in location number **<index>** in the current phonebook memory storage selected with **AT+CPBS**. It can also delete a phonebook entry in location number **<index>**.

AT+CPBW Write Phonebook Entry	
Test Command **AT+CPBW=?**	Response **+CPBW: (**list of supported **<index>**s**),<nlength>,(**list of supported **<type>**s**),<tlength>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Write Command **AT+CPBW=[<index>][,<number>[,<type>[,<text>]]]**	Response **OK** If there is any error:

	ERROR Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP 27.007	

Parameter

<index>	Integer type. Value in the range of location numbers of phone book memory. If **<index>** is not given, the first free entry will be used. If **<index>** is given as the only parameter, the phonebook entry specified by **<location>** is deleted.
<number>	String type. Phone number in format specified by **<type>**.
<nlength>	Integer type. Indicates the maximum length of field **<number>**.
<tlength>	Integer type. Indicates the maximum length of field **<text>**.
<type>	Type of address of octet in integer format (See *3GPP TS 24.008*). Usually, it has three kinds of values: 129 Unknown type 145 International type (contains the character "+") 161 National type
<text>	String type field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**.
<err>	Error codes. For more details, see ***Chapter 14.5***.

Example

```
AT+CSCS="GSM"                          //Set the character set to "GSM".
OK
AT+CPBW=10,"1234567890",129,"QUECTEL"  //Make a new phonebook entry at location 10.
OK
AT+CPBW=10                             //Delete entry at location 10.
OK
```

9 Short Message Service Commands

9.1. AT+CSMS Select Message Service

This command selects message service **<service>** and returns the types of messages supported by the ME.

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 any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<service>	Integer type. Type of message service.	
	0	*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

		which do not require new command syntax may be supported, e.g., correct routing of messages with new Phase 2+ data coding schemes).
	1	*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
	1	Type supported
<mo>	Integer type. Mobile originated messages.	
	0	Type not supported
	1	Type supported
<bm>	Integer type. Broadcast type messages.	
	0	Type not supported
	1	Type supported
<err>	Error codes. For more details, see ***Chapter 14.6***.	

Example

```
AT+CSMS=?                          //Test command
+CSMS: (0,1)

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

OK
AT+CSMS?                           //Read command
+CSMS: 1,1,1,1

OK
```

9.2. AT+CMGF Message Format

This command specifies the input and output format of the short messages. **<mode>** indicates the format of messages used with the Test, Read, Write and Execution 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 parameter **<chset>** specified by command **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/Execution Command **AT+CMGF[=<mode>]**	Response TA sets parameter to denote which kind of I/O format of messages is used. **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<mode>	Integer type.	
	0	PDU mode
	1	Text mode

9.3. AT+CSCA Service Center Address

This 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, setting is used by the same command, but only when the length of the SMSC address is coded into the **<pdu>** parameter which equals 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 any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.005	

Parameter

<sca>	Service center address. 3GPP TS 24.011 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 *3GPP TS 27.007*). The type of address is given by **<tosca>**.
<tosca>	Type of service center address. 3GPP TS 24.011 RP SC address Type-of-Address octet in integer format (default see **<toda>**).
<pdu>	In the case of SMS: *3GPP TS 24.011* SC address followed by *3GPP TS 23.040* TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (for example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<err>	Error codes. For more details, see ***Chapter 14.5***.

Example

```
AT+CSCA="+358501234567",145      //Set SMS service center address
OK
AT+CSCA?                         //Query SMS service center address
+CSCA: "+358501234567",145

OK
```

9.4. AT+CPMS Preferred Message Storage

This command selects the memory storages **<mem1>**, **<mem2>** and **<mem3>** to be used for reading, writing, and so on.

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 any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are 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" Same as "ME" storage "SR" SMS status report storage location
<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
	"SR"	SMS status report storage location
<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
	"SR"	SMS status report storage location
<usedx>	Integer type. The number of current messages in **<memx>**.	
<totalx>	Integer type. The total number of messages which can be stored in **<memx>**.	
<err>	Error codes. For more details, see ***Chapter 14.6***.	

NOTE

Executing **AT+CPMS=<mem1>,<mem2>,<mem3>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+CPMS?                                  //Query the current SMS message storage.
+CPMS: "ME",0,255,"ME",0,255,"ME",0,255

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
```

9.5. AT+CMGD Delete Messages

This command deletes short messages from the preferred message storage **<mem1>** location **<index>**. If **<delflag>** is presented and not set to 0, then the ME shall ignore **<index>** and follow the rules of **<delflag>** shown as below.

AT+CMGD Delete Messages	
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 any error: **ERROR** Or **+CMS ERROR:<err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<index>	Integer type. Value in the range of location numbers supported by the associated memory.
<delflag>	Integer type. Delete flag. 0 Delete the message specified in **<index>** 1 Delete all read messages from **<mem1>** storage 2 Delete all read messages from **<mem1>** storage and sent mobile originated messages 3 Delete all read messages from **<mem1>** storage, sent and unsent mobile originated messages 4 Delete all messages from **<mem1>** storage
<mem1>	String type. Messages to be read and deleted from this memory storage. "SM" (U)SIM message storage "ME" Mobile equipment message storage "MT" Same as "ME" storage "SR" SMS status report storage location
<err>	Error codes. For more details, see ***Chapter 14.6***.

NOTE

1. Operation of **<delflag>** depends on the storage of messages to be deleted.
2. Executing **AT+CMGD=<index>[,<delflag>]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+CMGD=1                    //Delete the message specified in <index>=1.
```

```
OK
AT+CMGD=1,4                    //Delete all messages from <mem1> storage.
OK
```

9.6. AT+CMGL List Messages

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

AT+CMGL List Messages	
Test Command **AT+CMGL=?**	Response **+CMGL: (**list of supported **<stat>**s**)** **OK**
Write Command **AT+CMGL[=<stat>]**	Response If the optional parameter is omitted (that is, execute **AT+CMGL**), list all messages with "REC UNREAD" status from message storage **<mem1>**, and then the status in the storage changes to "REC READ". If the optional parameter is specified: If in text mode (**AT+CMGF=1**) and the command is executed successfully: For SMS-SUBMITs and/or SMS-DELIVERs: **+CMGL: <index>,<stat>,<oa/da>,[<alpha>],[<scts>][,<toa/toda>,<length>]<CR><LF><data>[<CR><LF>]** **[...]** For SMS-STATUS-REPORTs: **+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[<CR><LF>]** **[...]** For SMS-COMMANDs: **+CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF>]** **[…]** For CBM storage: **+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[<CR><LF>]**

	[…] **OK** If in PDU mode (**AT+CMGF=0**) and the command is executed successfully: **+CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu>[<CR><LF>]** **[...]** **OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	300 ms.
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<stat>	In text mode:	
	"REC UNREAD"	Received unread messages
	"REC READ"	Received read messages
	"STO UNSENT"	Stored unsent messages
	"STO SENT"	Stored sent messages
	"ALL"	All messages
	In PDU mode:	
	0	Received unread messages
	1	Received read messages
	2	Stored unsent messages
	3	Stored sent messages
	4	All messages
<index>	Integer type. 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 (see **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 (see **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. Implementation of this feature is manufacturer specified. The used character set should be the one selected with **AT+CSCS** (see *3GPP TS 27.007*).
<scts>	Service center time stamp. *3GPP TS 23.040* TP-Service-Centre-Time-Stamp in time-string format (see **<dt>**).
<toda>	Type of recipient address. *3GPP TS 24.011* TP-Recipient-Address Type-of-Address octet in integer format.
<tooa>	Type of originating address. *3GPP TS 24.011* TP-Originating-Address Type-of-Address octet in integer format (see **<toda>** by default).
<length>	Integer type. Message length. Indicates the length of the message body **<data>** (or **<cdata>**) in characters in the text mode (**AT+CMGF=1**); or the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (that is, the RP layer SMSC address octets are not counted in the length).
<data>	In the case of SMS: *3GPP TS 23.040* TP-User-Data in text mode responses. The format is defined as follows: - If **<dcs>**, indicates that *3GPP TS 23.038* GSM 7-bit default alphabet is used and **<fo>** indicates that *3GPP TS 23.040* TP-User-Data-Header-Indication is not set. - If TE character set other than "HEX" (see **AT+CSCS** command in *3GPP TS 27.007*): ME/TA converts GSM alphabet into current TE character set according to rules of ***Annex A*** in *3GPP TS 27.007*. - 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 (for example, character Π (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 *3GPP TS 23.040* 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: *3GPP TS 23.041* CBM Content of Message in text mode responses. The format is defined as follows: - If **<dcs>**, indicates that *3GPP TS 23.038* GSM 7-bit default alphabet is used: - If TE character set other than "HEX" (see **AT+CSCS** command in *3GPP TS27.007*): ME/TA converts GSM alphabet into current TE character set according to rules of ***Annex A*** in *3GPP TS 27.007*. - 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.
<cdata>	*3GPP TS 23.040 [3]* TP-Command-Data in text mode responses; ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (for example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<dcs>	Data coding scheme. Depending on the command or result code: *3GPP TS 23.038* SMS Data Coding Scheme (default 0) or Cell Broadcast Data Coding Scheme in integer format.

<pdu>	In the case of SMS: *3GPP TS 24.011* SC address followed by *3GPP TS 23.040* TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (for example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) in *3GPP TS 27.007*.
<fo>	Depends on the command or result code: first octet of *3GPP TS 23.040 [3]* SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format.
<mr>	*3GPP TS 23.040 [3]* TP-Message-Reference in integer format
<ra>	*3GPP TS 23.040 [3]* 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** in *3GPP TS 27.007 [9]*). The type of address given by **<tora>**.
<tora>	*3GPP TS 24.011 [6]* TP-Recipient-Address Type-of-Address octet in integer format (see **<toda>** by default).
<dt>	*3GPP TS 23.040 [3]* 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. For example, 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08".
<st>	*3GPP TS 23.040 [3]* TP-Status in integer format.
<ct>	*3GPP TS 23.040 [3]* TP-Command-Type in integer format (default 0)
<sn>	*3GPP TS 23.041 [4]* CBM Serial Number in integer format.
<mid>	*3GPP TS 23.041 [4]* CBM Message Identifier in integer format.
<page>	*3GPP TS 23.041 [4]* CBM Page Parameter bits 4–7 in integer format.
<pages>	*3GPP TS 23.041 [4]* CBM Page Parameter bits 0–3 in integer format.
<err>	Error codes. For more details, see ***Chapter 14.6***.

NOTE

Operation of **<stat>** depends on the storage of listed messages.

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
```

9.7. AT+CMGR Read Messages

This Read Command returns SMS message with location value **<index>** from message storage **<mem1>** to the TE. If status of the message is "REC UNREAD", status in the storage changes to "REC READ".

AT+CMGR Read Messages	
Test Command **AT+CMGR=?**	Response **OK**
Write Command **AT+CMGR=<index>**	Response If in text mode (**AT+CMGF=1**) and the command is executed successfully: For SMS-DELIVER: **+CMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>** **OK** For SMS-SUBMIT: **+CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>** **OK** For SMS-STATUS-REPORTs: **+CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>** **OK** For SMS-COMMANDs: **+CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]** **OK** For CBM storage: **+CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>** **OK** If in PDU mode (**AT+CMGF=0**) and command is executed successfully:

	+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> **OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	Depends on the length of message content.
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<index>	Integer type. Value in the range of location numbers supported by the associated memory.	
<stat>	In text mode:	
	"REC UNREAD"	Received unread messages
	"REC READ"	Received read messages
	"STO UNSENT"	Stored unsent messages
	"STO SENT"	Stored sent messages
	"ALL"	All messages
	In PDU mode:	
	0	Received unread messages
	1	Received read messages
	2	Stored unsent messages
	3	Stored sent messages
	4	All messages
<alpha>	String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry found in MT phonebook. Implementation of this feature is manufacturer specified. The used character set should be the one selected with **AT+CSCS** (see *3GPP TS 27.007*).	
<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 (see **AT+CSCS** command 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 (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<tooa>**.	
<scts>	Service center time stamp. *3GPP TS 23.040* TP-Service-Centre-Time-Stamp in time-string format (see **<dt>**).	

<fo>	Depending on the command or result code: First octet of *3GPP TS 23.040* SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT or SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted.
<pid>	Protocol identifier. *3GPP TS 23.040* TP-Protocol-Identifier in integer format (default 0).
<dcs>	Data coding scheme. Depending on the command or result code: *3GPP TS 23.038* SMS Data Coding Scheme (default 0) or Cell Broadcast Data Coding Scheme in integer format.
<vp>	Validity period. Depending on SMS-SUBMIT **<fo>** setting: *3GPP TS 23.040* TP-Validity-Period either in integer format or in time-string format (see **<dt>**).
<mn>	Message number. *3GPP TS 23.040* TP-Message-Number in integer format.
<mr>	Message reference. *3GPP TS 23.040* TP-Message-Reference in integer format.
<ra>	Recipient address. *3GPP TS 23.040* 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**). The type of address is given by **<tora>**.
<tora>	Type of recipient address. *3GPP TS 24.011* TP-Recipient-Address Type-of-Address octet in integer format (default see **<toda>**).
<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-Address octet in integer format (default see **<toda>**).
<sca>	Service center address. *3GPP TS 24.011* 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 *3GPP TS 27.007*). The type of address is given by **<tosca>**.
<tosca>	Type of service center address. *3GPP TS 24.011* RP SC address Type-of-Address octet in integer format (default see **<toda>**).
<length>	Integer type. Message length. Indicate the length of the message body **<data>** (or **<cdata>**) in characters in the text mode (**AT+CMGF=1**), or the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (that is, the RP layer SMSC address octets are not counted in the length).
<data>	The text of short message. For details, see ***Chapter 14.8***.
<pdu>	In the case of SMS: *3GPP TS 24.011* SC address followed by *3GPP TS 23.040* TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (for example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<dt>	*3GPP TS 23.040 [3]* TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss±zz", during which characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. For example, 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08".
<st>	*3GPP TS 23.040 [3]* TP-Status in integer format.
<ct>	*3GPP TS 23.040 [3]* TP-Command-Type in integer format (default 0).
<sn>	*3GPP TS 23.041 [4]* CBM Serial Number in integer format.
<mid>	*3GPP TS 23.041 Section 9.4.1.2.2*. Message Identifier. Range: 0–65535.

<page>	*3GPP TS 23.041 [4]* CBM Page Parameter bits 4–7 in integer format.
<pages>	*3GPP TS 23.041 [4]* CBM Page Parameter bits 0–3 in integer format.
<cdata>	*3GPP TS 23.040 [3]* TP-Command-Data in text mode responses; ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (for example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<mem1>	String type. Messages to be read and deleted from this memory storage. "SM" (U)SIM message storage "ME" Mobile equipment message storage "MT" Same as "ME" storage "SR" SMS status report storage location
<err>	Error codes. For more details, see ***Chapter 14.6***.

Example

```
+CMTI: "SM",3                                   //Indicates that new message has been received and saved
                                                  to <index>=3 of "SM"
AT+CSDH=1
OK
AT+CMGR=3                                       //Read message
+CMGR:          "REC          UNREAD","+358501234567",,"13/12/13,15:06:37+32",145,4,0,0,"
+358501234567",145,27
<This is a test from Quectel>

OK
```

9.8. AT+CMGS Send Messages

This Write Command sends a short message from TE to network (SMS-SUBMIT). After invoking the Write Command, wait for the prompt **>** and then start to write the message. After that, enter **<CTRL+Z>** to indicate the ending of PDU and begin to send the message. Sending can be cancelled by giving **<ESC>** character. Abortion is acknowledged with **OK**, though the message will not be sent. The message reference **<mr>** is returned to the TE on successful message delivery. The value can be used to identify message upon unsolicited delivery status report result code.

AT+CMGS Send Messages	
Test Command **AT+CMGS=?**	Response **OK**
Write Command 1) If in text mode (**AT+CMGF=1**): **AT+CMGS=<da>[,<toda>]<CR>** **>**Input text **<Ctrl+Z/ESC>**	Response TA sends message from TE to the network (SMS-SUBMIT). Message reference value **<mr>** is returned to the TE on successful message delivery. Optionally (when **AT+CSMS <service>** value is 1 and the network supports) **<scts>** is

Send the message/Quit the sending 2) If in PDU mode (**AT+CMGF=0**): **AT+CMGS=<length><CR>** **>**PDU is given. **<Ctrl+Z/ESC>** Send the message/Quit the sending	returned. Values can be used to identify message upon unsolicited delivery status report result code. If in text mode (**AT+CMGF=1**) and the message is sent successfully: **+CMGS: <mr>** **OK** If in PDU mode (**AT+CMGF=0**) and the message is sent successfully: **+CMGS: <mr>** **OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	120 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<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 (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<toda>	Type of destination address. *3GPP TS 24.011* TP-Destination-Address Type-of-Address octet in integer format.
<length>	Integer type. Message length. Indicates the length of the message body **<data>** (or **<cdata>**) in characters in the text mode (**AT+CMGF=1**); or the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**), (that is, 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>**).
<data>	The text of short message. For details, see ***Chapter 14.8***.
<cdata>	*3GPP TS 23.040 [3]* TP-Command-Data in text mode responses; ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (for example, octet with

	integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<err>	Error codes. For more details, see ***Chapter 14.6***.

Example

