EC2x&EC9x&EG2x-G&EM05 Series
AT Commands Manual

LTE Standard Module Series

Version: 2.0

Date: 2021-02-24

Status: Released

Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company 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 office. 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 to support@quectel.com.

General Notes

Quectel offers the information as a service to its customers. The information provided is based upon customers' requirements. Quectel makes every effort to ensure the quality of the information it makes available. Quectel does not make any warranty as to the information contained herein, and does not accept any liability for any injury, loss or damage of any kind incurred by use of or reliance upon the information. All information supplied herein is subject to change without prior notice.

Disclaimer

While Quectel has made efforts to ensure that the functions and features under development are free from errors, it is possible that these functions and features could contain errors, inaccuracies and omissions. Unless otherwise provided by valid agreement, Quectel makes no warranties of any kind, implied or express, with respect to the use of features and functions under development. To the maximum extent permitted by law, Quectel excludes all liability for any loss or damage suffered in connection with the use of the functions and features under development, regardless of whether such loss or damage may have been foreseeable.

Duty of Confidentiality

The Receiving Party shall keep confidential all documentation and information provided by Quectel, except when the specific permission has been granted by Quectel. The Receiving Party shall not access or use Quectel's documentation and information for any purpose except as expressly provided herein. Furthermore, the Receiving Party shall not disclose any of the Quectel's documentation and information to any third party without the prior written consent by Quectel. For any noncompliance to the above

requirements, unauthorized use, or other illegal or malicious use of the documentation and information, Quectel will reserve the right to take legal action.

Copyright

About the Document

Revision History

Version	Date	Author	Description
1.0	2016-05-30	James CAI/ Bonnie ZHAO	Initial
1.1	2017-01-18	Ivan ZHANG/ Sophie ZHU	1. Added the following AT commands: +QRIR/+QINDCFG/+QINISTAT/+QLTS/+QSPN/ +QHUP/+QEEC/+QSIDET/+QMIC/+QRXGAIN/ +QIIC/+QADC 2. Added AT+QCFG commands shown as below: "urc/ri/ring"/"urc/ri/smsincoming"/"urc/ri/other"/"risig naltype"/"urc/delay"/"urc/cache" 3. Updated the description for <Act> parameter in AT+COPS command: added the value 100 which indicates CDMA network
1.2	2017-11-14	Jessica GENG	1. Added commands AT+QTONEDET, AT+QLDTMF, AT+QLTONE and AT+QCFG="tone/incoming" 2. Updated the description of parameter $<ci>$ in commands AT+CREG, AT+CGREG and AT+CEREG 3. Deleted command AT+QCFG="tdscsq" and the description of +QURCCFG? in command AT+QURCCFG 4. Updated the description of commands AT+QUCCFG, AT+CTZU, AT+QDAI, AT+QEEC, AT+QIIC and AT+QCFG="band" 5. Updated the examples of commands AT+QIIC and AT+COPS 6. Deleted some related information about CDMA 7. Updated the supported baud rates of command AT+IPR
1.3	2018-09-20	Alessa TANG/ Jessica GENG/	1. Added Chapters 14~20. 2. Added "ccinfo" as a supported value of <urctype>

| Demi HAN | | in AT+QINDCFG. |

(continued)

3. Updated the range of <index> in AT+QEEC.
8. Updated the default value description of <st_gain> in AT+QSIDET.

| 1.4 | 2021-02-24 | Wythe WANG | |

1. Added applicable EG91 series, EG95 series, EG21-G, EG25-G and EM05 series modules.
2. Deleted AT+QCFG and it will be provided in another specific document.
3. Updated AT+GSN (Chapter 2.8).
4. Updated AT+CGSN (Chapter 2.9).
5. Updated Table 2 of AT&V (Chapter 2.11).
6. Added the values of parameter <urc_port_value> in AT+QURCCFG (Chapter 2.25).
7. Added general commands: AT+QAPRDYIND (Chapter 2.26) and AT+QDIAGPORT (Chapter 2.27).
8. Added the values of parameter <rate> of AT+IPR (Chapter 3.5).
9. Updated the description of value "ccinfo" of parameter <urctype> of AT+QINDCFG (Chapter 4.3).
10. Added status control related command: AT+QMBNCFG (Chapter 4.4).
11. Updated the description of parameter <status> of AT+QINISTAT (Chapter 5.9).
12. Added (U)SIM related commands: AT+QSIMVOL, AT+CCHO, AT+CGLA and AT+CCHC (Chapter 5.13–5.16).
13. Modified the default value of parameter <format> of AT+CPOL to 2 (Chapter 6.4).
14. Updated the description of parameter <band> and the example of AT+QNWINFO (Chapter 6.9).
15. Added network services related commands: AT+QNETINFO, AT+QNWLOCK="common/lte", AT+QOPSCFG, AT+QOPS, AT+QFPLMNCFG and AT+QENG (Chapter 6.11–6.17).
16. Modified the range of parameter <n> of ATS10 (Chapter 7.12).
17. Added call related commands: ATS12 (Chapter 7.13) and AT+QCHLDIPMPTY (Chapter 7.22).
18. Added the memory storage type "SR" of AT+CPMS (Chapter 9.4).
19. Added parameters <IPv4_addr_alloc> and <request_type> of AT+CGDCONT (Chapter 10.2).

20. Updated the range of parameter <Maximum bitrate UL>, <Guaranteed bitrate UL> of AT+CGEQREQ (Chapter 10.5) and AT+CGEQMIN (Chapter 10.6).

21. Added packet domain related commands: AT$QCRMCALL, AT+QNETDEVSTATUS and AT+CGCONTRDP (Chapter 10.17–10.19).

22. Added value 128 of parameter <type> of AT+COLP (Chapter 11.6).

23. Added the values of parameter <mode> of AT+QAUDMOD (Chapter 12.6).

24. Updated the description and range of parameter <io>, <format> and the notes of AT+QDAI (Chapter 12.7).

25. Added the description of parameter <y> of AT+QLDTMF (Chapter 12.14).

26. Added audio related commands: AT+QWDTMF (Chapter 12.15), AT+QAUDRD, AT+QPSND, AT+QTTS, AT+QTTSETUP, AT+QWTTS, AT+QAUDCFG, AT+QAUDPLAY, AT+QAUDPLAYGAIN, AT+QAUDRDGAIN, AT+QACDBLOAD, AT+QACDBREAD and AT+QACDBDEL (Chapter 12.17–12.28).

27. Added SSL related AT commands (Chapter 14.8).

28. Updated CMS ERROR codes (Chapter 15.6).

29. Added (U)SIM URCs (Chapter 15.7).

30. Updated release cause text list of AT+CEER (Chapter 15.8).

Contents

Table Index

1 Introduction

This document gives details of the AT Command Set supported by Quectel LTE Standard EC2x series, EG9x series, EG2x-G and EM05 series modules.

1.1. Applicable Modules

Table 1: Applicable Modules

Module Series	Module
EC2x series	EC25 series
	EC21 series
	EC20 R2.1
EG9x series	EG95 series
	EG91 series
EG2x-G	EG25-G
	EG21-G
EM05 series	EM05 series

1.2. Special Mark

Table 2: Special Mark

Mark	Definition
*	When an asterisk (*) is used after a function, feature, interface, pin name, AT command, or argument, it indicates that the function, feature, interface, pin name, AT command, or argument is under development and currently not supported, unless otherwise specified.

1.3. Definitions

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

1.4. AT Command Syntax

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

AT commands implemented by EC2x series, EG9x series, EG2x-G and EM05 series modules can be separated into two categories syntactically: "basic command", and "extended command", 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.

● **Extended Command**

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

Table 3: Type of AT Commands and Responses

Command Type	Syntax	Description
Test Command	**AT+<cmd>=?**	Test the existence of corresponding Write Command and to give information about the type, value, or range of its parameter.
Read Command	**AT+<cmd>?**	Check the current parameter value of a corresponding Write 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.

1.5. Supported Character Sets

The AT command interface of LTE standard modules defaults to the **GSM** character set. LTE standard modules support the following character sets:

- GSM format
- UCS2
- IRA

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

1.6. 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.

1.7. Unsolicited Result Code

Unsolicited Result Code (URC) is not issued as a part of the response related to an executed AT command, but as a report message issued by the 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.

1.8. 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 1s to disconnect the power supply after the URC **POWERED DOWN** is outputted. If **POWERED DOWN** cannot be received within 65s, the power supply shall be disconnected compulsorily.

2 General Commands

2.1. ATI Display MT Identification Information

This Execution Command delivers the MT information text.

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

Parameter

<objectID>	String type. Identifier of device type.
<revision>	String type. Identification text of product software version.

Example

```
ATI
Quectel
EC25
Revision: EC25EFAR02A09M4G

OK
```

2.2. AT+GMI   Request Manufacturer Identification

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

AT+GMM Request TA 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 TA Firmware Revision Identification

This command delivers the product firmware version identification text. It is identical with **AT+CGMR**.

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

Parameter

<revision>	String type. Identification text of product software version.

Example

```
AT+GMR
EC25EFAR02A09M4G

OK
```

2.5. AT+CGMI   Request Manufacturer Identification

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

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

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

2.6. AT+CGMM   Request MT Model Identification

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

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

Parameter

<objectID>   String type. Identifier of device type.

2.7. AT+CGMR   Request MT Firmware Revision Identification

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

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. Identification text of MT firmware version.

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

This command requests the International Mobile Equipment Identity (IMEI) number which permits the user to identify individual ME device and the Serial Number (SN) of the ME. It is identical with the **AT+CGSN** command in *Chapter 2.9*.

AT+GSN Request International Mobile Equipment Identity (IMEI) and SN	
Test Command **AT+GSN=?**	Response **+GSN: (**list of supported **<snt>**s**)** **OK**
Write Command **AT+GSN=<snt>**	Response If **<snt>**=0, query SN of the ME: **+GSN: <SN>** **OK** If **<snt>**=1, query IMEI of the ME: **+GSN: <IMEI>** **OK**
Execution Command **AT+GSN**	Response **<IMEI>** **OK** Or **ERROR**

	If there is any error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<snt>	Integer type. Control to query SN or IMEI of the ME.
	0 Query SN of the ME
	1 Query IMEI of the ME
<SN>	String type. SN of the ME.
<IMEI>	String type. IMEI of the ME.
<err>	Error codes. For more details, please refer to **Chapter 15.5**.

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

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

AT+CGSN Request International Mobile Equipment Identity (IMEI)	
Test Command **AT+CGSN=?**	Response **+CGSN: (**list of supported **<snt>**s**)** **OK**
Write Command **AT+CGSN=<snt>**	Response If **<snt>**=0, query SN of the ME: **+CGSN: <SN>** **OK** If **<snt>**=1, query IMEI of the ME: **+CGSN: <IMEI>** **OK**
Execution Command **AT+CGSN**	Response **<IMEI>**

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

Parameter

<snt>	Integer type. Control to query SN or IMEI of the ME.
	    0 Query SN of the ME
	    1 Query IMEI of the ME

<SN>	String type. SN of the ME.
<IMEI>	String type. IMEI of the ME.
<err>	Error codes. For more details, please refer to **Chapter 15.5**.

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

This command resets AT command settings to the default values specified by the manufacturer. (See **Table 17**).

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

Parameter

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

2.11. AT&V   Display Current Configuration

This command displays the current settings of several AT command parameters (See **Table 2**), even including the single-letter AT command parameters which are not readable.

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

Table 4: AT&V Response

AT&V
&C: 1 &D: 2 &F: 0 &W: 0 E: 1 Q: 0 V: 1 X: 4 Z: 0 S0: 0 S3: 13 S4: 10 S5: 8 S6: 2 S7: 0 S8: 2 S10: 15 S12: 50 OK

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

This command stores the current AT command settings to a user-defined profile in non-volatile memory. (See *Table 18*).

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

Parameter

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

2.13. ATZ   Set all Current Parameters to User-defined Profile

This command first resets the AT command settings to their manufacturer defaults. Afterwards, the AT command settings are restored from the user-defined profile in the non-volatile memory, if they have been stored with **AT&W** before (See *Table 20*).

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

ATZ Set all Current Parameters to User-defined Profile	
Execution Command **ATZ[<value>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	/
Reference V.25ter	

Parameter

<value>	Integer type.

<u>0</u>   Reset to profile number 0.

2.14. ATQ   Set Result Code Presentation Mode

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

ATQ Set Result Code Presentation Mode	
Execution Command **ATQ\<n>**	Response If **\<n>**=0: **OK** If **\<n>**=1: (none)
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference V.25ter	

Parameter

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

2.15. ATV   MT Response Format

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

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

ATV MT Response Format	
Execution Command **ATV\<value>**	Response When **\<value>**=0: **0**

	When **<value>**=1: **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference V.25ter	

Parameter

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

Example

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

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

Table 5: The Numeric Equivalents and Brief Description of ATV0&ATV1 Result Codes

ATV1	ATV0	Description
OK	0	Acknowledges execution of a command
CONNECT	1	A connection has been established; the DCE is moving from command 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, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line
NO DIALTONE	6	No dial tone detected
BUSY	7	Engaged (busy) signal detected
NO ANSWER	8	"@" (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer (S7)

2.16. ATE   Set Command Echo Mode

This command controls whether TA echoes characters received from TE or not during AT command mode.

ATE Set Command Echo Mode	
Execution Command **ATE<value>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference V.25ter	

Parameter

<value>	Integer type.
	0 Echo mode OFF
	<u>1</u> Echo mode ON

2.17. A/   Repeat Previous Command Line

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

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

Example

ATI
Quectel
EC25
Revision: EC25EFAR02A09M4G

OK
A/   //Repeat the previous command.
Quectel
EC25
Revision: EC25EFAR02A09M4G

OK

2.18. ATS3   Set Command Line Termination Character

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

ATS3 Set Command Line Termination Character	
Read Command **ATS3?**	Response **<n>** **OK**
Write Command **ATS3=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.

Reference	
V.25ter	

Parameter

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

2.19. ATS4   Set Response Formatting Character

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

ATS4 Set Response Formatting Character	
Read Command **ATS4?**	Response **<n>** **OK**
Write Command **ATS4=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference V.25ter	

Parameter

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

2.20. ATS5 Set Command Line Editing Character

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

ATS5 Set Command Line Editing Character	
Read Command **ATS5?**	Response **<n>** **OK**
Write Command **ATS5=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference V.25ter	

Parameter

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

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

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

ATX Set CONNECT Result Code Format and Monitor Call Progress	
Execution Command **ATX<value>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations can be saved with **AT&W**.
Reference V.25ter	

Parameter

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

2.22. AT+CFUN   Set UE Functionality

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

AT+CFUN Set UE Functionality	
Test Command **AT+CFUN=?**	Response **+CFUN: (**list of supported **\<fun\>**s**),(**list of supported **\<rst\>**s**)** **OK**
Read Command **AT+CFUN?**	Response **+CFUN: \<fun\>** **OK**
Write Command **AT+CFUN=\<fun\>[,\<rst\>]**	Response **OK** If there is any error related to ME functionality: **+CME ERROR: \<err\>**
Maximum Response Time	15 s, determined by network.
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference 3GPP TS 27.007	

Parameter

<fun>	Integer type.	
	0	Minimum functionality
	<u>1</u>	Full functionality
	4	Disable the ME from both transmitting and receiving RF signals
<rst>	Integer type.	
	<u>0</u>	Do not reset the ME before setting it to **<fun>** functionality level.
	1	Reset the ME. The device is fully functional after the reset. This value is available only for **<fun>**=1
<err>	Error codes. For more details, please refer to *Chapter 15.4*.	

Example

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

OK
AT+CPIN?
+CME ERROR: 13                      ///(U)SIM failure.

AT+CFUN=1                           //Switch UE to full functionality.
OK

+CPIN: SIM PIN
AT+CPIN=1234
OK

+CPIN: READY

+QUSIM: 1

+QIND: PB DONE

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

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

OK

2.23. AT+CMEE   Error Message Format

This command controls the format of error result codes: **ERROR**, error numbers or verbose messages as **+CME ERROR: <err>** and **+CMS ERROR: <err>**. This command disables or enables the use of final result code **+CME ERROR: <err>** as the indication of an 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	The command takes effect immediately. The configuration will not be saved.
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type.
	0 Disable result code
	<u>1</u> Enable result code and use numeric values
	2 Enable result code and use verbose values

Example

AT+CMEE=0	//Disable result code.
OK	
AT+CPIN?	
ERROR	//Only **ERROR** is displayed
AT+CMEE=1	//Enable error result code with numeric values.
OK	

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

2.24. AT+CSCS   Select TE Character Set

This command informs the MT which character set is used by the TE. TA is then able 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	The command takes effect immediately. The configuration will not be saved.
Reference 3GPP TS 27.007	

Parameter

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

Example

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

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

OK

2.25. AT+QURCCFG   Configure URC Indication Option

This commands configures the output port of URC.

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

Parameter

<urc_port_value>	String type. Set URC output port.	
	"usbat"	USB AT port
	"usbmodem"	USB modem port
	"uart1"	Main UART
	"uart2"	Debug UART

"all"	All ports

Example

<div style="background-color:#e0e0e0">

AT+QURCCFG=?
+QURCCFG: "urcport",("usbat","usbmodem","uart1","uart2","all")

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

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

OK

</div>

2.26. AT+QAPRDYIND   Configure to Report Specified URC

This command configures whether to enable the specified URC or not after the process of AP side were booted successfully.

AT+QAPRDYIND Configure to Report Specified URC	
Read Command **AT+QAPRDYIND?**	Response **+QAPRDYIND: (**range of supported **<cfg_val>**s**)** **OK**
Write Command **AT+QAPRDYIND=<cfg_val>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after module is rebooted. The configuration will be saved automatically.

Parameter

<cfg_val>		Integer type. Range: 0–15. Default: 0.

<cfg_val>   Integer type. Range: 0–15. Default: 0.
The value and corresponding URC can be referred to below. The Y in the chart below indicates the URC will be reported and N indicates the URC will not be reported.

<cfg_val>	+APIND: UART DDP READY	+APIND: QUEC DAEMON READY	+APIND: ATFWD READY	+APIND: QMI READY
0	N	N	N	N
1	Y	N	N	N
2	N	Y	N	N
3	Y	Y	N	N
4	N	N	Y	N
5	Y	N	Y	N
6	N	Y	Y	N
7	Y	Y	Y	N
8	N	N	N	Y
9	Y	N	N	Y
10	N	Y	N	Y
11	Y	Y	N	Y
12	N	N	Y	Y
13	Y	N	Y	Y
14	N	Y	Y	Y
15	Y	Y	Y	Y

NOTES

1. The URC will be reported via the specified port after power on if the URC is enabled. And the port can be configured via **AT+QURCCFG="urcport"**, the default port is USB AT.
2. The AT function of module UART2 is disabled, if the DDP URC is needed, the enablement of AT function via **AT+QDIAGPORT=1** is required.

Example

AT+QAPRDYIND?
+QAPRDYIND=0

OK
AT+QURCCFG="urcport"   //This command can be used to set port for URC outputting.
+QURCCFG: "urcport","usbat"

OK
AT+QAPRDYIND=2
OK   //Set port successfully, and URC **+APIND: QUEC DAEMON READY**
                              will be reported after module is rebooted.

AT+QAPRDYIND=4
OK   //Set port successfully, and URC **+APIND: ATFWD READY** will be
                              reported after module is rebooted.

AT+QAPRDYIND=6
OK   //Set port successfully, and URC **+APIND: QUEC DAEMON READY**
                              and **+APIND: ATFWD READY** will be reported after rebooting.

//If the reporting of URC **+APIND: UART DDP READY** is needed, it is required to enable AT function of
UART2 via **AT+QDIAGPORT=1** before configuring.
AT+QDIAGPORT=1

OK
AT+QAPRDYIND=1
OK   //Set port successfully, and URC **+APIND: UART DDP READY** will
                              be reported after rebooting.

AT+QAPRDYIND=3
OK   //Set port successfully, and URC **+APIND: UART DDP READY**, and
                              +APIND: QUEC DAEMON READY will be reported after rebooting.

AT+QAPRDYIND=5
OK   //Set port successfully, and URC **+APIND: UART DDP READY** and
+APIND: **ATFWD READY** will be reported after rebooting.

AT+QAPRDYIND=7
OK   //Set port successfully, and URC **+APIND: UART DDP READY**,
+APIND: **QUEC DAEMON READY** and **+APIND: ATFWD READY** will be
                              reported after rebooting.

2.27. AT+QDIAGPORT   Debug UART Configuration

This commans configures debug UART as AT port.

AT+QDIAGPORT Debug UART Configuration	
Read Command **AT+QDIAGPORT=?**	Response **+QDIAGPORT: (**list of supported **<num>**s**)** **OK**
Write Command **AT+QDIAGPORT=<num>**	Response **OK** Or **ERROR**
Maximum Response Time	12 s
Characteristics	The command takes effect after module is rebooted. The configuration will be saved automatically.

Parameter

<num>	Integer type.
	<u>0</u> Debug UART port
	1 AT port

NOTES

1. When Debug UART is configured to AT port, the baud rate is fixed to 115200 bps.
2. There is still module booting message output when Debug UART is configured to AT port.
3. It is recommended not to set up data connection on Debug UART due to limited baudrate.

3 Serial Interface Control Commands

3.1. AT&C Set DCD Function Mode

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

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

Parameter

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

3.2. AT&D Set DTR Function Mode

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

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

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

Parameter

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

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

This command determines the flow control behavior of the serial port for data mode.

AT+IFC　Set TE-TA Local Data Flow Control	
Test Command **AT+IFC=?**	Response **+IFC: (**list of supported **<dce_by_dte>**s**),(**list of supported **<dte_by_dce>**s**)** **OK**
Read Command **AT+IFC?**	Response **+IFC: <dce_by_dte>,<dte_by_dce>** **OK**
Write Command **AT+IFC=<dce_by_dte>,<dte_by_dce>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations can be saved with **AT&W**.
Reference V.25ter	

Parameter

<dce_by_dte>	Integer type. Specifies the method that will be used by TE when receiving data from TA.
	0 None

	2	RTS flow control
<dte_by_dce>	Integer type. Specifies the method that will be used by TA when receiving data from TE.	
	<u>0</u>	None
	2	CTS flow control

NOTE

Flow control is only applicable for data mode.

Example

AT+IFC=2,2	//Open the hardware flow control.
OK	
AT+IFC?	
+IFC: 2,2	
OK	

3.4. AT+ICF   Set TE-TA Control Character Framing

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

AT+ICF Set TE-TA Control Character Framing	
Test Command **AT+ICF=?**	Response **+ICF: (**list of supported **<format>**s**),(**list of supported **<parity>**s**)** **OK**
Read Command **AT+ICF?**	Response **+ICF: <format>,<parity>** **OK**
Write Command **AT+ICF=[<format>,[<parity>]]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms

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

Parameter

<format>	Integer type.	
	3	8 data 0 parity 1 stop
<parity>	Integer type.	
	0	Odd
	1	Even
	2	Mark (1)
	3	Space (0)

NOTES

1. The command is applied for command state.
2. The **<parity>** field is omitted if the **<format>** field specifies no parity.

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

This command queries and set the baud rate of the UART.

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

Reference
V.25ter

Parameter

<rate>	String type. Baud rate per second.
	4800
	9600
	19200
	38400
	57600
	<u>115200</u>
	230400
	460800
	921600
	2900000
	3000000
	3200000
	3686400
	4000000

NOTES

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

Example

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

3.6. AT+QRIR   Restore RI Behavior to Inactive

This command restores RI behavior to inactive.

If the RI (ring indicator) behavior is "always", it can be restored to inactive by the Execution Command. The RI behavior is controlled by **AT+QCFG**. Please refer to **AT+QCFG="urc/ri/ring"**, **AT+QCFG="urc/ri/smsincoming"** and **AT+QCFG="urc/ri/other"** for more details.

AT+QRIR Restore RI Behavior to Inactive	
Test Command **AT+QRIR=?**	Response **OK**
Execution Command **AT+QRIR**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved automatically.

4 Status Control Commands

4.1. AT+CPAS   Mobile Equipment Activity Status

This command queries the module's activity status.

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

Parameter

<pas>	Integer type. ME activity status.
	<u>0</u> Ready
	3 Ringing
	4 Call in progress or call hold
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

```
AT+CPAS
+CPAS: 0                              //The module is idle

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

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

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

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

OK
```

4.2. AT+CEER   Extended Error Report

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

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

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

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

	OK Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<text>	Release cause text. Reason for the last call failure to setup or release (listed in ***Chapter 15.8***). Both CS and PS domain call types are reported. Cause data is captured from Call Manager events and cached locally for later use by this command.
<err>	Error codes. For more details, please refer to ***Chapter 15.4***.

4.3. 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: "ccinfo",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)** **OK**

Write command **AT+QINDCFG=\<urctype>[,\<enable>[,\<save_to_nvram>]]**	Response If the optional parameters are omitted, query the current configuration: **+QINDCFG: \<urctype>,\<enable>** **OK** If the optional parameters are specified, set the URC indication configurations: **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: \<err>**
Maximum Response Time	300 ms

Parameter

\<urctype>	String type. URC type.	
	"all"	Main 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, present: **+QIND: "csq",\<rssi>,\<ber>**
	"smsfull"	SMS storage full indication. Default is OFF. If this configuration is ON, present: **+QIND: "smsfull",\<storage>**
	"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 is OFF. If this configuration is ON, present: **+QIND: "act",\<actvalue>** **\<actvalue>** is string format. The values are as below: "GSM" "EGPRS" "WCDMA" "HSDPA" "HSUPA" "HSDPA&HSUPA" "LTE" "TD-SCDMA"

	"CDMA"
	"HDR"
	"EVDO"
	"UNKNOWN"
	The examples of URC are as below:
	+QIND: "act","HSDPA&HSUPA"
	+QIND: "act","UNKNOWN"
	The description of "act" is as below:
	1. If module does not register on network, the **<actvalue>** would be "UNKNOWN".
	2. If this configuration is ON, the URC of "act" is reported immediately. Only when the network access technology changes, a new URC is reported.
"ccinfo"	Indication of voice call state change. Default: 0. It is disabled by default, set to 1 to enable and **+QIND: "ccinfo",<id>,<dir>,<state>,<mode>,<mpty>,<number>,<type>[,<alpha>]** is reported.
<enable>	Integer type. URC indication is ON or OFF.
	0 OFF
	1 ON
<save_to_nvram>	Integer type. Whether to save configuration into NVM.
	<u>0</u> Not save
	1 Save
<err>	Integer type. For details of error codes, please refer to *Chapter 15.4*.

4.4. AT+QMBNCFG   MBN File Configuration Setting

AT+QMBNCFG	MBN File Configuration Setting
Test Command **AT+QMBNCFG=?**	Response **+QMBNCFG: "List"** **+QMBNCFG: "Select"[,<MBN name>]** **+QMBNCFG: "Deactivate"** **+QMBNCFG: "AutoSel"[,(0,1)]** **+QMBNCFG: "Delete","<MBN name>"** **+QMBNCFG: "Add","<filename>"** **+QMBNCFG: "List_all"** **OK**

4.4.1. AT+QMBNCFG="List"　Query Imported MBN File List

This command queries the imported MBN file list.

AT+QMBNCFG="List"　Query Imported MBN File List	
Write Command **AT+QMBNCFG="List"**	Response **+QMBNCFG:"List",<index>,<selected>,<activate>,<MBN na me>,<MBN_version>,<MBN_release_date>** **…** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved automatically.

Parameter

<index>	Integer type. The MBN index indicates which imported MBN file is currently listed.
<selected>	Integer type. Indicates whether the MBN file is selected. 　0　Unselected 　1　Selected
<activate>	Integer type. Indicates whether the MBN file is activated. 　0　Unactivated 　1　Activated
<MBN name>	String type. The name of the imported MBN file.
<MBN_version>	String type. The version of the imported MBN file.
<MBN_release_date>	String type. The release date of the imported MBN file.

Example

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


OK
```

4.4.2. AT+QMBNCFG="Select"　Select Imported MBN File

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

AT+QMBNCFG="Select"　Select Imported MBN File	
Write Command **AT+QMBNCFG="Select"[,<MB Nname>]**	Response If the optional parameter is omitted, query the current configuration: **+QMBNCFG: "Select",<MBN name>** **OK** If the optional parameter is specified, select a certain MBN file: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after reboot.

Parameter

<MBN name>	Integer type. MBN file name to be selected.

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

After the MBN file is deactivated, the currently activated MBN file becomes inactive.

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

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

This command configures whether MBN file can be automatically selected via (U)SIM card.

AT+QMBNCFG="AutoSel" Auto Select Whether to Activate MBN File	
Write Command **AT+QMBNCFG="AutoSel"**	Response **+QMBNCFG: "AutoSel",<enable>** **OK** or **ERROR**
Execution Command **AT+QMBNCFG="AutoSel"[,<enable>]**	Response: If the optional parameter is omitted, query the current configuration: **+QMBNCFG: "AutoSel",<enable>** **OK** or **ERROR** If the optional parameter is specified, configure whether MBN file can be automatically selected via (U)SIM card: **OK** or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after module is rebooted. The configuration will be saved automatically.

Parameter

<enable>	Integer type. Enable/disable to auto activate MBN file.
	0 Disable
	1 Enable

4.4.5. AT+QMBNCFG="Add"   Add MBN File

This command adds MBN file.

AT+ QMBNCFG="Add" Add MBN File	
Write Command **AT+QMBNCFG="Add",<filename>**	Response **OK** or

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

Parameter

<filename>   String type. The name of the MBN file to be added.

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

This command deletes MBN file from EFS.

AT+QMBNCFG="Delete" Delete MBN File	
Write Command: **AT+QMBNCFG="Delete",<MBN name>**	Response **OK** or **ERROR**
Characteristics	The command takes effect after module is rebooted.

Parameter

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

4.4.7. AT+QMBNCFG="List_all"   Query PLMN Contained in All Imported Lists of MBN Files

This command queries PLMN contained in all imported lists of MBN files.

AT+QMBNCFG="List_all" Query PLMN Contained in All Imported Lists of MBN Files	
Write Command **AT+ QMBNCFG="List_all"**	Response **+QMBNCFG: "List_all",<index>,<selected>,<activated>,"<MBN name>",<MBN_version>,<MBN_release_date>,<PLMN_list>** **…** **OK**

Parameter

<index>	Integer type. The MBN file label indicates which imported MBN file is currently listed.
<selected>	Integer type. Indicates whether the MBN file is selected.
	0 Unselected
	1 Selected
<activate>	Integer type. Indicates whether the MBN file list is activated.
	0 Inactive
	1 Activated
<MBN name>	String type. The name of the imported MBN file.
<MBN_version>	String type. The version of the imported MBN file.
<MBN_release_date>	String type. The release date of the imported MBN file.
<PLMN_list>	String type. List of supported PLMN contained in all imported lists of MBN files.

Example

AT+QMBNCFG="List_all"   //Query PLMN contained in all imported lists of MBN files.
+QMBNCFG: "List_all",0,0,0,"ROW_Generic_3GPP",0x05010814,201704141, ""
+QMBNCFG: "List_all",1,0,0,"OpenMkt-Commercial-CU",0x05011510,201704141,"460-01 460-09 460-06"
+QMBNCFG: "List_all",2,1,1,"OpenMkt-Commercial-CT",0x0501131C,201704141,"455-07 460-11 460-03"
+QMBNCFG: "List_all",3,0,0,"Volte_OpenMkt-Commercial-CMCC",0x05012011,201706021,"460-00 460-02 460-07 460-08 454-12 454-13 460-04"

OK

5 (U)SIM Related Commands

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

This command requests the International Mobile Subscriber Identity (IMSI) which is intended to permit the TE to identify the individual SIM card or active application in the UICC (GSM 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 TA returns **<IMSI>** for identifying the individual (U)SIM which is attached to ME. **<IMSI>** **OK** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristic	/
Reference 3GPP TS 27.007	

Parameter

<IMSI>	International Mobile Subscriber Identity (string without double quotes)
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

Example

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

OK

5.2. AT+CLCK   Facility Lock

This command locks, unlocks or interrogates a MT or a network facility **<fac>**. It can be aborted when network facilities are being set or interrogated. The factory default password of PF, PN, PU, PP and PC lock is "12341234". For Write Command, **<passwd>** is normally needed to do such actions. When querying the status of network service (**<mode>**=2) the response line for 'not active' case (**<status>**=0) should be returned only if service is not active for any **<class>**.

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

Parameter

<fac>   String type.
           "SC"   (U)SIM (lock SIM/UICC card installed in the currently selected card slot)
                      (SIM/UICC asks password in MT power-up and when this lock command issued).
           "AO"   BAOC (Bar All Outgoing Calls) (refer to *3GPP TS 22.088 clause 1*).
           "OI"   BOIC (Bar Outgoing International Calls) (refer to *3GPP TS 22.088 clause 1*).
           "OX"   BOIC-exHC (Bar Outgoing International Calls except to Home Country) (refer to

	3GPP TS 22.088 clause 1).	
"AI"	BAIC (Bar All Incoming Calls) (refer to *3GPP TS 22.088 clause 2*).	
"IR"	BIC-Roam (Bar Incoming Calls when Roaming outside the home country) (refer to *3GPP TS 22.088 clause 2*).	
"AB"	All Barring services (refer to *3GPP TS 22.030*) (applicable only for **<mode>**=0).	
"AG"	All outgoing barring services (refer to *3GPP TS 22.030*) (applicable only for **<mode>**=0).	
"AC"	All incoming barring services (refer to *3GPP TS 22.030*) (applicable only for **<mode>**=0).	
"FD"	SIM card or active application in the UICC (GSM or USIM) fixed dialing memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as **<passwd>**).	
"PF"	Lock Phone to the very first inserted SIM/UICC card (also referred in the present document as PH-FSIM) (MT asks password when other SIM/UICC cards are inserted).	
"PN"	Network Personalization (refer to *3GPP TS 22.022*)	
"PU"	Network Subset Personalization (refer to *3GPP TS 22.022*)	
"PP"	Service Provider Personalization (refer to *3GPP TS 22.022*)	
"PC"	Corporate Personalization (refer to *3GPP TS 22.022*)	
<mode>	Integer type. The status of network service.	
	0	Unlock
	1	Lock
	2	Query status
<passwd>	String type. Password.	
<class>	Integer type.	
	1	Voice
	2	Data
	4	FAX
	<u>7</u>	All telephony except SMS
	8	Short message service
	16	Data circuit synchronization
	32	Data circuit asynchronization
<status>	Integer type.	
	0	Off
	1	On

Example

AT+CLCK="SC",2	//Query the status of (U)SIM card.
+CLCK: 0	//The (U)SIM card is unlocked (OFF).
OK	
AT+CLCK="SC",1,"1234"	//Lock (U)SIM card, and the password is 1234.
OK	

AT+CLCK="SC",2	//Query the status of (U)SIM card.
+CLCK: 1	//The (U)SIM card is locked (ON).
OK	
AT+CLCK="SC",0,"1234"	//Unlock (U)SIM card.
OK	

5.3. AT+CPIN   Enter PIN

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

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

TA stores a password, such as (U)SIM PIN, (U)SIM PUK, etc., which is necessary before it can be operated. If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken and an error message **+CME ERROR** is returned to TE.

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

AT+CPIN Enter PIN	
Test Command **AT+CPIN=?**	Response **OK**
Read Command **AT+CPIN?**	Response **+CPIN: <code>** **OK**
Write Command **AT+CPIN=<pin>[,<new_pin>]**	Response **OK**
Maximum Response Time	5 s
Characteristic	The command takes effect immediately. The configuration will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<code>	String without double quotes. The password that the module requires.	
	READY	MT is not pending for any password

	SIM PIN	MT is waiting for SIM PIN to be given
	SIM PUK	MT is waiting for SIM PUK to be given
	SIM PIN2	MT is waiting for SIM PIN2 to be given
	SIM PUK2	MT is waiting for SIM PUK2 to be given
	PH-NET PIN	MT is waiting for network personalization password to be given
	PH-NET PUK	MT is waiting for network personalization unblocking password to be given
	PH-NETSUB PIN	MT is waiting for network subset personalization password to be given
	PH-NETSUB PUK	MT is waiting for network subset personalization unblocking password to be given
	PH-SP PIN	MT is waiting for service provider personalization password to be given
	PH-SP PUK	MT is waiting for service provider personalization unblocking password to be given
	PH-CORP PIN	MT is waiting for corporate personalization password to be given
	PH-CORP PUK	MT is waiting for corporate personalization unblocking password to be given
<pin>		String type. Password. If the requested password was a PUK, such as (U)SIM PUK1, PH-FSIM PUK or another passwords, then **<pin>** must be followed by **<new_pin>**.
<new_pin>		String type. New password required if the requested code was a PUK.

Example

```
//Enter PIN.
AT+CPIN?
+CPIN: SIM PIN                        //Queried PIN code is locked.


