RG50xQ&RM5xxQ Series
AT Commands Manual

5G Module Series

Version: 1.1.1

Date: 2020-10-09

Status: Preliminary

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Revision History

Version	Date	Author	Description
1.0	2020-04-17	Amos ZHANG/ Yosef ZHANG/ Harden XU/ Gibson PAN/ Tako ZHANG/ Simon XIAO/ Sandy YE	Initial
1.1.0	2020-09-04	Evan Jin/ Ozzy Ang/ Amos ZHANG/ Shaun DUAN/ Joseph WANG/ Pacifier WANG	1. Added Notes 3/4/5/67 in AT+QCFG="data_interface" (Chapter 3.3.7); 2. Deleted AT+QPING / +QEEC / +QSAR / +QETH="mode"; 3. Added AT+QNWCFG / +C5GREG / +QNWPREFCFG="policy_band" / +QNWPREFCFG="ue_capability_band" / +QNWPREFCFG="rat_acq_order; 4. Extended AT+QENG to add subcommands: AT+QETH="rgmii" / +QETH="ipptmac" / +QETH="routing" / +QETH="mac_address"; 5. Added SA mode response in AT+QENG="servingcell" (Chapter 5.11); 6. Added <5g basic> in AT+QENDC.(Chapter 5.13) 7. Added <voltage>, <mode>, <profileID> in subcommand AT+QETH="rgmii" (Chapter 12.7.1); 8. Added "0M" to AT+QETH="speed" (Chapter 12.7.5); 9. Added value 3 in <SLIC_type> in AT+QSLIC (Chapter 12.8); 10. Added related terms and abbreviations (Chapter 13.1).
1.1.1	2020-10-09	Evan JIN/ Ozzy ANG/	Added AT+QNWCFG and its sub-command +QNWPREFCFG="nr5g_disable_mode" (Chapter

	Amos ZHANG/ Shaun DUAN/ Joseph WANG/ Pacifier WANG	5.15.13)

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1 Introduction

1.1. Scope of the Document

This document presents the AT command set supported by Quectel 5G modules: RG500Q series, RG502Q-EA, RM500Q series, RM502Q-GL and RM510Q-GL.

Table 1: Applicable Modules

Module Series	Model
RG500Q Series	RG500Q-EA
	RG500Q-NA
RG502Q-EA	RG502Q-EA
RM500Q Series	RM500Q-GL
	RM500Q-AE
RM502Q-GL	RM502Q-GL
RM510Q-GL	RM510Q-GL

1.2. AT Command Syntax

1.2.1. Definitions

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

- Underline Default setting of a parameter.

1.2.2. AT Command Syntax

The **AT** or **at** prefix must be added at the beginning of each command line. Entering **<CR>** will terminate a command line. Commands are usually followed by a response that includes **<CR><LF><response><CR><LF>**. Throughout this document, only the response **<response>** will be presented, **<CR><LF>** are omitted intentionally.

The AT command set supported by RG500Q series/RG502Q-EA/RM500Q Series /RM502Q-GL/RM510Q-GL is a combination of international standards, such as *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 RG500Q series/RG502Q-EA/RM500Q series/RM502Q-GL/RM510Q-GL can be split into three categories syntactically: “Basic”, “S Parameter” and “Extended”, as listed below:

- **Basic Syntax**

These AT commands have the format of **AT<x><n>**, or **AT&<x><n>**, where **<x>** is the command, and **<n>** is/are the argument(s) for that command. An example of this is **ATE<n>**, which tells the DCE (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**

These AT commands are in the format of **ATS<n>=<m>**, in which **<n>** is the index of the **S** register to set, and **<m>** is the value to assign to it.

- **Extended Syntax**

These commands can be operated in several modes, as following table:

Table 2: Types of AT Commands and Responses

Test Command	**AT+<cmd>=?**	The command returns the list of parameters and value ranges set by the corresponding Write Command or internal processes.
Read Command	**AT+<cmd>?**	The command returns the currently set value of the parameter or parameters.
Write Command	**AT+<cmd>=<p1>[,<p2>[,<p3>[...]]]**	The command sets the user-definable parameter values.
Execution Command	**AT+<cmd>**	The command reads non-variable parameters affected by internal processes in the UE.

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

When entering AT commands, spaces are ignored except the following cases:

Within quoted strings, where they 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 specified after the **AT** token, **OK** will be returned. If an invalid command is specified, **ERROR** will be returned.

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

1.3. Supported Character Sets

The AT command interface of RG500Q series/RG502Q-EA/RM500Q Series/RM502Q-GL/RM510Q-GL uses the GSM character set by default and supports the following character sets:

- GSM format
- UCS2
- IRA

The character set can be configured and interrogated by executing the **AT+CSCS** command (*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.

1.4. AT Command Port

The main UART port and two USB ports (USB modem port and USB AT port) support AT command communication and data transfer.

1.5. Unsolicited Result Code

As an Unsolicited Result Code and a report message, URC is not issued as part of the response related to an executed AT command. URC is a report message issued by the RG500Q series/RG502Q-EA/RM500Q Series/RM502Q-GL/RM510Q-GL without being requested by the TE and 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.

1.6. Module Turn-off Procedure

It is recommended to execute **AT+QPOWD** command to power off the module, as it is the safest and best way. This procedure 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-off state. In order to avoid data loss, it is suggested to wait for 1s to disconnect the power supply after the URC **POWERED DOWN** is outputted. If **POWERED DOWN** cannot be received within 65s, the power supply shall be disconnected compulsorily.

2 General Commands

2.1. ATI Display MT Identification Information

This Execution Command delivers the MT identification information text.

ATI Display MT 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 MT firmware version.

Example

```
ATI
Quectel
RG500QEA
Revision: RG500QEAAAR01A01M4G

OK
```

2.2. AT+GMI Request Manufacturer Identification

This Execution Command returns the manufacturer identification text. It is identical with **AT+CGMI** command 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 Model Identification

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

AT+GMM Request MT 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. Identifier of device type.

2.4. AT+GMR Request MT Firmware Revision Identification

This Execution Command delivers the identification text of MT firmware version. It is identical with **AT+CGMR** command in ***Chapter 2.7***.

AT+GMR Request Firmware Revision 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 MT firmware version, including line terminators, which should not exceed 2048 characters in the information text.

Example

```
AT+GMR
RG500QEAAAR01A01M4G

OK
```

2.5. AT+CGMI Request Manufacturer Identification

This command returns the manufacturer identification text. It is identical with the above **AT+GMI** command.

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 MT Model Identification

This command returns the model information of the product. It is identical with the above **AT+GMM** command.

AT+CGMM Request MT 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. Identifier of device type.

2.7. AT+CGMR Request MT Firmware Revision Identification

This Execution Command delivers the identification text of MT firmware version. It is identical with the above **AT+GMR** command.

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

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

Parameter

<revision>	String type. Revision of software release, including line terminators, which should not exceed 2048 characters in the information text.

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

This Execution Command requests the International Mobile Equipment Identity (IMEI) number of the ME which permits the user to identify individual ME device. It is identical with the above **AT+CGSN** command.

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 ME.

NOTE

The IMEI is unique to each ME, so it can be used to identify an ME.

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

This Execution Command requests International Mobile Equipment Identity (IMEI) number of the ME. It is identical with the above **AT+GSN** command.

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

Parameter

<IMEI>	String type. IMEI number of the ME.

NOTE

The IMEI is unique to each ME, so it can be used to identify an ME.

2.10. AT&F Set All Current Parameters to Manufacturer Defaults

This command resets AT command settings to the manufacturer default values (See ***Table 7***).

AT&F Set All Current Parameters to Manufacturer Defaults	
Execution Command **AT&F[<value>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<value>	Integer type.	
	0	Set all current parameters to manufacturer defaults.

2.11. AT&V Display Current Configuration

This command displays the current settings 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 Parameters 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 Parameters 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 parameters.

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

This command first resets the AT command settings to their manufacturer defaults, similar to **AT&F**. Afterwards the AT command settings are restored from the user-defined profile in 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 AT Command Settings from a 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 TE. 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	/
Reference V.25ter	

Parameter

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

2.15. ATV MT Response Format

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

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

ATV MT Response Format	
Execution Command **ATV<value>**	Response When **<value>** = 0 **0** When **<value>** = 1 **OK**
Maximum Response Time	300 ms
Characteristics	/
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 switching from command mode to data mode.
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, caused by 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) dialing 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 TE or not during AT command mode.

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

Reference V.25ter	

Parameter

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

2.17. A/ Repeat Previous Command Line

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

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

Example

```
ATI
Quectel
RG500QEA
Revision: RG500QEAAAR01A01M4G

OK
A/                                  //Repeat the previous command.
Quectel
RG500QEA
Revision: RG500QEAAAR01A01M4G

OK
```

2.18. ATS3 Set Command Line Termination Character

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

ATS3 Set Command Line Termination Character	
Read Command **ATS3?**	Response **<n>** **OK**
Write Command **ATS3=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<n>	Integer type. Command line termination character. Range: 0–127. Default: 13.

2.19. ATS4 Set Response Formatting Character

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

ATS4 Set Response Formatting Character	
Read Command **ATS4?**	Response **<n>** **OK**
Write Command **ATS4=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<n>	Integer type. Response formatting character. Range: 0–127. Default: 10.

2.20. ATS5 Set Command Line Editing Character

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

ATS5 Set Command Line Editing Character	
Read Command **ATS5?**	Response **<n>** **OK**
Write Command **ATS5=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<n>	Integer type. Response editing character. Range: 0–127. Default: 8.

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

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

ATX Set CONNECT Result Code Format and Monitor Call Progress	
Execution Command **ATX<value>**	Response **OK**
Maximum Response Time	300 ms

Characteristics	/
Reference V.25ter	

Parameter

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

2.22. AT+CFUN Set UE Functionality

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

AT+CFUN Set UE Functionality	
Test Command **AT+CFUN=?**	Response **+CFUN: (**list of supported **<fun>**s**),(**list of supported **<rst>**s**)** **OK**
Read Command **AT+CFUN?**	Response **+CFUN: <fun>** **OK**
Write Command **AT+CFUN=<fun>[,<rst>]**	Response **OK** If there is any error related to MT functionality: **+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 UE from both transmitting and receiving RF signals
<rst>	Integer type.	
	0	Do not reset UE before setting it to **<fun>** power level. (Default value when **<rst>** is omitted.)
	1	Reset UE. The device is fully functional after the reset. This value is available only for **<fun>** = 1.
<err>	Error codes. For more details, please refer to ***Table 11***.	

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
```

2.23. AT+CMEE Error Message Format

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

AT+CMEE Error Message Format	
Test Command **AT+CMEE=?**	Response **+CMEE: (**range 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.	
	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, please refer to ***Table 11***.	

Example

```
AT+CMEE=0                    //Disable result code.
OK
AT+CPIN?
ERROR                        //Only ERROR is 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
```

2.24. AT+CSCS Select TE Character Set

The Write Command informs the MT which character set is used by the TE. This enables the MT 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"

OK
```

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

2.25. 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 setting: **+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 will be 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

Example

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

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

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

OK
```

3 Status Control Commands

3.1. AT+CPAS Mobile Equipment Activity Status

This command queries the activity status of MT.

AT+CPAS Mobile Equipment 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 MT: **+CPAS: <pas>** **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<pas>	Integer type.	
	0	Ready
	3	Ringing
	4	Call in progress or call hold
<err>	Error codes. For more details, please refer to ***Table 11***.	

Example

```
AT+CPAS
+CPAS: 0                                    //MT is idle.

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

OK
AT+CPAS
+CPAS: 3                                    //MT is ringing.

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

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

OK
```

3.2. 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 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** Or

	ERROR If there is any error related to MT functionality: **+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 13.9***). 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, please refer to ***Table 11***.

3.3. AT+QCFG Extended Configuration Settings

The command queries and configures various settings of UE.

AT+QCFG Extended Configuration Settings	
Test Command **AT+QCFG=?**	Response **+QCFG: "hsdpacat",(**list of supported **<cat>**s**)** **+QCFG: "hsupacat",(**list of supported **<cat>**s**)** **+QCFG: "rrc",(**range of supported **<rrcr>**s**)** **+QCFG: "pdp/duplicatechk",(**list of supported **<enable>**s**)** **+QCFG: "risignaltype",(**list of supported **<risignatype>**s**)** **+QCFG: "sarcfg",(**list of supported **<RAT>**s**),(**range of supported **<max_power>**s**),<row_grads>,<band>** **+QCFG: "data_interface",(**list of supported **<network>**s**),(**list of supported **<diag>**s**)** **+QCFG: "pcie/mode",(**list of supported **<mode>**s**)** **…** **OK**
Maximum Response Time	300 ms

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

This command specifies the HSDPA category.

AT+QCFG="hsdpacat" HSDPA Category Configuration	
Write Command **AT+QCFG="hsdpacat"[,<cat>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "hsdpacat",<cat>** **OK** If the optional parameter is specified, set the HSDPA category: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting. The configuration will be saved automatically.

Parameter

<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, please refer to ***Table 11***.

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

This command specifies the HSUPA category.

AT+QCFG="hsupacat" HSUPA Category Configuration	
Write Command **AT+QCFG="hsupacat"[,<cat>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "hsupacat",<cat>** **OK** If the optional parameter is specified, set the HSDPA category: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting. The configuration will be saved automatically.

Parameter

<cat>	Integer type. HSUPA category. 5 Category 5 6 Category 6 7 Category 7 8 Category 8
<err>	Error codes. For more details, please refer to ***Table 11***.

3.3.3. 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 setting: **+QCFG: "rrc",<rrcr>** **OK**

	If the optional parameter is specified, set the RRC release version: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting. The configuration will be 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, please refer to ***Table 11***.

3.3.4. 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 setting: **+QCFG: "pdp/duplicatechk",<enable>** **OK** If the optional parameter is specified, allow/refuse establishing multiple PDNs with the same APN profile: **OK** Or **ERROR**

	If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be 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, please refer to ***Table 11***.

3.3.5. AT+QCFG="risignaltype" RI Signal Output Carrier

This command specifies the RI (ring indicator) signal output carrier.

AT+QCFG="risignaltype" RI Signal Output Carrier	
Write Command **AT+QCFG="risignaltype"[,<risignatype>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "risignaltype",<risignatype>** **OK** If the optional parameter is specified, set the RI signal output carrier: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

<risignaltype>	String type. RI signal output carrier. "respective" The ring indicator behaves on the port where URC is

		presented. For example, if a URC is presented on UART port, it is physical ring indicator. If URC is presented on USB port, it is virtual ring indicator. If URC is presented on USB AT port which does not support ring indicator, then there will be no ring indicator. **AT+QURCCFG="urcport"** can get the port on which URC is presented.
	"physical"	No matter which port URC is presented on, URC only causes the behavior of physical ring indicator.
<err>	Error codes. For more details, please refer to ***Table 11***.	

3.3.6. AT+QCFG="sarcfg"* Set SAR Power Backoff Value for LTE/WCDMA Bands

AT+QCFG="sarcfg"* Set SAR Power Backoff Value for LTE/WCDMA Bands	
Write Command **AT+QCFG="sarcfg",<RAT>[,<max_power>,<row_grads>[,<band>]]**	Response If the optional parameters are omitted, query the current setting: **+QCFG: "sarcfg","lte_wcdma",<band>,<max_power>,<row_grads>** **…** **OK** If the optional parameters are specified, set the SAR power backoff value: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting. The configuration will be saved automatically.

Parameter

<RAT>	String type, the SAR power backoff value for supported LTE/WCDMA bands. "LTE_WCDMA" Set/get configuration for all supported LTE&WCDMA bands. "LTE" Set/get configuration for all supported LTE bands. "WCDMA" Set/get configuration for all supported WCDMA bands.
<max_power>	Integer type. The value of SAR power backoff [level1]. Range: 60–300 (i.e. 6–30 dBm). Default: 230 (23 dBm).
<row_grads>	Integer type. The reduced value for each grade. Default: 10 (1 dBm).

	backoff[level$_n$] = backoff[level$_{n-1}$] - <row_grads> The range of **[level$_n$]**: 2–8.
<band>	**WCDMA:** 1 WCDMA B1 WCDMA2100 2 WCDMA B2 WCDMA1900 3 WCDMA B3 WCDMA1700s 4 WCDMA B4 WCDMA1700 5 WCDMA B5 WCDMA850 8 WCDMA B8 WCDMA900 9 WCDMA B9 WCDMA1700 11 WCDMA B11 WCDMA1500 19 WCDMA B19 WCDMA850 **LTE:** 1 LTE B1 2 LTE B2 3 LTE B3 4 LTE B4 5 LTE B5 6 LTE B6 7 LTE B7 8 LTE B8 9 LTE B9 10 LTE B10 11 LTE B11 12 LTE B12 13 LTE B13 14 LTE B14 17 LTE B17 18 LTE B18 19 LTE B19 20 LTE B20 21 LTE B21 23 LTE B23 25 LTE B25 26 LTE B26 27 LTE B27 28 LTE B28 LTE B28B 30 LTE B30 34 LTE B34 38 LTE B38 LTE B38K 39 LTE B39 40 LTE B40

	LTE B40B
41	LTE B41
	LTE B41B
	LTE B41C
42	LTE B42
43	LTE B43
46	LTE B46
47	LTE B47
48	LTE B48
66	LTE B66
71	LTE B71
	LTE B71B
250	LTE B250

NOTES

1. When **backoff[level$_{n-1}$]** - **<row_grads>** < 0, the **backoff[level$_n$]** equals **backoff[level$_{n-1}$]**, the **<row_grads>** must be smaller than **<max_power>**.
2. The **<band>** setting is effective to all channels of each supported band.
3. Once the **AT+QCFG="sarcfg"** is executed, the SAR power takeoff will take effect when DPR is at low level.
4. "*" means under development.

3.3.7. AT+QCFG="data_interface" Set Network Port/Diagnostic Port Communication via PCIe/USB Interface

This command sets the network port/diagnostic port communication via USB/PCIe interface.

AT+QCFG="data_interface" Set Network Port/Diagnostic Port Communication via PCIe/USB Interface	
Write Command **AT+QCFG="data_interface"[,<network>,<diag>]**	Response If the optional parameters are omitted, query the current setting: **+QCFG: "data_interface",<network>,<diag>** **OK** If the optional parameters are specified, set the network port/diagnostic port communication via USB/PCIe interface: **OK** Or **ERROR**

Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting. The configuration will be saved automatically.

Parameter

<network>	Integer type. 0 Set the network port communication via USB interface. 1 Set the network port communication via PCIe interface.
<diag>	Integer type. 0 Set the diagnostic port communication via USB interface.

NOTES

1. If the PCIe with FUSE of the module's interface has been enabled, this command is invalid, and the network port and the diagnostic port communicate via PCIe interface always.
2. If the network port is set to communicate via the USB interface, the PCIe interface is disabled. Therefore, if the network port is set to communicate via the USB interface, no AT port or diagnostic port communicates via the PCIe interface.
3. The PCIe switched by **AT+QCFG="data_interface"** is only applicable when the host is installed with the ARM system, and the USB interface of the module must be connected to the host.
4. The fused PCIe supports to upgrade by connecting the host via the PCIe interface. However, the PCIE switched by **AT+QCFG="data_interface"** does not support to upgrade by connecting the host via the PCIe interface, thus you need to upgrade via the USB interface.
5. When the module needs to be rebooted (For example: 5 seconds after upgrading via DFOTA, after upgrading by connecting the host, etc.), please ensure that the host and the module reboot synchronously, and the power-on time sequence keeps the same with that of the first initialization.
6. It is not recommended to execute **AT+CFUN=1,1** to restart the module with the PCIe interface, which may cause the PCIe initialization time sequence error and then resulting in PCIe interface initialization failure; it is recommended to reset the module by hardware reset.
7. If the module or the host restarts, please make sure that the initialization time sequence of the PCIe interface is correct.

Example

