RGx00U&RM500U
AT Commands Manual

5G Module Series

Version: 1.0

Date: 2024-02-02

Status: Released

At Quectel, our aim is to provide timely and comprehensive services to our customers. If you require any assistance, please contact our headquarters:

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Tel: +86 21 5108 6236
Email: info@quectel.com

Or our local offices. For more information, please visit:
http://www.quectel.com-support-sales.htm.

For technical support, or to report documentation errors, please visit:
http://www.quectel.com-support-technical.htm.
Or email us at: support@quectel.com.

Legal Notices

We offer information as a service to you. The provided information is based on your requirements and we make every effort to ensure its quality. You agree that you are responsible for using independent analysis and evaluation in designing intended products, and we provide reference designs for illustrative purposes only. Before using any hardware, software or service guided by this document, please read this notice carefully. Even though we employ commercially reasonable efforts to provide the best possible experience, you hereby acknowledge and agree that this document and related services hereunder are provided to you on an “as available” basis. We may revise or restate this document from time to time at our sole discretion without any prior notice to you.

Use and Disclosure Restrictions

License Agreements

Documents and information provided by us shall be kept confidential, unless specific permission is granted. They shall not be accessed or used for any purpose except as expressly provided herein.

Copyright

Our and third-party products hereunder may contain copyrighted material. Such copyrighted material shall not be copied, reproduced, distributed, merged, published, translated, or modified without prior written consent. We and the third party have exclusive rights over copyrighted material. No license shall be granted or conveyed under any patents, copyrights, trademarks, or service mark rights. To avoid ambiguities, purchasing in any form cannot be deemed as granting a license other than the normal non-exclusive, royalty-free license to use the material. We reserve the right to take legal action for noncompliance with abovementioned requirements, unauthorized use, or other illegal or malicious use of the material.

Trademarks

Except as otherwise set forth herein, nothing in this document shall be construed as conferring any rights to use any trademark, trade name or name, abbreviation, or counterfeit product thereof owned by Quectel or any third party in advertising, publicity, or other aspects.

Third-Party Rights

This document may refer to hardware, software and-or documentation owned by one or more third parties ("third-party materials"). Use of such third-party materials shall be governed by all restrictions and obligations applicable thereto.

We make no warranty or representation, either express or implied, regarding the third-party materials, including but not limited to any implied or statutory, warranties of merchantability or fitness for a particular purpose, quiet enjoyment, system integration, information accuracy, and non-infringement of any third-party intellectual property rights with regard to the licensed technology or use thereof. Nothing herein constitutes a representation or warranty by us to either develop, enhance, modify, distribute, market, sell, offer for sale, or otherwise maintain production of any our products or any other hardware, software, device, tool, information, or product. We moreover disclaim any and all warranties arising from the course of dealing or usage of trade.

Privacy Policy

To implement module functionality, certain device data are uploaded to Quectel's or third-party's servers, including carriers, chipset suppliers or customer-designated servers. Quectel, strictly abiding by the relevant laws and regulations, shall retain, use, disclose or otherwise process relevant data for the purpose of performing the service only or as permitted by applicable laws. Before data interaction with third parties, please be informed of their privacy and data security policy.

Disclaimer

a) We acknowledge no liability for any injury or damage arising from the reliance upon the information.
b) We shall bear no liability resulting from any inaccuracies or omissions, or from the use of the information contained herein.
c) While we have made every effort to ensure that the functions and features under development are free from errors, it is possible that they could contain errors, inaccuracies, and omissions. Unless otherwise provided by valid agreement, we make no warranties of any kind, either implied or express, and exclude all liability for any loss or damage suffered in connection with the use of features and functions under development, to the maximum extent permitted by law, regardless of whether such loss or damage may have been foreseeable.
d) We are not responsible for the accessibility, safety, accuracy, availability, legality, or completeness of information, advertising, commercial offers, products, services, and materials on third-party websites and third-party resources.

About the Document

Revision History

Version	Date	Author	Description
-	2022-09-21	Rami ZHANG- Gale GAO- Wayen XU- Romeo SONG- John ZHAI- Xudong MAO- Craig GAN- Jeffery JIANG	Creation of the document
1.0	2024-02-02	Rami ZHANG- Gale GAO- Wayen XU- Romeo SONG- John ZHAI- Xudong MAO- Craig GAN- Jeffery JIANG	First official release

Content

Table Index

1 Introduction

1.1. Scope of the Document

This document presents the AT command set supported by Quectel 5G RG200U series, RG500U series and RM500U series modules.

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 the command line.
- **[...]** Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on the command line. When an optional parameter is not given in a command, the new value equals to its previous value or the default settings, unless otherwise specified.
- **Underline** Default setting of a parameter.

1.2.2. AT Command Syntax

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

AT commands implemented by the module can be separated into three categories syntactically: "**Basic**", "**S Parameter**" and "**Extended**", as listed below:

- **Basic Command**

  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>**, where **<n>** is the index of the **S** register to set, and **<m>** is the value to assign to it.

- **Extended Command**

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

Table 1: Type of AT Commands

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

Multiple commands can be placed on a single line using a semi-colon (**;**) between commands. 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 entered after the **AT** token, **OK** will be returned. If an invalid command is entered, **ERROR** will be returned.

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

1.2.3. AT Command Response

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

Responses will be in the format of:

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

Or

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

1.2.4. Declaration of AT Command Examples

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

1.3. Supported Character Sets

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

- GSM format
- UCS2
- IRA

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

1.4. 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

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

1.6. Module Turn-off Procedure

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

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

2 General Commands

2.1. ATI Display MT Identification Information

This command requests 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
RG500U-EA
Revision: RG500UEAAAR01A01M2G

OK
```

2.2. AT+GMI Request Manufacturer Identification

This command requests the manufacturer identification text. It is identical with **AT+CGMI**.

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 requests the model identification text. It is identical with **AT+CGMM**.

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 command requests the identification text of MT firmware version.

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

Parameter

<version>	String type. Identification text of MT firmware version, including line terminators, which should not exceed 2048 characters in the information text.

Example

```
AT+GMR
RG500UEAAAR01A01M4G

OK
```

2.5. AT+CGMI Request Manufacturer Identification

This command requests the manufacturer identification text.

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 requests the model information of the product. It is identical with **AT+GMM**.

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 command requests the identification text of MT firmware version.

AT+CGMR Request MT 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. MT firmware revision identification, including line terminators, which should not exceed 2048 characters in the information text.

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

This command requests the International Mobile Equipment Identity (IMEI) number of the ME.

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

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

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

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

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

This command resets AT command settings to the default values specified by the manufacturer (See ***Chapter 13.5***).

AT&F Reset AT Command Settings to Factory Settings	
Execution Command **AT&F[<value>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Parameter

<value>	Integer type. 0 Reset all AT command settings to factory setting.

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

This command stores the current AT command settings to a user-defined profile in non-volatile memory (See ***Chapter 13.6***). The AT command settings are automatically restored from the user-defined profile during power-up or if **ATZ** is executed.

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

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

This command first resets the AT command settings to their manufacturer defaults, which is similar to **AT&F**. Afterwards the AT command settings are restored from the user-defined profile in the non-volatile memory, if they have been stored with **AT&W** before (See ***Chapter 13.7***).

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.

2.13. 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 2***.

ATV MT Response Format	
Execution Command **ATV[<value>]**	Response When **<value>**=0 **0** When **<value>**=1 or omitted: **OK**
Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Parameter

<value>	Integer type. Response format. For more details, see ***Table 2***.	
	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 2: 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).

2.14. 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	Echo mode OFF
	1	Echo mode ON

2.15. 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
RG500UEA
Revision: RG500UEAAAR01A01M4G

OK
A-                                  //Repeat the previous command.
Quectel
RG500UEA
Revision: RG500UEAAAR01A01M4G

OK
```

2.16. 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.

2.17. 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.

2.18. 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.

2.19. 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 ME functionality:

	+CME ERROR: <err>
Maximum Response Time	15 s, determined by the network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<fun>	Integer type. Functionality level.	
	0	Minimum functionality
	1	Full functionality
	4	Disable both transmitting and receiving RF signals
<rst>	Integer type. Whether to rest UE.	
	0	Do not reset the UE before setting it to **<fun>** power level.
	1	Reset UE. The device is fully functional after the reset. This value is available only for **<fun>**=1.
<err>	Error code. For more details, see ***Chapter 13.3***.	

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

+QUIMSLOT: 1

+QIND: PB DONE

+QIND: SMS DONE
```

```
AT+CPIN?
+CPIN: READY

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

OK
```

2.20. AT+CMEE Error Message Format

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

AT+CMEE Error Message Format	
Test Command **AT+CMEE=?**	Response **+CMEE: (**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. Whether to enable result code. 0 Disable result code and use **ERROR** instead. 1 Enable result code and use numeric values. 2 Enable result code and use verbose values.
<err>	Error code. For more details, see ***Chapter 13.3***.

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 for <err>.
OK
AT+CPIN?
+CME ERROR: 10
AT+CMEE=2                          //Enable error result code with verbose (string) values.
OK
AT+CPIN?
+CME ERROR: SIM not inserted
```

2.21. AT+CSCS Select TE Character Set

This command informs the module of the character set used by 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. Character set. "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
```

2.22. AT+QURCCFG Configure URC Indication Option

This command configures the output port of URC.

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

Parameter

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

Example

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

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

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

OK
```

3 Status Control Commands

3.1. AT+CPAS ME Activity Status

This command queries the activity status of the ME.

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

Parameter

<pas>	Integer type. ME activity status. 0 Ready 3 Ringing 4 Call in progress
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+CPAS
+CPAS: 0                                    //ME is ready.

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

OK
AT+CPAS
+CPAS: 3                                    //ME 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:

- Failure to release a call
- Failure to set up a call (both mobile originated or terminated)
- Failure to modify a call by using supplementary services
- 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**

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

Parameter

<text>	String type. Release cause text. Reason for the last call-related failure(listed in ***Chapter 13.10***). 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 code. For more details, see ***Chapter 13.3***.

3.3. AT+QCFG Extended Configuration Settings

This command queries and configures various settings of UE.

AT+QCFG Extended Configuration Settings	
Test Command **AT+QCFG=?**	Response **+QCFG: "usbnet",(**list of supported **<net>**s**)** **+QCFG: "nat",(**range of supported **<nat>**s**)** **+QCFG: "usbcfg",(**range of supported **<VID>**s**),(**range of supported **<PID>**s**),(**list of supported **<diag>**s**),(**list of supported **<log>**s**),(**list of supported **<AT_port>**s**),(**list of supported **<modem>**s**),(**list of supported **<NMEA>**s**),(**list of supported **<ADB>**s**),(**list of supported **<UAC>**s**)** **+QCFG: "ims",(**list of supported **<IMS>**s**)** **+QCFG: "pcie-mode",(**list of supported **<mode>**s**)** **+QCFG: "ethernet",(**list of supported **<AcT>**s**)** **+QCFG: "uartat",(**list of supported **<enable>**s**)** **+QCFG: "usbid",(**range of supported **<VID>**s**),(**range of supported **<PID>**s**)** **+QCFG: "multiusbnet",(**range of supported **<count>**s**),(**range of supported **<offset>**s**)** **+QCFG: "usbmac",(**list of supported **<channel>**s**)** **+QCFG: "staticarp",(**list of supported **<channel>**s**),<mac>** **+QCFG: "lanip",<gateway>,<netmask>,<lease_time>** **+QCFG: "lanip_ex",<gateway>,<netmask>,<startIP>,<endIP>,<lease_time>**

	+QCFG: "loopback",(range of supported **<loopback>**s**)** **+QCFG: "5glan",(**range of supported **<cid>**s**),(**list of supported **<enable>**s**)** **+QCFG: "autoapn",(**list of supported **<enable>**s**)** **+QCFG: "usbmode",(**list of supported **<mode>**s**)** **+QCFG: "rp_filter",(**range of supported **<enable>**s**)** **+QCFG: "netmask",(**list of supported **<enable>**s**)** **+QCFG: "tts",(**list of supported **<enable>**s**)** **+QCFG: "pm/powersave",(**list of supported **<mode>**s**)** **OK**
Maximum Response Time	300 ms
Characteristics	-

3.3.1. AT+QCFG="usbnet" Configure USBnet Driver Type

This command configures USBnet driver type in USBnet mode.

AT+QCFG="usbnet" Configure USBnet Driver Type	
Write Command **AT+QCFG="usbnet"[,<net>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "usbnet",<net>** **OK** If the optional parameter is specified, configure USBnet driver type: **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	This command takes effect after the module is rebooted. The configuration is saved automatically. Restore to default value after firmware upgrade via USB.

Parameter

<net>	Integer type. USBnet driver type in USBnet mode. 1 ECM 2 MBIM 3 RNDIS

	5 NCM
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

When USBnet driver type of the module is configured to MBIM, the host controller can only communicate with the module through MBIM protocol rather than AT commands.

Example

```
AT+QCFG="usbnet",3          //Configure USBnet driver type to RNDIS.
OK
```

3.3.2. AT+QCFG="nat" Configure Call Mode

This command configures the call mode of USBnet.

AT+QCFG="nat" Configure Call Mode	
Write Command **AT+QCFG="nat"[,<nat>]**	Response If the optional parameter is omitted, query the current setting. **+QCFG: "nat",<nat>** **OK** If the optional parameter is specified, configure the call mode. **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically. Restore to default value after firmware upgrade via USB.

Parameter

<nat>	Integer type. Call mode. 0 NIC mode 1 Router mode 2 Bridge mode

Example

```
AT+QCFG="nat",1                    //Configure the call mode as router mode.
OK
```

3.3.3. AT+QCFG="usbcfg" Query/Set USB Information

This commands queries or sets USB vendor ID, product ID and interfaces status.

AT+QCFG="usbcfg" Query/Set USB Information	
Write Command **AT+QCFG="usbcfg"[,<VID>,<PID>,<diag>,<AT_port>,<modem>,<NMEA>,<ADB>,<UAC>]**	Response If the optional parameters are omitted, query the current setting: **+QCFG: "usbcfg",<VID>,<PID>,<diag>,<log>,<AT_port>,<modem>,<NMEA>,<ADB>,<UAC>** **OK** If the optional parameters are specified, set USB information: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configurations are saved automatically.

Parameter

<VID>	Hexadecimal integer. Vendor ID of USB device. Maximum: 0×FFFF.
<PID>	Hexadecimal integer. Product ID of USB device. Maximum: 0×FFFF.
<diag>	Integer type. USB diagnose interface status. 0 Disable all diagnose interfaces 1 Enable DM (Diagnostic Monitor) interface
<log>	Integer type. USB log interface status. 0 Disable 1 ENable
<AT_port>	Integer type. USB AT interface status. 0 Disable 1 Enable
<modem>	Integer type. USB modem interface status. 0 Disable 1 Enable

<NMEA>	Integer type. USB NMEA interface status. 0 Disable 1 Enable
<ADB>	Integer type. USB ADB interface status. 0 Disable 1 Enable
<UAC>	Integer type. USB UAC interface status. 0 Disable 1 Enable

Example

```
AT+QCFG="usbcfg"                                  //Query the current USB information.
+QCFG: "usbcfg",0x2C7C,0x0800,1,1,1,1,1,0,0

OK
AT+QCFG=”usbcfg”,0x2C7C,0x0800,1,1,1,1,1,1,0      //Enable ADB
OK
```

3.3.4. AT+QCFG="ims" Enable/Disable IMS Functionality

This command enables or disables IMS functionality.

AT+QCFG="ims" Enable/Disable IMS Functionality	
Write Command **AT+QCFG="ims"[,<IMS>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "ims",<IMS>** **OK** If the optional parameter is specified, enable or disable IMS functionality: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically. Restore to default value after firmware upgrade via USB.

Parameter

<IMS>	Integer type. Enable or disable IMS functionality. 0 Disable 1 Enable

Example

```
AT+QCFG="ims",1          //Enable IMS functionality.
OK
```

3.3.5. 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** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	This command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

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

Example

```
AT+QCFG="pcie-mode",1          //Set to PCIe RC mode.
OK
```

3.3.6. AT+QCFG="ethernet" Enable/Disable Ethernet Call

This command enables or disables Ethernet call.

AT+QCFG="ethernet" Enable/Disable Ethernet Call	
Write Command **AT+QCFG="ethernet"[,<AcT>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "ethernet",<AcT>** **OK** If the optional parameter is specified, enable or disable Ethernet call: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically. Restore to default value after firmware upgrade via USB.

Parameter

<AcT>	Integer type. Enable or disable Ethernet call. 0 Disable 1 Enable self-adaption functionality. If the hardware supports Ethernet, it will be used preferentially. Otherwise, USBnet will be used.

Example

```
AT+QCFG="ethernet",0          //Disable Ethernet adaptive function.
OK
```

3.3.7. AT+QCFG="uartat" Configure Main UART AT Functionality

This command enables or disables AT functionality of Main UART.

AT+QCFG="uartat" Configure Main UART AT Functionality	
Write Command **AT+QCFG="uartat"[,<enable>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "uartat",<enable>**

	OK If the optional parameter is specified, enable or disable AT functionality of Main UART: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically. Restore to default value after firmware upgrade via USB.

Parameter

<enable>	Integer type. Enable or disable AT functionality of Main UART. 0 Disable 1 Enable

Example

```
AT+QCFG="uartat",0      //Disable AT functionality of Main UART.
OK
```

3.3.8. AT+QCFG="usbid" Set Vendor ID and Product ID of USB Device

This command sets vendor ID and PID of the USB device.

AT+QCFG="usbid" Set Vendor ID and Product ID of USB Device	
Write Command **AT+QCFG="usbid"[,<VID>,<PID>]**	Response If the optional parameters are omitted, query the current setting: **+QCFG: "usbcfg",<VID>,<PID>** **OK** If the optional parameters are specified, set vendor ID and product ID of the USB device: **OK** If there is any error: **+CME ERROR: <err>**

Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configurations are saved automatically. Restore to default value after firmware upgrade via USB.

Parameter

<VID>	Integer type. Vendor ID of the USB device. Range: 1–65535.
<PID>	Integer type. Product ID of the USB device. Range: 1–65535.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+QCFG="usbid",11388,2304          //Set vendor ID and PID of the USB device
OK
```

3.3.9. AT+QCFG="multiusbnet" Set NCM Multiple Data Call

This command sets parameters of multiple data call in NCM call mode. This command is available only when the call mode is NIC mode (**AT+QCFG="nat",0**).

AT+QCFG="multiusbnet" Set NCM Multiple Data Call	
Write Command **AT+QCFG="multiusbnet"[,<count>[,<offset>]]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "multiusbnet",<count>,<offset>** **OK** If the optional parameter is specified, set parameters of multiple data call in NCM call mode: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configurations are saved automatically.

Parameter

<count>	Integer type. Channel number of NCM multiple data call. Range:1–4. Default: 1.
<offset>	Integer type. The offset of each data call channel. This parameter is valid only when the value of **<count>** is greater than 1. Range: 0–4. Default: 0 (no offset).

NOTE

1. Multiple data call is only supported when the call mode is NCM, and it is only valid when the host system supports NCM driver such as Linux.
2. Only in NIC mode (**AT+QCFG="nat",0**), NCM multiple data call is supported, that is, the IP address obtained by the Linux host is the one assigned by the core network.

Example

```
AT+QCFG="multiusbnet"
+QCFG: "multiusbnet",1,0

OK
AT+QCFG="multiusbnet",1
OK
AT+QCFG="multiusbnet",1,0
OK
```

3.3.10. AT+QCFG="usbmac" Query MAC Address of NCM Multiple Data Call Channel

This command queries the MAC address of the USB virtual NIC of the NCM multiple data call channels. This command is available only when the call mode is NIC mode (**AT+QCFG="nat",0**).

AT+QCFG="usbmac" Query MAC Address of NCM Multiple Data Call Channel	
Write Command **AT+QCFG="usbmac"[,<channel>]**	Response If the optional parameter is omitted, query all MAC address(es) of the USB virtual NIC: **[+QCFG: "usbmac",<channel>,<mac>** **[+QCFG: "usbmac",<channel>,<mac>** **[…]]]** **OK** If the optional parameters are specified, query specific MAC address of the USB virtual NIC: **+QCFG: "usbmac",<channel>,<mac>**

	OK If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<channel>	String type. USB virtual NIC name. The range is determined by **AT+QCFG="multiusbnet"**. usb0 usb1 usb2 usb3
<mac>	String type. MAC address of USB virtual NIC.

NOTE

1. This command is valid only when you configure the number of multiple data call channels via **AT+QCFG="multiusbnet"**.
2. If you configure several channels with **AT+QCFG="multiusbnet"**, the MAC addresses of several channels are returned. For example, if you configure 4 channels, you can query the 4 MAC addresses of USB virtual NIC.

Example

```
AT+QCFG="usbmac"          //Query MAC address of USB virtual NIC.
+QCFG: "usbmac",usb0,3a:32:1b:47:18:83

OK
```

3.3.11. AT+QCFG="staticarp" Set Static ARP

This command sets static ARP. This command is available only when the call mode is NIC mode (**AT+QCFG="nat",0**).

AT+QCFG="staticarp" Set Static ARP	
Write Command **AT+QCFG="staticarp",<channel>[,<mac>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "staticarp",<channel>,<mac>** **[+QCFG: "staticarp",<channel>,<mac>** **[…]]** **OK** If the optional parameter is specified, set static ARP: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	This command takes effect immediately. The configurations are saved automatically.

Parameter

<channel>	String type. USB virtual NIC name. The range is determined by **AT+QCFG="multiusbnet"**. 0 Disable static ARP usb0 usb1 usb2 usb3
<mac>	String type. MAC address of USB virtual NIC.

NOTE

1. You need to configure static ARP through this command before executing **AT+QNETDEVCTL** to perform a data call.
2. If you configure several channels with **AT+QCFG="multiusbnet"**, the MAC addresses of several channels are returned. For example, if you configure 4 channels, you can query the 4 MAC addresses of USB virtual NIC.

Example

```
AT+QCFG="staticarp",usb0,"12:22:33:44:55:66"
OK
AT+QCFG="staticarp",usb0
+QCFG: "staticarp",usb0,12:22:33:44:55:66

OK
```

3.3.12. AT+QCFG="lanip" Configure Gateway Address, Subnet Mask and Lease Time

This command configures gateway address, subnet mask and lease time in routed or bridge mode.

AT+QCFG="lanip" Configure Gateway Address, Subnet Mask and Lease Time	
Write Command **AT+QCFG="lanip"[,<gateway>,<netmask>,<lease_time>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "lanip",<gateway>,<netmask>,<lease_time>** **OK** If the optional parameter is specified, configure gateway address and subnet mask and lease time: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after immediately. The configuration is saved automatically. Restore to default value after firmware upgrade via USB.

Parameter

<gateway>	String type. The network segment of the gateway address.
<netmask>	String type. Subnet mask.
<lease_time>	Integer type. Lease time. Range: 3600–86400. Default: 86400. Unit: second. If the parameter is set to 0, it means that the corresponding lease time is ten years.

Example

```
AT+QCFG="usbspeed"                    //Query the current setting.
+QCFG: "lanip","192.168.42.0","255.255.255.0",86400

OK
```

3.3.13.AT+QCFG="lanip_ex" Extended Configuration for Gateway Address and Subnet Mask and Lease Time

In router and bridge modes, you can execute **AT+QCFG="lanip_ex"[,<gateway>[,<netmask>[,<startIP>[,<endIP>[,<lease_time>]]]]]** to set gateway address, subnet mask, start and end IP address of DHCP address pool, and lease time. This command takes effect immediately. In NIC mode, you can only execute **AT+QCFG="lanip_ex"[,<lease_time>]** to set the lease time of DHCP address pool. This command takes effect after the module is rebooted.

AT+QCFG="lanip_ex"[,<gateway>[,<netmask>[,<startIP>[,<endIP>[,<lease_time>]]]]] queries or sets gateway address, subnet mask, start and end IP address of DHCP address pool, and lease time in router and bridge modes, and it takes effect immediately. **AT+QCFG="lanip_ex"[,<lease_time>]** queries or sets the lease time of DHCP address pool in NIC mode, and it takes effect after the module is rebooted.

AT+QCFG="lanip_ex" Extended Configuration for Gateway Address and Subnet Mask and Lease Time	
Write Command In Router mode or bridge mode: **AT+QCFG="lanip_ex"[,<gateway>[,<netmask>[,<startIP>[,<endIP>[,<lease_time>]]]]]**	Response If the optional parameters are omitted, query the current setting: **+QCFG: "lanip_ex",<gateway>,<netmask>,<startIP>,<endIP>,<lease_time>** **OK** If the optional parameters are specified, set gateway address, subnet mask, start and end IP address of DHCP address pool, and lease time: **OK** If there is any error: **ERROR**
Write Command In NIC mode: **AT+QCFG="lanip_ex"[,<lease_time>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "lanip_ex",<lease_time>** **OK**

	If the optional parameter is specified, set the lease time of DHCP address pool: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The configurations are saved automatically. Restore to default value after firmware upgrade via USB.

Parameter

<gateway>	String type. Gateway address.
<netmask>	String type. Subnet mask.
<startIP>	String type. Start IP address of DHCP address pool.
<endIP>	String type. End IP address of DHCP address pool.
<lease_time>	Integer type. Lease time. Range: 0–86400. Default: 86400. Unit: second. If the parameter is set to 0, it means that the corresponding lease time is ten years.

NOTE

AT+QCFG="lanip_ex"[,<gateway>[,<netmask>[,<startIP>[,<endIP>[,<lease_time>]]]]] is an extended command for **AT+QCFG="lanip"[,<gateway>,<netmask>,<lease_time>]**, the configurations of these two commands are isolated from each other. Do not use them at the same time. The differences between these two commands are as follows:

1. **<gateway>** has different meanings. In **AT+QCFG="lanip_ex"**, the parameter directly specifies the gateway address; while in **AT+QCFG="lanip"**, it specifies the network segment of the gateway address.
2. Add parameters **<startIP>** and **<endIP>** in **AT+QCFG="lanip_ex"** to specify the DHCP address pool.

Example