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                        //Queried PUK code is locked.


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

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

5.4. AT+CPWD   Change Password

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

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: ("AB",4),("AC",4),("AG",4),("AI",4),("AO",4),("IR",4),("OI",4),("OX",4),("SC",8),("P2",8)** **OK**
Write Command **AT+CPWD=\<fac>,\<oldpwd>,\<newpwd>**	Response **OK**
Maximum Response Time	5 s
Characteristic	The command takes effect immediately. The configuration will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

\<fac>	String type. The facility lock
"SC"	(U)SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command is issued)
"AO"	BAOC (Bar All Outgoing Calls, refer to *3GPP TS 22.088 clause 1*)
"OI"	BOIC (Bar Outgoing International Calls, refer to *3GPP TS 22.088 clause 1*)
"OX"	BOIC-exHC (Bar Outgoing International Calls except to Home Country, refer to *3GPP TS 22.088 clause 1*)
"AI"	BAIC (Bar All Incoming Calls, refer to *3GPP TS 22.088 clause 2*)
"IR"	BIC-Roam (Bar Incoming Calls when Roaming outside the home country, refer

to *3GPP TS 22.088 clause 2*)

"AB"   All barring services (refer to *3GPP TS 22.030*, applicable only for **<mode>**=0)

"AG"   All outgoing barring services (refer to *3GPP TS 22.030*, applicable only for **<mode>**=0)

"AC   All incoming barring services (refer to *3GPP TS 22.030*, applicable only for **<mode>**=0)

"P2"   (U)SIM PIN2

<pwdlength>	Integer type. Maximum length of the password.
<oldpwd>	String type. Password specified for the facility from the user interface or with command.
<newpwd>	String type. New password

Example

AT+CPIN?
+CPIN: READY

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

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

+CPIN: READY

5.5. AT+CSIM   Generic (U)SIM Access

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

AT+CSIM Generic (U)SIM Access	
Test Command **AT+CSIM=?**	Response **OK**
Write Command **AT+CSIM=<length>,<command>**	Response **+CSIM: <length>,<response>**

	OK Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristic	The command takes effect immediately. The configuration will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<length>	Integer type. Length of **<command>** or **<response>** string.
<command>	Command transferred by the MT to the (U)SIM in the format as described in *3GPP TS 51.011*.
<response>	Response to the command transferred by the (U)SIM to the MT in the format as described in *3GPP TS 51.011*.
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

5.6. AT+CRSM   Restricted (U)SIM Access

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

AT+CRSM Restricted (U)SIM Access	
Test Command **AT+CRSM=?**	Response **OK**
Write Command **AT+CRSM=<command>[,<fileId>[,<P1>,<P2>,<P3>[,<data>][,<pathId>]]]**	Response **+CRSM: <sw1>,<sw2>[,<response>]** **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms

Characteristic	The command takes effect immediately. The configuration will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<command>	Integer type. (U)SIM command number.
	176 READ BINARY
	178 READ RECORD
	192 GET RESPONSE
	214 UPDATE BINARY
	220 UPDATE RECORD
	242 STATUS
<fileId>	Integer type. Identifier for an elementary data file on (U)SIM, if used by **<command>**.
<P1>, **<P2>**, **<P3>**	Integer type. Parameters transferred by the MT to the (U)SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in *3GPP TS 51.011*.
<data>	Information which shall be written to the (U)SIM (hexadecimal character format; refer to **AT+CSCS**).
<pathId>	The directory path of an elementary file on a SIM/UICC in hexadecimal format.
<sw1>, **<sw2>**	Integer type. Information from the (U)SIM about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command.
<response>	Response of a successful completion of the command previously issued (hexadecimal character format; refer to **AT+CSCS**). STATUS and GET RESPONSE return data, which gives information about the current elementary data field. The information includes the type of file and its size (refer to *3GPP TS 51.011*). After READ BINARY, READ RECORD or RETRIEVE DATA command, the requested data will be returned. **<response>** is not returned after a successful UPDATE BINARY, UPDATE RECORD or SET DATA command.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

5.7. AT+QCCID   Show ICCID

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

AT+QCCID Show ICCID	
Test Command **AT+QCCID=?**	Response **OK**
Execution Command **AT+QCCID**	Response **+QCCID: <ICCID>** **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<ICCID>   String without double quotes. ICCID (Integrated Circuit Card Identifier) number of the (U)SIM card.

Example

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

OK

5.8. AT+QPINC   Display PIN Remainder Counter

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

AT+ QPINC Display PIN Remainder Counter	
Test Command **AT+QPINC=?**	Response **+QPINC: (**list of supported **<facility>**s**)** **OK**
Read Command **AT+QPINC?**	Response **+QPINC: "SC",<PIN_counter>,<PUK_counter>**

	+QPINC: "P2",<PIN_counter>,<PUK_counter> **OK**
Write Command **AT+QPINC=<facility>**	Response **+QPINC: <facility>,<PIN_counter>,<PUK_counter>** **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<facility>	String type. "SC" (U)SIM PIN "P2" (U)SIM PIN2
<PIN_counter>	Integer type. Number of attempts left to enter the password of PIN. Maximum value is 3.
<PUK_counter>	Integer type. Number of attempts left to enter the password of PUK. Maximum value is 10.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

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

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

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

Characteristics	/

Parameter

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

5.10. 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 (U)SIM card is inserted.

AT+QSIMDET (U)SIM Card Detection	
Test Command **AT+QSIMDET=?**	Response **+QSIMDET: (**list of supported **<enable>**s**),(**list of supported **<insert_level>**s**)** **OK**
Read Command **AT+QSIMDET?**	Response **+QSIMDET: <enable>,<insert_level>** **OK**
Write Command **AT+QSIMDET=<enable>,<insert_level>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristic	The command takes effect after module is rebooted. The configuration will be saved automatically.

Parameter

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

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

NOTES

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

Example

AT+QSIMDET=1,0   //Set (U)SIM card detection pin level as low when (U)SIM card is inserted.
OK
<Remove (U)SIM card>
+CPIN: NOT READY
<Insert (U)SIM card>
+CPIN: READY   //If PIN1 of (U)SIM card is unlocked.

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

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

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

Parameter

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

Example

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

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

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

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

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

+CPIN: READY
```

5.12. AT+QSIMVOL   Fix (U)SIM Card Supply Voltage

This command fixes supply voltage of (U)SIM card. For a common UICC, the supply voltage of (U)SIM card is usually 1.8V or 3.0V.

AT+QSIMVOL Fix (U)SIM Card Supply Voltage	
Test Command **AT+QSIMVOL=?**	Response **+QSIMVOL: (**range of supported **<mode>**s**)** **OK**
Read Command **AT+QSIMVOL?**	Response **+QSIMVOL: <mode>** **OK**
Write Command **AT+QSIMVOL=<mode>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after module is rebooted. The configuration will be saved automatically.

Parameter

<mode>	Integer type. Mode of supply voltage of (U)SIM card.
	<u>0</u> Not fixed supply voltage of (U)SIM
	1 Fixed supply voltage of (U)SIM card of 1.8 V
	2 Fixed supply voltage of (U)SIM card is equal of 3.0 V

Example

```
AT+QSIMVOL=?
+QSIMVOL: (0-2)

OK
AT+QSIMVOL?
+QSIMVOL: 0

OK
AT+QSIMVOL=1
OK
AT+QSIMVOL?
```

```
+QSIMVOL: 1

OK
AT+QSIMVOL=2
OK
AT+QSIMVOL?
+QSIMVOL: 2

OK
```

5.13. AT+CCHO   Open Logical Channel

This command opens a logical channel of (U)SIM card.

AT+CCHO Open Logical Channel	
Test Command **AT+CCHO=?**	Response **OK**
Write Command **AT+CCHO=<dfname>**	Response **<sessionID>** **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.

Parameter

<dfname>	String type. All sel applications in the UICC are referenced by a DF name coded on 1 to 16 bytes.
<sessionID>	Integer type. A session ID to be used to target a specific application on the smart card using logical channels mechanism.

NOTE

The logical channel number is contained in the CLASS byte of an APDU command, thus implicitly contained in all APDU commands sent to a UICC. In this case it will be up to the MT to manage the logical channel part of the APDU CLASS byte and to ensure that the chosen logical channel is relevant to the **<sessionID>** indicated in the AT command. See *3GPP TS 31.101 [65]* for further information on logical

channels in APDU commands protocol.

Example

AT+CCHO=?   //Test command.
OK
AT+CCHO="A0000000871002FF86FFFF89FFFFFFFF" //**<dfname>** is made up of AID strings.
+CCHO: 1   //The session ID is 1.

OK

5.14. AT+CGLA   UICC Logical Channel Access

This command accesses a UICC logical channel.

AT+CGLA UICC Logical Channel Access	
Test Command **AT+CGLA=?**	Response **OK**
Write Command **AT+CGLA=<sessionID>,<length>,<command>**	Response **+CGLA: <length>,<response>** **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.

Parameter

<sessionID>	Integer type. This is the identifier of the session to be used to send the APDU commands to the UICC. It is mandatory to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0").
<length>	Integer type. Length of the characters that are sent to TE in **<command>** or **<response>** (Twice the actual length of the command or response).
<command>	Command passed on by the MT to the UICC in the format as described in 3GPP TS 31.101 [65] (hexadecimal character format; refer +cscs)
<response>	Response to the command passed on by the UICC to the MT in the format as described in 3GPP TS 31.101 [65] (hexadecimal character format; refer +cscs).

Example

AT+CGLA=?	//Test command.
OK	
AT+CGLA=1,14,"00A40804022F00"	//The command is 00A40804022F00.
+CGLA: 4,"6121"	//The length is 4, the response is 6121.
OK	

5.15. AT+CCHC   Close Logical Channel

This command closes a logical channel of (U)SIM card with the given **<sessionID>**.

AT+CCHC Close Logical Channel	
Test Command **AT+CCHC=?**	Response **OK**
Write Command **AT+CCHC=<sessionID>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.

Parameter

<sessionID>	Inter type. A session ID to be used to target a specific application on the smart card using logical channels mechanism.

Example

AT+CCHC=?	//Test command.
OK	
AT+CCHC=1	//Close logical channel: 1.
OK	

6 Network Service Commands

6.1. AT+COPS   Operator Selection

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

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

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

This Write Command forces an attempt to select and register the GSM/UMTS 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 Command (**AT+COPS?**).

AT+COPS Operator Selection	
Test Command **AT+COPS=?**	Response **+COPS: (**list of supported **<stat>,**long alphanumeric **<oper>,**short alphanumeric **<oper>,**numeric **<oper>**s**)[,<Act>]**)s**][,,(**list of supported **<mode>**s**),(**list of supported **<format>**s**)]** **OK** If there is any error related to ME functionality: **+CME ERROR: <err>**
Read Command **AT+COPS?**	Response **+COPS: <mode>[,<format>[,<oper>][,<Act>]]** **OK** If there is any error related to ME functionality: **+CME ERROR: <err>**

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

Parameter

<stat>	Integer type.	
	0	Unknown
	1	Operator available
	2	Current operator
	3	Operator forbidden
<oper>	Operator in format as per**<format>**. **<mode>** determines whether **<oper>** is present or not.	
<mode>	Integer type.	
	<u>0</u>	Automatic mode. **<oper>** field is omitted
	1	Manual operator selection. **<oper>** field shall be present and <**Act**> optionally
	2	Manually deregister from network
	3	Set only **<format>** (for **AT+COPS?** Read Command), and do not attempt registration/deregistration (**<oper>** and **<Act>** fields are ignored). This value is invalid in the response of Read Command.
	4	Manual/automatic selection. **<oper>** field shall be presented. If manual selection fails, automatic mode (**<mode>**=0) is entered
<format>	Integer type. Indicates the format of **<oper>**.	
	<u>0</u>	Long format alphanumeric **<oper>** which can be up to 16 characters long
	1	Short format alphanumeric **<oper>**
	2	Numeric **<oper>**. GSM location area identification number
<Act>	Integer type. Access technology selected. Values 3, 4, 5 and 6 occur only in the response of Read Command while MS is in data service state and is not intended for the **AT+COPS** Write Command.	
	0	GSM
	2	UTRAN
	3	GSM W/EGPRS
	4	UTRAN W/HSDPA
	5	UTRAN W/HSUPA
	6	UTRAN W/HSDPA and HSUPA
	7	E-UTRAN
	100	CDMA

<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

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

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

OK

6.2. AT+CREG   Network Registration Status

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

This Write Command controls the presentation of an unsolicited result code **+CREG: <stat>** when **<n>**=1 and there is a change in the ME network registration status.

AT+CREG Network Registration Status	
Test Command **AT+CREG=?**	Response **+CREG: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CREG?**	Response **+CREG: <n>,<stat>[,<LAC>,<ci>[,<Act>]]** **OK** If there is any error related to ME functionality: **+CME ERROR: <err>**
Write Command **AT+CREG[=<n>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.

Reference	
3GPP TS 27.007	

Parameter

\<n\>	Integer type. Whether to enable related registration network.	
	0	Disable network registration URC
	1	Enable network registration URC **+CREG: \<stat\>**
	2	Enable network registration URC with location information:
		+CREG: \<stat\>[,\<LAC\>,\<ci\>[,\<Act\>]]
\<stat\>	Integer type. Registration network status.	
	0	Not registered. ME is not currently searching a new operator to register to
	1	Registered, home network
	2	Not registered, but ME is currently searching a new operator to register to
	3	Registration denied
	4	Unknown
	5	Registered, roaming
\<LAC\>	String type. Two bytes location area code in hexadecimal format.	
\<ci\>	String type. 16-bit (GSM) or 28-bit (UMTS/LTE) cell ID in hexadecimal format.	
\<Act\>	Integer type. Access technology selected.	
	0	GSM
	2	UTRAN
	3	GSM W/EGPRS
	4	UTRAN W/HSDPA
	5	UTRAN W/HSUPA
	6	UTRAN W/HSDPA and HSUPA
	7	E-UTRAN
\<err\>	Error codes. For more details, please refer to *Chapter 15.4*.	

Example

AT+CREG=1	
OK	
+CREG: 1	//URC reports that ME has registered on network.
AT+CREG=2	//Activate extended URC mode.
OK	
+CREG: 1,"D509","80D413D",7	//URC reports that operator has found location area code
	and cell ID.

6.3. AT+CSQ   Signal Quality Report

This command indicates the received signal strength **<rssi>** and the channel bit error rate **<ber>**.

This Test Command returns values supported by MT.

This Execution Command returns received signal strength indication **<rssi>** and channel bit error rate **<ber>** from MT.

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

Parameter

<rssi>	Integer type. Received signal strength indication.	
	0	-113 dBm or less
	1	-111 dBm
	2–30	-109 dBm to -53 dBm
	31	-51 dBm or greater
	99	Not known or not detectable
	100	-116 dBm or less
	101	-115 dBm
	102...190	-114 dBm to -26 dBm
	191	-25 dBm or greater
	199	Not known or not detectable
	100–199	Extended to be used in TD-SCDMA indicating received signal code power (RSCP)

<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

Example

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

OK
AT+CSQ
+CSQ: 28,99        //The current signal strength indication is 28 dBm and channel bit error rate is 99 dBm.

OK
```

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.

6.4. 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**),(**list of supported **<format>**s**) **OK**
Read Command **AT+CPOL?**	Response Query the list of preferred operators: **+CPOL: <index>,<format>,<oper>[,<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>]** **[+CPOL: <index>,<format>,<oper>[,<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>** **…]** **OK**
Write Command	Response

AT+CPOL=<index>[,<format>[,<oper>[<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>]]]	Edit the list of preferred operators: **OK** Or **ERROR** If the **<index>** is given but the **<oper>** is omitted, the entry is deleted.
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.
Reference 3GPP TS 27.007	

Parameter

<index>	Integer type. The order number of the operator in the (U)SIM preferred operator list.
<format>	Integer type. Format of **<oper>**. 0 Long format alphanumeric **<oper>** 1 Short format alphanumeric **<oper>** 2 Numeric **<oper>**
<oper>	String type. **<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

NOTE

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

6.5. AT+COPN   Read Operator Names

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

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

Parameter

<numericn>	String type. Operator in numeric format (see **AT+COPS**).
<alphan>	String type. Operator in long alphanumeric format (see **AT+COPS**).
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

6.6. AT+CTZU   Automatic Time Zone Update

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

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

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

Parameter

<enable>	Integer type. The mode of automatic time zone update.
	<u>0</u> Disable automatic time zone update via NITZ.
	1 Enable automatic time zone update via NITZ
	3 Enable automatic time zone update via NITZ and update LOCAL time to RTC

Example

```
AT+CTZU?        //Read command.
+CTZU: 0

OK
AT+CTZU=?       //Test command.
+CTZU: (0,1,3)

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

OK
```

6.7. AT+CTZR   Time Zone Reporting

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

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

Parameter

<reporting>	Integer type. The mode of time zone reporting.
	<u>0</u> Disable time zone reporting of changed event
	1 Enable time zone reporting of changed event by URC **+CTZV: <tz>**
	2 Enable extended time zone reporting by URC **+CTZE: <tz>,<dst>,<time>**
<tz>	String type. The sum of the local time zone (difference between the local time and GMT is expressed in quarters of an hour) plus daylight saving time. The format is "±zz", expressed as a fixed width, two-digit integer with the range -48 to +56. To maintain a fixed width, numbers in the range -9 to +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09".
<dst>	Integer type. 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. The local time. The format is "YYYY/MM/DD,hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date (DD), hour (hh), minute (mm) and second (ss). This parameter can be provided by the network when delivering time zone information and will be presented in the unsolicited result code of extended time zone reporting if provided by the network.

Example

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

OK

+CTZE: "+32",0,"2017/11/04,06:51:13"   //Extended time zone and local time reporting by URC.

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

This command obtains the latest time synchronized through network.

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

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

Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

Parameter

<mode>	Integer type. Network time obtaining mode.
	0 Query the latest time that has been synchronized through network
	1 Query the current GMT time calculated from the latest time that has been synchronized through network
	2 Query the current LOCAL time calculated from the latest time that has been synchronized through network
<time>	String type value. Format is "YYYY/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; Range: -48 to +48). E.g. 6th of May 2004, 22:10:00 GMT+2 hours equals to "04/05/06,22:10:00+08"
<dst>	Integer type. Daylight saving time. Range: 0–2.
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

NOTE

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

Example

AT+QLTS=?	//Query the supported network time mode.
+QLTS: (0-2)	
OK	
AT+QLTS	//Query the latest time synchronized through network.
+QLTS: "2017/10/13,03:40:48+32,0"	
OK	
AT+QLTS=0	//Query the latest time synchronized through network. It acts the same function as Execution Command **AT+QLTS**.
+QLTS: "2017/10/13,03:40:48+32,0"	
OK	
AT+QLTS=1	//Query the current GMT time calculated from the latest time that has been synchronized through network.
+QLTS: "2017/10/13,03:41:22+32,0"	
OK	

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

OK

6.9. AT+QNWINFO   Query Network Information

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

AT+QNWINFO Query Network Information	
Test Command **AT+QNWINFO=?**	Response **OK**
Execution Command **AT+QNWINFO**	Response **+QNWINFO: <Act>,<oper>,<band>,<channel>** **OK**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<Act>	String type. Selected access technology. "NONE" "CDMA1X" "CDMA1X AND HDR" "CDMA1X AND EHRPD" "HDR" "HDR-EHRPD" "GSM" "GPRS" "EDGE" "WCDMA" "HSDPA" "HSUPA" "HSPA+" "TDSCDMA" "TDD LTE" "FDD LTE"
<oper>	String type. The operator in numeric format.

<band>	String type. The selected band.
	"CDMA BC0" – "CDMA BC19"
	"GSM 450"
	"GSM 480"
	"GSM 750"
	"GSM 850"
	"GSM 900"
	"GSM 1800"
	"GSM 1900"
	"WCDMA 2100"
	"WCDMA 1900"
	"WCDMA 1800"
	"WCDMA 1700 US"
	"WCDMA 850"
	"WCDMA 800"
	"WCDMA 2600"
	"WCDMA 900"
	"WCDMA 1700 JAPAN"
	"WCDMA 1500"
	"WCDMA 850 JAPAN"
	"LTE BAND 1" to "LTE BAND 43"
	"LTE BAND 66"
	"LTE BAND 71"
	"TDSCDMA BAND A"
	"TDSCDMA BAND B"
	"TDSCDMA BAND C"
	"TDSCDMA BAND D"
	"TDSCDMA BAND E"
	"TDSCDMA BAND F"
<channel>	Integer type. Channel ID.

Example

AT+QNWINFO=?
OK
AT+QNWINFO
+QNWINFO: "FDD LTE",46011,"LTE BAND 3",1650

OK

6.10. AT+QSPN   Display the Name of Registered Network

AT+QSPN Display the Name of Registered Network	
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 network name.
<SNN>	String type. Short network name.
<SPN>	String type. Service provider name.
<alphabet>	Integer type. Alphabet of full network name and short network name.
	<u>0</u> GSM 7-bit default alphabet
	1 UCS2
<RPLMN>	String type. Registered PLMN.

NOTES

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

Example

```
AT+QSPN              //Query the EONS information of RPLMN.
+QSPN: "CHN-UNICOM","UNICOM","",0,"46001"

OK
```

6.11. AT+QNETINFO   Query Network Information of RATs

This command queries the specified parameter of the specified RAT.

AT+QNETINFO Query Network Information of RATs	
Test Comannd **AT+QNETINFO=?**	Response **+QNETINFO: <rat>,<bit_msk>** **OK**
Write Command **AT+QNETINFO=<rat>,<bit_msk>**	Response **+QNETINFO: <mode>,<rslt_cnt>** **<func>,<value>** **……** **<func>,<value>** **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after module is rebooted.

Parameter

<rat>	Integer type. Access technology selected.
	0 GSM
	1 WCDMA
	2 LTE
	3 TD-SCDMA
	4 UMTS
	5 CDMA
	6 HDR
<bit_msk>	Digital format (HEX). Function mask. Range: 00xFFFFFFFF, and each bit represents a function.

rat	Bit	Function	<func>,<value>
	0	drx	"drx",value
GSM	...	-	
	31	-	
WCDMA	0	drx	"drx",value

	...	-	
	31	-	
LTE	0	rsssnr	"rsssnr",value
	1	timing advance	"timingadvance",value
	2	drx	"drx",value1,value2,value3
	…	-	
	31	-	
TD-SCDMA*	0	-	
	…	-	
	31	-	
UMTS*	0	-	
	…	-	
	31	-	
CDMA*	0	-	
	…	-	/
	31	-	/
HDR*	0	-	/
	…	-	/
	31	-	/

In the table, '-' indicates that this bit is not defined yet.

When querying the drx of LTE, it returns three parameters value1, value2, and value3 indicating the idle DRX period, the short CDRX period, and the long CDRX period respectively.

<mode> String type. Access technology selected.
"GSM"
"WCDMA"
"LTE"
"TD-SCDMA"
"UMTS"
"CDMA"
"HDR"

\<rslt_cnt\>	Digtal format (DEC). Number of response functions.
\<func\>	String type. Function.
\<value\>	The format is related to **\<func\>**. The value format of different **\<func\>** is different. If the return value is null, "-" will be returned.

NOTES

1. Each bit of the **\<bit_msk\>** in each network mode represents a function. For example, the 0th bit of the **\<bit_msk\>** in LTE indicates quering rsssnr, and the first bit indicates quering timing advance.
2. When the response is returned, if there is an undefined bit in the bit set to the **\<bit_msk\>** of the AT command, then **\<rslt_cnt\>** is smaller than the number of bits set in the **\<bit_msk\>** of the AT command.

Example

AT+QNETINFO=2,1	//Query rsssnr of LTE network.
+QNETINFO: "LTE",1	
"rsssnr",10	
OK	
AT+QNETINFO=2,1	
+QNETINFO: "LTE",1	
"rsssnr",-	
OK	
AT+QNETINFO=2,7	//Query rsssnr, timingadvance, drx of LTE network.
+QNETINFO: "LTE",1	
"rsssnr",10	
"timingadvance",39	
"drx",320,0,0	
OK	
AT+QNETINFO=0,1	//Query drx of GSM network.
+QNETINFO: "GSM", 1	
"drx",471	
OK	
AT+QNETINFO=1,1	//Query drx of WCDMA network.
+QNETINFO: "WCDMA", 1	
"drx",1280	

OK

6.12. AT+QNWLOCK="common/lte"   Network Locking Configuration

This command locks module to a specified FREQ or cell.

AT+QNWLOCK="common/lte" Network Locking Configuration	
Test Command **AT+QNWLOCK=?**	Response **…** **+QNWLOCK: "common/lte"[,<action>[,<EARFCN>,<PCI>[,<status>]]]** **OK**
Write Command **AT+QNWLOCK="common/lte"[,<action>[,<EARFCN>,<PCI>]]**	Response If the optional parameters are omitted, query the current setting: **+QNWLOCK: "common/lte",<action>,<EARFCN>,<PCI>,<status>** **OK** If the optional parameters are specified, lock the module to a specified FREQ or cell: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.

Parameter

<action>	Integer type.
	0 Disable lock cell
	1 Enable lock LTE cell through appointed EARFCN
	2 Enable lock LTE cell through appointed EARFCN and PCI
<EARFCN>	Integer type. The appointed EARFCN of cell to be locked. Default: 0.
<PCI>	Integer type. The appointed PCI of cell to be locked. Default: 0.
<status>	Integer type. Finish/not finish locking or unlocking cell. Default: 0.
	0 Finish locking or unlocking cell
	1 Not finish locking or unlocking cell

NOTES

1. Modules can unlock cell after setting **<action>** to 0 and restarting module.
2. Modules need be fixed to LTE-only mode with **AT+QCFG="NWSCANMODE",3** before locking LTE cell with this command. For more details, please refer to *document [12]*.

Example

AT+QCFG="NWSCANMODE",3
OK

AT+QNWLOCK="common/lte"   //Query lock cell status.
+QNWLOCK: "common/lte",0,0,0,0

OK

AT+QNWLOCK="common/lte",1,38400,0   //Lock cell on EARFCN 38400.
OK
AT+QNWLOCK="common/lte"
+QNWLOCK: "common/lte",1,38400,0,0

OK

AT+QNWLOCK="common/lte",2,38400,87   //Lock cell on PCI 87 of EARFCN 38400.
OK
AT+QNWLOCK="common/lte"
+QNWLOCK: "common/lte",2,38400,87,0

OK
AT+QENG="SERVINGCELL"
+QENG: "servingcell","NOCONN","LTE","TDD",460,00,82E8C80,87,38400,39,5,5,550A,-93,-13,-59,-4,46

OK
AT+QNWLOCK="common/lte",0   //Disable lock cell feature.
OK
AT+QNWLOCK="common/lte"
+QNWLOCK: "common/lte",0,38400,87,1

OK

6.13. AT+QOPSCFG="scancontrol"　Configure Bands to be Scanned in 2G/3G/4G

AT+QOPSCFG="scancontrol"　Configure Bands to be Scanned in 2G/3G/4G	
Test Command **AT+QOPSCFG=?**	Response **+QOPSCFG: "scancontrol",(**range of supported **<RAT>**s**),(**range of supported **<GW_band>**s**),(**range of supported **<LTE_band>**s**),(**range of supported **<TDS_band>**s)** **OK**
Write Command **AT+QOPSCFG="scancontrol"[,<RAT>[,<GW_band>,<LTE_band>,<TDS_band>]]**	Response If **<RAT>**, **<GW_band>**, **<LTE_band>** and **<TDS_band>** are omitted, query the current configuration: **+QOPSCFG: "scancontrol",<rat>,<GW_band>,<LTE_band>,<TDS_band>** **OK** If **<GW_band>**, **<LTE_band>** and **<TDS_band>** are omitted, configure all bands to be scanned in 2G/3G/4G: **OK** Or **ERROR** If **<RAT>**, **<GW_band>**, **<LTE_band>** and **<TDS_band>**are specified, configure bands to be scanned in 2G/3G/4G: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	This command takes effect immediately; The configurations will not be saved.

Parameter

<RAT>	Number format in DEC. Network mode.
	0　　2G
	1　　3G
	2　　4G
	3　　2G, 3G and 4G
<GW_band>	A hexadecimal value that specifies the GSM and WCDMA frequency bands. If it is set

to 0, it means not to change GSM and WCDMA frequency bands. Range: 0-FFFF. (e.g.: 00000013 = 00000001 (EGSM900) + 00000002 (DCS1800) + 00000010 (WCDMA2100)).

00000000	No change
00000001	EGSM900
00000002	DCS1800
00000004	GSM850
00000008	PCS1900
00000010	WCDMA2100
00000020	WCDMA1900
00000040	WCDMA850
00000080	WCDMA900
00000100	WCDMA800
00000200	WCDMA1700
0000FFFF	Any frequency band

<LTE_band> A hexadecimal value that specifies the LTE frequency band. If it is set to 0 or 0x40000000, it means not to change LTE frequency band. Range: 0-7FFFFDF3FFF (e.g.: 0x15 = 0x1 (LTE B1) + 0x4 (LTE B3) + 0x10 (LTE B5)).

0x1 (CM_BAND_PREF_LTE_EUTRAN_BAND1)	LTE B1
0x4 (CM_BAND_PREF_LTE_EUTRAN_BAND3)	LTE B3
0x10 (CM_BAND_PREF_LTE_EUTRAN_BAND5)	LTE B5
0x40 (CM_BAND_PREF_LTE_EUTRAN_BAND7)	LTE B7
0x80 (CM_BAND_PREF_LTE_EUTRAN_BAND8)	LTE B8
0x80000 (CM_BAND_PREF_LTE_EUTRAN_BAND20)	LTE B20
0x7FFFFFFFFFFFFFFF (CM_BAND_PREF_ANY)	Any frequency band

<TDS_band> A hexadecimal value that specifies the TD-SCDMA frequency band. If it is set to 0 or 0x40000000, it means not to change TD-SCDMA frequency band. Range: 0-3F (e.g.0x21 = 0x1 (TDS BCA) + 0x20 (TDS BCF).

0x1 (CM_BAND_PREF_TDS_BANDA)	TDS BCA
0x2 (CM_BAND_PREF_TDS_BANDB)	TDS BCB
0x4 (CM_BAND_PREF_TDS_BANDC)	TDS BCC
0x8 (CM_BAND_PREF_TDS_BANDD)	TDS BCD
0x10 (CM_BAND_PREF_TDS_BANDE)	TDS BCE
0x20 (CM_BAND_PREF_TDS_BANDF)	TDS BCF

NOTE

1. **<GW_band>** means all bands in GSM and WCDMA, ranging from 0 to FFFFFFFFBFFFFFFF. When setting **<GW_band>** as a value in the range of 0-FFFF, it corresponds to the band value in the range of 0-FFFFFFFFBFFFFFFF in GSM/WCDMA.
2. It is recommended to scan full bands in GSM/WCDMA (i.e. when configuring to scan GSM and WCDMA band, set the value of **<GW_band>** to FFFF) due to a small amount of bands in GSM/WCDMA.

6.14. AT+QOPSCFG="displayrssi" Enable/Disable to Display RSSI in LTE

AT+QOPSCFG="displayrssi" Enable/Disable to Display RSSI in LTE	
Write Command **AT+QOPSCFG="displayrssi",<enable>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	This command takes effect immediately; The configuration will not be saved.

Parameter

<enable>	Numeric format in DEC. Enable/Disable to display RSSI in LTE
	1 Enable
	0 Disable

NOTE

After configuring **<enable>**=1, when scanning bands in LTE or all bands in GSM/WCDMA/LTE via **AT+QOPS**, RSSI value in LTE will be returned.

6.15. AT+QOPS Band Scan

This command triggers band scan. The Execution Command lists the available network information of operators for all neighbor cell.