```
AT+QCFG="data_interface"          //Query the current configuration.
+QCFG: "data_interface",0,0
OK
AT+QCFG="data_interface",1,0      //Set the network port communication via PCIe interface, and
                                  diagnostic port communication via USB interface. AT commands can
                                  communicate via both the USB interface and the PCIe interface.
OK
```

3.3.8. AT+QCFG="pcie/mode" Set PCIe RC/EP Mode

This command sets PCIe RC/EP mode.

AT+QCFG="pcie/mode" Set PCIe RC/EP Mode	
Write Command **AT+QCFG="pcie/mode"[,<mode>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "pcie/mode",<mode>** **OK** If the optional parameter is specified, set PCIe RC/EP mode: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	This command will take effect after rebooting. The configuration will be saved automatically.

Parameter

<mode>	Integer type. Set PCIe RC or EP mode. 0 PCIe EP mode. 1 PCIe RC mode.

Example

```
AT+QCFG="pcie/mode"          //Query the current configuration.
+QCFG: "pcie/mode", 0
OK
AT+QCFG="pcie/mode",1
OK
```

3.4. 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 **<savetonvram>**s**)** **+QINDCFG: "csq",(**list of supported **<enable>**s**),(**list of supported **<savetonvram>**s**)** **+QINDCFG: "smsfull",(**list of supported **<enable>**s**),(**list of supported **<savetonvram>**s**)** **+QINDCFG: "ring",(**list of supported **<enable>**s**),(**list of supported **<savetonvram>**s**)** **+QINDCFG: "smsincoming",(**list of supported **<enable>**s**),(**list of supported **<savetonvram>**s**)** **+QINDCFG: "act",(**list of supported **<enable>**s**),(**list of supported **<savetonvram>**s**)** **OK**
Write Command **AT+QINDCFG=<urctype>[,<enable>[,<savetonvram>]]**	Response If the optional parameters are omitted, query the current setting: **+QINDCFG: <urctype>,<enable>** **OK** If the optional parameters are specified, set the URC indication configurations: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. Whether to save configuration depends on **<savetonvram>**.

Parameter

<urctype>	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: OFF. 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 type. 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, a new URC will be reported.
<enable>	Integer type. URC indication is ON or OFF. 0 OFF 1 ON	
<savetonvram>	Integer type. Whether to save configuration into NVM. 0 Not save 1 Save	
<err>	Error codes. For more details, please refer to ***Table 11***.	

4 (U)SIM Related Commands

4.1. 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 MT.

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 MT. **<IMSI>** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<IMSI>	International mobile subscriber identity (string without double quotes).
<err>	Error codes. For more details, please refer to ***Table 11***.

Example

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

OK
```

4.2. AT+CLCK Facility Lock

This command locks/unlocks or interrogates an MT 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>**.

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>** does not equal 2 and the command is set successfully: **OK** If **<mode>** = 2 and the command is set successfully: **+CLCK: <status>[,<class>]** **[+CLCK: <status>[,<class>]]** **[…]** **OK**
Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configuration will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<fac>	String type.	
	"SC"	(U)SIM (lock (U)SIM/UICC card inserted in the currently selected card slot) ((U)SIM/UICC asks password in MT power-up and when this lock command is issued).
	"AO"	BAOC (Bar All Outgoing Calls) (see *3GPP TS 22.088*).
	"OI"	BOIC (Bar Outgoing International Calls) (see *3GPP TS 22.088*).
	"OX"	BOIC-exHC (Bar Outgoing International Calls except to Home Country) (see *3GPP TS 22.088*).
	"AI"	BAIC (Bar All Incoming Calls) (see *3GPP TS 22.088*).
	"IR"	BIC-Roam (Bar Incoming Calls when Roaming outside the home country) (see *3GPP TS 22.088*).
	"AB"	All barring services (see *3GPP TS 22.030*) (applicable only for **<mode>** = 0).

	"AG"	All outgoing barring services (see *3GPP TS 22.030*) (applicable only for **<mode>** = 0).
	"AC"	All incoming barring services (see *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 (U)SIM/UICC cards are inserted).
	"PN"	Network Personalization (see *3GPP TS 22.022*)
	"PU"	Network Subset Personalization (see *3GPP TS 22.022*)
	"PP"	Service Provider Personalization (see *3GPP TS 22.022*)
	"PC"	Corporate Personalization (see *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.	
	0	OFF
	1	ON

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

4.3. AT+CPIN Enter PIN

This command enters a password or queries whether MT 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 MT returns an alphanumeric string indicating whether or not a password is required. **+CPIN: <code>** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Write Command **AT+CPIN=<pin>[,<new_pin>]**	Response MT stores a password, such as (U)SIM PIN, (U)SIM PUK, which is necessary before it can be operated. If the PIN is to be entered twice, the MT shall automatically repeat the PIN. If no PIN request is pending, no action will be 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 parameter is required. This second PIN **<new_pin>** replaces the old pin in the (U)SIM. **OK**
Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configuration will be 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 unlocking 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 unlocking 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 unlocking 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 unlocking 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, please refer to ***Table 11***.	

Example

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

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

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

OK
//Enter PUK and PIN
AT+CPIN?
+CPIN: SIM PUK                    //Waiting (U)SIM PIN to be given .
OK
AT+CPIN="26601934","1234"         //Enter PUK and the new password.
```

```
OK

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

OK
```

4.4. 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 MT 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 MT sets a new password for the facility lock function. **OK**
Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configuration will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<fac>	String type. "SC" (U)SIM (lock (U)SIM/UICC card) ((U)SIM/UICC asks password in MT power-up and when this lock command is issued) "AO" BAOC (Bar All Outgoing Calls, see *3GPP TS 22.088*) "OI" BOIC (Bar Outgoing International Calls, see *3GPP TS 22.088*) "OX" BOIC-exHC (Bar Outgoing International Calls except to Home Country, see *3GPP TS 22.088*) "AI" BAIC (Bar All Incoming Calls, see *3GPP TS 22.088*) "IR" BIC-Roam (Bar Incoming Calls when Roaming outside the home country, see *3GPP TS 22.088*)

	"AB" All barring services (see *3GPP TS 22.030*, applicable only for **<mode>** = 0) "AG" All outgoing barring services (see *3GPP TS 22.030*, applicable only for **<mode>** = 0) "AC All incoming barring services (see *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 MT or re-activate the (U)SIM card
AT+CPIN?                            //Waiting (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
```

4.5. AT+CSIM Generic (U)SIM Access

This command allows a direct control of the (U)SIM that is inserted in the currently selected card slot by a distant application on TE. TE should 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** Or

	ERROR If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference 3GPP TS 27.007	

Parameter

<length>	Length of **<command>** or **<response>** string.
<command>	Command transferred by the MT to the (U)SIM in the format as described in *3GPP TS 51.011*.
<response>	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, please refer to ***Table 11***.

4.6. 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 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** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be 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 203 RETRIEVE DATA 219 SET DATA
<fileId>	Integer type. Identifier for an elementary data file on (U)SIM, if used by **<command>**.
<P1>, <P2>, <P3>	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>	Information which should be written to the (U)SIM (hexadecimal character format; refer to **AT+CSCS**).
<pathId>	The directory path of an elementary file on a (U)SIM/UICC in hexadecimal format.
<sw1>, **<sw2>**	Integer type. Information from the (U)SIM about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command.
<response>	Response of a successful completion of the command previously issued (hexadecimal character format; 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 (see *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, please refer to ***Table 11***.

4.7. 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** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be 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, please refer to ***Table 11***.

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

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

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

Parameter

<status>	Integer type. Initialization status of (U)SIM card. Actual value is the sum of several of the following four kinds (e.g. 7 = 1 + 2 + 4 means CPIN READY & SMS DONE & PB DONE). 0 Initial state 1 CPIN READY. Operation like locking/unlocking PIN is allowed. 2 SMS initialization completed 4 Phonebook initialization completed

4.9. AT+QSIMDET (U)SIM Card Detection

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

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

	OK
Write Command **AT+QSIMDET=<enable>,<insert_level>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting. The configuration will be saved automatically.

Parameter

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

NOTES

1. Hot-swap function is invalid if the configured value of **<insert_level>** is inconsistent with hardware design.
2. Hot-swap function takes effect after the MT is restarted.

Example

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

<Remove (U)SIM card>

+CPIN: NOT READY

<Insert (U)SIM card>

+CPIN: READY            //If PIN1 of the (U)SIM card is unlocked.
```

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

This command queries (U)SIM card insertion status or determine whether (U)SIM card insertion status

report is enabled.

AT+QSIMSTAT (U)SIM Card Insertion Status Report	
Test Command **AT+QSIMSTAT=?**	Response **+QSIMSTAT: (**list of supported **<enable>**s**)** **OK**
Read Command **AT+QSIMSTAT?**	Response **+QSIMSTAT: <enable>,<inserted_status>** **OK**
Write Command **AT+QSIMSTAT=<enable>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.

Parameter

<enable>	Integer type. Enable or disable (U)SIM inserted status report. If it is enabled, when (U)SIM card is inserted or removed, the URC **+QSIMSTAT: <enable>,<inserted_status>** will be reported. 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)

Example

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

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

```
+QSIMSTAT: 1,1

OK

<Remove the (U)SIM card>

+QSIMSTAT : 1,0                 //Report of (U)SIM card insertion status: removed.

+CPIN: NOT READY
AT+QSIMSTAT?
+QSIMSTAT: 1,0

OK

<Insert a (U)SIM card>

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

+CPIN: READY
```

4.11. AT+QUIMSLOT Switch (U)SIM Slot

This command queries the slot currently used by the (U)SIM and decide which to use.

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 configurations will be saved automatically.

Parameter

<slot>	Integer type. Physical (U)SIM slot. 1 (U)SIM slot1 2 (U)SIM slot2

Example

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

OK
AT+QUIMSLOT=2                   //Switch to (U)SIM slot2.
OK
```

5 Network Service Commands

5.1. AT+COPS Operator Selection

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

The 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.

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

The Write Command forces an attempt to select and register the GSM/UMTS 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: [(**range of supported **<stat>,**long alphanumeric **<oper>,**short alphanumeric **<oper>,**numeric **<oper>**s**[,<AcT>])**s**][,(**range of supported **<mode**>s**),(**range of supported **<format>**s**)]** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Read Command **AT+COPS?**	Response **+COPS: <mode>[,<format>[,<oper>][,<AcT>]]** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**

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

Parameter

<stat>	Integer type.	
	0	Unknown
	1	Operator available
	2	Current operator
	3	Operator forbidden
<oper>	String type. Operator in format as per **<mode>**.	
<mode>	Integer type.	
	0	Automatic mode. **<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) will be 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
	10	E-UTRAN connected to a 5GCN
	11	NR connected to 5GCN
	12	NG-RAN

	13 E-UTRAN-NR dual connectivity
<err>	Error codes. For more details, please refer to ***Table 11***.

Example

```
AT+COPS=?                                   //List all current network operators.
+COPS:
(1,"CHN-UNICOM","UNICOM","46001",2),(2,"CHN-UNICOM","UNICOM","46001",7),(3,"46011","460
11","46011",7),(3,"CHINA MOBILE","CMCC","46000",7),,(0-4),(0-2)

OK
AT+COPS?                                    //Query the currently selected network operator.
+COPS: 0,0,"CHINA MOBILE CMCC",13

OK
```

5.2. AT+CREG Network Registration Status

The 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.

The 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: (**range of supported **<n>**s**)** **OK**
Read Command **AT+CREG?**	Response **+CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]]** **OK** If there is any error related to MT functionality: **+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
	10	E-UTRAN connected to a 5GCN
	11	NR connected to 5GCN
	12	NG-RAN
	13	E-UTRAN-NR dual connectivity
<err>	Error codes. For more details, please refer to ***Table 11***.	

Example

```
AT+CREG=1
OK

+CREG: 1                              //URC reports that MT 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.
```

5.3. 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 error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<RSSI>	Integer type.	
	0	-113 dBm or less
	1	-111 dBm
	2...30	-109 dBm... -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, please refer to ***Table 11***.	