```
AT+QCFG="nat",1          //Configure the USBnet call mode as router mode.
OK
AT+QCFG="nat",2          //Configure the USBnet call mode as bridge mode.
OK
//In router and bridge modes, set the gateway address to 192.168.42.1, subnet mask to 255.255.255.0, start IP address of the DHCP address pool to 192.168.42.2, end IP address of the DHCP address pool to 192.168.42.254, and the lease time to 86400 seconds.
AT+QCFG="lanip_ex","192.168.42.1","255.255.255.0","192.168.42.2","192.168.42.254",86400
OK
```

```
AT+QCFG="lanip_ex"          //Query the current setting.
+QCFG: "lanip_ex","192.168.42.1","255.255.255.0","192.168.42.2","192.168.42.254",86400

OK
AT+QCFG="nat",0             //Configure the USBnet call mode as NIC mode.
OK
//In NIC mode, set the lease time of DHCP address pool to 86400 seconds.
AT+QCFG="lanip_ex",86400
OK
AT+QCFG="lanip_ex"          //Query the current setting.
+QCFG: "lanip_ex",86400

OK
```

3.3.14. AT+QCFG="loopback" Enable/Disable Loopback

This command enables or disables loopback.

AT+QCFG="loopback" Enable/Disable Loopback	
Write Command **AT+QCFG="loopback"[,<loopback>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "loopback",<loopback>** **OK** If the optional parameter is specified, enable or disable loopback: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<loopback>	Integer type. Enable or disable loopback.	
	0	Disable
	1–15	Enable. It also represents the number of loopback packets

Example

```
AT+QCFG="loopback",10          //Enable loopback. The host sends 1 loopback packet, and then
                                 the module sends 10 loopback packets back.
OK
```

3.3.15. AT+QCFG="5glan" Enable/Disable 5G LAN

This command enables or disables 5G LAN.

AT+QCFG="5glan" Enable/Disable 5G LAN	
Write Command **AT+QCFG="5glan"[,<cid>,<enable>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "5glan",<cid>,<enable>** **OK** If the optional parameter is specified, enable or disable 5G LAN of a specified PDP context: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<enable>	Integer type. Enable or disable 5G LAN. 0 Disable 1 Enable
<cid>	Integer type. PDP context ID. Range: 1–8, 11.

3.3.16. AT+QCFG="autoapn" Enable/Disable APN Self-adaption Functionality

This command enables or disables APN self-adaption functionality.

AT+QCFG="autoapn" Enable/Disable APN Self-adaption Functionality	
Write Command **AT+QCFG="autoapn"[,<enable>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "autoapn",<enable>** **OK** If the optional parameter is specified, enable or disable APN self-adaption functionality: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<enable>	Integer type. Enable or disable APN self-adaption functionality. 0 Disable 1 Enable

NOTE

If you need to disable APN self-adaptation function and use a fixed APN, please use **AT+CGDCONT** or **AT+QICSGP** to configure the APN first, otherwise the APN will be empty.

Example

```
AT+QCFG="autoapn",1          //Enable APN self-adaptive functionality.
OK
```

3.3.17. AT+QCFG="usbmode" Configure USB to Master or Slave Mode

This command configures USB to master or slave mode.

AT+QCFG="usbmode" Configure USB to Master or Slave Mode	
Write Command **AT+QCFG="usbmode"[,<mode>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "usbmode",<mode>** **OK** If the optional parameter is specified, configures USB master or slave mode: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<mode>	String type without double quotes. Master or slave mode of USB.	
	device	Slave mode
	host	Master mode
	auto	Self-adaption mode, designed according to USBID hardware design

Example

```
AT+QCFG="usbmode"                  //Query the current setting.
+QCFG: "usbmode",auto

OK
AT+QCFG="usbmode",host             //Configure USB to master mode.
OK
//Reboot the module
AT+QCFG="usbmode"                  //Query the current setting.
+QCFG: "usbmode",host

OK
```

3.3.18. AT+QCFG="rp_filter" Enable/Disable Reverse Path Filter Functionality

This command enables or disables reverse path filter functionality.

AT+QCFG="loopback" Enable/Disable Reverse Path Filter Functionality	
Write Command **AT+QCFG="rp_filter"[,<enable>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "rp_filter",<enable>** **OK** If the optional parameter is specified, enable or disable loopback: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<enable>	Integer type. Enable or disable reverse path filter functionality.	
	0	Disable
	1	Enable reverse path filter strict mode. Check if the reverse path is the best path
	2	Enable reverse path filter loose mode. Check whether the source address is reachable, that is, whether the reverse path can be reached

3.3.19. AT+QCFG="netmask" Control Dynamic Subnet Mask

This command enables or disables the dynamic subnet mask functionality.

AT+QCFG="netmask" Control Dynamic Subnet Mask	
Write Command **AT+QCFG="netmask"[,<enable>]**	Response If the optional parameters are omitted, query the current setting: **+QCFG: "netmask",<enable>** **OK**

	If the optional parameter is specified, enable or disable the dynamic subnet mask functionality: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	This command takes effect after the module reconnects to the network card. The configurations are saved automatically.

Parameter

<enable>	Integer type. Enable or disable the dynamic subnet mask functionality 0 Disable 1 Enable

NOTE

The rule of dynamic subnet mask is that under the premise of preventing the host bits from becoming all 0 or 1, the mask should be as long as possible.

Example

```
AT+QCFG="netmask",1          //Enable dynamic subnet mask functionality. It takes effect after
                               the module reconnects to the network card.
OK
```

3.3.20. AT+QCFG="tts" Enable/Disable the TTS Feature

This command enables or disables the TTS feature.

AT+QCFG="tts" Enable/Disable the TTS Feature	
Write Command **AT+QCFG="tts"[,<enable>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "tts",<enable>** **OK** If the optional parameter is specified, enable or disable the TTS feature: **OK**

	If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	This command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<enable>	Integer type. Enable or disable the TTS feature. 0 Disable 1 Enable
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+QCFG="tts",1      //Enable the TTS feature. This command takes effect after the module is rebooted.
OK
```

3.3.21.AT+QCFG="pm/powersave" Set Power Mode of the Module During Data Transmission

This command sets the power mode of the module during data transmission.

AT+QCFG="pm/powersave" Set Power Mode of the Module During Data Transmission	
Write Command **AT+QCFG="pm/powersave"[,<mode>]**	Response If the optional parameter is omitted, query the current setting: **+QCFG: "pm/powersave",<mode>** **OK** If the optional parameter is specified, set the power mode of the module during data transmission: **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<mode>	Integer type. The power mode of the module during data transmission. 0 High performance mode 1 Power saving mode
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+QCFG="pm-powersave",0        //Set the power mode of the module to high performance mode during data transmission.

OK
AT+QCFG="pm-powersave",1        //Set the power mode of the module to power saving mode during data transmission.

OK
AT+QCFG="pm-powersave"          //Query the current power mode of the module during data transmission.

+QCFG: "pm-powersave",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 **<save_to_nvram>**s**)** **+QINDCFG: "csq",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)** **+QINDCFG: "smsfull",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)** **+QINDCFG: "ring",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)** **+QINDCFG: "smsincoming",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)** **+QINDCFG: "act",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)** **+QINDCFG: "rejinfo",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)**

	OK
Write Command **AT+QINDCFG=<URC_type>[,<enable>[,<save_to_nvram>]]**	Response If the optional parameters are omitted, query the current configuration: **+QINDCFG: <URC_type>,<enable>** **OK** If the optional parameters are specified, set the URC indication configurations: **OK** If there is any error: **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 **<save_to_nvram>**.

Parameter

<URC_type>	String type. URC type.	
	"all"	Master switch of all URCs. Default: ON.
	"csq"	Indication of signal strength and channel bit error rate change (similar to **AT+CSQ**). Default: OFF. If this configuration is ON, **+QIND: "csq",<rssi>,<ber>** is present.
	"smsfull"	SMS storage full indication. Default: 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>	String type. The values are as below:
	"WCDMA"	
	"HSDPA"	
	"HSUPA"	
	"HSDPA&HSUPA"	
	"LTE"	
	"NR5G-NSA"	

		"NR5G-SA" "UNKNOWN" The examples of URC are as below: **+QIND: "act","HSDPA&HSUPA"** or **+QIND:"act","UNKNOWN"**。 If MT does not register on network, the **<actvalue>** would be "UNKNOWN". 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.
	"rejinfo"	Rejection reason delivered by the network during registration, service request, network detachment process, or the cause value of (U)SIM authentication failure. Default: OFF. **+QREJINFO: <PLMN_ID>,<service_domain>,<reject_cause>,<RAT_type>,<reject_type>,<original_reject_cause>,<LAC>,<RAC>,<cellid>[,<esm_reject_cause>]**
<enable>	Integer type. URC indication is ON or OFF. 0 OFF 1 ON	
<save_to_nvram>	Integer type. Whether to save configuration into NVRAM. 0 Not save 1 Save	
<err>	Error code. For more details, see ***Chapter 13.3***.	

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 (or USIM) that is attached to MT.

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

Parameter

<IMSI>	International mobile subscriber identity (string without double quotes).
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+CIMI                 //Query IMSI number of (U)SIM.
460023210226023

OK
```

4.2. AT+CLCK Facility Lock

This command locks/unlocks an MT or a network facility. Password is normally needed to do such actions. When querying the status of network service (**<mode>**=2), the response line for 'not active' case 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>[,<passwd>[,<class>]]**	Response If **<mode>** is not 2 and the command is set successfully: **OK** If **<mode>** is 2 and the command is set successfully: **+CLCK: <status>[,<class>]** **[+CLCK: <status>[,<class>]** **[…]]** **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<fac>	String type.	
	"PS"	(U)SIM
	"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>**).
	"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. Operating mode.	
	0	Unlock
	1	Lock
	2	Query status
<passwd>	String type. Password.	
<class>	Integer type. The value is the combination of the following services.	
	Default value: 7 = 1 + 2 + 4, all telephony except short message service.	
	1	Voice
	2	Data
	4	FAX
	8	Short message service
	16	Data circuit synchronization
	32	Data circuit asynchronization
<status>	Integer type. Lock status.	
	0	OFF
	1	ON
<err>	Error code. For more details, see ***Chapter 13.3***.	

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 sends to the ME a password which is necessary before it can be operated 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.

This Read Command returns an alphanumeric string indicating whether or not a password is required.

MT stores a password, such as (U)SIM PIN, (U)SIM PUK, which is necessary before it can be operated. To verify the PIN, **<pin>** needs to be entered while **<new_pin>** does not need to be entered. If no PIN request is pending, no action will be taken and an error message **+CME ERROR** is returned. 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.

AT+CPIN Enter PIN	
Test Command **AT+CPIN=?**	Response **OK**
Read Command **AT+CPIN?**	Response **+CPIN: <code>** **OK** If there is any error: **+CME ERROR: <err>**
Write Command **AT+CPIN=<pin>[,<new_pin>]**	Response **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<code>	String type. The password type needed.	
	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 PIN password to be given
	PH-NET PUK	MT is waiting for network personalization PUK password to be given
	PH-NETSUB PIN	MT is waiting for network subset personalization PIN password to be given
	PH-NETSUB PUK	MT is waiting for network subset personalization PUK password to be given
	PH-SP PIN	MT is waiting for service provider personalization PIN password to be given
	PH-SP PUK	MT is waiting for service provider personalization PUK password to be given
	PH-CORP PIN	MT is waiting for corporate personalization PIN password to be given
	PH-CORP PUK	MT is waiting for corporate personalization PUK password to be given
<pin>	String type. PIN.	
<new_pin>	String type. New PIN. It is required if the requested password type is a PUK such as (U)SIM PUK1 and (U)SIM PUK2.	
<err>	Error code. For more details, see ***Chapter 13.3***.	

Example

```
//Enter PIN.
AT+CPIN?
+CPIN: SIM PIN                    //Waiting 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 PUK to be given.

OK
AT+CPIN="26601934","1234"               //Enter (U)SIM PUK and the new PIN.
OK

+CPIN: READY
AT+CPIN?
+CPIN: READY                            ///(U)SIM PUK has already been entered.

OK
```

4.4. AT+CPWD Change Password

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

This Test Command returns a list of pairs which present the available facilities and the maximum length of their password.

AT+CPWD Change Password	
Test Command **AT+CPWD=?**	Response **+CPWD:** list of supported **(<fac>,<pwdlength>)**s **OK**
Write Command **AT+CPWD=<fac>,<oldpwd>,<newpwd>**	Response **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	5 s
Characteristics	The command takes effect immediately; The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<fac>	String type. "PS" (U)SIM "P2" (U)SIM PIN2 "SC" (U)SIM (lock (U)SIM/UICC card) ((U)SIM/UICC asks password in MT power-up and when this lock command is executed) "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 3*GPP 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 **<passwd>**). "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*)
<pwdlength>	Integer type. Maximum length of password. When **<fac>**="AO" /"OI" /"OX" /"AI" /"IR" /"AB" /"AG" /"AC", the maximum length of the password is 4 bytes. When **<fac>**="PS" /"SC" /"P2" /"FD" /"PN" /"PU" /"PP" /"PC", the maximum length of the password is 4 bytes.
<oldpwd>	String type. Password specified for the facility from the user interface or with command.
<newpwd>	String type. New password.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+CPIN?
+CPIN: READY

OK
AT+CPWD="SC","1234","4321"          //Change (U)SIM card password to "4321".
OK
//Restart the module or re-activate the (U)SIM card.
```

```
AT+CPIN?                          //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.

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

Parameter

<length>	Integer type. String length of **<command>** or **<response>**.
<command>	String type in hexadecimal format. Command transferred by the MT to the (U)SIM in the format as described in *3GPP TS 51.011* (See **AT+CSCS**).
<response>	String type in hexadecimal format. Response to the command transferred by the (U)SIM to the MT in the format as described in *3GPP TS 51.011* (See **AT+CSCS**).
<err>	Error code. For more details, see ***Chapter 13.3***.

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 **<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** 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 is not saved.
Reference 3GPP TS 27.007	

Parameter

<command>	Integer type. (U)SIM command number. 176 READ BINARY 178 READ RECORD 192 GET RESPONSE 214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS 203 RETRIEVE DATA 219 SET DATA
<fileid>	Integer type. Identifier for an elementary data file on (U)SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS.
<P>	Parameters transferred by the MT to the (U)SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. See *3GPP TS 51.011* for the parameter values.
<data>	String type in hexadecimal format. Information which should be written to the (U)SIM (See **AT+CSCS**).
<pathID>	String type in hexadecimal format. The directory path of EF on a (U)SIM/UICC.
<sw>	Integer type. Information from the (U)SIM about the execution of the actual

	command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command.
<response>	String type in hexadecimal format. Response of a successful completion of the command previously issued (hexadecimal character format; see **AT+CSCS**). STATUS and GET RESPONSE return data, which gives information about the current elementary 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 code. For more details, see ***Chapter 13.3***.

4.7. AT+CCID Query EF-ICCID of (U)SIM Card

This command queries the EF-ICCID information of the (U)SIM card.

AT+CCID Query EF-ICCID of (U)SIM Card	
Test Command **AT+CCID=?**	Response **OK**
Execution Command **AT+CCID**	Response **+CCID: <CCID>** **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<CCID>	String type. CCID of the (U)SIM card.
<err>	Error code. For more details, see ***Chapter 13.3***.

4.8. AT+QCCID Query EF-ICCID of (U)SIM Card

This command queries the EF-ICCID information of the (U)SIM card. It is identical with **AT+CCID**.

AT+QCCID Query EF-ICCID of (U)SIM Card	
Test Command **AT+QCCID=?**	Response **OK**
Execution Command **AT+QCCID**	Response **+CCID: <CCID>** **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<CCID>	String type. CCID of the (U)SIM card.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+QCCID                    //Query CCID of (U)SIM.
+QCCID: 89860119801594358947

OK
```

4.9. AT+QPINC Display PIN Remainder Counter

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

AT+QPINC Display PIN Remainder Counter	
Test Command **AT+QPINC=?**	Response **+QPINC: (**list of supported **<facility>**s**)** **OK**
Read Command **AT+QPINC?**	Response **+QPINC: "SC",<pincounter>,<pukcounter>** **+QPINC: "P2",<pincounter>,<pukcounter>** **OK**
Write Command **AT+QPINC=<facility>**	Response **+QPINC: <facility>,<pincounter>,<pukcounter>** **OK** If there is any error: **+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 code. For more details, see ***Chapter 13.3***.

Example

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

OK
```

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

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

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

Parameter

<status>	Integer type. Initialization status of (U)SIM card. Actual value is the sum of several of the following four 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 DONE. SMS initialization completed. 4 PB DONE. Phonebook initialization completed.

Example

```
AT+QINISTAT=?
+QINISTAT: (0-5,7)

OK
AT+QINISTAT             //Query the current initialization status of (U)SIM card.
+QINISTAT: 0

OK
```

4.11. AT+QSIMDET (U)SIM Card Detection

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

AT+QSIMDET (U)SIM Card Detection	
Test Command **AT+QSIMDET=?**	Response **+QSIMDET: (**list of supported **<enable>**s**),(**list of supported **<insert_level>**s**)** **OK**
Read Command **AT+QSIMDET?**	Response **+QSIMDET: <enable>,<insert_level>** **OK**
Write Command **AT+QSIMDET=<enable>,<insert_level>**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configurations are saved automatically.

Parameter

<enable>	Integer type. Enable or disable (U)SIM card detection. 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

NOTE

1. Hot-swap function is invalid if the configured value of **<insert_level>** is inconsistent with hardware design.
2. Only when the module does not detect the (U)SIM card or is in the minimum function mode (**AT+CFUN=0**), the (U)SIM card hot-swap function can be controlled by this command.

Example

```
AT+QSIMDET=1,0          //Set (U)SIM card detection pin level as low when (U)SIM card is inserted.
OK
//Remove the (U)SIM card.
+CPIN: NOT READY
//Insert an (U)SIM card.
+CPIN: READY            //This URC is returned if the PIN1 of the (U)SIM card is unlocked.
```

4.12. AT+QUIMSLOT Switch (U)SIM Slot

This command queries and sets the slot currently used by the (U)SIM and configure 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** If there is any error: **ERROR**
Maximum Response Time	500 ms
Characteristics	The command takes effect immediately. The configurations is saved automatically.

Parameter

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

Example

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

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

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

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

AT+QSIMSTAT (U)SIM Card Insertion Status Report	
Test Command **AT+QSIMSTAT=?**	Response **+QSIMSTAT: (**list of supported **<enable>**s**)** **OK**
Read Command **AT+QSIMSTAT?**	Response **+QSIMSTAT: <enable>,<inserted_status>** **OK**
Write Command **AT+QSIMSTAT=<enable>**	Response **OK** If there is any error: **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, the URC **+QSIMSTAT: <enable>,<inserted_status>** is reported when (U)SIM card is inserted or removed. 0 Disable 1 Enable
<inserted_status>	Integer type. Inserted or removed status of the (U)SIM card. 0 Removed

1	Inserted

Example

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

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

4.14. AT+QSIMLOCK Configure Lock of SIM Card

This command queries or configures the lock of the SIM card.

AT+QSIMLOCK Configure Lock of SIM Card	
Test Command **AT+QSIMLOCK=?**	Response **+QSIMLOCK: (**list of supported **<fac>**s**)** **OK**
Write Command **AT+QSIMLOCK=<fac>[,<password>[,<MNC_length>,<list>]]**	Response If the optional parameters are omitted, query the current setting:

	When **<fac>**="PN", **+PN: <number>[,<MCC>,<MNC>,<MNC_length>[,<MCC>,<MNC>,<MNC_length>[,…]]]** **OK** 若**<fac>**="PU"， **+PU: <number>[,<MCC>,<MNC>,<MNC_length>,<IMSI_digit_6>,<IMSI_digit_7>[,<MCC>,<MNC>,<MNC_length>,<IMSI_digit_6>,<IMSI_digit_7>[,…]]]** **OK** 若**<fac>**="PP"， **+PP: <number>[,<MCC>,<MNC>,<MNC_length>,<GID1>[,<MCC>,<MNC>,<MNC_length>,<GID1>[,…]]]** **OK** 若**<fac>**="PC"， **+PC: <number>[,<MCC>,<MNC>,<MNC_length>,<GID1>,<GID2>[,<MCC>,<MNC>,<MNC_length>,<GID1>,<GID2>[,…]]]** **OK** If the optional parameters are specified, configures the lock of the SIM card: **OK** If there is any error: **ERROR**
Maximum Response Time	Determined by the length of **<list>**
Characteristics	The command takes effect after the module is rebooted or the module mode is switched with **AT+CFUN**. The configurations are saved automatically.

Parameter

<fac>	String type.	
	"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*)
<password>	String type. Password. The length is fixed at 8. Unit: byte.
<MNC_length>	Integer type. The length of the mobile network code. The value can be 2 or 3 digits. Unit: byte.
<list>	String type. The list to be locked. When **<fac>**="PN", the format is "**<MCC><MNC>**", such as "46001"; When **<fac>**="PU", the format is "**<MCC><MNC><IMSI_digit_6><IMSI_digit_7>**", such as "4600145"; When **<fac>**="PP", the format is "**<MCC><MNC><GID1>**", such as "460017"; When **<fac>**="PC", the format is "**<MCC><MNC><GID1><GID2>**", such as "4600178". A maximum of 20 items can be set at a time, and each item is separated by a comma, or a range can be indicated by a connector, such as "46001-46005,46006".
<number>	Integer type. The number of locked **<fac>**s.
<MCC>	Integer type. Mobile Country Code.
<MNC>	Integer type. Mobile Network Code.
<IMSI_digit_6>	Integer type. The 6th digit of MSI number.
<IMSI_digit_7>	Integer type. The 7th digit of IMSI number.
<GID1>	Integer type. 1st place in GID1.
<GID2>	Integer type. 1st place in GID2.

Example

```
AT+QSIMLOCK=?                                   //Query the supported personalization device lock.
+QSIMLOCK: ("PN","PU","PP","PC")

OK
AT+QSIMLOCK="PN","12345678",2,"12345,46001"     //Lock PLMN 12345 and 46001.
OK
AT+QSIMLOCK="PN"                                //Query the state of PN lock.
+PN: 2,123,45,2,460,1,2

OK
AT+QSIMLOCK="PN","12345678"                     //Unlock PN lock.
OK
```

5 Network Service Commands

5.1. AT+COPS Operator Selection

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

The Test Command returns a list of operators, which 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/EPS/5G network operator. If the selected operator is not available, no other operator shall be selected (except **<mode>**=4). The format of selected operator name shall apply to further Read Commands (**AT+COPS?**).

AT+COPS Operator Selection	
Test Command **AT+COPS=?**	Response **+COPS: [**list of supported **(<stat>,**long alphanumeric **<oper>,**short alphanumeric **<oper>,**numeric **<oper>[,<AcT>])**s**][...][,,(**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**	Response **OK**

>[,<AcT>]]]	If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	180 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<stat>	Integer type. Availability of operators. 0 Unknown 1 Operator available 2 Current operator 3 Operator forbidden
<oper>	String type. Operator name.
<mode>	Integer type. Operator selection mode. 0 Automatic operator selection (**<oper>** and **<format>** fields are ignored) 1 Manual operator selection (**<oper>** field shall be present and **<AcT>** optionally) 2 Deregister from network 3 Set only **<format>** (For Read Command **AT+COPS?**), 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. The format of **<oper>**. 0 Long format alphanumeric **<oper>** which can be up to 16 characters long 1 Short format alphanumeric **<oper>** 2 Numeric **<oper>**
<AcT>	Integer type. Access technology selected. Values 4, 5 and 6 occur only in the response of Read Command while MS is in data service state. 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 15 HSPA+
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+COPS=?                                   //List all current network operators.
+COPS:  (1,"CHN-UNICOM","UNICOM","46001",2),(2,"CHN-UNICOM","UNICOM","46001",7),(3,"CH
N-CT","CT","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-UNICOM",7

OK
AT+COPS=3,0;+COPS?                          //Set the operator in long alphanumeric format.
+COPS: 0,0,"CHINA TELECOM",12

OK
AT+COPS=3,1;+COPS?                          //Set the operator in short alphanumeric format.
+COPS: 0,1,"CTCC",12

OK
AT+COPS=3,2;+COPS?                          //Set the operator in numeric format.
+COPS: 0,2,"46011",12

OK
```

5.2. AT+CREG CS Domain Network Registration Status

The Read Command returns the CS domain network registration status and returns the status of result code presentation.

The Write Command sets whether to present URC or not and controls the presentation of an unsolicited result code.

AT+CREG CS Domain 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	The command takes effect immediately; The configuration is saved (Execute **AT&W** after this command is issued).
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Whether to enable the network registration unsolicited result code. 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. The 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 8 Emergency service
<lac>	String type. Two bytes location area code in hexadecimal format. This parameter is returned after the Read Command is executed only when **<n>**=2 and MT is registered on the network.
<ci>	String type. 28-bit (UMTS-LTE) cell ID in hexadecimal format. This parameter is returned after the Read Command is executed only when **<n>**=2 and MT is registered on the network.
<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 15 HSPA+

<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+CREG=1                          //Enable network registration unsolicited result code.
OK

+CREG: 1                           //URC reports that MT has registered on network.
AT+CREG=2                          //Enable network registration unsolicited result code with
                                     location information.
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 and the channel bit error rate.