AT+QOPS Band Scan	
Execution Command **AT+QOPS**	Response For 2G: **+QOPS: <oper_in_string>,<oper_in_short_string>,<oper_in_number>** **<index>,<RAT,<freq>,<lac>,<ci>,<bsic>,<rxlev>,<c1>,<cba>,<is_gprs_support>** **[…]**

	For 3G:
	+QOPS:
	<oper_in_string>,<oper_in_short_string>,<oper_in_number>
	<index>,<RAT>,<freq>,<psc>,<lac>,<ci>,<rscp>,<ecno>,<cba>
	[…]
	OK
	For 4G:
	+QOPS:
	<oper_in_string>,<oper_in_short_string>,<oper_in_number>
	<index>,<RAT>,<freq>,<pci>,<tac>,<ci>,<rsrp>,<rsrq>,<cba>
	[…]
	OK
	If there is any error:
	ERROR

Parameter

<oper_in_string>	Operator name in long string.
<oper_in_short_string>	Operator name in short string.
<per_in_number>	Operator name in integer.
<index>	Integer type. The item's ID in results.
<RAT>	String type.
	"2G" 2G network
	"3G" 3G network
	"4G" 4G network
<freq>	Numeric format in DEC. The ARFCN or UARFCN of cell.
<lac>	Numeric format in HEX. Location area code.
<ci>	Numeric format in HEX. Cell ID.
<bsic>	Numeric format in DEC. Base station identification code.
<rxlev>	Numeric format in DEC. RX level.
<c1>	Numeric format in DEC. Cell selection criterion.
<cba>	Numeric format in DEC. Cell bar access.
	0 Unbarred cell
	1 Barred cell
<is_gprs_support>	Numeric format in DEC. Indicate whether current cell support GPRS or not.
	0 Not support GPRS
	1 Support GPRS
<psc>	Number format in DEC. Primary scrambling code.

\<rscp>	Number format in DEC. Received signal code power level.
\<ecno>	Number format in DEC. Indicator of network quality.
\<pci>	Number format in DEC. Physical cell ID.
\<tac>	Number format in DEC. Tracking area code.
\<rsrp>	Reference Signal Receiving Power.
\<rsrq>	Reference Signal Receiving Quality.

NOTES

1. This command conflicts with network selection mode that is fixed to one of network types. Network selection mode must be set to AUTO mode by **AT+QCFG="NWSCANMODE",0**.
2. Execute this command in idle state. If CS or PS connections have been established, the signaling on the air will interrupt **AT+QOPS** and then the module will return ERROR.
3. Before scanning band with this command, please configure the network mode and specific band.

Example

AT+QOPSCFG="scancontrol",0	//Configure to scan all bands in 2G network.
OK	
AT+QOPS	//Scan all bands in 2G network.
+QOPS: "CHINA MOBILE","CMCC","46000"	
1,"2G",16,550B,D89,16,35,27,0,1	
2,"2G",124,550B,3A40,20,80,1,0,1	
...	
+QOPS: "CHN-UNICOM","UNICOM","46001"	
1,"2G",234,5504,56E3,27,44,12,0,1	
2,"2G",536,6254,7F62,13,70,1,0,1	
....	
OK	
AT+QOPSCFG="scancontrol",1	//Configure to scan all bands in 3G network.
OK	
AT+QOPS	//Scan all bands in 3G network.
+QOPS: "CHN-UNICOM","UNICOM","46001"	
1,"3G",10688,5,D5D5,8055189,-109,27,0	
OK	
AT+QOPSCFG="scancontrol",2	//Configure to scan all bands in 4G network.
OK	
AT+QOPS	//Scan all bands in 4G network.
+QOPS: "CHINA MOBILE","CMCC","46000"	
1,"4G",38950,206,550B,F2D4A42,-72,-11,0	
2,"4G",39148,206,550B,F2D4A44,-73,-12,0	

```
3,"4G",1300,121,550B,5C4EF2D,-99,-17,0
4,"4G",38400,121,550B,5C4EF01,-99,-16,0
5,"4G",3683,121,550B,5C4EF29,-99,-11,0
6,"4G",38098,428,550B,F48330E,-112,-20,0
7,"4G",1425,116,550B,80A61AA,-118,-25,0
+QOPS: "CHN-CT","CT","46011"
1,"4G",100,466,691D,DD8A30B,-75,-11,0
2,"4G",1850,314,691D,690843E,-88,-12,0
3,"4G",2452,9,691D,690271D,-97,-12,0
+QOPS: "CHN-UNICOM","UNICOM","46001"
1,"4G",1650,465,550C,5A29C0B,-78,-10,0
2,"4G",3770,312,550C,5F1EA65,-98,-13,0
3,"4G",1506,330,550C,5A7980D,-107,-15,0

OK
```

AT+QOPSCFG="scancontrol",3   //Configure to scan all bands in 2G, 3G and 4G network.
OK
AT+QOPS   //Scan all bands in 2G, 3G and 4G network.

```
+QOPS: "CHINA MOBILE","CMCC","46000"
1,"2G",32,550B,34B8,63,26,18,0,1
2,"2G",16,550B,D89,34,26,18,0,1
3,"4G",39148,206,550B,F2D4A44,-71,-4,0
4,"4G",38950,206,550B,F2D4A42,-80,-4,0
5,"4G",1300,121,550B,5C4EF2D,-100,-4,0
6,"4G",38400,121,550B,5C4EF01,-101,-11,0
7,"4G",3683,471,550B,84958A8,-103,-4,0
8,"4G",38544,168,550B,104FD44,-111,-11,0
9,"4G",36275,169,550B,104FD77,-116,-13,0
10,"4G",40738,428,550B,F48330E,-119,-11,0
+QOPS: "CHN-UNICOM","UNICOM","46001"
1,"3G",10688,387,D5D6,8066479,-106,23,0
2,"4G",1650,465,550C,5A29C0B,-74,0,0
3,"4G",3770,312,550C,5F1EA65,-96,-4,0
4,"4G",1506,330,550C,5A7980D,-108,-4,0
+QOPS: "CHN-CT","CT","46011"
1,"4G",100,466,691D,DD8A30B,-71,-4,0
2,"4G",2452,9,691D,690271D,-92,-10,0
3,"4G",1850,314,691D,690843E,-99,-4,0
+QOPS: "AT&T","AT&T","310410"
1,"4G",2525,3,1,1A2D003,-106,-15,0

OK
```

AT+QOPSCFG="scancontrol",2,0,1,0   //Configure to scan LTE Band1 in 4G.
OK

AT+QOPS	//Scan LTE Band1 in 4G.
+QOPS: "CHN-CT","CT","46011"	
1,"4G",100,466,691D,DD8A30B,-74,-12,0	
OK	
AT+QOPSCFG="displayrssi",1	//Enable to display RSSI.
OK	
AT+QOPSCFG="scancontrol",2,0,1,0	//Configure to scan LTE Band1 in 4G.
OK	
AT+QOPS	//Scan LTE Band1 in 4G.
+QOPS: "CHN-CT","CT","46011"	
1,"4G",100,466,691D,DD8A30B,-71,-11,-40,0	//The value of RSSI is -40.
OK	

6.16. AT+QFPLMNCFG   FPLMN Configuration

This command configures FPLMN (Forbidden Public Land Mobile Network), including adding a PLMN to FPLMN, removing a PLMN from FPLMN list.

AT+QFPLMNCFG FPLMN Configuration	
Test Command **AT+QFPLMNCFG=?**	Response **+QFPLMNCFG: "List"** **+QFPLMNCFG: "Add",<PLMN>** **+QFPLMNCFG: "Delete",(<PLMN>,"all")** **OK**
Write Command **AT+QFPLMNCFG=<cmd>[,<PLMN>][,(<PLMN>,"all")]**	Response If **<cmd>** is equal to "List", return current FPLMN list: **+QFPLMNCFG: "List",<index>,<PLMN>** **[+QFPLMNCFG: "List",<index>,<PLMN>** **[…]]** **OK** If **<cmd>** is equal to "Add" or "Delete": **OK** Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**

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

Parameter

<cmd>	String type. The operation command of FPLMN.
	"List" List of Forbidden PLMN
	"Add" Add a specified PLMN to FPLMN
	"Delete" Delete a specified PLMN or all PLMN form FPLMN
<index>	Integer type. Index of FPLMN.
<PLMN>	Integer type. PLMN.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

```
AT+QFPLMNCFG=?
+QFPLMNCFG: "List"
+QFPLMNCFG: "Add",<PLMN>
+QFPLMNCFG: "Delete",(<PLMN>,"all")

OK
AT+QFPLMNCFG="List"
+QFPLMNCFG: "List",1,"46000"
+QFPLMNCFG: "List",2,"46002"
+QFPLMNCFG: "List",3,"46004"
+QFPLMNCFG: "List",4,"46007"
+QFPLMNCFG: "List",5,"46008"
+QFPLMNCFG: "List",6,"46003"
+QFPLMNCFG: "List",7,"46011"
+QFPLMNCFG: "List",8,"46008"

OK
AT+QFPLMNCFG="Add","46001"          //Add PLMN "46001" from FPLMN list.
OK
AT+QFPLMNCFG="List"
+QFPLMNCFG: "List",1,"46000"
+QFPLMNCFG: "List",2,"46002"
+QFPLMNCFG: "List",3,"46004"
+QFPLMNCFG: "List",4,"46007"
+QFPLMNCFG: "List",5,"46008"
+QFPLMNCFG: "List",6,"46003"
+QFPLMNCFG: "List",7,"46011"
+QFPLMNCFG: "List",8,"46008"
```

```
+QFPLMNCFG: "List",9,"46001"

OK
AT+QFPLMNCFG="Delete","46001"        //Delete PLMN "46001" from FPLMN list.
OK
AT+QFPLMNCFG="List"
+QFPLMNCFG: "List",1,"46000"
+QFPLMNCFG: "List",2,"46002"
+QFPLMNCFG: "List",3,"46004"
+QFPLMNCFG: "List",4,"46007"
+QFPLMNCFG: "List",5,"46008"
+QFPLMNCFG: "List",6,"46003"
+QFPLMNCFG: "List",7,"46011"
+QFPLMNCFG: "List",8,"46008"

OK
AT+QFPLMNCFG="Delete","all"          //Delete all PLMN from FPLMN list.
OK

AT+QFPLMNCFG="List"
OK
```

6.17. AT+QENG   Switching on/off Engineering Mode

Engineering mode is designed to report the information of serving cells, neighbour cells and packet switch parameters. The command switches on/off the mode.

AT+QENG Switching on/off Engineering Mode	
Test Command **AT+QENG=?**	Response **+QENG:** (list of supported **<cell_type>**s) **OK**
AT+QENG="servingcell" Query the information of serving cells	Response In the case of GSM mode: **+QENG: "servingcell",<state>,"GSM",<mcc>,<mnc>,<LAC>,<cellID>,<BSIC>,<arfcn>,<band>,<rxlev>,<txp>,<rla>,<drx>,<c1>,<c2>,<gprs>,<tch>,<ts>,<ta>,<maio>,<hsn>,<rxlevsub>,<rxlevfull>,<rxqualsub>,<rxqualfull>,<voicecodec>** **OK**

	In the case of WCDMA mode:
	+QENG: "servingcell",<state>,"WCDMA",<mcc>,<mnc>, <LAC>,<cellID>,<uarfcn>,<psc>,<rac>,<rscp>,<ecio>,<ph ych>,<SF>,<slot>,<speech_code>,<ComMod>
	OK
	In the case of LTE mode:
	+QENG: "servingcell",<state>,"LTE",<is_tdd>,<mcc>,<m nc>,<cellID>,<pcid>,<earfcn>,<freq_band_ind>,<ul_band width>,<dl_bandwidth>,<tac>,<rsrp>,<rsrq>,<rssi>,<sin r>,<srxlev>
	OK
	In the case of TD-SCDMA mode:
	+QENG: "servingscell",<state>,"TDSCDMA",<mcc>,<mn c>,<LAC>,<cellID>,<pfreq>,<rssi>,<rscp>,<ecio>
	OK
	In the case of CDMA mode or CDMA+HDR mode:
	+QENG: "servingscell",<state>,"CDMA",<mcc>,<mnc>,< LAC>,<cellID>,<bcch>,<rxpwr>,<ecio>,<txpwr>
	[+QENG: "servingscell",<state>,"HDR",<mcc>,<mnc>,<L AC>,<cellID>,<bcch>,<rxpwr>,<ecio>,<txpwr>]
	OK
	In the case of SRLTE mode:
	+QENG: "servingscell",<state>,"CDMA",<mcc>,<mnc>,< LAC>,<cellID>,<bcch>,<rxpwr>,<ecio>,<txpwr>
	+QENG: "servingcell",<state>,"LTE",<is_tdd>,<mcc>,<m nc>,<cellID>,<pcid>,<earfcn>,<freq_band_ind>,<ul_band width>,<dl_bandwidth>,<tac>,<rsrp>,<rsrq>,<rssi>,<sin r>,<srxlev>
	OK
AT+QENG="neighbourcell"	Response
Query the information of neighbour cells	In the case of GSM mode:
	[+QENG: "neighbourcell","GSM",<mcc>,<mnc>,<LAC>,< cellID>,<BSIC>,<arfcn>,<rxlev>,<c1>,<c2>,<c31>,<c32> […]]
	[+QENG: "neighbourcell","WCDMA",<uarfcn>,<psc>,<rs

cp>,<ecno>
[…]]
[+QENG: "neighbourcell","LTE",<earfcn>,<pcid>,<rsrp>,
<rsrq>
[…]]

OK

In the case of WCDMA mode:
[+QENG: "neighbourcell","WCDMA",<uarfcn>,<srxqua
l>,<psc>,<rscp>,<ecno>,<set>,<rank>,<srxlev>
[…]]
[+QENG: "neighbourcell","GSM",<BSIC>,<rssi>,<rxlev>,
<rank>
[…]]
[+QENG: "neighbourcell","LTE",<earfcn>,<pcid>,<rsrp>,
<rsrq>,<s_rxlev>
[…]]

OK

In the case of LTE mode:
[+QENG:
"neighbourcell intra","LTE",<earfcn>,<pcid>,<rsrq>,<rsr
p>,<rssi>,<sinr>,<srxlev>,<cell_resel_priority>,<s_non_i
ntra_search>,<thresh_serving_low>,<s_intra_search>
[…]]
[+QENG:
"neighbourcell inter","LTE",<earfcn>,<pcid>,<rsrq>,<rsr
p>,<rssi>,<sinr>,<srxlev>,<threshX_low>,<threshX_hig
h>,<cell_resel_priority>
[…]]
[+QENG:
"neighbourcell","GSM",<arfcn>,<cell_resel_priority>,<th
resh_gsm_high>,<thresh_gsm_low>,<ncc_permitted>,<
band>,<bsic_id>,<rssi>,<srxlev>
[…]]
[+QENG:
"neighbourcell","WCDMA",<uarfcn>,<cell_resel_priorit
y>,<thresh_Xhigh>,<thresh_Xlow>,<psc>,<cpich_rscp>,
<cpich_ecno>,<srxlev>
[…]]

OK

AT+QENG="3gcomm" Get 3G cell common information	Response Only in WCDMA mode, get 3G cell common items which include the information about 3G neighbour cells, 2G neighbour cells and 3G serving cells information. For WCDMA serving cells information: **[+QENG: "3gcomm",<cell_type>,<rat>,<state>,<mcc>,<mnc>,<LAC>,<cellID>,<uarfcn>,<psc>,<rssi>,<rscp>,<ecn0>,<srxqual>,<srxlev>** **[…]]** For 3G neighbor cells information of WCDMA serving cell: **[+QENG: "3gcomm",<cell_type>,<rat>,<mcc>,<mnc>,<LAC>,<cellID>,<uarfcn>,<psc>,<rssi>,<rscp>,<ecn0>,<srxqual>,<srxlev>** **[…]]** For 2G neighbor cells information of WCDMA serving cells: **[+QENG: "3gcomm",<cell_type>,<rat>,<arfcn>,<BSIC>,<rssi>,<rxlev>,<rank>** **[…]]** **OK** If the module works in 2G network, response: **OK**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<cell_type>	String format. The information of different cells.	
	"servingcell"	The information of 2G/3G/4G serving cells
	"neighbourcell"	The information of 2G/3G/4G neighbour cells
<state>	String format. UE state.	
	"SEARCH"	UE is searching but could not (yet) find a suitable 2G/3G/4G cell.
	"LIMSRV"	UE is camping on a cell but has not registered on the network.
	"NOCONN"	UE is camping on a cell and has registered on the network, and it is in idle mode.
	"CONNECT"	UE is camping on a cell and has registered on the network, and a call is in progress.
<rat>	String format. Access technology, including:	

	"GSM"
	"WCDMA"
	"LTE"
	"CDMA"
	"HDR"
	"TDSCDMA"
<mcc>	Integer type. Mobile country code (first part of the PLMN code).
	"-"　　　　　Invalid
<mnc>	Integer type. Mobile network code (second part of the PLMN code).
	"-"　　　　　Invalid
<LAC>	Hexadecimal format. Location area code. Determines the two-byte location area code in hexadecimal format (e.g. 00C1 equals 193 in decimal) of the cell that was scanned. Range: 0-0xFFFFFFF.
	"-"　　　　　Invalid
<cellID>	Hexadecimal format. Cell ID. Determines the 16-bit (GSM) or 28-bit (UMTS) cell ID. Range: 0-0xFFFFFFF.
	"-"　　　　　Invalid
<BSIC>	Integer type. Base station identification code. Range: 0–63.
<arfcn>	Integer type. Determines the ARFCN of the cell that was scanned. Range: 0-1023.
<band>	Integer type. The current band.
	0　　　　　　DCS_1800
	1　　　　　　PCS_1900
	"-"　　　　　Other bands
<rac>	Integer type. Routing area code. Range: 0–255.
<pfreq>	Primary frequency.
<rxlev>	Integer type. RX level value for base station selection in dB (see *3GPP 25.304*). Range: 0-63. Subtracting 111 from the RX level value, a dBm value will be got.
<txp>	Integer type. MS maximum TX power in CCH.
<rla>	Integer type. Minimum access RX level.
<drx>	Integer type. Discontinuous reception cycle length.
<c1>	Integer type. Cell selection criterion.
<c2>	Integer type. Cell reselection criterion.
<gprs>	Integer type. Whether the current cell supports GPRS or not.
	0　　Not support GPRS
	1　　Support GPRS
<tch>	Integer type. In hopping, 'h' is displayed, otherwise the current ARFCN in a voice call is displayed.
<ts>	Integer type. Timeslot number.
<ta>	Integer type. Timing advance for the base station. Range: 0–63.
<maio>	Integer type. Mobile allocation index offset.
<hsn>	Integer type. Hopping sequence number.
<rxqualsub>	Integer type. RX quality (sub). Range: 0–7.
<rxqualfull>	Integer type. RX quality (full). Range: 0–7.
<rxlevsub>	Integer type. RX level (sub). Range: 0–63.

\<rxlevfull\>	Integer type. RX level (full). Range: 0–63.
\<voicecodec\>	String format. Channel mode during a voice call.
	"HR" Half rate
	"FR" Full rate
	"EFR" Enhanced full rate
	"AMR" Adaptive Multi-Rate
	"AMRHR" AMR half rate
	"AMRFR" AMR full rate
	"AMRWB" AMR wide band
	"-" Invalid
\<uarfcn\>	Integer type. UTRA-ARFCN of the cell that was scanned.
\<earfcn\>	Integer type. E-UTRA-ARFCN of the cell that was scanned.
\<psc\>	Integer type. The parameter determines the primary scrambling code of the cell that was scanned.
\<rssi\>	Integer type. Received signal strength indication.
\<sinr\>	Integer type. Logarithmic value of SINR. Range: -20–+30. Unit: dB.
\<rscp\>	Integer type. The received signal code power level of the cell that was scanned.
\<srxlev\>	Integer type. Select RX level value for base station in dB (see *3GPP 25.304*).
\<SF\>	Integer type. Spreading factor. Values are 4, 8, 16, 32, 64, 128, 256, and 512.
	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. Slot format for DPCH (0–16). Slot format for FDPCH (0–9).
\<ComMod\>	Integer type. Whether compress mode is supported.
	0 Not support compress mode
	1 Support compress mode
\<c31\>	Integer type. GPRS cell selection criterion.
\<c32\>	Integer type. GPRS cell reselection criterion.
\<set\>	Integer type. 3G neighbour cell set.
	1 Active Set
	2 Sync Neighbour Set
	3 Async Neighbour Set
\<rank\>	Rank of this cell as neighbour for inter-RAT cell reselection.
\<txpwr\>	Integer type. TX power level for the UE.
\<is_tdd\>	TDD or FDD mode.
\<pcid\>	Physical cell ID
\<freq_band_ind\>	E-UTRA frequency band (see *3GPP 36.101*).
\<ul_bandwidth\>	Integer type. UL bandwidth.

	0	1.4 MHz
	1	3 MHz
	2	5 MHz
	3	10 MHz
	4	15 MHz
	5	20 MHz

<dl_bandwidth> Integer type. DL bandwidth.

	0	1.4 MHz
	1	3 MHz
	2	5 MHz
	3	10 MHz
	4	15 MHz
	5	20 MHz

<tac>	Tracking area code (see *3GPP 23.003 Chapter 19.4.2.3*).
<rsrp>	Reference signal received power (see *3GPP 36.214 Chapter 5.1.1*).
<rsrq>	Reference signal received quality (see *3GPP 36.214 Chapter 5.1.2*).
<thresh_serving_low>	The threshold of **<srxlev>** (in dB) used by the UE on the serving cells when reselecting towards a lower priority RAT/frequency.
<ecio>	Integer type. Carrier to noise ratio in dB = measured Ec/Io value in dB.
<phych>	0 DPCH
	1 FDPCH
<speech_code>	Destination number on which the call is to be deflected.
<rxpwr>	Rx power value in 1/10 dBm resolution.
<ecno>	Integer type. Carrier to noise ratio in dB = measured Ec/Io value in dB.
<srxqual>	Receiver automatic gain control on the camped frequency.
<s_rxlev>	Inter-frequency cell suitable receive level.
<cell_resel_priority>	Integer type.Cell reselection priority. Range: 0–7.
<s_non_intra_search>	Threshold to control non-intra-frequency searches.
<s_intra_search>	Cell selection parameter for the intra-frequency cell.
<serving_cell_id>	Integer type. LTE serving cell ID. This is the cell ID for the serving cell and can be found in the cell list. Range: 0–503.
<threshX_low>	To be referenced when reselection. The suitable receive level value of an evaluated lower priority cell must be greater than this value.
<threshX_high>	To be referenced when reselection. The suitable receive level value of an evaluated higher priority cell must be greater than this value.
<thresh_gsm_high>	Reselection threshold for high priority layers.
<thresh_gsm_low>	Reselection threshold for low priority layers.
<ncc_permitted>	Bitmask that specifies whether a neighbor with a particular network color code is to be reported. Bit n set to 1 means that a neighbor with NCC n is to be included in the report.
<bsic_id>	Base station identity code ID.
<thresh_Xhigh>	Reselection threshold for high priority layers.
<thresh_Xlow>	Reselection threshold for low priority layers.
<cpich_rscp>	Absolute power level of the common pilot channel as received by the UE in

	dBm × 10.
<cpich_ecno>	Ratio of the received energy per PN chip for the common pilot channel to the total received power spectral density at the UE antenna connector in dB×10.
<bcch>	EARFCN. Active channel of the current system.

NOTES

1. If "-" or - is returned, it indicates the parameter is invalid under current condition.
2. 2G neighbour cells have already been visible in idle mode only.

Example

AT+QENG="servingcell"
+QENG: "servingcell","SEARCH"

OK
AT+QENG="servingcell"
+QENG:"servingcell","LIMSRV","GSM",460,01,5504,2B55,52,123,0,-67,5,14,64,30,28,0,-,-,-,-,-,-,-,-,"-"

OK
AT+QENG="servingcell" //Get serving cell information in GSM mode in idle state.
+QENG:"servingcell","NOCONN","GSM",460,01,5504,2B55,52,123,0,-111,5,14,64,0,0,0,-,-,-,-,-,-,-,-,"-"

OK
AT+QENG="servingcell" //Get serving cell information in GSM mode in connected state.
+QENG:"servingcell","CONNECT","GSM",460,00,550A,2BB9,23,94,0,-61,5,14,4,0,0,0,h,1,0,0,33,50,52,0,0,"EFR"

OK
AT +QENG="neighbourcell" //Get neighbour cell information in LTE mode.
+QENG: "neighbourcell intra","LTE",38950,276,-3,-88,-65,0,37,7,16,6,44
+QENG: "neighbourcell inter","LTE",39148,-,-,-,-,37,0,30,7,-,-,-,-
+QENG: "neighbourcell inter","LTE",37900,-,-,-,-,0,0,30,6,-,-,-,-
+QENG: "neighbourcell","GSM",0,3,14,50,255,0,0,-1920,0
+QENG: "neighbourcell","GSM",94,3,14,50,255,0,0,-1920,0
+QENG: "neighbourcell","GSM",93,3,14,50,255,0,0,-1920,0
+QENG: "neighbourcell","GSM",91,3,14,50,255,0,0,-1920,0
+QENG: "neighbourcell","GSM",90,3,14,50,255,0,0,-1920,0
+QENG: "neighbourcell","GSM",89,3,14,50,255,0,0,-1920,0
+QENG: "neighbourcell","GSM",87,3,14,50,255,0,0,-1920,0
+QENG: "neighbourcell","GSM",85,3,14,50,255,0,0,-1920,0

OK
AT+QENG="neighbourcell" //Get neighbour cell information in WCDMA mode.
+QENG: "neighbourcell","WCDMA",10713,-723,398,-880,-155,6,-32768,-
+QENG: "neighbourcell","WCDMA",10713,-723,331,-870,-155,2,-32768,-
+QENG: "neighbourcell","WCDMA",10713,-723,290,-880,-165,2,-32768,-
+QENG: "neighbourcell","WCDMA",10713,-723,397,-910,-190,2,-32768,-
+QENG: "neighbourcell","WCDMA",10713,-723,114,-910,-195,2,-32768,-
+QENG: "neighbourcell","WCDMA",10713,-723,332,-940,-220,2,-32768,-
+QENG: "neighbourcell","WCDMA",10713,-723,379,-950,-230,2,-32768,-
+QENG: "neighbourcell","WCDMA",10713,-723,115,-1210,-250,6,-32768,-

OK
AT+QENG="3gcomm"   //Get common information in WCDMA mode.
+QENG:"3gcomm","servingcell","3G","NOCONN",460,01,D5D6,8062AF1,10713,38,-72,-74,11,25,32
+QENG: "3gcomm","neighbourcell","3G",460,01,D5D6,8062AEF,10713,36,-87,-87,36,0,27
+QENG: "3gcomm","neighbourcell","2G",123,52,-98,12,-5

OK

6.18. AT+CIND   Command of Control Instructions

AT+CIND Command of Control Instructions	
Test Command **AT+CIND=?**	Response **+CIND:(<descr>,(list of supported <ind>s))[,(<descr>,(list of supported <ind>s))[,...]]** **OK**
Read Command **AT+CIND?**	Response **+CIND: <ind>[,<ind>[,...]]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<descr>	String type. Instructions state. See the following notes for details.
<ind>	Integer types. Instructions event. Related to the value of the **<descr>**. see the following notes for details.

<err>	Error codes. For more details, please refer to *Chapter 15.4*.

NOTE

The values of **<descr>** and **<ind>** are described as follows:

<descr>	**<ind>**
"battchg"	Battery charge level. Range: 0-5.
"signal"	Signal strength indication. 0–5: The signal is divided into five levels. The larger the value, the better the signal.
"service"	Network service status indicator. 0 Not registered on the network 1 Registered to the known network
"call"	Call status indication. 0 No call 1 Call
"roam"	Roaming indicator. 0 Registered with the ownership or unregistered network 1 Registered to the roaming network
"smsfull"	A short message memory storage in the MT has become full ('0'), or memory locations are available ('1').
"GPRS coverage"	PS domain registration instructions. 0 Unregistered on PS domain 1 Registered on PS domain
"callsetup"	Call setup call type: 0 None 1 MTRING 2 MOINIT 3 MORING

Example

```
AT+CIND=?
+CIND: ("battchg",(0-5)),("signal",(0-5)),("service",(0-1)),("call",(0-1)),("roam",(0-1)),("smsfull",(0-1)),("GPRS coverage",(0-1)),("callsetup",(0-3))

OK
AT+CIND?
+CIND: 0,3,1,0,0,0,1,0

OK
```

7 Call Related Commands

7.1. ATA   Answer an Incoming Call

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

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

NOTES

1. Any additional commands on the same command line are ignored.
2. This command may be aborted generally by receiving a character during execution. The aborting is not possible during some states of connection establishment such as handshaking.
3. See also **ATX** in *Chapter 2.21*.

Example

RING	//A voice call is ringing
AT+CLCC	
+CLCC: 1,0,0,1,0,"",128	//PS call in LTE mode
+CLCC: 2,1,4,0,0,"02154450290",129	//Incoming call
OK	
ATA	//Accept the voice call with **ATA**
OK	

7.2. ATD   Mobile Originated Call to Dial a Number

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

ATD Mobile Originated Call to Dial a Number	
Execution Command **ATD<n>[<mgsm>][;]**	Response If no dial tone and parameter setting **ATX2** or **ATX4**: **NO DIALTONE** If busy and (parameter setting **ATX3** or **ATX4**): **BUSY** If a connection cannot be established: **NO CARRIER** If connection is successful and non-voice call. **CONNECT <text>** And TA switches to data mode. Note: **<text>** outputs only when **<value>** is greater than 0 in **ATX<value>** parameter setting. When TA returns to command mode after call release: **OK** If connection is successful and voice call: **OK**
Maximum Response Time	5 s, determined by network (**AT+COLP=0**).
Characteristics	/
Reference V.25ter	

Parameter

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

NOTES

1. This command may be aborted generally by receiving an **ATH** command or a character during execution. The aborting is not possible during some states of connection establishment such as handshaking.
2. Parameter "I" and "i" can be omitted only when there is no "*" or "#" code within the dial string.
3. See **ATX** command for setting result code and call monitoring parameters.
4. Responses returned after dialing with ATD
   For voice call, two different responses mode can be determined. TA returns **OK** immediately either after dialing was completed or after the call was established. The setting is controlled by **AT+COLP**. Factory default is **AT+COLP=0**, which causes the TA to return **OK** immediately after dialing was completed. Otherwise TA will return **OK**, **BUSY**, **NO DIAL TONE**, or **NO CARRIER**.
5. Using **ATD** during an active voice call:
   - When a user originates a second voice call while there is already an active voice call, the first call will be automatically put on hold.
   - The current states of all calls can be easily checked at any time by using **AT+CLCC** command.