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 99.

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.

5.4. 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),(**range of supported **<format>**s**)** **OK**
Read Command **AT+CPOL?**	Response Query the list of preferred operators: **+CPOL: <index>,<format>,<oper>[,<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>,<NG-RAN>]** **[…]** **OK**
Write Command **AT+CPOL=<index>[,<format>[,<oper>[<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>,<NG-RAN>]]]**	Response Edit the list of preferred operators: **OK** Or **ERROR** If there is any error related to MT functionality: **+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
<NG-RAN>	Integer type. NG-RAN access technology. 0 Access technology is not selected 1 Access technology is selected
<err>	Error codes. For more details, please refer to ***Table 11***.

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.

5.5. AT+COPN Read Operator Names

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

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

Parameter

<numericn>	String type. Operator names in numeric format (see **AT+COPS**).
<alphan>	String type. Operator names in long alphanumeric format (see **AT+COPS**).
<err>	Error codes. For more details, please refer to ***Table 11***.

5.6. AT+CTZU Automatic Time Zone Update

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

AT+CTZU Automatic Time Zone Update	
Test Command **AT+CTZU=?**	Response **+CTZU: (**list of supported **<onoff>**s**)** **OK**
Write Command **AT+CTZU=<onoff>**	Response **OK** Or

	ERROR
Read Command **AT+CTZU?**	Response **+CTZU: <onoff>** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<onoff>	Integer type. Indicate the mode of automatic time zone update. 0 Disable automatic time zone update via NITZ 1 Enable automatic time zone update via NITZ

Example

```
AT+CTZU?                //Test command
+CTZU: 0

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

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

OK
```

5.7. AT+CTZR Time Zone Reporting

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

AT+CTZR Time Zone Reporting	
Test Command **AT+CTZR=?**	Response **+CTZR: (**range of supported **<reporting>**s**)** **OK**
Write Command **AT+CTZR=<reporting>**	Response **OK** Or **ERROR**
Read Command **AT+CTZR?**	Response **+CTZR: <reporting>** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<reporting>	Integer type. Indicate 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. Indicate 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 to +56. To maintain a fixed width, numbers in the range -9 to +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09".
<dst>	Integer type. Indicate 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. Indicate 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.

Example

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

OK

+CTZE: "+32",0,"2018/03/23,06:51:13"          //<reporting> is 2.
```

5.8. AT+QLTS Obtain the Latest Time Synchronized through Network

This command obtains the latest time synchronized through network. The 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: (**range of supported **<mode>**s**)** **OK**
Execution Command **AT+QLTS**	Response **+QLTS: <time>,<ds>** **OK**
Write Command **AT+QLTS=<mode>**	Response **+QLTS: <time>,<ds>** **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
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>	Format is "yy/MM/dd,hh:mm:ss±zz", in which 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 to +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, please refer to ***Table 11***.

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
```

5.9. 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 **AT+QNWINFO**	Response **+QNWINFO: <AcT>,<oper>,<band>,<channel>** **OK**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<AcT>	String type. Access technology selected. "NONE" "WCDMA" "HSDPA" "HSUPA" "HSPA+" "TDD LTE" "FDD LTE"
<oper>	Operator names in numeric format.
<band>	String type. Band selected. "WCDMA 2100" "WCDMA 1900" "WCDMA 1800" "WCDMA 1700 US" "WCDMA 850" "WCDMA 800" "WCDMA 2600"

	"WCDMA 900" "WCDMA 1700 JAPAN" "WCDMA 1500" "WCDMA 850 JAPAN" "LTE BAND 1"–"LTE BAND 66"
<channel>	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
```

5.10. 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.

NOTES

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
```

5.11. AT+QENG Query Primary Serving Cell and Neighbour Cell Information

This command obtains the network information, such as serving cell and neighbour cells.

AT+QENG Query Primary Serving Cell and Neighbour Cell Information	
Test Command **AT+QENG=?**	Response **+QENG: (**list of supported **<cell_type>**s**)** **OK**
Write Command Query the serving cell information **AT+QENG="servingcell"**	Response In SA mode: **+QENG: "servingcell",<state>,"NR5G-SA",<duplex_mode>,<MCC>,<MNC>,<cellID>,<PCID>,<TAC>,<ARFCN>,<band>,<NR_DL_bandwidth>,<RSRP>,<RSRQ>,<SINR>,<tx_power>,<srxlev>** In EN-DC mode: **+QENG: "servingcell",<state>** **+QENG: "LTE",<is_tdd>,<MCC>,<MNC>,<cellID>,<PCID>,<earfcn>,<freq_band_ind>,<UL_bandwidth>,<DL_bandwidth>,<TAC>,<RSRP>,<RSRQ>,<RSSI>,<SINR>,<CQI>,<tx_power>,<srxlev>** **+QENG: "NR5G-NSA",<MCC>,<MNC>,<PCID>,<RSRP>,<SINR>,<RSRQ>,<ARFCN>,<band>**

	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>,<CQI>,<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/5G 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.
<duplex_mode>	String type. The NR5G network mode. "TDD" "FDD"
<is_tdd>	String type. The LTE network mode. "TDD" "FDD"
<MCC>	Number format. Mobile Country Code (first part of the PLMN code)
<MNC>	Number format. Mobile Network Code (second part of the PLMN code)
<ARFCN>	The parameter determines the SA-ARFCN of the cell that was scanned.
<band>	NR5G frequency band.
<NR_DL_bandwidth>	Integer type. DL bandwidth. 0 5 MHz 1 10 MHz 2 15 MHz 3 20 MHz 4 25 MHz 5 30 MHz 6 40 MHz 7 50 MHz 8 60 MHz 9 80 MHz 10 90 MHz 11 100 MHz 12 200 MHz 13 400 MHz
<LAC>	Integer type. 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>	Integer type. Cell ID. The parameter determines the 16-bit (GSM) or 28-bit (UMTS) cell ID. Range: 0–0xFFFFFFF.
<PCID>	Number format. Physical cell ID.
<uarfcn>	The parameter determines the UTRA-ARFCN of the cell that was scanned.

<earfcn>	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 Section 19.4.2.3*)
<PSC>	The parameter determines the primary scrambling code of the cell that was scanned
<RAC>	Integer type. Routing Area Code. Range: 0–255.
<RSCP>	The parameter determines the Received Signal Code Power level of the cell that was scanned.
<ecio>	Carrier to noise ratio in dB = measured Ec/Io value in dB.
<RSRP>	In LTE mode: It indicates the signal of LTE Reference Signal Received Power (see *3GPP 36.214*). Range: -140 to -44 dBm. The closer to -44, the better the signal is. The closer to -140, the worse the signal is. In 5G NR mode: It indicates the signal of 5G NR Reference Signal Received Power. Range: -140 to -44 dBm. The closer to -44, the better the signal is. The closer to -140, the worse the signal is.
<RSRQ>	In LTE mode: It indicates the signal of current LTE Reference Signal Received Quality (see *3GPP 36.214*). Range: -20 to -3 dB. The closer to -3, the better the signal is. The closer to -20, the worse the signal is. In 5G NR mode: It indicates the signal of current 5G NR Reference Signal Received Quality. Range: -20 to -3 dB. The closer to -3, the better the signal is. The closer to -20, the worse the signal is.
<RSSI>	LTE Received Signal Strength Indication.
<SINR>	In LTE mode: It indicates LTE Signal-to-Interface plus Noise Ratio. The conversion formula for actual SINR is **Y** = (**1/5**) × **X** × **10** - **20** (**X** is the **<SINR>** value

	queried by **AT+QENG** and **Y** is the actual value of LTE SINR after calculating with the formula). Range: -20 to 30 dB. In 5G NR mode: It indicates the signal of 5G NR Signal-to-Interface plus Noise Ratio. Range: -20 to 30 dB.
<CQI>	Integer type. Channel Quality Indication. Range: 1–30.
<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>	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.
<srxlev>	Suitable reception 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>	Reselection threshold for high priority layers.
<thresh_Xlow>	Reselection threshold for low priority layers.
<srxlev>	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

If this command returns "-", it indicates that the parameter is invalid under current condition.

Example

```
AT+QENG="servingcell"
+QENG: "servingcell","NOCONN"
+QENG: "LTE","FDD",460,01,B38751,179,1650,3,5,5,1845,-79,-9,-50,16,-
+QENG:"NR5G-NSA",460,01,274,-81,160,-11,627264,78

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
```

5.12. 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>,<SINR>** **+QCAINFO: "SCC",<freq>,<bandwidth>,<band>,<scell_state>,<PCID>,<RSRP>,<RSRQ>,<RSSI>,<SINR>** **[+QCAINFO: "SCC",<freq>,<bandwidth>,<band>,<scell_state>,<PCID>,<RSRP>,<RSRQ>,<RSSI>,<SINR>** **[…]]**

	OK If no secondary cell was active: **OK**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<PCC>	Primary carrier component.
<SCC>	Secondary carrier component.
<freq>	EARFCN.
<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. DL Band information. "LTE BAND 1" "LTE BAND 2" "LTE BAND 3" … "LTE BAND 66"
<pcell_state>	Integer type. Primary cell state. 0 No serving 1 Registered
<scell_state>	Integer type. Secondary cell state. 0 Deconfigured 1 Configuration deactivated 2 Configuration 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. Received Signal Strength Indication.
<SINR>	Integer type. Logarithmic value of SINR. Values are in 1/5th of a dB. Range: 0–250 (-20 to +30 dB).

5.13. AT+QENDC Query EN-DC Status

This command queries EN-DC status.

AT+QENDC Query EN-DC Status	
Test Command **AT+QENDC=?**	Response **OK**
Execution Command **AT+QENDC**	Response **+QENDC: <endc_avl>,<plmn_info_list_r15_avl>,<endc_rstr>,<5g_basic>** **OK**
Characteristics	/

Parameter

<endc_avl>	Integer type. Indicate whether the current cell supports EN-DC mode. 0 Not support 1 Support
<plmn_info_list_r15_avl>	Integer type. Indicate whether the currently registered PLMN supports the EN-DC mode. 0 Not support 1 Support
<endc_rstr>	Integer type. EN-DC capability delivered by the network. 0 Restricted 1 Not restricted
<5G_basic>	Integer type. Indicate whether to get 5G Icon information successfully 0 Not support 1 Support

5.14. AT+QNWCFG Configure and Query Network Parameters

This command configures and queries network parameters.

AT+QNWCFG Configure and query network parameters	
Test Command **AT+QNWCFG=?**	Response **+QNWCFG: "cdrx",(**list of supported **<enable>**s**)** **+QNWCFG: "csi_ctrl",(**list of supported **<LTE_enable>**s**),(**list of supported **<NR5G_enable>**s**)** **+QNWCFG: "lte_csi",<mcs>,<ri>,<cqi>,<pmi>**

	+QNWCFG: "nr5g_csi",<mcs>,<ri>,<cqi>,<pmi> **+QNWCFG: "data_path_ctrl",(**list of supported **<monitor_enable>**s**)** **+QNWCFG:"data_path",(**list of supported **<RAT_path>**s**)** **OK**
Maximum Response Time	300 ms
Characteristics	/

5.14.1. AT+QNWCFG="cdrx" Enable or Disable CDRX function

This command enables or disables CDRX function. CDRX is enabled by default.

AT+QNWCFG="cdrx" Enable or Disable CDRX function	
Write Command **AT+QNWCFG="cdrx"[,<enable>]**	Response If the option parameter is omitted, query the current configuration: **+QNWCFG: "cdrx",<enable>** **OK** If the option parameter is specified, configure whether CDRX is enabled: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting. The configuration will be saved automatically.

Parameter

<enable>	Integer type. Whether to enable or disable CDRX function.	
	0	Disable
	1	Enable

Example

```
AT+QNWCFG="cdrx"                    //Query the current configuration.
+QNWCFG: "cdrx",1
```

```
OK
AT+QNWCFG="cdrx",1                    //Enable CDRX function.
OK
```

5.14.2. AT+QNWCFG="csi_ctrl" Control LTE and NR5G CSI Acquisition

This command controls LTE or NR5G CSI acquisition.

AT+QNWCFG="csi_ctrl" Control LTE and NR5G CSI Acquisition	
Write Command **AT+QNWCFG="csi_ctrl"[,<LTE_enable>,<NR5G_enable>]**	Response If the optional parameters are omitted, query the current configuration: **+QNWCFG: "csi_ctrl",<LTE_enable>,<NR5G_enable>** **OK** If the optional parameters are specified, configure whether LTE or NR5G CSI acquisition is enabled: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

<LTE_enable>	Integer type. Whether to enable or disable LTE CSI acquisition. 0 Disable 1 Enable
<NR5G_enable>	Integer type. Whether to enable or disable NR5G CSI acquisition. 0 Disable 1 Enable

Example

```
AT+QNWCFG="csi_ctrl"                  //Query the current configuration.
+QNWCFG: "csi_ctrl",1,1

OK
AT+QNWCFG="csi_ctrl",0,0              //Disable LTE and NR5G CSI acquisition
OK
```

5.14.3. AT+QNWCFG="lte_csi" Read LTE CSI information

This command reads CSI information of LTE, including MCS, CQI, RI and PMI.

AT+QNWCFG="lte_csi" Read LTE CSI information	
Write Command **AT+QNWCFG="lte_csi"**	Response **+QNWCFG: "lte_csi",<mcs>,<ri>,<cqi>,<pmi>** **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<mcs>	Integer type. Modulation and Coding Scheme of PDSCH.
<ri>	Integer type. Indicate the effective number of data layers of PDSCH.
<cqi>	Integer type. Indicate the quality of the downlink channel.
<pmi>	Integer type. Indicate the index of the codebook set.

Example

```
AT+QNWCFG="lte_csi"                    //Read LTE CSI information
+QNWCFG: "lte_csi"0,1,15,0

OK
```

5.14.4. AT+QNWCFG="nr5g_csi" Read NR5G CSI information

This command reads CSI information of NR5G, including MCS, CQI, RI and PMI.

AT+QNWCFG="nr5g_csi" Read NR5G CSI information	
Write Command **AT+QNWCFG="nr5g_csi"**	Response **+QNWCFG: "nr5g_csi",<mcs>,<ri>,<cqi>,<pmi>** **OK** Or **ERROR**
Maximum Response Time	300 ms

Characteristics	/

Parameter

<mcs>	Integer type. Modulation and Coding Scheme of PDSCH.
<ri>	Integer type. Indicate the effective number of data layers of PDSCH.
<cqi>	Integer type. Indicate the quality of the downlink channel.
<pmi>	Integer type. Indicate the index of the codebook set.

Example

```
AT+QNWCFG="nr5g_csi"                    //Read NR5G CSI information
+QNWCFG: "nr5g_csi"0,1,15,0

OK
```

5.14.5. AT+QNWCFG=" data_path_ctrl" Monitor User Layer Data Path under NSA Network

This command configures whether to monitor the downlink user layer data path under NSA network.

AT+QNWCFG="data_path_ctrl" Monitor User Layer Data Path under NSA Network	
Write Command **AT+QNWCFG="data_path_ctrl"[,<monitor_enable>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWCFG: "data_path_ctrl",<monitor_enable>** **OK** If the optional parameter is specified, configure whether to monitor the downlink user layer data path under NSA network: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

<monitor_enable>	Integer type. Whether to enable the feature of monitoring the downlink user layer data path under NSA network. 0 Disable 1 Enable

Example

```
AT+QNWCFG="data_path_ctrl"          //Query the current configuration
+QNWCFG: "data_path_ctrl",1
OK
AT+QNWCFG="data_path_ctrl",0        //Disable the feature of monitoring the downlink user layer data path under NSA network

OK
```

5.14.6. AT+QNWCFG=" data_path" Query User Layer Data Path under NSA Network

This command queries the downlink user layer data path under NSA network.