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. Received signal strength indication. 0 -113 dBm or less 1 -111 dBm 2–30 -109 to -53 dBm 31 -51 dBm or greater 99 Not known or not detectable
<ber>	Integer type. Channel bit error rate (in percent). 0–7 As RxQual values in the table in *3GPP TS 45.008 subclause 8.2.4* 99 Not known or not detectable
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

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

Example

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

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

OK
```

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 **+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 If the optional parameters are omitted, delete the PLMN whose index is **<index>**: **OK** If the optional parameters are specified, set the preferred operator**:** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<index>	Integer type. The order number of operators in the (U)SIM preferred operator list.
<format>	Integer type. The format of **<oper>**. 0 Long format alphanumeric **<oper>** 1 Short format alphanumeric **<oper>** 2 Numeric **<oper>**
<oper>	String type. Operator name. **<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
<NR-RAN>	Integer type. NG-RAN access technology. 0 Access technology is not selected 1 Access technology is selected
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

The access technology selection parameters **<GSM>**, **<GSM_compact>**, **<UTRAN>**, **<E-UTRAN>** and **<NR-RAN>** 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.

AT+COPN Read Operator Names	
Test Command **AT+COPN=?**	Response **OK**
Execution Command **AT+COPN**	Response **+COPN: <numeric1>,<alpha1>** **[+COPN: <numeric2>,<alpha2>** **[…]]** **OK** If there is 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

<numeric>	String type. Operator names in numeric format (see **AT+COPS**).
<alpha*n*>	String type. Operator names in long alphanumeric format (see **AT+COPS**).
<err>	Error code. For more details, see ***Chapter 13.3***.

5.6. AT+CTZU Automatic Time Zone Update

This command enables and disables automatic time zone update through 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** If there is any error: **ERROR**
Read Command **AT+CTZU?**	Response **+CTZU: <onoff>** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.007	

Parameter

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

Example

```
AT+CTZU?
+CTZU: 0

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

OK
AT+CTZU=1              //Enable automatic time zone update through NITZ.
OK
```

```
AT+CTZU?
+CTZU: 1

OK
```

5.7. AT+CTZR Time Zone Reporting

This command controls the reporting of time zone change event.

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

Parameter

<reporting>	Integer type. Indicates the mode of time zone reporting. 0 Disable the reporting of time zone change event 1 Enable the reporting of time zone change event by unsolicited result code: **+CTZV: <tz>** 2 Enable extended time zone reporting by unsolicited result code: **+CTZE: <tz>,<dst>,<time>** 3 Enable extended time zone reporting by unsolicited result code: **+CTZEU: <tz>,<dst>,<utime>**

<tz>	String type. Indicates the sum of the local time zone (difference between the local time and GMT is expressed in quarters of an hour) plus daylight saving time. The format is "±zz", expressed as a fixed width, two-digit integer with the range -48 to +56. To maintain a fixed width, numbers in the range -9 to +9 are expressed with a leading zero, for example, "-09", "+00" and "+09".
<dst>	Integer type. Indicates whether **<tz>** includes daylight savings adjustment. 0 **<tz>** includes no adjustment for daylight saving time 1 **<tz>** includes +1 hour (equals 4 quarters in **<tz>**) adjustment for daylight saving time 2 **<tz>** includes +2 hours (equals 8 quarters in **<tz>**) adjustment for daylight saving time
<time>	String type. Indicates 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.
<utime>	String type. Indicates the universal 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       //Enable extended time zone reporting by unsolicited result code
                  +CTZE: <tz>,<dst>,<time>.
OK
AT+CTZR?
+CTZR: 2

OK

+CTZE: "+32",0,"2018/03/23,06:51:13"
```

5.8. 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. The access technology selected. "NONE" "WCDMA" "HSDPA" "HSUPA" "HSPA+" "TDD LTE" "FDD LTE" "NR5G-NSA" "NR5G-SA"
<oper>	String type. Operator names in numeric format.
<band>	String type. Selected band. "WCDMA 2100" "WCDMA 1900" "WCDMA 850" "WCDMA 900" "LTE BAND 1" "LTE BAND 2" "LTE BAND 3" "LTE BAND 4" "LTE BAND 5" "LTE BAND 7" "LTE BAND 8" "LTE BAND 20"

	"LTE BAND 28" "LTE BAND 38" "LTE BAND 39" "LTE BAND 40" "LTE BAND 41" "LTE BAND 66" "NR N1" "NR N3" "NR N7" "NR N8" "NR N20" "NR N28" "NR N38" "NR N40" "NR N41" "NR N77" "NR N78" "NR N79"
<channel>	Integer type. Channel ID.

Example

```
AT+QNWINFO                          //Query network information.
+QNWINFO: "FDD LTE",46001,"LTE BAND 3",1650

OK
```

5.9. AT+QENG Query Primary Serving Cell and Neighbor Cell Information

This command queries primary serving cell and neighbor cell information.

AT+QENG Query Primary Serving Cell and Neighbor 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 NR mode: **+QENG: "servingcell",<state>,"NR5G-SA",<duplex_mod**

	e>,<MCC>,<MNC>,<cellID>,<PCID>,<TAC>,<ARFCN>,<band>,<NR_DL_bandwidth>,<RSRP>,<RSRQ>,<SINR>,<TX_power>,<srxlev>,<SCS> **OK** 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>,<cellID>,<TAC>,<SCS>** **OK** 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>** **OK** In WCDMA mode: **+QENG: "servingcell",<state>,"WCDMA",<MCC>,<MNC>,<LAC>,<cellID>,<UARFCN>,<RAC>,<RSCP>,<ecno>,<psych>,<SF>,<slot>** **OK**
Write Command Query the information of neighbor cells **AT+QENG="neighbourcell"**	Response In NR-EN-DC mode: **[+QENG: "neighbourcell","NR",<EARFCN>,<PCID>,<RSRP>,<RSRQ>,<SINR>,<srxlev>,<RAT>** **…]** **[+QENG: "neighbourcell","LTE",<EARFCN>,<PCID>,<RSRP>,<RSRQ>,<SINR>,<srxlev>,<RAT>** **…]** **OK** In LTE mode:

	[+QENG: "neighbourcell intra","LTE",<EARFCN>,<PCID>,<RSRP>,<RSRQ>,<srxlev>,<SINR>,<cell_resel_priority>,<threshX_low>,<threshX_high>,<RAT> **+QENG: "neighbourcell inter","LTE",<EARFCN>,<PCID>,<RSRP>,<RSRQ>,<srxlev>,<SINR>,<cell_resel_priority>,<threshX_low>,<threshX_high>,<RAT>** **…]** **[+QENG: "neighbourcell","WCDMA",<EARFCN>,<cell_resel_priority>,<threshX_high>,<threshX_low>,<PSC>,<RSCP>,<ecno>,<srxlev>,<PCID>,<RAT>** **…]** **[+QENG: "neighbourcell","NR",<EARFCN>,<PCID>,<RSRP>,<RSRQ>,<SINR>,<RAT>** **…]** **OK** In WCDMA mode: **[+QENG: "neighbourcell","WCDMA",<UARFCN>,<srxqual>,<PSC>,<RSCP>,<ecno>,<set>,<rank>,<srxlev>,<thresh_Xhigh>,<thresh_Xlow>,<RAT>** **…]** **[+QENG: "neighbourcell","LTE",<EARFCN>,<phycellID>,<RSRP>,<RSRQ>,<srxlev>,<thresh_Xhigh>,<thresh_Xlow>,<threshX_high>,<threshX_low>,<RAT>** **…]** **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/5G neighbor cells
<state>	String type. UE state. "SEARCH" UE is searching but could not (yet) find a suitable 3G/4G/5G 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 RRC 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 5G NR SA network mode. "FDD" "TDD"	
<MCC>	16-bit unsigned integer. Mobile Country Code (first part of the PLMN code).	
<MNC>	16-bit unsigned integer. Mobile Network Code (second part of the PLMN code).	
<cellID>	Integer type in hexadecimal format. Cell ID. The parameter determines the 28-bit (UMTS, LTE) or 36-bit (5G NR) cell ID. Range: 0–0xFFFFFFF.	
<PCID>	Integer type. Physical cell ID.	
<phycellID>	Integer type. Physical ID of current cell.	
<TAC>	Integer type. Tracking Area Code (see *3GPP 23.003 Section 19.4.2.3*).	
<band>	32-bit integer type. Frequency band in 5G NR/SA network mode.	
<NR_DL_bandwidth>	Integer type. Downlink bandwidth. 5 5 MHz 10 10 MHz 15 15 MHz 20 20 MHz 25 25 MHz 30 30 MHz 40 40 MHz 50 50 MHz 60 60 MHz 80 80 MHz 90 90 MHz 100 100 MHz 200 200 MHz 400 400 MHz	
<srxlev>	Integer type. Select reception level value for base station in dB (see *3GPP 25.304*). Unit: dB.	
<SCS>	Integer type. NR sub-carrier space. 0 15 KHz 1 30 KHz 2 60 KHz 3 120 KHz 4 240 KHz	
<is_tdd>	String type. The LTE network mode. "TDD"	

	"FDD"
<ARFCN>	Integer type. SA-ARFCN of the cell that was scanned.
<EARFCN>	E-UTRA-ARFCN of the cell that was scanned.
<UARFCN>	UTRA-ARFCN of the cell that was scanned.
<freq_band_ind>	E-UTRA frequency band (see *3GPP 36.101*).
<UL_bandwidth>	Integer type. Uplink bandwidth. 0 1.4 MHz 1 3 MHz 2 5 MHz 3 10 MHz 4 15 MHz 5 20 MHz 255 Invalid value
<DL_bandwidth>	Integer type. Downlink bandwidth 0 1.4 MHz 1 3 MHz 2 5 MHz 3 10 MHz 4 15 MHz 5 20 MHz 255 Invalid value
<LAC>	Integer type. Location Area Code. The parameter determines the two bytes location area code in hexadecimal format of the cell that was scanned. - Indicates that the corresponding value is not obtained
<RAC>	Integer type. Routing Area Code. Range: 0–255.
<PSC>	The primary scrambling code of the cell that was scanned.
<RSCP>	The received signal code power level of the cell that was scanned.
<RSRP>	Integer type. In 5G NR mode: It indicates the signal of 5G NR Reference Signal Received Power. Range: -156 to -31. Unit: dBm. The closer to -31, the better the signal is. The closer to -156, the worse the signal is. In LTE mode: It indicates the signal of LTE Reference Signal Received Power. Range: -140 to -44. Unit: dBm. The closer to -44, the better the signal is. The closer to -140, the worse the signal is.
<RSRQ>	Integer type. In LTE mode: It indicates the signal of current LTE Reference Signal Received Quality. Range: -19.5 to -3. Unit: dB. The closer to -3, the better the signal is. The closer to -19.5, the worse the signal is. In 5G NR mode: It indicates the signal of current 5G NR Reference Signal Received Quality.

	Range: -43–20. Unit: dB. The closer to 20, the better the signal is. The closer to -43, the worse the signal is.
<RSSI>	Received Signal Strength Indication.
<SINR>	Integer type. In 5G NR mode: 5G NR Signal to Noise Ratio. Range: -23–40. Unit: dB. In LTE mode: LTE Signal to Noise Ratio. Range: -23–40. Unit: dB.
<CQI>	Integer type. Channel Quality Indication. Range: 0–15.
<TX_power>	TX power value. It is the maximum of all Uplink channel TX power. Unit: dBm.
<ecno>	Integer type. The ratio of chip energy to power spectral density, which equals to the measured Ec-Io value in dB. Unit: dB.
<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
<srxqual>	Receiver automatic gain control on the camped frequency.
<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.
<cell_resel_priority>	Integer type. Cell reselection priority. Range: 0–7.
<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.
<RAT>	Integer type. Radio access technology type. 1 3G

16	4G
32	5G
13	EN-DC

NOTE

"-" or - indicates that this parameter is invalid under current condition.

Example

```
AT+QENG="servingcell"
+QENG:  "servingcell","NOCONN","NR5G-SA","TDD",460,00,314054003,377,161806,504990,41,25,-101,-5,9,0,18,1

OK
AT+QENG="neighbourcell"
+QENG: "neighbourcell","NR",504990,375,-107,-11,1,-,32
+QENG: "neighbourcell","NR",504990,357,-105,-9,0,-,32
+QENG: "neighbourcell","NR",504990,376,-109,-13,-4,-,32

OK
```

5.10. 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: "nr5g_band",(**list of supported **<NR5G_band>**s**)** **+QNWPREFCFG: "all_band_reset"** **+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: "ue_usage_setting",(**list of supported **<setting>**s**)** **+QNWPREFCFG: "roam_pref",(**range of supported **<roam_pref>**s**)**

	OK
Maximum Response Time	300 ms
Characteristics	-

5.10.1. 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 setting: **+QNWPREFCFG: "gw_band",<gw_band>** **OK** If the optional parameter is specified, configure the preferred WCDMA bands to be searched: **OK** If there is any error: **ERROR**
Maximum Response Time	3 s
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<gw_band>	String type. Use the colon as a separator to list the WCDMA bands to be configured. The parameter format is 1:2:…:*n*. **<gw_band>**=0 indicates that the WCDMA bands are reset to the initial state, i.e. all supported WCDMA bands For more details about supported WCDMA bands, see ***document [1]***, ***document [2]*** and ***document [3]***.

Example

```
AT+QNWPREFCFG="gw_band",1          //Set WCDMA B1.
OK
AT+QNWPREFCFG="gw_band"            //Query the currently configured WCDMA bands of the UE.
+QNWPREFCFG: "gw_band",1

OK
```

5.10.2. 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 setting: **+QNWPREFCFG: "lte_band",<LTE_band>** **OK** If the optional parameter is specified, configure the preferred LTE bands to be searched: **OK** If there is any error: **ERROR**
Maximum Response Time	3 s
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<LTE_band>	String type. Use the colon as a separator to list the LTE bands to be configured. The parameter format is 1:2:…:*n*. **<LTE_band>**=0 indicates that the LTE bands are reset to the initial state, i.e. all supported LTE bands. For more details about supported LTE bands, see ***document [1]***, ***document [2]*** and ***document [3]***.

Example

```
AT+QNWPREFCFG="lte_band",1:2:3          //Set LTE B1, LTE B2 and LTE B3.
OK
AT+QNWPREFCFG="lte_band"                //Query the currently configured LTE bands of the UE.
+QNWPREFCFG:  "lte_band",1:2:3

OK
```

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

This command specifies the preferred 5G NR 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 setting: **+QNWPREFCFG: "nr5g_band",<NR5G_band>** **OK** If the optional parameter is specified, configure the preferred 5G NR bands to be searched: **OK** If there is any error: **ERROR**
Maximum Response Time	3 s
Characteristics	The command takes effect immediately. The configuration is 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 1:2:…:*n*. **<NR5G_band>**=0 indicates that the NR 5G bands are reset to the initial state, i.e. all supported NR 5G bands For more details about supported NR 5G bands, see ***document [1]***, ***document [2]*** and ***document [3]***.

Example

```
AT+QNWPREFCFG= "nr5g_band",1:79      //Set 5G NR n1 and 5G NR n79.
OK
AT+QNWPREFCFG="nr5g_band"            //Query the currently configured 5G NR bands of the UE.
+QNWPREFCFG: "nr5g_band",1:79

OK
```

5.10.4. AT+QNWPREFCFG="all_band_reset" Reset All Bands

This command resets all bands of WCDMA, LTE and 5G NR.

AT+QNWPREFCFG="all_band_reset" Reset All Bands	
Write Command **AT+QNWPREFCFG="all_band_reset"**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	3 s
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Example

```
AT+QNWPREFCFG="all_band_reset"      //Reset all bands to initial state.
OK
```

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

This command specifies the network search mode.

AT+QNWPREFCFG="mode_pref" Network Search Mode Configuration	
Write Command **AT+QNWPREFCFG="mode_pref"[,<mode_pref>]**	Response If the optional parameter is omitted, query the current setting: **+QNWPREFCFG: "mode_pref",<mode_pref>** **OK** If the optional parameter is specified, configure the network search mode: **OK** If there is any error: **ERROR**
Maximum Response Time	3 s
Characteristics	The command takes effect immediately. The configuration is 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:…RAT*n*. The RATs supported by the module are as follows: AUTO 5G NR & LTE & WCDMA WCDMA WCDMA only LTE LTE only NR5G 5G NR NR5G-SA 5G NR SA only NR5G-NSA 5G NR NSA only

Example

```
AT+QNWPREFCFG="mode_pref"                  // Query the current network search mode.
+QNWPREFCFG: "mode_pref",AUTO

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

5.10.6. 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 setting: **+QNWPREFCFG: "srv_domain",<srv_domain>** **OK** If the optional parameter is specified, configure the service domain of UE: **OK** If there is any error: **ERROR**

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

Parameter

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

Example

```
AT+QNWPREFCFG="srv_domain"          //Query the current registered service domain.
+QNWPREFCFG: "srv_domain",2

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

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

This command specifies the voice domain of UE.

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

Parameter

<voice_domain>	Integer type. Voice 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 voice domain.
+QNWPREFCFG: "voice_domain",2

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

5.10.8. AT+QNWPREFCFG="ue_usage_setting" UE Usage Setting

This command specifies the usage setting of UE.

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

Parameter

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

Example

```
AT+QNWPREFCFG="ue_usage_setting"          //Query the current usage setting of UE.
+QNWPREFCFG: "ue_usage_setting",1

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

5.10.9. 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 setting: **+QNWPREFCFG: "roam_pref",<roam_pref>** **OK** If the optional parameter is specified, configure the roaming preference of UE: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

Parameter

<roam_pref>	Integer type. Roaming preference of UE. 0 Enable domestic and international roaming 1 Enable domestic roaming and disable international roaming 2 Disable domestic roaming and enable international roaming

3	Disable domestic and international roaming

Example

```
AT+QNWPREFCFG="roam_pref"          //Query the current roaming preference of UE.
+QNWPREFCFG: "roam_pref",1

OK
AT+QNWPREFCFG="roam_pref",1        //Enable domestic roaming and disable international roaming.
OK
```

5.11. AT+QREJINFO Query Network Reject Cause

This command queries the reject cause value issued by the network during the process of registration, service request and network detachment, or the cause value of (U)SIM authentication failure. Only the reject cause values specified in the protocol, internal extended authentication failure (#256), other cause values for CS failure in joint registration (#258, other cause values except #2, #16, #17 and #22), no response to CS-PS registration network (#301) and CS-PS registration link establishment error (#302 and #303) can be queried.

This command queries the (U)SIM authentication failure cause value starting from #65537. The supported cause values of (U)SIM authentication failure include #65537, #65538, #65539, #65540 and #65541. After the network is reconnected, the network reject cause value will be cleared.

AT+QREJINFO Query Network Reject Cause	
Test Command **AT+QREJINFO=?**	Response **OK** If there is any error: **ERROR**
Read Command **AT+QREJINFO?**	Response **+QREJINFO: <PLMN_ID>,<service_domain>,<reject_cause>,<RAT_type>,<reject_type>,<original_reject_cause>,<LAC>,<RAC>,<cellid>[,<esm_reject_cause>]** **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<PLMN_ID>	PLMN ID.
<service_domain>	Integer type. Service domain that reports the reject cause value. 0 CS only 1 PS only 2 CS + PS
<reject_cause>	Integer type. Network reject cause.
<RAT_type>	Integer type. The rejected network type. 0 GERAN 1 UTRAN 2 E-UTRAN 3 1X 4 HRPD 5 NR-5GC 6 Others
<reject_type>	Integer type. Network reject type. 0 LAU is injected 1 Authentication failure 2 Service request is rejected 3 Network detachment is rejected 4 Network attachment is rejected 5 Routing area update is rejected 6 TAU (cell switching) is rejected
<original_reject_cause>	Original network reject cause. The parameter is always 0 if there is no original network reject cause.
<LAC>	String type. Location code. 3G and 4G network: Two bytes location area code in hexadecimal format. For example, "00C3" equals 195 in decimal. 5G network: Three bytes location area code in hexadecimal format. For example, "0000C3" equals 195 in decimal.
<RAC>	Routing area code in hexadecimal format.
<cellid>	String type. 8 bytes Cell ID in hexadecimal format. It is encoded with half-bytecode. For example, "000000000A444202" indicates that the high 4 bytes are 0, and the low 4 bytes are "0A444202".
<esm_reject_cause>	Integer type. This parameter is carried when the NAS registration is rejected (#19).

NOTE

You can control whether to report the reject cause automatically through **AT+QINDCFG="rejinfo"**.

Example

```
//Network registration is rejected.
AT+QREJINFO?
+QREJINFO: 46000,1,111,5,4,111,"161806","FF","000000031405D001"

OK
```

5.12. 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**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<FNN>	String type. Full name of network.
<SNN>	String type. Shortened name of network.
<SPN>	String type. Service provider name. Only **""** is returned if there is no such value in the (U)SIM card.
<alphabet>	Integer type. Alphabet of **<FNN>** and **<SNN>** use. 0 GSM 7-bit default alphabet 1 UCS2
<RPLMN>	String type. Registered PLMN.

NOTE

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

Example

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

OK
```

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

This 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**
Write Command **AT+QLTS=<mode>**	Response **+QLTS: <latest_time>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Execution Command **AT+QLTS**	Response **+QLTS: <latest_time>** **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<mode>	Integer type. Query network time mode. 0 Query the latest time that has been synchronized through network 1 Query the current GMT time calculated from the latest time that has been synchronized through network 2 Query the current local time calculated from the latest time that has been synchronized through network
<latest_time>	String type. The latest time that has been synchronized through network. The format is **"<time>,<dst>"**. **<time>** String type without double quotations. Format: yyyy-MM-dd,hh:mm:ss±zz, in which characters indicate year (yyyy), month (MM), day (dd), hour (hh), minutes (mm), seconds (ss) and time zone (zz, indicates the difference between the local time and GMT expressed in quarters of an hour; range: -48 to +48). For example, 6th of May 2004, 22:10:00 GMT+2 hours equals 04-05-06,22:10:00+08. **<dst>** Integer type. Indicates whether daylight savings adjustment is included. 0 No adjustment for daylight saving time 1 +1 hour adjustment for daylight saving time 2 +2 hours adjustment for daylight saving time
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

1. If the time has not been synchronized through network, the command returns **+QLTS: ""**.
2. The function of **AT+QLTS=0** is the same as that of **AT+QLTS**.

Example

```
AT+QLTS=?                   //Query the 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 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: "2017-01-13,11:41:22+32,0"

OK

5.14. AT+QNWLOCK Lock/Unlock LTE/5G Frequency and Cell

This command locks or unlocks LTE/5G frequency and cell.

AT+QNWLOCK Lock/Unlock LTE/5G Frequency and Cell	
Test Command **AT+QNWLOCK=?**	Response **+QNWLOCK: (**list of supported **<standard>**s**),(**range of supported **<num_of_cells>**s**),(**list of supported **<freq>,<pci>**s**)** **OK**
Write Command **AT+QNWLOCK=<standard>[,<num_of_cells>[,<freq1>,<pci1>[,…[,<freq6>,<pci6>]]]]**	Response If all the optional parameters are omitted, query the current locked frequency and cell: **+QNWLOCK: <standard>,<freq1>,<pci1>** **…** **+QNWLOCK: <standard>,<freq6>,<pci6>** **OK** If any of the optional parameters is specified, lock the specified frequency and cell or unlock all frequencies and cells: **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	10 s
Characteristics	The command takes effect immediately.

	The configurations are not saved.

Parameter

<standard>	String type. "common/lte" Lock or unlock LTE frequency "common/5g" Lock or unlock 5G frequency
<num_of_cells>	Integer type. Range: 0–6. 0 Unlock (If **<freq>** and **<pci>** are omitted, unlock all frequencies and cells) 1–6 Number of locked cells
<freq>	Integer type. Frequency of LTE/5G.
<pci>	Integer type. Cell ID.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+QNWLOCK=?
+QNWLOCK:  ("common/lte","common/5g"),(0-6),(<freq1>,<pci1>,<freq2>,<pci2>,<freq3>,<pci3>,<freq4>,<pci4>,<freq5>,<pci5>,<freq6>,<pci6>)

OK
AT+QNWLOCK="common/5g"                  //Query the locked 5G frequencies and cells.
+QNWLOCK: "common/5g",633984,747
+QNWLOCK: "common/5g",633985,748
+QNWLOCK: "common/5g",633986,749
+QNWLOCK: "common/5g",633987,750
+QNWLOCK: "common/5g",633988,751
+QNWLOCK: "common/5g",633989,751

OK
AT+QNWLOCK="common/5g",6,633984,747,633985,748,633986,749,633987,750,633988,751,633989,751                                    //Lock six 5G frequencies and cells.
OK
AT+QNWLOCK="common/5g",0                //Unlock all 5G frequencies and cells.
OK
```

5.15. AT+QNWLOCKFREQ Lock or Unlock LTE/5G Frequency Point

This command locks or unlocks LTE/5G frequency point.

AT+QNWLOCKFREQ Lock or Unlock LTE/5G Frequency Point	
Test Command **AT+QNWLOCKFREQ=?**	Response **+QNWLOCKFREQ: (**list of supported **<standard>**s**),(**list of supported **<action>**s**),(**list of supported**<freq>**s**)** **OK**
Write Command **AT+QNWLOCKFREQ=<standard>[,<action>[,<freq1>[...-<freq6>]]]**	Response If the optional parameters are omitted, query the current locked frequency point(s): **+QNWLOCKFREQ: <standard>[,<freq>]** **…** **OK** If any of the optional parameters is specified, lock the specified frequency point or unlock all frequency points: **OK** If there is any error: **ERROR** or **+CME ERROR: <err>**
Maximum Response Time	10 s
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<standard>	String type. "common/lte" Lock or unlock LTE frequency point(s) "common/5g" Lock or unlock 5G frequency point(s)
<action>	Integer type. 0 Unlock (Only supports unlocking all frequency points without specifying **<freq>**) 1 Lock (**<freq>** must be specified)
<freq>	Integer type. List of locked frequency point(s) of LTE/5G. If multiple frequency points are locked, they should be separated by "-".
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

1. Each network mode supports locking up to 6 frequency points at a time;
2. This command only supports unlocking all frequency points at the same time.