Example

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

7.3. ATH Disconnect Existing Connection

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

ATH Disconnect Existing Connection	
Execution Command **ATH[n]**	Response Disconnect existing call by local TE from command line and terminate the call. **OK**
Maximum Response Time	90 s, determined by network.
Characteristics	/
Reference V.25ter	

Parameter

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

7.4. AT+CVHU Voice Hang up Control

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

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

Characteristics	/
Reference 3GPP TS 27.007	

Parameter

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

7.5. AT+CHUP   Hang up Voice Call

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

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

Example

```
RING                              //Incoming call.

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

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

This command is only available when TA is in data mode. The "**+++**" character sequence causes the TA to cancel the data flow over the AT interface and switch to command mode. This allows entering AT command while maintaining the data connection with the remote server or, accordingly, the GPRS connection.

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

NOTES

1. To prevent the **+++** escape sequence from being misinterpreted as data, the following sequence should be followed:
   - Do not input any character within 1s before inputting **+++**.
   - Input **+++** within 1s, and no other characters can be inputted during the time.
   - Do not input any character within 1s after **+++** has been inputted.
   - Switch to command mode successfully; otherwise return to Step 1.
2. To return back to data mode from command mode, please enter **ATO**.
3. Another way to change to command mode is through DTR level change, and please refer to **AT&D** command for details.

7.7. ATO Switch from Command Mode to Data Mode

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

ATO Switch from Command Mode to Data Mode	
Execution Command **ATO[n]**	Response If connection is not successfully resumed: **NO CARRIER** If connection is successfully resumed, TA returns to data mode from command mode: **CONNECT <text>**

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

Parameter

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

NOTE

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

7.8. ATS0   Set Number of Rings before Automatical Answering

This command controls automatic answering mode for the incoming calls.

ATS0 Set Number of Rings before Automatical Answering	
Read Command
ATS0? | Response
<n>

OK |
| Write Command
ATS0=<n> | Response
OK |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.
The configuration can be saved with **AT&W**. |
| Reference
V.25ter | |

Parameter

<n>	Integer type. This parameter setting determines the number of rings before auto-answer.
	0 Automatic answering is disabled
	1–255 Enable automatic answering on the ring number specified

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

Example

ATS0=3	//Set three rings before automatically answering a call.
OK	
RING	//A call is coming.
RING	
RING	//Automatically answering the call after three rings.

7.9. ATS6   Set Pause before Blind Dialing

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

ATS6 Set Pause before Blind Dialing	
Read Command **ATS6?**	Response **<n>** **OK**
Write Command **ATS6=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with **AT&W**.
Reference V.25ter	

Parameter

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

7.10. ATS7   Set Time to Wait for Connection Completion

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

ATS7	Set Time to Wait for Connection Completion
Read Command **ATS7?**	Response **<n>** **OK**
Write Command **ATS7=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with **AT&W**.
Reference V.25ter	

Parameter

<n>	Integer type.	
	<u>0</u>	Disabled
	1–255	Number of seconds to wait for connection completion. Unit: second.

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

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

ATS8	Set the Time to Wait for Comma Dial Modifier
Read Command **ATS8?**	Response **<n>** **OK**
Write Command **ATS8=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with **AT&W**.

Reference	
V.25ter	

Parameter

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

7.12. ATS10   Set Disconnection Delay after Indicating the Absence of Data Carrier

This command determines the amount of time (unit: tenths of a second) during which the UE remains connected in absence of a data carrier. If the data carrier is once more detected before disconnection, the TA remains connected.

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

Parameter

\<n\>	Integer type. Number of tenths of seconds to wait before disconnecting after UE has indicated the absence of received line signal. Range: 1–15–255.

7.13. ATS12   Set the Interval for Exiting the Transparent Access Mode Using +++

ATS12 Set the Interval for Exiting the Transparent Access Mode Using +++	
Read Command **ATS12?**	Response **<value>** **OK**
Write Command **ATS12=<value>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with **AT&W**.
Reference V.25ter	

Parameter

<value>   Integer type. The interval for exiting the transparent access mode using **+++**. Range: 10–250. Default: 50. If set the value to 25, it means that the interval is 0.5 s; if set the value to 50, it means that the interval is 1 s; if set the value to 100, it means that the interval is 2 s, and so on.

Example

```
ATS12
050

OK
ATS12=25
OK
```

7.14. AT+CBST   Select Bearer Service Type

This Write Command selects the bearer service **<name>**, the data rate **<speed>** and the connection element **<ce>** to be used when data calls are originated.

AT+CBST Select Bearer Service Type	
Test Command **AT+CBST=?**	Response **+CBST: (**list of supported **<speed>**s**),(**list of supported **<name>**s**),(**list of supported **<ce>**s**)** **OK**
Read Command **AT+CBST?**	Response **+CBST: <speed>,<name>,<ce>** **OK**
Write Command **AT+CBST=[<speed>[,<name>[,<ce>]]]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.007	

Parameter

<speed>	Integer type.	
	0	Automatic speed selection
	7	9600 bps (V.32)
	12	9600 bps (V.34)
	14	14400 bps (V.34)
	16	28800 bps (V.34)
	17	32000 bps (V.34)
	39	9600 bps (V.120)
	43	14400 bps (V.120)
	48	28800 bps (V.120)
	51	56000 bps (V.120)
	71	9600 bps (V.110)
	75	14400 bps (V.110)
	80	28800 bps (V.110 or X.31 flag stuffing)
	81	38400 bps (V.110 or X.31 flag stuffing)
	83	56000 bps (V.110 or X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent UDI or RDI service in order to get FTM)
	84	64000 bps (X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent UDI service in order to get FTM)
	116	64000 bps (bit transparent)
	134	64000 bps (multimedia)

<name>	Integer type.	
	<u>0</u>	Asynchronous Modem
	1	Synchronous Modem
	4	Asynchronous Modem (RDI)
<ce>	Integer type.	
	0	Transparent
	<u>1</u>	Non-transparent

Table 6: Parameter Configurations Supported by AT+CBST

<speed>	GSM	WCDMA	Synchronous Modem	Asynchronous Modem	Asynchronous Modem (RDI)	Transparent	Non-transparent
0	Y	Y	N	Y	N	N	Y
7	Y	N	N	Y	N	N	Y
12	Y	N	N	Y	N	N	Y
14	Y	Y	N	Y	N	N	Y
16	N	Y	N	Y	N	N	Y
17	N	Y	N	Y	N	N	Y
39	Y	N	N	Y	N	N	Y
43	Y	Y	N	Y	N	N	Y
48	N	Y	N	Y	N	N	Y
51	N	Y	N	Y	N	N	Y
71	Y	N	N	Y	N	N	Y
75	Y	Y	N	Y	N	N	Y
80	Y	Y	N	Y	N	N	Y
81	Y	Y	N	Y	N	N	Y
83	Y	Y	N	Y	Y	N	Y
84	N	Y	N	Y	N	N	Y
116	N	Y	Y	N	N	Y	N
134	N	Y	Y	N	N	Y	N

> **NOTE**
>
> *3GPP TS 22.002* lists the allowed combinations of the sub-parameters.

7.15. AT+CSTA   Select Type of Address

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

AT+CSTA Select Type of Address	
Test Command **AT+CSTA=?**	Response **+CSTA: (**list of supported **<type>**s**)** **OK**
Read Command **AT+CSTA?**	Response **+CSTA: <type>** **OK**
Write Command **AT+CSTA=<type>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.007	

Parameter

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

7.16. AT+CLCC   List Current Calls of ME

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

AT+CLCC   List Current Calls of ME

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

Parameter

<idx>	Integer type. Call identification number as described in *3GPP TS 22.030 subclause 4.5.5.1*. This number can be used in **AT+CHLD** command operation.
<dir>	Integer type.
	0 Mobile originated (MO) call
	1 Mobile terminated (MT) call
<stat>	Integer type. State of the call.
	0 Active
	1 Held
	2 Dialing (MO call)
	3 Alerting (MO call)
	4 Incoming (MT call)
	5 Waiting (MT call)
<mode>	Integer type. Bearer/tele service.
	0 Voice
	1 Data
	2 FAX
<mpty>	Integer type.
	0 Call is not one of multiparty (conference) call parties
	1 Call is one of multiparty (conference) call parties
<number>	Phone number in string type in format specified by **<type>**.

\<type\>	Type of address of octet in integer format (refer to *3GPP TS 24.008 subclause 10.5.4.7* for details). Usually, it has three kinds of values:
	129 Unknown type
	145 International type (contains the character "+")
	161 National type
\<alpha\>	Alphanumeric representation of **\<number\>** corresponding to the entry found in phonebook.
\<err\>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

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

7.17. AT+CR   Service Reporting Control

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

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

AT+CR Service Reporting Control	
Test Command **AT+CR=?**	Response **+CR: (**list of supported **\<mode\>**s**)** **OK**
Read Command **AT+CR?**	Response **+CR: \<mode\>** **OK**
Write Command **AT+CR=[\<mode\>]**	Response TA controls whether or not intermediate result code **+CR: \<serv\>** is returned from the TA to the TE when a call is being set up. **OK**

Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.007	

Parameter

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

7.18. AT+CRC   Set Cellular Result Codes for Incoming Call Indication

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

AT+CRC Set Cellular Result Codes for Incoming Call Indication	
Test Command **AT+CRC=?**	Response **+CRC: (**list of supported **<mode>**s**)** **OK**
Read Command **AT+CRC?**	Response **+CRC: <mode>** **OK**
Write Command **AT+CRC=[<mode>]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type.	
	0	Disable extended format
	1	Enable extended format
<type>	ASYNC	Asynchronous transparent
	SYNC	Synchronous transparent
	REL ASYNC	Asynchronous non-transparent
	REL SYNC	Synchronous non-transparent
	FAX	Facsimile
	VOICE	Voice

Example

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


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


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

7.19. AT+CRLP   Select Radio Link Protocol Parameter

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

AT+CRLP Select Radio Link Protocol Parameter	
Test Command **AT+CRLP=?**	Response **+CRLP: (**range of supported **<iws>**s**),(**range of supported **<mws>**s**),(**range of supported **<T1>**s**),(**range of supporte d **<N2>**s**),<ver>** **+CRLP: (**range of supported **<iws>**s**),(**range of supported **<mws>**s**),(**range of supported **<T1>**s**),(**range of supported **<N2>**s**),<ver>** **+CRLP: (**range of supported **<iws>**s**),(**range of supported **<mws>**s**),(**range of supported **<T1>**s**),(**range of supported

	<N2>s**),<ver>** **OK**
Read Command **AT+CRLP?**	Response **+CRLP: <iws>,<mws>,<T1>,<N2>,<ver>** **+CRLP: <iws>,<mws>,<T1>,<N2>,<ver>** **+CRLP: <iws>,<mws>,<T1>,<N2>,<ver>** **OK**
Write Command **AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>]]]]]**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS27.007	

Parameter

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

7.20. 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 and ECC numbers with (U)SIM. The default ECC numbers without (U)SIM is 911, 112, 00, 08, 110, 999, 118 and 119. The default ECC number with (U)SIM is 911 and 112. 911 and 112 will always be supported as ECC numbers, and cannot be deleted. ECC numbers can be saved into NVM automatically. If the (U)SIM card contains ECC file, the numbers in ECC file can

also be regarded as ECC numbers.

The maximal supported ECC numbers of each type is 20.

AT+QECCNUM Configure Emergency Call Numbers	
Test Command **AT+QECCNUM=?**	Response **+QECCNUM: (**range of supported **<mode>**s**)** **OK**
Write Command **AT+QECCNUM=<mode>,<type>[,<ec cnum1>[,<eccnum2>,…[,<eccnumN>]]]**	Response If **<mode>** is equal to 0, query the ECC numbers. In this case, **<eccnumN>** should be omitted: **+QECCNUM: <type>,<eccnum1>,<eccnum2>[…]** **OK** If **<mode>** is not equal to 0: **<mode>**=1 is used to add the ECC number; **<mode>**=2 is used to delete the ECC number. In this case, at least one ECC number **<eccnumN>** should be inputted, and the response is: **OK** Or **ERROR**
Read Command **AT+QECCNUM?**	Response **+QECCNUM: 0,<eccnum1>,<eccnum2>[…]** **+QECCNUM: 1,<eccnum1>,<eccnum2>[…]** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.

Parameter

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

Example

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

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

OK
AT+QECCNUM=0,1                  //Query the ECC numbers with (U)SIM.
+QECCNUM: 1,"911","112"

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

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

OK
```

7.21. AT+QHUP   Hang up Call with a Specific Release Cause

This command can terminate a call or calls (including both voice call and data call) with a specific *3GPP TS 24.008* release cause specified by the host.

AT+QHUP Hang up Call with a Specific Release Cause	
Test Command **AT+QHUP=?**	Response **OK**
Write Command **AT+QHUP=<cause>[,<idx>]**	Response **OK** Or **ERROR** If there is any error related to ME functionality:

	+CME ERROR: <err>
Maximum Response Time	90 s, determined by network.
Characteristics	/

Parameter

<cause>	Integer type. Release cause. *3GPP TS 24.008* release cause to be indicated to the network.

	1	Release cause "unassigned (unallocated) number"
	16	Release cause "normal call clearing"
	17	Release cause "user busy"
	18	Release cause "no user responding"
	21	Release cause "call rejected"
	27	Release cause "destination out of order"
	31	Release cause "normal, unspecified"
	88	Release cause "incompatible destination"

<idx>	Integer type. Call identification number is an optional index in the list of current calls indicated by **AT+CLCC**. **AT+QHUP** will terminate the call identified by the given call number. The default call number 0 is not assigned to any call, but signifies all calls.

	<u>0</u>	Terminate all known calls. However, if circuit switches data calls and voice calls at the same time, this command only terminates the CSD calls.
	1…7	Terminate the specific call with identification number.

<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

```
AT+QHUP=?          //Test Command.
OK
ATD10010;          //Dial 10010.
OK
ATD10086;          //Dial 10086.
OK
AT+CLCC            //Query the status of calls.
+CLCC: 1,0,1,0,0,"10010",129
+CLCC: 2,0,0,0,0,"10086",129

OK
AT+QHUP=17,1       //Terminate the call whose ID is 1. Disconnect cause is "user busy".
OK
AT+CLCC            //Query the status of calls.
+CLCC: 1,0,0,0,0,"10086",129
```

OK
AT+QHUP=16   //Terminate all existed calls. Disconnect cause is "normal call clearing".
OK
AT+CLCC
OK

7.22. AT+QCHLDIPMPTY   Hang Up a Call in the VoLTE Conference

This command hangs up a call in the VoLTE conference.

AT+QCHLDIPMPTY Hang Up a Call in the VoLTE Conference	
Test Command **AT+QCHLDIPMPTY=?**	Response **+QCHLDIPMPTY: \<number>** **OK**
Write Command **AT+QCHLDIPMPTY=\<number>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/

Parameter

\<number>	String of dialing digits and optionally V.25ter modifiers. Dialing digits: 0-9, *, #, +, A, B, C

Example

AT+QCHLDIPMPTY=?   //Test command.
+QCHLDIPMPTY: \<number>

OK
ATD13866783782;   //Establish a call.
OK
AT+CLCC
+CLCC: 2,1,0,1,0,"",128
+CLCC: 1,0,0,0,0,"13866783782",129   //The second call be active.

```
OK
AT+CHLD=2                    //Place the active call on hold and accept the waiting call as the active call.
OK
AT+CLCC                      //Query the status of calls.
+CLCC: 2,1,0,1,0,"",128
+CLCC: 1,0,1,0,0,"13866783782",129    //The second call on hold.

OK
ATD15155196746;              //Establish a call.
OK
AT+CLCC
+CLCC: 2,1,0,1,0,"",128
+CLCC: 1,0,1,0,0,"13866783782",129    //The second call on hold.
+CLCC: 3,1,0,1,0,"",128
+CLCC: 4,0,0,0,0,"15155196746",129    //The fourth call be active.

OK
AT+CHLD=3          //Add a held call to the active calls in order to set up a conference (multiparty) call.
OK
AT+CLCC
+CLCC: 2,1,0,1,0,"",128
+CLCC: 3,1,0,1,0,"",128
+CLCC: 5,0,0,0,0,"sip:mmtel",128

OK
AT+QCHLDIPMPTY="13866783782"     //Hang up a call which is activated.
OK
AT+QCHLDIPMPTY="15155196746"     //Hang up a call which is activated.
OK
```

7.23. AT^DSCI   Call Status Indication

This command configures whether TA enables the presentation of the DSCI at the TE.

AT^DSCI Call status indication	
Test Command AT^DSCI=?	Response ^DSCI: (list of supported **<n>**s) OK
Write Command AT^DSCI?	Response ^DSCI: <n>

	OK
AT^DSCI=<n>	OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.

Parameter

<n>	Integer type.	
	0	DSCI not provisioned
	1	DSCI provisioned

NOTE

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

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

Parameters

<id>	Call ID	
<dir>	Call direction	
<stat>	Call state	
	1	CALL_HOLD
	2	CALL_ORIGINAL
	3	CALL_CONNECT
	4	CALL_INCOMING
	5	CALL_WAITING
	6	CALL_END
	7	CALL_ALERTING
<type>	Call type	
	0	Voice call
	1	PS call
<number>	Phone number	
<num_type>	Type of phone number	
<tone_info>	Information of host play tone	
	0	Host play tone
	1	Host not play tone

<id>, **<dir>**, **<number>**, **<number_type>** should be value set in **AT+CLCC**.

Example

//Dial a call.	
AT^DSCI=1	//Enable DSCI.
OK	
ATD10086;	//Dial 10086.
OK	
^DSCI: 1,0,2,0,10086,129,0	//Call start.
^DSCI: 1,0,7,0,10086,129,0	//Call alerting.
^DSCI: 1,0,3,0,10086,129,0	//Call connect.
ATH	
OK	
^DSCI: 1,0,6,0,10086,129,0	//Call end.
//A call is incoming	
RING	
^DSCI: 1,1,4,0,13022100000,129,0	//Call incoming.
RING	
^DSCI: 1,1,6,0,13022100000,129,0	//Call end.
NO CARRIER	

8 Phonebook Commands

8.1. AT+CNUM Subscriber Number

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

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

Parameter

<alpha>	Optional alphanumeric string associated with **<number>**. The used character set should be the one selected with **AT+CSCS** command.
<number>	String type phone number of format specified by **<type>**.
<type>	Type of address of octet in integer format (See *3GPP TS 24.008*). Usually, it has three kinds of values:
	129 Unknown type
	145 International type (contains the character "+")
	161 National type
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

8.2. AT+CPBF   Find Phonebook Entries

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

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

Parameter

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

<err>	Error codes. For more details, please refer to *Chapter 15.4*.

8.3. AT+CPBR   Read Phonebook Entries

This command reads phonebook entries in location number range **<index1>... <index2>** from the current phonebook memory storage selected with **AT+CPBS**. If **<index2>** is left out, only location **<index1>** is 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** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	Depends on the storage of phonebook entries.
Characteristics	/
Reference 3GPP 27.007	

Parameter

<index>	Integer type. Location numbers of phone book 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 phone book record to read.
<index2>	Integer type. The last phonebook record to read.
<number>	String type. The phone number of format specified by **<type>**.
<type>	Type of address of octet in integer format (see *3GPP TS 24.008*). Usually, it has three kinds of values:
	129 Unknown type

	145	International type (contains the character "+")
	161	National type
<text>		String type. The field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**.
<err>		Error codes. For more details, please refer to *Chapter 15.4*.

8.4. AT+CPBS   Select Phonebook Memory Storage

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

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

Reference	
3GPP 27.007	

Parameter

<storage>	String type. Phonebook memory storage.
	"SM" (U)SIM phonebook
	"DC" ME dialed calls list (**AT+CPBW** may not be applicable to this storage)
	"FD" (U)SIM fix dialing-phone book (**AT+CPBW** operation need the authority of PIN2)
	"LD" (U)SIM last-dialing-phone book (**AT+CPBW** may not be applicable to this storage)
	"MC" ME missed (unanswered) calls list (**AT+CPBW** may not be applicable to this storage)
	"ME" Mobile equipment phonebook
	"RC" ME received calls list (**AT+CPBW** may not be applicable to this storage)
	"EN" (U)SIM (or ME) emergency number (**AT+CPBW** may not be applicable to this storage)
	"ON" (U)SIM own numbers (MSISDNs) list
<used>	Integer type. Indicate the total number of used locations in selected memory.
<total>	Integer type. Indicate the total number of locations in selected memory.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

8.5. AT+CPBW   Write Phonebook Entry

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

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

	If there is any error related to ME functionality: **+CME ERROR: \<err>**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP 27.007	

Parameter

\<index>	Integer type. Location numbers of phone book memory. If **\<index>** is not given, the first free entry will be used. If **\<index>** is given as the only parameter, the phonebook entry specified by **\<index>** is deleted.
\<nlength>	Integer type. Indicate the maximum length of field **\<number>**.
\<tlength>	Integer type. Indicate the maximum length of field **\<text>**.
\<number>	String type phone number of format specified by **\<type>**
\<type>	Type of address of octet in integer format (See *3GPP TS 24.008*). Usually, it has three kinds of values:
	129 Unknown type
	145 International type (contains the character "+")
	161 National type
\<text>	String type field of maximum length **\<tlength>** in current TE character set specified by **AT+CSCS**.
\<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

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

9 Short Message Service Commands

9.1. AT+CSMS   Select Message Service

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

AT+CSMS Select Message Service	
Test Command **AT+CSMS=?**	Response **+CSMS: (**list of supported **<service>**s**)** **OK**
Read Command **AT+CSMS?**	Response **+CSMS: <service>,<mt>,<mo>,<bm>** **OK**
Write Command **AT+CSMS=<service>**	Response **+CSMS: <mt>,<mo>,<bm>** **OK** If there is any error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.005	

Parameter

<service>	Integer type. Type of message service.
0	*3GPP TS 23.040* and *3GPP TS 23.041* (the syntax of SMS AT commands is compatible with *3GPP TS 27.005 Phase 2 version 4.7.0*; Phase 2+ features which do not require new command syntax may be supported, e.g. correct routing of messages with new Phase 2+ data coding schemes).

	1	*3GPP TS 23.040* and *3GPP TS 23.04*1 (the syntax of SMS AT commands is compatible with *3GPP TS 27.005 Phase 2+ version*; the requirement of **<service>** setting 1 is mentioned under corresponding command descriptions).
<mt>		Integer type. Mobile terminated messages.
	0	Type not supported
	<u>1</u>	Type supported
<mo>		Integer type. Mobile originated messages.
	0	Type not supported
	<u>1</u>	Type supported
<bm>		Integer type. Broadcast type messages.
	0	Type not supported
	<u>1</u>	Type supported
<err>		Error codes. For more details, please refer to ***Chapter 15.5***.

Example

AT+CSMS=?	//Test command.
+CSMS: (0,1)	
OK	
AT+CSMS=1	//Set type of message service to 1.
+CSMS: 1,1,1	
OK	
AT+CSMS?	//Read command.
+CSMS: 1,1,1,1	
OK	

9.2. AT+CMGF   Message Format

This command specifies the input and output format of the short messages. **<mode>** indicates the format of messages used with Test, Read, Write and Execution Commands and unsolicited result codes resulting from received messages.

The format of messages can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters). Text mode uses the value of parameter **<chset>** specified by **AT+CSCS** command 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 TA sets parameter to denote which kind of I/O format of messages is used. **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.
Reference 3GPP TS 27.005	

Parameter

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

9.3. AT+CSCA   Service Center Address

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

AT+CSCA Service Center Address	
Test Command **AT+CSCA=?**	Response **OK**
Read Command **AT+CSCA?**	Response **+CSCA: <sca>,<tosca>** **OK**
Write Command	Response

AT+CSCA=<sca>[,<tosca>]	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 will be saved automatically.
Reference 3GPP TS 27.005	

Parameter

<sca>	Service center address. 3GPP TS 24.011 RP SC address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<tosca>**.
<tosca>	Type of service center address. 3GPP TS 24.011 RP SC address Type-of-Address octet in integer format (see **<toda>**).
<err>	Error codes. For more details, please refer to *Chapter 15.5*.

Example

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

OK
```

9.4. AT+CPMS   Preferred Message Storage

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

AT+CPMS Preferred Message Storage	
Test Command **AT+CPMS=?**	Response **+CPMS: (**list of supported **<mem1>**s**),(**list of supported **<mem2>**s**),(**list of supported **<mem3>**s**)** **OK**

Read Command **AT+CPMS?**	Response **+CPMS:** **<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>** **OK**
Write Command **AT+CPMS=<mem1>[,<mem2>[,<mem3>]]**	Response **+CPMS:** **<used1>,<total1>,<used2>,<total2>,<used3>,<total3>** **OK** If there is any error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.005	

Parameter

<mem1>	String type. Messages to be read and deleted from this memory storage.
	"SM" (U)SIM message storage
	"ME" Mobile equipment message storage
	"MT" Same as "ME" storage
	"SR" SMS status report storage location
<mem2>	String type. Messages will be written and sent to this memory storage.
	"SM" (U)SIM message storage
	"ME" Mobile equipment message storage
	"MT" Same as "ME" storage
	"SR" SMS status report storage location
<mem3>	String type. Received messages will be placed in this memory storage if routing to PC is not set (**AT+CNMI**).
	"SM" (U)SIM message storage
	"ME" Mobile equipment message storage
	"MT" Same as "ME" storage
	"SR" SMS status report storage location
<usedx>	Integer type. Number of current messages in **<memx>**.
<totalx>	Integer type. Total number of messages which can be stored in **<memx>**.
<err>	Error codes. For more details, please refer to **Chapter 15.5**.

Example

AT+CPMS?	//Query the current SMS message storage.
+CPMS: "ME",0,255,"ME",0,255,"ME",0,255	
OK	
AT+CPMS="SM","SM","SM"	//Set SMS message storage as "SM".
+CPMS: 0,50,0,50,0,50	
OK	
AT+CPMS?	//Query the current SMS message storage.
+CPMS: "SM",0,50,"SM",0,50,"SM",0,50	
OK	

9.5. AT+CMGD   Delete Message

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

AT+CMGD Delete Message	
Test Command **AT+CMGD=?**	Response **+CMGD: (**range of supported **<index>**s**),(**range of supported **<delflag>**s**)** **OK**
Write Command **AT+CMGD=<index>[,<delflag>]**	Response TA deletes message from preferred message storage **<mem1>** location **<index>**. **OK** If there is any error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms. Note: Operation of **<delflag>** depends on the storage of deleted messages.
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.005	

Parameter

\<index\>	Integer type. Location numbers supported by the associated memory.
\<delflag\>	Integer type.
	0 Delete the message specified in **\<index\>**
	1 Delete all read messages from **\<mem1\>** storage
	2 Delete all read messages from **\<mem1\>** storage and sent mobile originated messages
	3 Delete all read messages from **\<mem1\>** storage, sent and unsent mobile originated messages
	4 Delete all messages from **\<mem1\>** storage
\<mem1\>	String type. Messages to be read and deleted from this memory storage.
	"SM" (U)SIM message storage
	"ME" Mobile equipment message storage
	"MT" Same as "ME" storage
\<err\>	Error codes. For more details, please refer to **Chapter 15.5**.

Example

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

9.6. AT+CMGL   List Message

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

AT+CMGL List Message	
Test Command **AT+CMGL=?**	Response **+CMGL: (**list of supported **\<stat\>**s**)** **OK**
Write Command **AT+CMGL[=\<stat\>]**	Response If in text mode (**AT+CMGF=1**) and the command is executed successfully: For SMS-SUBMITs and/or SMS-DELIVERs: **+CMGL: \<index\>,\<stat\>,\<oa/da\>,[\<alpha\>],[\<scts\>][,\<too**

a/toda>,<length>]<CR><LF><data>[<CR><LF>
+CMGL: <index>,<stat>,<da/oa>,[<alpha>],[<scts>][,<too
a/toda>,<length>]<CR><LF><data>[...]]

For SMS-STATUS-REPORTs:
+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<sct
s>,<dt>,<st>[<CR><LF>
+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<sct
s>,<dt>,<st>[...]]

For SMS-COMMANDs:
+CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF>
+CMGL: <index>,<stat>,<fo>,<ct>[...]]

For CBM storage:
+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><C
R><LF><data>[<CR><LF>
+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><C
R><LF><data>[...]]

OK

If in PDU mode (**AT+CMGF=0**) and the command is executed
successfully:
+CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><p
du><CR><LF>
+CMGL: <index>,<stat>,[alpha],<length><CR><LF><pd
u>[...]]

OK

If there is any error related to ME functionality:
+CMS ERROR: <err>

Execution Command **AT+CMGL**	Response List all messages with "REC UNREAD" status from message storage **<mem1>**, and then the status in the storage changes to "REC READ".
Maximum Response Time	300 ms.
Characteristics	The command takes effect immediately. The configurations will not be saved.
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. Location numbers supported by the associated memory.
\<da\>	Destination Address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **\<toda\>**.
\<oa\>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** command 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** command (see definition of this command in *3GPP TS 27.007*).
\<scts\>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (see **\<dt\>**).
\<toda\>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format.
\<tooa\>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (see **\<toda\>** by default).
\<length\>	Message length. Integer type. Indicate the length of the message body **\<data\>** (or **\<cdata\>**) in characters in the text mode (**AT+CMGF=1**), or the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (i.e. the RP layer SMSC address octets are not counted in the length).
\<data\>	In the case of SMS: 3GPP TS 23.040 TP-User-Data in text mode responses; format:
	- If **\<dcs\>** (see *chapter 9.7*), indicates that 3GPP TS 23.038 GSM 7 bit default alphabet is used and **\<fo\>** (see *Chapter 9.7*) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set.
	- If TE character set other than "HEX" (refer to **AT+CSCS** command in *3GPP TS 27.007*): ME/TA converts GSM alphabet into current TE character set according to rules of **Annex A** in *3GPP TS 27.007*.

- If TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character Π (GSM 7 bit default alphabet 23) is presented as 17 (IRA 49 and 55)).
- If **<dcs>**, indicates that 8-bit or UCS2 data coding scheme is used, or **<fo>** indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).

In the case of CBS: 3GPP TS 23.041 CBM Content of Message in text mode responses; format:
- If **<dcs>**, indicates that 3GPP TS 23.038 GSM 7 bit default alphabet is used:
- If TE character set other than "HEX" (see **AT+CSCS** in *3GPP TS27.007*): ME/TA converts GSM alphabet into current TE character set according to rules of *Annex A* in *3GPP TS 27.007*.
- If TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7 bit default alphabet into two IRA character long hexadecimal number.
- If **<dcs>**, indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number.

<pdu>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) 3GPP TS 27.007.
<fo>	Depends on the command or result code: first octet of 3GPP TS 23.040 [3] SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format.
<mr>	3GPP TS 23.040 [3] TP-Message-Reference in integer format.
<ra>	3GPP TS 23.040 [3] TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (see +CSCS in 3GPP TS 27.007 [9]); type of address given by **<tora>**.
<tora>	3GPP TS 24.011 [6] TP-Recipient-Address Type-of-Address octet in integer format (see **<toda>** by default).
<scts>	3GPP TS 23.040 [3] TP-Service-Centre-Time-Stamp in time-string format (see **<dt>**)
<dt>	3GPP TS 23.040 [3] TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08".
<st>	3GPP TS 23.040 [3] TP-Status in integer format.
<ct>	3GPP TS 23.040 [3] TP-Command-Type in integer format (default 0).
<sn>	3GPP TS 23.041 [4] CBM Serial Number in integer format.
<mid>	3GPP TS 23.041 [4] CBM Message Identifier in integer format.
<page>	3GPP TS 23.041 [4] CBM Page Parameter bits 4-7 in integer format.
<pages>	3GPP TS 23.041 [4] CBM Page Parameter bits 0-3 in integer format.
<mem1>	Messages to be read and deleted from this memory storage

"SM"	(U)SIM message storage	
"ME"	Mobile equipment message storage	
"MT"	Same as "ME" storage	
<err>	Integer type. For details of error codes, please refer to *Chapter 15.5*.	

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	

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

9.7. AT+CMGR   Read Message

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

AT+CMGR Read Message	
Test Command **AT+CMGR=?**	Response **OK**
Write Command **AT+CMGR=<index>**	Response In Non-CDMA mode: If in text mode (**AT+CMGF=1**) and the command is executed successfully: For SMS-DELIVER: **+CMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>** **OK**

For SMS-SUBMIT:
+CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>

OK

For SMS-STATUS-REPORTs:
+CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>

OK

For SMS-COMMANDs:
+CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>], <length><CR><LF><cdata>]

OK
For CBM storage:
+CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>

OK

If in PDU mode (**AT+CMGF=0**) and command   is executed successfully:
+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu>

OK

In CDMA Text mode:
+CMGR: <stat>,<oa/da>,<scts>,<alpha>,<tooa/toda>,<lang>,<fmt>,<length>,<prt>,<prv>,<type><CR><LF><data>

OK
If there is any error related to ME functionality:
+CMS ERROR: <err>

Maximum Response Time	Depends on the length of message content.
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.005	

Parameter

<index>	Integer type value in the range of location numbers supported by the associated memory.
<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** command (see definition of this command in *3GPP TS 27.007*).
<da>	Destination address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<tooa>**.
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**).
<fo>	First octet. Depending on the command or result code: First octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted.
<pid>	Protocol identifier. 3GPP TS 23.040 TP-Protocol-Identifier in integer format (default 0).
<dcs>	Data coding scheme. Depending on the command or result code: 3GPP TS 23.038 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format.
<vp>	Validity period. Depending on SMS-SUBMIT **<fo>** setting: 3GPP TS 23.040 TP-Validity-Period either in integer format or in time-string format (refer to **<dt>**).
<mn>	Message number. 3GPP TS 23.040 TP-Message-Number in integer format.
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<ra>	Recipient address. 3GPP TS 23.040 TP-Recipient-Address Address-Value field in

string format. BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command). The type of address is given by **<tora>**.

<tora>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format (default refer **<toda>**).
<toda>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format.
<tooa>	Type of originating address.3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer to **<toda>**).
<sca>	Service center address. 3GPP TS 24.011 RP SC address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<tosca>**.
<tosca>	Type of service center address. 3GPP TS 24.011 RP SC address Type-of-Address octet in integer format (default refer to **<toda>**).
<length>	Message length. Integer type. Indicating in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**) the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<data>	The text of short message. Please refer *Chapter 14.8* for details.
<pdu>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<prt>	Priority.
	0 Normal
	1 Interactive
	2 Urgent
	3 Emergency
<fmt>	Format.
	0 GSM 7 bit
	1 ASCII
	6 UNICODE
<prv>	Privacy.
	0 Normal
	1 Restricted
	2 Confidential
	3 Secret
<lang>	Language.
	0 Unspecified
	1 English
	2 French
	3 Spanish
	4 Japanese

	5	Korean
	6	Chinese
	7	Hebrew
\<type>	0	Normal
	1	CPT
	2	Voice Mail
	3	SMS Report
\<mem1>	String type. Messages to be read and deleted from this memory storage.	
	"SM"	(U)SIM message storage
	"ME"	Mobile equipment message storage
	"MT"	Same as "ME" storage
\<err>	Error codes. For more details, please refer to *Chapter 15.5*.	

Example

```
+CMTI: "SM",3                    //Indicates that new message has been received and saved
                                   to <index>=3 of "SM".