```
AT+CMGF=1                                  //Set SMS message format as text mode.
OK
AT+CSCS="GSM"                              //Set character set as GSM which is used by the TE.
OK
AT+CMGS="1234567890"
> <This is a test from Quectel>            //Text is entered. Tap <CTRL+Z> to send message, or
                                             <ESC> to quit the sending.
+CMGS: 247

OK
```

9.9. AT+CMMS Send More Messages

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

AT+CMMS Send More Messages	
Test Command **AT+CMMS=?**	Response **+CMMS: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CMMS?**	Response **+CMMS: <n>** **OK**
Write Command **AT+CMMS[=<n>]**	Response **OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	120 s, determined by 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** and so on) and the next send command exceeds 1–5 seconds (the exact value is up to ME implementation); then ME shall close the link and TA switches **<n>** back to 0 automatically. 2 Feature enabled. If the time between the response of the latest message send command and the next send command exceeds 1–5 seconds (the exact value is up to ME implementation), ME shall close the link but TA will not switch **<n>** back to 0 automatically.
<err>	Error codes. For more details, see ***Chapter 14.6***.

NOTE

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

9.10. AT+CMGW Write Messages to Memory

This Write and Execution Commands store short messages (either SMS-DELIVER or SMS-SUBMIT) from TE to memory storage **<mem2>**, and then the memory location **<index>** of the stored message is returned. The message status will be set to "STO UNSENT" by default; but parameter **<stat>** also allows other status values to be given.

The syntax of input text is the same as the one specified in **AT+CMGS** Write Command.

AT+CMGW Write Messages to Memory	
Test Command **AT+CMGW=?**	Response **OK**
Write Command 1) If in text mode (**AT+CMGF=1**): **AT+CMGW=<oa/da>[,<tooa/toda>[,<stat>]]** **>**Input text **<Ctrl+Z/ESC>** Send the message/Quit the sending	Response **+CMGW: <index>** **OK** If there is any error: **ERROR** Or

2) If in PDU mode (**AT+CMGF=0**): **AT+CMGW=<length>[,<stat>]** **>**PDU is given **<Ctrl+Z/ESC>** Send the message/Quit the sending	**+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<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 (see **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 (see **AT+CSCS** in *3GPP TS 27.007*). The type of address given by **<tooa>**.
<tooa>	Type of originating address. *3GPP TS 24.011* TP-Originating-Address Type-of-Address octet in integer format (default see **<toda>**).
<stat>	In text mode: "REC UNREAD" Received unread messages "REC READ" Received read messages "STO UNSENT" Stored unsent messages "STO SENT" Stored sent messages "ALL" All messages In PDU mode: 0 Received unread messages 1 Received read messages 2 Stored unsent messages 3 Stored sent messages 4 All messages
<toda>	Type of destination address. *3GPP TS 24.011* TP-Destination-Address Type-of-Address octet in integer format.
<length>	Integer type. Message length. Indicates the length of the message body **<data>** (or **<cdata>**) in characters in the text mode (**AT+CMGF=1**), or the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**), (that is, the RP layer SMSC address octets are not counted in the length).
<data>	The text of short message. For details, see ***Chapter 14.8***.
<cdata>	*3GPP TS 23.040 [3]* TP-Command-Data in text mode responses; ME/TA converts each

	8-bit octet into two IRA character long hexadecimal number (for example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<pdu>	In the case of SMS: *3GPP TS 24.011* SC address followed by *3GPP TS 23.04* TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (for example, 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>**.
<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 "SR" SMS status report storage location
<err>	Error codes. For more details, see ***Chapter 14.6***.

NOTE

Executing **AT+CMGW** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+CMGF=1                                   //Set SMS message format as text mode
OK
AT+CSCS="GSM"                               //Set character set as GSM which is used by the TE
OK
AT+CMGW="1234567890"
> <This is a test from Quectel>             //Text is entered. Tap <CTRL+Z> to send message or
                                            <ESC> to quit the sending
+CMGW: 4

OK
AT+CMGF=0                                   //Set SMS message format as PDU mode
OK
AT+CMGW=18
> 0051FF00000008000A0500030002016D4B8BD5
+CMGW: 5

OK
```

9.11. AT+CMSS Send Messages from Storage

This Write Command sends a message with location value **<index>** from message storage **<mem2>** to the network (SMS-SUBMIT). If a new recipient address **<da>** is given, it shall 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 status report result code.

AT+CMSS Send Messages 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 any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	120 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<index>	Integer type. 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 (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<toda>	Type of destination address. *3GPP TS 24.011* TP-Destination-Address Type-of-

	Address octet in integer format.
<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>**).
<ackpdu>	The format is the same as **<pdu>** in case of SMS, but without *3GPP TS 24.011* SC address field and parameter shall be bounded by double quote characters like a normal string type parameter.
<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 "SR" SMS status report storage location
<err>	Error codes. For more details, see ***Chapter 14.6***.

Example

```
AT+CMGF=1                          //Set SMS message format as text mode.
OK
AT+CSCS="GSM"                      //Set character set as GSM which is used by the TE.
OK
AT+CMGW="1234567890"
> Hello                            //Text is entered. Tap <CTRL+Z> to send message or
                                   <ESC> to quit the sending.
+CMGW: 4

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

OK
```

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

The Write and Execution Commands confirm successful receipt of a new message (SMS-DELIVER or SMS-STATUS-REPORT) routed directly to the TE. If the UE does not receive acknowledgement within required time (network timeout), it sends an **RP-ERROR** message to the network. The UE will automatically disable 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
Write Command **AT+CNMA=<n>**	Response **OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Execution Command **AT+CNMA**	Response **OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
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 codes. For more details, see ***Chapter 14.6***.

NOTE

The Execution and Write commands shall only be used when **<service>** in **AT+CSMS** equals 1 (phase 2+) and an appropriate URC has been issued by the module, that is:

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

Example

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

```
OK
AT+CNMI=1,2,0,0,0
OK
AT+CMGF=1
OK
AT+CSDH=1
OK
+CMT: "+358501234567",,"13/03/18,17:07:21+32",145,4,0,0,"+358501234567",145,28
This is a test from Quectel.          //Short message is outputted directly when SMS is incoming.
AT+CNMA                               //Send ACK to the network.
OK
AT+CNMA
+CMS ERROR: 340                       //The second time return error; it needs ACK only once.
```

9.13. AT+CNMI SMS Event Reporting Configuration

This Write Command selects the procedure on how the received new messages from the network are indicated to the TE when TE is active, for example, DTR is at low level (ON). If TE is inactive (for example, DTR is at high level (OFF)), message receiving should be done as specified in *3GPP TS 23.038*.

AT+CNMI SMS Event Reporting Configuration	
Test Command **AT+CNMI=?**	Response **+CNMI: (**list of supported **<mode>**s**),(**list of supported **<mt>**s**),(**list of supported **<bm>**s**),(**list of supported **<ds>**s**),(**list of supported **<bfr>**s**)** **OK**
Read Command **AT+CNMI?**	Response **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>** **OK**
Write Command/Execution Command **AT+CNMI[=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]**	Response **OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Reference
3GPP TS 27.005

Parameter

<mode> Integer type.

0 Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.

1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (for example, in on-line data mode). Otherwise forward them directly to the TE.

2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (for example, 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 SMS depend on its data coding scheme (see *3GPPTS 23.038*) and preferred memory storage (**AT+CPMS**) setting, and the value is:

0 No SMS-DELIVER indications are routed to the TE.

1 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) are routed directly to the TE using unsolicited result code: **+CMT: [<alpha>],<length><CR><LF><pdu>** (PDU mode enabled) or **+CMT: <oa>,[<alpha>],<scts>[,*<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>*]<CR><LF><data>** (text mode enabled; about the parameters in italics, see **AT+CSDH**). Class 2 messages result in indication as defined in **<mt>**=1.

3 Class 3 SMS-DELIVERs are routed directly to TE by using unsolicited result codes defined in **<mt>**=2. Messages of other classes result in indication as defined in **<mt>**=1.

<bm> Integer type. The rules for storing received CBMs depend on its data coding scheme (see *3GPP TS 23.038*) and the setting of Select CBM Types (**AT+CSCB**); and the value is:

0 No CBM indications are routed to the TE.

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.

0 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)
+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<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.

0 TA buffer of unsolicited result codes defined within this command is flushed to the TE when **<mode>** 1 or 2 is entered (**OK** response shall be given before flushing the

	codes). 1 TA buffer of unsolicited result codes defined within this command is cleared when **<mode>** 1 or 2 is entered.
<err>	Error codes. For more details, see ***Chapter 14.6***.

NOTE

Unsolicited result code:

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

Example

```
AT+CMGF=1                          //Set SMS message format as text mode.
OK
AT+CSCS="GSM"                      //Set character set as GSM which is used by the TE.
OK
AT+CNMI=1,2,0,1,0                  //Set SMS-DELIVERs are routed directly to the TE.
OK
AT+CSDH=1                          //Show text mode parameters.
OK
+CMT: "+358501234567",,"13/03/18,17:07:21+32",145,4,0,0,"+358501234567",145,28
This is a test from Quectel.       //Short message is outputted directly when an SMS is incoming.
```

9.14. AT+CSCB Select Cell Broadcast Message Types

This Write Command selects which types of CBMs are to be received by the ME. This command writes the parameters in NON-VOLATILE memory.

AT+CSCB Select Cell Broadcast Message Types	
Test Command **AT+CSCB=?**	Response **+CSCB: (**list of supported **<mode>**s**)** **OK**
Read Command **AT+CSCB?**	Response **+CSCB: <mode>,<mids>,<dcss>** **OK**
Write Command **AT+CSCB=<mode>[,mids>[,<dcss>]]**	Response **OK**

	If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.
Reference 3GPP TS 27.005	

Parameter

<mode>	Integer type. 0 Message types specified in **<mids>** and **<dcss>** are accepted 1 Message types specified in **<mids>** and **<dcss>** are not accepted
<mids>	String type. All different possible combinations of CBM message identifiers (see **<mid>**) (default is empty string), for example, "0,1,5,320-478,922"
<dcss>	String type. All different possible combinations of CBM data coding schemes (see **<dcs>**) (default is empty string), for example, "0-3,5".
<err>	Error codes. For more details, see ***Chapter 14.6***.

9.15. AT+CSDH Show SMS Text Mode Parameters

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

AT+CSDH Show SMS 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/Execution 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 **+CSCA**, **+CSMP** (**<sca>**, **<tosca>**, **<fo>**, **<vp>**, **<pid>**, **<dcs>**) and **<length>**, **<toda>** or **<tooa>** in **+CMT**, **+CMGL**, **+CMGR** result codes for SMS-DELIVERs and SMS-SUBMITs in text mode.
	1	Show the values in result codes.

Example

```
AT+CSDH=0
OK
AT+CMGR=2
+CMGR: "STO UNSENT","",
<This is a test from Quectel>

OK
AT+CSDH=1
OK
AT+CMGR=2
+CMGR: "STO UNSENT","",,128,17,0,0,143,"+358501234567",145,18
<This is a test from Quectel>

OK
```

9.16. AT+CSMP Set SMS Text Mode Parameters

This command sets values for additional parameters needed when a short message is sent to the network or placed in a storage in text mode 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>** ranges from 0 to 255) or define the absolute time of the validity period termination (**<vp>** is a string).

AT+CSMP Set SMS Text Mode Parameters	
Test Command **AT+CSMP=?**	Response **OK**

Read Command **AT+CSMP?**	Response **+CSMP: <fo>,<vp>,<pid>,<dcs>** **OK**
Write Command **AT+CSMP=<fo>[,<vp>[,<pid>[,<dcs>]]]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.005	

Parameter

<fo>	First octet. Depending on the command or result code: First octet of *3GPP TS 23.040* SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, SMS-COMMAND in integer format. If a valid value has been entered once, parameter can be omitted.
<vp>	Validity period. Depending on SMS-SUBMIT **<fo>** setting: *3GPP TS 23.040* TP-Validity-Period either in integer format or in time-string format (see **<dt>**).
<pid>	Protocol identifier. *3GPP TS 23.040* TP-Protocol-Identifier in integer format. Default value: 0.
<dcs>	Data coding scheme. Depending on the command or result code: *3GPP TS 23.038* SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format.

9.17. AT+QCMGS Send Concatenated Messages

This command sends concatenated massages. Different from **AT+CMGS**, when sending a concatenated message through 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 used in text mode (**AT+CMGF**=1).

AT+QCMGS Send Concatenated Messages	
Test Command **AT+QCMGS=?**	Response **OK**
Write Command If text mode (**+CMGF=1**):	Response If in text mode (**AT+CMGF**=1) and sent successfully:

AT+QCMGS=<da>[,<toda>],<uid>,<msg_seg>,<msg_total> **>**Input text **<Ctrl+Z/ESC>** Send the message/Quit the sending	**+QCMGS: <mr>** **OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	120 s, determined by 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>	See **AT+CMGS**.
<toda>	See **AT+CMGS**.
<mr>	See **AT+CMGS**.
<err>	Error codes. For more details, see ***Chapter 14.6***.

NOTE

1. For concatenated messages, the maximum length will be reduced by the length of the user data header (UDH). *3GPP TS 23.040* defines two kinds of UDH length: 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 the case of GSM 7-bit default alphabet data coding scheme, the maximum length of each segment of a concatenated message is (140 octets - 6) × 8/7=153 characters.
   - In the case of 16-bit UCS2 data coding scheme, the maximum length of each segment is (140-6)/2=67 characters.
   - In the case of 8-bit data coding scheme, the maximum length of each segment is 140-6=134 characters.
2. **<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.

3. **<uid>** The field of UDH. It 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.
4. **AT+QCMGS** does not support to send message in PDU mode (**AT+CMGF=0**).

Example

```
AT+CMGF=1                                  //Set SMS message format as text mode.
OK
AT+CSCS="GSM"                              //Set character set as GSM which is used by the TE.
OK
AT+QCMGS="15056913384",120,1,2             //Input 120 for <uid>, and send the first segment of the
                                           concatenated SMS.
>ABCD                                      //Text is entered. Tab <Ctrl+Z> to send the message,
                                             or <ESC> to quit the sending.
+QCMGS: 190

OK
AT+QCMGS="15056913384",120,2,2 <CR>        //Send the second segment of the concatenated SMS.
>EFGH                                      //Text is entered.Tab <Ctrl+Z> to send the message,
                                             or <ESC> to quit the sending.
+QCMGS: 191

OK
```

9.18. 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 used in text mode (**AT+CMGF=1**).

AT+QCMGR Read Concatenated Messages	
Test Command **AT+QCMGR=?**	Response **OK**
Write Command **AT+QCMGR=<index>**	Response In text mode (**AT+CMGF=1**) and command is executed successfully: For SMS-DELIVER: **+QCMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>][,<uid>,<msg_seg>,<**

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

Parameter

<uid>	Integer type. Message identification in the user data header (UDH). Range: 0–65535 (see **NOTE** below). All segments of a same concatenated message have 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. See **AT+CMGR** for details of other parameters.
<err>	Error codes. For more details, see ***Chapter 14.6***.

NOTE

1. 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 maximal value is 255 with 8-bit and 65535 with 16-bit.
2. If the message to be read is not a concatenated message, **<uid>**, **<msg_seg>** and **<msg_total>** would not be shown in the result.

Example

```
+CMTI: "SM",3              /The first message of a concatenated message comes.

+CMTI: "SM",4              //The second message of a concatenated message comes.
AT+QCMGR=3                 //Read the first segment of the concatenated message.
+QCMGR: "REC UNREAD","+358501234567",,"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","+358501234567",,"13/07/30,14:44:37+32",120,2,2
EFGH

OK
```

10 Packet Domain Commands

10.1. AT+CGATT Attachment or Detachment of PS

This Write Command attaches the MT to, or detach the MT from the Packet Domain service. After the command has been completed, the MT remains in V.25ter command state. If the MT is already in the requested state, the command is ignored and the **OK** response will be returned. If the requested state cannot be achieved, an **ERROR** or **+CME ERROR** response is returned.

