EM12&EG12&EG18

AT Commands Manual

LTE-A Module Series

Rev. EM12&EG12&EG18_AT_Commands_Manual_V1.0

Date: 2020-01-08

Status: Released

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About the Document

Revision History

Revision	Date	Author	Description
1.0	2020-01-08	Amos ZHANG/ Ned WANG	Initial

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1 Introduction

1.1. Scope of the Document

This document presents the AT command set supported by Quectel LTE-A modules EM12, EG12 and EG18.

1.2. AT Command Syntax

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

The AT commands set supported by EM12/EG12/EG18 is a combination of international standards, such as *3GPP TS 27.007*, *3GPP TS 27.005* and *ITU-T recommendation V.25ter* as well as the AT Commands developed by Quectel.

All these AT commands can be split into three categories syntactically: "**Basic Syntax**", "**S Parameter Syntax**", and "**Extended Syntax**". They are listed as follows:

- **Basic Syntax**

These AT commands are in the format of "**AT<*x*><*n*>**", or "**AT&<x><n>**", in which "**<*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 whether received characters should be echoed back to the DTE according to the value of "**<*n*>**". "**<*n*>**" is optional and the default value will be used if it is null.

- **S Parameter Syntax**

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

- **Extended Syntax**

The types of these AT commands and the corresponding responses are shown in the following table.

Table 1: Types of AT Commands and Responses

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

1.3. Supported Character Sets

The AT command interface of EM12/EG12/EG18 uses the **GSM** character set by default and supports the following character sets:

- GSM format
- UCS2
- IRA

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

1.4. AT Command Interface

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

1.5. Unsolicited Result Code

As an Unsolicited Result Code and a report message, URC is not issued as part of the response related to an executed AT command. URC is a report message issued by the EM12/EG12/EG18 without being requested by the TE and it is issued automatically when a certain event occurs. Typical events leading to URCs are incoming calls (**RING**), received short messages, high/low voltage alarm, high/low temperature alarm, etc.

1.6. Turn off Procedure

It is recommended to execute **AT+QPOWD** command to power off the module, as it is the safest and best way. This procedure is realized by letting the module log off from the network and allowing the software to enter a secure and safe data state before disconnecting the power supply.

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

2 General Commands

2.1. ATI Display MT Identification Information

This command is used to deliver an MT identification information text.

ATI Display MT Identification Information	
Execution Command **ATI**	Response TA issues a product information text. **Quectel** **<objectID>** **Revision: <revision>** **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

Example

```
ATI
Quectel
EM12
Revision: EM12GPAR01A07M4G

OK
```

2.2. AT+GMI Request Manufacturer Identification

The command returns a manufacturer identification text. It is identical with **AT+CGMI** command.

AT+GMI Request Manufacturer Identification	
Test Command **AT+GMI=?**	Response **OK**
Execution Command **AT+GMI**	Response TA reports an information text which permits the user to identify the manufacturer. **Quectel** **OK**
Maximum Response Time	300ms
Reference V.25ter	

2.3. AT+GMM Request MT Model Identification

The command returns an MT model identification text. It is identical with **AT+CGMM** command.

AT+GMM Request MT Model Identification	
Test Command **AT+GMM=?**	Response **OK**
Execution Command **AT+GMM**	Response TA returns a product model identification text. **<objectID>** **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<objectID>	Identifier of device type

2.4. AT+GMR Request MT Firmware Revision Identification

The command is used to deliver an identification text of MT firmware version. It is identical with **AT+CGMR** command.

AT+GMR Request Firmware Revision Identification	
Test Command **AT+GMR=?**	Response **OK**
Execution Command **AT+GMR**	Response TA reports one or more lines of information text which permit the user to identify the revision of firmware release. **<revision>** **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<revision>	Identification text of MT firmware version.

Example

```
AT+GMR
EM12GPAR01A07M4G

OK
```

2.5. AT+CGMI Request Manufacturer Identification

The command returns a manufacturer identification text. It is identical with **AT+GMI** command.

AT+CGMI Request Manufacturer Identification	
Test Command **AT+CGMI=?**	Response **OK**
Execution Command **AT+CGMI**	Response TA returns a manufacturer identification text. **Quectel**

	OK
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

2.6. AT+CGMM Request MT Model Identification

The command returns an MT model identification text. It is identical with **AT+GMM** command.

AT+CGMM Request MT Model Identification	
Test Command **AT+CGMM=?**	Response **OK**
Execution Command **AT+CGMM**	Response MT returns a product model identification text. **<objectID>** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<objectID>	Identifier of device type

2.7. AT+CGMR Request MT Firmware Revision Identification

The command is used to deliver an identification text of MT firmware version. It is identical with **AT+GMR** command.

AT+CGMR Request Firmware Revision Identification	
Test Command **AT+CGMR=?**	Response **OK**
Execution Command **AT+CGMR**	Response TA returns an identification text of MT firmware version. **<revision>**

	OK
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<revision>	Identification text of MT firmware version

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

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

AT+GSN Request International Mobile Equipment Identity (IMEI)	
Test Command **AT+GSN=?**	Response **OK**
Execution Command **AT+GSN**	Response TA reports the IMEI (International Mobile Equipment Identity) number in information text which permits the user to identify the individual ME device. **<IMEI>** **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<IMEI>	IMEI number of the ME

NOTE

The IMEI is unique to every ME, thus it can be used to identify an ME.

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

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

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

Parameter

<IMEI>	IMEI number of the ME

NOTE

The IMEI is unique to every ME, thus it can be used to identify an ME.

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

The command is used to reset AT command settings to the manufacturer default values.