AT+CSDH=1
OK
AT+CMGR=3                        //Read message.
+CMGR:  "REC   UNREAD","+8615021012496",,"13/12/13,15:06:37+32",145,4,0,0,"+8613800210500",145,27

<This is a test from Quectel>

OK
```

9.8. AT+CMGS   Send Message

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

AT+CMGS Send Message	
Test Command **AT+CMGS=?**	Response **OK**
Write Command 1) If text mode (**AT+CMGF=1**): **AT+CMGS=\<da>[,\<toda>]**\<CR>	Response TA sends message from TE to the network (SMS-SUBMIT). Message reference value **\<mr>** is returned to the TE on

text is entered **<Ctrl+Z/ESC>** ESC quits without sending 2) If PDU mode (**AT+CMGF=0**): **AT+CMGS=<length>**<CR> **PDU is given <Ctrl+Z/ESC>**	successful message delivery. Optionally (when **AT+CSMS** **<service>** value is 1 and network supports) **<scts>** is returned. Values can be used to identify message upon unsolicited delivery status report result code. If in text mode (**AT+CMGF=1**) and sent successfully: **+CMGS: <mr>** **OK** If in PDU mode (**AT+CMGF=0**) and sent successfully: **+CMGS: <mr>** **OK** If there is any error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	120 s, determined by network.
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.005	

Parameter

<da>	Destination address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<toda>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format.
<length>	Integer type. Integer type. Indicating in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length). The maximum length in text mode is 160 bytes. The maximum length in PDU mode is 140 bytes.
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<err>	Error codes. For more details, please refer to *Chapter 15.5*.

NOTES

1. For concatenated messages, the maximum length will be reduced by the length of the user data header (UDH). *3GPP TS 23.040* defines two kinds of UDH length: 6 bytes and 7 bytes, so the two kinds of **<uid>** are 8-bit (6 bytes) and 16-bit (7 bytes). **AT+QCMGS** uses 8-bit **<uid>**.
   - In the case of GSM 7 bit default alphabet data coding scheme, the maximum length of each segment of a concatenated message is (140 octets - 6) × 8/7=153 characters.
   - In the case of 16 bit UCS2 data coding scheme, the maximum length of each segment is (140-6)/2=67 characters.
   - In the case of 8-bit data coding scheme, the maximum length of each segment is 140-6=134 characters.
2. **<mr>**   Message-Reference field gives an integer representation of a reference number of the SMS-SUBMIT or SMS-COMMAND submitted to the SC by the MS, and it is used to confirm whether the SMS-DELIVER has been received from SC duplicate or not.
   <uid> The field of UDH. It is message identification of the concatenated SMS, which is different from **<mr>**. Each segment in a concatenated message should have the same **<uid>**, but **<mr>** must be incremented for each segment of a concatenated message.
3. **AT+QCMGS** does not support to send message in PDU mode (**AT+CMGF=0**).

Example

AT+CMGF=1	//Set SMS message format as text mode.
OK	
AT+CSCS="GSM"	//Set character set as GSM which is used by the TE.
OK	
AT+CMGS="15021012496"	
> <This is a test from Quectel>	//Enter in text. Use **<CTRL+Z>** to send message, or **<ESC>** quits without sending.
+CMGS: 247	
OK	

9.9. AT+CMMS   More Messages to Send

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 open.

AT+CMMS More Messages to Send	
Test Command **AT+CMMS=?**	Response **+CMMS: (**range of supported **<n>**s**)**

	OK
Read Command **AT+CMMS?**	Response **+CMMS: \<n\>** **OK**
Write Command **AT+CMMS=\<n\>**	Response **OK** Or **ERROR** If there is any error related to ME functionality: **+CMS ERROR: \<err\>**
Maximum Response Time	120 s, determined by network.
Characteristics	The command takes effect immediately. The configuration will be saved automatically.
Reference 3GPP TS 27.005	

Parameter

\<n\>	Integer type.	
	0	Feature disabled
	1	Keep enabled until the time between the response of the latest message send command (**AT+CMGS**, **AT+CMSS**, etc.) and the next send command exceeds 1-5 seconds (the exact value is up to ME implementation), and then ME shall close the link and TA switches **\<n\>** back to 0 automatically
	2	Feature enabled (if the time between the response of the latest message send command and the next send command exceeds 1-5 seconds (the exact value is up to ME implementation), ME shall close the link but TA will not switch **\<n\>** back to 0 automatically)
\<err\>	Error codes. For more details, please refer to *Chapter 15.5*.	

NOTE

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

9.10. AT+CMGW   Write Message to Memory

This Write and Execution Commands store short messages from TE to memory storage **<mem2>**, and then the memory location **<index>** of the stored message is returned. Message status will be set to "stored unsent" by default, but parameter **<stat>** also allows other status values to be given.

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

AT+CMGW Write Message to Memory	
Test Command **AT+CMGW=?**	Response **OK**
Write Command 1) If text mode (**AT+CMGF=1**): **AT+CMGW=<oa/da>[,<tooa/toda>[,<stat>]]**<CR> **text is entered** **<Ctrl+Z/ESC>** **<ESC>** quits without sending 2) If PDU mode (**AT+CMGF=0**): **AT+CMGW=<length>[,<stat>]**<CR> **PDU is given <Ctrl+Z/ESC>**	Response If writing is successful: **+CMGW: <index>** **OK** If there is any error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.005	

Parameter

<da>	Destination address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** command in *3GPP TS 27.007*). The type of address given by **<tooa>**.
<tooa>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (see **<toda>** by default).

<stat>	PDU mode	Text mode	Explanation
	0	"REC UNREAD"	Received unread messages

	1	"REC READ"	Received read messages
	2	"STO UNSENT"	Stored unsent messages
	3	"STO SENT"	Stored sent messages
	4	"ALL"	All messages

\<toda\>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format.
\<length\>	Message length. Integer type, indicating the length of the message body **\<data\>** (or **\<cdata\>**) in characters in the text mode (**AT+CMGF=1**), or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
\<pdu\>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.04TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
\<index\>	Index of message in selected storage **\<mem2\>**.
\<err\>	Error codes. For more details, please refer to *Chapter 15.5*.

Example

```
AT+CMGF=1                               //Set SMS message format as text mode.
OK
AT+CSCS="GSM"                           //Set character set as GSM which is used by the TE.
OK
AT+CMGW="15021012496"

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

+CMGW: 4

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

OK
```

9.11. AT+CMSS   Send Message from Storage

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

AT+CMSS Send Message from Storage	
Test Command **AT+CMSS=?**	Response **OK**
Write Command **AT+CMSS=<index>[,<da>[,<toda>]]**	Response If in text mode (**AT+CMGF=1**) and sent successfully: **+CMSS: <mr>[,<scts>]** **OK** If in PDU mode (**AT+CMGF=0**) and sent successfully: **+CMSS: <mr> [,<ackpdu>]** **OK** If there is any error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	120 s, determined by network.
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.005	

Parameter

<index>	Integer type value in the range of location numbers supported by the associated memory.
<da>	Destination Address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (see **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<toda>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format.
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (see **<dt>**).

\<ackpdu\>	The format is the same as **\<pdu\>** in case of SMS, but without 3GPP TS 24.011 SC address field and the parameter shall be bounded by double quote characters like a normal string type parameter.
\<err\>	Error codes. For more details, please refer to **Chapter 15.5**.

Example

AT+CMGF=1	//Set SMS message format as text mode.
OK	
AT+CSCS="GSM"	//Set character set as GSM which is used by the TE.
OK	
AT+CMGW="15021012496"	
> Hello	//Enter in text. Use **\<CTRL+Z\>** to send message or **\<ESC\>** to quit without sending.
+CMGW: 4	
OK	
AT+CMSS=4	//Send the message of index 4 from memory storage.
+CMSS: 54	
OK	

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

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

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

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

Parameter

<n>   Integer type. Parameter required only for PDU mode.
    0   Command operates similarly as in text mode
    1   Send positive (RP-ACK) acknowledgement to the network. Accepted only in PDU mode
    2   Send negative (RP-ERROR) acknowledgement to the network. Accepted only in PDU mode
<err>   Error codes. For more details, please refer to **Chapter 15.5**.

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

Example

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

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

+CMT: "+8615021012496",,"13/03/18,17:07:21+32",145,4,0,0,"+8613800551500",145,28
This is a test from Quectel.   //Short message is outputted directly when an SMS is incoming.

AT+CNMA   //Send ACK to the network.
OK

AT+CNMA
+CMS ERROR：340   //The second time to return error. It needs ACK only once.

9.13. AT+CNMI   SMS Event Reporting Configuration

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

AT+CNMI SMS Event Reporting Configuration	
Test Command **AT+CNMI=?**	Response **+CNMI: (**range of supported **<mode>**s**),(**range of supported **<mt>**s**),(**list of supported **<bm>**s**),(**range of supported **<ds>**s**),(**list of supported **<bfr>**s**)** **OK**
Read Command **AT+CNMI?**	Response **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>** **OK**
Write Command **AT+CNMI[=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]**	Response **OK** Or **ERROR** If there is any error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.005	

Parameter

<mode>	Integer type.
0	Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.
1	Discard indication and reject new received message unsolicited result codes

		when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.
	2	Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.
<mt>		Integer type. The rules for storing received SMS depend on its data coding scheme (refer to *3GPPTS 23.038*) and preferred memory storage (**AT+CPMS**) setting, and the value is:
	0	No SMS-DELIVER indications are routed to the TE.
	1	If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE by using unsolicited result code: **+CMTI: <mem>,<index>**
	2	SMS-DELIVERs (except class 2) are routed directly to the TE using unsolicited result code: **+CMT: [<alpha>],<length><CR><LF><pdu>** (PDU mode enabled) or **+CMT: <oa>,[<alpha>],<scts>[,*<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>, <length>*]<CR><LF><data>** (text mode enabled; about the parameters in italics, see **AT+CSDH**) or **^HCMT: <oa>,<scts>,<lang>,<fmt>,<length>, <prt>,<prv>,<type>,<stat><CR><LF><data>** (text mode for CDMA SMS). Class 2 messages result in indication as defined in **<mt>**=1.
	3	Class 3 SMS-DELIVERs are routed directly to TE by using unsolicited result codes defined in **<mt>**=2. Messages of other classes result in indication as defined in **<mt>**=1.
<bm>		Integer type. The rules for storing received CBMs depend on its data coding scheme (see *3GPP TS 23.038*) and the setting of Select CBM Types (**AT+CSCB**), and the value is:
	0	No CBM indications are routed to the TE.
	2	New CBMs are routed directly to the TE using unsolicited result code: **+CBM: <length><CR><LF><pdu>** (PDU mode); or **+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>** (text mode)
<ds>		Integer type.
	0	No SMS-STATUS-REPORTs are routed to the TE.
	1	SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: **+CDS: <length><CR><LF><pdu>** (PDU mode) **+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>** (text mode)
	2	If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: **+CDSI: <mem>,<index>**
<bfr>		Integer type.
	0	TA buffer of unsolicited result codes defined within this command is flushed to the TE when **<mode>** 1 or 2 is entered (**OK** response shall be given before flushing the codes).
	1	TA buffer of unsolicited result codes defined within this command is cleared when **<mode>** 1 or 2 is entered.
<err>		Error codes. For more details, please refer to *Chapter 15.5*.

> **NOTE**

Unsolicited result code:

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

Example

AT+CMGF=1	//Set SMS message format as text mode.
OK	
AT+CSCS="GSM"	//Set character set as GSM which is used by the TE.
OK	
AT+CNMI=1,2,0,1,0	//Set SMS-DELIVERs are routed directly to the TE.
OK	
+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.

9.14. AT+CSCB   Select Cell Broadcast Message Types

This Write 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 ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.

NOTE

The configuration is stored to NVM.

Parameter

<mode>	Integer type.
	<u>0</u> Message types specified in **<mids>** and **<dcss>** are accepted
	1 Message types specified in **<mids>** and **<dcss>** are not accepted
<mids>	String type. All different possible combinations of CBM message identifiers (refer to **<mid>**) (default is empty string), e.g. "0,1,5,320-478,922"
<dcss>	String type. All different possible combinations of CBM data coding schemes (refer to **<dcs>**) (default is empty string), e.g. "0-3,5"
<err>	Error codes. For more details, please refer to **Chapter 15.5**.

9.15. AT+CSDH   Show SMS Text Mode Parameters

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

AT+CSDH Show SMS Text Mode Parameters	
Test Command **AT+CSDH=?**	Response **+CSDH: (**list of supported **<show>**s**)** **OK**
Read Command **AT+CSDH?**	Response **+CSDH: <show>** **OK**
Write Command **AT+CSDH[=<show>]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.005	

Parameter

<show>		Integer type.
	<u>0</u>	Do not show header values defined in commands **+CSCA**, **+CSMP** (**<sca>**, **<tosca>**, **<fo>**, **<vp>**, **<pid>**, **<dcs>**) and **<length>**, **<toda>** or **<tooa>** in **+CMT**, **+CMGL**, **+CMGR** result codes for SMS-DELIVERs and SMS-SUBMITs in text mode
	1	Show the values in result codes

Example

```
AT+CSDH=0
OK
AT+CMGR=2
+CMGR: "STO UNSENT" ,"",

<This is a test from Quectel>

OK
AT+CSDH=1
OK
AT+CMGR=2
+CMGR: "STO UNSENT","",,128,17,0,0,143,"+8613800551500",145,18

<This is a test from Quectel>

OK
```

9.16. AT+CSMP   Set SMS Text Mode Parameters

This command sets values for additional parameters needed when a short message is sent to the network or placed in a storage in text mode.

AT+CSMP Set SMS Text Mode Parameters	
Test Command **AT+CSMP=?**	Response **OK**
Read Command **AT+CSMP?**	Response **+CSMP: <fo>,<vp>,<pid>,<dcs>** **OK**
Write Command **AT+CSMP=<fo>[,<vp>[,<pid>[,<dcs>]]]**	Response TA selects values for additional parameters needed when SM is sent to the network or placed in a storage when text mode is selected (**AT+CMGF=1**). It is possible to set the validity period starting from when the SM is received by the SMSC

	(**\<vp\>** ranges from 0 to 255) or define the absolute time of the validity period termination (**\<vp\>** is a string). **OK**
Maximum Response Time	300 ms
Characteristics	/
Reference 3GPP TS 27.005	

Parameter

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

9.17. AT+QCMGS   Send Concatenated Messages

This command sends concatenated massages. Different from **AT+CMGS**, when sending a concatenated message via this command, each segment of the concatenated message must be identified by the additional parameters: **\<uid\>**, **\<msg_seg\>** and **\<msg_total\>**. When sending all segments of the message one by one, **AT+QCMGS** must be executed multiple times (equal to **\<msg_total\>**) for each segment. This command is only used in text mode (**AT+CMGF**=1).

AT+QCMGS Send Concatenated Messages	
Test Command **AT+QCMGS=?**	Response **OK**
Write Command If text mode (**+CMGF=1**): **AT+QCMGS=\<da\>[,\<toda\>],\<uid\>,\<msg_seg\>,\<msg_total\>**\<CR\> **text is entered** **\<Ctrl+Z/ESC\>**	Response If in text mode (**AT+CMGF**=1) and sent successfully: **+QCMGS: \<mr\>** **OK** Or **ERROR** If there is any error related to ME functionality:

	+CMS ERROR: <err>
Maximum Response Time	120 s, determined by network.
Characteristics	/

Parameter

<uid>	Integer type. Message identification in the user data header (UDH). Range: 0–255. This parameter is defined and inputted by the user. All segments of a same concatenated message must have the same **<uid>**. Different concatenated messages should have different **<uid>**.
<msg_seg>	Integer type. Sequence number of a concatenated message. Range: 0–7. **<msg_seg>**=0 means: ignore the value and regard it as a non-concatenated message.
<msg_total>	Integer type. The total number of the segments of one concatenated message. Range: 0–7. **<msg_total>**=0 or 1 means: ignore the value and regard it as a non-concatenated message.
<da>	Please refer to **AT+CMGS**.
<toda>	Please refer to **AT+CMGS**.
<mr>	Please refer to **AT+CMGS**.
<err>	Integer type. For details of error codes, please refer to *Chapter 15.5*.

NOTES

1. For concatenated messages, the maximum length will be reduced by the length of the user data header (UDH). *3GPP TS 23.040* defines two kinds of UDH length: 6 bytes and 7 bytes, so the two kinds of **<uid>** are 8-bit (6 bytes) and 16-bit (7 bytes). **AT+QCMGS** uses 8-bit **<uid>**.
   - In the case of GSM 7 bit default alphabet data coding scheme, the maximum length of each segment of a concatenated message is (140 octets - 6) $\times$ 8/7=153 characters.
   - In the case of 16 bit UCS2 data coding scheme, the maximum length of each segment is (140-6)/2=67 characters.
   - In the case of 8-bit data coding scheme, the maximum length of each segment is 140-6=134 characters.
2. **<mr>** Message-Reference field gives an integer representation of a reference number of the SMS-SUBMIT or SMS-COMMAND submitted to the SC by the MS, and it is used to confirm whether the SMS-DELIVER has been received from SC duplicate or not.
   <uid> The field of UDH. It is message identification of the concatenated SMS, which is different from **<mr>**. Each segment in a concatenated message should have the same **<uid>**, but **<mr>** must be incremented for each segment of a concatenated message.
3. **AT+QCMGS** does not support to send message in PDU mode (**AT+CMGF=0**).

Example

AT+CMGF=1	//Set SMS message format as text mode.
OK	
AT+CSCS="GSM"	//Set character set as GSM which is used by the TE.
OK	
AT+QCMGS="15056913384",120,1,2 <CR>	//Input 120 for **<uid>**, and send the first segment of the concatenated SMS.
>ABCD<Ctrl-Z>	
+QCMGS: 190	
OK	
AT+QCMGS="15056913384",120,2,2 <CR>	//Send the second segment of the concatenated SMS.
>EFGH<Ctrl-Z>	
+QCMGS: 191	
OK	

9.18. AT+QCMGR　Read Concatenated Messages

The function of this command is similar to **AT+CMGR**, except that the message to be read is a segment of concatenated messages, and parameters **<uid>**, **<msg_seg>** and **<msg_total>** would be shown in the result. Several segments should be concatenated to a whole concatenated message according to these three parameters. Similar to **AT+QCMGS**, **AT+QCMGR** is only used in text mode (**AT+CMGF=1**).

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

	<CR><LF><data> **OK** For SMS-STATUS-REPORTs: **+QCMGR:** **<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>** **OK** For SMS-COMMANDs: **+QCMGR:** **<stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length>** **<CR><LF><cdata>]** **OK** Else, If there is any error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	Depends on the length of message content.
Characteristics	/

Parameter

<uid>	Integer type. Message identification in the user data header (UDH). Range: 0–65535 (see NOTES). All segments of a same concatenated message have same **<uid>**. Different concatenated messages should have different **<uid>**.
<msg_seg>	Integer type. Sequence number of a concatenated message. Range: 1–7.
<msg_total>	Integer type. The total number of the segments of one concatenated message. Range: 2–7. Other parameters please refer to **AT+CMGR**
<err>	Integer type. For details of error codes, please refer to *Chapter 15.5*.

NOTES

1. The **<uid>** in **AT+QCMGR** is different from the **<uid>** in **AT+QCMGS**. It is possible that UE receives concatenated messages with 8-bit or 16-bit **<uid>**. So its maximal value is 255 with 8-bit and 65535 with 16-bit.
2. If the message to be read is not a concatenated message, **<uid>**, **<msg_seg>** and **<msg_total>** would not be shown in the result.

Example

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

+CMTI: "SM",4            //The second message of a concatenated message comes.
AT+QCMGR=3              //Read the first segment of the concatenated message.
+QCMGR: "REC UNREAD","+8615056913384",,"13/07/30,14:44:37+32",120,1,2
ABCD

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

OK
```

10 Packet Domain Commands

10.1. AT+CGATT   Attachment or Detachment of PS

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

AT+CGATT Attachment or Detachment of PS	
Test Command **AT+CGATT=?**	Response **+CGATT: (**list of supported **<state>**s**)** **OK**
Read Command **AT+CGATT?**	Response **+CGATT: <state>** **OK**
Write Command **AT+CGATT=<state>**	Response **OK** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	140 s, determined by network.
Characteristics	Whether the command takes effect determined by network. The configuration will not be saved.
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 codes. For more details, please refer to *Chapter 15.4*.

Example

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

10.2. AT+CGDCONT   Define PDP Context

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

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

AT+CGDCONT Define PDP Context	
Test Command **AT+CGDCONT=?**	Response **+CGDCONT: (**range of supported **<cid>**s**),<PDP_type>,< APN>,<PDP_addr>,(**range of supported **<data_comp>**s),** (**range of supported **<head_comp>**s),(**list of supported **<I Pv4_addr_alloc>**s),(**list of supported **<request_type>**s)** **OK**
Read Command **AT+CGDCONT?**	Response **+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<da ta_comp>,<head_comp>,<IPv4_addr_alloc>,<request_ty pe>** **[…]** **OK**
Write Command **AT+CGDCONT=<cid>[,<PDP_type>[,< APN>[,<PDP_addr>[,<data_comp>[,< head_comp>[,<IPv4_addr_alloc>[,<re quest_type>]]]]]]]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

	The configurations will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. PDP context identifier. A numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1) is returned by the test form of the command.
<PDP_type>	String type. Packet data protocol type, a string parameter which specifies the type of packet data protocol. "IP"　　　　Internet Protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6"
<APN>	String type. Access point name, a string parameter that is a logical name used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.
<PDP_addr>	String type. Identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The allocated address may be read with **AT+CGPADDR**.
<data_comp>	Integer type. Controls PDP data compression (applicable for SNDCP only) (refer to *3GPP TS 44.065*). 0　　　Off (Default if value is omitted) 1　　　On (Manufacturer preferred compression) 2　　　V.42bis
<head_comp>	Integer type. Controls PDP header compression (refer to *3GPP TS 44.065* and *3GPP TS 25.323*). 0　　　Off (Default if value is omitted) 1　　　On 2　　　RFC1144 3　　　RFC2507 4　　　RFC3095
<IPv4_addr_alloc>	Integer type. Controls how the MT/TA requests to get the IPv4 address information. 0　　　　IPv4 address allocation through NAS signaling 1　　　　IPv4 address allocated through DHCP
<request_type>	Integer type. Indicate the type of PDP context activation request for the PDP context. 0　　　　PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP

	1	context is for new PDP context establishment or for handover is implementation specific). PDP context is for emergency bearer services

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

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

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**),(**range of supported **<mean>**s**)** **OK**
Read Command **AT+CGQREQ?**	Response **+CGQREQ:[<cid>,<precedence>,<delay>,>reliability>,<peak>,<mean>]** **[+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 will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
<PDP_type>	String type. Packet Data Protocol type.
	"IP" Internet Protocol (IETF STD 5)
	"PPP"
	"IPV6"
	"IPV4V6"
<precedence>	Integer type. Specifies the precedence class.
	<u>0</u> Network subscribed value
	1 High Priority. Service commitments shall be maintained ahead of precedence classes 2 and 3
	2 Normal priority. Service commitments shall be maintained ahead of precedence class 3
	3 Low priority. Service commitments shall be maintained
<delay>	Integer type. Specifies the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. For the details, please refer to *Table 6*.
	<u>0</u> Network subscribed value
<reliability>	Integer type. Specifies the reliability class.
	<u>0</u> 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.
	<u>0</u> 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>	A numeric parameter which specifies the mean throughput class, in octets per hour.
	<u>0</u> 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	1000 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 codes. For more details, please refer to *Chapter 15.4*.

Table 7: Delay Class

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

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

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

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

AT+CGQMIN Quality of Service Profile (Minimum Acceptable)	
Test Command **AT+CGQMIN=?**	Response **+CGQMIN: <PDP_type>,(**range of supported **<precedence>**s**),(**range of supported **<delay>**s**),(**range of supported **<reliability>**s**),(**range of supported **<peak>**s**),(**range of supported **<mean>**s**)** **OK**
Read Command **AT+CGQMIN?**	Response **+CGQMIN:[<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>]** **[+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>]** **[…]** **OK**
Write Command **AT+CGQMIN=<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]**	Response **OK** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
<PDP_type>	String type. Packet Data Protocol type.

	"IP"	IPv4. Internet Protocol (IETF STD 5).
	"PPP"	
	"IPV6"	
	"IPV4V6"	
<precedence>	Integer type. Specifies the precedence class.	
	0	Network subscribed value
	1	High Priority. Service commitments shall be maintained ahead of precedence classes 2 and 3
	2	Normal priority. Service commitments shall be maintained ahead of precedence class 3
	3	Low priority. Service commitments shall be maintained
<delay>	Integer type. Specifies the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. For the detail please refer to *Table 6*.	
	0	Network subscribed value
<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	1000 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 codes. For more details, please refer to ***Chapter 15.4***.	

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

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

AT+CGEQREQ UMTS Quality of Service Profile (Requested)	
Test Command **AT+CGEQREQ=?**	Response **+CGEQREQ: <PDP_type>,(**range of supported **<Traffic class>**s**),(**range of supported **<Maximum bitrate UL>**s**),(**range of supported **<Maximum bitrate DL>**s**),(**range of supported **<Guaranteed bitrate UL>**s**),(**range of supported **<Guaranteed bitrate DL>**s**),(**range of supported **<Delivery order>**s**),(**listof supported **<Maximum SDU size>**s**),(**list of supported **<SDU error ratio>**s**),(**list of supported **<Residual bit error ratio>**s**),(**range of supported **<Delivery of erroneous SDUs>**s**),(**list of supported **<Transfer delay>**s**),(**range of supported **<Traffic handling priority>**s**),(**list of supported **<Source statistics descriptor>**s**),(**list of supported **<Signalling indication>**s)** **OK**
Read Command **AT+CGEQREQ?**	Response **+CGEQREQ:[<cid>,<Traffic class>,<Maximum bitrate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,< Guaranteed bitrate DL>,<Delivery order>,<Maximum S DU size>,<SDU error ratio>,<Residual bit error ratio>, <Delivery of erroneous SDUs>,<Transfer delay>,<Traffi**

	c handling priority>,<Source statistics descriptor>,<Signalling indication>] [...] OK
Write Command **AT+CGEQREQ=[<cid>[,<Traffic class>[,<Maximum bitrate UL>[,<Maximum bitrate DL>[,<Guaranteed bitrate UL>[,<Guaranteed bitrate DL>[,<Delivery order>[,<Maximum SDU size>[,<SDU error ratio>[,<Residual bit error ratio>[,<Delivery of erroneous SDUs>[,<Transfer delay>[,<Traffic handling priority>[,<Source statistics descriptor>[,<Signalling indication>]]]]]]]]]]]]]]]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. PDP context identifier, a numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value=1) is returned by the test form of the command.
<PDP_type>	String type. Packet data protocol type, a string parameter which specifies the type of packet data protocol. "IP"　　　IPv4. Internet protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6"
The following parameters are defined in *3GPP TS 23.107*	
<Traffic class>	Integer type. Indicates the type of application for which the UMTS bearer service is optimized (refer to *3GPP TS 24.008 subclause 10.5.6.5*). If the parameter is specified as conversational or streaming, then the Guaranteed and Maximum bitrate parameters should also be provided. 0　　　Conversational

	1	Streaming
	2	Interactive
	3	Background
	<u>4</u>	Subscribed value
\<Maximum bitrate UL\>	\multicolumn{2}{l}{Integer type. Indicates the maximum number of kbits/s delivered to UMTS (uplink traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (e.g. **AT+CGEQREQ=…,32,…**).}
	<u>0</u>	Subscribed value
	1–11520	
\<Maximum bitrate DL\>	\multicolumn{2}{l}{Integer type. Indicates the maximum number of kbits/s delivered by UMTS (downlink traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (e.g. **AT+CGEQREQ=…,32,…**).}
	<u>0</u>	Subscribed value
	1–42200	
\<Guaranteed bitrate UL\>	\multicolumn{2}{l}{Integer type. Indicates the guaranteed number of kbits/s delivered to UMTS (uplink traffic) at an SAP (provided that there is data to deliver). As an example, a bitrate of 32 kbit/s would be specified as 32 (e.g. **AT+CGEQREQ=…,32,…**).}
	<u>0</u>	Subscribed value
	1–11520	
\<Guaranteed bitrate DL\>	\multicolumn{2}{l}{Integer type. Indicates the guaranteed number of kbits/s delivered by UMTS (downlink traffic) at an SAP (provided that there is data to deliver). As an example, a bitrate of 32 kbit/s would be specified as 32 (e.g. **AT+CGEQREQ=…,32,…**).}
	<u>0</u>	Subscribed value
	1–42200	
\<Delivery order\>	\multicolumn{2}{l}{Integer type. Indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer to *3GPP TS 24.008 subclause 10.5.6.5*).}
	0	No
	1	Yes
	<u>2</u>	Subscribed value
\<Maximum SDU size\>	\multicolumn{2}{l}{Integer type. (1,2,3,…) indicates the maximum allowed SDU size in octets. If the parameter is set to 0 the subscribed value will be requested (refer to *3GPP TS 24.008 subclause 10.5.6.5*).}
	<u>0</u>	Subscribed value
	10–1520	(This value needs to be divisible by 10 without remainder)
	1520	
\<SDU error ratio\>	\multicolumn{2}{l}{String type. Indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as "mEe". As an example, a target SDU error ratio of 5×10^{-3} would be specified as "5E3" (e.g. **AT+CGEQREQ=…,"5E3",…**).}
	"<u>0E0</u>"	Subscribed value

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

	0	Subscribed
	1	
	2	
	3	
<Source statistics descriptor>	Integer type. Specifies characteristics of the source of the submitted SDUs for a PDP context.	
	0	Characteristics of SDUs is unknown
	1	Characteristics of SDUs correspond to a speech source
<Signalling indication>	Integer type. Indicates signaling content of submitted SDUs for a PDP context.	
	0	PDP context is not optimized for signaling
	1	PDP context is optimized for signaling

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

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

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

	nalling indication>] **[…]** **OK**
Write Command **AT+CGEQMIN=[<cid>[,<Traffic class>[,<Maximum bitrate UL>[,<Maximum bitrate DL>[,<Guaranteed bitrate UL>[,<Guaranteed bitrate DL>[,<Delivery order>[,<Maximum SDU size>[,<SDU error ratio>[,<Residual bit error ratio>[,<Delivery of erroneous SDUs>[,<Transfer delay>[,<Traffic handling priority>[,<Source statistics descriptor>[,<Signalling indication>]]]]]]]]]]]]]]]**	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 will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<cid>	Integer type. PDP context identifier. A numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1) is returned by the test form of the command.
<PDP_type>	String type Packet data protocol type. A string parameter which specifies the type of packet data protocol. "IP"　　　IPv4 "PPP" "IPV6" "IPV4V6"
The following parameters are defined in *3GPP TS 23.107*.	
<Traffic class>	Integer type. Indicates the type of application for which the UMTS bearer service is optimized (refer to *3GPP TS 24.008 subclause 10.5.6.5*). If the parameter is specified as conversational or streaming, then the Guaranteed and Maximum bitrate parameters should also be provided. 0　　　Conversational

	1 Streaming
	2 Interactive
	3 Background
	<u>4</u> Subscribed value
\<Maximum bitrate UL\>	Integer type. Indicates the maximum number of kbits/s delivered to UMTS (uplink traffic) at an SAP. As an example, a bitrate of 32 kbit/s would be specified as 32 (e.g. **AT+CGEQREQ=…,32,…**).
	<u>0</u> Subscribed value
	1–11520
\<Maximum bitrate DL\>	Integer type. Indicates the maximum number of kbits/s delivered by UMTS (downlink traffic) at an SAP. As an example, a bitrate of 32 kbit/s would be specified as 32 (e.g. **AT+CGEQREQ=…,32,…**).
	<u>0</u> Subscribed value
	1–42200
\<Guaranteed bitrate UL\>	Integer type. Indicates the guaranteed number of kbits/s delivered to UMTS (uplink traffic) at an SAP (provided that there is data to deliver). As an example, a bitrate of 32 kbit/s would be specified as 32 (e.g. **AT+CGEQREQ=…,32,…**).
	<u>0</u> Subscribed value
	1–11520
\<Guaranteed bitrate DL\>	Integer type. Indicates the guaranteed number of kbits/s delivered by UMTS (downlink traffic) at an SAP (provided that there is data to deliver). As an example, a bitrate of 32 kbit/s would be specified as 32 (e.g. **AT+CGEQREQ=…,32,…**).
	<u>0</u> Subscribed value
	1–42200
\<Delivery order\>	Integer type. Indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer to *3GPP TS 24.008 subclause 10.5.6.5*).
	0 No
	1 Yes
	<u>2</u> Subscribed value
\<Maximum SDU size\>	Integer type. (1,2,3,…) indicates the maximum allowed SDU size in octets. If the parameter is set to 0 the subscribed value will be requested (refer to *3GPP TS 24.008 subclause 10.5.6.5*).
	<u>0</u> Subscribed value
	10–1520 (This value needs to be divisible by 10 without remainder)
	1502
\<SDU error ratio\>	String type. Indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as mEe. As an example a target SDU error ratio of 5×10^{-3} would be specified as "5E3" (e.g. **AT+CGEQREQ=…,"5E3",…**).
	"<u>0E0</u>" Subscribed value

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

	Range: 0–3. Default: 0.
<Source statistics descriptor>	Integer type. Specifies characteristics of the source of the submitted SDUs for a PDP context.
	0　　　Characteristics of SDUs are unknown
	1　　　Characteristics of SDUs corresponds to a speech source
<Signalling indication>	Integer type. Indicates signaling content of submitted SDUs for a PDP context.
	0　　　PDP context is not optimized for signaling
	1　　　PDP context is optimized for signaling
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

10.7. AT+CGACT　Activate or Deactivate PDP Context

This Write Command activates or deactivates the specified PDP context(s). After the command has completed, the MT remains in V.250 command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the MT is not PS attached when the activation form of the command is executed, the MT first performs a PS attach and then attempts to activate the specified contexts. If no **<cid>**s specify the activation/deactivation form of the command, it will activate or deactivate all defined contexts.

AT+CGACT　Activate or Deactivate PDP Context	
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 ME functionality: **+CME ERROR: <err>**
Maximum Response Time	150 s, determined by network.
Characteristics	Whether the command takes effect is determined by network. The configurations will not be saved.

Reference	
3GPP TS 27.007	

Parameter

<state>	Integer type. Indicates the state of PDP context activation.
	0 Deactivated
	1 Activated
	Other values are reserved and will result in an **ERROR** response to the Write Command
<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

Example

```
AT+CGDCONT=1,"IP","UNINET"          //Define PDP context.
OK
AT+CGACT=1,1                        //Activated PDP.
OK
AT+CGACT=0,1                        //Deactivated the PDP.
OK
```

10.8. AT+CGDATA   Enter Data State

This Write Command causes the MT to perform whatever actions that are necessary to establish communication between the TE and the network using one or more packet domain PDP types. This may include performing a PS attach and one or more PDP context activations. Any command following the **AT+CGDATA** in the AT command line will not be processed by the MT.

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

AT+CGDATA Enter Data State	
Test Command **AT+CGDATA=?**	Response **+CGDATA: (**list of supported **<L2P>**s**)** **OK**
Write Command **AT+CGDATA=<L2P>[,<cid>[,<cid>[,…** **]]]**	Response **CONNECT** Or

	ERROR
	If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	Whether the command takes effect is determined by network. The configurations will not be saved.
Reference 3GPP TS 27.007	

Parameter

<L2P>	String type. Indicates the layer 2 protocol to be used between the TE and MT: PPP Point to Point protocol for a PDP such as IP Other values are not supported and will result in an **ERROR** response to the Execution Command
<cid>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

10.9. AT+CGPADDR   Show PDP Address

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

AT+CGPADDR Show PDP Address	
Test Command **AT+CGPADDR=?**	Response **+CGPADDR: (**list of defined **<cid>**s**)** OK
Write Command **AT+CGPADDR[=<cid>[,<cid>[,…]]]**	Response **+CGPADDR: <cid>,<PDP_addr>** **[+CGPADDR: <cid>,<PDP_addr>** **…]** OK Or **ERROR**
Maximum Response Time	300 ms
Characteristics	Whether the command takes effect is determined by network.

	The configurations will not be saved.
Reference 3GPP TS 27.007	

Parameter

\<cid\>	Integer type. Specifies a particular PDP context definition (see **AT+CGDCONT**).
\<PDP_addr\>	String type. Identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by **AT+CGDCONT** when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by **\<cid\>**. **\<PDP_address\>** is omitted if none is available.