AT+CGATT Attachment or Detachment of PS	
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 any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	140 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<state>	Integer type. Indicates the state of PS attachment	
	0	Detached
	1	Attached

<err>	Other values are reserved and will result in an **ERROR** response to the Write Command Error codes. For more details, see ***Chapter 14.5***.

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
```

10.2. AT+CGDCONT Define PDP Contexts

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 Contexts	
Test Command **AT+CGDCONT=?**	Response **+CGDCONT: (**list of supported **<cid>**s)**,<PDP_type>,<APN>,<PDP_addr>,(**list of supported **<data_comp>**s)**,(**list of supported **<head_comp>**s)**,(**list of supported **<IPv4_addr_alloc>**s)**,(**list of supported **<request_type>**s)** **OK**
Read Command **AT+CGDCONT?**	Response **+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<data_comp>,<head_comp>,<IPv4_addr_alloc>,<request_type>** **[…]** **OK**
Write Command **AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<data_comp>[,<head_comp>,<IPv4_addr_alloc>,<request_type>]]]]]**	Response **OK** Or **ERROR**

Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. PDP context identifier, a numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value=1) is returned by the test form of the command.
<PDP_type>	String type. Packet data protocol type, a string parameter which specifies the type of packet data protocol. "IP" IPv4. Internet Protocol (*IETF STD 5*) "PPP" "IPV6" "IPV4V6"
<APN>	String type. Access point name, which is 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) (see *3GPP TS 44.065*). 0 Off (Default if value is omitted) 1 On (Manufacturer preferred compression) 2 V.42bis 3 V.44 (Not supported currently)
<head_comp>	Integer type. Controls PDP header compression (see 3GPP TS 44.065 and *3GPP TS25.323*). 0 Off 1 On 2 RFC1144 3 RFC2507 4 RFC3095
<IPv4_addr_alloc>	Integer type. Controls how the MT/TA requests to get the IPv4 address information. 0 IPv4 address allocation through NAS signaling 1 IPv4 address allocated through DHCP
<request_type>	Integer type. Indicates the type of PDP context activation request for the PDP context.

0	PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP context is for new PDP context establishment or for handover is implementation specific)
1	PDP context is for emergency bearer services

NOTE

Executing **AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<data_comp>[,<head_comp>,<IPv4_addr_alloc>,<request_type>]]]]]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

10.3. AT+CGQREQ Quality of Service Profile (Requested)

This command allows the TE to specify the quality of service profile that is used when the MT activates a PDP context.

This Write Command specifies a profile for the context **<cid>**. A special form of the Write Command, **AT+CGQREQ=<cid>** causes the requested profile for context number **<cid>** to become undefined. The Read Command returns the current settings for each defined context. Details can be found in *3GPP TS 23.107* and all parameters are saved in NVM automatically.

AT+CGQREQ Quality of Service Profile (Requested)	
Test Command **AT+CGQREQ=?**	Response **+CGQREQ: <PDP_type>,(**list of supported **<precedence>**s**),(**list of supported **<delay>**s**),(**list of supported **<reliability>**s**),(**list of supported **<peak>**s**),(**list of supported **<mean>**s**)** **OK**
Read Command **AT+CGQREQ?**	Response **[+CGQREQ: <cid>,<precedence>,<delay>,>reliability>,<peak>,<mean>]** **[…]** **OK**
Write Command **AT+CGQREQ=<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]**	Response **OK** If there is any error: **ERROR** Or

	+CME ERROR: <err>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
<PDP_type>	String type. Packet Data Protocol type "IP" IPv4. Internet Protocol (*IETF STD 5*) "PPP" "IPV6" "IPV4V6"
<precedence>	Integer type. Specifies the precedence class. 0 Network subscribed value 1 High Priority. Service commitments shall be maintained ahead of precedence classes 2 and 3 2 Normal priority. Service commitments shall be maintained ahead of precedence class 3 3 Low priority. Service commitments shall be maintained.
<delay>	Integer type. Specifies the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. For the details, see ***Table 6***: Delay Class. 0 Network subscribed value 1–4 See ***Table 6***: Delay Class.
<reliability>	Integer type. Specifies the reliability class. 0 Network subscribed value 1 Non real-time traffic, error-sensitive application that cannot cope with data loss 2 Non real-time traffic, error-sensitive application that can cope with infrequent data loss 3 Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS 4 Real-time traffic, error-sensitive application that can cope with data loss 5 Real-time traffic, error non-sensitive application that can cope with data loss
<peak>	Integer type. Specifies the peak throughput class, in octets per second. 0 Network subscribed value 1 Up to 1 000 (8 kbit/s) 2 Up to 2 000 (16 kbit/s)

	3 Up to 4 000 (32 kbit/s) 4 Up to 8 000 (64 kbit/s) 5 Up to 16 000 (128 kbit/s) 6 Up to 32 000 (256 kbit/s) 7 Up to 64 000 (512 kbit/s) 8 Up to 128 000 (1024 kbit/s) 9 Up to 256 000 (2048 kbit/s)
<mean>	Integer type. Specifies the mean throughput class, in octets per hour. 0 Network subscribed value 1 100 (about 0.22 bit/s) 2 200 (about 0.44 bit/s) 3 500 (about 1.11 bit/s) 4 1 000 (about 2.2 bit/s) 5 2 000 (about 4.4 bit/s) 6 5 000 (about 11.1 bit/s) 7 10 000 (about 22 bit/s) 8 20 000 (about 44 bit/s) 9 50 000 (about 111 bit/s) 10 100 000 (about 0.22 kbit/s) 11 200 000 (about 0.44 kbit/s) 12 500 000(about 1.11 kbit/s) 13 1000 000 (about 2.2 kbit/s) 14 2 000 000 (about 4.4 kbit/s) 15 5 000 000 (about 11.1 kbit/s) 16 10 000 000 (about 22 kbit/s) 17 20 000 000 (about 44 kbit/s) 18 50 000 000 (about 111 kbit/s) 31 Best effort
<err>	Error codes. For more details, see ***Chapter 14.5***.

Table 6: Delay Class

SDU Size	Delay Class	Mean Transfer Delay	95 Percentile
128 octets	1 (Predictive)	<0.5	<1.5
	2 (Predictive)	<5	<25
	3 (Predictive)	<50	<250
	4 (Best Effort)	Unspecified	-
1024 octets	1 (Predictive)	<0.5	<1.5

2 (Predictive)	<5	<25
3 (Predictive)	<50	<250
4 (Best Effort)	Unspecified	-

10.4. AT+CGQMIN Quality of Service Profile (Minimum Acceptable)

This command allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile when the PDP context is activated. This Write Command specifies a profile for the context identified by the context identification parameter **<cid>**.

A special form of the Write Command, **AT+CGQMIN=<cid>** causes the minimum acceptable profile for context number **<cid>** to become undefined. In this case no check is made against the negotiated profile. This Read Command returns the current settings for each defined context. Details can be found in *3GPP TS 23.107* and all parameters are saved in NVM automatically.

AT+CGQMIN Quality of Service Profile (Minimum Acceptable)	
Test Command **AT+CGQMIN=?**	Response **+CGQMIN: <PDP_type>,(**list of supported **<precedence>**s**),(**list of supported **<delay>**s**),(**list of supported **<reliability>**s**),(**list of supported **<peak>**s**),(**list of supported **<mean>**s**)** **OK**
Read Command **AT+CGQMIN?**	Response **[+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>** **[…]]** **OK**
Write Command **AT+CGQMIN=<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Reference
3GPP TS 27.007

Parameter

<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**)
<PDP_type>	String type. Packet Data Protocol type "IP" IPv4. Internet Protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6"
<precedence>	Integer type. Specifies the precedence class 0 Network subscribed value 1 High Priority. Service commitments shall be maintained ahead of precedence classes 2 and 3 2 Normal priority. Service commitments shall be maintained ahead of precedence class 3 3 Low priority. Service commitments shall be maintained
<delay>	Integer type. Specifies the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. See ***Table 6***: Delay Class for details. 0 Network subscribed value 1 Delay Class 1 2 Delay Class 2 3 Delay Class 3 4 Delay Class 4
<reliability>	Integer type. Specifies the reliability class. 0 Network subscribed value 1 Non real-time traffic and error-sensitive application that cannot cope with data loss 2 Non real-time traffic and error-sensitive application that can cope with infrequent data loss 3 Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS 4 Real-time traffic and error-sensitive application that can cope with data loss 5 Real-time traffic and error non-sensitive application that can cope with data loss
<peak>	Integer type. Specifies the peak throughput class, in octets per second. 0 Network subscribed value 1 Up to 1 000 (8 kbit/s) 2 Up to 2 000 (16 kbit/s) 3 Up to 4 000 (32 kbit/s) 4 Up to 8 000 (64 kbit/s) 5 Up to 16 000 (128 kbit/s)

	6	Up to 32 000 (256 kbit/s)
	7	Up to 64 000 (512 kbit/s)
	8	Up to 128 000 (1024 kbit/s)
	9	Up to 256 000 (2048 kbit/s)
<mean>	Integer type. Specifies the mean throughput class, in octets per hour.	
	0	Network subscribed value
	1	100 (about 0.22 bit/s)
	2	200 (about 0.44 bit/s)
	3	500 (about 1.11 bit/s)
	4	1 000 (about 2.2 bit/s)
	5	2 000 (about 4.4 bit/s)
	6	5 000 (about 11.1 bit/s)
	7	10 000 (about 22 bit/s)
	8	20 000 (about 44 bit/s)
	9	50 000 (about 111 bit/s)
	10	100 000 (about 0.22 kbit/s)
	11	200 000 (about 0.44 kbit/s)
	12	500 000(about 1.11 kbit/s)
	13	1000 000 (about 2.2 kbit/s)
	14	2 000 000 (about 4.4 kbit/s)
	15	5 000 000 (about 11.1 kbit/s)
	16	10 000 000 (about 22 kbit/s)
	17	20 000 000 (about 44 kbit/s)
	18	50 000 000 (about 111 kbit/s)
	31	Best effort
<err>	Error codes. For more details, see ***Chapter 14.5***.	

10.5. AT+CGEQREQ 3G Quality of Service Profile (Requested)

This command allows TE to specify a UMTS quality of service profile that is used when the MT activates a PDP context. Details can be found in *3GPP TS 23.107*.

AT+CGEQREQ 3G Quality of Service Profile (Requested)	
Test Command **AT+CGEQREQ=?**	Response **+CGEQREQ: <PDP_type>,(**list of supported **<Traffic class>**s**),(**list of supported **<Maximum bitrate UL>**s**),(**list of supported **<Maximum bitrate DL>**s**),(**list of supported **<Guaranteed bitrate UL>**s**),(**list of supported **<Guaranteed bitrate DL>**s**),(**list of supported **<Delivery order>**s**),(**list of supported **<Maximum SDU size>**s**),(**list of supported **<SDU error ratio>**s**),(**list of supported **<Residual bit error ratio>**s**),(**list of supported **<Delivery of erroneous**

	SDUs>s),(list of supported **<Transfer delay>**s),(list of supported **<Traffic handling priority>**s),(list of supported **<Source statistics descriptor>**s),(list of supported **<Signaling indication>**s) **OK**
Read Command **AT+CGEQREQ?**	Response **[+CGEQREQ: <cid>,<Traffic class>,<Maximum bitrate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority>,<Source statistics descriptor>,<Signaling indication>]** **[...]** **OK**
Write Command **AT+CGEQREQ=[<cid>[,<Traffic class>[,<Maximum bitrate UL>[,<Maximum bitrate DL>[,<Guaranteed bitrate UL>[,<Guaranteed bitrate DL>[,<Delivery order>[,<Maximum SDU size>[,<SDU error ratio>[,<Residual bit error ratio>[,<Delivery of erroneous SDUs>[,<Transfer delay>[,<Traffic handling priority>[,<Source statistics descriptor>[,<Signaling indication>]]]]]]]]]]]]]]]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are 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 = 1) is returned by the test form of the command.
<PDP_type>	String type. The type of packet data protocol type.

	"IP" IPv4. Internet Protocol (*IETF STD 5*) "PPP" "IPV6" "IPV4V6"
The following parameters are defined in *3GPP TS 23.107*	
<Traffic class>	Integer type. Indicates the type of application for which the UMTS bearer service is optimized (refer to *3GPP TS 24.008 subclause 10.5.6.5*). If the parameter is specified as conversational or streaming, then **<Maximum bitrate UL>**, **<Maximum bitrate DL>** ,**<Guaranteed bitrate UL>** and **<Guaranteed bitrate DL>** should also be provided. 0 Conversational 1 Streaming 2 Interactive 3 Background 4 Subscribed value
<Maximum bitrate UL>	Integer type. Indicates the maximum number of kbits/s delivered to UMTS (uplink traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (for example, **AT+CGEQREQ=…,32,…**). 0 Subscribed value 1–5760
<Maximum bitrate DL>	Integer type. Indicates the maximum number of kbits/s delivered by UMTS (downlink traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (for example, **AT+CGEQREQ=…,32,…**). 0 Subscribed value 1–42200
<Guaranteed bitrate UL>	Integer type. Indicates the guaranteed number of kbits/s delivered to UMTS (uplink traffic) at an SAP (provided that there is data to deliver). As an example, a bit rate of 32 kbit/s would be specified as 32 (for example, **AT+CGEQREQ=…,32,…**). 0 Subscribed value 1–5760
<Guaranteed bitrate DL>	Integer type. Indicates the guaranteed number of kbits/s delivered by UMTS (downlink traffic) at an SAP (provided that there is data to deliver). As an example, a bit rate of 32 kbit/s would be specified as 32 (for example., **AT+CGEQREQ=…,32,…**). 0 Subscribed value 1–42200
<Delivery order>	Integer type. Indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer to *3GPP TS 24.008 subclause 10.5.6.5*). 0 No 1 Yes 2 Subscribed value
<Maximum SDU size>	Integer type. Indicates the maximum allowed SDU size in octets. If the

	parameter is set to 0, the subscribed value will be requested (see *3GPP TS 24.008 subclause 10.5.6.5*). 0–1520 (This value needs to be divisible by 10 without remainder)
<SDU error ratio>	String type. Indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as "mEe". As an example, a target SDU error ratio of 5 × 10^{-3} would be specified as "5E3" (for example, **AT+CGEQREQ=…,"5E3",…**). "0E0" Subscribed value "1E1" "1E2" "7E3" "1E3" "1E4" "1E5" "1E6"
<Residual bit error ratio>	String type. Indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, it indicates the bit error ratio in the delivered SDUs. The value is specified as "mEe". As an example a target residual bit error ratio of 5 × 10^{-3} would be specified as "5E3" (e.g., **AT+CGEQREQ=…,"5E3",…**). "0E0" Subscribed value "5E2" "1E2" "5E3" "4E3" "1E3" "1E4" "1E5" "1E6" "6E8"
<Delivery of erroneous SDUs>	Integer type. Indicates whether SDUs detected as erroneous shall be delivered or not (see *3GPP TS 24.008 subclause 10.5.6.5*). 0 No 1 Yes 2 No detect 3 Subscribed value
<Transfer delay>	Integer type. Indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds. If the parameter is set to 0, the subscribed value will be requested (see *3GPP TS 24.008 subclause 10.5.6.5*). 0 Subscribed value 100–150 (This value needs to be divisible by 10 without remainder)

	200–950	(This value needs to be divisible by 50 without remainder)
	1000–4000	(This value needs to be divisible by 100 without remainder)
<Traffic handling priority>	Integer type. Specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers. If the parameter is set to 0, the subscribed value will be requested (see *3GPP TS 24.008 subclause 10.5.6.5*).	
	0	Subscribed
	1	Priority level 1
	2	Priority level 2
	3	Priority level 3
<Source statistics descriptor>	Integer type. Specifies characteristics of the source of the submitted SDUs for a PDP context.	
	0	Characteristics of SDUs are unknown
	1	Characteristics of SDUs corresponds to a speech source
<Signaling indication>	Integer type. Indicates signaling content of submitted SDUs for a PDP context.	
	0	PDP context is not optimized for signaling
	1	PDP context is optimized for signaling

10.6. AT+CGEQMIN 3G Quality of Service Profile (Minimum Acceptable)

This command allows the TE to specify a minimum acceptable profile, which is checked by the MT against the negotiated profile returned in the PDP context establishment and PDP context modification procedures. Details can be found in *3GPP TS 23.107* and all parameters are saved in NVM automatically.

AT+CEGQMIN 3G Quality of Service Profile (Minimum Acceptable)	
Test Command **AT+CGEQMIN=?**	Response **+CGEQMIN: <PDP_type>,(**list of supported **<Traffic class>**s**),(**list of supported **<Maximum bitrate UL>**s**),(**list of supported **<Maximum bitrate DL>**s**),(**list of supported **<Guaranteed bitrate UL>**s**),(**list of supported **<Guaranteed bitrate DL>**s**),(**list of supported **<Delivery order>**s**),(**list of supported **<Maximum SDU size>**s**),(**list of supported **<SDU error ratio>**s**),(**list of supported **<Residual bit error ratio>**s**),(**list of supported **<Delivery of erroneous SDUs>**s**),(**list of supported **<Transfer delay>**s**),(**list of supported **<Traffic handling priority>**s**),(**list of supported **<Source statistics descriptor>**s**),(**list of supported **<Signaling indication>**s**)**

	OK
Read Command **AT+CGEQMIN?**	Response **[+CGEQMIN: <cid>,<Traffic class>,<Maximum bitrate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority>,<Source statistics descriptor>,<Signaling indication>]** **[…]** **OK**
Write Command **AT+CGEQMIN=[<cid>[,<Traffic class>[,<Maximum bitrate UL>[,<Maximum bitrate DL>[,<Guaranteed bitrate UL>[,<Guaranteed bitrate DL>[,<Delivery order>[,<Maximum SDU size>[,<SDU error ratio>[,<Residual bit error ratio>[,<Delivery of erroneous SDUs>[,<Transfer delay>[,<Traffic handling priority>[,<Source statistics descriptor>[,<Signaling indication>]]]]]]]]]]]]]]]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are 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 = 1) is returned by the test form of the command
<PDP_type>	Packet data protocol type, a string parameter which specifies the type of packet data protocol. "IP" IPv4. Internet Protocol (*IETF STD 5*) "PPP" "IPV6"

"IPV4V6"

The following parameters are defined in *3GPP TS 23.107.*

<Traffic class> Integer type. Indicates the type of application for which the UMTS bearer service is optimized (see *3GPP TS 24.008 subclause 10.5.6.5*). If the parameter is specified as conversational or streaming, then **<Maximum bitrate UL>**, **<Maximum bitrate DL>**, **<Guaranteed bitrate UL>** and **<Guaranteed bitrate DL>** should also be provided.

0 Conversational
1 Streaming
2 Interactive
3 Background
4 Subscribed value

<Maximum bitrate UL> Integer type. Indicates the maximum number of kbits/s delivered to UMTS (uplink traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (for example, **AT+CGEQREQ=…,32,…**).

0 Subscribed value
1–5760

<Maximum bitrate DL> Integer type. Indicates the maximum number of kbits/s delivered by UMTS (downlink traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (for example, **AT+CGEQREQ=…,32,…**).

0 Subscribed value
1–42200

<Guaranteed bitrate UL> Integer type. Indicates the guaranteed number of kbits/s delivered to UMTS (uplink traffic) at an SAP (provided that there is data to deliver). As an example, a bit rate of 32 kbit/s would be specified as 32 (for example, **AT+CGEQREQ=…,32,…**).

0 Subscribed value
1–5760

<Guaranteed bitrate DL> Integer type. Indicates the guaranteed number of kbits/s delivered by UMTS (downlink traffic) at an SAP (provided that there is data to deliver). As an example, a bit rate of 32 kbit/s would be specified as 32 (for example, **AT+CGEQREQ=…,32,…**).

0 Subscribed value
1–42200

<Delivery order> Integer type. Indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer to *3GPP TS 24.008 subclause 10.5.6.5*).

0 No
1 Yes
2 Subscribed value

<Maximum SDU size> Integer type. Indicates the maximum allowed SDU size in octets. If the parameter is set to 0, the subscribed value will be requested (see *3GPP TS 24.008 subclause 10.5.6.5*).

0–1520 (This value needs to be divisible by 10 without remainder)

<SDU error ratio>	String type. Indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as "mEe". As an example, a target SDU error ratio of 5 × 10^{-3} would be specified as "5E3" (for example, **AT+CGEQREQ=…,"5E3",…**). "0E0" Subscribed value "1E2" "7E3" "1E3" "1E4" "1E5" "1E6" "1E1"
<Residual bit error ratio>	String type. Indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, it indicates the bit error ratio in the delivered SDUs. The value is specified as "mEe". As an example, a target residual bit error ratio of 5 × 10^{-3} would be specified as "5E3" (for example, **AT+CGEQREQ=…,"5E3",…**). "0E0" Subscribed value "5E2" "1E2" "5E3" "4E3" "1E3" "1E4" "1E5" "1E6" "6E8"
<Delivery of erroneous SDUs>	Integer type. Indicates whether SDUs detected as erroneous shall be delivered or not (see *3GPP TS 24.008 subclause 10.5.6.5*). 0 No 1 Yes 2 No detect 3 Subscribed value
<Transfer delay>	Integer type. Indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds. If the parameter is set to 0 the subscribed value will be requested (refer to *3GPP TS 24.008 subclause 10.5.6.5*). 0 Subscribed value 100–150 (This value needs to be divisible by 10 without remainder) 200–950 (This value needs to be divisible by 50 without remainder) 1000–4000 (This value needs to be divisible by 100 without

	remainder)
<Traffic handling priority>	Integer type. Specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers. If the parameter is set to 0, the subscribed value will be requested (see *3GPP TS 24.008 subclause 10.5.6.5*). 0 Subscribed 1 Priority level 1 2 Priority level 2 3 Priority level 3
<Source statistics descriptor>	Integer type. Specifies characteristics of the source of the submitted SDUs for a PDP context. 0 Characteristics of SDUs are unknown 1 Characteristics of SDUs corresponds to a speech source
<Signaling indication>	Integer type. Indicates signaling content of submitted SDUs for a PDP context. 0 PDP context is not optimized for signaling 1 PDP context is optimized for signaling
<err>	Error codes. For more details, see ***Chapter 14.5***.

10.7. AT+CGACT Activate or Deactivate PDP Contexts

This command activates or deactivates the specified PDP context(s). After the command has been completed, 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 specifies the activation/deactivation form of the command, it will activate or deactivate all defined contexts.

AT+CGACT Activate or Deactivate PDP Contexts	
Test Command **AT+CGACT=?**	Response **+CGACT: (**list of supported **<state>**s**)** **OK**
Read Command **AT+CGACT?**	Response **+CGACT: <cid>,<state>** **[…]** **OK**
Write Command **AT+CGACT=<state>,<cid>**	Response **OK** Or **NO CARRIER**

	If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	150 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<state>	Integer type. Indicates the state of PDP context activation. 0 Deactivated 1 Activated Other values are reserved and will result in an **ERROR** response to the Write Command.
<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
<err>	Error codes. For more details, see ***Chapter 14.5***.

Example