AT+QNWCFG="data_path"	Query User Layer Data Path under NSA Network
Write Command **AT+QNWCFG="data_path"**	Response **+QNWCFG: "data_path",<RAT_path>** **OK**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<RAT_path>	String type. Data path under NSA network.	
	"NONE"	**AT+QNWCFG="data_path_ctrl"** is not used to enable the data path query function
	"LTE"	Downlink data on LTE
	"LTE_AND_NR"	Downlink data on LTE and NR
	"NR"	Downlink data on NR

NOTES

In the NSA network, use **AT+QNWCFG="data_path_ctrl"** to enable the data path query function.

Example

```
AT+QNWCFG ="data_path"          //Query the current configuration
+QNWCFG: "data_path","NR"

OK
```

5.15. 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: "nsa_nr5g_band",(**list of supported **NSA_NR5G_band>**s**)** **+QNWPREFCFG: "nr5g_band",(**list of supported **<NR5G_band>**s**)** **+QNWPREFCFG: "mode_pref",(**list of supported **<mode_pref>**s**)** **+QNWPREFCFG: "srv_domain",(**range of supported **<srv_domain>**s**)** **+QNWPREFCFG: "voice_domain",**(range 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"** **+QNWPREFCFG: "rat_acq_order",(**list of supported **<rat_order>**s**)** **+QNWPREFCFG: "nr5g_disable_mode",(**list of supported **<disable_mode>**s**)** **OK**
Maximum Response Time	300 ms
Characteristics	/

5.15.1. 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** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be 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

RG50xQ&RM5xxQ series modules support 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

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 WCDMA B2
OK
```

5.15.2. 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_band>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "lte_band",<LTE_band>** **OK** If the optional parameter is specified, configure the preferred LTE bands to be searched: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be 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

The LTE bands supported by RG50xQ&RM5xxQ series modules are: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, 39, B40, B41, B42, B43, B48, B66 and B71.

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 N1 and LTE N2
OK
```

5.15.3. AT+QNWPREFCFG="nsa_nr5g_band" NSA 5G NR Band Configuration

This command specifies the preferred NSA 5G NR bands to be searched by UE.

AT+QNWPREFCFG="nsa_nr5g_band" NSA 5G NR Band Configuration	
Write Command **AT+QNWPREFCFG="nsa_nr5g_band"[,<NSA_NR5G_band>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "nsa_nr5g_band",<NSA_NR5G_band>** **OK** If the optional parameter is specified, configure the preferred NSA 5G NR bands to be searched: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

<NSA_NR5G_band>	String type. Use the colon as a separator to list the NSA 5G NR bands to be configured. The parameter format is **N1:N2:…:Nx**.

NOTE

The configurable NSA 5G NR bands supported by the applicable modules for this command are: N1, N2, N3, N5, N7, N8, N12, N20, N25, N28, N38, N40, N41, N48, N66, N71, N77, N78, N79, N257, N258, N260 and N261.

Example

```
AT+QNWPREFCFG= "nsa_nr5g_band"        //Query the currently configured NSA 5G NR bands of UE
```

+QNWPREFCFG: "nsa_nr5g_band",1:3:7:20:28:40:41:71:77:78:79

OK
AT+QNWPREFCFG= "nsa_nr5g_band",1:2 //Set NSA 5G NR N1 and NSA 5G NR N2
OK

5.15.4. AT+QNWPREFCFG="nr5g_band" 5G NR Band Configuration

This command specifies the preferred NR5G bands to be searched by UE.

AT+QNWPREFCFG="nr5g_band"	5G NR Band Configuration
Write Command **AT+QNWPREFCFG="nr5g_band"[,<NR5G_band>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "nr5g_band",<NR5G_band>** **OK** If the optional parameter is specified, configure the preferred 5G NR bands to be searched: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

<NR5G_band>	String type. Use the colon as a separator to list the 5G NR bands to be configured. The parameter format is **N1:N2:…:Nx**. The configurable SA 5G NR bands supported by the applicable modules for this command are: N1, N2, N3, N5, N7, N8, N12, N20, N25, N28, N38, N40, N41, N48, N66, N71, N77, N78, N79.

Example

AT+QNWPREFCFG= "nr5g_band" //Query the currently configured NR5 bands of the UE
+QNWPREFCFG: "nr5g_band",1:3:7:20:28:40:41:71:77:78:79

OK
AT+QNWPREFCFG= "nr5g_band",1:2 //Set 5G NR N1 and 5G NR N2
OK

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

This command specifies the network search mode.

AT+QNWPREFCFG="mdoe_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** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

<mode_pref>	String type. Use the colon as a separator to list the RATs to be configured. The parameter format is: **RAT1:RAT2:…RATN**. The RATs supported by the module are as follows:	
	AUTO	WCDMA & LTE & 5G NR
	WCDMA	WCDMA only
	LTE	LTE only
	NR5G	5G NR only

Example

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

OK
AT+QNWPREFCFG= "mode_pref",LTE              //Set RAT to LTE only.
OK
AT+QNWPREFCFG= "mode_pref",LTE:NR5G         //Set RAT to LTE & 5G NR.
OK
```

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

Parameter

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

Example

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

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

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

This command specifies the voice domain of UE.

AT+QNWPREFCFG="voice_domain"	Voice Domain Configuration
Write Command	Response

AT+QNWPREFCFG="voice_domain"[,<voice_domain>]	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** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be 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

Example

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

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

5.15.8. 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** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be 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

Example

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

OK
AT+QNWPREFCFG= "roam_pref",1               //Roaming preference on home network
OK
```

5.15.9. 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** Or **ERROR**

Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

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

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
```

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

This command queries the band configured in the carrier policy.

AT+QNWPREFCFG="policy_band"	Policyman Band
Write Command **AT+QNWPREFCFG="policy_band"**	Response **+QNWPREFCFG: "gw_band",<gw_band>** **+QNWPREFCFG: "lte_band",<LTE_band>** **+QNWPREFCFG: "nsa_nr5g_band",<NSA_NR5G_band>** **+QNWPREFCFG: "nr5g_band",<NR5G_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**.

<NSA_NR5G_band>	String type. Use the colon as a separator to list the NSA 5G NR bands to be configured. The parameter format is **N1:N2:…:Nx**.
<NR5G_band>	String type. Use the colon as a separator to list the 5G NR bands to be configured. The parameter format is **N1:N2:…:Nx**.

NOTE

RG50xQ&RM5xxQ series modules support 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
The LTE bands supported by RG50xQ&RM5xxQ series modules are: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, 39, B40, B41, B42, B43, B48, B66 and B71.
The configurable NSA 5G NR bands supported by the applicable modules for this command are: N1, N2, N3, N5, N7, N8, N12, N20, N25, N28, N38, N40, N41, N48, N66, N71, N77, N78, N79, N257, N258, N260 and N261.
The configurable SA 5G NR bands supported by the applicable modules for this command are: N1, N2, N3, N5, N7, N8, N12, N20, N25, N28, N38, N40, N41, N48, N66, N71, N77, N78, N79.

Example

```
AT+QNWPREFCFG="policy_band"
+QNWPREFCFG: "gw_band",1:8
+QNWPREFCFG: "lte_band",1:3:8
+QNWPREFCFG: "nsa_nr5g_band",78
+QNWPREFCFG: "nr5g_band",78

OK
```

5.15.11. AT+QNWPREFCFG="ue_capability_band" UE Capability Band

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

AT+QNWPREFCFG="ue_capability_band" UE Capability Band	
Write Command **AT+QNWPREFCFG="ue_capability_band"**	Response **+QNWPREFCFG: "gw_band",<gw_band>** **+QNWPREFCFG: "lte_band",<LTE_band>**

	+QNWPREFCFG: "nsa_nr5g_band",<NSA_NR5G_band> **+QNWPREFCFG: "nr5g_band",<NR5G_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**.
<NSA_NR5G_band>	String type. Use the colon as a separator to list the NSA 5G NR bands to be configured. The parameter format is **N1:N2:…:Nx**.
<NR5G_band>	String type. Use the colon as a separator to list the 5G NR bands to be configured. The parameter format is **N1:N2:…:Nx**.

NOTE

RG50xQ&RM5xxQ series modules support 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
The LTE bands supported by RG50xQ&RM5xxQ series modules are: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, 39, B40, B41, B42, B43, B48, B66 and B71.
The configurable NSA 5G NR bands supported by the applicable modules for this command are: N1, N2, N3, N5, N7, N8, N12, N20, N25, N28, N38, N40, N41, N48, N66, N71, N77, N78, N79, N257, N258, N260 and N261.
The configurable SA 5G NR bands supported by the applicable modules for this command are: N1, N2, N3, N5, N7, N8, N12, N20, N25, N28, N38, N40, N41, N48, N66, N71, N77, N78, N79.

Example

```
AT+QNWPREFCFG="ue_capability_band"
```

```
+QNWPREFCFG: "gw_band",1:8
+QNWPREFCFG: "lte_band",1:3:8
+QNWPREFCFG: "nsa_nr5g_band",78
+QNWPREFCFG: "nr5g_band",78

OK
```

5.15.12. AT+QNWPREFCFG="rat_acq_order" RAT Priority Configuration

This command specifies the RAT acquisition order.

AT+QNWPREFCFG="rat_acq_order" Rat Priority Configuration	
Write Command **AT+QNWPREFCFG="rat_acq_order"[,<rat_order>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "rat_acq_order",<rat_order>** **OK** If the optional parameter is specified, configure the network search mode: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting. The configuration will be saved automatically.

Parameter

<rat_order>	String type. Use the colon as a separator to specify RAT priority. The parameter format is: **RAT1:RAT2:…RATN**. The RATs supported by the module are as follows: WCDMA WCDMA LTE LTE NR5G 5G NR

Example

```
AT+QNWPREFCFG= "rat_acq_order"                    //Query the current RAT order.
+QNWPREFCFG: "rat_acq_order",NR5G:LTE:WCDMA

OK
```

```
AT+QNWPREFCFG= "rat_acq_order",LTE:NR5G:WCDMA      //Set RAT order priority.
OK
AT+CFUN=1,1                                        //Reset the module.
OK
AT+QNWPREFCFG= "rat_acq_order"                     //Query the current RAT order.
+QNWPREFCFG: "rat_acq_order", LTE:NR5G:WCDMA

OK
```

5.15.13. AT+QNWPREFCFG="nr5g_disable_mode" Disable NR5G Configuration

This command disables NR5G.

AT+QNWPREFCFG="nr5g_disable_mode" Disable NR5G Configuration	
Write Command **AT+QNWPREFCFG="nr5g_disable_mode"[,<disable_mode>]**	Response If the optional parameter is omitted, query the current configuration: **+QNWPREFCFG: "nr5g_disable_mode",<disable_mode>** **OK** If the optional parameter is specified, disable NR5G configuration: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

<disable_mode>	Integer type. Disable NA/NSA. 0 None is disabled 1 Disable SA 2 Disable NSA

Example

```
AT+QNWPREFCFG="nr5g_disable_mode"          //Query the current configuration
+QNWPREFCFG: "nr5g_disable_mode",0

OK
```

```
AT+QNWPREFCFG="nr5g_disable_mode",1      //Disable SA
OK
```

6 Call Related Commands

6.1. 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. Response in case of data call, if successfully connected: **CONNECT<text>** And MT switches to data mode. **<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	

NOTES

1. Any additional commands on the same command line are ignored.
2. This command may be aborted generally by receiving a character during execution. The aborting is impossible happened during some connection establishments such as handshaking.

Example

```
RING                                    //A voice call is ringing.
AT+CLCC
+CLCC: 1,0,0,1,0,"",128                 //PS call in LTE mode.
+CLCC: 2,1,4,0,0,"02154450290",129      //Incoming call.

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

6.2. 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: **BUSYBUSY** 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 Actives **CLIR** (Disable presentation of own number to the called party) i Deactivates **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
<;>	It is required when setting up voice call, and will return to command state after call.

NOTES

1. This command may be aborted generally caused by receiving an **ATH** command or a character during execution. The aborting is not impossible happened during some connection establishment such as handshaking.
2. Parameter "**I**" and "**i**" only valid if no "*****" or "#" code is within the dial string.
3. See **ATX** command for setting result code and call monitoring parameters.
4. Responses returned after dialing with **ATD**:
   For voice call, two different responses mode 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**. For factory version, the default is **AT+COLP=0**, which causes the MT to return **OK** immediately after dialing was completed. Otherwise MT will return **OK**, **BUSY**, **NO DIAL TONE**, or **NO CARRIER**.
5. 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 by using **AT+CLCC** command.

Example

```
ATD10086;                    //Dialing out the party's number.
OK
```

6.3. 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 Disconnect existing call by local TE from command line and terminate the call. **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

6.4. AT+CVHU Voice Hangup Control

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

AT+CVHU Voice Hangup 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 but **OK** response is returned

6.5. 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
```

6.6. ATS0 Set Number of Rings before Automatically Answering Call

This command controls automatic answering mode for the incoming calls.

ATS0 Set Number of Rings before Automatically Answering Call	
Read Command **ATS0?**	Response **<n>** **OK**
Write Command **ATS0=<n>**	Response This parameter setting determines the number of rings before auto-answer. **OK**
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

6.7. 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**
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<n>	Integer type. 0–2–10 Number of seconds to wait before blind dialing

6.8. 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 This parameter setting determines the amount of time (unit: second) to wait for the connection completion in case of answering or originating a call.

	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

6.9. 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

6.10. 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

6.11. AT+CSTA Select Type of Address

This command selects the type of number for further dialing commands **ATD** according to 3GPP Specifications. The 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 **AT+CSTA=[<type>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

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

6.12. 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 related to MT functionality: **+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** command 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, please refer to ***Table 11***.

Example

```
ATD10086;                                  //Establish a call.
OK
AT+CLCC
+CLCC: 1,0,0,1,0,"",128                    //PS call in LTE mode.
+CLCC: 2,0,0,0,0,"10086",129               //Establish a call, and the call has been answered.