Example

```
AT+QNWLOCKFREQ=?
+QNWLOCKFREQ:  ("common/lte","common/5g"),(0,1),(<freq1>,<freq2>,<freq3>,<freq4>,<freq5>,
<freq6>)

OK
AT+QNWLOCKFREQ="common/5g",1,633984                 //Lock 1 NR5G frequency point
OK
AT+QNWLOCKFREQ="common/5g",1,633983-633985          //Lock 2 NR5G frequency points
OK
AT+QNWLOCKFREQ="common/5g"                          //Query the current locked frequency
                                                      point(s)
+QNWLOCKFREQ: "common/5g",633984
+QNWLOCKFREQ: "common/5g",633983
+QNWLOCKFREQ: "common/5g",633985

OK
//Lock 6 NR5G frequency points
AT+QNWLOCKFREQ="common/5g",1,633983-633985-633984-633986-633987-633988

OK
AT+QNWLOCKFREQ="common/5g"                          //Query the current locked frequency
                                                      point(s)

+QNWLOCKFREQ: "common/5g",633983
+QNWLOCKFREQ: "common/5g",633985
+QNWLOCKFREQ: "common/5g",633984
+QNWLOCKFREQ: "common/5g",633986
+QNWLOCKFREQ: "common/5g",633987
+QNWLOCKFREQ: "common/5g",633988

OK
AT+QNWLOCKFREQ="common/5g",0                        //Unlock all NR5G frequency points
OK
```

5.16. AT+QCAINFO Query Carrier Aggregation Parameters

This command queries carrier aggregation parameters.

AT+QCAINFO Query Carrier Aggregation Parameters	
Test Command **AT+QCAINFO=?**	Response **OK**
Execution Command **AT+QCAINFO**	Response **+QCAINFO: "PCC",<freq>,<bandwidth>,<band>,<pcell_state>,<PCID>,<RSRP>,<RSRQ>,<RSSI>,<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

<freq>	String type. 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 4" "LTE BAND 5" "LTE BAND 7" "LTE BAND 8"

	"LTE BAND 20" "LTE BAND 28" "LTE BAND 34" "LTE BAND 38" "LTE BAND 39" "LTE BAND 40" "LTE BAND 41" "LTE BAND 66"
<pcell_state>	Integer type. The state of primary cell. 0 No serving 1 Registered
<scell_state>	Integer type. The state of secondary cell. 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. Unit: dBm.
<SINR>	Integer type. Logarithmic value of SINR. Range: 0–250. Unit: 1-5 dB. Value range of SINR: -20 to +30 dB.

5.17. 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**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<endc_avl>	Integer type. Whether the current cell supports EN-DC mode. 0 Not support

	1 Support
<plmn_info_list_r15_avl>	Integer type. Whether the currently registered PLMN supports the EN-DC mode. 0 Not support 1 Support
<endc_rstr>	Integer type. Whether the EN-DC capability delivered by the network is restricted. 0 Restricted 1 Not restricted
<5G_basic>	Integer type. Whether to support 5G icon information successfully 0 Not support 1 Support

5.18. AT+QNTP Synchronize Time through NTP Server

This command synchronizes time through NTP server. **AT+QNTP=<NTP_server>** only configures IP address or domain name of NTP server and the configuration is saved automatically. **AT+QNTP=<contextID>,<NTP_server>,<port>** synchronizes time through configured IP address or domain name of NTP server and the default port number 123, and the configurations are not saved.

AT+QNTP Synchronize Time through NTP Server	
Write Command **AT+QNTP[=<NTP_server>]**	Response If the optional parameter is omitted, synchronize time through the configured NTP server directly: **OK** If the optional parameter is specified, configure IP address or domain name of NTP server: **OK** If there is any error: **+CME ERROR: <err>**
Write Command **AT+QNTP=<contextID>,<NTP_server>[,<port>]**	Response **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	5 s
Characteristics	The above commands take effect immediately.

Parameter

<contextID>	Integer type. PDP context ID. This parameter can only be set to 1.
<NTP_server>	String type. IP address or domain name of NTP server. Default value: "ntp.aliyun.com".
<port>	Integer type. Port number. Range: 0–65535. Default value: 123. If **<port>** is omitted, the time is synchronized through the default value 123. If **<port>** is specified, the time is synchronized through configured port number.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+QNTP                                  //Synchronize time through default NTP server.
OK
AT+QNTP="ntp.xxx.com"                    //Configure the domain name of NTP server as "ntp.xxx.com" and save the configuration. (please specify your own NTP server under a private network or special network)

OK
AT+QNTP=1,"ntp.aliyun.com",123           //Synchronize time through configured domain name "ntp.aliyun.com" of NTP server and default port number 123. The configuration will not be saved.

OK
```

5.19. AT+QDMZ Set DMZ Configurations

This command sets DMZ configurations.

AT+QDMZ Set DMZ Configurations	
Test Command **AT+QDMZ=?**	Response **+QDMZ: (**list of supported **<status>**s**),(**list of supported **<IP_version>**s**),<IP_address>** **OK**
Read Command **AT+QDMZ?**	Response **+QDMZ: <status>,4[,<IP_address>]** **+QDMZ: <status>,6[,<IP_address>]** **OK**
Write Command **AT+QDMZ=<status>[,<IP_version>[,<IP_address>]]**	Response **OK** If there is any error:

	ERROR
Execution Command **AT+QDMZ**	Response **+QDMZ: <status>,4[,<IP_address>]** **+QDMZ: <status>,6[,<IP_address>]** **OK**
Maximum Response Time	300 ms
Characteristics	This command takes effect immediately. The configurations are saved automatically.

Parameter

<status>	Integer type. Enable/Disable DMZ. 0 Disable 1 Enable
<IP_version>	Integer type. IP version. 4 IPv4 6 IPv6
<IP_address>	String type. DMZ IP address to be set or obtained. The default address of IPv4 is 127.0.0.1. The default address of IPv6 is ::1.

NOTE

1. When **<status>** is set to 0, the optional parameter **<IP_address>** can be omitted, which means disabling DMZ.
2. This command is used only in router mode or bridge mode.

Example

```
AT+QDMZ=?
+QDMZ: (0,1),(4,6),<IP_address>

OK
AT+QDMZ                         //Query DMZ configurations.
+QDMZ: 0,4
+QDMZ: 0,6

OK
AT+QDMZ=1,4,192.168.42.2        //Set the address of IPv4 DMZ to 192.168.42.2.
OK
AT+QDMZ?                        //Query DMZ configurations.
+QDMZ: 1,4,192.168.42.2
```

```
+QDMZ: 0,6

OK
AT+QDMZ=0,4                    //Delete IPv4 DMZ.
OK
AT+QDMZ?                       //Query DMZ configurations.
+QDMZ: 0,4
+QDMZ: 0,6

OK
```

5.20. AT+QNWCFG Query Network Parameters

This command queries network parameters.

AT+QNWCFG Query Network Parameters	
Read Command **AT+QNWCFG=?**	Response **+QNWCFG: "nr5g_ulMCS",(**list of supported **<enable>**s**)** **+QNWCFG: "nr5g_dlMCS",(**list of supported **<enable>**s**)** **+QNWCFG: "lte_csi"** **+QNWCFG: "nr5g_ulMCS",(**list of supported **<enable>**s**)** **+QNWCFG: "nr5g_dlMCS",(**list of supported **<enable>**s**)** **+QNWCFG: "nr5g_csi"** **OK**
Maximum Response Time	300 ms
Characteristics	-

Example

```
AT+QNWCFG=?
+QNWCFG: "lte_ulMCS",(0,1)
+QNWCFG: "lte_dlMCS",(0,1)
+QNWCFG: "lte_csi"
+QNWCFG: "nr5g_ulMCS",(0,1)
+QNWCFG: "nr5g_dlMCS",(0,1)
+QNWCFG: "nr5g_csi"

OK
```

5.20.1. AT+QNWCFG="lte_ulMCS" Query LTE Uplink MCS and Modulation Type

This command queries LTE uplink MCS and modulation type.

AT+QNWCFG="lte_ulMCS" Query LTE Uplink MCS and Modulation Type	
Write Command **AT+QNWCFG="lte_ulMCS"[,<enable>]**	Response If the optional parameter is omitted, query LTE uplink MCS and modulation type : **+QNWCFG: "lte_ulMCS",<enable>[,<MCS>,<mod_type>]** **OK** If the optional parameter is specified, enable or disable querying the LTE uplink MCS and modulation type: **+QNWCFG: "lte_ulMCS",<enable>[,<MCS>,<mod_type>]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 38.214	

Parameter

<enable>	Integer type. Enable or disable querying the LTE uplink MCS and modulation type. 0 Disable 1 Enable
<MCS>	Integer type. MCS value. Range: 0–31.
<mod_type>	Integer type. Modulation type. 1 BPSK 2 QPSK 4 16_QAM 6 64_QAM 8 256_QAM
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

1. This command takes effect when the module performs the uplink data service.
2. The parameter **<mod_type>** is not supported currently and the result queried by the command is replaced with"-".

Example

```
AT+QNWCFG="lte_ulMCS"
+QNWCFG: "lte_ulMCS",1,3,-

OK
```

5.20.2. AT+QNWCFG="lte_dlMCS" Query LTE Downlink MCS and Modulation Type

This command queries LTE downlink MCS and modulation type.

AT+QNWCFG="lte_dlMCS" Query LTE Downlink MCS and Modulation Type	
Write Command **AT+QNWCFG="lte_dlMCS"[,<enable>]**	Response If the optional parameter is omitted, query LTE downlink MCS and modulation type: **+QNWCFG: "lte_dlMCS",<enable>[,<MCS>,<mod_type>]** **OK** If the optional parameter is specified, enable or disable querying the LTE downlink MCS and modulation type: **+QNWCFG: "lte_dlMCS",<enable>[,<MCS>,<mod_type>]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<enable>	Integer type. Enable or disable querying the LTE uplink MCS and modulation type. 0 Disable 1 Enable
<MCS>	Integer type. MCS value. Range: 0–31.
<mod_type>	Integer type. Modulation type. 1 BPSK 2 QPSK 4 16_QAM 6 64_QAM 8 256_QAM
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

1. This command takes effect when the module performs the downlink data service.
2. The parameter **<mod_type>** is not supported currently and the result queried by the command is replaced with"-".

Example

```
AT+QNWCFG="lte_dlMCS"
+QNWCFG: "lte_dlMCS",1,3,-

OK
```

5.20.3. AT+QNWCFG="lte_csi" Query LTE CSI information

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

AT+QNWCFG="lte_csi" Query LTE CSI information	
Write Command **AT+QNWCFG="lte_csi"**	Response **+QNWCFG: "lte_csi",<MCS>,<RI>,<CQI>,<PMI>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms

Characteristics	-

Parameter

<MCS>	Integer type. Modulation and coding scheme of PDSCH. Range: 0–31.
<RI>	Integer type. Effective number of data layers of PDSCH.
<CQI>	Integer type. Quality of the downlink channel.
<PMI>	Integer type. Precoding Matrix Indicator.
<err>	Error codes. For more details, see ***Chapter 13.3***.

NOTE

This command takes effect when the module performs the downlink data service.

Example

```
AT+QNWCFG="lte_csi"
+QNWCFG: "lte_csi"0,1,15,0

OK
```

5.20.4. AT+QNWCFG="nr5g_ulMCS" Query NR5G Uplink MCS and Modulation Type

This command queries NR5G uplink MCS and modulation type.

AT+QNWCFG="nr5g_ulMCS"	Query NR5G Uplink MCS and Modulation Type
Write Command **AT+QNWCFG="nr5g_ulMCS"[,<enable>]**	Response If the optional parameter is omitted, query NR5G uplink MCS and modulation type: **+QNWCFG: "nr5g_ulMCS",<enable>[,<MCS>,<mod_type>]** **OK** If the optional parameter is specified, enable or disable querying the NR5G uplink MCS and modulation type: **+QNWCFG: "nr5g_ulMCS",<enable>[,<MCS>,<mod_type>]** **OK** If there is any error: **ERROR**

	Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 38.214	

Parameter

<enable>	Integer type. Enable or disable querying the NR5G uplink MCS and modulation type and the parameter is meaningless. 0 Disable 1 Enable
<MCS>	Integer type. MCS value. Range: 0–31.
<mod_type>	Integer type. Modulation type. 1 BPSK 2 QPSK 4 16_QAM 6 64_QAM 8 256_QAM
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

This command takes effect when the module performs the uplink data service.

Example

```
AT+QNWCFG="nr5g_ulMCS"
+QNWCFG: "nr5g_ulMCS",1,20,4

OK
```

5.20.5.AT+QNWCFG="nr5g_dlMCS" Query NR5G Downlink MCS and Modulation Type

This command queries NR5G downlink MCS and modulation type.

AT+QNWCFG="nr5g_dlMCS"	Query NR5G Downlink MCS and Modulation Type
Write Command **AT+QNWCFG="nr5g_dlMCS"[,<enable>]**	Response If the optional parameter is omitted, query NR5G downlink MCS and modulation type: **+QNWCFG: "nr5g_dlMCS",<enable>[,<MCS>,<mod_type>]** **OK** If the optional parameter is specified, enable or disable querying the NR5G downlink MCS and modulation type: **+QNWCFG: "nr5g_dlMCS",<enable>[,<MCS>,<mod_type>]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<enable>	Integer type. Enable or disable querying the NR5G downlink MCS and modulation type and the parameter is meaningless. 0 Disable 1 Enable
<MCS>	Integer type. MCS value. Range: 0–31.
<mod_type>	Integer type. Modulation type. 1 BPSK 2 QPSK 4 16_QAM 6 64_QAM 8 256_QAM
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

This command takes effect when the module performs the downlink data service.

Example

```
AT+QNWCFG="nr5g_dlMCS"
+QNWCFG: "nr5g_dlMCS",1,1,4

OK
```

5.20.6. AT+QNWCFG="nr5g_csi" Query NR5G CSI Information

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

AT+QNWCFG="nr5g_csi"	Query NR5G CSI Information
Write Command **AT+QNWCFG="nr5g_csi"**	Response **+QNWCFG: "nr5g_csi",<MCS>,<RI>,<CQI>,<PMI>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<MCS>	Integer type. Modulation and coding scheme of PDSCH. Range: 0–31.
<RI>	Integer type. Effective number of data layers of PDSCH.
<CQI>	Integer type. Quality of the downlink channel.
<PMI>	Integer type. Precoding Matrix Indicator.
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

This command takes effect when the module performs the downlink data service.

Example

```
AT+QNWCFG="nr5g_csi"
+QNWCFG: "nr5g_csi"0,1,15,0

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. After this command is executed, the MT sends an off-hook signal to the remote station.

ATA Answer an Incoming Call	
Execution Command **ATA**	Response Response in case of voice call, if successfully connected: **OK** Response if no connection: **NO CARRIER**
Maximum Response Time	90 s, determined by the network.
Characteristics	-
Reference V.25ter	

NOTE

Any additional commands on the same command line are ignored.

Example

```
RING                                    //Incoming call.
AT+CLCC
+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 busy: **BUSY** If a connection cannot be established: **NO CARRIER** 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 type. GSM modifiers. I Activate **CLIR** (Disable presentation of own number to the called party) i Deactivate **CLIR** (Enable presentation of own number to the called party) G Activates closed user group invocation for this call only g Deactivates closed user group invocation for this call only
;	It is required when setting up voice call, and will return to command state after call.

NOTE

1. When being executed, this command may be aborted generally by the module's receiving of an **ATH** or a character. However, the command will not be aborted during some connection establishments such as handshaking.
2. Parameters "**I**" and "**i**" of **<mgsm>** are only valid when no "*" or "**#**" code is within the dial string.
3. Responses returned after dialing with **ATD**:

For voice call, two different response modes can be determined. MT returns **OK** immediately either after dialing was completed or after the call was established. The setting is controlled by **AT+COLP**, of which default is **AT+COLP=0** which causes the MT to return **OK** immediately after the dialing was completed. Otherwise, MT returns **OK**, **BUSY**, **NO DIAL TONE**, or **NO CARRIER**.

4. Using **ATD** during an active voice call:
   - When a user originates a second voice call while there is already an active voice call, the first call will be automatically put on hold.
   - The current states of all calls can be easily checked at any time with **AT+CLCC**.

Example

```
ATD10086;                    //Dialing.
OK
```

6.3. ATH Disconnect Existing Connection

This command disconnects data calls or voice calls, that is, the local TE disconnects from the command line and terminates the call. **AT+CHUP** is also used to disconnect the voice call.

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

Parameter

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

6.4. AT+CHUP Hang up Calls

This command cancels all voice calls in the state of Active, Waiting and Held. **ATH** can be used to disconnect a data call.

AT+CHUP Hang up Calls	
Test Command **AT+CHUP=?**	Response **OK**
Execution Command **AT+CHUP**	Response **OK** If there is any error: **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
```

6.5. ATS0 Set Number of Rings Before Automatic Answering

This command sets the number of rings before automatic answering the incoming calls. If **<n>** is not 0, the ME automatically answers the call when the call indicator (**RING**) reaches the set number.

ATS0 Set Number of Rings Before Automatic Answering	
Read Command **ATS0?**	Response **<n>** **OK**
Write Command **ATS0=<n>**	Response **OK** If there is any error: **ERROR**

Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Parameter

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

NOTE

If the value of **<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                    //Incoming call.

RING

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

6.6. 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 **S7: <n>** **OK**
Write Command **ATS7=<n>**	Response **OK**

Maximum Response Time	300 ms
Characteristics	-
Reference V.25ter	

Parameter

<n>	Integer type. Default value: 45.	
	0	Disable
	1–255	Duration of seconds to wait for connection completion

6.7. AT+CSTA Select Type of Address

This command selects the type of number for further dialing commands **ATD** according to 3GPP Specifications.

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. Address type.	
	128	Unknown numbering plan, unknown type
	129	ISDN -phone number plan, unknown number
	145	International type (contains the character "+")

161	National type

6.8. AT+CLCC List Current Calls

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

AT+CLCC List Current Calls	
Test Command **AT+CLCC=?**	Response **OK**
Execution Command **AT+CLCC**	Response **[+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>[,<priority>[,<CLI validity>]]]]** **[+CLCC: <id2>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>[,<priority>[,<CLI validity>]]]]** **[...]]]** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<id>	Integer type. The call identification number as described in 3GPP TS 22.030 can be used in **AT+CHLD**.
<dir>	Integer type. Call direction. 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>	String type. Phone number 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). 129 Unknown type 145 International type (contains the character "+") 161 National type
<alpha>	Alphanumeric representation for **<number>** corresponding to the entry found in phonebook.
<priority>	Integer type. EMLPP priority of the call (see *3GPP TS 22.067*).
<CLI validity>	**<number>** does not contain the calling party BCD number (see *3GPP TS 24.008 subclause 10.5.4.30*). If **<dir>**=0, this parameter is not displayed. 0 CLI is valid 1 CLI is rejected by the initiator (see *3GPP TS 24.008 table 10.5.135a-3GPP TS 24.008 code "Reject by user"*) 2 CLI is unavailable due to communication problems or original network restrictions (see *3GPP TS 24.008 table 10.5.135a-3GPP TS 24.008 code "Interaction with other service"*) 3 CLI is unavailable because the calling party is making a paid call (see *3GPP TS 24.008 table 10.5.135a-3GPP TS 24.008 code "Coin line-payphone"*) 4 CLI is unavailable for other reasons (See *3GPP TS 24.008 table 10.5.135a-3GPP TS 24.008 code "Unavailable"*)
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

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

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

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

AT+CRC Set Extended Format of Incoming Call Indication	
Test Command **AT+CRC=?**	Response **+CRC: (**list of supported **<mode>**s**)** **OK**
Read Command **AT+CRC?**	Response **+CRC: <mode>** **OK**
Write Command **AT+CRC=[<mode>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	This command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. Whether to enable call reporting through unsolicited result code **+CRING: <type>**.	
	0	Disable
	1	Enable
<type>	String type.	
	ASYNC	Asynchronous transparent
	SYNC	Synchronous transparent
	REL ASYNC	Asynchronous non-transparent
	REL SYNC	Synchronous non-transparent
	FAX	Facsimile
	VOICE	Voice

Example

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

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

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

6.10. AT+QECCNUM Configure Emergency Call Numbers

This command queries, adds and deletes ECC (Emergency Call Codes) numbers.

There are two kinds of ECC numbers: ECC numbers without (U)SIM card and ECC numbers with (U)SIM card. The default ECC numbers without (U)SIM card is 911, 112, 00, 08, 110, 999, 118 and 119. The default ECC number with (U)SIM card 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 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**
Read Command Query ECC numbers without (U)SIM card and ECC numbers with (U)SIM card **AT+QECCNUM?**	Response **+QECCNUM: <type>,<eccnum1>,<eccnum2>[,…]** **…** **OK**
Write Command **AT+QECCNUM=<mode>,<type>[,<eccnum1>[,<eccnum2>,…[,<eccnumN>]]]**	Response If **<mode>**=0, **<eccnum>** is omitted, query the ECC numbers: **+QECCNUM: <type>,<eccnum1>,<eccnum2>[,…]** **OK**

	If **<mode>**=1, **<type>**=0 or 1, and at least one **<eccnum>** is specified, add ECC numbers with (U)SIM card or ECC numbers without (U)SIM card: **OK** If there is any error: **ERROR** If **<mode>**=2, **<type>**=0 or 1, and at least one **<eccnum>** is specified, delete ECC numbers with (U)SIM card or ECC numbers without (U)SIM card: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<mode>	Integer type. ECC number operation modes. 0 Query ECC numbers 1 Add ECC numbers 2 Delete ECC numbers
<type>	Integer type. ECC number type. 0 ECC numbers stored in the module without (U)SIM card 1 ECC numbers stored in the module with (U)SIM card
<eccnumN>	String type. ECC numbers (such as "110" and "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 card.
+QECCNUM: 0,"911","112","00","08","110","999","118","119"
+QECCNUM: 1,"911","112"

OK
AT+QECCNUM=0,1                  //Query the ECC numbers with (U)SIM card.
```

```
+QECCNUM: 1,"911","112"

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

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

OK
```

6.11. AT^DSCI Call Status Indication

This command command enables or disables the reporting of call status indication.

AT^DSCI Call Status Indication	
Test Command **AT^DSCI=?**	Response **^DSCI: (**list of supported **<n>**s**)** **OK**
Read Command **AT^DSCI?**	Response **^DSCI: <n>** **OK**
Write Command **AT^DSCI=[<n>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<n>	Integer type. Enable or disable the URC (**^DSCI: <id>,<dir>,<stat>,<type>,<mpty>,<number>,<num_type>**) of call status indication. 0 Disable 1 Enable

<id> Integer type. Call ID.

<dir> Integer type. Call direction.

0 Mobile originated call

1 Mobile terminated call

<stat> Integer type. State of the call.

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

<mpty> Integer type. Whether the call is one of multiparty (conference) call parties.

0 Call is not one of multiparty (conference) call parties

1 Call is one of multiparty (conference) call parties

<number> String type. Phone number.

<num_type> Type of address of octet in integer format (See *3GPP TS 24.008 subclause 10.5.4.7*).

129 Unknown type

145 International type (contains the character "+")

161 National type

Example

```
//Dial a call.
AT^DSCI=1                          //Enable the URC of call status indication.
OK
ATD10086;                          //Dial 10086.
OK

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

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

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

^DSCI: 1,0,6,0,0,10086,129         //The call is ended.
```

```
//Incoming call
RING

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

RING

^DSCI: 1,1,6,0,0,13022100000,129          //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 card.

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

Parameter

<alpha>	Optional alphanumeric string associated with **<number>**. The used character set should be the one selected with **AT+CSCS**.
<number>	String type. Phone number of format specified by **<type>**.
<type>	Type of address of octet in integer format (see *3GPP TS 24.008 subclause 10.5.4.7*). 129 Unknown type 145 International type (contains the character "+") 161 National type
<err>	Error code. For more details, see ***Chapter 13.3***.

7.2. 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>** **[[+CPBR: <index2>,<number>,<type>,<text>]** **[…]]]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	Depends on the storage of phonebook entries.
Characteristics	-
Reference 3GPP 27.007	

Parameter

<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.
<number>	String type. Phone number of format specified by **<type>**.
<type>	Type of address of octet in integer format (see *3GPP TS 24.008 subclause 10.5.4.7*). 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 code. For more details, see ***Chapter 13.3***.

7.3. AT+CPBS Select Phonebook Memory Storage

This command selects phonebook memory storage.

AT+CPBS Select Phonebook Memory Storage	
Test Command **AT+CPBS=?**	Response **+CPBS: (**list of supported **<storage>**s**)** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CPBS?**	Response **+CPBS: <storage>[,<used>,<total>]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Write Command **AT+CPBS=<storage>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP 27.007	

Parameter

<storage>	String type. Phonebook memory storage. "FD" (U)SIM fix dialing-phone book (**AT+CPBW** may not be applicable to this storage) "LD" (U)SIM last-dialing-phone book (**AT+CPBW** may not be applicable to this storage) "SN" (U)SIM system number (**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. Indicates the total number of used locations in selected memory.
<total>	Integer type. Indicates the total number of locations in selected memory.
<err>	Error code. For more details, see ***Chapter 13.3***.

7.4. AT+CPBW Write Phonebook Entry

This command writes or deletes phonebook entry in location number **<index>** in the current phonebook memory storage.

AT+CPBW Write Phonebook Entry	
Test Command **AT+CPBW=?**	Response **+CPBW: (**range of supported **<index>**s**),<nlength>,(**list of supported of **<type>**s**),<tlength>** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Write Command **AT+CPBW=<index>[,<number>[,<type>[,<text>]]]**	Response If the optional parameters are omitted, delete a phonebook entry in location number **<index>**: **OK** If any of the optional parameters is specified, write phonebook entry in location number **<index>** **OK** If there is any error: **ERROR**

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

Parameter

<index>	Integer type. Value in the range of location numbers of phone book memory.
<nlength>	Integer type. Indicates the maximum length of field **<number>**.
<tlength>	Integer type. Indicates the maximum length of field **<text>**.
<number>	String type. Phone number in format specified by **<type>**.
<type>	Integer type. Type of address of octet (see *3GPP TS 24.008 subclause 10.5.4.7* for details). 128 Unknown type 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 code. For more details, see ***Chapter 13.3***.