```
AT+CGDCONT=4,"IP","UNINET"          //Define a PDP context.
OK
AT+CGACT=1,4                        //Activate the PDP.
OK
AT+CGACT?                           //Query the current PDP context state.
+CGACT: 1,1
+CGACT: 2,0
+CGACT: 3,0
+CGACT: 4,1

OK
AT+CGACT=0,4                        //Deactivate the PDP.
OK
```

10.8. AT+CGDATA Enter Data State

This Write Command causes the MT to perform whatever actions that are necessary to establish communication between the TE and the network using one or more packet domain PDP types. This may include performing a PS attach and one or more PDP context activations. Commands following the

AT+CGDATA in the AT command line will not be processed by the MT.

If the **<L2P>** value is unacceptable to the MT, the MT shall return an **ERROR** or **+CME ERROR** response. Otherwise, the MT issues the intermediate result code **CONNECT** and enters V.250 online data state. After data transfer is completed, and the layer 2 protocol termination procedure has been completed successfully, the command state is reentered and the MT returns the final result code **OK**.

AT+CGDATA Enter Data State	
Test Command **AT+CGDATA=?**	Response **+CGDATA: (**list of supported **<L2P>**s**)** **OK**
Write Command **AT+CGDATA=<L2P>,<cid>**	Response **CONNECT** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<L2P>	String type. Indicates the layer 2 protocol to be used between the TE and MT: PPP Point to Point protocol for a PDP such as IP Other values are not supported and will result in an **ERROR** response to the Execution Command.
<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
<err>	Error codes. For more details, see ***Chapter 14.5***.

10.9. AT+CGPADDR Show PDP Address

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	
Test Command **AT+CGPADDR=?**	Response **+CGPADDR: (**list of defined **<cid>**s**)** **OK**
Write Command **AT+CGPADDR[=<cid>[,<cid>[,…]]]**	Response **+CGPADDR: <cid>,<PDP_addr>** **[…]** **OK** If there is any 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 the **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_addr>** 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

10.10. AT+CGCLASS GPRS Mobile Station Class

This command sets the MT to operate according to the specified mode of operation, see *3GPP TS 23.060*.

AT+CGCLASS GPRS Mobile Station Class	
Test Command **AT+CGCLASS=?**	Response **+CGCLASS:** (list of supported **<class>**s) **OK**
Read Command **AT+CGCLASS?**	Response **+CGCLASS: <class>** **OK**
Write Command **AT+CGCLASS=<class>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.007	

Parameter

<class>	String type. Indicates the GPRS mobile class (Functionality in descending order). "A" Class A
<err>	Error codes. For more details, see ***Chapter 14.5***.

10.11. AT+CGEREP Report Packet Domain Event

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 specified.

AT+CGEREP Report Packet Domain Event	
Test Command **AT+CGEREP=?**	Response **+CGEREP: (**list of supported **<mode>**s**),(**list of supported **<bfr>**s**)** **OK**
Read Command **AT+CGEREP?**	Response **+CGEREP: <mode>,<bfr>** **OK** Or **ERROR**
Write Command **AT+CGEREP=[<mode>[,<bfr>]]**	Response **OK** Or **ERROR**
Execution Command **AT+CGEREP**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type.	
	0	Buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.
	1	Discard unsolicited result codes when MT-TE link is reserved (for example, 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 (for example, in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE.
<bfr>	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 shall 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 for 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 for 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.
7. **+CGEV: NW CLASS<class>**: The network has forced a change of MS class. The highest available class is reported (see **AT+CGCLASS**).
8. **+CGEV: ME CLASS<class>**: The mobile equipment has forced a change of MS class. The highest available class is reported (see **AT+CGCLASS**).
9. **+CGEV: PDN ACT<cid>**: Activated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS.
10. **+CGEV: PDN DEACT<cid>**: Deactivated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS.

Parameter

<PDP_type>	String 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>	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.

<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=1) is returned by the test form of **AT+CGDCONT**.
<class>	String type. Indicates the GPRS mobile class. A Class A

Example

```
AT+CGEREP=?                 //Test command.
+CGEREP: (0-2),(0,1)

OK
AT+CGEREP?                  //Query the current configuration.
+CGEREP: 0,0

OK
AT+CGEREP=2,1               //Report packet domain event.
OK
AT+CGACT=1,2                //Activate a context.
OK

+CGEV: PDN ACT2
AT+CGACT=0,2                //Deactivate a context.
OK

+CGEV: PDN DEACT2
```

10.12. 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: (**list of currently available **<service>**s**)** **OK**
Read Command **AT+CGSMS?**	Response **+CGSMS: <service>**

	OK
Write Command **AT+CGSMS=<service>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
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
	2	Packet Domain preferred (use circuit switched if GPRS not available)
	3	Circuit switch preferred (use GPRS if circuit switched not available)
<err>	Error codes. For more details, see ***Chapter 14.5***.	

NOTE

Executing **AT+CGSMS=<service>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

10.13. AT+QGDCNT Packet Data Counter

The command allows the application to check how much bytes are sent to or received by the module.

AT+QGDCNT Packet Data Counter	
Test Command **AT+QGDCNT=?**	Response **+QGDCNT: (**list of supported **<op>**s**)** **OK**
Read Command **AT+QGDCNT?**	Response **+QGDCNT: <bytes_sent>,<bytes_recv>**

	OK
Write Command **AT+QGDCNT=<op>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<op>	Integer type. The operation about data counter. 0 Reset the data counter 1 Save the results of data counter to NVM
<bytes_sent>	Integer type. The amount of sent bytes.
<bytes_recv>	Integer type. The amount of received bytes.
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

1. **AT+QGDCNT=1** can write data bytes to NVM and it should not be executed frequently, otherwise the service life of the module flash will be shortened. If you need to write to NVM, it is recommended that the interval be more than 60 seconds.
2. When module is power on, **<bytes_sent>** and **<bytes_recv>** are loaded from results of data counter in NVM. The default result in NVM is 0.
3. Executing **AT+QGDCNT=<op>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QGDCNT=?          //Test command.
+QGDCNT: (0,1)

OK
AT+QGDCNT?           //Query the current bytes sent and received.
+QGDCNT: 3832,4618

OK
AT+QGDCNT=1          //Save the results of data counter to NVM.
OK
```

```
AT+QGDCNT=0                 //Reset the data counter.
OK
```

11 Supplementary Service Commands

NOTE

Supplementary service related AT commands are not supported on EG065K series, EM120K-GL, EM060K series and EM061K-GL modules.

11.1. AT+CCFC Call Forwarding Number and Conditions Control

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

AT+CCFC Call Forwarding Number and Conditions Control	
Test Command **AT+CCFC=?**	Response **+CCFC: (**list of supported **<reads>**s**)** **OK**
Write Command **AT+CCFC=<reads>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]]**	Response If **<mode>** is not equal to 2 and the command is executed successfully: **OK** If **<mode>**=2 and the command is executed successfully (only in connection with **<reads>**=(0–3)): For registered call forwarding numbers: **+CCFC: <status>,<class>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]** **[...]** **OK** If no call forwarding number is registered (and therefore all classes are inactive): **+CCFC: <status>,<class>** **OK**

	If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	180 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<reads>	Integer type.	
	0	Unconditional
	1	Mobile busy
	2	No reply
	3	Not reachable
	4	All call forwarding (see *3GPP TS 22.030*)
	5	All conditional call forwarding (see *3GPP TS 22.030*)
<mode>	Integer type.	
	0	Disable
	1	Enable
	2	Query status
	3	Registration
	4	Erasure
<number>	String type. Phone number of forwarding address in format specified by **<type>**.	
<type>	Integer type. Type of address. The default value is 145 when dialing string includes international access code character "**+**"; otherwise, 129.	
<subaddr>	String type. Sub-address in the format specified by **<satype>**.	
<satype>	Type of sub-address octet in integer format (see *3GPP TS 24.008 subclause 10.5.4.8*)	
<class>	Integer type. Each represents a class of information.	
	1	Voice (telephony)
	2	Data (refers to all bearer services; and this may only see some bearer services if TA does not support values 16, 32, 64 and 128 with **<mode>**=2)
	4	Fax (facsimile services)
	7	Voice, data and fax
	8	Short message service
	16	Data circuit synchronization
	32	Data circuit asynchronization
	64	Dedicated packet access
	128	Dedicated PAD access
	255	No information

<time>	Integer type. When "no reply", "all call forwarding" or "all conditional call forwarding" is enabled or queried, this gives the time in seconds to wait before call is forwarded. Range:1–30. Default value:20. Unit: second.
<status>	Integer type. 0 Not active 1 Active
<err>	Error codes. For more details, see ***Chapter 14.5***.

Example

```
AT+CCFC=0,3,"1234567890"                    //Register the destination number for unconditional call
OK                                           forwarding (CFU).
AT+CCFC=0,2                                 //Query the status of CFU without specifying <class>.
+CCFC: 1,1,"+358501234567",145,,,

OK
AT+CCFC=0,4                                 //Erase the registered CFU destination number.
OK
AT+CCFC=0,2                                 //Query the status and there is no destination number.
+CCFC: 0,255

OK
```

11.2. AT+CCWA Call Waiting Control

This command allows control of the call waiting supplementary service according to *3GPP TS 22.083*. Activation, deactivation and status query are supported.