OK
```

6.13. 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, an 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

6.14. AT+CRC Set Cellular Result Codes for 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 Cellular Result Codes for 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 MT controls whether the extended format of incoming call indication is used or not. **OK**
Maximum Response Time	300 ms
Characteristics	/
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 to TE.
ATH
OK
AT+CRC=0                         //Disable extended format.
OK

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

6.15. AT+CRLP Select Radio Link Protocol Parameter

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

AT+CRLP Select Radio Link Protocol Parameter	
Test Command **AT+CRLP=?**	Response MT returns values supported. RLP (Radio Link Protocol) versions 0 and 1 share the same parameter set. MT returns only one line for this set (during which **<ver>** is not presented). **+CRLP: (**range of supported **<iws>**s**),(**range of supported **<mws>**s**),(**range of supported **<T1>**s**),(**range of supported **<N2>**s**),<ver>** **+CRLP: (**range of supported **<iws>**s**),(**range of supported **<mws>**s**),(**range of supported **<T1>**s**),(**range of supported **<N2>**s**),<ver>** **+CRLP: (**range of supported **<iws>**s**),(**range of supported **<mws>**s**),(**range of supported **<T1>**s**),(**range of supported **<N2>**s**),<ver>** **OK**
Read Command **AT+CRLP?**	Response MT returns current settings 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). **+CRLP: <iws>,<mws>,<T1>,<N2>,<ver>** **...** **OK**
Write Command **AT+CRLP=[<iws>[,<mws>[,<T1>[,<**	Response TA sets radio link protocol (RLP) parameters used when

N2>[,<ver>]]]]]	non-transparent data calls are set up. **OK**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS27.007	

Parameter

<iws>	Integer type.	
	0–61	Interworking window size (IWF to MS)
	0–240–488	For **<ver>** = 2
<mws>	Integer type.	
	0–61	Mobile window size (MS to IWF)
	0–240–488	For **<ver>** = 2
<T1>	Integer type.	
	38–48–255	Acknowledgment timer T1 in a unit of 10ms
	42–52–255	For **<ver>** = 2
<N2>	Integer type.	
	1– -6–55	Retransmission attempts N2
<ver>	Integer type.	
	0–2	RLP version number in integer format

6.16. AT+QECCNUM Configure Emergency Call Numbers

This command queries, add and delete ECC numbers (emergency call numbers). There are two kinds of ECC numbers: ECC numbers without (U)SIM and ECC numbers with (U)SIM. The default ECC numbers without (U)SIM is 911, 112, 00, 08, 110, 999, 118 and 119. The default ECC number with (U)SIM is 911 and 112. 911 and 112 will always be supported as ECC numbers, and cannot be deleted. ECC numbers can be saved into NVM automatically. If the (U)SIM card contains ECC file, the numbers in ECC file can also be regarded as ECC numbers.

The maximal supported ECC numbers of each type is 20.

AT+QECCNUM Configure Emergency Call Numbers	
Test Command **AT+QECCNUM=?**	Response **+QECCNUM: (**range of supported **<mode>**s**)** **OK**

Write Command **AT+QECCNUM=<mode>,<type>[,<eccnum1>[,<eccnum2>,...[,<eccnumN>]]]**	Response If **<mode>** is equal to 0, query the ECC numbers. In this case, **<eccnumN>** should be omitted: **+QECCNUM: <type>,<eccnum1>,<eccnum2>[…]** **OK** If **<mode>** is not equal to 0: **<mode>** = 1 adds the ECC number; **<mode>** = 2 deletes the ECC number. In this case, at least one ECC number **<eccnumN>** should be inputted: **OK** Or **ERROR**
Read Command **AT+QECCNUM?**	Response **+QECCNUM: 0,<eccnum1>,<eccnum2>[…]** **…** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.

Parameter

<mode>	Integer type. ECC number operation mode. 0 Query ECC numbers 1 Add ECC numbers 2 Delete ECC numbers
<type>	Integer type. ECC number type. 0 ECC numbers without (U)SIM 1 ECC numbers with (U)SIM
<eccnumN>	String type. ECC numbers (e.g."110", "119")

Example

```
AT+QECCNUM=?                    //Query the supported ECC number operation mode.
+QECCNUM: (0-2)

OK
AT+QECCNUM?                     //Query the ECC numbers with or without (U)SIM.
+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.
+QECCNUM: 1,"911","112"

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

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

OK
```

6.17. 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 MT enables or disables the presentation of the DSCI at TE. **OK**
Characteristics	/
Reference	

Parameter

<n>	Integer type.

0	DSCI not supported
1	DSCI supported

NOTE

When the presentation of the DSCI at the TE is enabled, an unsolicited result code is returned after the action:

^DSCI: <id>,<dir>,<stat>,<type>,<number>,<num_type>

Parameters

<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

8 CALL_REMOTE_HOLD

9 CALL_BOTH_HOLD

<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
ATD10086;                          //Dial 10086.
OK

^DSCI: 1,0,2,0,10086,129           //A call is originated.

^DSCI: 1,0,7,0,10086,129           //The call is alerting.
```

^DSCI: 1,0,3,0,10086,129 //The call is connected.

ATH
OK

^DSCI: 1,0,6,0,10086,129 //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 Phonebook Commands

7.1. 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** Or **ERROR** If there is any error related to MT functionality: **+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 of 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, please refer to ***Table 11***.

7.2. 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 return 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** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	Depend on the storage of phonebook entries.
Characteristics	/
Reference 3GPP 27.007	

Parameter

<nlength>	Integer type. Indicate the maximum length of field **<number>**.
<tlength>	Integer type. Indicate 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.
<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, please refer to ***Table 11***.

7.3. 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** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	Depends on the storage of phonebook entries.
Characteristics	/
Reference 3GPP 27.007	

Parameter

<index>	Integer type. Location numbers of phonebook memory.
<nlength>	Integer type. Indicate the maximum length of field **<number>**.
<tlength>	Integer type. Indicate the maximum length of field **<text>**.
<index1>	Integer type. The first phonebook record to be read.
<index2>	Integer type. The last phonebook record to be read.
<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, please refer to ***Table 11***.

7.4. AT+CPBS Select Phonebook Memory Storage

This command selects phonebook memory storage, which is used by other phonebook related 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. The 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** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Read Command **AT+CPBS?**	Response **+CPBS: <storage>[,<used>,<total>]** **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Write Command **AT+CPBS=<storage>**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP 27.007	

Parameter

<storage>	String type. "SM" (U)SIM phonebook "DC" MT dialed calls list (**AT+CPBW** may not be applicable to this storage) "FD" (U)SIM fix dialing-phone book (**AT+CPBW** operation needs the authority of PIN2) "LD" (U)SIM last-dialing-phone book (**AT+CPBW** may not be applicable to this storage) "MC" MT missed (unanswered) calls list (**AT+CPBW** may not be applicable to this storage) "ME" Mobile equipment phonebook "RC" MT received calls list (**AT+CPBW** may not be applicable to this storage) "EN" (U)SIM (or MT) emergency number (**AT+CPBW** may not be applicable to this storage) "ON" (U)SIM own numbers (MSISDNs) list
<used>	Integer type. Indicate the total number of used locations in selected memory.
<total>	Integer type. Indicate the total number of locations in selected memory.
<err>	Error codes. For more details, please refer to ***Table 11***.

7.5. 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: (**range of supported **<index>**s**),<nlength>,**(list of supported **<type>**s**),<tlength>** **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Write Command **AT+CPBW=<index>][,<number>[,<type>[,<text>]]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**

Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP 27.007	

Parameter

<index>	Integer type. In the range of location numbers of phone book memory.
<nlength>	Integer type. Indicate the maximum length of field **<number>**
<tlength>	Integer type. Indicate the maximum length of field **<text>**
<nlength>	Integer type value indicating the maximum length of field **<number>**
<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, please refer to ***Table 11***.

Example

```
AT+CSCS="GSM"
OK
AT+CPBW=10,"15021012496",129,"QUECTEL"
OK                                  //Make a new phonebook entry at location 10.
AT+CPBW=10                          //Delete entry at location 10.
OK
```

8 Short Message Service Commands

8.1. AT+CSMS Select Message Service

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

AT+CSMS Select Message Service	
Test Command **AT+CSMS=?**	Response **+CSMS: (**list of supported **<service>**s**)** **OK**
Read Command **AT+CSMS?**	Response **+CSMS: <service>,<mt>,<mo>,<bm>** **OK**
Write Command **AT+CSMS=<service>**	Response **+CSMS: <mt>,<mo>,<bm>** **OK** If there is any error related to MT functionality: **+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 can 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, please refer to ***Table 12***.	

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
```

8.2. AT+CMGF Message Format

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

The format of messages can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters). Text mode uses the value of 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 **AT+CMGF[=<mode>]**	Response MT sets parameter to decide which kind of I/O format of messages is used. **OK**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.005	

Parameter

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

8.3. AT+CSCA Service Center Address

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

	Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be 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 (refer to command **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 (refer to **<toda>** by default).

Example

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

OK
```

8.4. AT+CPMS Preferred Message Storage

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

AT+CPMS Preferred Message Storage	
Test Command **AT+CPMS=?**	Response **+CPMS: (**list of supported **<mem1>**s**),(**list of supported **<mem2>**s**),(**list of supported **<mem3>**s**)** **OK**
Read Command **AT+CPMS?**	Response **+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>**

	OK
Write Command **AT+CPMS=<mem1>[,<mem2>[,<mem3>]]**	Response MT selects memory storages **<mem1>**, **<mem2>** and **<mem3>** to be used for reading, writing, etc. **+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>** **OK** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be 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, please refer to ***Table 12***.

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
```

8.5. 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 should ignore **<index>** and follow the rules of **<delflag>** shown as below.

AT+CMGD Delete Messages	
Test Command **AT+CMGD=?**	Response **+CMGD: (**range of supported **<index>**s**),(**range of supported **<delflag>**s**)** **OK**
Write Command **AT+CMGD=<index>[,<delflag>]**	Response MT deletes message from preferred message storage **<mem1>** location **<index>**. **OK** If there is any error related to MT functionality: **+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. 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
<err>	Error codes. For more details, please refer to ***Table 12***.

Example

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

8.6. AT+CMGL List Messages

This 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 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>],<sct**

	s>,<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 related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms. Note: Operation of **<stat>** depends on the storage of listed messages.
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. In the range of location numbers supported by the associated memory	
<da>	Destination Address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *3GPP TS 27.007*); type of address is given by **<toda>**.	
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *TS 27.007*); 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 command Select TE Character Set **AT+CSCS** (see definition of this command in *3GPP TS 27.007*).	
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to **<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 (refer to **<toda>** by default).	
<length>	Message length, integer type. Indicate the length of the message body <data> in the text mode (**AT+CMGF=1**); or the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (i.e. 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; format: - 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" (refer to **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 (e.g. 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; format: - If **<dcs>**, indicates that 3GPP TS 23.038 GSM 7-bit default alphabet is used: - If TE character set other than "HEX" (refer to **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.
<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 (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) 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 (refer command +CSCS in *3GPP TS 27.007 [9]*); type of address given by **<tora>**
<tora>	*3GPP TS 24.011 [6]* TP-Recipient-Address Type-of-Address octet in integer format (refer to **<toda>** by default)
<scts>	*3GPP TS 23.040 [3]* TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**)
<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. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08".
<st>	*3GPP TS 23.040 [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, please refer to ***Table 12***.

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
```

8.7. AT+CMGR Read Messages

This 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 will change to "REC READ".

AT+CMGR Read Messages	
Test Command **AT+CMGR=?**	Response **OK**
Write Command **AT+CMGR=<index>**	Response MT 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 will change to "REC READ". 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 related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	Depends on the length of message content.
Characteristics	/
Reference 3GPP TS 27.005	

Parameter

<index>	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** command (see definition of this command in *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 (refer to **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 (refer to **AT+CSCS** command 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 (refer to **<dt>**).
<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, 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 (refer to **<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 default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command). 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 (refer to **<toda>** by default).
<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 (refer to **<toda>** by default).
<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 (refer to **AT+CSCS** command 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 (refer to **<toda>** by default).
<length>	Message length. Indicate in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**) the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<data>	The text of short message.
<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 (e.g. 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. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08".

<st>	*3GPP TS 23.040 [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.
<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 (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))
<err>	Error codes. For more details, please refer to ***Table 12***.

Example

```
+CMTI: "SM",3                          //Indicate 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","+8615021012496",,"13/12/13,15:06:37+32",145,4,0,0,"+8613800210500",145,27
<This is a test from Quectel>

OK
```

8.8. AT+CMGS Send Messages

This command sends a short message from TE to the 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>** text is specified **<Ctrl+Z/ESC>** **<ESC>** means quit without sending 2) If in PDU mode (**AT+CMGF=0**):	Response MT 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>** will be returned. Values can be used to identify message upon unsolicited delivery status report result code.

AT+CMGS=<length><CR> PDU is given **<Ctrl+Z/ESC>**	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 related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	120 s, determined by the 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 (refer to command **AT+CSCS** in *3GPP TS 27.007*); 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>	Message length. Indicate in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters; or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<err>	Error codes. For more details, please refer to ***Table 12***.

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="15021012496"
> <This is a test from Quectel>        //Enter in text, <CTRL+Z> send message, <ESC> quits
```

	without sending.
+CMGS: 247 **OK**	

8.9. 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: (**range of supported **<n>**s**)** **OK**
Read Command **AT+CMMS?**	Response **+CMMS: <n>** **OK**
Write Command **AT+CMMS[=<n>]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+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 commands to be sent (**AT+CMGS**, **AT+CMSS**, etc.) and the next command to be sent exceeds 1–5 seconds (the exact value is up to ME implementation); then ME shall close the link and MT switches **<n>** back to 0 automatically.

2	Feature enabled. If the time between the response of the latest commands to be sent and the next command to be sent exceeds 1–5 seconds (the exact value is up to ME implementation), ME shall close the link but MT will not switch **<n>** back to 0 automatically.
<err>	Error codes. For more details, please refer to ***Table 12***.

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.

8.10. AT+CMGW Write Messages to Memory

This command stores short messages from TE to memory storage **<mem2>**, and then the memory location **<index>** of the stored message is returned. Message status will be set to "stored 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>]]**<CR> text is specified **<Ctrl+Z/ESC>** **<ESC>** quits without sending 2) If in PDU mode (**AT+CMGF=0**): **AT+CMGW=<length>[,<stat>]**<CR> PDU is given **<Ctrl+Z/ESC>**	Response MT transmits SMS message (either SMS-DELIVER or SMS-SUBMIT) from TE to memory storage **<mem2>**, and then the memory location **<index>** of the stored message is returned. By default the message status will be set to 'stored unsent', but parameter **<stat>** also allows other status values to be given. If message writing is successful: **+CMGW: <index>** **OK** If there is any error related to MT functionality: **+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 (refer to **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 (refer to **AT+CSCS** command 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 (refer to **<toda>** by default).		
<stat>	PDU mode	Text mode	Explanation
	0	"REC UNREAD"	Received unread messages
	1	"REC READ"	Received read messages
	2	"STO UNSENT"	Stored unsent messages
	3	"STO SENT"	Stored sent messages
	4	"ALL"	All messages
<toda>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.		
<length>	Message length. Indicate in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).		
<pdu>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.04TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).		
<index>	Integer type. Index of message in selected storage **<mem2>.**		
<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, please refer to ***Table 12***.		

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="15021012496"

> <This is a test from Quectel>          //Enter in text. Use <CTRL+Z> to write message or <ESC> to quit without sending.

+CMGW: 4

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

+CMGW: 5

OK
```

8.11. AT+CMSS Send Messages from Storage

This command sends a message with location value **<index>** from message storage **<mem2>** to the network. If a new recipient address **<da>** is given for SMS-SUBMIT, it should be used instead of the one stored with the message.

AT+CMSS Send Messages from Storage	
Test Command **AT+CMSS=?**	Response **OK**
Write Command **AT+CMSS=<index>[,<da>[,<toda>]]**	Response MT sends message with location value **<index>** from message storage **<mem2>** to the network (SMS-SUBMIT). If new recipient address **<da>** is given, it should be used instead of the one stored with the message. Reference value **<mr>** is returned to the TE on successful message delivery. Values can be used to identify message upon unsolicited delivery status report result code. 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 related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	120 s, determined by network.
Characteristics	/
Reference 3GPP TS 27.005	

Parameter

<index>	Integer type in the range of location numbers supported by the associated memory.
<da>	Destination Address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *3GPP TS 27.007*); type of address is given by **<toda>**.
<toda>	Type of destination address. 3GPP TS 24.011 TP-Detination-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 (refer to **<dt>**).
<ackpdu>	Format is same for **<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, please refer to ***Table 12***.

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="15021012496"
> Hello                            //Enter in text. Use <CTRL+Z> to send message or
                                   <ESC> to quit without sending.
+CMGW: 4
```

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

OK
```

8.12. AT+CNMA New Message Acknowledgement to ME/TA

This command confirms 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 will send 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 If in text mode (**AT+CMGF=1**): **OK** If in PDU mode (**AT+CMGF=0**): **+CNMA: (**list of supported **<n>**s**)** **OK**
Execution Command If in text mode (**AT+CMGF=1**): **AT+CNMA**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Write Command If in PDU mode (**AT+CMGF=0**): **AT+CNMA=<n>[,<length>[<CR>** **PDU is given<ctrl-Z/ESC>]]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.005	

Parameter

<n>	String 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.
<length>	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 (i.e. the RP layer SMSC address octets are not counted in the length) in PDU mode (**AT+CMGF=0**).
<err>	Error codes. For more details, please refer to ***Table 12***.

NOTE

The Execution and Write Commands shall only be used when **AT+CSMS** parameter **<service>** equals 1 (phase 2+) and an appropriate URC has been issued by the MT, i.e.:
+CMT for **<mt>** = 2 incoming message classes 0, 1, 3 and none;
+CMT for **<mt>** = 3 incoming message classes 0 and 3;
+CDS for **<ds>** = 1.