Example

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

OK
```

10.10. AT+CGCLASS   GPRS Mobile Station Class

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

AT+CGCLASS GPRS Mobile Station Class	
Test Command **AT+CGCLASS=?**	Response **+CGCLASS: (**list of supported **\<class\>**s**)** **OK**
Read Command **AT+CGCLASS?**	Response **+CGCLASS: \<class\>** **OK**
Write Command **AT+CGCLASS=\<class\>**	Response **OK**

	Or
	ERROR
	If there is any error related to ME functionality:
	+CME ERROR: <err>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.
	The configuration will be saved automatically.
Reference	
3GPP TS 27.007	

Parameter

<class>	String type. Indicates the GPRS mobile class (Functionality in descending order)
	"A" Class A
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

10.11. AT+CGREG   Network Registration Status

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

AT+CGREG Network Registration Status	
Test Command **AT+CGREG=?**	Response **+CGREG: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CGREG?**	Response **+CGREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]]** **OK**
Write Command **AT+CGREG[=<n>]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

	The configuration will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

\<n\>	Integer type. Control the presentation of the specified URC.
	<u>0</u> 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\>]]**
\<stat\>	Integer type. Network 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 currently 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. 16 bit (GSM) or 28 bit (UMTS/LTE) cell ID in hexadecimal format.
\<AcT\>	Integer type. Access technology selected.
	0 GSM
	2 UTRAN
	3 GSM W/EGPRS
	4 UTRAN W/HSDPA
	5 UTRAN W/HSUPA
	6 UTRAN W/HSDPA and HSUPA
	7 E-UTRAN

Example

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

```
+CGREG: 2
AT+CGATT=1
OK


+CGREG: 1,"D504","80428B5",7
```

10.12. AT+CGEREP   Packet Domain Event Reporting

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

AT+CGEREP Packet Domain Event Reporting	
Test Command **AT+CGEREP=?**	Response **+CGEREP: (**range of supported **<mode>**s**),(**list of supported **<bfr>**s**)** **OK**
Read Command **AT+CGEREP?**	Response **+CGEREP: <mode>,<bfr>** **OK**
Write Command **AT+CGEREP=mode[,<bfr>]**	Response **OK** Or **ERROR**
Execution Command **AT+CGEREP**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved automatically.
Reference 3GPP TS 27.007	

Parameter

<mode>   Integer type. Controls the processing of unsolicited result codes specified within this command.

	<u>0</u>	Buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.
	1	Discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode), otherwise forward them directly to the TE.
	2	Buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in 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. Controls the effect on buffered codes.
	<u>0</u>	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.
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.

Example

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

OK
AT+CGEREP?
+CGEREP: 0,0

OK

10.13. 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　GPRS
	<u>1</u>　Circuit switch

	2	GPRS preferred (use circuit switched if GPRS not available)
	3	Circuit switch preferred (use GPRS if circuit switched not available)
<err>		Error codes. For more details, please refer to *Chapter 15.4*.

10.14. AT+CEREG   EPS Network Registration Status

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

AT+CEREG EPS Network Registration Status	
Test Command **AT+CEREG=?**	Response **+CEREG: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CEREG?**	Response **+CEREG: <n>,<stat>[,<tac>,<ci>[,<AcT>]]** **OK**
Write Command **AT+CEREG[=<n>]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Controls the presentation of an unsolicited result code **+CEREG: <stat>**.
	<u>0</u> 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.
	0 Not registered. MT is not currently searching an operator to register to
	1 Registered, home network

	2	Not registered, but MT is currently trying to attach or searching an operator to register to
	3	Registration denied
	4	Unknown
	5	Registered, roaming
<tac>		String type. Two-byte tracking area code in hexadecimal format.
<ci>		String type. 28-bit E-UTRAN cell ID in hexadecimal format.
<AcT>		Integer type. Access technology selected.
	0	GSM
	2	UTRAN
	3	GSM W/EGPRS
	4	UTRAN W/HSDPA
	5	UTRAN W/HSUPA
	6	UTRAN W/HSDPA and HSUPA
	7	E-UTRAN

10.15. AT+QGDCNT   Packet Data Counter

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

AT+QGDCNT Packet Data Counter	
Test Command **AT+QGDCNT=?**	Response **+QGDCNT: (**list of supported **<op>**s**)** **OK**
Read Command **AT+QGDCNT?**	Response **+QGDCNT: <bytes_sent>,<bytes_recv>** **OK**
Write Command **AT+QGDCNT=<op>**	Response **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	Whether the command takes effect is determined by network. The configuration will not be saved.

Parameter

<op>	Integer type. The operation about data counter.
	0 Reset the data counter
	1 Save the results of data counter to NVM
	If results need to be automatically saved, please refer to **AT+QAUGDCNT**.
<bytes_sent>	Integer type. The amount of sent bytes.
<bytes_recv>	Integer type. The amount of received bytes.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

NOTE

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

Example

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

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

OK
AT+QGDCNT=1          //Save the results to NVM.
OK
AT+QGDCNT=0          //Reset the data counter.
OK
```

10.16. AT+QAUGDCNT　Auto Save Packet Data Counter

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

AT+QAUGDCNT　Auto Save Packet Data Counter	
Test Command **AT+QAUGDCNT=?**	Response **+QAUGDCNT: (**list of supported **<value>**s**)** **OK**
Read Command **AT+QAUGDCNT?**	Response **+QAUGDCNT: <value>**

	OK
Write Command **AT+QAUGDCNT=<value>**	Response **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	Whether the command takes effect is determined by network. The configuration will not be saved.

Parameter

<value>	Integer type. This parameter is the time-interval for **AT+QGDCNT** to save results to NV automatically. Range: 0, 30–65535. Default: 0. Unit: second. If it is set to 0, auto-save feature is disabled.
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

Example

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

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

OK

10.17. AT$QCRMCALL   Start or Stop an RmNet Call

This command triggers an RmNet call based on **<action>** parameter which is typically a start of an RmNet Call or stop of an RmNet call.

AT$QCRMCALL Start or Stop a RmNet Call	
Test Command **AT$QCRMCALL=?**	Response **$QCRMCALL: (**list of supported **<action>**s**),(**range of

	supported **<instance>**s**),(**range of supported **<IP_type>**s**),(**list of supported **<tech_pref>**s**),(**list of supported **<call_type>**s**),,** **OK**
Read Command **AT$QCRMCALL?**	Response If a RmNet call has been established: **$QCRMCALL: <instance>,<call_Type>** **OK** Or **ERROR**
Write Command **AT$QCRMCALL=<action>,<instance> [,<IP_type>[,<tech_pref>[,<profile_nu m>]]**	Response **OK** Or **ERROR**
Maximum Response Time	
Characteristics	/

Parameter

<action>	Integer type.
	0 Stop a RmNet call
	1 Start a RmNet call
<instance>	Integer type. Currently this parameter only can be set to 1.
<IP_type>	Integer type.
	1 Call type is IPV4
	2 Call type is IPV6
	3 Call type is IPV4V6
<tech_pref>	Integer type.
	1 3GPP2(CMDA/HDR/EHPRD)
	2 3GPP(GSM/WCDMA/LTE/TDS-CDMA)
<profile_num>	Integer type. Range: 1–24, 100–179.
<call_type>	String type.
	V4 IPv4 call
	V6 IPv6 call

Example

AT$QCRMCALL=?   //Test command.
$QCRMCALL: (0,1),(1,2,3,4,5,6,7,8),(1-3),(1-2),(1-24,100-179),,

OK

AT$QCRMCALL=1,1,1,2,1   //Start a IPv4 RmNet call.
$QCRMCALL: 1,V4

OK
AT$QCRMCALL?
$QCRMCALL: 1,V4

OK

10.18. AT+QNETDEVSTATUS   Query RmNet Device Status

This command can query RmNet device status.

AT+QNETDEVSTATUS Query RmNet Device Status	
Test Command **AT+QNETDEVSTATUS=?**	Response **+QNETDEVSTATUS: (**list of supported **<on_off>**s**)** **OK**
Read Command **AT+QNETDEVSTATUS?**	Response If an RmNet call exists, **<state>**, **<IP_type>** and **<instance>** will be included. **+QNETDEVSTATUS: <on_off>[,<state>[,<IP_type>[,<instance>]]]** **OK**
Write Command **AT+QNETDEVSTATUS=<on_off>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<on_off>	Integer type.
	0 Disable RmNet device status URC
	1 Enable RmNet device status URC
<state>	Integer type.
	0 Enable RmNet device status URC
	1 A RmNet call is ready and MCU can get IP addresses by DHCP or QMI
	2 A RmNet call is connected

<IP_type>	Integer type.
	4 IPv4 call
	6 IPv6 call
	Other value is invalid.
<instance>	Integer type. RmNet call instance. It is always 1.

NOTE

When the module gets IP addresses from network successfully, **<state>** will be change to 1 and the module will keep IP addresses for 2 min to wait for MCU to request IP addresses from module by DHCP or QMI. The module will disconnect an RmNet call if IP addresses requests are not be received by the module in 2 min.

Example

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

OK
AT+QNETDEVSTATUS?           //Query command.
+QNETDEVSTATUS: 0

OK
AT+QNETDEVSTATUS=1          //Enable RmNet device status URC.
OK
AT+QNETDEVSTATUS?           //Query command.
+QNETDEVSTATUS: 1

OK
AT$QCRMCALL=1,1,1,2,1       //Start an IPv4 RmNet call.
$QCRMCALL: 1,4

OK

+QNETDEVSTATUS: 1,1,4,1     //RmNet call is ready URC.

+QNETDEVSTATUS: 1,2,4,1     //MCU get IP addresses from module.

AT+QNETDEVSTATUS?           //Query the current configuration.
+QNETDEVSTATUS: 1,2,4,1

OK
AT$QCRMCALL=0,1,1,2,1       //Stop an IPv4 RmNet call.
OK
```

+QNETDEVSTATUS: 1,0,4,1	//Module report RmNet call disconnect URC.
AT+QNETDEVSTATUS?	//Query the current configuration.
+QNETDEVSTATUS: 1	
OK	

10.19. AT+CGCONTRDP   PDP Context Read Dynamic Parameters

AT+CGCONTRDP PDP Context Read Dynamic Parameters	
Test Command **AT+CGCONTRDP=?**	Response **+CGCONTRDP: (**list of supported **<cid>**s**)** **OK**
Write Command **AT+CGCONTRDP[=<cid>]**	Response **+CGCONTRDP: <cid>,<bearer_id>,<APN>[,<local_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<P-CSCF_sec_addr>[,<IM_CN_Signalling_Flag>[,<LIPA_indication>[,<IPv4_MTU>[,<WLAN_Offload>[,<Local_Addr_Ind>[,<Non-IP_MTU>[,<Serving_PLMN_rate_control_value>]]]]]]]]]]]]]]** **[+CGCONTRDP: <cid>,<bearer_id>,<APN>[,<local_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<P-CSCF_sec_addr>[,<IM_CN_Signalling_Flag>[,<LIPA_indication>[,<IPv4_MTU>[,<WLAN_Offload>[,<Local_Addr_Ind>[,<Non-IP_MTU>[,<Serving_PLMN_rate_control_value>]]]]]]]]]]]]]]** **[...]** **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/

Parameter

\<cid\>	Integer type. Specifies a particular non secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related command.
\<bearer_id\>	Integer type. Identifies the bearer, i.e. the EPS bearer in EPS and the NSAPI in UMTS/GPRS. 1 A RmNet call is ready and MCU can get IP addresses by DHCP or QMI 2 A RmNet call is connected
\<APN\>	String type. A logical name that was used to select the GGSN or the external packet data network.
\<local_addr and subnet_mask\>	String type. Shows the IP address and subnet mask of the MT. The string is given as dot-separated numeric (0–255) parameters on the form: "a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16" for IPv6.
\<gw_addr\>	String type. Shows the Gateway Address of the MT. The string is given as dot-separated numeric (0–255) parameters.
\<DNS_prim_addr\>	String type. Shows the IP address of the primary DNS server.
\<DNS_sec_addr\>	String type. Shows the IP address of the secondary DNS server.
\<P_CSCF_prim_addr\>	String type. Shows the IP address of the primary P-CSCF server.
\<P_CSCF_sec_addr\>	String type. Shows the IP address of the secondary P-CSCF server.
\<IM_CN_Signalling_Flag\>	Integer type. Shows whether the PDP context is for IM CN subsystem-related signalling only or not. 0 PDP context is not for IM CN subsystem-related signalling only 1 PDP context is for IM CN subsystem-related signalling only
\<LIPA_indication\>	Integer type. Indicates that the PDP context provides connectivity using a LIPA PDN connection. This parameter cannot be set by the TE. 0 Indication not received that the PDP context provides connectivity using a LIPA PDN connection 1 Indication received that the PDP context provides connectivity using a LIPA PDN connection
\<IPv4_MTU\>	Integer type. Shows the IPv4 MTU size in octets.
\<WLAN_Offload\>	Integer type. Indicates whether traffic can be offloaded using the specified PDN connection via a WLAN or not. This refers to bits 1 and 2 of the WLAN offload acceptability IE as specified in *3GPP TS 24.008 [8] subclause 10.5.6.20*. 0 Offloading the traffic of the PDN connection via a WLAN when in S1 mode or when in Iu mode is not acceptable. 1 Offloading the traffic of the PDN connection via a WLAN when in S1 mode is acceptable, but not acceptable in Iu mode. 2 Offloading the traffic of the PDN connection via a WLAN when in Iu mode is acceptable, but not acceptable in S1 mode. 3 Offloading the traffic of the PDN connection via a WLAN when in S1

	mode or when in Iu mode is acceptable.
<Local_Addr_Ind>	Integer type. Indicates whether or not the MS and the network support local IP address in TFTs (see *3GPP TS 24.301 [83]* and *3GPP TS 24.008 [8] subclause 10.5.6.3*)
	0 Indicates that the MS or the network or both do not support local IP address in TFTs
	1 Indicates that the MS and the network support local IP address in TFTs
<Non-IP_MTU>	Integer type. Shows the Non-IP MTU size in octets.
<Serving_PLMN_rate_control_value>	Integer type. Indicates the maximum number of uplink messages the UE is allowed to send in a 6 minute interval. This refers to octet 3 to 4 of the Serving PLMN rate control IE as specified in *3GPP TS 24.301 [8] subclause 9.9.4.28*.

11 Supplementary Service Commands

11.1. AT+CCFC   Call Forwarding Number and Conditions Control

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

AT+CCFC Call Forwarding Number and Conditions Control	
Test Command **AT+CCFC=?**	Response **+CCFC: (**range of supported **<reads>**s**)** **OK**
Write Command **AT+CCFC=<reads>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,time]]]]]]**	Response If **<mode>** is not equal to 2 and the command is executed successfully: **OK** If **<mode>**=2 and the command is executed successfully (only in connection with **<reads>** 0–3): For registered call forwarding numbers: **+CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]** **[+CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]]** **OK** If no call forwarding numbers are registered (and therefore all classes are inactive): **+CCFC: <status>,<class>** **OK** where **<status>**=0 and **<class>**=15 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 will not be saved.
Reference 3GPP TS 27.007	

Parameter

<reads>	Integer type. Configure the forwarding conditions.	
	0	Unconditional
	1	Mobile busy
	2	No reply
	3	Not reachable
	4	All call forwarding (0–3)
	5	All conditional call forwarding (1–3)
<mode>	Integer type. Controls the call forwarding supplementary service.	
	0	Disable
	1	Enable
	2	Query status
	3	Registration
	4	Erasure
<number>	Phone number in string type of forwarding address in format specified by **<type>**.	
<type>	Integer type. Type of address. Default value: 145 when dialing string includes international access code character "+", otherwise 129.	
<subaddr>	String type sub-address of format specified by **<satype>**.	
<satype>	Type of sub-address in integer.	
<class>	Integer type. Information class.	
	1	Voice
	2	Data
	4	FAX
	7	All telephony except SMS
	8	Short message service
	16	Data circuit synchronization
	32	Data circuit asynchronization
<time>	Integer type. When "no reply" (**<reads>**=no reply) is enabled or queried, this gives the time in seconds to wait before call is forwarded. Range: 1–30. Default: 20.	
<status>	Integer type.	
	0	Not active
	1	Active
<err>	Error codes. For more details, please refer to *Chapter 15.4*.	

Example

AT+CCFC=0,3,"15021012496"	//Register the destination number for unconditional call forwarding (CFU).
OK	
AT+CCFC=0,2	//Query the status of CFU without specifying **<class>**.
+CCFC: 1,1,"+8615021012496",145,,,	
OK	
AT+CCFC=0,4	//Erase the registered CFU destination number.
OK	
AT+CCFC=0,2	//Query the status, no destination number.
+CCFC: 0,255	
OK	

11.2. AT+CCWA   Call Waiting Control

This command allows control of the call waiting supplementary service according to *3GPP TS 22.083*. Activation, deactivation and status query are supported. TA controls the call waiting supplementary service with the Write Command. 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 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 ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Disable or enable the presentation of an unsolicited result code.
	<u>0</u> Disable presentation of an unsolicited result code
	1 Enable presentation of an unsolicited result code
<mode>	Integer type. When **<mode>** parameter is not given, network is not interrogated.
.	0 Disable
	1 Enable
	2 Query status
<class>	A sum of integers, each integer represents a class of information.
	1 Voice (telephony)
	2 Data (bearer service)
	4 FAX (facsimile)
	16 Data circuit synchronization
	32 Data circuit asynchronization
<status>	Integer type. Disable or enable the call waiting supplementary service.
	0 Disable
	1 Enable
<number>	Phone number in string type of calling address in format specified by **<type>**.
<type>	Type of address octet in integer format.
	129 Unknown type (IDSN format number)
	145 International number type (ISDN format)
<alpha>	Optional string type alphanumeric representation of **<number>** corresponding to the entry found in phone book.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

NOTES

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

When the presentation call waiting at the TA is enabled (and call waiting is enabled) and a terminating call set up during an established call, an unsolicited result code is returned:
+CCWA: <number>,<type>,<class>[,<alpha>]

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.

11.3. AT+CHLD   Call Related Supplementary Services

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

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

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

This is based on the GSM/UMTS supplementary services HOLD (Call Hold; refer to *3GPP TS 22.083 clause 2*), MPTY (MultiParty; refer to *3GPP TS 22.084*) and ECT (Explicit Call Transfer; refer to *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 ME functionality:
	+CME ERROR: \<err>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.
	The configuration will not be saved.
Reference	
3GPP TS 27.007	

Parameter

\<n>	0	Terminate all held calls or UDUB (User Determined User Busy) for a waiting call. If a call is waiting, terminate the waiting call. Otherwise, terminate all held calls (if any)
	1	Terminate all active calls (if any) and accept the other call (waiting call or held call).
	1X	Terminate the specific call number X (X=1-7)
	2	Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call
	2X	Place all active calls except call X (X=1-7) on hold
	3	Add the held call to the active calls
	4	Connects the two calls and disconnects the subscriber from both calls (ECT)
\<err>	Error codes. For more details, please refer to ***Chapter 15.4***.	

Example

ATD10086;	//Establish a call.
OK	
+CCWA: "02154450293",129,1	//Indication of a call that has been waiting.
AT+CHLD=2	//Place the active call on hold and accept the waiting call as the active call.
OK	
AT+CLCC	
+CLCC: 1,0,1,0,0,"10086",129	//The first call is on hold.
+CLCC: 2,1,0,0,0,"02154450293",129	//The second call is active.
OK	
AT+CHLD=21	//Place the active call except call X=1 on hold.
OK	
AT+CLCC	
+CLCC: 1,0,0,0,0,"10086",129	//The first call is active.

+CLCC: 2,1,1,0,1,"02154450293",129   //The second call is on hold.

OK
AT+CHLD=3   //Add a held call to the active calls in order to set up a
                                        conference (multiparty) call.

OK
AT+CLCC
+CLCC: 1,0,0,0,1,"10086",129

+CLCC: 2,1,0,0,1,"02154450293",129

OK

11.4. AT+CLIP   Calling Line Identification Presentation

This command refers to the GSM/UMTS supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call. TA enables or disables the presentation of the calling line identity (CLI) at the TE with the Write Command. It has no effect on the execution of the supplementary service CLIP in the network.

AT+CLIP Calling Line Identification Presentation	
Test Command **AT+CLIP=?**	Response **+CLIP: (**list of supported **<n>**s) **OK**
Read Command **AT+CLIP?**	Response **+CLIP: <n>,<m>** **OK**
Write Command **AT+CLIP=<n>**	Response **OK** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	15 s, determined by network.
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference 3GPP TS 27.007	

Parameter

\<n>	Integer type.
	0 Suppress unsolicited result codes
	1 Display unsolicited result codes
\<m>	Integer type.
	0 CLIP not provisioned
	1 CLIP provisioned
	2 Unknown
\<number>	Phone number in string type of 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 (refer to *3GPP TS 24.008 [8] subclause 10.5.4.8*)
\<type>	Type of address octet in integer format
	129 Unknown type (IDSN format)
	145 International number type (ISDN format)
	161 National number
\<alpha>	String type alphanumeric representation of **\<number>** corresponding to the entry found in phone book.
\<CLI_validity>	Integer type.
	0 CLI valid
	1 CLI has been withheld by the originator
	2 CLI is not available due to interworking problems or limitations of originating network
\<err>	Error codes. For more details, please refer to *Chapter 15.4*.

NOTE

Unsolicited result code:

When the presentation of the CLIP at the TE is enabled (and calling subscriber allows), an unsolicited result code is returned after every RING (or **+CRING: \<type>**) at a mobile terminating call:

+CLIP: \<number>,\<type>,[subaddr],[satype],[\<alpha>],\<CLI_validity>

Example

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

RING

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

11.5. AT+CLIR   Calling Line Identification Restriction

This command refers to the CLIR supplementary service (Calling Line Identification Restriction) according to *3GPP TS 22.081* and the OIR supplementary service (Originating Identification Restriction) according to *3GPP TS 24.607* that allows a calling subscriber to enable or disable the presentation of the calling line identity (CLI) to the called party when originating a call. TA restricts or enables the presentation of the calling line identity (CLI) to the called party when originating a call with the write command.

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 ME functionality: **+CME ERROR: <err>**
Maximum Response Time	15 s, determined by network.
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference 3GPP TS 27.007	

Parameter

<n>　　　　Integer type. Parameter sets the adjustment for outgoing calls.
　　　　　　　<u>0</u>　　Presentation indicator is used according to the subscription of the CLIR service
　　　　　　　1　　CLIR invocation
　　　　　　　2　　CLIR suppression
<m>　　　　Integer type. Parameter shows the subscriber CLIR service status in the network.
　　　　　　　0　　CLIR not provisioned
　　　　　　　1　　CLIR provisioned in permanent mode
　　　　　　　2　　Unknown (e.g. no network, etc.)

	3	CLIR temporary mode presentation restricted
	4	CLIR temporary mode presentation allowed
\<err\>		Error codes. For more details, please refer to *Chapter 15.4*.

11.6. AT+COLP   Connected Line Identification Presentation

This command refers to the GSM/UMTS supplementary service COLP (Connected Line Identification Presentation) that enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call. The command enables or disables the presentation of the COL at the TE. It has no effect on the execution of the supplementary service COLR in the network.

Intermediate result code **OK** is returned from TA to TE before any +CR or V.25ter responses.

AT+COLP Connected Line Identification Presentation	
Test Command **AT+COLP=?**	Response **+COLP: (**list of supported **\<n\>**s**)** **OK**
Read Command **AT+COLP?**	Response **+COLP: \<n\>,\<m\>** **OK**
Write Command **AT+COLP[=\<n\>]**	Response **OK**
Maximum Response Time	15 s, determined by network.
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference 3GPP TS 27.007	

Parameter

\<n\>		Integer type. Sets/shows the result code presentation status in the TA.
	0	Disable
	1	Enable
\<m\>		Integer type. Shows 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, the format is specified by **\<type\>**.

\<type\>	Integer type. Type of address octet in integer format.
	128 Unknown type (Number length is 0)
	129 Unknown type (IDSN format number)
	145 International number type (ISDN format)
\<subaddr\>	String type sub-address of format specified by **\<satype\>**.
\<satype\>	Integer type. Type of sub-address octet (refer to *3GPP TS 24.008 subclause 10.5.4.8*)
\<alpha\>	Optional string type alphanumeric representation of **\<number\>** corresponding to the entry found in phone book.

NOTE

Intermediate result code:

When enabled (and called subscriber allows), an intermediate result code is returned before any +CR or V.25ter responses:

+COLP: \<number\>,\<type\>,[\<subaddr\>],[\<satype\>],[\<alpha\>]

Example

```
AT+CPBW=1,"02151082965",129,"QUECTEL"
OK
AT+COLP=1
OK
ATD02151082965;
+COLP: "02151082965",129,,,"QUECTEL"

OK
```

11.7. AT+CSSN   Supplementary Service Notifications

This command refers to supplementary service related network initiated notifications. This Write Command enables/disables the presentation of notification result codes from TA to TE.

AT+CSSN Supplementary Service Notifications	
Test Command **AT+CSSN=?**	Response **+CSSN: (**list of supported **\<n\>**s**),(**list of supported **\<m\>**s**)** **OK**
Read Command **AT+CSSN?**	Response **+CSSN: \<n\>,\<m\>** **OK**

Write Command **AT+CSSN=<n>[,<m>]**	Response **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type. Sets/shows the **+CSSI** intermediate result code presentation status to the TE.
	<u>0</u> Disable
	1 Enable
<m>	Integer type. Sets/shows the **+CSSU** unsolicited result code presentation status to the TE.
	<u>0</u> Disable
	1 Enable
<code1>	Integer type. It is manufacturer specific and supports the following codes:
	0 Unconditional call forwarding is active
	1 Some of the conditional call forwardings are active
	2 Call has been forwarded
	3 Waiting call is pending
	5 Outgoing call is barred
<code2>	Integer type. It is manufacturer specific and supports the following codes:
	0 The incoming call is a forwarded call
	2 Call has been put on hold (during a voice call)
	3 Call has been retrieved (during a voice call)
	5 Held call was terminated by another party
	10 Additional incoming call forwarded
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

NOTES

1. When **<n>**=1 and a supplementary service notification is received after a mobile originated call setup, the **+CSSI** intermediate result code is sent to TE before any other MO call setup result codes:
   +CSSI: <code1>
2. When **<m>**=1 and a supplementary service notification is received during a mobile terminated call

setup or during a call, the **+CSSU** unsolicited result code is sent to TE:
+CSSU: <code2>

11.8. AT+CUSD   Unstructured Supplementary Service Data

This command allows control of the Unstructured Supplementary Service Data (USSD) according to *3GPP TS 22.090*. Both network and mobile initiated operations are supported.

<mode> is used to disable/enable the presentation of an unsolicited result code. **<mode>**=2 is used to cancel an ongoing USSD session. For an USSD response from the network, or a network initiated operation, the format is: **+CUSD: <status>[,<rspstr>,[<dcs>]]**.

When **<reqstr>** is given, a mobile initiated USSD string or a response USSD string to a network initiated operation is sent to the network. The response USSD string from the network is returned in a subsequent **+CUSD** URC.

AT+CUSD Unstructured Supplementary Service Data	
Test Command **AT+CUSD=?**	Response **+CUSD: (**range of supported **<mode>**s**)** **OK**
Read Command **AT+CUSD?**	Response **+CUSD: <mode>** **OK**
Write Command **AT+CUSD[=<mode>[,<reqstr>[,<dcs>]]]**	Response **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	120 s, determined by network.
Characteristics	The command takes effect immediately. The configurations will not be saved.
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. Sets/shows the result code presentation status to the TE.
	<u>0</u> 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>	Unstructured Supplementary Service Data (USSD) to be sent to the network. If this parameter is not given, network is not interrogated.
<rspstr>	Unstructured Supplementary Service Data (USSD) received from the network.
<dcs>	Integer type. 3GPP TS 23.038 Cell Broadcast Data Coding Scheme, Default: 15.
<status>	Integer type. USSD response from the network or the network initiated operation.
	0 No further user action required (network initiated USSD Notify, or no further information needed after mobile initiated operation)
	1 Further user action required (network initiated USSD Request, or further information needed after mobile initiated operation)
	2 USSD terminated by network
	3 Another local client has responded
	4 Operation not supported
	5 Network time out
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

12 Audio Commands

12.1. AT+CLVL Loudspeaker Volume Level Selection

This command selects the volume of the internal loudspeaker of the MT.

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** Or **ERROR** 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 will be saved.
Reference 3GPP TS 27.007	

Parameter

<level>	Integer type. Volume level with manufacturer specific range (Smallest value represents the lowest sound level). Range: 0–5. Default: 3.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

12.2. AT+CMUT   Mute Control

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

AT+CMUT Mute Control	
Test Command **AT+CMUT=?**	Response **+CMUT: (**list of supported **<n>**s**)** **OK**
Read Command **AT+CMUT?**	Response **+CMUT: <n>** **OK**
Write Command **AT+CMUT=<n>**	Response **OK** Or **ERROR** 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 will not be saved and must be set during the call.
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type.
	0 Mute OFF
	1 Mute ON
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

12.3. AT+QAUDLOOP Enable/Disable Audio Loop Test

This command enables/disables audio loop test.

AT+QAUDLOOP Enable/Disable Audio Loop Test	
Test Command **AT+QAUDLOOP=?**	Response **+QAUDLOOP: (**list of supported **<enable>**s**)** **OK**
Read Command **AT+QAUDLOOP?**	Response **+QAUDLOOP: <enable>** **OK**
Write Command **AT+QAUDLOOP=<enable>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.

Parameter

<enable>	Integer type. To enable or disable audio loop test.
	0 Disable audio loop test
	1 Enable audio loop test
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

12.4. 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 voice call.

AT+VTS DTMF and Tone Generation	
Test Command **AT+VTS=?**	Response **+VTS: (**list of supported **<DTMF_string>**s**),(**range of supported of **<duration>**s**)** **OK**

Write Command **AT+VTS=<DTMF_string>[,<duration>]**	Response **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	Depends on the length of **<DTMF_string>** and **<duration>**.
Characteristics	/
Reference 3GPP TS 27.007	

Parameter

<DTMF_string>	String type. ASCII characters in the set **0...9**, **#**, *****, **A**, **B**, **C**, **D**. The string should be enclosed in quotation marks ("..."). When sending multiple tones at a time, the time interval of two tones **<interval>** can be specified by **AT+VTD**. The maximal length of the string is 31.
<duration>	The duration of each tone in 1/10 seconds with tolerance. Range: 0–255. If the duration is less than the minimum time specified by the network, the actual duration will be the network specified time. If this parameter is omitted, **<duration>** is specified by **AT+VTD**.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

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

12.5. AT+VTD   Set Tone Duration

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

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

Parameter

<duration>	The duration tone in 1/10 seconds with tolerance. Range: 0–255. Default value: 3. If the duration is less than the minimum time specified by the network, the actual duration will be network specified time.
<interval>	The time interval of two tones when sending multiple tones at a time by **AT+VTS**. Range: 0–255. Default: 0.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

12.6. 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 related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.
Reference Quectel	

Parameter

<mode> Integer type. Indicates the current configured audio mode.
  <u>0</u> Echo canceller, noise suppressor, digital gain and calibration parameter for handset
  1 Echo canceller, noise suppressor, digital gain and calibration parameter for headset
  2 Echo canceller, noise suppressor, digital gain and calibration parameter for speaker
  3 Turn off all audio processing functions
  4 Echo canceller, noise suppressor, digital gain and calibration parameter for Bluetooth
  5 Echo canceller, noise suppressor, digital gain and calibration parameter for general audio modes
<err> Error codes. For more details, please refer to *Chapter 15.4*.

12.7. AT+QDAI Digital Audio Interface Configuration

This command configures the digital audio interface.

● When **<io>**=1, you can define the PCM formats. In the following conditions, the module can be used directly with default settings (master mode, short-synchronization, 2048 kHz clock frequency, 16-bit liner data format, 8 kHz sampling rate).
● When **<io>**=2, and the external codec chip linked with PCM interface is the NAU8814 model and configurable through the I2C.
● When **<io>**=3, and the external codec chip linked with PCM interface is the ALC5616 model and configurable through the I2C.
● When **<io>**=5, and the external codec chip linked with PCM interface is the TLV320AIC3104 model and configurable through the I2C.
● When **<io>**=6, and the external codec chip linked with PCM interface is the NAU8810 model and configurable through the I2C.

AT+QDAI Digital Audio Interface Configuration	
Test Command **AT+QDAI=?**	Response **+QDAI: (**range of supported **<io>**s**),(**list of supported **<mode>**s**),(**list of supported **<fsync>**s**),(**range of supported **<clock>**s**),(**range of supported **<format>**s**),(**list of supported **<sample>**s**),(**list of supported **<num_slots>**s**),(**range of supported **<slot_mapping>**s**)** **OK**
Read Command **AT+QDAI?**	Response **+QDAI: <io>[,<mode>,<fsync>,<clock>,<format>,<sample>,<num_slots>,<slot_mapping>]** **OK**
Write Command **AT+QDAI=<io>[,<mode>,<fsync>,<clock>[,<format>[,<sample>[,<num_slots>,<slot_mapping>]]]]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after module is rebooted. The configurations will be saved automatically.
Reference Quectel	

Parameter

<io>	Integer type.	
	1	Digital PCM output (customer defined)
	2	Analog output (for audio codec NAU8814)
	<u>3</u>	Analog output (for our default audio codec ALC5616)
	4	Analog output (for audio codec MAX9860)
	5	Analog output (for audio codec TLV320AIC3104)
	6	Analog output (for audio codec NAU8810)
<mode>	Integer type.	
	<u>0</u>	Master mode
	1	Slave mode
<fsync>	Integer type.	
	<u>0</u>	Primary mode (short-synchronization)
	1	Auxiliary mode (long-synchronization)
<clock>	Integer type. Clock frequency.	
	0	128 kHz
	1	256 kHz
	2	512 kHz
	3	1024 kHz
	<u>4</u>	2048 kHz
	5	4096 kHz
<format>	Integer type. Data format.	
	<u>0</u>	16-bit linear
<sample>	Integer type. Sampling rate.	
	<u>0</u>	8 kHz
	1	16 kHz
<num_slots>	Integer type. Number of slot. Default: 1.	
<slot_mapping>	Integer type. Slot mapping value. Range: 1–16.	

NOTES

1. 4096 kHz clock frequency is only applicable for 16 kHz sampling rate.
2. 128 kHz clock frequency is not supported.
3. 8-bit a-law and 8-bit u-law data formats are not supported.
4. Bit per frame=**<clock>**/**<sample>**. For example, if **<clock>** is 2048 kHz and **<sample>** is 8 kHz, then bit per frame is 256. Bit per frame should be greater than 16.
5. When slave mode is selected, master and synchronization clock should be provided for the module.
6. When a recommended codec is selected and 16 kHz sampling rate is desired, please input **<sample>**. Currently only ALC5616 supports 16 kHz (**AT+QDAI=3,0,0,5,0,1,1,1**).
7. Project software versions with R07 (e.g. EG91NAXGA**R07**A03M1G_01.003.01.003) support automatically matching codec drivers, thus you cannot configure the digital audio interface with this command.

Example

```
AT+QDAI=?                    //Query the range.
+QDAI: (1-6),(0,1),(0,1),(0-5),(0-2),(0,1),(1),(1-16)

OK
AT+QDAI?                     //Query the current interface configuration.
+QDAI: 3,0,0,4,0,0,1,1

OK
AT+QDAI=1,1,0,4,0,0,1,1     //Set AUX PCM interface to slave, short-synchronization, 8 kHz sample
                             and 2048 kHz BCLK.