AT+CCWA Call Waiting Control	
Test Command **AT+CCWA=?**	Response **+CCWA: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CCWA?**	Response **+CCWA: <n>** **OK**
Write Command **AT+CCWA=[<n>[,<mode>[,<class>]]]**	Response TA controls the call waiting supplementary service. Activation, deactivation and status query are supported. If **<mode>** is not equal to 2 and the command is executed successfully:

	OK If **<mode>**=2 and the command is executed successfully: **+CCWA: <status>,<class>** **[+CCWA: <status>,<class>** **[...]]** **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. 0 Disable presentation of an unsolicited result code 1 Enable presentation of an unsolicited result code
<mode>	Integer type. When **<mode>** is omitted, network is not interrogated. 0 Disable 1 Enable 2 Query status
<class>	Integer type. Each integer represents a class of information. 1 Voice (telephony) 2 Data (refers to all bearer services; and this may only see some bearer services if TA does not support values 16, 32, 64 and 128 with **<mode>**=2) 4 Fax (facsimile services) 7 Voice, data and fax 8 Short message service 16 Data circuit synchronization 32 Data circuit asynchronization 64 Dedicated packet access 128 Dedicated PAD access 255 No information is found
<status>	Integer type. Indicate whether the status of the command is enabled or not. 0 Disable 1 Enable
<number>	String type. Phone number of calling address in format specified by **<type>**.
<type>	Type of address octet in integer format.

	128 Type specified by the network 129 Unknown number type (ISDN format) 145 International number type (ISDN format)
<alpha>	Optional string type alphanumeric representation of **<number>** corresponding to the entry found in phonebook.
<CLI_validity>	Integer type. Provide details why **<number>** does not contain a calling party BCD number (see *3GPP TS 24.008 [8] subclause 10.5.4.30*). 0 CLI valid 1 CLI has been withheld by the originator (see *3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008* code "Reject by user") 2 CLI is not available due to interworking problems or limitations of originating network (see *3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008* code "Interaction with other service") 3 CLI is not available due to calling party being of type payphone (see *3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008* code "Coin line/payphone") 4 CLI is not available due to other reasons (see *3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008* code "Unavailable") When CLI is not available (**<CLI_validity>**=2, **<CLI_validity>**=3 or **<CLI_validity>**=4), **<number>** shall be an empty string ("") and **<type>** value will not be significant. Nevertheless, TA may return the recommended value 128 for **<type>** (TON/NPI unknown in accordance with 3*GPP TS 24.008 [8] subclause 10.5.4.7*). When CLI has been withheld by the originator, (**<CLI_validity>**=1) and the CLIP is provisioned with the "override category" option (see *3GPP TS 22.081 [3] and 3GPP TS 23.081 [40]*), **<number>** and **<type>** is provided. Otherwise, TA shall return the same setting for **<number>** and **<type>** as if the CLI is not available.
<subaddr>	String type. Subaddress of format specified by **<satype>**.
<satype>	Integer type. Subaddress octet (see *3GPP TS 24.008 [8] subclause 10.5.4.8*).
<priority>	Optional digit type parameter indicating that the eMLPP priority level of the incoming call. The priority level values are as defined in eMLPP specification *3GPP TS 22.067 [54]*.
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

1. **<status>**=0 should be returned only if the service is not active for any **<class>** i.e. **+CCWA: 0,7** will be returned in this case.
2. When **<mode>**=2, all active call waiting classes will be reported. In this mode the command is aborted by pressing any key.
3. Unsolicited result code:
   When the presentation call waiting at the MT is enabled (and call waiting is enabled) and a terminating call set up during an established call, an unsolicited result code is returned: **+CCWA: <number>,<type>,<class>[,<alpha>][,<CLI_validity>[,<subaddr>,<satype>[,<priority>]]]**
4. Executing **AT+CCWA=[<n>[,<mode>[,<class>]]]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+CCWA=1,1                          //Enable presentation of an unsolicited result code.
OK
ATD1234567890;                       //Establish a call.
OK

+CCWA: "1234567890",129,1            //Indication of a call that has been waiting.
```

11.3. AT+CHLD Call Related Supplementary Services

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

- A call can be temporarily disconnected from the MT but the connection is retained by the network;
- Multiparty conversation (conference calls);
- The served subscriber who has two calls (one held and the other either active or alerting) can connect the other parties and release the served subscriber's own connection.

Calls can be put on hold, recovered, released and added to a conversation, and transferred similarly as defined in *3GPP TS 22.030*.

This is based on the GSM/UMTS supplementary services HOLD (Call Hold; see *3GPP TS 22.083 clause 2*), MPTY (MultiParty; see *3GPP TS 22.084*) and ECT (Explicit Call Transfer; see *3GPP TS 22.091*). The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standards. Call Hold, MultiParty and Explicit Call Transfer are only applicable to teleservice 11.

AT+CHLD Call Related Supplementary Services	
Test Command **AT+CHLD=?**	Response **+CHLD: (**list of supported **<n>**s**)** **OK**
Write Command **AT+CHLD=[<n>]**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Reference
3GPP TS 27.007

Parameter

<n>	Integer type.	
	0	Terminate all held calls or UDUB (User Determined User Busy) for a waiting call. If a call is waiting, terminate the waiting call. Otherwise, terminate all held calls (if any)
	1	Terminate all active calls (if any) and accept the other call (waiting call or held call).
	1X	Terminate the specific call number X (X = 1–7)
	2	Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call.
	2X	Place all active calls except call X (X = 1–7) on hold
	3	Add the held call to the active calls
	4	Connect the two calls and disconnects the subscriber from both calls (ECT)
<err>	Error codes. For more details, see ***Chapter 14.5***.	

Example

```
ATD1234567890;                          //Establish a call.
OK

+CCWA: "1234567890",129,1               //Indication of a call that has been waiting.
AT+CHLD=2                               //Place the active call on hold and accept the waiting call as
                                          the active call.
OK
AT+CLCC
+CLCC: 1,0,1,0,0,"1234567890",129       //The first call is on hold.
+CLCC: 2,1,0,0,0,"1234567890",129       //The second call is active.

OK
AT+CHLD=21                              //Place the active call except call X = 1 on hold.
OK
AT+CLCC
+CLCC: 1,0,0,0,0,"1234567890",129               //The first call is active.
+CLCC: 2,1,1,0,1,"1234567890",129       //The second call is on hold.

OK
AT+CHLD=3                               //Add a held call to the active calls in order to set up a
                                          conference (multiparty) call.
OK
AT+CLCC
```

```
+CLCC: 1,0,0,0,1,"1234567890",129        //The first call is active.
+CLCC: 2,1,0,0,1,"1234567890",129        //The second call is active.

OK
```

11.4. AT+CLIP Calling Line Identification Presentation

This command refers to the GSM/UMTS supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call. It has no effect on the execution of the supplementary service CLIP in the network.

AT+CLIP Calling Line Identification Presentation	
Test Command **AT+CLIP=?**	Response **+CLIP: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CLIP?**	Response **+CLIP: <n>,<m>** **OK**
Write Command **AT+CLIP=[<n>]**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	15 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Configure/show the result code presentation status to the TE. 0 Disable unsolicited result codes 1 Enable unsolicited result codes
<m>	Integer type. The subscriber CLIP service status in the network. 0 CLIP not provisioned

	1	CLIP provisioned
	2	Unknown (e.g., no network, etc.)
<number>	String type. Phone number calling address in format specified by **<type>**.	
<subaddr>	String type. Sub-address of format specified by **<satype>**.	
<satype>	Type of sub-address octet in integer format (see *3GPP TS 24.008 subclause 10.5.4.8*)	
<type>	Type of address octet in integer format.	
	129	Unknown number type (ISDN format)
	145	International number type (ISDN format)
	161	National number
<alpha>	String type alphanumeric representation of **<number>** corresponding to the entry found in phone book.	
<CLI_validity>	Integer type. This parameter can provide details why **<number>** does not contain a calling party BCD number.	
	0	CLI valid
	1	CLI has been withheld by the originator
	2	CLI is not available due to interworking problems or limitations of originating network
<err>	Error codes. For more details, see ***Chapter 14.5***.	

NOTE

When the presentation of the CLIP at the TE is enabled (and calling subscriber allows), an unsolicited result code is returned after every **RING** (or **+CRING: <type>**) at a mobile terminating call:
+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI_validity>

Example

```
AT+CPBW=1,"1234567890",129,"QUECTEL"
OK
AT+CLIP=1
OK

RING

+CLIP: "1234567890",129,,,"QUECTEL",0
```

11.5. AT+CLIR Calling Line Identification Restriction

This command refers to the CLIR supplementary service (Calling Line Identification Restriction) according to *3GPP TS 22.081* and the OIR supplementary service (Originating Identification Restriction) according to *3GPP TS 24.607* that allows a calling subscriber to enable or disable the presentation of the calling line identity (CLI) to the called party when originating a call.

The Write Command overrides the CLIR subscription (default is restricted or allowed) when temporary mode is provisioned as a default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite command.

AT+CLIR Calling Line Identification Restriction	
Test Command **AT+CLIR=?**	Response **+CLIR: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CLIR?**	Response **+CLIR: <n>,<m>** **OK**
Write Command **AT+CLIR=<n>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	15 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Set the adjustment for outgoing calls.	
	0	Presentation indicator is used according to the subscription of the CLIR service
	1	CLIR invocation
	2	CLIR suppression
<m>	Integer type. Show the subscriber CLIR service status in the network.	
	0	CLIR not provisioned
	1	CLIR provisioned in permanent mode
	2	Unknown (e.g., no network, etc.)
	3	CLIR temporary mode presentation restricted
	4	CLIR temporary mode presentation allowed
<err>	Error codes. For more details, see ***Chapter 14.5***.	

11.6. AT+COLP Connected Line Identification Presentation

This command enables/disables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call, referring to the GSM/UMTS supplementary service COLP (Connected Line Identification Presentation). MT enables or disables the presentation of the COL (Connected Line) at the TE for a mobile originating a call. It has no effect on the execution of the supplementary service COLR in the network.

AT+COLP Connected Line Identification Presentation	
Test Command **AT+COLP=?**	Response **+COLP: (**list of supported **<n>**s**)** **OK**
Read Command **AT+COLP?**	Response **+COLP: <n>,<m>** **OK**
Write Command **AT+COLP=[<n>]**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	15 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Set/present the result code presentation status in the MT.	
	0	Disable
	1	Enable
<m>	Integer type. Parameter presents the subscriber COLP service status in the network.	
	0	COLP not provisioned
	1	COLP provisioned
	2	Unknown (e.g., no network, etc.)
<number>	String type. Phone number; calling address in format specified by **<type>**.	
<type>	Integer type. Type of address octet.	
	129	Unknown number type (ISDN format)

	145 International number type (ISDN format)
<subaddr>	String type. Sub-address of format specified by **<satype>**.
<satype>	Type of sub-address octet in integer format (see *3GPP TS 24.008 subclause 10.5.4.8*).
<alpha>	Optional string type alphanumeric representation of **<number>** corresponding to the entry found in phone book.

NOTE

When the presentation of the COL is enabled (and called subscriber allows), an intermediate result code is returned before any +CR or V.25ter responses:
+COLP: <number>,<type>,[<subaddr>],[<satype>],[<alpha>]

Example

```
AT+CPBW=1,"1234567890",129,"QUECTEL"
OK
AT+COLP=1
OK
ATD1234567890;
+COLP: "1234567890",129,,,"QUECTEL"

OK
```

11.7. AT+CSSN Supplementary Service Notifications

This command enables/disables the presentation of notification result codes from TA to TE.

AT+CSSN Supplementary Service Notifications	
Test Command **AT+CSSN=?**	Response **+CSSN: (**list of supported **<n>**s**),(**list of supported **<m>**s**)** **OK**
Read Command **AT+CSSN?**	Response **+CSSN: <n>,<m>** **OK**
Write Command **AT+CSSN=<n>[,<m>]**	Response **OK** If there is any error:

	ERROR Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Set/indicate the **+CSSI** intermediate result code presentation status to the TE. 0 Disable 1 Enable
<m>	Integer type. Set/indicate the **+CSSU** unsolicited result code presentation status to TE. 0 Disable 1 Enable
<code1>	Integer type. It is manufacturer specific and supports the following codes: 0 Unconditional call forwarding is active 1 Some of the conditional call forwarding are active 2 Call has been forwarded 3 Call is waiting 5 Outgoing call is barred
<code2>	Integer type. It is manufacturer specific and supports the following codes: 0 The incoming call is a forwarded call 2 Call has been put on hold (during a voice call) 3 Call has been retrieved (during a voice call) 5 Held call was terminated by another party 10 Additional incoming call forwarded
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

1. When **<n>**=1 and a supplementary service notification is received after a mobile originated call setup, the **+CSSI** intermediate result code is sent to TE before any other MO call setup result codes:
   +CSSI: <code1>
2. When **<m>**=1 and a supplementary service notification is received during a mobile terminated call setup or during a call, the **+CSSU** unsolicited result code is sent to TE:
   +CSSU: <code2>

11.8. AT+CUSD Unstructured Supplementary Service Data

This command allows control of the Unstructured Supplementary Service Data (USSD) according to *3GPP TS 22.090*. Both network and mobile initiated operations are supported.

<mode> disables/enables the presentation of an unsolicited result code. The value **<mode>**=2 cancels an ongoing USSD session. For a USSD response from the network, or a network initiated operation, the format is: **+CUSD: <status>[,<rspstr>,[<dcs>]]**.

When **<reqstr>** is given, a mobile initiated USSD string or a response USSD string to a network-initiated operation is sent to the network. The response USSD string from the network is returned in a subsequent **+CUSD** URC.

AT+CUSD Unstructured Supplementary Service Data	
Test Command **AT+CUSD=?**	Response **+CUSD: (**list of supported **<mode>**s**)** **OK**
Read Command **AT+CUSD?**	Response **+CUSD: <mode>** **OK**
Write Command **AT+CUSD=[<mode>[,<reqstr>[,<dcs>]]]**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	120 s, determined by the network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. Set/indicate the result code presentation status to the TE. 0 Disable the result code presentation to the TE 1 Enable the result code presentation to the TE 2 Cancel session (not applicable to Read Command response)
<reqstr>	String type. Unstructured Supplementary Service Data (USSD) to be sent to the network.

	If this parameter is omitted, network is not interrogated.
<rspstr>	String type. Unstructured Supplementary Service Data (USSD) received from the network
<dcs>	Integer type. See *3GPP TS 23.038* Cell Broadcast Data Coding Scheme (default value: 15)
<status>	Integer type. USSD response from the network or the network-initiated operation
	0 No further user action required (network initiated USSD Notify, or no further information needed after mobile initiated operation)
	1 Further user action required (network initiated USSD Request, or further information needed after mobile initiated operation)
	2 USSD terminated by network
	3 Another local client has responded
	4 Operation not supported
	5 Network time out
<err>	Error codes. For more details, see ***Chapter 14.5***.

12 Audio Commands

NOTE

Audio related AT commands are not supported on EG065K series, EM120K-GL, EM060K series and EM061K-GL modules.

12.1. AT+CLVL Loudspeaker Volume Level Selection

This command selects the volume level of the internal loudspeaker of MT.

AT+CLVL Loudspeaker Volume Level Selection	
Test Command **AT+CLVL=?**	Response **+CLVL: (**list of supported **<level>**s**)** **OK**
Read Command **AT+CLVL?**	Response **+CLVL: <level>** **OK** If there is any error: **ERROR**
Write Command **AT+CLVL=<level>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.007	

Parameter

<level>	Integer type. Volume level with manufacturer specific range (Smallest value represents the lowest sound level). Range: 0–5. Default: 3.

NOTE

Executing **AT+CLVL=<level>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

12.2. AT+CMUT Mute Control

This command enables/disables the uplink voice muting during a voice call.

AT+CMUT Mute Control	
Test Command **AT+CMUT=?**	Response **+CMUT: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CMUT?**	Response **+CMUT: <n>** **OK**
Write Command **AT+CMUT=<n>**	Response **OK** Or **ERROR**
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	Mute off
	1	Mute on

12.3. AT+QAUDLOOP Enable/Disable Audio Loopback Test

This command enables/disables audio loopback test.

AT+QAUDLOOP Enable/Disable Audio Loopback Test	
Test Command **AT+QAUDLOOP=?**	Response **+QAUDLOOP: (**list of supported **<enable>**s**)** **OK**
Read Command **AT+QAUDLOOP?**	Response **+QAUDLOOP: <enable>** **OK**
Write Command **AT+QAUDLOOP=<enable>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<enable>	Integer type. Enable or disable audio loopback test. 0 Disable audio loopback test 1 Enable audio loopback test

12.4. AT+QAUDMOD Set Audio Mode

This command sets the audio mode required for the connected device.

AT+QAUDMOD Set Audio Mode	
Test Command **AT+QAUDMOD=?**	Response **+QAUDMOD: (**list of supported **<mode>**s**)** **OK**
Read command **AT+QAUDMOD?**	Response **+QAUDMOD: <mode>**

	OK
Write Command **AT+QAUDMOD=<mode>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<mode>	Integer type. Indicate the current configured audio mode of echo canceller, noise suppressor, digital gain and parameter calibration. 0 Handset 1 Headset 2 Speaker 3 VCO 4 Bluetooth 5 Voice over USB 6 Full TTY 7 HCO 8 FAX

NOTE

Executing **AT+QAUDMOD=<mode>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

12.5. AT+QDAI Digital Audio Interface Configuration

This command configures the digital audio interface. When there is no codec on board, please define the PCM formats. In the following conditions, the MT can be used directly with default settings (master mode, short-synchronization, 2048 kHz clock frequency, 16-bit liner data format, 8 kHz sampling rate).

AT+QDAI Digital Audio Interface Configuration	
Test Command **AT+QDAI=?**	Response **+QDAI: x,(**list of supported **<mode>**s**),(**list of supported **<fsync>**s**),(**list of supported **<clock>**s**),(**list of supported **<format>**s**),(**list of supported **<sample>**s**),(**list of

	supported **<num_slots>**s),(list of supported **<slot_mapping0>**s),(list of supported **<slot_mapping1>**s) **OK**
Read Command **AT+QDAI?**	Response **+QDAI: <io>[,<mode>,<fsync>,<clock>,<format>,<sample>,<num_slots>,<slot_mapping0>[,<slot_mapping1>]]** **OK**
Write Command **AT+QDAI=<io>[,<mode>,<fsync>,<clock>[,<format>[,<sample>[,<num_slots>,<slot_mapping0>[,<slot_mapping1>]]]]]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting. The configurations is saved automatically.

Parameter

<io>	Codec type. It can be set to x, 1–6. (1–6 is not supported currently).
<mode>	Integer type. Working mode of digital audio interface.
	0 Master mode
	1 Slave mode
<fsync>	Integer type. Period length mode of synchronization.
	0 Primary mode (short-synchronization)
	1 Secondary mode (long-synchronization)
<clock>	Integer type. Clock frequency.
	0 128 kHz (Not supported currently)
	1 256 kHz
	2 512 kHz
	3 1024 kHz
	4 2048 kHz
	5 4096 kHz
<format>	Integer type. Data format.
	0 16-bit linear
<sample>	Integer type. Sampling rate.
	0 8 kHz
	1 16 kHz
<num_slots>	Integer type.
	1 Number of slot
	2 Number of slot (Set to 2 when use **<slot_mappinp1>**)

<slot_mapping0>	Integer type. Slot mapping value. Range: 1–16.
<slot_mapping1>	Integer type. Slot mapping value. Range: 2–16.

NOTE

1. 4096 kHz clock frequency is only applicable for 16 kHz sampling rate.
2. Bit per frame = **<clock>**/**<sample>**. For example, if **<clock>** is 2048 kHz and **<sample>** is 8 kHz, bit per frame will be 256. Bit per frame should be greater than 16.
3. If slave mode is selected (**<mode>**=1), the clock and synchronization signals should be provided by master device, otherwise the audio feature cannot work.
4. When a recommended codec is selected and 16 kHz sampling rate is required, input **<sample>**. Currently the MT only supports 16 kHz (**AT+QDAI=x,0,0,5,0,1**).
5. Executing **AT+QDAI=<io>[,<mode>,<fsync>,<clock>[,<format>[,<sample>[,<num_slots>,<slot_mapping0>[,<slot_mapping1>]]]]]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QDAI=?                       //Query the range.
+QDAI: x,(0,1),(0,1),(0-5),(0),(0,1),(1-2),(1-16),(2-16)

OK
AT+QDAI?                        //Query the current interface configuration.
+QDAI: x,0,0,4,0,0,1,1

OK
AT+QDAI=x,1,0,4,0,0,1,1         //Set digital audio interface to slave mode, short-sync, 8 kHz sampling rate,
                                2048 kHz BCLK.
OK
AT+QDAI=x,0,0,4,0,1,1,1         //Configure one slot.
OK
AT+QDAI=x,0,0,4,0,1,2,1,3       //Configure two slots.
OK
```