Example

```
AT+CSMS=1
OK
AT+CNMI=1,2,0,0,0
OK
AT+CMGF=1
OK
AT+CSDH=1
OK
+CMT: "+8615021012496",,"13/03/18,17:07:21+32",145,4,0,0,"+8613800551500",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.
```

8.13. AT+CNMI New Message Indications to TE

This command selects the procedure on how the received new messages from the network are indicated to the TE when TE is active, e.g. DTR is at low level (ON). If TE is inactive (e.g. 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: (**range of supported **<mode>**s**),(**range of supported **<mt>**s**),(**list of supported **<bm>**s**),(**range of supported **<ds>**s**),(**list of supported **<bfr>**s**)** **OK**
Read Command **AT+CNMI?**	Response **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>** **OK**
Write Command **AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]**	Response MT selects the procedure on how the received new messages from the network are indicated to the TE when TE is active, e.g. DTR is at low level (ON). If TE is inactive (e.g. DTR is at high level (OFF)), message receiving should be done as specified in *3GPP TS 23.038*. **OK** Or **ERROR** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be 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 (e.g. in data mode). Otherwise forward them directly to TE. 2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in data mode) and flush them to the TE after reservation. Otherwise forward them directly to TE.
<mt>	Integer type. The rules for storing received SMS depend on its data coding scheme (refer to *3GPPTS 23.038*) and preferred memory storage (AT+CPMS) setting, and the value is: 0 No SMS-DELIVER indications are routed to 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, please refer to **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 (refer to *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 specified (**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 specified.
<err>	Error codes. For more details, please refer to ***Table 12***.

NOTE

Unsolicited result code:

+CMTI: <mem>,<index>	Indicate that 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: "+8615021012496",,"13/03/18,17:07:21+32",145,4,0,0,"+8613800551500",145,28
This is a test from Quectel.       //Short message is outputted directly when an SMS is incoming.
```

8.14. AT+CSCB Select Cell Broadcast Message Types

This command selects which types of CBMs are to be received by the ME.

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 related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/

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 (refer to **<mid>**) (default: empty string), e.g. "0,1,5,320–478,922".
<dcss>	String type. All different possible combinations of CBM data coding schemes (refer to **<dcs>**) (default: empty string), e.g. "0–3,5".
<err>	Error codes. For more details, please refer to ***Table 12***.

8.15. AT+CSDH Show SMS Text Mode Parameters

This 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 **AT+CSDH[=<show>]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/
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,"+8613800551500",145,18

<This is a test from Quectel>

OK
```

8.16. 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.

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 MT selects values for additional parameters needed when SM is sent to the network or placed in a storage when text mode is selected (**AT+CMGF=1**). It is possible to set the

	validity period starting from when the SMS 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). **OK**
Maximum Response Time	300 ms
Characteristics	/
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. Depend on SMS-SUBMIT **<fo>** setting: 3GPP TS 23.040 TP-Validity-Period either in integer format or in time-string format (refer to **<dt>**). Default: 167.
<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.

9 Packet Domain Commands

9.1. AT+CGATT Attachment or Detachment of PS

This command attaches MT to, or detach MT from, the Packet Domain service. After the command has been completed, the MT remains in V.250 command state. If MT is already in the requested state, the command will be ignored and the **OK** response will be returned. If the requested state cannot be achieved, an **ERROR** or **+CME ERROR** response will be 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** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	140 s, determined by the network.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<state>	Integer type. Indicate 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, please refer to ***Table 11***.

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
```

9.2. AT+CGDCONT Define PDP Contexts

The 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: (**range of supported **<cid>**s**),<PDP_type>,<APN>,<PDP_addr>,(**range of supported **<data_comp>**s**),(**range 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 will be 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 supported values (minimum value = 1) is returned by the test form of the command. Range: 1–42.
<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, a string parameter that 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 the **AT+CGPADDR**.
<data_comp>	Integer type. Controls PDP data compression (applicable for SNDCP only) (refer to *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 TS 25.323*). 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. Indicate 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.

9.3. 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. 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+CGQREQ Quality of Service Profile (Requested)	
Test Command **AT+CGQREQ=?**	Response **+CGQREQ: <PDP_type>,(**range of supported **<precedence>**s**),(**range of supported **<delay>**s**),(**range of supported **<reliability>**s**),(**range 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 related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. Specify 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. Specify 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 should be maintained ahead of precedence class 3 3 Low priority. Service commitments should be maintained
<delay>	Integer type. A numeric parameter which 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, please refer to ***Table 4***. 0 Network subscribed value 1–4 Please refer to ***Table 4***.
<reliability>	Integer type. A numeric parameter which 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 and 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. A numeric parameter which 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. A numeric parameter which 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, please refer to ***Table 11***.

Table 5: 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	

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

This command allows TE to specify a minimum acceptable profile which is checked by MT against the negotiated profile when the PDP context is activated. The 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>,(**range of supported **<precedence>**s**),(**list of supported **<delay>**s**),(**range of supported **<reliability>**s**),(**range of supported **<peak>**s**),(**range 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 related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. Specify 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. Specify 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 should be maintained ahead of precedence class 3 3 Low priority. Service commitments should be maintained
<delay>	Integer type. Specify the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. See ***Table 4*** for details. 0 Network subscribed value
<reliability>	Integer type. Specify 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 and 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. Specify 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. Specify the mean throughput class, in octets per second. 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, please refer to ***Table 11***.	

9.5. 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 will remain in V.250 command state. If any PDP context is already in the requested state, the state for that context will remain unchanged. If MT is not PS attached when the activation form of the command is executed, MT will first perform a PS attach and then attempt to activate the specified contexts. If no **<cid>** 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 related to MT functionality: **+CME ERROR: <err>**

Maximum Response Time	150 s, determined by network.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<state>	Integer type. Indicate 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. Specify a particular PDP context definition (see **AT+CGDCONT**)
<err>	Error codes. For more details, please refer to ***Table 11***.

Example

```
AT+CGDCONT=4,"IP","UNINET"          //Define a PDP context.
OK
AT+CGACT=1,4                        //Activated 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                        //Deactivated the PDP.
OK
```

9.6. 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. Any commands following the **AT+CGDATA** in the AT command line shall not be processed by MT.

If the **<L2P>** value is unacceptable to MT, MT shall return an **ERROR** or **+CME ERROR**. 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 V.250 command state is re-entered 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** Or **ERROR** If there is any error related to MT functionality: **+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 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. Specify a particular PDP context definition (see **AT+CGDCONT**).
<err>	Error codes. For more details, please refer to ***Table 11***.

9.7. 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** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. Specify 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** command when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by **<cid>**. **<PDP_addr>** is omitted if no address is available.

Example

```
AT+CGDCONT=1,"IP","UNINET"          //Define a PDP context.
OK
AT+CGACT=1,1                        //Activated the PDP.
OK
AT+CGPADDR=1                        //Show the PDP address.
+CGPADDR: 1,"10.76.51.180"

OK
```

9.8. AT+CGREG GPRS Network Registration Status

This command queries the network registration status and control 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	Response

AT+CGREG=?	**+CGREG: (**range 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	/
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 bytes 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>	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"
```

9.9. AT+CGEREP Packet Domain Event Reporting

This command enables/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 Packet Domain Event Reporting	
Test Command **AT+CGEREP=?**	Response **+CGEREP: (**range of supported **<mode>**s**),(**list of supported **<bfr>**s**)** **OK**
Read Command **AT+CGEREP?**	Response **+CGEREP: <mode>,<bfr>** **OK** 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 (e.g. in on-line data mode); otherwise forward them directly to the TE.

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

<bfr> Integer type.

0 MT buffer of unsolicited result codes defined within this command is cleaned when **<mode>** 1 or 2 is specified.

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

NOTES

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 and 5GS.
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>	Srting 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. Specify 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. Indicate the GPRS mobile class. A Class A (highest) B Class B C Class C in GPRS and circuit switched alternate mode CG Class C in GPRS only mode CC Class C in circuit switched only mode (lowest)

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            //Activated a context.
OK
```

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

+CGEV: PDN DEACT2
```

9.10. AT+CGSMS Select Service for MO SMS Messages

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

AT+CGSMS Select Service for MO SMS Messages	
Test Command **AT+CGSMS=?**	Response **+CGSMS: (**range of currently available **<service>**s**)** **OK**
Read Command **AT+CGSMS?**	Response **+CGSMS: <service>** **OK**
Write Command **AT+CGSMS=<service>**	Response **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<service>	A numeric parameter which indicates the service or service preference to be used.	
	0	Packet domain
	1	Circuit switched
	2	Packet domain preferred (use circuit switched if GPRS not available)
	3	Circuit switch preferred (use Packet Domain if circuit switched not available)
<err>	Error codes. For more details, please refer to ***Table 11***.	

9.11. 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: (**range 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	/
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 13 E-UTRAN-NR dual connectivity

9.12. AT+C5GREG 5GS Network Registration Status

This command queries the network registration status and controls the presentation of URC **+C5GREG: <stat>** when **<n>** = 1 and there is a change in the MT's network registration status in 5GS, or URC **+C5GREG: <stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]]** when **<n>** = 2 and there is a change of the network cell in 5GS or the network provided an Allowed NSSAI. The parameters **<AcT>**, **<tac>**, **<ci>**, **<Allowed_NSSAI_length>** and **<Allowed_NSSAI>** are provided only if available.

AT+CEREG EPS Network Registration Status	
Test Command **AT+C5GREG=?**	Response **+C5GREG: (**range of supported **<n>**s**)** **OK**
Read Command **AT+C5GREG?**	Response **+C5GREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]]** **OK**
Write Command **AT+C5GREG=[<n>]**	Response **OK** Or **ERROR**
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 **+CEREG:<stat>** 2 Enable network registration and location information unsolicited result code **+C5GREG:<stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allow**

	ed_NSSAI>]]
<stat>	Integer type. Indicate the NR 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 8 Registered for emergency services only
<tac>	String type. Three-byte tracking area code in hexadecimal format.
<ci>	String type. Five-byte (NR) cell ID in hexadecimal format.
<AcT>	Access technology selected. 10 E-UTRAN connected to a 5GCN 11 NR connected to a 5GCN
<Allowed_NSSAI_length>	Integer type; Indicates the number of octets of the **<Allowed_NSSAI>** information element.
<Allowed_NSSAI>	String type in hexadecimal format. Dependent of the form, the string can be separated by dot(s), semicolon(s) and colon(s). This parameter indicates the list of allowed S-NSSAIs received from the network. The **<Allowed_NSSAI>** is coded as a list of **<S-NSSAI>**s separated by colons. Refer parameter **<S-NSSAI>** in *subclause 10.1.1*. This parameter shall not be subject to conventional character conversion as per **AT+CSCS**.

9.13. AT+QGDCNT Packet Data Counter

This command allows the application to check how much bytes are sent to or received by MT.

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** Or **ERROR**

	If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference	

Parameter

<op>	Integer type. The operation about data counter. 0 Reset the data counter 1 Save the results of data counter to NVM. If results need to be automatically saved, see **AT+QAUGDCNT**.
<bytes_sent>	Integer type. The amount of sent bytes.
<bytes_recv>	Integer type. The amount of received bytes.
<err>	Error codes. For more details, please refer to ***Table 11***.

NOTE

When MT is powered on, **<bytes_sent>** and **<bytes_recv>** are loaded from results of data counter in NVM. The default result in NVM is 0.

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

9.14. AT+QAUGDCNT* Auto Save Packet Data Counter

This command allows **AT+QGDCNT** to save results to NVM automatically.

AT+QAUGDCNT* Auto Save Packet Data Counter	
Test Command **AT+QAUGDCNT=?**	Response **+QAUGDCNT: (**list of supported **<value>**s**)** **OK**
Read Command **AT+QAUGDCNT?**	Response **+QAUGDCNT: <value>** **OK**
Write Command **AT+QAUGDCNT=<value>**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference	

Parameter

<value>	Integer type. The parameter is the time-interval for **AT+QGDCNT** to save results to NVM automatically. If it is set to 0, auto-save feature is disabled. Range: 0, 30–65535. Default: 0. Unit: second.
<err>	Error codes. For more details, please refer to ***Table 11***.

Example

```
AT+QAUGDCNT=?          //Test command.
+QAUGDCNT: (0,30-65535)

OK
AT+QAUGDCNT=35         //Set <value> to 35.
OK
AT+QAUGDCNT?           //Query the interval of auto-save.
+QAUGDCNT: 35

OK
```

NOTE

"*" means under development.

10 Supplementary Service Commands

10.1. 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: (**range 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>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]<CR><LF>** **[...]** **OK** If no call forwarding number is registered (and therefore all classes are inactive): **+CCFC: <status>,<class>** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**

Maximum Response Time	300 ms
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; 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>	Integer type. Type of sub-address.	
<classx>	Integer type. Each represents a class of information.	
	1	Voice (telephony)
	2	Data (refers to all bearer services; and this may only refer to 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
<time>	Integer type.	
	1–30	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, default value is 20
<status>	Integer type.	
	0	Not active

	1	Active
<err>	Error codes. For more details, please refer to ***Table 11***.	

Example

```
AT+CCFC=0,3,"15021012496"                  //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,"+8615021012496",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
```

10.2. 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>,<class1>** **[<CR><LF>+CCWA: <status>,<class2>**

	[...]] **OK** If there is any error related to MT functionality: **+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
<classx>	Integer type. Each integer represents a class of information.	
	1	Voice (telephony)
	2	Data (refers to all bearer services; and this may only refer to 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
<status>	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.	
	129	Unknown type (IDSN format number)
	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 was 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, please refer to ***Table 11***.

NOTES

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>]]]

Example

```
AT+CCWA=1,1                          //Enable presentation of an unsolicited result code.
OK
ATD10086;                            //Establish a call.
OK

+CCWA: "02154450293",129,1           //Indication of a call that has been waiting.
```

10.3. 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 MT controls the supplementary services call hold, multiparty and explicit call transfer. Calls can be put on hold, recovered, released, added to conversation and transferred. **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. If it is ignored in Write Command, value 2 is used.	
	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, please refer to ***Table 11***.	

Example

```
ATD10086;                                  //Establish a call.
OK

+CCWA: "02154450293",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,"10086",129               //The first call is on hold.
+CLCC: 2,1,0,0,0,"02154450293",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,"10086",129               //The first call is active.
+CLCC: 2,1,1,0,1,"02154450293",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,"10086",129
+CLCC: 2,1,0,0,1,"02154450293",129

OK
```

10.4. 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.

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 MT enables or disables the presentation of the calling line identity (CLI) at the TE. It has no effect on the execution of the supplementary service CLIP in the network. **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	15 s, determined by network.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type.	
	0	Suppress unsolicited result codes
	1	Display unsolicited result codes
<m>	Integer type.	
	0	CLIP not provisioned
	1	CLIP provisioned
	2	Unknown
<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 [8] subclause 10.5.4.8*)	

<type>	Type of address octet in integer format. 129 Unknown type (IDSN 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, please refer to ***Table 11***.

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,"02151082965",129,"QUECTEL"
OK
AT+CLIP=1
OK

RING

+CLIP: "02151082965",129,,,"QUECTEL",0
```

10.5. 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: (**range 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 related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	15 s, determined by network.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Parameter sets 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. Parameter shows 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, please refer to ***Table 11***.	

10.6. 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 Intermediate result code is returned from TA to TE before any +CR or V.25ter responses. **OK**
Maximum Response Time	15 s, determined by network.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Parameter sets/presents 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, format specified by **<type>**
<type>	Integer type. Type of address octet in integer format. 129 Unknown type (IDSN format number) 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 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,"02151082965",129,"QUECTEL"
OK
AT+COLP=1
OK
ATD02151082965;
+COLP: "02151082965",129,,,"QUECTEL"

OK
```

10.7. 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** Or **ERROR** If there is any error related to MT functionality: **+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 the TE. 0 Disable 1 Enable
<code1>	Integer type. It is manufacturer specified 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 Waiting call is pending 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, please refer to ***Table 11***.