Example

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

8 Short Message Service Commands

8.1. AT+CSMS Select Message Service

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

AT+CSMS Select Message Service	
Test Command **AT+CSMS=?**	Response **+CSMS: (**list of supported **<service>**s**)** **OK**
Read Command **AT+CSMS?**	Response **+CSMS: <service>,<mt>,<mo>,<bm>** **OK**
Write Command **AT+CSMS=<service>**	Response **+CSMS: <mt>,<mo>,<bm>** **OK** If there is 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 code. For more details, see ***Chapter 13.4***.

Example

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

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

OK
AT+CSMS?
+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 whether text mode or PDU mode is used to write and read 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 **AT+CSCS** to inform the character set to be used in the message body in the TA-TE interface

AT+CMGF Message Format	
Test Command **AT+CMGF=?**	Response **+CMGF: (**list of supported **<mode>**s**)** **OK**
Read Command **AT+CMGF?**	Response **+CMGF: <mode>** **OK**
Write Command **AT+CMGF=<mode>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.005	

Parameter

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

8.3. AT+CSCA Service Center Address

This command updates the SMSC address when mobile originated SMS are transmitted. In text mode, the setting is used by Write Command. In PDU mode, setting is used by the same command, but only when the length of the SMSC address is coded into the **<pdu>** parameter which equals to 0.

AT+CSCA Service Center Address	
Test Command **AT+CSCA=?**	Response **OK**
Read Command **AT+CSCA?**	Response **+CSCA: <sca>,<tosca>** **OK**
Write Command **AT+CSCA=<sca>[,<tosca>]**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.005	

Parameter

<sca>	Service center address. 3GPP TS 24.011 RP SC address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<tosca>**.
<tosca>	Type of service center address. *3GPP TS 24.011* RP SC address Type-of-Address octet in integer format (see **<toda>**).
<pdu>	In the case of SMS: *3GPP TS 24.011* SC address followed by *3GPP TS 23.040* TPDU in hexadecimal format: ME-TA converts each octet of TP data unit into two IRA character long hexadecimal number (for example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).

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

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

Parameter

<mem1>	String type. Messages to be read and deleted from this memory storage. "SM" (U)SIM message storage "ME" Mobile equipment message storage

<mem2>	String type. Messages will be written and sent to this memory storage. "SM" (U)SIM message storage "ME" Mobile equipment message storage
<mem3>	String type. Received messages will be placed in this memory storage if routing to PC is not set (**AT+CNMI**). "SM" (U)SIM message storage "ME" Mobile equipment message storage
<used*x*>	Integer type. Number of current messages in **<mem*x*>**.
<total*x*>	Integer type. Total number of messages which can be stored in **<mem*x*>**.
<err>	Error code. For more details, see ***Chapter 13.4***.

Example

```
AT+CPMS?                                  //Query the current SMS message storage.
+CPMS: "ME",0,20,"ME",0,20,"ME",0,20

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, 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 **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. Range: 0–255.
<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, sent and unsent mobile originated messages from **<mem1>** storage 4 Delete all messages from **<mem1>** storage
<mem1>	String type. Messages to be read and deleted from this memory storage. See **AT+CPMS**. "SM" (U)SIM message storage "ME" Mobile equipment message storage
<err>	Error code. For more details, see ***Chapter 13.4***.

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" after executing the command.

AT+CMGL List Messages	
Test Command **AT+CMGL=?**	Response **+CMGL: (**list of supported **<stat>**s) **OK**
Write Command **AT+CMGL[=<stat>]**	Response If the optional parameter is omitted (that is, execute **AT+CMGL)**, list all received but unread short messages. If the optional parameter is specified: If in text mode (**AT+CMGF=1**) and the command is executed successfully: For SMS-SUBMITs and/or SMS-DELIVERs: **+CMGL: <index>,<stat>,<oa-da>,[<alpha>],[<scts>][,<tooa-toda>,<length>]<CR><LF><data>** **[+CMGL: <index>,<stat>,<da-oa>,[<alpha>],[<scts>][,<tooa-toda>,<length>]<CR><LF><data>** **…]** For SMS-STATUS-REPORTs: **+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>** **[+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>** **…]** For SMS-COMMANDs: **+CMGL: <index>,<stat>,<fo>,<ct>** **[+CMGL: <index>,<stat>,<fo>,<ct>** **...]** For CBM storage: **+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>** **[+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>** **…]** **OK** If in PDU mode (**AT+CMGF=0**) and the command is executed successfully: **+CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu>**

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

Parameter

<stat>	String type. 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 Integer type. 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. Range: 0–255.
<da>	String type. Destination Address. *3GPP TS 23.040* TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<oa>	String type. Originating address. *3GPP TS 23.040* TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<tooa>**.
<alpha>	String type. Alphanumeric representation of **<da>** or **<oa>** corresponding to the entry found in MT phonebook. Implementation of this feature is manufacturer specified. The used character set should be the one selected with **AT+CSCS** (see definition of this command in *3GPP TS 27.007*).
<scts>	String type. Service center time stamp. *3GPP TS 23.040* TP-Service-Centre-Time-Stamp in time-string format (see **<dt>**).

<toda>	Integer type. Type of destination address. *3GPP TS 24.011* TP- Destination-Address Type-of-Address octet in integer format.
<tooa>	Integer type. Type of originating address. *3GPP TS 24.011* TP-Originating-Address Type-of-Address octet in integer format (default see **<toda>**).
<length>	Integer type. Message length. Indicates the length of the message body **<data>** in the text mode (**AT+CMGF=1**). Or indicates the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (that is, the RP layer SMSC address octets are not counted in the length). Maximum length: 140; Unit: byte.
<data>	String type in hexadecimal format. Content of the short message command in hexadecimal string format. See *3GPP TS 23.040 TP-User-Data* for the output format.
<pdu>	In the case of SMS: *3GPP TS 24.011* SC address followed by *3GPP TS 23.040* TPDU in hexadecimal format: ME-TA converts each octet of TP data unit into two IRA character long hexadecimal number (For example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<mem1>	String type. Messages to be read and deleted from this memory storage. "SM" (U)SIM message storage "ME" Mobile equipment message storage
<fo>	Integer type. Depending on the command or result code: First octet of *3GPP TS 23.040* SMS-DELIVER, SMS-SUBMIT (default value: 17), SMS-STATUS-REPORT, or SMS-COMMAND (default value: 2).
<mr>	Integer type. Message reference. *3GPP TS 23.040* TP-Message-Reference.
<ra>	String type. Recipient address. *3GPP TS 23.040* TP-Recipient-Address Address-Value field. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS**). The type of address is given by **<tora>**.
<tora>	Integer type. Type of recipient address. *3GPP TS 24.011* TP-Recipient-Address Type-of-Address octet (see **<toda>**).
<dt>	String type of time. *3GPP TS 23.040* TP-Discharge-Time in time-string format: “yy-MM-dd,hh:mm:ss zz”, during which characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. For example, 6th of May 1994, 22:10:00 GMT+2 hours equals “94-05-06,22:10:00+08”.
<st>	*3GPP TS 23.040* TP-Status in integer format
<ct>	*3GPP TS 23.040* TP-Command-Type in integer format (default value: 0).
<sn>	*3GPP TS 23.041* CBM serial number in integer format
<mid>	*3GPP TS 23.041* CBM message identifier in integer format.
<page>	*3GPP TS 23.041* CBM page parameter bits 4-7 in integer format.
<pages>	*3GPP TS 23.041* CBM page parameter bits 0-3 in integer format.
<err>	Error code. For more details, see ***Chapter 13.4***.

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" after executing the command.

AT+CMGR Read Messages	
Test Command **AT+CMGR=?**	Response **+CMGR: (**range of supported **<index>**s**)** **OK**
Write Command **AT+CMGR=<index>**	Response 1) 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** 2) 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>	Integer type. Value in the range of location numbers supported by the associated memory. Range: 0–255 (The number range supported by different operators varies).
<stat>	String type. 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 Integer type. In PDU mode: 0 Received unread messages 1 Received read messages 2 Stored unsent messages 3 Stored sent messages

	4 All messages
<alpha>	String type. Alphanumeric representation of **<da>** or **<oa>** corresponding to the entry found in MT phonebook. Implementation of this feature is manufacturer specified. The used character set should be the one selected with **AT+CSCS** (see definition of this command in *3GPP TS 27.007*).
<da>	String type. Destination Address. *3GPP TS 23.040* TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<oa>	String type. Originating address. *3GPP TS 23.040* TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<tooa>**.
<scts>	String type. Service center time stamp. *3GPP TS 23.040* TP-Service-Centre-Time-Stamp in time-string format (see **<dt>**).
<fo>	Integer type. Depending on the command or result code: First octet of *3GPP TS 23.040* SMS-DELIVER, SMS-SUBMIT (default value: 17), SMS-STATUS-REPORT or SMS-COMMAND (default value: 2).
<pid>	Integer type. Protocol identifier. *3GPP TS 23.040* TP-Protocol-Identifier in integer format (default value: 0).
<dcs>	Integer type. Data coding scheme. Depending on the command or result code: *3GPP TS 23.038* SMS Data Coding Scheme (default value: 0), or Cell Broadcast Data Coding Scheme in integer format.
<vp>	Integer type or string type of time. Validity period. Depending on SMS-SUBMIT **<fo>** setting: *3GPP TS 23.040* TP-Validity-Period either in integer format or in time-string format (see **<dt>**).
<mn>	Integer type. Message number. *3GPP TS 23.040* TP-Message-Number in integer format.
<mr>	Integer type. Message reference. *3GPP TS 23.040* TP-Message-Reference in integer format.
<ra>	String type. 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 (see **AT+CSCS**). The type of address is given by **<tora>**.
<tora>	Integer type. Type of recipient address. *3GPP TS 24.011* TP-Recipient-Address Type-of-Address octet in integer format (default refer **<toda>**)
<toda>	Integer type. Type of destination address. *3GPP TS 24.011* TP-Destination-Address Type-of-Address octet in integer format.
<tooa>	Integer type. Type of originating address. *3GPP TS 24.011* TP-Originating-Address Type-of-Address octet in integer format (default see **<toda>**).
<sca>	String type. Service center address. *3GPP TS 24.011* RP SC address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<tosca>**.

<tosca>	Integer type. Type of service center address. *3GPP TS 24.011* RP SC address Type-of-Address octet in integer format (default see **<toda>**).
<length>	Integer type. Message length. Indicates the length of the message body **<data>** in the text mode (**AT+CMGF=1**). Or indicates the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (that is, the RP layer SMSC address octets are not counted in the length). Maximum length: 140 bytes.
<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 (For example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<dt>	String type of time. *3GPP TS 23.040* TP-Discharge-Time in time-string format: "yy-MM-dd,hh:mm:ss zz", during which characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. For example, 6th of May 1994, 22:10:00 GMT+2 hours equals "94-05-06,22:10:00+08".
<st>	Integer type. *3GPP TS 23.040* TP-Status in integer format
<ct>	Integer type. *3GPP TS 23.040* TP-Command-Type in integer format (default value: 0).
<sn>	Integer type. *3GPP TS 23.041* CBM serial number in integer format
<mid>	Integer type. *3GPP TS 23.041* CBM message identifier in integer format.
<page>	Integer type. *3GPP TS 23.041* CBM page parameter bits 4-7 in integer format.
<pages>	Integer type. *3GPP TS 23.041* CBM page parameter bits 0-3 in integer format.
<cdata>	*3GPP TS 23.040* TP-Command-Data in text mode responses; ME-TA converts each 8-bit octet into two IRA character long hexadecimal number (For example, octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<err>	Error code. For more details, see ***Chapter 13.4***.

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 network (SMS-SUBMIT). After executing 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.

AT+CMGS Send Messages	
Test Command **AT+CMGS=?**	Response **OK**
Write Command If in text mode (**AT+CMGF=1**): **AT+CMGS=<da>[,<toda>]**	Response **>** After the above response, input the data in text mode. Then tap **Ctrl+Z** to send the data or tap **ESC** to cancel the operation. If the message is sent successfully: **+CMGS: <mr>** **OK** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Write Command If in PDU mode (**AT+CMGF=0**): **AT+CMGS=<length>**	Response **>** After the above response, input the data in PDU mode. Then tap **Ctrl+Z** to send the data or tap **ESC** to cancel the operation. If 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 network.
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<da>	String type. Destination address. *3GPP TS 23.040* TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<toda>	Integer type. Type of destination address. *3GPP TS 24.011* TP-Destination-Address Type-of-Address octet.
<length>	Message length. Indicates the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (that is, the RP layer SMSC address octets are not counted in the length). Maximum length: 140 bytes.
<mr>	Integer type. Message reference. *GSM 03.40* TP-Message-Reference in integer format.
<err>	Error code. For more details, see ***Chapter 13.4***.

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      //Input the data in text mode. Tap Ctrl+Z to send the data or tap
                                     ESC to cancel the operation.
+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	Response

AT+CMMS[=<n>]	**OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	120 s, determined by network.
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<n>	Integer type. Enable or disable the SMS relay protocol link. 0 Feature disabled 1 Keep enabled until the time between the response of the latest commands to be sent (**AT+CMGS**, **AT+CMSS** and so on) 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 (**AT+CMGS**, **AT+CMSS** and so on) 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 code. For more details, see ***Chapter 13.4***.

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 can be set to specified status via **<stat>**. Message status will be set to "stored unsent" by default. 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 If in text mode (**AT+CMGF=1**): **AT+CMGW=<oa/da>[,<tooa>/<toda>[,<stat>]]**	Response **>** After the above response, input the data in text mode. Then tap **Ctrl+Z** to send the data or tap **ESC** to cancel the operation. If message writing is successful: **+CMGW: <index>** **OK** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Write Command If in PDU mode (**AT+CMGF=0**): **AT+CMGW=<length>[,<stat>]**	Response **>** After the above response, input the data in PDU mode. Then tap **Ctrl+Z** to send the data or tap **ESC** to cancel the operation. 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 GSM 07.05	

Parameter

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

	field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** in *3GPP TS 27.007*). The type of address given by **<tooa>**.
<tooa>	Integer type. Type of originating address. *3GPP TS 24.011* TP-Originating-Address Type-of-Address octet in integer format (default see **<toda>**).
<stat>	String type. 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 Integer type. PDU mode. 0 Received unread messages 1 Received read messages 2 Stored unsent messages 3 Stored sent messages 4 All messages
<toda>	Integer type. Type of destination address. *3GPP TS 24.011* TP-Destination-Address Type-of-Address octet in integer format.
<length>	Integer type. Message length. Indicates the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (that is, the RP layer SMSC address octets are not counted in the length). Range: 7–164. Unit: byte.
<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
<err>	Error code. For more details, see ***Chapter 13.4***.

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      //Input the data in text mode. Then tap Ctrl+Z to send the data or
                                     tap ESC to cancel the operation.
+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

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

AT+CMSS Send Messages from Storage	
Test Command **AT+CMSS=?**	Response **OK**
Write Command **AT+CMSS=<index>[,<da>[,<toda>]]**	Response If in text mode (**AT+CMGF=1**) and the message is sent successfully: **+CMSS: <mr>[,<scts>]** **OK** If in PDU mode (**AT+CMGF=0**) and the message is sent successfully: **+CMSS: <mr>[,<ackpdu>]** **OK** If there is any error 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. Value in the range of location numbers supported by the associated memory.
<da>	String type. Destination Address. *3GPP TS 23.040* TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are

	converted to characters of the currently selected TE character set (see **AT+CSCS** in *3GPP TS 27.007*); type of address is given by **<toda>**.
<toda>	Integer type. Type of destination address. *3GPP TS 24.011* TP-Destination-Address Type-of-Address octet in integer format.
<mr>	Integer type. Message reference. *3GPP TS 23.040* TP-Message-Reference in integer format.
<scts>	String type. Service center time stamp. *3GPP TS 23.040* TP-Service-Centre-Time-Stamp in time-string format (see **<dt>**).
<ackpdu>	String type. 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
<err>	Error code. For more details, see ***Chapter 13.4***.

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                            //Input the data in text mode. Then tap Ctrl+Z to send the data or
                                     tap ESC to cancel the operation.
+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

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	
Test Command **AT+CNMA=?**	Response If in text mode (**AT+CMGF=1**): **OK** If in PDU mode (**AT+CMGF=0**): **+CNMA: (**range of supported **<n>s)** **OK**
Execution Command If in text mode (**AT+CMGF=1**): **AT+CNMA**	Response **OK** If there is any error: **ERROR** Or **+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** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.005	

Parameter

<n>	Integer type. Parameter required only for PDU mode. 0 Command operates similarly as in text mode 1 Send positive (RP-ACK) acknowledgement to the network. Accepted only in PDU mode 2 Send negative (RP-ERROR) acknowledgement to the network. Accepted only in PDU mode.
<length>	Integer type. Message length. Indicates the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (that is, the RP layer SMSC address octets are not counted in the length).
<err>	Error code. For more details, see ***Chapter 13.4***.

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, that is:
+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                       //Return error in the second time; 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.

AT+CNMI New Message Indications to TE	
Test Command **AT+CNMI=?**	Response **+CNMI:** (range of supported **<mode>**s),(range of supported **<mt>**s),(list of supported **<bm>**s),(range of supported **<ds>**s),(list of supported **<bfr>**s) **OK**
Read Command **AT+CNMI?**	Response **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>** **OK**

Write Command **AT+CNMI=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]**	Response **OK** If there is any error: **ERROR** Or **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.005	

Parameter

<mode> Integer type.

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

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

2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (that is, in data mode) and flush them to the TE after reservation. Otherwise forward them directly to TE.

<mt> Integer type. Mode for SMS-DELIVER to TE.

0 No SMS-DELIVER indications are routed to TE.

1 SMS-DELIVERs are routed to the TE by using unsolicited result code: **+CMTI: <mem>,<index>**

2 SMS-DELIVERs 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)

3 Class 3 SMS-DELIVERs are routed directly to TE by 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). Messages of other classes result in indication are routed directly to TE by using unsolicited result code: **+CMTI: <mem>,<index>**.

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

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 enabled) or
+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (text mode enabled)

<ds>	Integer type. Mode for routing SMS-STATUS-REPORT to TE. 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) or **+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>** (text mode) 2 SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: **+CDSI: <mem>,<index>**.
<bfr>	Integer type. 0 TA buffer of unsolicited result codes defined within this command is flushed to the TE when **<mode>** 1 or 2 is entered (**OK** response shall be given before flushing the codes) 1 TA buffer of unsolicited result codes defined within this command is cleared when **<mode>** 1 or 2 is specified.
<err>	Error code. For more details, see ***Chapter 13.4***.

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

+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. Whether message types specified in **<mids>** and **<dcss>** are accepted. 0 Accepted 1 Not accepted
<mids>	String type. All different possible combinations of CBM message identifiers (see **<mid>** of **AT+CBM**) (default value: empty string), for example, "0,1,5,320-478,922".
<dcss>	String type. All different possible combinations of CBM data coding schemes (see **<dcs>** of **AT+CBM**) (default value: empty string), for example, "0-3,5".
<err>	Error code. For more details, see ***Chapter 13.4***.

8.15. AT+CSDH Show Text Mode Parameters

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

AT+CSDH Show Text Mode Parameters	
Test Command **AT+CSDH=?**	Response **+CSDH: (**list of supported **<show>**s**)** **OK**
Read Command **AT+CSDH?**	Response **+CSDH: <show>** **OK**
Write Command **AT+CSDH[=<show>]**	Response **OK** If there is any error: **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 header 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 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+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).

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

Write Command **AT+CSMP=<fo>[,<vp>[,<pid>[,<dcs>]]]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.
Reference 3GPP TS 27.005	

Parameter

<fo>	Integer type. The first octet of TPDU. See *3GPP TS 23.040* for a detailed description of the different message types.
<vp>	Integer type or string type. Validity period. Depend on SMS-SUBMIT **<fo>** setting: *3GPP TS 23.040* TP-Validity-Period either in integer format or in time-string format (see **<dt>**). Default value: 143.
<pid>	Integer type. Protocol identifier. *3GPP TS 23.040* TP-Protocol-Identifier. Default value: 0.
<dcs>	Integer type. Data coding scheme. Depending on the command or result code: *3GPP TS 23.038* SMS Data Coding Scheme (default value: 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 detaches 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 an **OK** 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** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	140 s, determined by network.
Characteristics	-
Reference *3GPP TS 27.007*	

Parameter

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

	Other values are reserved and will result in an **ERROR** response to the Write Command.
<err>	Error code. For more details, see ***Chapter 13.3***.

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 Context

This command specifies PDP context parameters for a specific context **<cid>**. A special form of the Write Command (**AT+CGDCONT=<cid>**) causes the values for context **<cid>** to become undefined. This Read Command returns the current configurations for each defined context.

AT+CGDCONT Define PDP Context	
Test Command **AT+CGDCONT=?**	Response **+CGDCONT: (**range of supported **<cid>**s)**,<PDP_type>,<APN>,<PDP_addr>,(**range of supported **<d_comp>**s)**,(**range of supported **<h_comp>**s)**,(**list of supported **<IPv4AddrAlloc>**s)**,(**list of supported **<request_type>**s)**,(**range of supported **<P-CSCF_discovery>**s)**,(**list of supported **<IM_CN_Signalling_Flag_Ind>**s)**,(**list of supported **<NSLPI>**s)**,,,,,,(**list of supported **<SSC_mode>**s)**,<S-NSSAI>,(**list of supported **<Pref_access_type>**s)**,(**list of supported **<RQoS_ind>**s)**,(**list of supported **<MH6-PDU>**s)**,(**list of supported **<Always-on_req>**s) **[...]** **OK**
Read Command **AT+CGDCONT?**	Response **+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,[,[,[,[,[,<SSC_mode>[,<S-NSSAI>[,<Pref_access_type>[,<RQoS_ind>[,<MH6-PDU>[,<Always-on_req>]]]]]]]]]]]]]]]]]] **[…]**

	OK
Write Command **AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,[,[,[,[,[,<SSC_mode>[,<S-NSSAI>[,<Pref_access_type>[,<RQoS_ind>[,<MH6-PDU>[,<Always-on_req>]]]]]]]]]]]]]]]]]]]]]]**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. PDP context identifier. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. Range: 1–11 (9 and 10 are not supported).
<PDP_type>	String type. Packet data protocol type, a string parameter which specifies the type of packet data protocol. Only "IP", "IPv6" and "IPv4v6" are supported for EPS services. "IP" Internet Protocol Version 4 "IPV6" Internet Protocol Version 6 "IPV4V6" Configure dual IP stack UE capability, and support Internet Protocol Version 4 and Version 6. "Ethernet" Ethernet Protocol
<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. The maximum length is 99 bytes. 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 with **AT+CGPADDR**.
<d_comp>	Integer type. Controls PDP data compression (applicable for SNDCP

	only, see *3GPP TS 44.065*). 0 Off 1 On (Manufacturer preferred compression) 2 V.42bis 3 V.44 (Not currently supported)
<h_comp>	Integer type. Controls PDP header compression (see *3GPP TS 44.065* and *3GPP TS 25.323*). 0 Off 1 On 2 RFC 1144 3 RFC 2507 4 RFC 3095 (applicable for PDCP only)
<IPv4AddrAlloc>	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. 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
<P-CSCF_discovery>	Integer type. Controls how the MT/TA requests to get the P-CSCF address. 0 Preference of P-CSCF address discovery not influenced by **AT+CGDCONT** 1 Preference of P-CSCF address discovery through NAS signaling 2 Preference of P-CSCF address discovery through DHCP
<IM_CN_Signalling_Flag_Ind>	Integer type. Indicates to the network whether the PDP context is for IM CN subsystem-related signaling only or not. 0 This PDP context is not for IM CN subsystem-related signaling only 1 This PDP context is for IM CN subsystem-related signaling only
<NSLPI>	Integer type. The NAS signaling priority requested for this PDP context. 0 The PDP context is to be activated with the value for the low priority parameters set by MT 1 The PDP context is to be activated with the value for the low priority parameters set to "MS is not configured for NAS signaling low priority".
<SSC_mode>	Integer type. Session and Service Continuity (SSC) mode for data traffic. 0 SSC mode 1

	1 SSC mode 2 2 SSC mode 3
<S-NSSAI>	String type. 5GS fragment information. See *3GPP TS 23.501* and *3GPP TS 24.501* for details. See *3GPP TS 23.003* for format and encoding details. sst — Only SST fragment-Service type (SST) is present sst;mapped_sst — SST and SST with mapping configuration are present sst.sd — SST and slice differentiator (SD) are present sst.sd;mapped_sst — SST, SD and SST with mapping configuration are present sst.sd;mapped_sst.mapped_sd — SST, SD, SST with mapping configuration and SD with mapping configuration are all present
<Pref_access_type>	Integer type. Priority access type in 5GS system. 0 3GPP 1 Non-3GPP
<RQoS_ind>	Integer type. Whether the PDU session reflects QoS. 0 Not support 1 Support
<MH6-PDU>	Integer type. Whether the UE supports the IPv6 multi-homing function when establishing a PDU session. 0 Not support 1 Support
<Always-on_req>	Integer type. Whether it is a permanent online PDU session. 0 No 1 Yes

Example

```
//5GS is not supported
AT+CGDCONT=1,"IP","UNINET","200.1.1.80",1,1,0,0,0,0,0
OK
//5GS is supported
AT+CGDCONT=1,"IP","UNINET","200.1.1.80",1,1,0,0,0,0,0,,,,,,1,"",0,1,0,0
OK
//5GS is not supported
AT+CGDCONT?
+CGDCONT: 1,"IP","UNINET","200.1.1.80",1,1,0,0,,,,,,0,,,0,,0,0,0,0
+CGDCONT: 11,"IPV4V6","IMS","0.0.0.0",0,0,0,0,,,,,,0,,,0,,0,0,0,0
OK
```