12.6. AT+QSIDET Set Side Tone Gain in Current Mode

This command sets the side tone gain value in current mode.

AT+QSIDET Set Side Tone Gain in Current Mode	
Test Command **AT+QSIDET=?**	Response **+QSIDET: (**list of supported **<st_gain>**s**)**

	OK
Read Command **AT+QSIDET?**	Response **+QSIDET: <st_gain>** **OK**
Write Command **AT+QSIDET=<st_gain>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<st_gain>	Integer type. Indicate the configured side tone gain in current mode. Range: 0–65535. Default: 1298.

NOTE

This command is valid only after audio loopback test is enabled by **AT+QAUDLOOP=1**.

12.7. AT+QMIC Set Uplink Gains of Microphone

This command sets the uplink gains of microphone.

AT+QMIC Set Uplink Gains of Microphone	
Test Command **AT+QMIC=?**	Response **+QMIC: (**list of supported **<TX_gain>**s**),(**list of supported **<TXD_gain>**s**)** **OK**
Read Command **AT+QMIC?**	Response **+QMIC: <TX_gain>,<TXD_gain>** **OK**

Write Command **AT+QMIC=<TX_gain>[,<TXD_gain>]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<TX_gain>	Integer type. Indicate uplink codec gain. Range: 0–65535. The default value may be different in different audio modes.
<TXD_gain>	Integer type. Indicate uplink digital gain. Range: 0–65535. The default value may be different in different audio modes.

12.8. AT+QIIC IIC Read and Write

This command configures the codec via IIC interface.

AT+QIIC IIC Read and Write	
Test Command **AT+QIIC=?**	Response **+QIIC: (**list of supported **<rw>**s**),(**list of supported **<device>**s**),(**list of supported **<addr>**s**),(**list of supported **<bytes>**s**),(**list of supported **<value>**s**)** **OK**
Write Command **AT+QIIC=<rw>,<device>,<addr>,<bytes>[,<value>]**	Response If **<rw>** is set to 1, omit the optional parameter and read IIC: **[+QIIC: <value>]** **OK** If **<rw>** is set to 0, specify the optional parameter and write IIC: **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<rw>	Integer type.	
	0	Write operation
	1	Read operation
<device>	Hex integer type.	
	0–0xFF	7-bit device address
<addr>	Hex Integer type.	
	0–0xFF	Register address
<bytes>	Integer type. The number of bytes read or written.	
	1	Read or write 1 byte
	2	Read or write 2 bytes
<value>	Hex integer type.	
	0–0xFFFF	Data value

Example

```
AT+QIIC=1,0x18,0x0c,1          //Read 1-byte register content of the register's location: slave
                                address: 0x18, register address: 12.
+QIIC: 0x50

OK
AT+QIIC=0,0x18,0x0c,1,0x5f     //Write 1-byte register content of the register's location: slave address:
                                0x18, register address: 12, value to write is 0x5f.
OK
```

12.9. AT+QTONEDET Enable/Disable DTMF Detection

This command enables or disables DTMF detection. If this function is enabled, DTMF tones sent by the other party will be detected, and reported on the assigned serial port.

AT+ QTONEDET Enable/Disable DTMF Detection	
Test Command **AT+QTONEDET=?**	Response **+QTONEDET: (**list of supported **<enable>**s**)** **OK**
Read Command **AT+QTONEDET?**	Response **+QTONEDET: <enable>** **OK**
Write Command **AT+QTONEDET=<enable>**	Response **OK**

	Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<enable>	Integer type. Enable/disable DTMF detection. 0 Disable 1 Enable

NOTE

DTMF characters - ASCII:

DTMF	ASCII	DTMF	ASCII
0	48	8	56
1	49	9	57
2	50	A	65
3	51	B	66
4	52	C	67
5	53	D	68
6	54	*	42
7	55	#	35

12.10. AT+QLDTMF Play Local DTMF Tone

This command plays a local DTMF string, and stops playing the DTMF tone.

AT+QLDTMF Play Local DTMF Tone	
Test Command **AT+QLDTMF=?**	Response **+QLDTMF: (**list of supported **<n>**s**),(**list of supported **<DTMF_string >**s**)**

	OK
Write Command **AT+QLDTMF=<n>,<DTMF_string>[,<y>]**	Response **OK** After the DTMF tone is completely played: **+QLDTMF: 5** If there is any error: **ERROR**
Execute Command **AT+QLDTMF**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<n>	Integer type. Play time and mute time of each DTMF. Range: 1–1000. Unit: 1/100 second when **<y>** is set to 1, or 1/10 second when **<y>** is not set.
<DTMF_string>	String type. DTMF tone string. Maximum length: 20 characters, separated by comma. DTMF tone string format: 0–9,*,#,A–D. The string should be enclosed in quotation marks ("...").
<y>	Integer type. If this parameter is omitted, it means the unit of **<n>** is 1/10 second. If this parameter is specified to 1, it means the unit of **<n>** is 1/100 second.

Example

```
AT+QLDTMF=?
+QLDTMF: (1-1000),(0-9,*,#,A-D)

OK
AT+QLDTMF=2,"AB12#"     //Play local DTMF tone (A,B,1,2,#), the play time & mute time is 200 ms.
OK
AT+QLDTMF               //Stop playing local DTMF tone.
OK
```

12.11. AT+QAUDRD Record Media File

This command records the uplink or downlink speech during a voice call or records sound from local microphone in idle state and saves it to files.

AT+QAUDRD Record Media File	
Test Command **AT+QAUDRD=?**	Response **+QAUDRD: (**list of supported **<control>**s**),<file_name>,(**list of supported **<format>**s**),(**list of supported **<dlink>**s**)** **OK**
Read Command **AT+QAUDRD?**	Response **+QAUDRD: <state>** **OK**
Write Command **AT+QAUDRD=<control>[,<file_name>[,<format>[,<dlink>]]]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<state>	Integer type. Whether the module is in recording. 0 Module is not in recording 1 Module is in recording
<control>	Integer type. Start or stop recording. 0 Stop recording 1 Start recording
<file_name>	String type. Name of the file to be recorded.
<format>	Integer type. Recording format of the file. 13 WAV_PCM16
<dlink>	Integer type. Record the uplink or downlink sound. 0 Record uplink sound 1 Record downlink sound

NOTE

1. **<file_name>** is stored in the */cache/ufs* path by default.
2. If the name and format of the recording file are the same with that of an existing file or an unknown error occurs, the module reports URC **+QAUDRIND: 0,1**.
3. Executing **AT+QAUDRD=<control>[,<file_name>[,<format>[,<dlink>]]]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QAUDRD=1,"A.wav",13,0        //Record the uplink sound in WAV format, and store it in /cache/ufs.
OK
AT+QAUDRD=0                     //Stop recording.
OK
AT+QAUDRD=1,"B.wav",13,1        //Record the downlink sound in WAV format, and store it in /cache/ufs.
OK
AT+QAUDRD=0                     //Stop recording.
OK
```

12.12. AT+QPSND Play Wave File

This command plays the local wave file.

AT+QPSND Play Wave File	
Test Command **AT+QPSND=?**	Response **+QPSND: (**list of supported **<control>**s**),<file_name>,(**list of supported **<repeat>**s**),(**list of supported **<ulmute>**s**),(**list of supported **<dlmute>**s**)** **OK**
Read Command **AT+QPSND?**	Response **+QPSND: <state>** **OK**
Write Command **AT+QPSND=<control>,<file_name>,<repeat>[,<ulmute>[,<dlmute>]]**	Response **OK** After the Wave file is completely played: **+QPSND: 0** If there is error:

	ERROR Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<state>	Integer type. Whether the module is playing the wave file. 0 Not playing 1 Playing
<control>	Integer type. Start or stop playing. 0 Stop playing 1 Start playing
<file_name>	String type. Name of the file to be played
<repeat>	Integer type. Repeat play or not. 0 Play only once 1 Repeatedly play
<ulmute>	Integer type. Whether to mute the uplink sound. 0 Mute 1 Not mute
<dlmute>	Integer type. Whether to mute the downlink sound. 0 Mute 1 Not mute
<err>	Error codes. For more details, see ***Chapter 14.5***.

NOTE

1. The default play path of **<file_name>** is the */cache/ufs* directory.
2. The module only supports 8 K liner, mono wave format.
3. Executing **AT+QPSND=<control>,<file_name>,<repeat>[,<ulmute>[,<dlmute>]]** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QPSND=1,"A.wav",0          //Play a wave file which is stored in /cache/ufs.
OK

+QPSND: 0

AT+QPSND=1,"A.wav",0,1,1      //Play a wave file to far-end when a call is ongoing.
OK
```

```
+QPSND: 0
```

12.13. AT+QCFG="pcmclk" Configure PCM Clock Output

This command enables or disables PCM clock output when there is no calling and audio play.

AT+QCFG="pcmclk" Configure PCM Clock Output	
Write Command **AT+QCFG="pcmclk"[,<PCM_clkout>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "pcmclk",<PCM_clkout>** **OK** If the optional parameter is specified, configure PCM clock signal: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations is not saved.

Parameter

<PCM_clkout>	Integer type. Enable/disable PCM clock output. 0 Disable PCM clock output 1 Enable PCM clock output

NOTE

If PCM clock output is enabled, the frequency of PCM_CLK is 2048 KHz, and the frequency of PCM_SYNC is 8 KHz.

12.14. AT+QAUDPLAY Play Media File

This command plays media file.

AT+QAUDPLAY Play Media File	
Test Command **AT+QAUDPLAY=?**	Response **+QAUDPLAY: <file_name>,(**list of supported **<repeat>**s**)** **OK**
Read Command **AT+QAUDPLAY?**	Response **+QAUDPLAY: <state>** **OK**
Write Command **AT+QAUDPLAY=<file_name>,<repeat>**	Response **OK** After the media file is completely played: **+QAUDPLAY: 0** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<state>	Integer type. Whether the module is playing the media file. 0 Not playing 1 Playing
<file_name>	String type. Name of the file to be played.
<repeat>	Integer type. Repeat to play the media file or not. 0 Play only once 1 Repeat

NOTE

<file_name> only includes file name and file suffix, but no file path. The default play path is */cache/ufs*.

Example

```
AT+QAUDPLAY="A.wav",0     //Play a wave file which is stored in UFS only once.
OK

+QAUDPLAY: 0
AT+QAUDPLAY="A.wav",1     //Play a wave file which is stored in UFS and repeat it.
OK

+QAUDPLAY: 0
```

12.15. AT+QAUDSTOP Stop Playing Media File

This command stops playing the media file.

AT+QAUDSTOP Stop Playing Media File	
Test Command **AT+QAUDSTOP=?**	Response **OK**
Write Command **AT+QAUDSTOP**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-

12.16. AT+QAUDPLAYGAIN Set Audio Playing Gain

This command sets audio playing gain to change audio playing volume.

AT+QAUDPLAYGAIN Set Audio Playing Gain	
Test Command **AT+QAUDPLAYGAIN=?**	Response **+QAUDPLAYGAIN: (**list of supported **<audplay_gain>**s**)** **OK**
Read Command **AT+QAUDPLAYGAIN?**	Response **+QAUDPLAYGAIN: <audplay_gain>** **OK**
Write Command	Response

AT+QAUDPLAYGAIN=<audplay_gain>	**OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration is not saved.

Parameter

<audplay_gain>	Integer type. Audio playing gain. Range: 0–65535. The default value varies from different audio modes.

Example

```
AT+QAUDPLAYGAIN=?                  //Test command.
+QAUDPLAYGAIN: (0-65535)

OK
AT+QAUDPLAYGAIN?                   //Query the current value. The default value might be different in different audio modes.
+QAUDPLAYGAIN: 8192

OK
AT+QAUDPLAYGAIN=4096               //Set audio playing gain to 4096.
OK
AT+QAUDPLAYGAIN?                   //Query the current configuration.
+QAUDPLAYGAIN: 4096

OK
```

12.17. AT+QAUDRDGAIN Set Audio Recording Gain

This command sets audio recording gain to change audio recording volume.

AT+QAUDRDGAIN	**Set Audio Recording Gain**
Test Command **AT+QAUDRDGAIN=?**	Response **+QAUDRDGAIN: (**list of supported **<audrd_gain>**s**)** **OK**

Read Command **AT+QAUDRDGAIN?**	Response **+QAUDRDGAIN: <audrd_gain>** **OK**
Write Command **AT+QAUDRDGAIN=<audrd_gain>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration is not saved.

Parameter

<audrd_gain>	Integer type. Audio recording gain. Range: 0–65535. The default value varies from different audio modes.

Example

```
AT+QAUDRDGAIN=?                 //Test command.
+QAUDRDGAIN: (0-65535)

OK
AT+QAUDRDGAIN?                  //Query the current value. The default value might be different in
                                different audio modes.
+QAUDRDGAIN: 8192

OK
AT+QAUDRDGAIN=4096              //Set audio record gain to 4096.
OK
AT+QAUDRDGAIN?                  //Query the current configuration.
+QAUDRDGAIN: 4096

OK
```

12.18. AT+QRXGAIN Set Downlink Gain of RX

This command sets RX digital gains to change the downlink volume.