OK
```

12.8. AT+QEEC   Set Echo Cancellation Parameters

This command sets echo cancellation parameters.

AT+QEEC Set Echo Cancellation Parameters	
Test Command **AT+QEEC=?**	Response **+QEEC: (**range of supported **<index>**s**),(**range of supported **<value>**s**)** **OK**
Read Command **AT+QEEC?**	Response **+QEEC: <index>,<value>** **......** **+QEEC: <index>,<value>** **OK**
Write Command **AT+QEEC=<index>,<value>**	Response **OK** Or **ERROR**
Characteristics	The command takes effect immediately. The configurations will not be saved.

Parameter

<index>	Integer type. Indicates the parameter's index. Range: 0–50.
<value>	Integer type. Indicates the parameter's value. Range: 0–65535.

Example

```
AT+QEEC=?          //Query the range.
+QEEC: (0-50),(0-65535)

OK
AT+QEEC=6,1234     //Set the value of index 6 to 1234.
OK
```

12.9. AT+QSIDET   Set the Side Tone Gain in Current Mode

This command sets the side tone gain value in current mode.

AT+QSIDET Set the Side Tone Gain in Current Mode	
Test Command **AT+QSIDET=?**	Response **+QSIDET: (**range of supported **<st_gain>**s**)** **OK**
Read Command **AT+QSIDET?**	Response **+QSIDET: <st_gain>** **OK**
Write Command **AT+QSIDET=<st_gain>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The configuration takes effect at next sound activity. The configuration would not be saved.
Reference Quectel	

Parameter

<st_gain>   Integer type. Indicates the configured side tone gain in current mode.
             Range: 0–65535. Default: 0.

12.10. AT+QMIC   Set Uplink Gains of Microphone

This command sets the uplink gains of microphone.

AT+QMIC Set Uplink Gains of Microphone	
Test Command **AT+QMIC=?**	Response **+QMIC: (**range of supported **<txgain>**s**),(**range of supported **<txdgain>**s**)** **OK**
Read Command **AT+QMIC?**	Response **+QMIC: <txgain>,<txdgain>** **OK**
Write Command **AT+QMIC=<txgain>[,<txdgain>]**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will be saved.

Parameter

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

12.11. AT+QRXGAIN   Set Downlink Gains of RX

This command sets RX digital gains to change the downlink volume.

AT+QRXAGIN Set Downlink Gains of RX	
Test Command **AT+QRXGAIN=?**	Response **+QRXGAIN: (**range of supported **<rxgain>**s**)** **OK**

Read Command **AT+QRXGAIN?**	Response **+QRXGAIN: <rxgain>** **OK**
Write Command **AT+QRXGAIN=<rxgain>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.

Parameter

<rxgain>   Integer type. Downlink digital gains. Range: 0–65535. The default value varies depending on audio modes.

Example

```
AT+QRXGAIN=?
+QRXGAIN: (0-65535)

OK
AT+QRXGAIN?              //Query the current configuration.
+QRXGAIN: 20577

OK
AT+QRXGAIN=8192         //Set digital gain to 8192.
OK
AT+QRXGAIN?              //Query the current configuration.
+QRXGAIN: 8192

OK
```

12.12. AT+QIIC Read and Write Codec via IIC

This command configures the codec via IIC interface.

AT+QIIC Read and Write Codec via IIC	
Test Command **AT+QIIC=?**	Response **+QIIC: (**list of supported **<rw>**s),(range of supported **<device>**s),(range of supported **<addr>**s),(list of supported **<bytes>**s),(range of supported **<value>**s) **OK**
Write Command **AT+QIIC=<rw>,<device>,<addr>,<bytes>[,<value>]**	Response If **<rw>**=0, all configuration parameters should be specified: **OK** If **<rw>**=1, **<value>** should be omitted: **+QIIC: <value>** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.

Parameter

<rw>	Integer type. 0 Write command 1 Read command
<device>	Hex integer type. 0-0xFF 7-bit device address
<addr>	Hex integer type. 0-0xFF Register address
<bytes>	Integer type. Length of the read or write bytes. Range: 1–2.
<value>	Hex integer type. 0-0xFFFF Data value

Example

AT+QIIC=1,0x1B,0x00,2   // Read register value, slave address: 0x1B, register address: 0x00, read two bytes.

+QIIC: 0x0021

OK

AT+QIIC=0,0x1B,0x00,2,0x0000	//Write register value, slave address: 0x1B, register address: 0x00, write two bytes.
OK	

12.13. AT+QTONEDET   Enable/Disable DTMF Detection

This command enables or disables DTMF detection. If this function is enabled, DTMF tones sent by the other side are detected and reported on the assigned serial port.

AT+ QTONEDET Enable/Disable DTMF Detection	
Test Command **AT+QTONEDET=?**	Response **+QTONEDET: (**list of supported **<enable>**s**)** **OK**
Read Command **AT+QTONEDET?**	Response **+QTONEDET: <enable>** **OK**
Write Command **AT+QTONEDET=<enable>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.

Parameter

<enable>	Integer type. Enable or disable DTMF detection.	
	0	Disable
	1	Enable

NOTE

DTMF characters - ASCII:

DTMF	ASCII	DTMF	ASCII
0	48	8	56
1	49	9	57
2	50	A	65
3	51	B	66

4	52	C	67
5	53	D	68
6	54	*	42
7	55	#	35

12.14. AT+QLDTMF   Play Local DTMF

This command plays a local DTMF string. The maximum length of a local DTMF string is 20 characters. It can also be used to stop playing local DTMF.

AT+QLDTMF Play Local DTMF	
Test Command **AT+QLDTMF=?**	Response **+QLDTMF: (**range of supported **<n>**s**),(**list of supported **<DTMF_string>**s**)** **OK**
Write Command **AT+QLDTMF=<n>,<DTMF_string>[,<y>]**	Response **OK** Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>** After the DTMF string is completely played: **+QLDTMF:5**
Execute Command Stop playing the DTMF string **AT+QLDTMF**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.

Parameter

<n>	Integer type. Indicates every DTMF's play time and mute time. Range: 1–1000. Unit: 1/100 second when **<y>**=1, or 1/10 second when **<y>** is not set.
<DTMF_string>	String type. DTMF string. Maximum length: 20 characteristics (separated by comma). DTMF format: 0-9,*, #, A-D.

<y>	Integer type. If this parameter is omitted, the unit of **<n>** is 1/10 second. If this parameter is specified to 1, the unit of **<n>** is 1/100 second.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

AT+QLDTMF=?
+QLDTMF: (1-1000),(0-9,*,#,A-D)

OK
AT+QLDTMF=2,"A,B,1,2,#"   //Play local DTMF string A,B,1,2,#, and the ON & mute time is 200 ms.

OK
AT+QLDTMF   //Stop playing local DTMF.
OK

12.15. AT+QWDTMF   Play or Send DTMF Files to Far End

This command plays or sends DTMF files to far end during a call.

AT+QWDTMF Play or Send DTMF Files to Far End	
Test Command **AT+QWDTMF=?**	Response **+QWDTMF: (**list of supported **<ulmute>**s**),(**list of supported **<dlmute>**s**),(**list of supported **<DTMF_string>**s**),(**range of supported **<duration>**s**),(**range of supported **<pause>**s**)** **OK**
Read Command **AT+QWDTMF?**	Response **+QWDTMF: <status>** **OK**
Write Command **AT+QWDTMF=<ulmute>,<dlmute>,<DTMF_string>,<duration>,<pause>**	Response **OK** After the DTMF playing is completed: **+QWDTMF: 6** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<ulmute>	Integer type. Whether to mute uplink DTMF or not.
	0 Mute
	1 Not mute
<dlmute>	Integer type. Whether to mute downlink DTMF or not.
	0 Mute
	1 Not mute
<DTMF_string>	String type. DTMF string. Maximum length: 16 characters (separated by comma). DTMF format: 0–9,*,#,A–D,E(1400 Hz),F(2300 Hz),G(1000 Hz).
<duration>	Integer type. DTMF play time in milliseconds. Range: 55–1000.
<status>	Integer type. Status of the DTMF player.
	0 Idle
	1 Busy
<pause>	Integer type. Interval of playing DTMF. Range: 55–1000.

Example

```
AT+QWDTMF=?
+QWDTMF: (0,1),(0,1),(0-9,*,#,A-G),(1-1000)

OK
AT+QWDTMF=1,1,"A,B,1,2,#",100          //Play DTMF string A,B,1,2,# and send it to far end
                                          during a call.

OK
+QWDTMF: 6                             //DTMF playing is completed.
AT+QWDTMF?                             //Query DTMF player status.
+QWDTMF: 0

OK
```

12.16. AT+QLTONE   Play a Local Customized Tone

This command plays a local customized tone. **<period_on>** indicates play time, **<period_off>** indicates mute time, and **<duration>** indicates total time.

AT+QLTONE Play a Local Customized Tone	
Test Command **AT+QLTONE=?**	Response **+QLTONE: (**list of supported **<mode>**s**),(**range of supported **<frequency>**s**),(**range of supported **<period_on>**s**),(**range of supported **<period_off>**s**),(**range of supported **<duration>**s**)**

	OK
Write Command **AT+QLTONE=<mode>[,<frequency>,<period_on>,<period_off>,<duration>]**	Response **OK** Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>** After the tone is completely played: **+QLTONE: 0**
Execution Command Stop playing the local customized tone. **AT+QLTONE**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.

Parameter

<mode>	Integer type.
	0 Stop playing
	1 Start playing
<frequency>	Integer type. Tone's frequency. Range: 100–4000. Unit: Hz.
<period_on>	Integer type. Tone's play time. Range: 0–1000. Unit: ms.
<period_off>	Integer type. Tone's mute time. Range: 0–1000. Unit: ms.
<duration>	Integer type. Tone's total time. Range: 0–15300000. Unit: ms.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

AT+QLTONE=?
+QLTONE: (0,1),(100-4000),(0-1000),(0-1000),(0-15300000)

OK
AT+QLTONE=1,1000,200,300,3000   //Play a 1000 Hz tone, play time is 200 ms and mute time is 300 ms. Total time is 3000 ms.

OK

+QLTONE: 0

AT+QLTONE=0	//Stop playing.
OK	

12.17. AT+QAUDRD   Record Media File

This command records the uplink or downlink speech during a voice call or sound from local microphone in idle state and saves it to files.

AT+QAUDRD Record Media File	
Test Command **AT+QAUDRD=?**	Response **+QAUDRD: (**list of supported of **<state>**s**),"filename",(**list of supported **<format>),(**list of supported **<dlink>**s**)** **OK**
Read Command **AT+QAUDRD?**	Response **+QAUDRD: <state>** **OK**
Write Command **AT+QAUDRD=<control>[,<filename>** **[,<format>[,<dlink>]]]**	Response **OK** Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<state>	Integer type.		
	<u>0</u>	Module is not recording media file	
	1	Module is recording media file	
<control>	Integer type.		
	0	Stop recording	
	1	Start recording	
<filename>	String type. Name of the recorded media file.		
<format>	Integer type. Format of the file.		
	3	FORMAT_AMR	

	13	WAV_PCM16
<dlink>	Integer type. Record the uplink or downlink sound.	
	0	Record uplink sound
	1	Record downlink sound
<err>	Error codes. For more details, please refer to *Chapter 15.4*.	

NOTES

1. **<filename>** is the path used to save the recording file, and the default path is */data/ufs* directory.
2. EC2x, EG9x, EG2x-G and EM05 series modules support playing media file in wav or amr format with 8 kHz and 16 kHz sampling frequency, mono, and 16-bit quantization.
3. If the recording file's name and format are same with that of an existing file or an unknown error occurs, the module reports **+QAUDRIND: 0,1**.
4. If the current recording is interrupted by other audio task, the module reports **+QAUDRIND: 0,6**.
5. If there is no space to record, the module reports **+QAUDRIND: 0,3**.
6. The module supports recording uplink and downlink audio data, but not simultaneous recording.
7. This command returns an error if the file format is inconsistent with the file extension.

Table 8: The Description of <code> in URC +QAUDRIND: 0,<code>

<code>	Meaning
0	Reserved
1	Unknown error
3	No space to record
6	Interrupted by other audio task

Example

AT+QAUDRD=1,"A.wav",13,0	//Record the uplink sound in wav format, and store it in UFS.
OK	
AT+QAUDRD=0	//Stop the recording.
OK	
AT+QAUDRD=1,"B.wav",13,1	//Record the downlink sound in wav format, and store it in UFS.
OK	
AT+QAUDRD=0	//Stop the recording.
OK	

12.18. AT+QPSND   Play WAV File

This command plays local wave file.

AT+QPSND Play WAV File	
Test Command **AT+QPSND=?**	Response **+QPSND: (**list of supported **<control>**s**),"filename",(**list of supported **<repeat>**s**),(**list of supported **<ulmute>**s**),(**list of supported **<dlmute>**s)** **OK**
Read Command **AT+QPSND?**	Response **+QPSND: <state>** **OK**
Write Command **AT+QPSND=<control>,<filename>,<repeat>[,<ulmute>[,<dlmute>]]**	Response **OK** Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>** After the playing is finished: **+QPSND: 0**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<state>	Integer type.
	0 Module is not playing local Audio file
	1 Module is playing local Audio file
<control>	Integer type.
	0 Stop playing local Audio file
	1 Start playing local Audio file
<filename>	String type. Name of the file to be played.
<repeat>	Integer type. Repeat playing or not.
	0 Play only once
	1 Repeat playing

\<ulmute>	Integer type. Mute uplink or not.
	0 Mute
	1 Not mute
\<dlmute>	Integer type. Mute downlink or not.
	0 Mute
	1 Not mute
\<err>	Error codes. For more details, please refer to *Chapter 15.4*.

NOTES

1. **\<filename>** includes file path, file name and file suffix. The default playing path is */data/ufs*.
2. EC2x, EG9x, EG2x-G and EM05 series modules support playing media file in wav, amr or mp3 format with 8 kHz and 16 kHz sampling frequency, mono, and 16-bit quantization.

Example

AT+QPSND=1,"A.wav",0	//Play a wave file stored in UFS.
OK	
+QPSND: 0	
AT+QPSND=1,"A.wav",0,1,1	//Play a wave file to far end when a call is ongoing.
OK	
+QPSND: 0	

12.19. AT+QTTS   Play Text

This command plays text.

AT+QTTS Play Text	
Test Command **AT+QTTS=?**	Response **+QTTS: (range of supported \<mode>s),\<text>** **OK**
Read Command **AT+QTTS?**	Response **+QTTS: \<status>** **OK**
Write Command **AT+QTTS=\<mode>[,\<text>]**	Response **OK**

	Or
	ERROR
	If error is related to ME functionality:
	+CME ERROR: <err>
	After the playing is finished:
	+QTTS: 0
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.
	The configurations will not be saved.

Parameter

<mode>	Integer type. Start/stop playing, and specify **<text>** format.
	0 Stop playing, and **<text>** can be omitted.
	1 Start playing, and **<text>** is UCS2 encoding.
	2 Start playing, and **<text>** is character(s): ASCII normally, GBK encoding in Chinese.
<text>	String type. Text to be played. The text format varies depending on **<mode>**. Maximum length: 548 bytes.
<status>	Integer type. The status of the TTS player.
	0 Idle
	1 Busy
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

NOTES

1. The module supports playing TTS with **AT+QTTS** or **AT+QWTTS** during a non-call process.
2. The TTS is terminated when calling.
3. The module supports playing TTS and audio, but not simultaneously.

Example

```
AT+QTTS=?
+QTTS: (0-2),<text>

OK
AT+QTTS=1,"6B228FCE4F7F752879FB8FDC6A215757"//Play a UCS2 string.
OK

+QTTS: 0
AT+QTTS=2,"hello world,你好"                    //Play a ASCII string.
```

OK

+QTTS: 0
AT+QTTS=0   //Stop playing.
OK

12.20. AT+QTTSETUP   Set TTS

This command sets the TTS speed and adjusts the volume.

AT+QTTSETUP Set TTS	
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 **OK** Or **ERROR** 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 will not be saved.

Parameter

<mode>	Integer type. 1 Write the value of parameters 2 Read the value of parameters
<ID>	Integer type. 1 Set/read the speed 2 Set/read the volume
<value>	Integer type. Speed or volume value. If **<mode>**=2, please omit the value in the Write Command.

	TTS speed. Range: -32768–32767. Default: 0.
	TTS volume. Range: -32768–32767. Default: 0.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

AT+QTTSETUP=?
+QTTSETUP: (1,2),(1,2),(-32768~32767)

OK
AT+QTTSETUP=1,2,0   //Set the volume to 0.
OK

12.21. AT+QWTTS   Play Text or Send Text To Far End

This command plays text or sends text to far end when telephoning.

AT+QWTTS Play Text Or Send Text To Far End	
Test Command **AT+QWTTS=?**	Response **+QWTTS: (**list of supported **<ulmute>**s**),(**list of supported **<dlmute>**s**),(**range of supported **<mode>**s**),<text>** **OK**
Read Command **AT+QWTTS?**	Response **+QWTTS: <status>** **OK**
Write Command **AT+QWTTS=<ulmute>,<dlmute>,<mode>,<text>**	Response **OK** Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>** After the playing is completed: **+QWTTS: 0**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations will not be saved.

Example

\<ulmute\>	Integer type. Whether to mute uplink volume or not.
	0 Mute
	1 Not mute
\<dlmute\>	Integer type. Whether to mute downlink volume or not.
	0 Mute
	1 Not mute
\<mode\>	Integer type. Start/stop playing, and specify **\<text\>** format.
	0 Stop playing, and **\<text\>** can be omitted
	1 Start playing, and **\<text\>** is UCS2 encoding
	2 Start playing, and **\<text\>** is character(s), ASCII normally, GBK encoding in Chinese
\<text\>	String type. Text to be played. The text format varies with **\<mode\>**. Maximum length: 543 bytes.
\<status\>	Integer type. Status of the TTS player.
	0 Idle
	1 Busy
\<err\>	Error codes. For more details, please refer to *Chapter 15.4*.

NOTES

1. Reporting **+QWTTS: 4111** means that TTS is interrupted by a call event.
2. In the non-call state, playing TTS reports **+CME ERROR: 903**.
3. In the call state, after muting the uplink and downlink volume, playing TTS reports **+CME ERROR: 903.**
4. If **\<ulmute\>** and **\<dlmute\>** are set to invalid values, the module reports **+CME ERROR: 902**.
5. The module supports playing txt characters, and the maximum length is 543 bytes.
6. When playing empty characters, the module reports **+CME ERROR: 902**.

Example

```
AT+QWTTS=?
+QWTTS:(0,1),(0,1),(0-2),<text>

OK
AT+QWTTS=1,1,1,"6B228FCE4F7F752879FB8FDC6A215757"    //Play an UCS2 string and send it to
                                                       far end during a call.
OK

+QWTTS: 0                                   //The playing ls completed.
AT+QWTTS=1,0,2,"hello world,你好"            //Play an ASCII string to far end during a call.
OK
```

+QWTTS: 0	//The playing is completed.
AT+QWTTS=1,0,0	//Stop playing.
OK	

12.22. AT+QAUDCFG   Query and Configure Audio Tuning Process

This command queries and configures various audio tunning process.

AT+QAUDCFG Query and Configure Audio Tuning Process	
Test Command **AT+QAUDCFG=?**	Response **+QAUDCFG: "alc5616/dlgain",(**range of supported**<level>**s**)** **+QAUDCFG: "alc5616/ulgain",(**range of supported**<level>**s**)** **+QAUDCFG: "tonevolume",(**range of supported **<tone_volume>**s**)** **+QAUDCFG: "alc5616/pwrctr",(**list of supported**<enable>**s**)** **+QAUDCFG: "nau8814/dlgain",(**list of supported**<level>**s**)** **+QAUDCFG: "nau8814/aoutput",(**list of supported**<level>**s**)** **+QAUDCFG: "encgain",(**list of supported**<control>**s**),(**range of supported**<gain>**s**)** **+QAUDCFG: "voltedtmfcfg",(**range of supported**<duration>**s**),(**range of supported**<volume>**s**)** **+QAUDCFG: "decgain",(**range of supported**<gain>**s**)** **+QAUDCFG: "fns",(**list of supported **<fns>**s**),(**list of supported **<enable>**s**)** **+QAUDCFG: "nau8810/config",(**range of supported **<addr>**s**),(**range of supported **<value>**s**),...** **OK**
Maximum Response Time	300 ms

12.22.1.   AT+QAUDCFG="alc5616/dlgain"   Set the Downlink Gain Level for Codec ALC5616

This command sets or queries the downlink gain level for codec ALC5616.

AT+QAUDCFG="alc5616/dlgain" Set the Downlink Gain Level for Codec ALC5616	
Write Command **AT+QAUDCFG="alc5616/dlgain"** **[,<level>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "alc5616/dlgain",<level>**

	OK
	If the optional parameter is specified, set the downlink gain level:
	OK
	Or
	ERROR
	If there is any error related to ME functionality:
	+CME ERROR: <err>
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately.
	The configuration will not be saved.

Parameter

<level>	Integer type. Downlink gain of ALC5616. Range: 0–100. Default: 79.
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

Example

AT+QAUDCFG="alc5616/dlgain",85	//Set downlink gain to 85.
OK	
AT+QAUDCFG="alc5616/dlgain"	//Query the current downlink gain.
+QCFG: "alc5616/dlgain", 85	
OK	

12.22.2. AT+QAUDCFG="alc5616/ulgain" Set the Uplink Gain Level for Codec ALC5616

This command sets or queries uplink gain level for codec ALC5616.

AT+QAUDCFG="alc5616/ulgain" Set the Uplink Gain Level for Codec ALC5616	
Write Command **AT+QAUDCFG="alc5616/ulgain"[, <level>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "alc5616/ulgain",<level>** **OK**

	If the optional parameter is specified, set the uplink gain level: **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will not be saved.

Parameter

<level>	Integer type. Uplink gain of ALC5616. Range: 0–100. Default: 73.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

AT+QAUDCFG="alc5616/ulgain",85 **OK**	//Set uplink gain to 85.
AT+QAUDCFG="alc5616/ulgain" **+QCFG: "alc5616/ulgain", 85** **OK**	//Query the current uplink gain.

12.22.3. AT+QAUDCFG="tonevolume" Set the Tone Volume

This command sets or queries the tone volume.

AT+QAUDCFG="tonevolume" Set the Tone Volume	
Write Command **AT+QAUDCFG="tonevolume"[,<tone_volume>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "tonevolume",<tone_volume>** **OK** If the optional parameter is specified, set the tone volume: **OK** or **ERROR**

	If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will be saved automatically.

Parameter

<tone_volume>	Integer type. Tone volume value. Range: 0–100. Default: 10.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

AT+QAUDCFG="tonevolume",10   //Set the tone of volume to 10.
OK
AT+QAUDCFG="tonevolume"   //Query the current volume.
+QCFG: "tonevolume",10

OK

12.22.4.   AT+QAUDCFG="alc5616/pwrctr"   Enable/Disable the Power Reset

This command enables or disables the power reset when the codec power is reset to the MX-66h register.

AT+QAUDCFG="alc5616/pwrctr" Enable/Disable the Power Reset	
Write Command **AT+QAUDCFG="alc5616/pwrctr"[,<enable>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "alc5616/pwrctr",<enable>** **OK** If the optional parameter is specified, enable/disable the power reset **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms

Characteristics	The command takes effects immediately.
	The configuration will not be saved.

Parameter

<enable>	Integer type. Enable/disable the power reset when the codec power is reset to the MX-66h register.
	<u>0</u> Disable
	1 Enable
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

AT+QAUDCFG=?
+QAUDCFG: "alc5616/pwrctr",(0-1)

OK
AT+QAUDCFG="alc5616/pwrctr",1   //Enable the power reset.
OK
AT+QAUDCFG="alc5616/pwrctr"   //Query the current configuration.
+QCFG: "alc5616/pwrctr", 1

OK

12.22.5. AT+QAUDCFG="nau8814/dlgain" Set the Downlink Gain Level for Codec NAU8814

This command sets or queries the downlink gain level for codec NAU8814.

AT+QAUDCFG="nau8814/dlgain" Set the Downlink Gain Level for Codec NAU8814	
Write Command **AT+QAUDCFG="nau8814/dlgain"[,<level>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "nau8814/dlgain",<level>** **OK** If the optional parameter is specified, set the downlink gain level: **OK** Or **ERROR**

	If there is any error related to ME functionality: **+CME ERROR: \<err>**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will not be saved.

Parameter

\<level>	Integer type. Downlink gain of NAU8814. Range: 0–100. Default: 79.
\<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

AT+QAUDCFG="nau8814/dlgain",85	//Set downlink gain to 85.
OK	
AT+QAUDCFG="nau8814/dlgain"	
+QCFG: "nau8814/dlgain",85	//Query the current downlink gain.
OK	

12.22.6. AT+QAUDCFG="nau8814/aoutput" Set the Analog Output for Codec NAU8814

This command sets or queries the analog output for codec NAU8814.

AT+QAUDCFG="nau8814/aoutput" Set the Analog Output for Codec NAU8814	
Write Command **AT+QAUDCFG="nau8814/aoutput"[,\<level>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "nau8814/output ",\<level>** **OK** If the optional parameter is specified, set the analog output for codec NAU8814: **OK** Or **ERROR** If there is any error related to ME functionality:

	+CME ERROR: <err>
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will not be saved.

Parameter

<level>	Integer type. Output mode.
	<u>0</u> Speaker mixer output
	1 Mono mixer output
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

Example

AT+QAUDCFG="nau8814/aoutput",1	//Set mono mixer output.
OK	
AT+QAUDCFG="nau8814/aoutput"	//Query the current output configuration.
+QCFG: "nau8814/analog/output",0	
OK	

12.22.7.   AT+QAUDCFG="encgain"   Set Uplink ENC Gains

This command sets or queries the uplink ENC gains.

AT+QAUDCFG="encgain" Set Uplink ENC Gains	
Write Command **AT+QAUDCFG="encgain"[,<control>,<gain>]**	Response If the optional parameters are omitted, return the current configuration: **+QCFG: "encgain",<control>,<gain>** **OK** If the optional parameters are specified, set the uplink ENC gains: **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**

Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will not be saved.

Parameter

<control>	Integer type. Enable/disable ENC.
	<u>0</u>　Disable
	1　Enable
<gain>	Integer type. ENC gains. Range: 0–65535. Default: 8192.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

AT+QAUDCFG="encgain",1,65535　　//Enable ENC and set the ENC gain to 65535.
OK
AT+QAUDCFG="encgain"　　//Query the current uplink gain.
+QCFG: "encgain",1,65535

OK

12.22.8. AT+QAUDCFG="voltedtmfcfg" Set Duration and Volume of VoLTE DTMF Tone

This command sets or queries the duration and the volume of VoLTE DTMF tone received by the module. If this command has never been set or the duration is set to 0, the duration of VoLTE DTMF tone is controlled by network, and the volume is performed as the default one 200 x 2.5 ms. In this way, the duration set by network cannot be longer than the default 500 ms, otherwise, the module cuts it off to 500 ms.

AT+QAUDCFG="voltedtmfcfg" Set Duration and Volume of VoLTE DTMF Tone	
Write Command **AT+QAUDCFG="voltedtmfcfg"[,<duration>[,<volume>]]**	Response If the optional parameters are omitted, return the current configuration: **+QCFG: "voltedtmfcfg",<duration>,<volume>** **OK** If the optional parameters are specified, set the duration and volume of VoLTE DTMF tone: **OK**

	Or
	ERROR
	If there is any error related to ME functionality:
	+CME ERROR: <err>
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will not be saved.

Parameter

<duration>	Integer type. Duration of DTMF tone. Unit: 2.5 ms. Range: 1–1000. Default: 200.
<volume>	Integer type. Volume of DTMF tone. Range: 0–65535. Default: 5000.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

NOTES

The time interval between two tones of VoLTE DTMF is a little bit longer than the duration.

Example

AT+QAUDCFG="voltedtmfcfg",40,5000	//Set the VoLTE DTMF duration to 100 ms, set the volume to 5000.
OK	
AT+QAUDCFG="voltedtmfcfg"	//Query the current configuration.
+QCFG: "voltedtmfcfg",40,5000	
OK	

12.22.9. AT+QAUDCFG="decgain" Set Downlink DEC Gains

This command sets or queries the downlink DEC gains.

AT+QAUDCFG="decgain" Set Downlink DEC Gains	
Write Command **AT+ QAUDCFG="decgain"[,<gain>]**	Response If the optional parameter is omitted, query the current configuration: **+QCFG: "decgain",<gain>** OK

	If the optional parameter is specified, set the downlink DEC gains: **OK** Or **ERROR** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will not be saved.

Parameter

<gain>	Integer type. Downllink DEC gains. Range: 0–65535. The default value varies with the configuration of ACDB.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

AT+QAUDCFG="decgain",65535 **OK**	//Set the downlink DEC gain to 65535.
AT+QAUDCFG="decgain" **+QAUDCFG: "decgain", 65535** **OK**	//Query the current downlink DEC gain.

12.22.10. AT+QAUDCFG="fns" Enable/Disable Noise Suppression

This command enables/disables the feature of noise suppression and queries the current configuration.

AT+QAUDCFG="fns" Enable/Disable Noise Suppression	
Write Command **AT+QAUDCFG="fns"[,<fns>,<enable>]**	Response If the optional parameters are omitted, query the current configuration: **+QCFG: "fns",<fns>,<enable>** **OK** If the optional parameters are specified, enables/disables the feature of noise suppression: **OK**

	Or
	ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately.
	The configuration will not be saved.

Parameter

<fns>   Integer type. Configure the feature of noise suppression. Always be 0.
<enable>   Integer type. Enable or disble the feature of noise suppression.
        0   Disable
        1   Enable

12.22.11.   AT+QAUDCFG="nau8810/config"   Set Register Value of Codec NAU8810

This command sets and queries register value of codec NAU8810.

AT+QAUDCFG="nau8810/config" Set Register Value of Codec NAU8810	
Write Command **AT+QAUDCFG="nau8810/config"[,<addr>,<value>[,<addr>,<value>[,…]]]**	Response If the optional parameters are omitted, query the current configuration: **+QCFG: "nau8810/config",<addr>,<value>[,<addr>,<value>[,..]]** **OK** If the optional parameters are specified, set the register value: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will be saved automatically.

Parameter

<addr>   Integer type. Address of NAU8810 register. Range: 0–255.
<value>   Integer type. Value of NAU8810 register. Range: 0–255.

12.23. AT+QAUDPLAY　Play Media File

This command plays local media file.

AT+QAUDPLAY　Play Media File	
Test Command **AT+QAUDPLAY=?**	Response **+QAUDPLAY: "filename",(**list of supported **<state>**s**)** **OK**
Read Command **AT+QAUDPLAY?**	Response **+QAUDPLAY: <state>** **OK**
Write Command **AT+QAUDPLAY=<filename>,<repeat>**	Response **OK** Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>** After the playing is finished: **+QAUDPLAY: 0**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will not be saved.

Parameter

<state>	Integer type. 　0　　Module is not playing media file 　1　　Module is playing media file
<filename>	String type. Name of the file to play, includes file path, file name and file suffix. File path must be UFS.
<repeat>	Integer type. Whether to paly the file repeatedly. 　0　　Play only once 　1　　Repeat
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

NOTES

1. If there is an unknown error occurrs, the module reports **+QAUDPIND: 0,1**.
2. If current playing is interrupted by other audio tasks, the module reports **+QAUDPIND: 0,6**.
3. EC2x, EG9x, EG2x-G and EM05 series modules support playing media file in wav, amr or mp3 format with 8 kHz and 16 kHz sampling frequency, mono, and 16-bit quantization.

12.24. AT+QAUDPLAYGAIN   Set Audio Playing Gain

This command sets audio play gain to change audio playing volume.

AT+QAUDPLAYGAIN Set Audio Playing Gain	
Test Command **AT+QAUDPLAYGAIN=?**	Response **+QAUDPLAYGAIN: (**range of supported **<audplay_gain>**s**)** **OK**
Read Command **AT+QAUDPLAYGAIN?**	Response **+QAUDPLAYGAIN: <audplay_gain>** **OK**
Write Command **AT+QAUDPLAYGAIN=<audplay_gain>**	Response **OK** Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will not be saved.

Parameter

<audplay_gain>	Integer type. Audio playing gain. Range: 0–65535. The default value varies depending on audio modes.
<err>	Error codes. For more details, please refer to **Chapter 15.4**.

Example

```
AT+QAUDPLAYGAIN=?
+QAUDPLAYGAIN: (0-65535)

OK
AT+QAUDPLAYGAIN?          //Query the current configuration.
+QAUDPLAYGAIN: 8192

OK
AT+QAUDPLAYGAIN=4096     //Set audio playing gain to 4096.
OK
AT+QAUDPLAYGAIN?          //Query the current configuration.
+QAUDPLAYGAIN: 4096

OK
```

12.25. AT+QAUDRDGAIN   Set Audio Recording Gain

This command sets audio recording gain to change audio recording volume.

AT+QAUDRDGAIN Set Audio Recording Gain	
Test Command **AT+QAUDRDGAIN=?**	Response **+QAUDRDGAIN: (**range of supported **<audrd_gain>**s**)** **OK**
Read Command **AT+QAUDRDGAIN?**	Response **+QAUDRDGAIN: <audrd_gain>** **OK**
Write Command **AT+QAUDRDGAIN=<audrd_gain>**	Response **OK** Or **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effects immediately. The configuration will not be saved.

Parameter

<audrd_gain>	Integer type. Audio recording gain. Range: 0–65535. The default value varies with audio modes.
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

```
AT+QAUDRDGAIN=?
+QAUDRDGAIN: (0-65535)

OK
AT+QAUDRDGAIN?              //Query the current configuration.
+QAUDRDGAIN: 8192

OK
AT+QAUDRDGAIN=4096         //Set audio record gain to 4096.
OK
AT+QAUDRDGAIN?             //Query the current configuration.
+QAUDRDGAIN: 4096

OK
```

12.26. AT+QACDBLOAD   Write ACDB File

This command writes audio DSP parameter configuration file (ACDB file) to module, and automatically saves one copy on modem side and AP side respectively. After a new ACDB file is imported, the value of **<version>** is increased by 1.

AT+QACDBLOAD Write ACDB File	
Test Command **AT+QACDBLOAD=?**	Response **+QACDBLOAD: "filename",<file_length>** **OK**
Write Command **AT+QACDBLOAD=<filename>,<file_length>**	Response **CONNECT** <input data> **OK** **+QACDBLOAD: <writen_length>** Or

	ERROR
Read Command **AT+QACDBLOAD?**	Response **+QACDBLOAD: "modem","filename",<file_length>,<version>,** **+QACDBLOAD: "ap","filename",<file_length>,<version>** **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configurations will be saved automatically.

Parameter

<filename>	String type. Name of the ACDB file.
<file_length>	Integer type. Size of the ACDB file.
<written_length>	Integer type. Length of the ACDB file actually written.
<version>	Integer type. Version of the ACDB file.

Example

```
AT+QACDBLOAD="11.acdb",100
CONNECT
<input data>
OK

+QACDBLOAD: 100
AT+QACDBLOAD?
+QACDBLOAD: "modem","11.acdb",100,1
+QACDBLOAD: "AP",'11.acdb",100,1