```
//5GS is supported
AT+CGDCONT?
+CGDCONT: 1,"IP","UNINET","200.1.1.80",1,1,0,0,,,,,,0,,,1,,0,1,0,0
+CGDCONT: 2,"IP","UNINET","200.1.1.80",1,1,0,0,,,,,,0,,,1,,0,1,0,0
+CGDCONT: 11,"IPV4V6","IMS","0.0.0.0",0,0,0,0,,,,,,0,,,0,,0,0,0,0
OK
//5GS is not supported
AT+CGDCONT=?
+CGDCONT: (1-11),"IP",,,(0,3),(0,4),(0,1),(0,4),(0-2),,,,(0,1),,,,(0,2),(),(0,1),(0,1),(0,1),(0,1)

OK
//5GS is supported
AT+CGDCONT=?
+CGDCONT: (1-11),"IP",,,(0,3),(0,4),(0,1),(0,4),(0-2),,,,(0,1),,,,(0,2),(),(0,1),(0,1),(0,1),(0,1)

OK
```

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.

The 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*.

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

Parameter

<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
<PDP_type>	String type. Packet Data Protocol type. EPS services only support IP, IPv6 and IPv4v6. "IP" Internet Protocol Version 4 (IPv4) "IPV6" Internet Protocol Version 6 "IPV4V6" Configure dual IP stack UE capability, and support Internet Protocol Version 4 and Version 6. "Ethernet" Point-to-Point Protocol (*IETF STD 51 [104]*)
<precedence>	Integer type. Specifies the precedence class. 0 Network subscribed value 1 High priority. Service commitments shall be maintained ahead of precedence classes 2 and 3 2 Normal priority. Service commitments shall be maintained ahead of precedence class 3 3 Low priority. Service commitments shall be maintained
<delay>	Integer type. Specifies the delay class. See *3GPP TS 23.107*. Default: 0。
<reliability>	Integer type. Specifies the reliability class. 0 Network subscribed value 1 Non real-time traffic, error-sensitive application that cannot cope with data loss 2 Non real-time traffic, error-sensitive application that can cope with infrequent data loss 3 Non real-time traffic, error-sensitive application that can cope with data loss, GMM-SM, and SMS 4 Real-time traffic, error-sensitive application that can cope with data loss 5 Real-time traffic, error non-sensitive application that can cope with data loss
<peak>	Integer type. Specifies the peak throughput class, in octets per second. 0 Network subscribed value 1 Up to 1,000 (8 kbit-s) 2 Up to 2,000 (16 kbit-s)

	3	Up to 4,000 (32 kbit-s)
	4	Up to 8,000 (64 kbit-s)
	5	Up to 16,000 (128 kbit-s)
	6	Up to 32,000 (256 kbit-s)
	7	Up to 64,000 (512 kbit-s)
	8	Up to 128,000 (1024 kbit-s)
	9	Up to 256,000 (2048 kbit-s)
<mean>	Integer type. Specifies the mean throughput class, in octets per hour.	
	0	Network subscribed value
	1	100 (~0.22 bit-s)
	2	200 (~0.44 bit-s)
	3	500 (~1.11 bit-s)
	4	1,000 (~2.2 bit-s)
	5	2,000 (~4.4 bit-s)
	6	5,000 (~11.1 bit-s)
	7	10,000 (~22 bit-s)
	8	20,000 (~44 bit-s)
	9	50,000 (~111 bit-s)
	10	100,000 (~0.22 kbit-s)
	11	200,000 (~0.44 kbit-s)
	12	500,000 (~1.11 kbit-s)
	13	1,000,000 (~2.2 kbit-s)
	14	2,000,000 (~4.4 kbit-s)
	15	5,000,000 (~11.1 kbit-s)
	16	10,000,000 (~22 kbit-s)
	17	20,000,000 (~44 kbit-s)
	18	50,000,000 (~111 kbit-s)
	31	Best effort
<err>	Error code. For more details, see ***Chapter 13.3***.	

9.4. 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>** **[+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. PDP context ID (see **AT+CGDCONT**).
<err>	Error codes. For more details, see ***Chapter 13.3***.

Example

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

9.5. 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** If there is any error **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<L2P>	String type. Indicates the layer 2 protocol to be used between the TE and MT. "PPP" Point to Point protocol for a PDP such as IP "M-IP" IP protocol specified by the manufacturer "M-ETHER" Ethernet protocol specified by the manufacturer Other values are not supported and will result in an **ERROR** response to the Write Command.
<cid>	Integer type. PDP context ID (see **AT+CGDCONT**).
<err>	Error codes. For more details, see ***Chapter 13.3***.

9.6. 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-Execution Command **AT+CGPADDR[=<cid>[,<cid>[,...]]]**	Response **+CGPADDR: <cid>,<PDP_addr>** **[+CGPADDR: <cid>,<PDP_addr>]** **[…]** **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
<PDP_addr>	String type. Identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by **AT+CGDCONT** when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by **<cid>**. **<PDP_addr>** is omitted if no address is available.

Example

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

OK
```

9.7. AT+CGREG GPRS Network Registration Status

This command queries the network registration status and controls the presentation of the unsolicited result code:

- The unsolicited result code **+CGREG: <stat>** is presented when **<n>**=1 and there is a change in the MT's GPRS network registration status in GERAN-UTRAN, or
- The unsolicited result code **+CGREG: <stat>[,[<lac>],[<ci>],[<AcT>],[<rac>]]** is presented when **<n>**=2 and there is a change of the network cell in GERAN-UTRAN. The configuration will take effect immediately.

AT+CGREG Network Registration Status	
Test Command **AT+CGREG=?**	Response **+CGREG: (**range of supported **<n>**s**)** **OK**
Read Command **AT+CGREG?**	Response **+CGREG: <n>,<stat>[,<lac>,<ci>[,<AcT>],[<rac>][,<cause_type>,<reject_cause>]]** **OK**

Write Command **AT+CGREG[=<n>]**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved (Execute **AT&W** after this command is issued).
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. controls the presentation of the specified unsolicited result code. 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. Indicates 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, but 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 trying to attach or searching an operator to register to. UE is in GMM state GMM-DEREGISTERED or GMM-REGISTERED-INITIATED. The GPRS service is enabled, but an allowable PLMN is currently not available. The UE will start a GPRS attach as soon as an allowable PLMN is available. 3 Registration denied. The UE is in GMM state GMM-NULL. The GPRS service is disabled, and the UE is not allowed to attach for GPRS if requested by the user. 4 Unknown 5 Registered, roaming
<lac>	String type. Two-byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal).
<ci>	String type. 4-byte (UMTS-LTE) cell ID in hexadecimal format.
<rac>	One-byte routing area code in hexadecimal format.
<cause_type>	Integer type. The type of rejection cause, that is, the type of **<reject_cause>**. 0 **<reject_cause>** is GMM cause value (see *3GPP TS 24.008 Annex G*) 1 **<reject_cause>** is manufacturer's cause.
<reject_cause>	Integer type. The reason for the registration failure, and the type is defined by

	<cause_type>.
<AcT>	Integer type. Integer type. Access technology selected. 2 UTRAN 4 UTRAN W-HSDPA 5 UTRAN W-HSUPA 6 UTRAN W-HSDPA and HSUPA

Example

```
AT+CGREG=2                                  //Enable network registration and location
                                              information unsolicited result code
                                              +CGREG: <stat>[,<lac>,<ci>[,<AcT>],[<rac>]]
OK
AT+CGATT=0
OK

+CGREG: 2
AT+CGATT=1
OK

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

9.8. AT+CGEREP Packet Domain Event Reporting

This Write Command enables or disables sending of unsolicited result codes **+CGEV** 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.

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** If there is any error: **ERROR**

Write Command **AT+CGEREP=<mode>[,<bfr>]**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<mode> Integer type.

0 Buffer unsolicited result codes in the MT; if TA 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 cleared 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).

NOTE

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

1. **+CGEV: REJECT <PDP_type>, <PDP_addr>**: A network request for PDP context activation occurred when the MT was unable to report it to the TE with a **+CRING** unsolicited result code and was automatically rejected.
   Note: This event is not applicable for EPS 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>	String type. Packet Data Protocol type. "IP" Internet Protocol Version 4 "IPV6" Internet Protocol Version 6 "IPV4V6" Configure dual IP stack UE capability, and support Internet Protocol Version 4 and Version 6. "Ethernet" Ethernet Protocol
<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 with **AT+CGPADDR**.
<cid>	Integer type. PDP context identifier. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. Range: 1–8, 11.
<class>	String type. GPRS class. A Class A (highest) B Class B C Class C for GPRS and circuit-switched standby mode CG Class C for GPRS only CC Class C for circuit-switched standby mode only (lowest)

Example

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

OK
AT+CGEREP?
+CGEREP: 0,0

OK
AT+CGEREP=2,1
```

```
OK
AT+CGACT=1,2            //Activated a PDP context.
OK

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

+CGEV: PDN DEACT 2
```

9.9. 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 supported **<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 ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<service>	Integer type. indicates the service or service preference to be used. 0 PS domain 1 CS domain 2 PS domain preferred (Use CS domain when PS domain is not available)

	3 CS domain preferred (Use PS domain when CS domain is not available)
<err>	Error codes. For more details, see ***Chapter 13.3***.

9.10. 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>][,<cause_type>,<reject_cause>]]** **OK**
Write Command **AT+CEREG=<n>**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved (Execute **AT&W** after this command is issued).
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>[,<tac>,<ci>[,<AcT>]]**
<stat>	Integer type. Network 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 Emergency service
<tac>	String type. Two-byte tracking area code in hexadecimal format.
<ci>	String type. Four-byte E-UTRAN cell ID in hexadecimal format.
<cause_type>	Integer type. The type of rejection cause, that is, the type of **<reject_cause>**. 0 **<reject_cause>** is GMM cause value (see *3GPP TS 24.008 Annex G*) 1 **<reject_cause>** is manufacturer's cause.
<reject_cause>	Integer type. The reason for the registration failure, and the type is defined by **<cause_type>**.
<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 5GCN 11 NR connected to 5GCN 12 NG-RAN 13 E-UTRAN-NR dual connectivity 15 HSPA+

9.11. AT+C5GREG 5GS Network Registration Status

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

AT+C5GREG 5GS Network Registration Status	
Test Command **AT+C5GREG=?**	Response **+C5GREG: (**range of supported **<n>**s**)** **OK**
Read Command	Response

AT+C5GREG?	**+C5GREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<Allowed_NSSAI_length>,<Allowed_NSSAI>][,<cause_type>,<reject_cause>]]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Write Command **AT+C5GREG=<n>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007(R15)	

Parameter

<n>	Integer type. 0 Disable network registration unsolicited result code 1 Enable network registration unsolicited result code **+C5GREG: <stat>** 2 Enable network status unsolicited result code **+C5GREG: <stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]]**
<stat>	Integer type. 5G NR 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
<tac>	String type. Three-byte tracking area code in hexadecimal format.
<ci>	String type. Five-byte NR cell ID in hexadecimal format.
<AcT>	Integer type. Access technology selected.

	10 EUTRAN-5GC 11 NR-5GC
<Allowed_NSSAI_length>	Integer type. Length in octets.
<Allowed_NSSAI>	String type in hexadecimal format. List of allowed S-NSSAIs received by the network. Values can be separated by colons.
<cause_type>	Integer type. The type of rejection cause, that is, the type of **<reject_cause>** 0 **<reject_cause>** is GMM cause value (see *3GPP TS 24.008 Annex G*) 1 **<reject_cause>** is manufacturer's cause.
<reject_cause>	Integer type. The reason for the registration failure, and the type is defined by **<cause_type>**.
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

This command only supports 5G NR.

Example

```
AT+C5GREG=1
OK
AT+C5GREG?
+C5GREG: 1,1

OK
```

9.12. AT+C5GQOS Set 5GS Quality of Service

This command sets or deletes 5G QoS (Quality of Service) parameters for a specific PDP context ID. See *3GPP TS 23.501* and *3GPP TS 24.501* for details. For error codes, see *3GPP TS 24.501 subclause 9.2*.

AT+C5GQOS Set 5GS Quality of Service	
Test Command **AT+C5GQOS=?**	Response **+C5GQOS: (**range of supported **<cid>**s**),(**range of supported **<5QI>**s**),(**range of supported **<DL_GFBR>**s**),(**range of supported **<UL_GFBR>**s**),(**range of supported **<DL_MFBR>**s**),(**range of supported **<UL_MFBR>**s**)** **OK**
Read Command	Response

AT+C5GQOS?	**[+C5GQOS:<cid>,<5QI>[,<DL_GFBR>,<UL_GFBR>[,<DL_MFBR>,<UL_MFBR>]]** **[+C5GQOS:<cid>,<5QI>[,<DL_GFBR>,<UL_GFBR>[,<DL_MFBR>,<UL_MFBR>]]** **[…]]** **OK**
Write Command **AT+C5GQOS=[<cid>[,<5QI>[,<DL_GFBR>,<UL_GFBR>[,<DL_MFBR>,<UL_MFBR>]]]]**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007(R15)	

Parameter

<cid>	Integer type. PDP context ID. Range: 1–31.	
<5QI>	Integer type. 5GS QoS level. Range: 0–254.	
	0	5QI is selected by network
	1–4, 71–76	Value range for guaranteed bit rate QoS flows
	65–67	Values for guaranteed bit rate QoS flows
	5–9	Value range for non-guaranteed bit rate QoS flows
	69/70/79/80	Values for non-guaranteed bit rate QoS flows
	82–85	Value range for delay critical guaranteed bit rate QoS flows
	128–254	Value range for Operator-specific 5QIs
<DL_GFBR>	Integer type. Downlink GFBR under GBR 5QI. Unit: kbit-s. Range: 0–4294967295. This parameter is omitted under non-GBR 5QI.	
<UL_GFBR>	Integer type. Uplink GFBR under GBR 5QI. Unit: kbit-s. Range: 0–4294967295. This parameter is omitted under non-GBR 5QI.	
<DL_MFBR>	Integer type. Downlink MFBR under GBR 5QI. Unit: kbit-s. Range: 0–4294967295. This parameter is omitted under non-GBR 5QI.	
<UL_MFBR>	Integer type. Uplink MFBR under GBR 5QI. Unit: kbit-s. Range: 0–4294967295. This parameter is omitted under non-GBR 5QI.	
<err>	Error code. For more details, see ***Chapter 13.3***.	

Example

```
AT+C5GQOS=1,1,1000,2000,3000,4000
OK
AT+C5GQOS?
+C5GQOS: 1,1,1000,2000,3000,4000
+C5GQOS: 2,65,1000,1000,1000,1000

OK
AT+C5GQOS=?
+C5GQOS: (1-31),(0-254),(0-4294967295),(0-4294967295),(0-4294967295),(0-4294967295)

OK
```

9.13. AT+C5GQOSRDP Read 5GS Dynamic QoS Parameters

This command reads the 5G QoS parameters allocated by the network of the specified PDP context or all activated contexts.

AT+ C5GQOSRDP Read 5GS Dynamic QoS Parameters	
Test Command **AT+C5GQOSRDP=?**	Response **+C5GQOSRDP: (**list of supported **<cid>** associated with QoS flow**)** **OK**
Write Command **AT+C5GQOSRDP[=<cid>]**	Response **[+C5GQOSRDP: <cid>,<5QI>[,<DL_GFBR>,<UL_GFBR>[,<DL_MFBR>,<UL_MFBR>[,<DL_SAMBR>,<UL_SAMBR>[,<Averaging_window>]]]]** **[…]** **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007(R15)	

Parameter

<cid>	Integer type. PDP context ID. Range: 1–8, 11.
<5QI>	Integer type. 5GS QoS level. Range: 0–254. 0 5QI is selected by network 1–4, 71–76 Value range for guaranteed bit rate QoS flows 65/66/67 Values for guaranteed bit rate QoS flows 5–9 Value range for non-guaranteed bit rate QoS flows 69/70/79/80 Values for non-guaranteed bit rate QoS flows 82–85 Value range for delay critical guaranteed bit rate QoS flows 128–254 Value range for Operator-specific 5QIs
<DL_GFBR>	Integer type. Downlink GFBR under GBR 5QI. Unit: kbit-s. Range: 0–4294967295. This parameter is omitted under non-GBR 5QI.
<UL_GFBR>	Integer type. Uplink GFBR under GBR 5QI. Unit: kbit-s. Range: 0–4294967295. This parameter is omitted under non-GBR 5QI.
<DL_MFBR>	Integer type. Downlink MFBR under GBR 5QI. Unit: kbit-s. Range: 0–4294967295. This parameter is omitted under non-GBR 5QI.
<UL_MFBR>	Integer type. Uplink MFBR under GBR 5QI. Unit: kbit-s. Range: 0–4294967295. This parameter is omitted under non-GBR 5QI.
<UL_SAMBR>	Integer type. Uplink session AMBR (see *3GPP TS 24.501*). Unit: kbit-s.
<DL_SAMBR>	Integer type. Downlink session AMBR (see *3GPP TS 24.501*). Unit: kbit-s.
<Averaging_window>	Integer type. Average window size (see *3GPP TS 24.501*). Unit: ms.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+C5GQOSRDP=1                          //Read the 5G QoS parameters assigned by the network with <cid>=1.
+C5GQOSRDP: 1,1,1000,2000,3000,4000,10000,10000,2000

OK
AT+C5GQOSRDP=?
+C5GQOSRDP: 1

OK
```

9.14. AT+C5GNSSAI 5GS NSSAI Setting

This command enables updating the default configuration NSSAI stored in the MT. If the value of **<default_configured_nssai_length>** is 0 and **<default_configured_nssai>** consists of a empty string,

any default configured NSSAI stored in the MT will be deleted by the MT. If the MT received the default configured NSSAI from the network through NAS signaling before, the default configured NSSAI stored in the MT will not be updated.

AT+C5GNSSAI 5GS NSSAI Setting	
Test Command **AT+C5GNSSAI=?**	Response **+C5GNSSAI: (**range of supported **<default_configured_nssai_length>**s**),(**list of supported **<default_configured_nssai>**s**)** **OK**
Read Command **AT+C5GNSSAI?**	Response **+C5GNSSAI: <default_configured_nssai_length>[,<default_configured_nssai>]** **OK**
Write Command **AT+C5GNSSAI=<default_configured_nssai_length>,<default_configured_nssai>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007(R15)	

Parameter

<default_configured_nssai_length>	Integer type. Indicate the length in octets of the default configured NSSAI to be stored in the MT. If the value is 0, no default configured NSSAI is stored in the MT.
<default_configured_nssai>	String type in hexadecimal format. Indicate the default configured NSSAI stored in the MT. If the value is an empty character (""), no default configured NSSAI is stored in the MT.
<err>	Error codes. For more details, see ***Chapter 13.3***.

Example

```
AT+C5GNSSAI=15,"1:2:3:4:5:6:7:8"          //Set 5GS default NSSAI。
OK
```

```
AT+C5GNSSAI?
+C5GNSSAI: 15,"1:2:3:4:5:6:7:8"

OK
```

9.15. AT+C5GPNSSAI 5GS Preferred NSSAI Setting

This command specifies the preferred NSSAI as a list of S-NSSAIs that match the TE's preferences. The preferred NSSAI is encoded as a list of HPLMN values for S-NSSAI, which is independent of the selected or registered PLMN. The preferred NSSAI will be considered by MT when selecting the requested NSSAI.

AT+C5GPNSSAI 5GS Preferred NSSAI Setting	
Test Command **AT+C5GPNSSAI=?**	Response **+C5GPNSSAI:** (range of supported **<Preferred_NSSAI_3gpp_length>**s),(range of supported **<Preferred_NSSAI_non3gpp_length>**s) **OK**
Read Command **AT+C5GPNSSAI?**	Response **+C5GPNSSAI: [<Preferred_NSSAI_3gpp_length>,[<Preferred_NSSAI_3gpp>]],[<Preferred_NSSAI_non3gpp_length>,[<Preferred_NSSAI_non3gpp>]]** **OK**
Write Command **AT+C5GPNSSAI=[<Preferred_NSSAI_3gpp_length>,[<Preferred_NSSAI_3gpp>]],[<Preferred_NSSAI_non3gpp_length>,[<Preferred_NSSAI_non3gpp>]]**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007(R15)	

Parameter

<Preferred_NSSAI_3gpp_length>	Integer type. The length in octets of **<Preferred_NSSAI_3gpp>**. If the value is 0, no preferred NSSAI for 3GPP access is stored in the MT.
<Preferred_NSSAI_3gpp>	String type in hexadecimal format. Preferred NSSAI for 3GPP access stored in the MT. This parameter is coded as a list of S-NSSAI separated by colons. If the value is an empty character (""), no preferred NSSAI for 3GPP access is stored in the MT.
<Preferred_NSSAI_non3gpp_length>	Integer type. The length in octets of **<Preferred_NSSAI_3gpp>**. If the value is 0, no preferred NSSAI for non-3GPP access is stored in the MT.
<Preferred_NSSAI_non3gpp>	String type in hexadecimal format. Preferred NSSAI for non-3GPP access stored in the MT. This parameter is coded as a list of S-NSSAI separated by colons. If the value is an empty character (""), no preferred NSSAI for non-3GPP access is stored in the MT.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+C5GPNSSAI=15,"1:2:3:4:5:6:7:8"
OK
AT+C5GPNSSAI?
+C5GPNSSAI: 15,"1:2:3:4:5:6:7:8"

OK
```

9.16. AT+QNETDEVCTL Make-Disconnect PDP Call

This command makes or disconnects a PDP call.

AT+QNETDEVCTL Make-Disconnect PDP Call	
Test Command **AT+QNETDEVCTL=?**	Response **+QNETDEVCTL: (**range of supported **<cid>**s**),(**list of supported **<op>**s**),(**list of supported **<state>**s**)** **OK**

Read Command Query all current context configurations **AT+QNETDEVCTL?**	Response **[+QNETDEVCTL: <cid>,<op>,<state>]** **[…]** **OK**
Write Command Make a call through specified PDP **AT+QNETDEVCTL=<cid>[,<op>,<state>]**	Response If the optional parameters are omitted, query the current setting: **+QNETDEVCTL: <cid>,<op>,<state>** **OK** If the optional parameters are specified, make a PDP call through specified PDN: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<cid>	Integer type. PDP context ID. Range: 1–8, 11.
<op>	Integer type. Make or disconnect a call. 0 Disconnect a call, and the configurations are not saved. 1 Make a call, and the configurations are not saved. 2 Disconnect a call, and the configurations are saved. 3 Make a call, and the configurations are saved.
<state>	Integer type. Whether to remake a call after disconnecting from the network, and it is only valid when **<op>**=1 or 3. 0 Disable automatic remaking the call, the return value responses synchronously, and the return value needs to wait for the USBnet-Ethernet call result; when disconnecting from the network, you need to remake the call manually. 1 Enable remaking the call automatically after disconnecting from the network, the return value responses immediately. When disconnecting PDP, the mechanism of remaking the call will be triggered immediately, and the retry will be performed every 8 seconds, 16 seconds, 32 seconds... in a multiple of 2, and the maximum retry interval is 512 seconds.

NOTE

The URC **+QNETDEVSTATUS: <cid>,<state>,<IP_version>,<code>** is reported after making or disconnecting PDP call.

<cid> Integer type. PDP context ID. Range: 1–8.

<state> Integer type. Current USBnet-Ethernet connection status.

0 Disconnected

1 Connected

<IP_version> String type. IP version.

"IPV4" Internet Protocol Version 4

"IPV6" Internet Protocol Version 6

"IPV4V6" Configure dual IP stack UE capability, and support Internet Protocol Version 4 and Version 6.

<code> Integer type. Operation result code.

0 Success

3331 Timeout

Other values See 3GPP SM Cause codes

Example

```
//Configure protocol type to IPv4 through AT+QICSGP.
AT+QNETDEVCTL=1,1,1                 //Make a call and enable remaking the call automatically after
                                      disconnecting from the network with <cid> = 1.
OK

+QNETDEVSTATUS: 1,1,"IPV4",0        //The URC is reported after making a call successfully.
```

9.17. AT+QNETDEVSTATUS Query USBnet-Ethernet Status

This command queries USBnet-Ethernet status.

AT+QNETDEVSTATUS Query USBnet-Ethernet Status	
Test Command **AT+QNETDEVSTATUS=?**	Response **+QNETDEVSTATUS: (**range of supported **<cid>**s**)** **OK**
Write Command **AT+QNETDEVSTATUS=<cid>**	Response **+QNETDEVSTATUS: <clIPv4>,<IPv4_netmask>,<IPv4_gate>,<IPv4_DHCP>,<IPv4_pDNS>,<IPv4_sDNS>,<clIPv6>,<IPv6_netmask>,<IPv6_gate>,<IPv6_DHCP>,<IPv6_pDNS>,<IPv6_sDNS>**

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

Parameter

<cid>	Integer type. PDP context ID. Range: 1–8, 11.
<cIIPv4>	Host IPv4 address. Range: 0x0000_0000–0xFFFF_FFFF.
<IPv4_netmask>	IPv4 subnet mask. Range: 0x0000_00FF–0xFCFF_FFFF.
<IPv4_gate>	IPv4 default gateway. Range: 0x0000_0000–0xFFFF_FFFF.
<IPv4_DHCP>	IPv4 DHCP server address. Range: 0x0000_0000–0xFFFF_FFFF.
<IPv4_pDNS>	Primary IPv4 DNS address. Range: 0x0000_0000–0xFFFF_FFFF.
<IPv4_sDNS>	Secondary IPv4 DNS address. Range: 0x0000_0000–0xFFFF_FFFF.
<cIIPv6>	Host IPv6 address. Range: 0x::–0xFFFF_FFFF_FFFF_FFFF .
<IPv6_netmask>	IPv6 Subnet mask. Range:0x::–0xFFFF_FFFF_FFFF_FFFF.
<IPv6_gate>	IPv6 default gateway. Range: 0x::–0xFFFF_FFFF_FFFF_FFFF.
<IPv6_DHCP>	IPv6 DHCP server address. Range: 0x::–0xFFFF_FFFF_FFFF_FFFF.
<IPv6_pDNS>	Primary IPv6 DNS address. Range: 0x::–0xFFFF_FFFF_FFFF_FFFF.
<IPv6_sDNS>	Secondary IPv6 DNS address. Range: 0x::–0xFFFF_FFFF_FFFF_FFFF.
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

1. Query USBnet-Ethernet status corresponding to the PDP context **<cid>**. If an **ERROR** is returned, it indicates that USBnet-Ethernet call is disconnected; if the information such as the IP address, gateway corresponding to **<cid>** are returned, it indicates that USBnet-Ethernet call is connected.
2. The IP address is in dotted decimal, such as: 192.168.0.1.