AT+QRXAGIN Set Downlink Gain of RX	
Test Command **AT+QRXGAIN=?**	Response **+QRXGAIN: (**list of supported **<RX_gain>**s**)** **OK**
Read Command **AT+QRXGAIN?**	Response **+QRXGAIN: <RX_gain>** **OK**
Write Command **AT+QRXGAIN=<RX_gain>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<RX_gain>	Integer type. Downlink digital gains. Range: 0–65535. The default value varies from different audio modes.

NOTE

This command only takes effect dynamically during the call, and does not take effect when you configure it before the call. If you configure it before the call, the default values are restored after the call is started.

Example

```
AT+QRXGAIN=?                    //Test Command.
+QRXGAIN: (0-65535)

OK
AT+QRXGAIN?                     //Query current value; the default value might be different in different
                                  audio modes.
+QRXGAIN: 36864

OK
```

```
AT+QRXGAIN=8192          //Set downlink digital gain to 8192.
OK
AT+QRXGAIN?              //Query current configuration.
+QRXGAIN: 8192

OK
```

12.19. AT+QAUDCFG Query and Configure Audio Tuning Process

AT+QAUDCFG Query and Configure Audio Tuning Process	
Test Command **AT+QAUDCFG=?**	Response **+QAUDCFG: "slic/AudLoop",(**list of supported **<enable>**s**)** **+QAUDCFG: "slic/LF_Ring",(**list of supported **<enable>**s**)** **+QAUDCFG: "slic_IndRep",(**list of supported **<op>**s**)** **+QAUDCFG: "slic_cid_cfg",(**list of supported **<type>**s**)** **+QAUDCFG: "slic_cid",<num> **+QAUDCFG: "slic_hook_time ",(**list of supported **<breakMin>**s**), (**list of supported **<breakMax>**s**), (**list of supported **<makeMin>**s**), (**list of supported **<makeMax>**s**), (**list of supported **<interDigitMin>**s**), (**list of supported **<flashMin>**s**), (**list of supported **<flashMax>**s**),(**list of supported **<hookMin>**s**) **+QAUDCFG: "toneswitch",(**list of supported **<level>**s**)** **OK**
Maximum Response Time	300 ms

12.19.1. AT+QAUDCFG="slic/AudLoop" Control Dial Tone of Analog Phone

This command controls the dial tone of an analog phone.

AT+QAUDCFG="slic/AudLoop" Control Dial Tone of Analog Phone	
Write Command **AT+QAUDCFG="slic/AudLoop"[,<enable>]**	Response If the optional parameter is omitted, query the current setting: **+QAUDCFG: "slic/AudLoop",<enable>** **OK** If the optional parameter is specified, control the dial tone of an analog phone:

	OK If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<enable>	Integer type. Whether to enable the dial tone of an analog phone. 0 Enable 1 Disable

NOTE

1. The dial tone refers to the prompt tone of an analog phone after picking up the phone and before dialing, which is used to prompt the user to dial.
2. The audio loop tone is used to test whether the audio playback and recording functions are normal.

Example

```
AT+QAUDCFG="slic/AudLoop",1     //Disable the dial tone of the analog phone.OK
AT+QAUDCFG="slic/AudLoop"       //Query the current configuration.
+QAUDCFG: "slic/AudLoop",1

OK
```

12.19.2. AT+QAUDCFG="slic/LF_Ring" Control Ring Tone of Analog Phone

This command controls the ring tone of an analog phone.

AT+QAUDCFG="slic/LF_Ring" Control Ring Tone of Analog Phone	
Write Command **AT+QAUDCFG="slic/LF_Ring"[,<enable>]**	Response If the optional parameter is omitted, query the current setting: **+QAUDCFG: "slic/LF_Ring",<enable>** **OK** If the optional parameter is specified, controls the ring tone of an analog phone: **OK**

	If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<enable>	Integer type. Whether to enable the ring tone of an analog phone.	
	0	Disable
	1	Enable

Example

```
AT+QAUDCFG="slic/LF_Ring",1          //Enable the ring tone of an analog phone.
OK
AT+QAUDCFG="slic/LF_Ring"            //Query the current configuration.
AT+QAUDCFG="slic/LF_Ring",1

OK
```

12.19.3. AT+QAUDCFG="slic_IndRep" Enable/Disable Event Report of SLIC Analog Phone

This command enables or disables the reporting of SLIC analog phone event.

AT+QAUDCFG="slic_IndRep" Enable/Disable Event Report of SLIC Analog Phone	
Test Command **AT+QAUDCFG="slic_IndRep"[,<op>]**	Response If the optional parameter is omitted, query the current setting: **+QAUDCFG: "slic_IndRep",<op>** **OK** If the optional parameter is specified, enable or disable the reporting of SLIC analog phone event: **OK** If there is any error: **ERROR**

Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<op>	Integer type. Enable or disable the reporting of SLIC analog phone event. 0 Disable 1 Enable

Example

AT+QAUDCFG="slic_IndRep",1 **OK**	//Enable the reporting of SLIC analog phone event.
+QIND: "SLIC Hook off"	//Hook off the phone, the URC of hook off event is received.
+QIND: "SLIC DTMF",1	//Press key 1, the URC of DTMF 1 event is received.
+QIND: "SLIC Flash Key"	//Press the flash key, the URC of flash event is received.

12.19.4. AT+QAUDCFG="slic_cid_cfg" Configure Caller ID Display Mode of SLIC

This command configures caller ID display mode of the SLIC analog phone.

AT+QAUDCFG="slic_cid_cfg" Configure Caller ID Display Mode of SLIC	
Write Command **AT+QAUDCFG="slic_cid_cfg"[,<type>]**	Response If the optional parameter is omitted, query the current setting: **+QAUDCFG: "slic_cid_cfg",<type>** **OK** If the optional parameter is specified, configure caller ID display mode of the SLIC analog phone: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms

Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<type>	Integer type. The caller ID display mode of the SLIC analog phone.	
	0	DTMF
	1	FSK SDMF
	2	FSK MDMF
	3	Enable the voice mail
	4	Disable the voice mail

NOTE

After configuring this command, you need to use it together with **AT+QAUDCFG="slic_cid"**.

- If **<type>** is 0–2, you should execute **AT+QAUDCFG="slic_cid"** to display the caller ID on the analog phone and make it ring;
- If **<type>** is 3, you should execute **AT+QAUDCFG="slic_cid"** to display "mailbox" on the analog phone (if the phone supports mailbox);
- If **<type>** is 4, you should execute **AT+QAUDCFG="slic_cid"** to remove the "mailbox" character displayed by the analog phone (if the phone supports mailbox).

Example

```
AT+QAUDCFG="slic_cid_cfg",2          //Configure the caller ID display mode to FSK MDMF.
OK
AT+QAUDCFG="slic_cid_cfg"            //Query the current configuration.
+QAUDCFG: "slic_cid_cfg",2

OK
```

12.19.5. AT+QAUDCFG="slic_cid" Configure Caller ID of SLIC Analog Phone

This command configures the caller ID of SLIC analog phone.

AT+QAUDCFG="slic_cid" Configure Caller ID of SLIC Analog Phone	
Write Command **AT+QAUDCFG="slic_cid",<num>**	Response **OK** Or **ERROR**

Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<num>	String type. The phone number of caller ID. Maximum length: 15 bytes.

NOTE

1. During the test and before the caller ID is displayed, the SLIC will be forced to ring once.
2. The command takes effect only when SLIC analog phone is working.

Example

```
AT+QAUDCFG="slic_cid","012345678901234"
OK
```

12.19.6. AT+QAUDCFG="slic_hook_time" Configure Hook Change Time Detection

This command configures the hook change time detection.

AT+QAUDCFG="slic_hook_time"	Configure Hook Change Time Detection
Write Command **AT+QAUDCFG="slic_hook_time"[,<breakMin>,<breakMax>,<makeMin>,<makeMax>,<interDigitMin>,<flashMin>,<flashMax>,<hookMin>]**	Response If the optional parameters are omitted, query the current setting: **+QAUDCFG: "slic_hook_time",<breakMin>,<breakMax>,<makeMin>,<makeMax>,<interDigitMin>,<flashMin>,<flashMax>,<hookMin>** **OK** If the optional parameters are specified, configure the hook change time detection: **OK** If there is any error: **ERROR**

Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<breakMin>	Integer type. Minimum pulse break time. Range: 0–2000. Unit: Millisecond.
<breakMax>	Integer type. Maximum pulse break time. Range: 0–2000. Unit: Millisecond.
<makeMin>	Integer type. Minimum pulse make time. Range: 0–2000. Unit: Millisecond.
<makeMax>	Integer type. Maximum pulse make time. Range: 0–2000. Unit: Millisecond.
<interDigitMin>	Integer type. Minimum pulse interdigit time. Range: 0–2000. Unit: Millisecond.
<flashMin>	Integer type. Minimum flash break time. Range: 0–2000. Unit: Millisecond.
<flashMax>	Integer type. Maximum flash break time. Range: 0–2000. Unit: Millisecond.
<hookMin>	Integer type. Minimum hook time. It should be greater than the maximum flash break time. Range: 0–2000. Unit: Millisecond.

NOTE

1. When you execute this command to query the hook change time detection, the default values of different SLICs may be different.
2. It is recommended to set the time limit in accordance with the following relationship:

- **<breakMin>** < **<breakMax>** < **<flashMin>** < **<flashMax>** < **<hookMin>**
- **<makeMin>** < **<makeMax>** < **<interDigitMin>**

Example

```
AT+QAUDCFG="slic_hook_time",20,80,20,80,90,100,630,680    //Set the hook change time detection.
OK
AT+QAUDCFG="slic_hook_time"                               //Query the current configuration.
+QAUDCFG: "slic_hook_time",20,80,20,80,90,100,630,680

OK
```

12.19.7. AT+QSLIC Enable/Disable SLIC

This command enables or disables the SLIC.

AT+QSLIC Enable/Disable SLIC	
Test Command **AT+QSLIC=?**	Response **+QSLIC: (**list of supported **<enable>**s**),(**list of supported

	<SLIC_type>s) **OK**
Read Command **AT+QSLIC?**	Response **+QSLIC: <enable>[,<SLIC_type>]** **OK**
Write Command **AT+QSLIC=<enable>,<SLIC_type>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately The configurations are saved automatically.
Reference Quectel	

Parameter

<enable>	Integer type. Enable or disable SLIC. 0 Disable 1 Enable
<SLIC_type>	Integer type. Set SLIC platform type. It is valid only when **<enable>**=1. 0 Reserved 1 LE9641 (Currently not supported) 2 SI32185 3 LE9643

NOTE

Executing **AT+QSLIC=<enable>,<SLIC_type>** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

Example

```
AT+QSLIC=?              //Test command.
+QSLIC: (0,1),(0-3)

OK
AT+QSLIC=0,2            //Disable SLIC.
OK
AT+QSLIC=1,2            //Enable SLIC and set the SLIC platform type to SI32185.
```

```
OK
AT+QSLIC?                    //Query the current configurations.
+QSLIC: 1,2

OK
```

12.19.8. AT+QAUDCFG="toneswitch" Switch On/Off Ring Tone

The command switches on/off the ring tone.

AT+QAUDCFG="toneswitch" Switch On/Off Ring Tone	
Write Command **AT+QAUDCFG="toneswitch"[,<value>]**	Response If the optional parameter is omitted, query the current setting: **+QAUDCFG: "toneswitch",<value>** **OK** If the optional parameter is specified, switch on or off the ring tone: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<value>	Integer type. Switch on/off the ring tone. 0 Switch off the ring tone 1 Switch on the ring tone

Example

```
AT+QAUDCFG="toneswitch",1    //Switch on the ring tone.
OK
AT+QAUDCFG="toneswitch"      //Query the current status of the ring tone.
+QAUDCFG: "toneswitch",1

OK
```

13 Hardware Related Commands

13.1. AT+QPOWD Power Off

This command powers off the MT. UE returns **OK** immediately when the command is executed. Then UE deactivates the network. After the deactivation is completed, UE outputs **POWERED DOWN** and enters into the power-off state. The maximum time for unregistering network is 60 seconds. To avoid data loss, the power supply for the module cannot be disconnected before the URC **POWERED DOWN** is outputted.

AT+QPOWD Power Off	
Test Command **AT+QPOWD=?**	Response **+QPOWD: (**list of supported **<n>**s**)** **OK**
Execution Command **AT+QPOWD=<n>**	Response **OK** **POWERED DOWN**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<n>	Integer type.	
	0	Immediately power down
	1	Normal power down

13.2. AT+CCLK Clock

This command sets and queries the real time clock (RTC) of the MT. The current setting is retained until the MT is totally disconnected from the 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 any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.007	

Parameter

<time>	String type. The format is "yy/MM/dd,hh:mm:ss±zz", indicating year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -48 to +56). For example, May 6th, 1994, 22:10:00 GMT+2 hours equals to “94/05/06,22:10:00+08”.
<err>	Error codes. For more details, see ***Chapter 14.5***.