OK
```

12.27. AT+QACDBREAD   Read ACDB File

This command reads the audio DSP parameter configuration file (ACDB file) stored in modem side or AP side.

AT+QACDBREAD Read ACDB File	
Test Command **AT+QACDBREAD=?**	Response **+QACDBREAD: "filename",**(list of supported **<location>**s)

	OK
Write Command **AT+QACDBREAD="filename", <location>**	Response **CONNECT** <output data> **OK** **+QACDBREAD: <read_length>** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<filename>	String type. Name of the ACDB file.
<read_length>	Integer type. Length of the ACDB file actually read.
<location>	Integer type. Position of the ACDB file. 0 Modem side 1 AP side

Example

AT+QACDBREAD="11.acdb",0
CONNECT
OK

+QACDBREAD: 100

12.28. AT+QACDBDEL   Delete ACDB File

This command deletes the audio DSP parameter configuration file (ACDB file) stored in modem side or AP side.

AT+QACDBDEL Delete ACDB File	
Test Command **AT+QACDBDEL=?**	Response **+QACDBDEL:** **"filename",**(list of supported **<location>**s)

	OK
Write Command **AT+QACDBDEL="filename",<location>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<filename>	String type. Name of the ACDB file.
<location>	Integer type. Position of the ACDB file.
	0 Modem side
	1 AP side

Example

AT+QACDBDEL="11.acdb",1
OK
AT+QACDBLOAD?
+QACDBLOAD: "modem","11.acdb",100,1

OK

13 Hardware Related Commands

13.1. AT+QPOWD   Power off

This command shuts down the module. The UE returns **OK** immediately when the command is executed. Then the UE deactivates the network. After it is completed, the UE outputs **POWERED DOWN** and enters into the shutdown state. The maximum time for unregistering network is 60 seconds. The UE is not allowed to turn off the power before the module's STATUS pin is set low or the URC **POWERED DOWN** is outputted to avoid data loss.

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

Parameter

<n>	Integer type. Power down the module.	
	0	Immediately power down
	<u>1</u>	Normal power down

13.2. AT+CCLK   Clock

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

AT+CCLK Clock	
Test Command **AT+CCLK=?**	Response **OK**
Read Command **AT+CCLK?**	Response **+CCLK: <time>** **OK**
Write Command **AT+CCLK=<time>**	Response **OK** If there is any error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will not be saved.
Reference 3GPP TS 27.007	

Parameter

<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). E.g. May 6th, 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08".
<err>	Error codes. For more details, please refer to *Chapter 15.4*.

Example

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

13.3. AT+CBC   Battery Charge

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

AT+CBC Battery Charge	
Test Command	Response

AT+CBC=?	+CBC: (range of supported **<bcs>**s),(range of supported **<bcl>**s),**<voltage>**
	OK
Execution Command	Response
AT+CBC	**+CBC: <bcs>,<bcl>,<voltage>**
	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

<bcs>	Integer type. Battery charge status.	
	0	ME is not charging
	1	ME is charging
	2	Charging has been finished
<bcl>	Integer type. Battery charge level.	
	0–100	Battery has 0–100 percent of capacity remaining vent
<voltage>	Battery voltage (Mv).	
<err>	Error codes. For more details, please refer to *Chapter 15.4*.	

13.4. AT+QADC   Read ADC Value

This command reads the voltage value of ADC channel.

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

Maximum Response Time	300 ms
Characteristics	/

Parameter

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

13.5. AT+QSCLK   Enable/Disable Low Power Mode

This command enables or disables low power mode. When low power mode is enabled, and both DTR and WAKEUP_IN are pulled up, the module directly enters into sleep mode. If low power mode is enabled, but both DTR and WAKEUP_IN are pulled down, only after the DTR and the WAKEUP_IN are pulled up, can the module enter into low power mode.

AT+QSCLK Enable/Disable Low Power Mode	
Test Command **AT+QSCLK=?**	Response **+QSCLK: (**list of supported **<n>**s**)** **OK**
Read Command **AT+QSCLK?**	Response **+QSCLK: <n>** **OK**
Write Command **AT+QSCLK=<n>**	Response **OK**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately The configuration will not be saved
Reference Quectel	

Parameter

\<n\>	Integer type. Disable or enable low power mode.
	<u>0</u> Disable
	1 Enable. It is controlled by DTR pin and WAKEUP_IN pin.

14 Other Related Commands

14.1. GNSS Related AT Commands

Please refer to *Quectel_EC2x&EG9x&EG2x-G&EM05_Series_GNSS_Application_Note* for details of GNSS function.

Table 9: GNSS Related AT Commands

Commands	Description
AT+QGPSCFG	GNSS configurations
AT+QGPSDEL	Deletes assistance data
AT+QGPS	Turns on GNSS
AT+QGPSEND	Turns off GNSS
AT+QGPSLOC	Acquires positioning information
AT+QGPSGNMEA	Acquires NMEA sentences
AT+QGPSXTRA	Enables gpsOneXTRA assistance function
AT+QGPSXTRATIME	Injects gpsOneXTRA time
AT+QGPSXTRADATA	Injects gpsOneXTRA data file

14.2. DFOTA Related AT Command

See *Quectel_EC2x&EG9x&EM05_DFOTA_User_Guide* for details of DFOTA function.

Table 10: DFOTA Related AT Command

Command	Description
AT+QFOTADL	Upgrades firmware via DFOTA

14.3. FTP(S) Related AT Commands

See *Quectel_EC2x&EG9x&EG2x-G&EM05_Series_FTP(S)_Application_Note* for details of FTP(S) function.

Table 11: FTP(S) Related AT Commands

Commands	Description
AT+QFTPCFG	Configures parameters for FTP(S) server
AT+QFTPOPEN	Logins to FTP(S) server
AT+QFTPCWD	Configures the current directory on FTP(S) server
AT+QFTPPWD	Gets the current directory on FTP(S) server
AT+QFTPPUT	Uploads a file to FTP(S) server
AT+QFTPGET	Downloads a file from FTP(S) server
AT+QFTPSIZE	Gets the file size on FTP(S) server
AT+QFTPDEL	Deletes a file on FTP(S) server
AT+QFTPMKDIR	Creates a folder on FTP(S) server
AT+QFTPRMDIR	Deletes a folder on FTP(S) server
AT+QFTPLIST	Lists content of a directory on FTP(S) server
AT+QFTPNLIST	Lists file names of a directory on FTP(S) server

AT+QFTPMLSD	Lists standardized file and directory information
AT+QFTPMDTM	Gets the file modification time on FTP(S) server
AT+QFTPRENAME	Renames a file or folder on FTP(S) server
AT+QFTPLEN	Gets the length of transferred data
AT+QFTPSTAT	Gets the status of FTP(S) server
AT+QFTPCLOSE	Logs out from FTP(S) server

14.4. HTTP(S) Related AT Commands

Please refer to *Quectel_LTE_Standard_HTTP(S)_Application_Note* for details of HTTP(S) function.

Table 12: HTTP(S) Related AT Commands

Commands	**Description**
AT+QHTTPCFG	Configures parameters for HTTP(S) server
AT+QHTTPURL	Sets URL of HTTP(S) server
AT+QHTTPGET	Sends GET request to HTTP(S) server
AT+QHTTPGETEX	Sends range GET request to HTTP(S) server
AT+QHTTPPOST	Sends POST request to HTTP(S) server via UART/USB
AT+QHTTPPOSTFILE	Sends POST request to HTTP(S) server via file
AT+QHTTPREAD	Reads response from HTTP(S) server via UART/USB
AT+QHTTPREADFILE	Reads response from HTTP(S) server via file
AT+QHTTPSTOP	Cancels HTTP(S) request

14.5. MMS Related AT Commands

Please refer to *Quectel_LTE_Standard_MMS_Application_Note* for details of MMS function.

Table 13: MMS Related Commands

Commands	Description
AT+QMMSCFG	Configures parameters of MMS
AT+QMMSEDIT	Edits MMS messages
AT+QMMSEND	Sends MMS messages

14.6. SMTP Related AT Commands

Please refer to *Quectel_EC2x&EG2x-G&EG9x&EM05_SMTP_Application_Note* for details of SMTP function.

Table 14: SMTP Related AT Commands

Commands	Description
AT+QSMTPCFG	Configures parameters for SMTP server
AT+QSMTPDST	Adds or deletes recipients
AT+QSMTPSUB	Edits the subject of an Email
AT+QSMTPBODY	Edits the body of an Email
AT+QSMTPATT	Adds or deletes attachments for an Email
AT+QSMTPCLR	Clears the content of an Email
AT+QSMTPPUT	Sends an Email

14.7. TCP(IP) Related AT Commands

Please refer to *Quectel_LTE_Standard_TCP(IP)_Application_Note* for details of TCP(IP) function.

Table 15: TCP(IP) Related AT Commands

Commands	Description
AT+QICSGP	Configures parameters of a TCP/IP context
AT+QIACT	Activates a PDP context
AT+QIDEACT	Deactivates a PDP context
AT+QIOPEN	Opens a socket service
AT+QICLOSE	Closes a socket service
AT+QISTATE	Querys socket service status
AT+QISEND	Sends data
AT+QIRD	Retrieves the received TCP/IP data
AT+QISENDEX	Sends hex string
AT+QISWTMD	Switchs data access modes
AT+QPING	Pings a remote server
AT+QNTP	Synchronizes local time with NTP server
AT+QIDNSCFG	Configures address of DNS server
AT+QIDNSGIP	Gets IP address by domain name
AT+QICFG	Configures optional parameters
AT+QISDE	Controls whether to echo the data for AT+QISEND
AT+QIGETERROR	Queries the last error code

14.8. SSL Related AT Commands

Please refer to *EC2x&EG9x&EG2x-G&EM05_SSL_Application_Note* for details of SSL function.

Table 16: SSL Related AT Commands

Commands	Description
AT+QSSLCFG	Configures Parameters of an SSL Context
AT+QSSLOPEN	Opens an SSL Socket to Connect a Remote Server
AT+QSSLSEND	Sends Data via SSL Connection
AT+QSSLRECV	Receives Data via SSL Connection
AT+QSSLCLOSE	Closes an SSL Connection
AT+QSSLSTATE	Queries the State of SSL Connection

15 Appendix References

Table 17: Related Documents

SN	Document Name	Description
[1]	V.25ter	Serial asynchronous automatic dialing and control
[2]	3GPP TS 27.007	Digital cellular telecommunications (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; AT command set for User Equipment (UE)
[3]	3GPP TS 27.005	Digital cellular telecommunications (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Use of Data Terminal Equipment – Data Circuit terminating Equipment (DTE-DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)
[4]	Quectel_EC2x&EG9x&EM05_DFOTA_ User_Guide	DFOTA user guide applicable for EC2x&EG9x&EM05 series modules
[5]	Quectel_EC2x&EG9x&EG2x-G&EM05_ Series_FTP(S)_Application_Note	FTP(S) application note applicable for EC2x&EG9x&EG2x-G&EM05 series modules
[6]	Quectel_LTE_Standard_HTTP(S)_ Application_Note	HTTP(S) application note applicable for EC2x&EG9x&EG2x-G&EM05 series modules
[7]	Quectel_LTE_Standard_MMS_ Application_Note	MMS application note applicable for EC2x&EG9x&EG2x-G&EM05 series modules
[8]	Quectel_EC2x&EG9x&EG2x-G&EM05_ Series_SMTP_Application_Note	SMTP(S) application note applicable for EC2x&EG9x&EG2x-G&EM05 series modules
[9]	Quectel_LTE_Standard_TCP(IP)_ Application_Note	TCP/IP application note applicable for EC2x&EG9x&EG2x-G&EM05 series modules
[10]	Quectel_EC2x&EG9x&EG2x-G&EM05_ Series_GNSS_Application_Note	GNSS application note applicable for EC2x&EG9x&EG2x-G&EM05 series modules
[11]	Quectel_EC2x&EG9x&EG2x-G&EM05_ Series_SSL_Application_Note	SSL application note applicable for EC2x&EG9x&EG2x-G&EM05 series modules
[12]	Quectel_LTE_Standard_QCFG_AT_ Commands_Manual	AT+QCFG commands manual applicable for EC2x&EG9x&EG2x-G&EM05 series modules

Table 18: Terms and Abbreviations

Abbreviation	Description
3GPP	3rd Generation Partnership Project
ACDB	Audio Calibration Database
ACK	Acknowledge Character
ACL	Access Control List
ADC	Analog-to-Digital Converter
AMR	Adaptive Multi-Rate
APN	Access Point Name
ARFCN	Absolute Radio-Frequency Channel Number
ASCII	American Standard Code for Information Interchange
BCD	Binary-Coded Decimal
CBM	Cell Broadcast Message
CCH	Control Channel
CDMA	Code Division Multiple Access
EFS	Embedded File System
CFU	Call Forwarding Unconditional
CLI	Calling Line Identity
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
COL	Connected Line
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CPT	Communication Production Technology
CS	Circuit Switching

CSD	Circuit Switch Data
DCD	Dynamic Content Delivery
DCD	Data Carrier Detection
DCE	Data Circuit-terminating Equipment
DCH	Data Channel
DCS	Data Coding Scheme
DEC	Decode
DFOTA	Delta Firmware Over-The-Air
DNS	Domain Name Server
DPCH	Dedicated Physical Channel
DRX	Discontinuous Reception
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
ECC	Emergency Call
ECT	Explicit Call Transfer supplementary service
EFS	Embedded File System
EGPRS	Enhanced General Packet Radio Service
EMM	EPS Mobility Management
ENC	Encode
EONS	Enhanced Operator Name String
EPS	Evolved Packet System
ESM	EPS Session Management
E-UTRAN	Evolved UMTS Terrestrial Radio Access Network
EVDO	Evolution, Data Only

FDD	Frequency Division Duplexing
FDPCH	Fraction-Dedicated Physical Channel
FPLMN	Forbidden PLMN
FTM	Factory Test Mode
FTP(S)	File Transfer Protocol over SSL
GBK	Chinese Internal Code Specification
GERAN	GSM EDGE Radio Access Network
GGSN	Gateway GPRS Support Node
GMT	Greenwich Mean Time
GNSS	Global Navigation Satellite System
GPIO	General-Purpose Input/Output
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HDR	High-Dynamic Range
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
HTTP(S)	HyperText Transfer Protocol over SSL
ICCID	Integrated Circuit Card Identifier
IDSN	Integrated Services Digital Network
IETF	The Internet Engineering Task Force
IIC	Inter-Integrated Circuit
IMEI	International Mobile Equipment Identity
IMS	IP Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
Ipv4	Internet Protocol version 4

Ipv6	Internet Protocol version 6
IRA	International Reference Alphabet
IRAT	Inter-Radio Access Technology
IWF	Interactive Website Framework
LIPA	Local IP Access
LTE	Long Term Evolution
MBN	Modem Software Configuration
MCC	Mobile Country Code
MCU	Microprogrammed Control Unit
ME	Mobile Equipment
MMS	Multimedia Messaging Service
MNC	Mobile Network Code
MO	Mobile Originated
MPTY	MultiParty
MS	Mobile Station
MSC	Mobile Services Switching Center
MSISDN	Mobile Subscriber International ISDN/PSTN number
MT	Mobile Terminal
MTU	Maximum Transmission Unit
NMEA	National Marine Electronics Association
NITZ	Network Identity and Time Zone / Network Informed Time Zone. It is a mechanism for provisioning local time and date, time zone and DST offset, as well as network provider identity information, to mobile devices via a wireless network.
NSAPI	Network Service Access Point Identifier
NV	Non-Volatile Random Access Memory
OIR	Originating Identification Restriction

PCM	Pulse Code Modulation
PDN	Public Data Network
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PPP	Point to Point Protocol
PSC	Primary Synchronization Code
PUK	Personal Identification Number Unlock Key
QCI	QoS Class Identifier
QMI	Qualcom Message Interface
QoS	Quality of Servic
RAT	Radio Access Technology
RDI	Remote Defect Indication
RI	Ring Indicator
RLP	Radio Link Protocol
RPLMN	Registered PLMN
RTC	Real Time Clock
RTS/CTS	Request To Send/Clear To Send
RSCP	Received Signal Code Power
RxQual	Received Signal Quality
SAP	Service Access Point
SDU	Service Data Unit
SMS	Short Message Service
SMSC	Short Message Service Center

SMTP	Simple Mail Transfer Protocol
SN	Serial Number
SNDCP	SubNetwork Dependent Convergence Protocol
SSL	Secure Sockets Layer
TA	Terminal Adapter
TCP	Transmission Control Protocol
TDD	Time Division Duplexing
TDSCDMA	Time Division-Synchronous Code Division Multiple Access
TE	Terminal Equipment
TFT	Traffic Flow Template
TTS	Text To Speech
UARFCN	UTRA Absolute Radio Frequency Channel Number
UART	Universal Asynchronous Receiver/Transmitter
UAC	USB Audio Class
UCS2	Unicode
UDH	User Data Header
UDI	Unique Device Identification
UDP	User Datagram Protocol
UDUB	User Determined User Busy
UE	User Equipment
UFS	User File System
UMTS	Universal Mobile Telecommunications System
UICC	Universal Integrated Circuit Card
URC	Unsolicited Result Code
USB	Universal Serial Bus

(U)SIM	Universal Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	UMTS Terrestrial Radio Access Network
VoLTE	Voice (voice calls) over LTE. A standard high-speed wireless communication for mobile phones and data terminals, including Internet of things devices and wearables.
WCDMA	Wideband Code Division Multiple Access
WLAN	Wireless Local Area Network

15.1. Factory Default Settings Restorable with AT&F

Table 19: Factory Default Settings Restorable with AT&F

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATS0	<n>	0
ATS3	<n>	13
ATS4	<n>	10
ATS5	<n>	8
ATS6	<n>	2
ATS7	<n>	0
ATS8	<n>	2
ATS10	<n>	15
ATS12	<value>	50
ATV	<value>	1
ATX	<value>	4

AT&C	<value>	1
AT&D	<value>	2
AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+CBST	<speed>,<name>,<ce>	0,0,1
AT+CMEE	<n>	1
AT+CSCS	<chset>	"GSM"
AT+CSTA	<type>	129
AT+CR	<mode>	0
AT+CRC	<mode>	0
AT+CSMS	<service>	0
AT+CMGF	<mode>	0
AT+CSMP	<fo>,<vp>,<pid>,<dcs>	17,167,0,0
AT+CSDH	<show>	0
AT+CSCB	<mode>	0
AT+CPMS	<mem1>,<mem2>,<mem3>	"ME","ME","ME"
AT+CNMI	<mode>,<mt>,<bm>,<ds>,<bfr>	2,1,0,0,0
AT+CMMS	<n>	0
AT+CVHU	<mode>	0
AT+CLIP	<n>	0
AT+COLP	<n>	0
AT+CLIR	<n>	0
AT+CSSN	<n>	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+QAUDLOOP	<enable>	0

15.2. AT Command Settings Storable with AT&W

Table 20: AT Command Settings Storable with AT&W

AT Command	Parameters	Display with AT&V
ATE	<value>	Yes
ATQ	<n>	Yes
ATS0	<n>	Yes
ATS7	<n>	Yes
ATS10	<n>	Yes
ATS12	<value>	Yes
ATV	<value>	Yes
ATX	<value>	Yes
AT&C	<value>	Yes
AT&D	<value>	Yes
AT+IPR	<rate>	No
AT+CREG	<n>	No
AT+CGREG	<n>	No
AT+CEREG	<n>	No

15.3. AT Command Settings Storable with ATZ

Table 21: AT Command Settings Storable with ATZ

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATS0	<n>	0
ATS7	<n>	0
ATS10	<n>	15
ATS12	<value>	50
ATV	<value>	1
ATX	<value>	4
AT&C	<value>	1
AT&D	<value>	2
AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+CEREG	<n>	0

15.4. Summary of CME ERROR Codes

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

<err> values are mostly used by common message commands. The following table lists most of general and GRPS related **ERROR** codes. For some GSM protocol failure cause described in GSM specifications, the corresponding **ERROR** codes are not included.

Table 22: 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
901	Audio unknown error
902	Audio invalid parameters
903	Audio operation not supported
904	Audio device busy

15.5. Summary of CMS ERROR Codes

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

<err> values are mostly used by common message commands:

Table 23: Different Coding Schemes of +CMS ERROR: <err>

Code of <err>	Meaning
107	Other General problems
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	SIM pin necessary
312	PH SIM pin necessary
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	SIM PUK2 required
320	Memory failure
321	Invalid memory index
322	Memory full
330	SMSC address unknown
331	No network
332	Network timeout
340	No +CNMA acknowledgement expected

350	Unknown	
500	Unknown	
510	Message blocked	

15.6. Summary of URC

Table 24: Summary of URC

Index	URC Display	Meaning	Condition
1	+CREG: <stat>	Indicate registration status of the ME	**AT+CREG=1**
2	+CREG: <stat>[,<lac>,<ci>[,<Act>]]	After cell neighborhood changing shows whether the network has currently indicated the registration of the ME, with location area code	**AT+CREG=2**
3	+CGREG: <stat>	Indicate network registration status of the ME	**AT+CGREG=1**
4	+CGREG: <stat>[,<lac>,<ci>[,<Act>]]	Indicate network registration and location information of the ME	**AT+CGREG=2**
5	+CTZV: <tz>	Time zone reporting	**AT+CTZR=1**
6	+CTZE: <tz>,<dst>,<time>	Extended time zone reporting	**AT+CTZR=2**
7	+CMTI: <mem>,<index>	New message is received, and saved to memory	See **AT+CNMI**
8	+CMT: [<alpha>],<length><CR><LF><pdu>	New short message is received and output directly to TE (PDU mode)	See **AT+CNMI**
9	+CMT: <oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>	New short message is received and output directly to TE (Text mode)	See **AT+CNMI**
10	^HCMT: <oa>,<scts>,<lang>,<fmt>,<length>,<prt>,<prv>,<type>,<stat><CR><LF><data>	New short message is received and output directly to TE	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	^HCDS: <oa>,<scts>,<lang>, <fmt>,<length>,<prt>,<prv>,<type>,<stat><CR><LF><data>	New CDS is received and output directly to TE	See **AT+CNMI**
17	+COLP: <number>,<type>,[<subaddr>], [<satype>],[<alpha>]	The presentation of the COL (connected line) at the TE for a mobile originated call	AT+**COLP=1**
18	+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI validity>	Mobile terminating call indication	AT+**CLIP=1**
19	+CRING: <type>	An incoming call is indicated to the TE with unsolicited result code instead of the normal RING	AT+**CRC=1**
20	+CCWA: <number>,<type>,<class>[,<alpha>]	Call waiting indication	AT+**CCWA=1,1**
21	+CSSI: <code1>	Shows the +CSSI intermediate result code presentation status to the TE	AT+**CSSN=1**
22	+CSSU: <code2>	Shows the +CSSU unsolicited result code presentation status to the TE	AT+**CSSN=<n>,1**
23	+CUSD: <status>[,<rspstr>,[<dcs>]]	USSD response from the network, or a network initiated operation	AT+**CUSD=1**
24	RDY	ME initialization is successful	N/A
25	+CFUN: 1	All function of the ME is available	N/A
26	+CPIN: <state>	SIM card pin state	N/A
27	+QIND: SMS DONE	SMS initialization finished	N/A
28	+QIND: PB DONE	Phonebook initialization finished	N/A
29	POWERED DOWN	Module power down	**AT+QPOWD**

30	+CGEV: REJECT <PDP_type>, <PDP_addr>	A network request for PDP activation, and was automatically rejected.	AT+CGEREP=2,1
31	+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]	The network request PDP reactivation	AT+CGEREP=2,1
32	+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]	The network has forced a context deactivation	AT+CGEREP=2,1
33	+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]	The ME has forced a context deactivation.	AT+CGEREP=2,1
34	+CGEV: NW DETACH	The network has forced a Packet Domain detach.	AT+CGEREP=2,1
35	+CGEV: ME DETACH	The mobile equipment has forced a Packet Domain detach.	AT+CGEREP=2,1
36	+CGEV: NW CLASS <class>	The network has forced a change of MS class.	AT+CGEREP=2,1
37	+CGEV: ME CLASS <class>	The mobile equipment has forced a change of MS class.	AT+CGEREP=2,1
38	+USIM: 0	Use SIM card	N/A
39	+USIM: 1	Use USIM card	N/A

15.7. SMS Character Sets Conversions

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

Table 25: 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 26: The Input Conversions Table (DCS = GSM 7 bit and AT+CSCS="GSM")

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

Table 27: The Output Conversions Table (DCS = GSM 7 bit and AT+CSCS="GSM")

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

Table 28: GSM Extended Characters

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

	0	1	2	3	4	5	6	7
0		20	20	30	00	50	20	70
1	20	20	21	31	41	51	61	71
2	20	20	22	32	42	52	62	72
3	20	20	23	33	43	53	63	73
4	20	20	02	34	44	54	64	74
5	20	20	25	35	45	55	65	75
6	20	20	26	36	46	56	66	76
7	20	20	27	37	47	57	67	77
8	backspace	20	28	38	48	58	68	78
9	20	20	29	39	49	59	69	79
A	0A	Submit	2A	3A	4A	5A	6A	7A
B	20	Cancel	2B	3B	4B	1B3C	6B	1B28

C	20	20	2C	3C	4C	1B2F	6C	1B40
D	0D	20	2D	3D	4D	1B3E	6D	1B29
E	20	20	2E	3E	4E	1B14	6E	1B3D
F	20	20	2F	3F	4F	11	6F	20

Table 30: IRA Extended Characters

	A	B	C	D	E	F
0	20	20	20	20	7F	20
1	40	20	20	5D	20	7D
2	20	20	20	20	20	08
3	01	20	20	20	20	20
4	24	20	5B	20	7B	20
5	03	20	0E	20	0F	20
6	20	20	1C	5C	1D	7C
7	5F	20	09	20	20	20
8	20	20	20	0B	04	0C
9	20	20	1F	20	05	06
A	20	20	20	20	20	20
B	20	20	20	20	20	20
C	20	20	20	5E	07	7E
D	20	20	20	20	20	20
E	20	20	20	20	20	20
F	20	60	20	1E	20	20

Table 31: The Output Conversions Table (DCS = GSM 7 bit and AT+CSCS="IRA")

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

Table 32: GSM Extended Characters

	0	1	2	3	4	5	6	7
0					7C			
1								
2								
3								
4		5E						

5	
6	
7	
8	7B
9	7D
A	
B	
C	5B
D	7E
E	5D
F	5C

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

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

The difference is the way of SMS text input or output. Please refer to *Table 24* for more details.

15.8. Release Cause Text List of AT+CEER

Table 33: List of Location ID List

Location ID	Meaning
0	CS internal cause
1	CS network cause
2	CS network reject
3	PS internal cause

4	PS network cause
5	PS LTE cause
6	PS LTE local cause

Table 34: List of Cause

CS Internal Cause	Meaning
-1	No cause information available (default)
0	Phone is offline
21	No service available
25	Network release, no reason given
27	Received incoming call
29	Client ended call
34	UIM not present
35	Access attempt already in progress
36	Access failure, unknown source
38	Concur service not supported by network
39	No response received from network
45	GPS call ended for user call
46	SMS call ended for user call
47	Data call ended for emergency call
48	Rejected during redirect or handoff
100	Lower-layer ended call
101	Call origination request failed
102	Client rejected incoming call
103	Client rejected setup indication

104	Network ended call
105	No funds available
106	No service available
108	Full service not available
109	Maximum packet calls exceeded
301	Video connection lost
302	Video call setup failure
303	Video protocol closed after setup
304	Video protocol setup failure
305	Internal error
CS Network Cause	**Meaning**
1	Unassigned/unallocated number
3	No route to destination
6	Channel unacceptable
8	Operator determined barring
16	Normal call clearing
17	User busy
18	No user responding
19	User alerting, no answer
21	Call rejected
22	Number changed
26	Non selected user clearing
27	Destination out of order
28	Invalid/incomplete number
29	Facility rejected

30	Response to status enquiry
31	Normal, unspecified
34	No circuit/channel available
38	Network out of order
41	Temporary failure
42	Switching equipment congestion
43	Access information discarded
44	Requested circuit/channel not available
47	Resources unavailable, unspecified
49	Quality of service unavailable
50	Requested facility not subscribed
55	Incoming calls barred within the CUG
57	Bearer capability not authorized
58	Bearer capability not available
63	Service/option not available
65	Bearer service not implemented
68	ACM >= ACM max
69	Requested facility not implemented
70	Only RDI bearer is available
79	Service/option not implemented
81	Invalid transaction identifier value
87	User not member of CUG
88	Incompatible destination
91	Invalid transit network selection
95	Semantically incorrect message

96	Invalid mandatory information
97	Message non-existent/not implemented
98	Message type not compatible with state
99	IE non-existent/not implemented
100	Conditional IE error
101	Message not compatible with state
102	Recovery on timer expiry
111	Protocol error, unspecified
127	Interworking, unspecified
CS Network Reject	**Meaning**
2	IMSI unknown in HLR
3	Illegal MS
4	IMSI unknown in VLR
5	IMEI not accepted
6	Illegal ME
7	GPRS services not allowed
8	GPRS and non GPRS services not allowed
9	MS identity cannot be derived
10	Implicitly detached
11	PLMN not allowed
12	Location area not allowed
13	Roaming not allowed
14	GPRS services not allowed in PLMN
15	No suitable cells in location area
16	MSC temporary not reachable

17	Network failure
20	MAC failure
21	Synch failure
22	Congestion
23	GSM authentication unacceptable
32	Service option not supported
33	Requested service option not subscribed
34	Service option temporary out of order
38	Call cannot be identified
40	No PDP context activated
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent
98	Message type not compatible with state
99	Information element non-existent
101	Message not compatible with state
161	RR release indication
162	RR random access failure
163	RRC release indication
164	RRC close session indication
165	RRC open session failure
166	Low level failure
167	Low level failure no redial allowed
168	Invalid SIM
169	No service

170	Timer T3230 expired
171	No cell available
172	Wrong state
173	Access class blocked
174	Abort message received
175	Other cause
176	Timer T303 expired
177	No resources
178	Release pending
179	Invalid user data
PS Internet Cause	**Meaning**
0	Invalid connection identifier
1	Invalid NSAPI
2	Invalid primary NSAPI
7	PDP establish timeout
3	Invalid field
4	SNDCP failure
5	RAB setup failure
6	No GPRS context
8	PDP activate timeout
9	PDP modify timeout
10	PDP inactive max timeout
11	PDP lower layer error
12	PDP duplicate
13	Access technology change

14	PDP unknown reason
PS Network Cause	**Meaning**
25	LLC or SNDCP failure
26	Insufficient resources
27	Missing or unknown APN
28	Unknown PDP address or PDP type
29	User authentication failed
30	Activation rejected by GGSN
31	Activation rejected, unspecified
32	Service option not supported
33	Requested service option not subscribed
34	Service option temporary out of order
35	NSAPI already used (not sent)
36	Regular deactivation
37	QoS not accepted
38	Network failure
39	Reactivation required
40	Feature not supported
41	Semantic error in the TFT operation
42	Syntactical error in the TFT operation
43	Unknown PDP context
44	PDP context without TFT already activated
45	Semantic errors in packet filter
46	Syntactical errors in packet filter
81	Invalid transaction identifier

95	Semantically incorrect message
96	Invalid mandatory information
97	Message non-existent/not implemented
98	Message type not compatible with state
99	IE non-existent/not implemented
100	Conditional IE error
101	Message not compatible with state
111	Protocol error, unspecified
PS LTE Cause	**Meaning**
8	Operator determined barring
26	Insufficient Resources
27	Missing or unknown APN
28	Unknown PDP address or PDP type
29	User Aauthentication faile
30	Activation rejected by Servicing GW or PDN GW
31	Activation rejected, unspecified
32	Service option not supported
33	Requested service option not subscribed
34	Service option temporarily out of order
35	PTI already In use
36	Regular deactivation
37	QoS not accepted
38	Network failure
39	Reactivation required
40	Feature not supported

41	Semantic error in the TFT operation
42	Syntactical error in the TFT operation
43	Unknown Bearer context
44	Semantic errors in packet filter
45	Syntactical errors in packet filter
46	Bearer Context without TFT already Active
47	PTI mismatch
49	PDN disconnected, not allowed
50	PDN type IPV4 only Allowed
51	PDN type IPV6 only Allowed
52	Single ADR bearers only Allowed
53	ESM info not recieved
54	PDN connection does not exist
55	Multiple PDN connection for given APN not allowed
56	Collision with network init request
59	Unsupported QCI value
81	Invalid PTI value
95	Symantically invalid message
96	Invalid mandatory information
97	Message non-existent/not implemented
98	Message type not compatible with state
99	Info Elemant non existent
100	Conditional IE error
101	Message type not compatible with state
111	Protocol error, unspecified

112	APN restrict value incompatible with ACT context
PS LTE Local Cause	**Meaning**
3	Illegal UE
6	Illegal ME
7	EPS services not allowed
9	UE id can't be driven by network
10	Implicitly Detached
11	PLMN not allowed
12	tracking area not allowed
13	Roaming not allowed in this tracking area
15	No Suitable cells in tracking area
18	CS Domain Not available
25	Not Authorized for this CSG
38	CS fallback call EST not allowed
39	CS domain temperarly not allowed
43	Unknown EPS bearer context
256	Released AT RRC
257	Signal Connection Released
258	EMM detached
259	EMM attach failed
260	EMM attach started
261	NAS service request failed
262	ESM activate dedicated bearer reactivater by network
263	Lower layer failure
264	Lower layer failure

265	Network activater dedicated bearer with ID of deffered bearer
266	BAD OTA message
267	DS rejected the call
268	Context transferred due to IRAT
269	DS explicit deactivation
270	ESM MSGR failure
271	Local Cause not Available
272	Rejected due to connected state
273	Nas Service request failed, no throttle
274	ACL failure
275	Nas Service request failed, DS disallow
276	EMM T3417 expired
277	EMM T3417 ext expired
278	Nas LRRC UL data CNF failure TXN
279	Nas LRRC UL data CNF failure HO
280	Nas LRRC UL data CNF failure Conn release
281	Nas LRRC UL data CNF failure RLF
282	Nas LRRC UL data CNF failure control Not CONN
283	NAS LRRC connection EST success
284	NAS LRRC connection EST failure
285	NAS LRRC connection EST failure, aborted
286	NAS LRRC connection EST failure, access barrer
287	NAS LRRC connection EST failure, CELL resel
288	NAS LRRC connection EST failure, config failure
289	NAS LRRC connection EST failure, timer expired

290	NAS LRRC connection EST failure, link failure
291	NAS LRRC connection EST failure, not camped
292	NAS LRRC connection EST failure, SI failure
293	NAS LRRC connection EST failure, CONN reject
294	NAS LRRC connection release normal
295	NAS LRRC connection release RLF
296	NAS LRRC connection release CRE failure
297	NAS LRRC connection release QOS during CRE
298	NAS LRRC connection release aborted
299	NAS LRRC connection release SIB read error
300	NAS LRRC connection release aborted IRAT Success
301	Nas Reject LRRC radio link failure
302	Nas service request failure, LTE network reject
303	Nas detach with reattach, LTE network detach
304	NAS detach without reacttach, LTE network detach