9.18. AT+QICSGP Configure Parameters of a PDP Context

This command configures **<APN>**, **<username>**, **<password>** and other PDP context parameters.

AT+QICSGP Configure Parameters of a PDP Context	
Test Command **AT+QICSGP=?**	Response **+QICSGP: (**range of supported **<contextID>**s**),(**range of supported**<context_type>**s**),<APN>,<username>,<password>,(**range of supported **<authentication>**s**)** **OK**
Read Command Query the configuration of all contexts. **AT+QICSGP?**	Response **[+QICSGP: <contextID>,<context_type>,<APN>,<username>,<password>,<authentication>** **…]** **OK**
Write Command Query the configuration of a specified context. **AT+QICSGP=<contextID>**	Response **[+QICSGP: <context_type>,<APN>,<username>,<password>,<authentication>** **...]** **OK**
Write Command Configure the context. **AT+QICSGP=<contextID>[,<context_type>,<APN>[,<username>,<password>)[,<authentication>]]]**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<contextID>	Integer type. PDP context ID. Range: 1–11.
<context_type>	Integer type. Protocol type. 1 IPv4 2 IPv6 3 IPv4v6 4 Ethernet

<APN>	String type. The access point name.
<username>	String type. The username.
<password>	String type. The password.
<authentication>	Integer type. The APN authentication methods. 0 None 1 PAP 2 CHAP 3 PAP or CHAP

9.19. 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 Query the current bytes sent and received **AT+QGDCNT?**	Response **+QGDCNT: <bytes_sent>,<bytes_recv>** **OK**
Write Command **AT+QGDCNT=<op>**	Response **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<op>	Integer type. The operation about data counter. 0 Reset the data counter 1 Save the results of data counter If results need to be automatically saved, see **Chapter *9.20***.
<bytes_sent>	Integer type. The amount of sent bytes.
<bytes_recv>	Integer type. The amount of received bytes.
<err>	Error code. For more details, see ***Chapter 13.3***.

9.20. AT+QAUGDCNT Auto Save Packet Data Counter

This command allows **AT+QGDCNT** to save results of data counter 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** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<value>	Integer type. The parameter is the time-interval for **AT+QGDCNT** to save results of data counter automatically. Unit: second. 0 Auto-save is disabled. 30–65535 Time interval
<err>	Error code. For more details, see ***Chapter 13.3***.

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*.

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>]]]** **[+CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]** **[...]]** **OK** If no call forwarding number is registered (and therefore all classes are inactive): **+CCFC: <status>,<class>** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms

Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<reads>	Integer type. Call forwarding condition. 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. Operation type. 0 Disable 1 Enable 2 Query status 3 Registration 4 Erasure
<number>	Integer 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.
<class>	Integer type. Each represents a class of information. The value is a combination of the following classes (XOR operation format). Default: 7 = 1 + 2 + 4 (voice, data, and fax) 1 Voice (telephony) 2 Data (refers to all bearer services; and this may only see some bearer services if TA does not support values 16, 32, 64 and 128 with <mode>=2) 4 Fax (facsimile services) 8 Short message service 16 Data circuit synchronization 32 Data circuit asynchronization 64 Dedicated packet access 128 Dedicated PAD access
<time>	Integer type. when "no reply", "all call forwarding" or "all conditional call forwarding" is enabled or queried, this gives the time in seconds to wait before call is forwarded. Range: 0–30; default value :20; Unit: second.
<status>	Integer type. Call forwarding service status. 0 Not active 1 Active
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

You should make sure that the current PDP context is activated before using this command.

Example

```
AT+CCFC=0,3,"15021012496"                  //Register the destination number for unconditional call forwarding.

OK
AT+CCFC=0,2                                //Query the status of unconditional call forwarding without specifying <class>.

+CCFC: 1,1,"+8615021012496",145,,,

OK
AT+CCFC=0,4                                //Erase the registered destination number of unconditional call forwarding.

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>** **[+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. Enable/disable presentation of an unsolicited result code. When MT displays call waiting (that is, the call waiting is enabled) and the call service is terminated during the call waiting period, the following URC will be reported: **+CCWA: <number>,<type>,<class>[,<alpha>][,<CLI_validity>[,<subaddr>,<satype>[,<priority>]]]**。 0 Disable 1 Enable
<mode>	Integer type. When **<mode>** is omitted, network is not interrogated. 0 Disable call waiting control 1 Enable call waiting control 2 Query call waiting control status
<class>	Integer type. Each integer represents a class of information. 1 Voice (telephony) 2 Data (refers to all bearer services; and this may only see some bearer services if TA does not support values 16, 32, 64 and 128 with **<mode>**=2) 4 Fax (facsimile services) 8 Short message service 16 Data circuit synchronization 32 Data circuit asynchronization 64 Dedicated packet access 128 Dedicated PAD access
<status>	Integer type. Indicate whether the status of the command is enabled or not. 0 Disable 1 Enable

<number> String type. Phone number of calling address in format specified by **<type>**.

<type> Type of address octet in integer format.
- 129 Unknown type (ISDN 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 subclause 10.5.4.30*).
- 0 CLI valid
- 1 CLI has been withheld by the originator (see *3GPP TS 24.008 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 table 10.5.135a/3GPP TS 24.008* code "Interaction with other service")
- 3 CLI is not available due to calling party being type of payphone (see *3GPP TS 24.008 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 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 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 and 3GPP TS 23.081*), **<number>** and **<type>** is provided. Otherwise, TA shall return the same setting for **<number>** and **<type>** as if the CLI is not available.

<subaddr> String type. Sub-address of format specified by **<satype>**.

<satype> Integer type. Sub-address octet (see *3GPP TS 24.008 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*.

<err> Error code. For more details, see ***Chapter 13.3***.

NOTE

1. **<status>**=0 should be returned only if the **<status>** is not active for any **<class>.** I.e. **+CCWA: 0,7** will be returned in this case.
3. When **<mode>**=2, all active call waiting classes will be reported. In this mode the command is aborted by pressing any key.

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.

TA controls the supplementary services call hold, multiparty and explicit call transfer with the Write Command. Calls can be put on hold, recovered, released, added to conversation and transferred.

AT+CHLD Call Related Supplementary Services	
Test Command **AT+CHLD=?**	Response **+CHLD: (**list of supported **<n>**s**)** **OK**

Write Command **AT+CHLD=[<n>]**	Response **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type.	
	0	Terminate all held calls or UDUB (User Determined User Busy) for a waiting call. If a call is waiting, terminate the waiting call. Otherwise, terminate all held calls (if any)
	1	Terminate all active calls (if any) and accept the other call (waiting call or held call).
	1X	Terminate the specific call 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	Connects the two calls and disconnects the subscriber from both calls (ECT)
	5	Activate or accept network-originated calls (CCBS)
	7X	Terminate the specific conference call X (X = 1–7)
<err>	Error code. For more details, see ***Chapter 13.3***.	

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                               //Query current MT call.
+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. The Write Command enables or disables the calling line identification presentation of TE.

AT+CLIP Calling Line Identification Presentation	
Test Command **AT+CLIP=?**	Response **+CLIP: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CLIP?**	Response **+CLIP: <n>,<m>** **OK**
Write Command **AT+CLIP=[<n>]**	Response **OK** If there is any error 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. Enable/disable unsolicited result codes to report. When displaying CLIP is enabled on TE (and the calling party allows it), after the called party returns **RING** (or **+CRING: <type>**), the following URC will be reported: **+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI_validity>** 0 Disable unsolicited result codes 1 Enable unsolicited result codes
<m>	Integer type. 0 CLIP not provisioned 1 CLIP provisioned 2 Unknown (e.g., no network, etc.) **<number>** String type. Phone number calling address in format specified by **<type>**. **<subaddr>** String type. Sub-address of format specified by **<satype>**. **<satype>** Type of sub-address octet in integer format (see *3GPP TS 24.008 subclause 10.5.4.8*) **<type>** Type of address octet in integer format. 129 Unknown type (ISDN format) 145 International number type (ISDN format) 161 National number **<alpha>** String type alphanumeric representation of **<number>** corresponding to the entry found in phone book. **<CLI_validity>** Integer type. 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 code. For more details, see ***Chapter 13.3***.

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. 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. 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 code. For more details, see ***Chapter 13.3***.

10.6. AT+COLP Connected Line Identification Presentation

This command enables/disables a calling subscriber to get the connected line identity 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 TA returns the intermediate result code to the 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. Enables/disables the result code presentation status in the MT. 0 Disable 1 Enable; 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>]**
<m>	Integer type. Presents the subscriber COLP service status in the network. 0 COLP not provisioned 1 COLP provisioned 2 Unknown (e.g., no network, etc.)

<number>	String type. Phone number; calling address in format specified by **<type>**.
<type>	Integer type. Type of address octet in integer format. 129 Unknown type (ISDN 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.

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** If there is any error: **ERROR** Or **+CME ERROR: <err>**

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

Parameter

<n> Integer type. Enables/disables the intermediate result code presentation status from TA to TE. When **<n>**=1 and a supplementary service notification is received after a mobile originated call setup, the **+CSSI: <code1>** intermediate result code is sent to TE before any other MO call setup result codes.

0 Disable

1 Enable

<m> Integer type. Enables/disables the unsolicited result code presentation status to TE. When **<m>**=1 and a supplementary service notification is received during a mobile terminated call setup or during a call, the URC **+CSSU: <code2>** unsolicited result code is sent to 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 Call is waiting

5 Outgoing call is barred

<code2> Integer type. It is manufacturer specific and supports the following codes:

0 The incoming call is a forwarded call

2 Call has been put on hold (during a voice call)

3 Call has been retrieved (during a voice call)

5 Held call was terminated by another party

1 0 Additional incoming call forwarded

<err> Error code. For more details, see ***Chapter 13.3***.

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** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	120 s, determined by the network.
Characteristics	-
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. Enables/disables 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 code. For more details, see ***Chapter 13.3***.	

10.9. AT+CGU Extended Conference Call

This command controls extended conference call.

AT+CGU Extended Conference Call	
Write Command **AT+CGU=<operation>,<num>[,<num>…]**	Response **OK** If there is any error: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<operation>	Integer type. Operation type.	
	1	Create a multi-party conference call
	2	Connect to the web conference center
	4	Add a conference call party
<num>	String type. Phone number; supports up to six-party calling. Multiple phone numbers can be set at one time only when **<operation>**=1. Format: "tel:<number>".	
<err>	Error code. For more details, see ***Chapter 13.4***.	

NOTE

1. After creating a three-party call with **AT+CHLD=3**,you can use **AT+CGU** to add a new session.
2. For the phone number added by **AT+CGU**, you can query the corresponding **<idx>** by **AT+CLCC**, **<idx>** is the **X** in **AT+CHLD=7X** and **AT+CHLD=2X**.

Example

```
AT+CGU=1,"tel:15021012496","tel:15399691447"    //Create a conference call

OK
AT+CGU=4,"tel:15813636380"                      // Add a new call to the active conference calls.

OK
```

11 Audio Related Commands

11.1. AT+CMUT Mute Control

This command enables/disables the uplink voice muting during a voice call.

AT+CMUT Mute Control	
Test Command **AT+CMUT=?**	Response **+CMUT: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CMUT?**	Response **+CMUT: <n>** **OK**
Write Command **AT+CMUT=<n>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations is not saved.
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. 0 Mute off 1 Mute on
<err>	Error code. For more details, see ***Chapter 13.3***.

11.2. 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** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

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

Example

```
AT+QAUDLOOP=1                    //Enable audio loop test.
OK
```

11.3. 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** If there is any error: **ERROR** Or **+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. When sending multiple tones at a time, the string should be enclosed in quotation marks (""). The time interval of two tones can be specified by **AT+VTD**.
<duration>	Integer type. The duration of each tone with tolerance. Range: 0–255. Unit: 0.1 s. If the duration is less than the minimum time specified by the network, the actual duration will be the network specified time. When sending multiple tones at a time, this parameter cannot be used. If this parameter is omitted, **<duration>** is specified by **AT+VTD**.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
ATD12345678900;                    //Dial.
OK
//The call is connected.
AT+VTS=1                           //The remote caller can hear the DTMF tone.
```

```
OK
AT+VTS=1,50                    //The remote caller can hear the DTMF tone.
OK
AT+VTS="1,2,3,4,5,6,7,8,9,0,A"  //Send multiple tones at a time.
OK
```

11.4. AT+VTD Set Tone Duration

This command sets the duration of DTMF tones.

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

Parameter

<duration>	Integer type. The duration of DTMF tones. Range: 0–255. Default: 1. Unit: 0.1 s.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+VTD=10                      //Set the duration of DTMF tones to 1 second.
OK
```

11.5. 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** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The parameter is not saved.
Reference Quectel	

Parameter

<mode>	Integer type. Indicate the current configured audio mode of echo canceller, noise suppressor, digital gain and parameter calibration. 0 Handset 1 Headset 2 Speaker
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+QAUDMOD=2          //Set the current configured audio mode of echo canceller, noise
                        suppressor, digital gain and parameter calibration to speaker.
OK
```

11.6. 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: <txgain>,<txdgain>** **OK**
Write Command **AT+QMIC=<txgain>[,<txdgain>]**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

Parameter

<txgain>	Integer type. Uplink codec gain. Range: 0–7. Unit: dB. The default value may be different in different audio modes.
<txdgain>	Integer type. Uplink digital gain. Range: 0–7. Unit: dB. The default value may be different in different audio modes.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+QMIC=1,2                 //Set uplink codec gain to 1 dB and uplink digital gain to 2 dB.
OK
```

11.7. AT+CLVL Loudspeaker Volume Level Selection

This command selects the volume level of the loudspeaker.

AT+CLVL Loudspeaker Volume Level Selection	
Test Command **AT+CLVL=?**	Response **+CLVL: (**range of supported **<level>**s**)** **OK**
Read Command **AT+CLVL?**	Response **+CLVL: <level>** **OK**
Write Command **AT+CLVL=<level>**	Response **OK** If there is any error: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect on calling. The parameter is not saved.

Parameter

<level>	Integer type. Volume level of the loudspeaker. Range: 0–7. Default: 4.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+CLVL=?                  //Test Command.
+CLVL: (0-7)

OK
AT+CLVL?                   //Query the current setting.
+CLVL: 4

OK
AT+CLVL=7                  //Set the volume level of the loudspeaker to 7.
OK
```

11.8. AT+QIIC IIC Read and Write

This command configures the codec via IIC interface.

AT+QIIC IIC Read and Write	
Test Command **AT+QIIC=?**	Response **+QIIC: (**list of supported **<rw>**s**),(**list of supported **<device>**s**),(**list of supported **<addr>**s**),(**list of supported **<bytes>**s**),(**list of supported **<value>**s**)** **OK**
Write Command **AT+QIIC=<rw>,<device>,<addr>,<bytes>[,<value>]**	Response If the optional parameters are omitted, query the current configuration: **+QIIC: <value>** **OK** If the optional parameters are specified, read or write IIC: **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<rw>	Integer type. Operation type. 0 Write command 1 Read command
<device>	Integer type in hexadecimal format. 7-bit device address. Range: 0–0xFF.
<addr>	Integer type in hexadecimal format. Register address. Range: 0–0xFF.
<bytes>	Integer type. 1 Read/write 1 bytes 2 Read/write 2 bytes
<value>	Integer type in hexadecimal format. Data value. Range: 0–0xFFFF.

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
```

11.9. AT+QAUDRD Record Media File

This command records sound from local microphone in idle state and saves it to files. In this Write Command, when **<control>** is specified to 0, the optional parameters can be omitted.

AT+QAUDRD Record Media File	
Test Command **AT+QAUDRD=?**	Response **+QAUDRD: (**list of supported **<control>**s**),"filename",(**list of supported **<format>**s**),(**range of supported **<link>**s**)** **OK**
Read Command **AT+QAUDRD?**	Response **+QAUDRD: <state>** **OK**
Write Command **AT+QAUDRD=<control>[,<filename>[,<format>[,<link>]]]**	Response **OK** After the media file is completely recorded: **+QAUDRD: 0** After failure occurs during the recording: **+QAUDRIND: 0,<code>** If there is any error: **ERROR** or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<control>	Integer type. Start or stop recording. 0 Stop recording 1 Start to record
<filename>	String type. Name of the file to be played and it should include file name and file suffix. The default path is the */data/UFS* directory.
<format>	Integer type. Recording format of the file. 13 WAV_PCM16
<link>	Integer type. Record sound. (Not supported currently) 0 Record uplink sound 1 Reserved 2 Reserved
<state>	Integer type. Whether the module is recording. 0 Not recording 1 Recording
<code>	Integer type. Cause of recording failure. 1 Unknown error 3 Insufficient recording space
<err>	Integer type. Error code. 901 Audio unknown error 902 Audio invalid parameters 903 Audio operation not supported 904 Audio device busy 4 An unsupported operation

NOTE

1. The module supports recording files in WAV_PCM16 format with the suffix of .wav. The recorded file is of 16 kHz sampling rate, mono, 16-bit wide WAV audio file.
2. The module supports recording uplink sound and currently does not support recording downlink sound.

Example

```
AT+QAUDRD=?                          //Test command.
+QAUDRD: (0,1),"filename",(13),(0-2)

OK
AT+QAUDRD=1,"123.wav",13,0           //Record the uplink sound to 123.wav.
OK
AT+QAUDRD?                           //Query the current recording status.
+QAUDRD: 1
```

```
OK
AT+QAUDRD=0                    //Stop recording.
OK

+QAUDRIND: 0                   //Report this URC after the media file is completely recorded.
AT+QAUDRD?                     //Query the current recording status.
+QAUDRD: 1

OK
```

11.10. AT+QAUDPLAY Play Local Media File

This command plays local media file.

AT+QAUDPLAY Play Local Media File	
Test Command **AT+QAUDPLAY=?**	Response **+QAUDPLAY: "filename",(**list of supported **<repeat>**s**)** **OK**
Read Command **AT+QAUDPLAY?**	Response **+QAUDPLAY: <state>** **OK**
Write Command **AT+QAUDPLAY=<filename>,<repeat>**	Response **OK** After the media file is completely played: **+QAUDPLAY: 0** If there is any error: **ERROR** or **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<repeat>	Integer type. Number of times the media file is played. 0 Play only once 1 Play repeatedly
<filename>	String type. Name of the file to be played and it should include file name and file suffix. The default play path is the */data/UFS* directory.
<state>	Integer type. Whether the module is playing the media file. 0 Not playing 1 Playing
<err>	Integer type. Error code. 901 Audio unknown error 902 Audio invalid parameters 903 Audio operation not supported 904 Audio device busy 4 An unsupported operation

NOTE

1. The module supports playing files of 16 kHz sampling rate, mono, 16-bit wide WAV audio file.
2. If the audio file fails to be opened, the device fails to be started, the command is repeatedly executed, or an unknown error occurs, URC **+QAUDPIND: 0,1** is reported.

Example

```
AT+QAUDPLAY=?                    //Test command.
+QAUDPLAY: "filename",(0,1)

OK
AT+QAUDPLAY="123.wav",0          //Play the local file 123.wav once.
OK

+QAUDPLAY: 0                     //Report this URC after the media file is completely played.
```

11.11. AT+QAUDSTOP Stop Playing Media File

This command stops playing the media file.

AT+QAUDSTOP Stop Playing Media File Play	
Test Command **AT+QAUDSTOP=?**	Response **OK**
Execution Command **AT+QAUDSTOP**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-

NOTE

If **AT+QAUDSTOP** is repeatedly executed, URC **+QAUDPIND: 0,1** is reported.

Example

```
AT+QAUDSTOP=?                  //Test command.
OK
AT+QAUDPLAY="123.wav",0        //Play the local file 123.wav once.
OK
AT+QAUDSTOP                    //Stop playing the local media file.
OK

+QAUDPLAY:0
```

11.12. AT+QTTS Read Texts Aloud

This command reads texts aloud.

AT+QTTS Read Texts Aloud	
Test Command **AT+QTTS=?**	Response **+QTTS:** (range of supported **<mode>**s),**<text>**,(list of supported **<peripheral>** s) **OK**

Read Command **AT+QTTS?**	Response **+QTTS: <status>** **OK**
Write Command **AT+QTTS=<mode>[,<text>[,<peripheral>]]**	Response **OK** If there is any error: **+CME ERROR: <err>** When the texts have been read aloud: **+QTTS: 0**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<mode>	Integer type. Starts/stops reading texts aloud and also determine **<text>** format. 0 Stop reading texts aloud. **<text>** can be omitted. 1 Start reading Chinese texts aloud. **<text>** is encoded in UCS2. 2 Start reading English texts aloud. **<text>** is an ACSII string starting with [m20].
<text>	String type. The texts to be read aloud. Text format is determined by **<mode>**.
<peripheral>	Integer type. Indicates the peripheral used for reading texts aloud. Codec is used for reading texts aloud by default if **<peripheral>** is omitted. 0 Codec 1 UAC device 2 Voice (It is used during the voice call)
<status>	Integer type. Status of the TTS player. 0 Idle 1 Busy
<err>	Error code. For more details, see ***Chapter 13.3***.

NOTE

1. If you need to use the TTS feature, you must enable the TTS feature by executing **AT+QCFG="tts",1** first and then reboot the module.
2. "[m20]" must be added as the ASCII control character before the English texts.
3. When UAC device is use for reading texts aloud, the host should monitor the audio data in the sound card and read the audio data from the sound card in time before or at the same time as sending **AT+QTTS=1,"6b228fce4f7f752879fb8fdc6a215757",1** to read texts. Otherwise, TTS will be blocked and causes the failed execution of **AT+QTTS** subsequently.

Example

```
AT+QTTS=?                                          //Test Command.
+QTTS: (0-2),<text>,(0,1)

OK
AT+QTTS=1,"6b228fce4f7f752879fb8fdc6a215757"       //Use codec to read the text in UCS2 aloud.
OK

+QTTS: 0
AT+QTTS=1,"6b228fce4f7f752879fb8fdc6a215757",0     //Use codec to read the text in UCS2 aloud.
OK

+QTTS: 0
AT+QTTS=1,"6b228fce4f7f752879fb8fdc6a215757",1     //Use UAC device to read the text in UCS2
                                                     aloud.
OK

+QTTS: 0
AT+QTTS=2,"[m20]hello world"                       //Use codec to read the text in ASCII aloud.
OK

+QTTS: 0
```

11.13. AT+QTTSETUP Set Audio Speed or Adjust Volume

This command sets the audio speed or adjusts the volume.

AT+QTTSETUP Set Audio Speed or Adjust Volume	
Test Command **AT+QTTSETUP=?**	Response **+QTTSETUP: (**list of supported **<mode>**s**),(**list of supported **<ID>**s**),(**range of supported **<value>**s**)** **OK**
Read Command **AT+QTTSETUP?**	Response **OK**
Write Command **AT+QTTSETUP=<mode>,<ID>[,<value>]**	Response If the optional parameter is omitted, query the current setting: **+QTTSETUP: <mode>,<ID>,<value>** **OK**

	If the optional parameter is specified, set the audio speed or adjust the volume: **OK** If there is any error: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<mode>	Integer type. Set or query the parameter values. 1 Set 2 Query
<ID>	Integer type. 1 Speed 2 Volume
<value>	Integer type. Speed or volume value. If **<mode>**=2, omit **<value>** in the Write Command. Speed Range: -32768 to 32767. Normal speed: 0. Default: 0. Volume Range: -32768 to 32767. Default: 0. When the volume is set to the minimum, it is mute.
<err>	Error code. For more details, see ***Chapter 13.3***.

Example

```
AT+QTTSETUP=?                          //Test Command.
+QTTSETUP: (1,2),(1,2),(-32768-32767)

OK
AT+QTTSETUP=1,2,32767                  //Set the volume to maximum.
OK
AT+QTTSETUP=1,1,0                      //Set the audio speed to 0.
OK
AT+QTTSETUP=2,2                        //Query the current audio volume.
+QTTSETUP:2,2,32767

OK
AT+QTTSETUP=2,1                        //Query the current audio speed.
+QTTSETUP:2,1,0

OK
```

11.14. AT+QAUDCFG Query and Configure Audio Tuning Process

AT+QAUDCFG Query and Configure Audio Tuning Process	
Test Command **AT+QAUDCFG=?**	Response **+QAUDCFG: "slic-LF_Ring",(**list of supported **<state>**s**)** **+QAUDCFG: "slic_IndRep",(**list of supported **<op>**s**)** **OK**
Maximum Response Time	300 ms

Example

```
AT+QAUDCFG=?            //Test Command
+QAUDCFG: "slic-LF_Ring",(0,1)
+QAUDCFG: "slic_IndRep",(0,1)

OK
```

11.14.1. AT+QAUDCFG="slic/LF_Ring" Set Line Status Register of SLIC Chip

This command sets or queries the state of the line status register of SLIC chip.

AT+QAUDCFG="slic-LF_Ring" Set Line Status Register of SLIC Chip	
Write Command **AT+QAUDCFG="slic/LF_Ring"[,<state>]**	Response If the optional parameter is omitted, query the current setting: **+QAUDCFG: "slic/LF_Ring",<state>** **OK** If the optional parameter is specified, set the line status register of SLIC chip: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<state>	Integer type. The state of the line status register of SLIC chip. 0 FORWARD ACTIVE. It enables on-hook-off-hook detection feature. When on-hook, the audio streaming is disabled. When off-hook, the audio streaming is enabled. 1 RINGING. It indicates that the analog phone detects the TIP-RING telephone line, and when it is in RINGING state, the ring tone will be performed to remind the user that there is currently an incoming call.

NOTE

1. You must execute **AT+QSLIC=<enable>,<SLIC_type>[,<dcdc_type>]** to enable SLIC before using this command.
2. Currently this command only supports FORWARD ACTIVE and RINGING states. When the analog phone is on-hook and there is no incoming call, it is in FORWARD ACTIVE state; when the analog phone is on-hook and there is an incoming call, it is in RINGING state.
3. The command takes effect only when SLIC analog phone is working.

Example

```
AT+QAUDCFG="slic-LF_Ring",1          //Set the state of line status register of SLIC chip to RINGING.
OK
AT+QAUDCFG="slic-LF_Ring"            //Query current line status register state.
+QAUDCFG: "slic-LF_Ring",1

OK
```

11.14.2. AT+QAUDCFG="slic_IndRep" Enable/Disable the Reporting of SLIC Analog Phone Events

This command enables or disables the reporting of SLIC analog phone events. Currently, only the event of DTMF, on-hook, off-hook and flash are reported. These events are reported to the AT port in URC. You do not need to view application logs through the Debug port to check whether the operations on the phone meet expectations.

AT+QAUDCFG="slic_IndRep" Enable/Disable the Reporting of SLIC Analog Phone Events	
Write Command **AT+QAUDCFG="slic_IndRep"[,<op>]**	Response If the operational parameter is omitted, query the current settings: **+QAUDCFG: "slic_IndRep",<op>** **OK**

	If the operational parameter is specified, enable or disable the reporting of SLIC analog phone events: **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<op>	Integer type. Enable or disable the reporting of SLIC analog phone events. 0 Disable 1 Enable

NOTE

1. Currently the supported DTMF events include 0–9, * and #.
2. The command takes effect only when SLIC analog phone is working.

Example

```
AT+QAUDCFG="slic_IndRep",1          //Enable the reporting of SLIC analog phone events.
OK
AT+QAUDCFG?                         //Query the current setting.
+QAUDCFG: "slic_IndRep",1

OK

+QIND: "SLIC Hook off"              //Pick up the phone and receive the off-hook URC.