Example

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

OK
```

13.3. 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: (**list of supported **<bcs>s),(**list of supported **<bcl>**s)**,<voltage>** **OK**
Execution Command **AT+CBC**	Response **+CBC: <bcs>,<bcl>,<voltage>** **OK** If there is any error: **ERROR** Or **+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 remaining capacity.
<voltage>	Integer type. Battery voltage. Unit: mV.	
<err>	Error codes. For more details, see ***Chapter 14.5***.	

13.4. AT+QADC Read ADC Value

This 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**
Write Command **AT+QADC=<port>**	Response **+QADC: <status>,<value>** **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<port>	Integer type. Channel number of the ADC. 0 ADC Channel 0 1 ADC Channel 1
<status>	Integer type. Indicate whether the ADC value is read successfully. 0 Failed 1 Success
<value>	Integer type. The voltage of specified ADC channel. Unit: mV.

13.5. AT+QSCLK Enable/Disable Low Power Mode

This command enables or disables low power mode. When low power mode is enabled, and both DTR and WAKEUP_IN pins are pulled up, the module directly enters into sleep mode. If low power mode is enabled, but either DTR or WAKEUP_IN is pulled down, the module will wake up. Only after both DTR and WAKEUP_IN are pulled up can the module enter into sleep mode.

AT+QSCLK Enable/Disable Low Power Mode	
Test Command **AT+QSCLK=?**	Response **+QSCLK: (**list of supported **<n>**s**),(**list of supported **<saved>**s**)** **OK**

Read Command **AT+QSCLK?**	Response **+QSCLK: <n>,<saved>** **OK**
Write Command **AT+QSCLK=<n>[,<saved>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference Quectel	

Parameter

<n>	Integer type. Disable or enable low power mode. The default value varies from different modules. 0 Disable 1 Enable. It is controlled by DTR and WAKEUP_IN pins.
<saved>	Integer type. Whether to save the configuration after the module is rebooted. The default value varies from different modules. 0 Not save 1 Save.

NOTE

Executing **AT+QSCLK=0,1** or **AT+QSCLK=1,1** indicates to write data to NVM (Non-Volatile Memory). Please operate with caution.

14 Appendix

14.1. Terms and Abbreviations

Table 7: Terms and Abbreviations

Abbreviation	Description
3GPP	3rd Generation Partnership Project
ACK	Acknowledge Character
ADC	Analog To Digital Converter
APN	Access Point Name
ARFCN	Absolute Radio-Frequency Channel Number
ASCII	American Standard Code for Information Interchange
BAIC	Bar All Incoming Calls
BAOC	Bar All Outgoing Calls
BCD	Binary Coded Decimal
BCLK	Bus Clock
BOIC	Bar Outgoing International Calls
CBM	Cell Broadcast Message
CFU	Call Forwarding Unconditional
CLI	Calling Line Identity
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction

COL	Connected Line
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CS	Circuit Switch
DCE	Data Communication Equipment
DHCP	Dynamic Host Configuration Protocol
DSC	Data Coding Scheme
DTE	Data Terminal Equipment
DTMF	Dual-Tone Multifrequency
DTR	Data Terminal Ready
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
ECC	Emergency Communications Center
ECT	Explicit Call Transfer
eMLPP	Enhanced Multi-Level Precedence and Pre-emption Service
EONS	Enhanced Operator Name String
EPS	Evolved Packet System
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
FDD	Frequency Division Duplex
GERAN	GSM/EDGE Radio Access Network
GPIO	(General-Purpose Input/Output) an uncommitted digital signal pin on an integrated circuit or electronic circuit board whose behavior—including whether it acts an input or output
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HCO	Hearing Carry-Over
HSDPA	High Speed Downlink Packet Access

HSUPA	High Speed Uplink Packet Access
ID	Mostly refers to Identifier in terms of software
IIC	Inter-Integrated Circuit
IMEI	International Mobile Equipment Identity
IMS	IP Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
IRA	International Reference Alphabet (7-bit coded character set)
ISDN	Integrated Services Digital Network
IWF	Interworking Function
LTE	(Long-Term Evolution) a 4G mobile communications standard.
MBN	Modem Configuration Binary
ME	Mobile Equipment
MO	Mobile originated
MPTY	MultiParty
MS	Mobile Station
MSISDN	Mobile Subscriber International Integrated Service Digital Network Number
MT	Mobile Terminal
NAS	Network Attached Storage
NPI	Numbering Plan Identification
NVM	Non-Volatile Memory
NVRAM	Non-Volatile Random Access Memory
OIR	Originating Identification Restriction
PC	Personal Computer

PCC	Primary Carrier Component
PCM	Pulse Code Modulation
PDN	Public Data Network
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PF	Paging Frame
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PN	Personal Network
PPP	Point-to-Point Protocol
PS	Packet Switch
PSC	Primary Synchronization Code
PUK	PIN Unlock Key
QoS	Quality of Service
RAT	Radio Access Technology
RLP	Radio Link Protocol
RPLMN	Registered PLMN
RRC	Radio Resource Control
RTC	Real Time Clock
RX	Receive
SAP	Service Access Point
SC	Service Center
SCC	Secondary Carrier Component
SDU	Service Data Unit
SGSN	Serving GPRS Support Node

SINR	Signal to Interference plus Noise Ratio
SMS	Short Messaging Service
SMSC	Short Message Service Center
SNDCP	Sub Network Dependence Convergence Protocol
TA	Terminal Adapter
TDD	Time Division Duplex
TE	Terminal Equipment
TON	Type of Number
TP	Touch Panel
TX	Transmission
UART	Universal Asynchronous Receiver/Transmitter. A digital protocol which we use to transfer data between two devices
UCS2	Universal Character Set (UCS-2) Format
UDH	User Data Header
UDUB	User Determined User Busy
UE	User Equipment
UFS	Universal Flash Storage
UICC	Universal Integrated Circuit Card
UMTS	Universal Mobile Telecommunications System (UMTS) is a third-generation mobile cellular system for networks based on the GSM standard
URC	Unsolicited Result Code
USB	Universal Serial Bus
(U)SIM	(Universal) Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	Universal Terrestrial Radio Access Network
VCO	Voice Carry-Over
WCDMA	Wideband Code Division Multiple Access

14.2. Factory Default Settings Restorable with AT&F

Table 8: Factory Default Settings Restorable with AT&F

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATS0	<n>	0
ATS6	<n>	2
ATS7	<n>	0
ATS8	<n>	2
ATS10	<n>	15
ATV	<value>	1
ATX	<value>	4
AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+CMEE	<n>	1
AT+CSCS	<chset>	"GSM"
AT+CSTA	<type>	129
AT+CR	<mode>	0
AT+CRC	<mode>	0
AT+CSMS	<service>,<mt>,<mo>,<bm>	0,1,1,1
AT+CMGF	<mode>	0
AT+CSMP	<fo>,<vp>,<pid>,<dcs>	17,167,0,0
AT+CSDH	<show>	0
AT+CSCB	<mode>,<mids>,<dcss>	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+CVHU	<mode>	0
AT+CLIP	<n>	0
AT+COLP	<n>	0
AT+CLIR	<n>	0
AT+CSSN	<n><m>	0,0
AT+CTZR	<reporting>	0
AT+CPBS	<storage>	"SM"
AT+CGEREP	<mode>,<brf>	0,0
AT+CEREG	<n>	0
AT+CCWA	<n>	0
AT+CUSD	<mode>	0
AT+CLVL	<level>	3
AT+QAUDMOD	<mode>	0
AT+QAUDLOOP	<enable>	0

14.3. AT Command Settings Storable with AT&W

Table 9: AT Command Settings Storable with AT&W

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

ATS0	<n>	Yes
ATS7	<n>	Yes
ATS10	<n>	Yes
ATV	<value>	Yes
ATX	<value>	Yes
AT+CREG	<n>	No
AT+CGREG	<n>	No
AT+CEREG	<n>	No

14.4. AT Command Settings Storable with ATZ

Table 10: AT Command Settings Storable with ATZ

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATS0	<n>	0
ATS7	<n>	0
ATS10	<n>	15
ATV	<value>	1
ATX	<value>	4
AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+CEREG	<n>	0

14.5. Summary of CME ERROR Codes

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

<err> values are mostly used by common message commands. The following table lists most of general and GRPS related **ERROR** codes. For some GSM protocol failure causes described in GSM specifications, the corresponding **ERROR** codes are not included.

Table 11: Different Coding Schemes of +CME ERROR: <err>

Code of <err>	Meaning
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	(U)SIM not inserted
11	(U)SIM PIN required
12	(U)SIM PUK required
13	(U)SIM failure
14	(U)SIM busy
15	(U)SIM wrong
16	Incorrect password
17	(U)SIM PIN2 required

18	(U)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
901	Audio unknown error
902	Audio invalid parameters
903	Audio operation is not supported
904	Audio device is busy

14.6. 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 shall be returned.

<err> values are mostly used by common message commands:

Table 12: Different Coding Schemes of +CMS ERROR: <err>

Code of <err>	Meaning
300	ME failure
301	SMS ME reserved
302	Operation not allowed
303	Operation not supported
304	Invalid PDU mode
305	Invalid text mode
310	(U)SIM not inserted
311	(U)SIM pin necessary
312	PH (U)SIM pin necessary
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
332	Network timeout
500	Unknown
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

14.7. Summary of URC

Table 13: Summary of URC

Index	URC Display	Meaning	Condition
1	**+QUSIM: 1**	Indicate (U)SIM card initialization status	-
2	**+QSIMSTAT: <enable>,<inserted_status>**	Indicate (U)SIM card insertion status	**AT+QSIMSTAT=1**
3	**+CREG: <stat>**	Indicate registration status of the ME	**AT+CREG=1**
4	**+CREG: <stat>[,<lac>,<ci>[,<AcT>]]**	After cell neighborhood changing shows whether the network has currently indicated the registration of the ME, with location area code	**AT+CREG=2**

5	**+CGREG: <stat>**	Indicate network registration status of the ME	**AT+CGREG=1**
6	**+CGREG: <stat>[,<lac>,<ci>[,<AcT>]]**	Indicate network registration and location information of the ME	**AT+CGREG=2**
7	**+CTZV: <tz>**	Time zone reporting	**AT+CTZR=1**
8	**+CTZE: <tz>,<dst>,<time>**	Extended time zone reporting	**AT+CTZR=2**
9	**+CEREG: <stat>**	Indicate the change in EPS network registration status in E-UTRAN	**AT+CEREG=1**
10	**+CEREG: <stat>[,<lac>,<ci>[,<AcT>]]**	Indicate the change of the network cell in E-UTRAN	**AT+CEREG=2**
11	**+CMTI: <mem>,<index>**	New message is received, and saved to memory	**See AT+CNMI**
12	**+CMT: [<alpha>],<length><CR><LF><pdu>**	New short message is received and output directly to TE (PDU mode)	**See AT+CNMI**
13	**+CMT: <oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>**	New short message is received and output directly to TE (Text mode)	**See AT+CNMI**
14	**+CBM: <length><CR><LF><pdu>**	New CBM is received and output directly (PDU mode)	**See AT+CNMI**
15	**+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>**	New CBM is received and output directly to TE (Text mode)	**See AT+CNMI**
16	**+CDS: <length><CR><LF><pdu>**	New CDS is received and output directly (PDU mode)	**See AT+CNMI**
17	**+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>**	New CDS is received and output directly to TE (Text mode)	**See AT+CNMI**
18	**+CDSI: <mem>,<index>**	New message status report is received, and saved to memory	**See AT+CNMI**
19	**+COLP: <number>,<type>,[<subaddr>],[<satype>],[<alpha>]**	The presentation of the COL (connected line) at the TE for a mobile originated call	**AT+COLP=1**
20	**+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI validity>**	Mobile terminating call indication	**AT+CLIP=1**
21	**+CCWA: <number>,<type>,<class>[,<alpha>][,<CLI_validity>[,<subaddr>,<satype>[,<priority>]]]**	Call waiting indication	**AT+CCWA=1,1**
22	**+CSSI: <code1>**	Shows the +CSSI intermediate result code presentation status to	**AT+CSSN=1**

		the TE	
23	**+CSSU: <code2>**	Shows the +CSSU unsolicited result code presentation status to the TE	**AT+CSSN=<n>,1**
24	**+CRING: <type>**	An incoming call is indicated to the TE with unsolicited result code instead of the normal RING	**AT+CRC=1**
25	**+CFUN: 1**	All function of the ME is available	-
26	**+CPIN: <state>**	(U)SIM card pin state	-
27	**+QIND: SMS DONE**	SMS initialization finished	-
28	**+QIND: PB DONE**	Phonebook initialization finished	-
29	**^DSCI: <id>,<dir>,<stat>,<type>,<number>,<num_type>**	Call status indication.	**AT^DSCI=1**
30	**POWERED DOWN**	Module power down	**AT+QPOWD**
31	**+CGEV: REJECT <PDP_type>,<PDP_addr>**	A network request for PDP activation, and was automatically rejected.	**AT+CGEREP=2,1**
32	**+CGEV: NW REACT <PDP_type>,<PDP_addr>,[<cid>]**	The network request PDP reactivation	**AT+CGEREP=2,1**
33	**+CGEV: NW DEACT <PDP_type>,<PDP_addr>,[<cid>]**	The network has forced a context deactivation	**AT+CGEREP=2,1**
34	**+CGEV: ME DEACT <PDP_type>,<PDP_addr>,[<cid>]**	The ME has forced a context deactivation.	**AT+CGEREP=2,1**
35	**+CGEV: NW DETACH**	The network has forced a Packet Domain detach.	**AT+CGEREP=2,1**
36	**+CGEV: ME DETACH**	The mobile equipment has forced a Packet Domain detach.	**AT+CGEREP=2,1**
37	**+CGEV: NW CLASS <class>**	The network has forced a change of MS class.	**AT+CGEREP=2,1**
38	**+CGEV: ME CLASS <class>**	The mobile equipment has forced a change of MS class.	**AT+CGEREP=2,1**
39	**+QIND: "csq",<rssi>,<ber>**	The signal strength and channel bit error rate is changed.	**AT+QINDCFG="csq",1**
40	**+QIND: "smsfull",<storage>**	SMS storage is full.	**AT+QINDCFG="smsfull",1**
41	**RING**	There is an incoming call.	**AT+QINDCFG="ring",1**
42	**+QIND: "act",<actvalue>**	Network access technology is changed.	**AT+QINDCFG="act",1**

43	**+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI_validity>**	Indicate the calling line identity (CLI) of the calling party when receiving a mobile terminated call	**AT+CLIP=1**
44	**+CUSD: <status>[,<rspstr>,[<dcs>]]**	USSD response from the network, or a network initiated operation.	**AT+CUSD=1**
45	**+QIND: "SLIC Hook off"**	Hook off the phone	**AT+QAUDCFG="slic_IndRep",1**
46	**+QIND: "SLIC DTMF",<key>**	Press key	**AT+QAUDCFG="slic_IndRep",1**
47	**+QIND: "SLIC Flash Key"**	Press the flash key	**AT+QAUDCFG="slic_IndRep",1**
48	**+QAUDRIND: 0,1**	Wav file already exists	**AT+QAUDRD=1,"A.wav",13,0**

14.8. 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 14: The Way 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. So only support characters 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. So only support characters 0-9 and A-F.
8-bit	-	Ignore the value of **AT+CSCS,** input or output a hex string similar to PDU mode. So only support characters 0-9 and A-F.

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

Table 15: The Input Conversions Table (DCS=GSM 7-bit and AT+CSCS="GSM")

No.	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 16: The Output Conversions Table (DCS=GSM 7-bit and AT+CSCS="GSM")

No.	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 17: GSM Extended Characters

No.	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 18: The Input Conversions Table (DCS=GSM 7-bit and AT+CSCS="IRA")

No.	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 19: IRA Extended Characters

No.	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 20: The Output Conversions Table (DCS=GSM 7-bit and AT+CSCS="IRA")

No.	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 21: GSM Extended Characters

No.	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"**.

The difference is the way of SMS text input or output. Please refer to ***Table 14*** for more details.

14.9. Release Cause Text List of AT+CEER

Table 22: Release Cause Text List of AT+CEER

CS Internal Cause
No cause information available (default)
Phone is offline
No service available
Network release, no reason given

Received incoming call
Client ended call
UIM not present
Access attempt already in progress
Access failure, unknown source
Concur service not supported by network
No response received from network
GPS call ended for user call
SMS call ended for user call
Data call ended for emergency call
Rejected during redirect or handoff
Lower-layer ended call
Call origination request failed
Client rejected incoming call
Client rejected setup indication
Network ended call
No funds available
No service available
Full service not available
Maximum packet calls exceeded
Video connection lost
Video protocol closed after setup
Video protocol setup failure
Internal error
CS Network Cause

Unassigned/unallocated number
No route to destination
Channel unacceptable
Operator determined barring
Normal call clearing
User busy
No user responding
User alerting, no answer
Call rejected
Number changed
Non selected user clearing
Destination out of order
Invalid/incomplete number
Facility rejected
Response to status enquiry
Normal, unspecified
No circuit/channel available
Network out of order
Temporary failure
Switching equipment congestion
Access information discarded
Requested circuit/channel not available
Resources unavailable, unspecified
Quality of service unavailable
Requested facility not subscribed

Incoming calls barred within the CUG
Bearer capability not authorized
Bearer capability not available
Service/option not available
Bearer service not implemented
ACM >= ACM max
Requested facility not implemented
Only RDI bearer is available
Service/option not implemented
Invalid transaction identifier value
User not member of CUG
Incompatible destination
Invalid transit network selection
Semantically incorrect message
Invalid mandatory information
Message non-existent/not implemented
Message type not compatible with state
IE non-existent/not implemented
Conditional IE error
Message not compatible with state
Recovery on timer expiry
Protocol error, unspecified
Interworking, unspecified
CS Network Reject
IMSI unknown in HLR

Illegal MS
IMSI unknown in VLR
IMEI not accepted
Illegal ME
GPRS services not allowed
GPRS and non GPRS services not allowed
MS identity cannot be derived
Implicitly detached
PLMN not allowed
Location area not allowed
Roaming not allowed
GPRS services not allowed in PLMN
No suitable cells in location area
MSC temporary not reachable
Network failure
MAC failure
Synch failure
Congestion
GSM authentication unacceptable
Service option not supported
Requested service option not subscribed
Service option temporary out of order
Call cannot be identified
No PDP context activated
Semantically incorrect message

Invalid mandatory information
Message type non-existent
Message type not compatible with state
Information element non-existent
Message not compatible with state
RR release indication
RR random access failure
RRC release indication
RRC close session indication
RRC open session failure
Low level failure
Low level failure no redial allowed
Invalid SIM
No service
Timer T3230 expired
No cell available
Wrong state
Access class blocked
Abort message received
Other cause
Timer T303 expired
No resources
Release pending
Invalid user data
PS Internal Cause

Invalid connection identifier
Invalid NSAPI
Invalid primary NSAPI
PDP establish timeout
Invalid field
SNDCP failure
RAB setup failure
No GPRS context
PDP activate timeout
PDP modify timeout
PDP inactive max timeout
PDP lower layer error
PDP duplicate
Access technology change
PDP unknown reason
CS PS Network Cause
LLC or SNDCP failure
Insufficient resources
Missing or unknown APN
Unknown PDP address or PDP type
User authentication failed
Activation rejected by GGSN
Activation rejected, unspecified
Service option not supported
Requested service option not subscribed

Service option temporary out of order
NSAPI already used (not sent)
Regular deactivation
QoS not accepted
Network failure
Reactivation required
Feature not supported
Semantic error in the TFT operation
Syntactical error in the TFT operation
Unknown PDP context
PDP context without TFT already activated
Semantic errors in packet filter
Syntactical errors in packet filter
Invalid transaction identifier
Semantically incorrect message
Invalid mandatory information
Message non-existent/not implemented
Message type not compatible with state
IE non-existent/not implemented
Conditional IE error
Message not compatible with state
Protocol error, unspecified