NOTES

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>

10.8. 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: (**range of supported **<mode>**s**)** **OK**
Read Command **AT+CUSD?**	Response **+CUSD: <mode>** **OK**
Write Command **AT+CUSD=[<mode>[,<reqstr>[,<dcs>]]]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+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. 3GPP TS 23.038 Cell Broadcast Data Coding Scheme (default 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, please refer to ***Table 11***.	

11 Audio Commands

11.1. 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** Or **ERROR**
Write Command **AT+CLVL=<level>**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<level>	Integer type. A value with manufacturer specific range (Smallest value represents the lowest sound level). Range: 0–5; Default: 3.
<err>	Error codes. For more details, please refer to ***Table 11***.

11.2. AT+CRSL Set Ring Tone Volume

This command sets the volume of ring tone.

AT+CRSL Set Ring Tone Volume	
Test Command **AT+CRSL=?**	Response **+CRSL: (**range of supported **<volume>**s**)** **OK**
Read Command **AT+CRSL?**	Response **+CRSL: <volume>** **OK**
Write Command **AT+CRSL=<volume>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately The configuration will be saved automatically

Parameter

<volume>	Integer type. Indicate the configured volume of ring tone. Range: 0–7. Default: 3.

11.3. 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	Response

AT+CMUT=<n>	**OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type.	
	0	Mute off
	1	Mute on
<err>	Error codes. For more details, please refer to ***Table 11***.	

11.4. AT+QAUDLOOP Enable/Disable Audio Loop Test

This command enables/disables audio loop test.

AT+QAUDLOOP Enable/Disable Audio Loop 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	300ms
Characteristics	The command takes effect immediately. The configuration will not be saved.

Parameter

<enable>	Integer type. Enable or disable audio loop test.	
	0	Disable audio loop test
	1	Enable audio loop test

11.5. AT+VTS DTMF and Tone Generation

This command sends ASCII characters which cause MSC to transmit DTMF tones to a remote subscriber. This command can only be operated in a voice call.

AT+VTS DTMF and Tone Generation	
Test Command **AT+VTS=?**	Response **+VTS: (**list of supported **<DTMF_string>**s**),(**range of supported **<duration>**s**)** **OK**
Write Command **AT+VTS=<DTMF_string>[,<duration>]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	Depends on the length of **<DTMF_string>** and **<duration>**.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<DTMF_string>	String type. ASCII characters in the set 0-9, #, *, A, B, C, D. The string should be enclosed in quotation marks ("..."). When sending multiple tones at a time, the time interval of two tones **<interval>** can be specified by **AT+VTD**. The maximal length of the string is 31.
<duration>	Integer type. The duration of each tone in 10 ms with tolerance. Range: 0–255. If the duration is less than the minimum time specified by the network, the actual duration will be the network specified time. If this parameter is omitted, **<duration>** is specified by **AT+VTD**.

<err>	Error codes. For more details, please refer to ***Table 11***.

Example

```
ATD12345678900;                    //Dial.
OK
//Call connected
AT+VTS="1"                         //The remote caller can hear the DTMF tone.
OK
AT+VTS="1234567890A"               //Send multiple tones at a time.
OK
```

11.6. AT+VTD* Set Tone Duration

This command sets the duration of DTMF tones. It can also set time interval of two tones when sending multiple tones at a time.

AT+VTD* Set Tone Duration	
Test Command **AT+VTD=?**	Response **+VTD: (**range of supported **<duration>**s**),(**range of supported **<interval>**s**)** **OK**
Read Command **AT+VTD?**	Response **+VTD: <duration>,<interval>** **OK**
Write Command **AT+VTD=<duration>[,<interval>]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The parameters will not be saved.
Reference 3GPP TS 27.007	

Parameter

<duration>	Integer type. The duration tone in 1/10 seconds with tolerance. Range: 0–255; Default: 3. If the duration is less than the minimum time specified by the network, the actual duration will be network specified time.
<interval>	Integer type. The time interval of two tones when sending multiple tones at a time by **AT+VTS**. Range: 0–255; Default: 0.
<err>	Error codes. For more details, please refer to ***Table 11***.

NOTE

"*" means under development.

11.7. 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: (**range of supported **<mode>**s**)** **OK**
Read command **AT+QAUDMOD?**	Response **+QAUDMOD: <mode>** **OK**
Write Command **AT+QAUDMOD=<mode>**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Characteristics	The command takes effect immediately. The parameters will not be saved.
Reference Quectel	

Parameter

<mode>	Integer type. Indicate the current configured audio mode. 0 Echo canceller, noise suppressor, digital gain and calibration parameter for handset 1 Echo canceller, noise suppressor, digital gain and calibration parameter for headset 2 Echo canceller, noise suppressor, digital gain and calibration parameter for speaker 3 Turn off all audio processing functions
<err>	Error codes. For more details, please refer to ***Table 11***.

11.8. 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: (**range of supported **<io>**s**),(**list of supported **<mode>**s**),(**list of supported **<fsync>**s**),(**range of supported **<clock>**s**),(**list of supported **<format>**s**),(**list of supported **<sample>**s**),(**list of supported **<num_slots>**s**),(**range of supported **<slot_mapping0>**s**),(**range 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 will be saved automatically.
Reference Quectel	

Parameter

<io>	x	Unused (1–6 can be set)
<mode>	Integer type.	
	0	Master mode
	1	Slave mode
<fsync>	Integer type.	
	0	Primary mode (short-synchronization)
	1	Auxiliary mode (long-synchronization)
<clock>	Integer type. Clock frequency.	
	0	128 kHz
	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.	
	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.	

NOTES

1. 4096 kHz clock frequency is only applicable for 16 kHz sampling rate.
2. 128 kHz clock frequency is not supported.
3. 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.
4. If slave mode is selected, master and synchronization clock should be provided for the MT.
5. If 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**).

Example

```
AT+QDAI=?                    //Query the range.
+QDAI: x,(0,1),(0,1),(0-5),(0-2),(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 AUX PCM interface to slave, short-sync, 8 kHz sample, 2048kHz
                               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
```

11.9. 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: (**range 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 will not be saved.
Reference Quectel	

Parameter

<st_gain>	Integer type. Indicate the configured side tone gain in current mode. Range: 0–65535. Default value may be different in different audio modes.

NOTE

This command is valid only after **AT+QAUDLOOP** is disabled.

11.10. 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: (**range of supported **<txgain>**s**),(**range of supported **<txdgain>**s**)** **OK**
Read Command **AT+QMIC?**	Response **+QMIC: <tx_gain>,<txdgain>** **OK**
Write Command **AT+QMIC=<txgain>[,<txdgain>]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	It will take effect on next call. The configuration will not be saved.

Parameter

<txgain>	Integer type. Indicate uplink codec gain. Range: 0–65535. The default value may be different in different audio modes.
<txdgain>	Integer type. Indicate uplink digital gain. Range: 0–65535. The default value may be different in different audio modes.

11.11. 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 the optional parameter is specified: **OK** If the optional parameter is omitted: **+QIIC: <value>** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.

Parameter

<rw>	Integer type.	
	0	Write command
	1	Read command
<device>	Hex integer type.	
	0–0xFF	7-bit device address
<addr>	Hex Integer type.	
	0–0xFF	Register address
<bytes>	Integer type.	
	1	Read bytes
	2	Write 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 Hardware Related Commands

12.1. 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 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**
Write Command **AT+QPOWD[=<n>]**	Response **OK** **POWERED DOWN**
Maximum Response Time	300 ms
Characteristics	/
Reference	

Parameter

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

12.2. 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 related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<time>	String type. The format is "yy/MM/dd,hh:mm:ss±zz", indicating year (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...+56). E.g. May 6th, 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08".
<err>	Error codes. For more details, please refer to ***Table 11***.

Example

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

OK
```

12.3. 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
Read 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 read is successful. 0 Failed 1 Successful
<value>	Integer type. The voltage of specified ADC channel. Unit: mV.

12.4. AT+QSCLK Enable/Disable Entering Sleep Mode

This command controls whether MT enters sleep mode. When entering into sleep mode is enabled, the MT can directly enter sleep mode.

AT+QSCLK Enable/Disable Entering Sleep 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. Slow clock mode.	
	0	Disable slow clock
	1	Enable slow clock. It is controlled by DTR. DTR is pulled up by default.
<saved>	Integer type. Whether to save the configuration into NVM.	
	0	Not save
	1	Save

12.5. AT+QTEMP Get the Temperature of MT

This command gets the temperature of MT.

AT+QTEMP Get the Temperature of MT	
Test Command **AT+QTEMP=?**	Response **OK**
Execution Command **AT+QTEMP**	Response **[+QTEMP: <sensor>,<temp>]** **[…]** **OK**
Characteristics	/
Reference Quectel	

Parameter

<sensor>	String type. Sensor type.	
	"aoss0-usr"	Type of the first detection points on modem
	"mdm-q6-usr"	Type of the second detection points on modem
	"ipa-usr"	Type of the third detection points on modem
	"cpu0-a7-usr"	Type of the forty detection points on modem
	"mdm-core-usr"	Type of the fifth detection points on modem
	"xo-therm-usr"	Type of XO crystal
	"pa-therm2-usr"	Type of PA chip
	"sdx-case-therm-usr"	Type of BB chip
	"ambient-therm-usr"	Type of NTC

<temp>	Integer type. Temperature value. Unit: °C.

Example

```
AT+QTEMP
+QTEMP:"aoss0-usr","26"

+QTEMP:"mdm-q6-usr","27"

+QTEMP:"ipa-usr","27"

+QTEMP:"cpu0-a7-usr","27"

+QTEMP:"mdm-core-usr","28"

+QTEMP:"xo-therm-usr","24"

+QTEMP:"pa-therm2-usr","24"

+QTEMP:"sdx-case-therm-usr","24"

+QTEMP:"ambient-therm-usr","24"

OK
```

12.6. AT+QAGPIO Set Output Level of AP or PMU GPIO

This command sets the AP or PMU GPIO output level.

AT+QAGPIO Set Output Level of AP Or PMU GPIO	
Test Command **AT+QAGPIO=?**	Response **+QAGPIO: <type>,<gpio_num>,(**list of supported **<value>**s**)** **OK**
Write Command **AT+QAGPIO=<type>,<gpio_num>,<value>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will be saved automatically.

Parameter

<type>	Integer type. Set up the AP or PMU. 0 AP 1 PMU
<gpio_num>	Integer type. GPIO number.
<value>	Set GPIO output value. 0 Set the GPIO output low 1 Set the GPIO output high

NOTE

The range of PMU GPIO is 1–11.

Example

```
AT+QAGPIO=?
+QAGPIO: <type>,<gpio_num>,(0,1)

OK
AT+QAGPIO=0,105,1          //Set the AP gpio_105 output high level.
OK
AT+QAGPIO=1,8,0            //Set the PMU gpio_8 output low level.
OK
```

12.7. AT+QETH RGMII Extended Configuration

AT+QETH RGMII Extended Configuration	
Test command **AT+QETH=?**	Response: **+QETH: "rgmii",(**list of supported **<status>**s**),(**list of supported **<voltage>**s**),(**range of supported **<mode>**s**),(**range of supported **<profileID>**s**)** **+QETH: "ipptmac",<host_mac_addr>** **+QETH: "routing",(**list of supported **<option>**s**),(**list of supported **<IP_version>**s**),<dest_ip_addr>,(**range of supported **<profileID>**s**)** **+QETH: "mac_address",<rgmii_mac_addr>** **+QETH: "speed",(**list of supported **<speed>**s**)** **+QETH: "an",(**list of supported **<status>**s**)** **+QETH: "dm",(**list of supported **<mode>**s**)**

	OK

12.7.1. AT+QETH="rgmii" Enable/Disable RGMII

This command enables/disables RGMII and queries the current configuration.

AT+QETH="rgmii" Enable/Disable RGMII	
Write Command **AT+QETH="rgmii"[,<status>,<voltage>[,<mode>[,<profileID>]]]**	Response: If all optional parameters are omitted, query the current configuration: **+QETH: "RGMII",<status>,<voltage>,<mode>** **+QETH: "RGMII",<Line1 call status>,<Line1 profileID>** **+QETH: "RGMII",<Line2 call status>,<Line2 profileID>** **+QETH: "RGMII",<Line3 call status>,<Line3 profileID>** **+QETH: "RGMII",<Line4 call status>,<Line4 profileID>** **OK** If the optional parameters (**<mode>** and **<profileID>**) are omitted, enable or disable RGMII without data call: **OK** If the optional parameter (**<profileID>**) is omitted, enable RGMII with specified mode and default profile or disable all RGMII data call in the current mode: **OK** If all optional parameters are specified, enable or disable RGMII with specified mode and specified profile: **OK** If there is any error: **ERROR**
Maximum Response Time	20 s
Characteristics	This command takes effect immediately; See the notes for whether to save the parameter configuration.

Parameter

<status>	String type. Enable or disable RGMII.

	"ENABLE"	Enable RGMII
	"DISABLE"	Disable RGMII
<voltage>	Integer type. RGMII voltage mode.	
	0	TX Strength of RGMII is 1.8V.
	1	TX Strength of RGMII is 2.5V
<mode>	Integer type. RGMII mode.	
	-1	Empty mode (No any data call)
	0	Call RGMII with COMMON-RGMII mode
	1	Call RGMII with IPPassthrough-RGMII mode
<profileID>	Integer type. Profile ID of RGMII data call. Range: 1–8.	
	It should be used with **AT+CGDCONT**.	

NOTES

1. The two modes COMMON and IPPassthrough are mutually exclusive and cannot be enabled at the same time.
2. When a data call is performed with the second, third and fourth channels, the configuration of enabling/disabling RGMII is not saved (that is, RGMII configuration does not take effect after the module is rebooted), but APN setting is saved automatically; when a data call is performed with the first channels, the configuration is saved automatically, that is, the configuration takes effect after the module is rebooted.
3. Before enabling IPPassthrough mode, you need to configure the MAC address through **AT+QETH="ipptmac",<host_mac_addr>**.
4. Calling the command to perform data call for the first time enables the corresponding RGMII mode and APN's first data call. Calling this command to perform data call for the second and third times causes that the second and third data calls are performed. If you call this command multiple times to perform data call without specifying APN, the default APN of 1, 2, 3 and 4 are used (up to 4 channels are supported at the same time).

Example

```
//Query the status of RGMII.
AT+QETH="rgmii"
+QETH: "RGMII","DISABLE",1,-1
+QETH: "RGMII",0,1
+QETH: "RGMII",0,2
+QETH: "RGMII",0,3
+QETH: "RGMII",0,4

OK
//Enable RGMII without data call.
AT+QETH="rgmii","ENABLE",1
OK
//Enable RGMII data call of COMMON mode and perform data call with the default APN.
```

```
AT+QETH="rgmii","ENABLE",1,0
OK
//Enable RGMII data call of COMMON mode and perform data call with the first APN.
AT+QETH="rgmii","ENABLE",1,0,1
OK
//Enable RGMII data call of IPPassthrough mode and perform data call with the default APN.
AT+QETH="rgmii","ENABLE",1,1
OK
//Enable RGMII data call of IPPassthrough mode and perform data call with the first APN.
AT+QETH="rgmii","ENABLE",1,1,1
OK
```

12.7.2. AT+QETH="ipptmac" Set MAC address of IPPassthrough-RGMII

This command sets MAC address of IPPassthrough mode.

AT+QETH="ipptmac" Set MAC address of IPPassthrough-RGMII	
Write Command **AT+QETH="ipptmac"[,<host_mac_addr>]**	Response: If the optional parameter is omitted, query the current configuration: **+QETH: "ipptmac",<host_mac_addr>** **OK** If the optional parameter is specified, configure the MAC address for RGMII: **OK** If there is any error: **ERROR**
Maximum Response Time	100 ms
Characteristics	The command takes effect when enabling RGMII data call of IPPassthrough mode next time; The configuration will be saved automatically.

Parameter

<host_mac_addr>	String type. MAC address of the device connected to the module.

Example