+QIND: "SLIC DTMF",1                //Press number key 1 and receive the DTMF 1 URC.

+QIND: "SLIC Flash Key"             //Press the flash key and receive the hook flash URC.

+QIND: "SLIC Hook on"               //Put down the phone and receive the on-hook URC.
```

12 Hardware Related Commands

12.1. AT+QPOWD Power off

This command powers off the module. 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	-

Parameter

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

Example

```
AT+QPOWD=1                  //Normal power-down.
OK

POWERED DOWN
```

12.2. AT+CCLK Clock

This command sets or queries the real time clock (RTC) of the MT.

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: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.007	

Parameter

<time>	String type. The format is "yy-MM-dd,hh:mm:ss±zz", indicating year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -48 to +56). For example, May 6th, 1994, 22:10:00 GMT+2 hours equals to “94-05-06,22:10:00+08”.
<err>	Error code. For more details, see ***Chapter 13.3***.

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**
Write Command **AT+QADC=<port>**	Response **+QADC: <status>,<value>** **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<port>	Integer type. Channel number of the ADC. 0 ADC Channel 0
<status>	Integer type. Indicate whether the ADC value is read successfully. 0 Failed 1 Success
<value>	Integer type. The voltage of ADC channel. Unit: mV.

Example

```
AT+QADC=0
+QADC: 1,1791          //The voltage of ADC channel 0 is 1791 mV.

OK
```

12.4. AT+QSLIC Enable/Disable SLIC

This command enables or disables SLIC.

AT+QSLIC Enable/Disable SLIC	
Test Command **AT+QSLIC=?**	Response **+QSLIC: (**list of supported **<enable>**s**),(**range of supported **<SLIC_type>**s**),(**range of supported **<DCDC_type>**s**)** **OK**
Read Command **AT+QSLIC?**	Response **+QSLIC: <enable>[,<SLIC_type>[,<DCDC_type>]]** **OK**
Write Command **AT+QSLIC=<enable>,<SLIC_type>[,<DCDC_type>]**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<enable>	Integer type. Enable or disable SLIC. 0 Disable 1 Enable
<SLIC_type>	Integer type. SLIC chip type. 0 None 1 Reserved 2 Si32185 3 Le9643 4 Le9641 5 dxs101 (used with **<DCDC_type>**) 6 dxs102 (used with **<DCDC_type>**)
<DCDC_type>	Integer type. DCDC type. It is supported only when **<SLIC_type>** is 5 or 6. When **<SLIC_type>** is set to 5 or 6, you must specify the corresponding DCDC type. Otherwise, the SLIC chip will be burned out with a high probability. 0 DCDC_TYPE_IBB12. 1 DCDC_TYPE_CIBB12 2 DCDC_TYPE_IB12

3	DCDC_TYPE_CBB48
4	DCDC_TYPE_BB48
5	DCDC_TYPE_NONE
6	DCDC_TYPE_IFB12
7	DCDC_TYPE_CIFB12

Example

```
AT+QSLIC=?                          //Test command.
+QSLIC: (0,1),(0-6),(0-7)

OK
AT+QSLIC=1,2                        //Enable Si32185.
OK
AT+QSLIC?                           //Query the current settings.
+QSLIC: 1,2

OK
AT+QSLIC=0,2                        //Disable Si32185.
OK
AT+QSLIC=1,5,0                      //Enable DXS101 with DCDC type as IBB12.
OK
AT+QSLIC?                           //Query the current settings.
+QSLIC: 1,5,0

OK
AT+QSLIC=0,5                        //Disable DXS101.
OK
```

12.5. AT+QDOWNLOAD Enter Downloading Mode

This command configures the module to enter downloading mode.

AT+QDOWNLOAD Enter Downloading Mode	
Test Command **AT+QDOWNLOAD=?**	Response **+QDOWNLOAD: (**list of supported **<n>**s**)** **OK**
Read Command **AT+QDOWNLOAD?**	Response **+QDOWNLOAD: <n>** **OK**

Execution Command **AT+QDOWNLOAD=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	-

Parameter

<n>	Integer type. 0 Non-downloading mode 1 Downloading mode

Example

```
AT+QDOWNLOAD=1          //Configure the module to enter downloading mode.
OK
```

12.6. AT+QPRTPARA Restore User Configuration Information

This command restores user configuration information.

AT+QPRTPARA Restore User Configuration Information	
Execution Command **AT+QPRTPARA=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted.

Parameter

<n>	Integer type. 3 Restore user configuration information 4 Get the number of restore operations for supported partition

Example

```
AT+QPRTPARA=3           //Restore user configuration information.
OK
```

12.7. AT+IPR Set Baud Rate of Serial Port

This command sets baud rate of serial port.

AT+IPR Set Baud Rate of Serial Port	
Test Command **AT+IPR=?**	Response **+IPR: (**list of supported **<n>**s**)** **OK**
Read Command **AT+IPR?**	Response **+IPR:<n>** **OK**
Write Command **AT+IPR=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved (Execute **AT&W** after this command is issued).

Parameter

<n>	Integer type. The baud rate of serial port. Unit: bps.	
	0	Enable baud rate self-adaption
	4800	Set baud rate of serial port as 4800
	9600	Set baud rate of serial port as 9600
	19200	Set baud rate of serial port as 19200
	38400	Set baud rate of serial port as 38400
	57600	Set baud rate of serial port as 57600
	115200	Set baud rate of serial port as 115200
	230400	Set baud rate of serial port as 230400
	460800	Set baud rate of serial port as 460800
	921600	Set baud rate of serial port as 921600

Example

```
AT+IPR=0                    //Enable baud rate self-adaption.
OK
AT+IPR=115200               //Set baud rate of serial port a115200。
OK
```

12.8. AT+QFUPL Upload a File to the Storage Medium

This command uploads a file to the storage medium. If there is any file in the storage medium which has the same name with the file to be uploaded, **ERROR** will be reported.

AT+QFUPL Upload a File to the Storage Medium	
Test Command **AT+QFUPL=?**	Response **+QFUPL: "<path>:<filename>",<file_size>,(**range of supported **<timeout>**s**),(**list of supported **<ackmode>**s**)** **OK**
Write Command **AT+QFUPL="[<path>:]<filename>",<file_size>,<timeout>,<ackmode>**	Response **CONNECT** TA switches to the data mode (transparent access mode), and data of the file should be inputted. When the total size of the inputted data reaches **<file_size>**, or there is no data inputted before **<timeout>** reaches, TA returns to the command mode and reply with the following codes: **+QFUPL: <upload_size>** **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<path>	String type. The directory where the file is uploaded. This parameter is optional. Currently, files can be uploaded to the *update* directory (the path is *mnt/data/update*) or *UFS* directory (the path is *data/UFS*). If this parameter is omitted, the common file is uploaded to the *data/UFS* path and *update.zip* file is uploaded to the *mnt/data/update* path by default.
<filename>	String type. Name of the file to be uploaded.
<file_size>	Integer type. Size of the file to be uploaded. Unit: byte.
<timeout>	Integer type. The waiting time for data to be inputted. Range: 1–65535. Default: 5. Unit: second.
<ackmode>	Integer type. Enable/Disable ACK mode. 0 Disable ACK mode.

	1 Enable ACK mode.
<upload_size>	Integer type. The actual size of the uploaded data. Unit: byte.

NOTE

1. Only after **CONNECT** returns can you input the data of the file.
2. The ACK mode is provided to avoid loss of data during the uploading of large files in case hardware flow control does not work. The ACK mode works as follows:
   1) Execute **AT+QFUPL="[<path>:]<filename>",<file_size>,<timeout>,1** to enable ACK mode.
   2) The module outputs **CONNECT**.
   3) MCU sends 1 KB data, and then module will respond with an **A**.
   4) MCU receives this **A** and then sends the next 1 KB data.
   5) Repeat step 3) and 4) until the data transfer is completed.

Example

```
AT+QFUPL="update.zip",26844205,5,0                  //Upload the upgrade package file update.zip with 26844205 bytes to the mnt/data/update path of module in non-ACK mode.

the
CONNECT
<Input file bin data>
+QFUPL: 26844205

OK
AT+QFUPL="update:update.zip",26844205,5,0           //Upload the upgrade package file update.zip with 26844205 bytes to the mnt/data/update path of module in non-ACK mode.

the
CONNECT
<Input file bin data>
+QFUPL: 26844205

OK

AT+QFUPL="quectel.xml",516213,10,0                  //Upload the file quectel.xml with 516213 bytes to the data/UFS path of the module in non-ACK mode.


CONNECT
<Input file bin data>
+QFUPL: 516213

OK
AT+QFUPL="UFS:quectel.xml",516213,10,0              //Upload the file quectel.xml with 516213 bytes to the data/UFS path of the module in non-ACK mode.
```

```
CONNECT
<Input file bin data>
+QFUPL: 516213

OK

AT+QFUPL="update.zip",26844205,5,1          //Upload the upgrade package file update.zip with 26844205 bytes to the mnt/data/update path of the module in ACK mode.

CONNECT
<Input file bin data of 1024bytes>

A
<input file bin data of 1024bytes>

A
<input file bin data of 1024bytes>

A
...
+QFUPL: 26844205

OK
```

12.9. AT+QFDEL Delete a File in the Storage Medium

This command deletes a file in the storage medium.

AT+QFDEL Delete a File in the Storage Medium	
Test Command **AT+QFDEL=?**	Response **+QFDEL: "<path>:<filename>"** **OK**
Write Command **AT+QFDEL="[<path>:]<filename>"**	Response **OK** If there is any error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<path>	String type. The directory where the file is deleted. This parameter is optional. Currently, files can be deleted from the *update* directory (the path is *mnt/data/update*) and *UFS* directory (the path is *data/UFS*). If this parameter is omitted, the common file with the same name in the *data/UFS* path and the *update.zip* file with the same name in the *mnt/data/update* path are deleted by default. If the file to be deleted is not found in the corresponding path, an error will be reported.
<filename>	String type. The name of the file to be deleted.

NOTE

To delete all files in the corresponding path, you can set **<filename>** as *, that is, **AT+QFDEL="<path>:*"**. Also **<path>** can be omitted, that is, **AT+QFDEL="*"**, and all files in the *data/UFS* path are deleted by default.

Example

```
AT+QFDEL="update:update.zip"          //Delete the upgrade package file mnt/data/update/update.zip.
OK
AT+QFDEL="update.zip"                 //Delete the upgrade package file mnt/data/update/update.zip.
OK
AT+QFDEL="UFS:update.zip"             //Delete the upgrade package file data/UFS/update.zip.
OK
AT+QFDEL="UFS:*"                      //Delete all files in data/UFS path.
OK
AT+QFDEL="*"                          //Delete all files in data/UFS path.
OK
AT+QFDEL="quectel.xml"                //Delete data/UFS/quectel.xml.
OK
```

13 Appendix

13.1. Related Document

Table 3: Related Document

Document Name
[1] Quectel_RG200U_Series_5G_Specification
[2] Quectel_RG500U_Series_5G_Specification
[3] Quectel_RM500U_Series_5G_Specification

13.2. Terms and Abbreviations

Table 4: Terms and Abbreviations

Abbreviation	Description
3GPP	3rd Generation Partnership Project
5GC	5G Core Network
5QI	5G QoS Identifier
ACK	Acknowledgement
AMR	Adaptive Multi-Rate
APN	Access Point Name
AGNSS	Assisted Global Navigation Satellite System
A-GPS	Assisted Global Positioning Systems

ADC	Analog To Digital Converter
AMBR	Aggregated Maximum Bit Rate
AMF	Access and Mobility Management Function
APN	Access Point Name
ARFCN	Absolute Radio-Frequency Channel Number
ASCII	American Standard Code for Information Interchange
BER	Bit Error Rate
BS	Base Station
BCD	Binary-Coded Decimal
CBM	Cell Broadcast Message
CCBS	Completion of Calls to Busy Subscriber
CFU	Call Forwarding Unconditional
CHAP	Challenge-Handshake Authentication Protocol
CLI	Calling Line Identity
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CPU	Central Processing Unit
CSD	Circuit Switch Data
CS	Circuit Switched
DCD	Dynamic Content Delivery
DCE	Data Communication Equipment
DFOTA	Delta Firmware Upgrade Over-The-Air
DHCP	Dynamic Host Configuration Protocol
DL	Downlink
DNS	Domain Name Server

DPCH	Dedicated Physical Channel
DTE	Data Terminal Equipment
DTMF	Dual-Tone Multifrequency
DTR	Data Terminal Ready
DRB	Data Radio Bearer
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
ECC	Emergency Communications Center
ECM	Ethernet Networking Control Model
ECT	Explicit Call Transfer
EPS	Evolved Packet System
EN-DC	E-UTRA NR Dual Connectivity
E-RAB	E-UTRAN Radio Access Bearer
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
eMBB	Enhanced mobile broadband
eMLPP	Enhanced Multi-Level Precedence and Pre-emption Service
FDD	Frequency Division Duplex
F-DPCH	Fractional Dedicated Physical Channel
FTP	File Transfer Protocol
GBR	Guaranteed Bit Rate
GERAN	GSM EDGE Radio Access Network
GFBR	Guaranteed Flow Bit Rate
GGSN	Gateway GPRS Support Node
GID	Group Identifier
GMM	GPRS Mobility Management
GMT	Greenwich Mean Time

GPIO	General-Purpose Input-Output
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile communications
HCS	Hierarchical Cell Structure
HPLMN	Home Public Land Mobile Network
HSDPA	High Speed Downlink Packet Access
HSPA+	High Speed Packet Access
HSUPA	High Speed Uplink Packet Access
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICCID	Integrated Circuit Card Identifier
ID	Identifier
IDSN	Integrated Services Digital Network
IIC	Inter-Integrated Circuit
IMEI	International Mobile Equipment Identity
IMS	IP Multimedia Subsystem
IMSI	Internation Mobile Subscriber Identity
IP	Internet Protocol
IPv4	Internet Protocol Version 4
IPv6	Internet Protocol Version 6
IRA	International Reference Alphabet
LTE	Long-Term Evolution
MBIM	Mobile Broadband Interface Model
MCU	Microprogrammed Control Unit

ME	Mobile Equipment
MFBR	Maximum Flow Bit Rate
mmWave	Millimeter Wave
mMTC	Massive connections
MS	Mobile Station
MSC	Mobile Switching Center
MSISDN	Mobile Subscriber International Integrated Service Digital Network number
MT	Mobile Terminal
MO	Mobile Originating - Originated
NAS	Non-Access Stratum
NCM	Network Control Model
NITZ	Network Identity and Time Zone
NMEA	(National Marine Electronics Association) 0183 Interface Standard
NRPPa	NR Positioning Protocol Annex
NR	New Radio
NSSAI	Network Slice Selection Assistance Information
NSA	Non Standalone
NVRAM	Non-Volatile Random Access Memory
PAP	Password Authentication Protocol
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

PDU	Protocol Data Unit
PDCP	Packet Data Convergence Protocol
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PPP	Point-to-Point Protocol
PS	Packet Switch
PSC	Primary Synchronization Code
PUK	PIN Unlocking Key
QoS	Quality of Service
RAN	Radio Access Network
RAT	Radio Access Technology
RLP	Radio Link Protocol
RNDIS	Remote Network Driver Interface Specification
RP	Relay Protocol
RTC	Real-Time Clock
RTS-CTS	Request To Send-Clear To Send
RRC	Radio Resource Control
RF	Radio Frequency
TPDU	Transfer Protocol Data Unit
SA	Standalone
SAR	Specific Absorption Rate
SD	Slice Differentiator
SGSN	Serving GPRS Support Node
SINR	Signal to Interference plus Noise Ratio
SLIC	Subscriber Line Interface Circuit

SMS	Short Messaging Service
SMSC	Short Message Service Center
SNDCP	SubNetwork Dependent Convergence Protocol
S-NSSAI	Single Network Slice Selection Assistance Information
SSC	Session and Service Continuity
SST	Slice-Service Type
TA	Terminal Adapter
TCP	Transmission Control Protocol
TDD	Time Division Duplex
TE	Terminal Equipment
UART	Universal Asynchronous Receiver-Transmitter
UCS2	Universal Character Set (UCS-2) Format
UDP	User Datagram Protocol
UDUB	User Determined User Busy
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunications System
UICC	Universal Integrated Circuit Card
URC	Unsolicited Result Code
URL	Uniform Resource Locator
URLLC	Low Latency and High Reliability
USB	Universal Serial Bus
(U)SIM	(Universal) Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	Universal Terrestrial Radio Access Network

WCDMA	Wideband Code Division Multiple Access

13.3. 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 5: 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	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong

16	Incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	Memory full
21	Invalid index
22	Not found
23	Memory failure
24	Text string too long
25	Invalid characters in text string
26	Dial string too long
27	Invalid characters in dial string
30	No network service
31	Network timeout
32	Network not allowed - emergency calls only
40	Network personalization PIN required
41	Network personalization PUK required
42	Network subset personalization PIN required
43	Network subset personalization PUK required
44	Service provider personalization PIN required
45	Service provider personalization PUK required
46	Corporate personalization PIN required
47	Corporate personalization PUK required

13.4. 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 6: 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	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

13.5. AT Command Settings Storable with AT&F

Table 7: AT Command Settings Storable with AT&F

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATS0	<n>	0
ATS3	<n>	13
ATS4	<n>	10
ATS5	<n>	8
ATS7	<n>	0
ATV	<value>	1

AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+CMEE	<n>	1
AT+CSCS	<chset>	"GSM"
AT+CSTA	<type>	129
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+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

13.6. AT Command Settings Storable with AT&W

Table 8: AT Command Settings Storable with AT&W

AT Command	Parameters
ATE	<value>
AT+CREG	<n>
AT+CGREG	<n>
AT+CEREG	<n>
AT+IPR	<n>

13.7. AT Command Settings Storable with ATZ

Table 9: AT Command Settings Storable with ATZ

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATS0	<n>	0
ATS7	<n>	0
ATV	<value>	1
AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+CEREG	<n>	0

13.8. Summary of URC

Table 10: 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	+CTZEU: <tz>,<dst>,<utime>	Extended time zone reporting	AT+CTZR=3
8	+CMTI: <mem>,<index>	New message is received, and saved to memory	See AT+CNMI
9	+CMT: [<alpha>],<length><CR><LF><pdu>	New short message is received and output directly to TE (PDU mode)	See AT+CNMI
10	+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
11	+CBM: <length><CR><LF><pdu>	New CBM is received and output directly (PDU mode)	See AT+CNMI
12	+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>	New CBM is received and output directly to TE (Text mode)	See AT+CNMI
13	+CDS: <length><CR><LF><pdu>	New CDS is received and output directly (PDU mode)	See AT+CNMI
14	+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>	New CDS is received and output directly to TE (Text mode)	See AT+CNMI
15	+CDSI: <mem>,<index>	New message status report is received, and saved to memory	See AT+CNMI
16	+COLP: <number>,<type>,[<subaddr>],[<satype>],[<alpha>]	The presentation of the COL (connected line) at the TE for a mobile originated call	AT+COLP=1

17	+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI_validity>	Mobile terminating call indication	AT+CLIP=1
18	+CRING: <type>	An incoming call is indicated to the TE with unsolicited result code instead of the normal RING	AT+CRC=1
19	+CCWA: <number>,<type>,<class>[,<alpha>][,<CLI_validity>[,<subaddr>,<satype>[,<priority>]]]	Call waiting indication	AT+CCWA=1,1
20	+CSSI: <code1>	Shows the +CSSI intermediate result code presentation status to the TE	AT+CSSN=1
21	+CSSU: <code2>	Shows the +CSSU unsolicited result code presentation status to the TE	AT+CSSN=<n>,1
22	+CFUN: <fun>	MT initialization is successful	N/A
23	+CPIN: <code>	(U)SIM card pin state	N/A
24	RING	There is an incoming call.	AT+QINDCFG="ring",1
25	+QIND: "csq",<rssi>,<ber>	The signal strength and channel bit error rate are changed.	AT+QINDCFG="csq",1
26	+QIND: "smsfull",<storage>	SMS storage is full.	AT+QINDCFG="smsfull",1
27	+QIND: "act",<actvalue>	Network access technology is changed.	AT+QINDCFG="act",1
28	+QREJINFO: <PLMN_ID>,<service_domain>,<reject_cause>,<RAT_type>,<reject_type>,<original_reject_cause>,<LAC>,<RAC>,<cellid>[,<esm_reject_cause>]	Rejection cause value delivered by the network or (U)SIM authentication failure cause value	AT+QINDCFG="rejinfo",1
29	+QIND: SMS DONE	SMS initialization finished	N/A
30	+QIND: PB DONE	Phonebook initialization finished	N/A
31	+CGEV: REJECT <PDP_type>,<PDP_addr>	A network request for PDP activation, and was automatically rejected.	AT+CGEREP=2,1
32	+CGEV: NW REACT <PDP_type>,<PDP_addr>,[<cid>]	The network request PDP reactivation	AT+CGEREP=2,1
33	+CGEV: NW DEACT <PDP_type>,<PDP_addr>,[<cid>]	The network has forced a context deactivation	AT+CGEREP=2,1
34	+CGEV: ME DEACT <PDP_type>,<PDP_addr>,[<cid>]	The ME has forced a context deactivation.	AT+CGEREP=2,1
35	+CGEV: NW DETACH	The network has forced a Packet	AT+CGEREP=2,1

		Domain detach.	
36	+CGEV: ME DETACH	The ME has forced a Packet Domain detach.	AT+CGEREP=2,1
37	+CGEV: NW CLASS <class>	The network has forced a change of MS class.	AT+CGEREP=2,1
38	+CGEV: ME CLASS <class>	The ME has forced a change of MS class.	AT+CGEREP=2,1
39	POWERED DOWN	Module power down	AT+QPOWD
40	+CUSD: <status>[,<rspstr>,[<dcs>]	USSD response to network or mobile initiated action	N/A
41	+QSIMSTAT: <enable>,<inserted_status>	Unplug or Insert (U)SIM card	AT+QSIMSTAT=1
42	+C5GREG: <stat>	Indicate the change of the network registration status in 5GS	AT+C5GREG=1
43	+C5GREG: <stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]]	Indicate the change of the network cell in 5GS	AT+C5GREG=2
44	^DSCI: <id>,<dir>,<stat>,<type>,<mpty>,<number>,<num_type>	Call status indication.	AT^DSCI=1
45	+CGREG: <stat>[,<lac>,<ci>[,<AcT>],[<rac>]]	Indicate the change of the network cell in GERAN-UTRAN	AT+CGREG=2
46	+CEREG: <stat>	Indicate the change of the EPS network registration status of MT in E-UTRAN	AT+CEREG=1
47	+CEREG: <stat>[,<tac>,<ci>[,<AcT>]]	Indicate the change of the network cell in E-UTRAN	AT+CEREG=2
48	+QNETDEVSTATUS: <cid>,<state>,<IP_version>,<code>	The connection status of USBnet-Ethernet call	N/A
49	+QUIMSLOT: <slot>	SIM card status	N/A
50	+QAUDPLAY: <stat>	Audio playing status	AT+QAUDPLAY=<filename>,<repeat>

13.9. 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 and **AT+CSCS** determine the way of SMS text input or output.

Table 11: 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 12: 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 13: 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 14: 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 15: 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 16: 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 17: 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 18: 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. See ***Table 10*** for more details.

13.10. Release Cause Text List of AT+CEER

Table 19: 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