```
//Set the current MAC address of IPPassthrough mode.
```

```
AT+QETH="ipptmac",a1:b2:c3:d4:e5:f6
OK

//Query the current MAC address of IPPassthrough mode.
AT+QETH="ipptmac"
+QETH: "ipptmac",a1:b2:c3:d4:e5:f6

OK
```

12.7.3. AT+QETH="routing" Set Routing Rules for Multiple Data Call

This command sets the routing rules for multiple data call.

AT+QETH="routing" Set routing rules for multiple data call	
Write Command **AT+QETH="routing"[,<option>,<IP_version>,<dest_ip_addr>,<profileID>]**	Response: If the optional parameters are omitted, query the current configuration: **+QETH: route IPv4:** **……** **+QETH: route IPv6:** **……** **OK** If the optional parameters are specified, set the routing rules for multiple data call: **OK** If there is any error: **ERROR**
Maximum Response Time	200 ms
Characteristics	The command takes effect immediately; The configuration will not be saved.

Parameter

<option>	String type. Operation type. add Add routing rule del Delete routing rule
<IP_version>	Integer type. IP version. 4 IPv4 6 IPv6

<dest_addr>	String type. Destination IP address. 8.8.8.8 IPv4 example 240C::6666 IPv6 example
<profileID>	Integer type. RGMII data call profileID. 1–8 The APN number used by the data call connection specified by the current routing rule.

Example

```
//Query the current route list.
AT+QETH="routing"
+QETH: route IPv4:
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         10.151.9.244    0.0.0.0         UG    0      0        0 rmnet_data0
10.151.9.240    *               255.255.255.248 U     0      0        0 rmnet_data0
61.132.163.68   *               255.255.255.255 UH    10     0        0 rmnet_data0
192.168.225.0   *               255.255.255.0   U     0      0        0 bridge0
202.102.213.68  *               255.255.255.255 UH    10     0        0 rmnet_data0
+QETH: route IPv6:
Kernel IPv6 routing table
Destination  Next Hop     Flags Metric Ref Use Iface
::1/128   ::    U    256 1    0    lo
240e:46:4088::4088/128   ::    U    10   1    0    rmnet_data0
240e:46:4888::4888/128   ::    U    10   1    0    rmnet_data0
240e:9a:114:20dc::/64    ::    U    1024     1    0    bridge0
fe80::/64     ::    U    256 1    0    bridge0
fe80::/64     ::    U    256 1    0    rmnet_data0
::/0 ::    U    256 1    0    rmnet_data0
::/0 ::    !n   -1   1    1    lo
::1/128   ::    Un   0    2    0    lo
240e:9a:114:20dc::/128   ::    Un   0    2    0    rmnet_data0
240e:9a:114:20dc:6c57:8d2d:6bcd:7dca/128   ::    Un   0    2    0    rmnet_data0
fe80::/128    ::    Un   0    2    0    bridge0
fe80::/128    ::    Un   0    2    0    rmnet_data0
fe80::1a20:8c46:9e00:c3ea/128    ::    Un   0    3    1    rmnet_data0
fe80::cc53:9ff:fe13:1b87/128  ::    Un   0    2    0    bridge0
ff00::/8  ::    U    256 2    37   bridge0
ff00::/8  ::    U    256 2    7    rmnet_data0
::/0 ::    !n   -1   1    1    lo

OK

//Add a route to route list.
```

```
AT+QETH="routing",add,4,8.8.8.8,3
OK
```

12.7.4. AT+QETH="mac_address" Query MAC Address of RGMII

This command queries RGMII interface mac address.

AT+QETH="mac_address" Query MAC Address of RGMII	
Query Command **AT+QETH="mac_address"**	Response: **+QETH: "mac_address",<rgmii_mac_address>** **OK**
Maximum Response Time	200 ms
Characteristics	/

Parameter

<rgmii_mac_address>	String type. MAC address of RGMII of the module.

Example

```
//Query RGMII interface MAC address.
AT+QETH="mac_address"
+QETH: "mac_address",06:EA:9F:31:49:28

OK
```

12.7.5. AT+QETH="speed" Set the Speed for RGMII

This command configures the speed for RGMII.

AT+QETH="speed" Set the Speed for RGMII	
Write Command **AT+QETH="speed"[,<speed>]**	Response If the optional parameter is omitted, query the current configuration: **+QETH: "speed",<speed>** **OK** If the optional parameter is specified, configure the speed for

	RGMII: **OK** If there is any error: **ERROR**
Maximum Response Time	100 ms
Characteristics	This command takes effect after RGMII function is restarted; The configuration will be saved automatically.

Parameter

<speed>	String type. RGMII speed.	
	"0M"	auto negotiation speed.
	"10M"	10 Mbps Ethernet.
	"100M"	100 Mbps Ethernet.
	"1000M"	1000 Mbps Ethernet

Example

```
//Query the current configuration.
AT+QETH="speed"
+QETH: "speed","0M"

OK

//Set RGMII speed to 100M.
AT+QETH="speed","100M"
OK
```

12.7.6. AT+QETH="an" Enable/Disable Auto-negotiation for RGMII

This command enables or disables the auto-negotiation for RGMII.

AT+QETH="an" Enable or Disable Auto-negotiation for RGMII	
Write Command **AT+QETH="an"[,<status>]**	Response If the optional parameter is omitted, query the current configuration: **+QETH: "an",<status>** **OK** If the optional parameter is specified, enable or disable

	RGMII auto-negotiation: **OK** **If there is any error:** **ERROR**
Maximum Response Time	100 ms
Characteristics	This command takes effect after RGMII function is restarted; The configuration will be saved automatically.

Parameter

<status>	String type. Enable or disable RGMII auto-negotiation.	
	"on"	Enable auto-negotiation for RGMII.
	"off"	Disable auto-negotiation for RGMII.

Example

```
//Query the current configuration.
AT+QETH="an"
+QETH: "an","on"

OK

//Set RGMII auto negotiation as off.
AT+QETH="an","off"
OK
```

12.7.7. AT+QETH="dm" Set the Duplex Mode for RGMII

This command sets the duplex mode for RGMII.

AT+QETH="dm" Set the Duplex Mode for RGMII	
Write Command **AT+QETH="dm"[,<mode>]**	Response If the optional parameter is omitted, query the current configuration: **+QETH: "dm",<mode>** **OK** If the optional parameter is specified, set the duplex mode for RGMII: **OK**

	If there is any error: **ERROR**
Maximum Response Time	100 ms
Characteristics	This command takes effect after RGMII function is restarted; The configuration will be saved automatically.

Parameter

<mode>	String type. RGMII duplex mode. "full" RGMII is working at full duplex mode. "half" RGMII is working at half duplex mode.

Example

```
//Query the current configuration.
AT+QETH="dm"
+QETH: "dm","full"

OK

//Set half duplex mode for RGMII.
AT+QETH="dm","half"
OK
```

12.8. AT+QSLIC Enable/Disable SLIC Feature

This command enables or disables the SLIC feature.

AT+QSLIC Enable/Disable Slic Feature	
Test Command **AT+QSLIC=?**	Response **+QSLIC: (**list of supported **<enable>**s**),(**range 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 configuration will be 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 **<SLIC_type>**=1. 0 Reserved 1 LE9641 (Currently not supported) 2 Si32185 3 LE9643

Example

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

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
```

13 Appendix A References

13.1. References

Table 6: Related Documents

SN	Document Name	Remark
[1]	V.25ter	Serial asynchronous automatic dialing and control
[2]	3GPP TS 27.007	Digital cellular telecommunications (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; AT command set for User Equipment (UE)
[3]	3GPP TS 27.005	Digital cellular telecommunications (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Use of Data Terminal Equipment–Data Circuit terminating Equipment (DTE-DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)

Table 7: Terms and Abbreviations

Abbreviation	Description
3GPP	3rd Generation Partnership Project
5GCN	5G Core Network
ADC	Analog To Digital Converter
AP	Application Processor
APN	Access Point Name
ARFCN	Absolute Radio-Frequency Channel Number
ARM	Advanced RISC (Reduced Instruction Set Computing) Machine
ASCII	American Standard Code for Information Interchange
BCD	Binary Coded Decimal

BER	Bit Error Rate
CBM	Cell Broadcast Message
CDRX	Connected Discontinuous Reception
CFU	Call Forwarding Unconditional
CLI	Calling Line Identification
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
COL	Connected Line
COLP	Connected Line Identification Presentation
CQI	Channel Quality Indicator
CS	Circuit Switch
CSD	Circuit Switch Data
CSI	Channel State Information
DCD	Dynamic Content Delivery
DCE	Data Communication Equipment
DCS	Data Coding Scheme
DFOTA	Delta Firmware Upgrade Over-The-Air
DL	Downlink
DPCH	Dedicated Physical Channel
DPR	Dynamic Power Reduction
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 supplementary service
EN-DC	E-UTRA NR Dual Connectivity
EPS	Evolved Packet System
eUTRAN	Evolved Universal Terrestrial Radio Access Network
FDD	Frequency Division Duplex
FDPCH	Fraction-Dedicated Physical Channel
FOTA	Firmware Upgrade Over-The-Air
GERAN	GSM/EDGE Radio Access Network
GGSN	Gateway GPRS Support Node
GMT	Greenwich Mean Time
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
GPS	Global Positioning System
GSM	Global System for Mobile Communications
HLR	Home Location Register
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
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
LLC	Logical Link Control
LTE	(Long-Term Evolution) a 4G mobile communications standard.
MCS	Modulation and Coding Scheme
ME	Mobile Equipment
MO	Mobile Original
MPTY	MultiParty
MS	Mobile Station
MSC	Mobile Switching Center
MSISDN	Mobile Subscriber International Integrated Service Digital Network number
MT	Mobile Terminal
NAS	Network Attached Storage
NG-RAN	Next-Generation Radio Access Network
NITZ	Network Identity and Time Zone / Network Informed Time Zone. It is a mechanism for provisioning local time and date, time zone and DST offset, as well as network provider identity information, to mobile devices via a wireless network.
NR	New Radio
NSA	Non Standalone
NSAPI	Network Service Access Point Identifier
NSSAI	Single Network Slice Selection Assistance Information
NVM	Non-Volatile Memory
NSSAI	Network Slice Selection Assistance Information
PCIe	Peripheral Component Interconnect Express
PCIe EP	PCI Express Endpoint Device
PCIe RC	PCI Express Root Complex

PCM	Pulse Code Modulation
PDN	Public Data Network
PDP	Packet Data Protocol
PDSCH	Physical Downlink Shared CHannel
PDU	Protocol Data Unit
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PMI	Precoding Matrix Indicator
PMU	Power Management Unit
PPP	Point-to-Point Protocol
PS	Packet Switch
PSC	Primary Synchronization Code
PUK	PIN Unlock Key
QoS	Quality of Service
RAN	Radio Access Network
RAT	Radio Access Technology
RGMII	Reduced Gigabit Media Independent Interface
RI	Ring Indicator
RLP	Radio Link Protocol
RRC	Radio Resource Control
RSSI	Received Signal Strength Indicator
RTC	Real-Time Clock
SA	Standalone
SAR	Specific Absorption Rate
SINR	Signal to Interference plus Noise Ratio

SLIC	Subscriber Line Interface Circuit
SMS	Short Messaging Service
SMSC	Short Message Service Center
SNDCP	Sub Network Dependence Convergence Protocol
TA	Terminal Adapter
TCP	Transmission Control Protocol
TDD	Time Division Duplex
TE	Terminal Equipment
UART	Universal Asynchronous Receiver/Transmitter. A digital protocol which we use to transfer data between two devices
UCS2	Universal Character Set (UCS-2) Format
UDP	User Datagram Protocol
UDUB	User Determined User Busy
UE	User Equipment
UICC	Universal Integrated Circuit Card
UIM	User Identity Model
UL	Uplink
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
USSD	Unstructured Supplementary Service Data
(U)SIM	(Universal) Subscriber Identity Module
UTRA	UMTS Terrestrial Radio Access
UTRAN	Universal Terrestrial Radio Access Network
VLR	Visitor Location Register
WCDMA	Wideband Code Division Multiple Access

13.2. 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
ATS3	<n>	13
ATS4	<n>	10
ATS5	<n>	8
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

13.3. 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

13.4. 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

13.5. 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 should 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 cause 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

13.6. 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 should 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

13.7. Summary of URC

Table 13: Summary of URC

Index	URC Display	Meaning	Condition
1	+CREG: <stat>	Indicate registration status of the MT	AT+CREG=1
2	+CREG: <stat>[,<lac>,<ci>[,<AcT>]]	After cell neighborhood changing shows whether the network has currently indicated the registration of the MT, with location area code	AT+CREG=2
3	+CGREG: <stat>	Indicate network registration status of the MT	AT+CGREG=1

4	+CGREG: <stat>[,[<lac>],[<ci>],[<AcT>],[<rac>]]	Indicate network registration and location information of the MT	AT+CGREG=2
5	+CTZV: <tz>	Time zone reporting	AT+CTZR=1
6	+CTZE: <tz>,<dst>,<time>	Extended time zone reporting	AT+CTZR=2
7	+CMTI: <mem>,<index>	New message is received, and saved to memory	See AT+CNMI
8	+CMT: [<alpha>],<length><CR><LF><pdu>	New short message is received and output directly to TE (PDU mode)	See AT+CNMI
9	+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
10	+CBM: <length><CR><LF><pdu>	New CBM is received and output directly (PDU mode)	See AT+CNMI
11	+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>	New CBM is received and output directly to TE (Text mode)	See AT+CNMI
12	+CDS: <length><CR><LF><pdu>	New CDS is received and output directly (PDU mode)	See AT+CNMI
13	+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>	New CDS is received and output directly to TE (Text mode)	See AT+CNMI
14	+CDSI: <mem>,<index>	New message status report is received, and saved to memory	See AT+CNMI
15	+COLP: <number>,<type>,[<subaddr>],[<satype>],[<alpha>]	The presentation of the COL (connected line) at the TE for a mobile originated call	AT+COLP=1
16	+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI validity>	Mobile terminating call indication	AT+CLIP=1
17	+CRING: <type>	An incoming call is indicated to the TE with unsolicited result code instead of the normal RING	AT+CRC=1
18	+CCWA: <number>,<type>,<class>[,<alpha>]	Call waiting indication	AT+CCWA=1,1
19	+CSSI: <code1>	Shows the +CSSI intermediate result code presentation status to the TE	AT+CSSN=1
20	+CSSU: <code2>	Shows the +CSSU unsolicited result code presentation status to the TE	AT+CSSN=<n>,1
21	RDY	MT initialization is successful	N/A

22	+CFUN: 1	All function of the MT is available	N/A
23	+CPIN: <state>	(U)SIM card pin state	N/A
24	+QIND: SMS DONE	SMS initialization finished	N/A
25	+QIND: PB DONE	Phonebook initialization finished	N/A
26	POWERED DOWN	Module power down	AT+QPOWD
27	+CGEV: REJECT <PDP_type>,<PDP_addr>	A network request for PDP activation, and was automatically rejected.	AT+CGEREP=2,1
28	+CGEV: NW REACT <PDP_type>,<PDP_addr>,[<cid>]	The network request PDP reactivation	AT+CGEREP=2,1
29	+CGEV: NW DEACT <PDP_type>,<PDP_addr>,[<cid>]	The network has forced a context deactivation	AT+CGEREP=2,1
30	+CGEV: ME DEACT <PDP_type>,<PDP_addr>,[<cid>]	The ME has forced a context deactivation.	AT+CGEREP=2,1
31	+CGEV: NW DETACH	The network has forced a Packet Domain detach.	AT+CGEREP=2,1
32	+CGEV: ME DETACH	The mobile equipment has forced a Packet Domain detach.	AT+CGEREP=2,1
33	+CGEV: NW CLASS <class>	The network has forced a change of MS class.	AT+CGEREP=2,1
34	+CGEV: ME CLASS <class>	The mobile equipment has forced a change of MS class.	AT+CGEREP=2,1

13.8. 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 (GSM Encode)

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 (ISO-8859-1/Unicode)

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.

13.9. 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