AT&F Set All Current Parameters to Manufacturer Defaults	
Execution Command **AT&F[<value>]**	Response TA sets all current parameters to the manufacturer defined profile. See ***Table 7***. **OK**
Maximum Response Time	300ms
Reference **V.25ter**	

Parameter

<value>	0	Set all current parameters to manufacturer defaults

2.11. AT&V Display Current Configuration

The command is used to display the current settings of several AT command parameters, even including the single-letter AT command parameters which are not readable.

AT&V Display Current Configuration	
Execution Command **AT&V**	Response TA returns the current parameter settings. See ***Table 2***. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Table 2: AT&V Response

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

2.12. AT&W Store Current Parameters to User Defined Profile

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

AT&W Store Current Parameters to User Defined Profile	
Execution Command **AT&W[<n>]**	Response TA stores the current parameter settings in the user defined profile. See ***Table 8***. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0	Profile number to store current parameters

2.13. ATZ Restore All AT Command Settings from User Defined Profile

The command first resets the AT command settings to their manufacturer defaults, similar to AT&F. Afterwards the AT command settings are restored from the user defined profile in non-volatile memory, if they have been stored with AT&W before.

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

ATZ Restore AT Command Settings from a User Defined Profile	
Execution Command **ATZ[<value>]**	Response TA restores the AT command settings from the user defined profile. See ***Table 9***. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<value>	0	Reset to profile number 0

2.14. ATQ Set Result Code Presentation Mode

The command is used to control 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 This parameter setting determines whether TA transmits any result code to TE or not. Information text transmitted in response is not affected by this setting. If **<n>**=0: **OK** If **<n>**=1: (none)
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

2.15. ATV MT Response Format

The 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 3***.

ATV MT Response Format	
Execution Command **ATV<value>**	Response This parameter setting determines the contents of the header

	and trailer transmitted with result codes and information responses. When **<value>**=0 **0** When **<value>**=1 **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<value>	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 3: The Numeric Equivalents and Brief Description of ATV0&ATV1 Result Codes

ATV1	ATV0	Description
OK	0	Acknowledges execution of a command
CONNECT	1	A connection has been established. The DCE is switching from command mode to data mode.
RING	2	The DCE has detected an incoming call signal from network

NO CARRIER	3	The connection has been terminated or the attempt to establish a connection failed.
ERROR	4	Command not recognized, caused by command line maximum length exceeded, parameter value invalid, or other problem with processing the command line.
NO DIALTONE	6	No dial tone detected
BUSY	7	Engaged (busy) signal detected
NO ANSWER	8	"@" (Wait for Quiet Answer) 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

The command is used to control whether TA echoes characters received from TE or not during AT command mode.

ATE Set Command Echo Mode	
Execution Command **ATE<value>**	Response This setting determines whether TA echoes characters received from TE or not during command mode. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<value>	0	Echo mode OFF
	1	Echo mode ON

2.17. A/ Repeat Previous Command Line

The command is used to repeat previous AT command line, and "/" acts as the line termination character.

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

Example

```
ATI
Quectel
EM12
Revision: EM12GPAR01A07M4G

OK
A/                                  //Repeat the previous command.
Quectel
EM12
Revision: EM12GPAR01A07M4G

OK
```

2.18. ATS3 Set Command Line Termination Character

The 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 This parameter setting determines the character recognized by TA to terminate an incoming command line. TA also returns this character in output. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0-13-127	Command line termination character (Default 13=**<CR>**)

2.19. ATS4 Set Response Formatting Character

The 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 This parameter setting determines the character generated by TA for result code and information text. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0-10-127	Response formatting character (Default 10=**<LF>**)

2.20. ATS5 Set Command Line Editing Character

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

ATS5 Set Command Line Editing Character	
Read Command **ATS5?**	Response **<n>** **OK**

Write Command **ATS5=<n>**	Response This parameter setting determines the character recognized by TA as a request to delete the immediately preceding character from the command line. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0-8-127	Response editing character (Default 8=**<Backspace>**)

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

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

ATX Set CONNECT Result Code Format and Monitor Call Progress	
Execution Command **ATX<value>**	Response This parameter setting determines whether TA detects the presence of dial tone and busy signal or not and whether TA transmits particular result codes or not. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

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

2.22. AT+CFUN Set UE Functionality

The command is used to control the functionality level. It can also be used to reset the UE.

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

Parameter

<fun>	0	Minimum functionality
	1	Full functionality
	4	Disable UE from both transmitting and receiving RF signals
<rst>	0	Do not reset UE before setting it to **<fun>** power level Default value when **<rst>** is not given
	1	Reset UE. The device is fully functional after the reset. This value is available only for **<fun>**=1

Example

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

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

+CPIN: SIM PIN
AT+CPIN=1234
OK

+CPIN: READY

+QUSIM: 1

+QIND: PB DONE

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

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

OK
```

2.23. AT+CMEE Error Message Format

The command is used to control the format of error result codes: **ERROR**, error numbers or verbose messages as **+CME ERROR: <err>**.

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

	OK
Read Command **AT+CMEE?**	Response **+CMEE: <n>** **OK**
Write Command **AT+CMEE=<n>**	Response TA disables or enables the use of result code **+CME ERROR: <err>** as an indication of an error related to the functionality of the MT. **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

2.24. AT+CSCS Select TE Character Set

The Write Command informs the MT which character set is used by the TE. This enables the MT to convert character strings correctly between TE and MT character sets.

AT+CSCS Select TE Character Set	
Test Command **AT+CSCS=?**	Response **+CSCS:** (list of supported **<chset>**s) **OK**
Read Command **AT+CSCS?**	Response **+CSCS: <chset>** **OK**
Write Command **AT+CSCS=<chset>**	Response Set character set **<chset>** which is used by the TE. Then the MT can convert character strings correctly between the TE and MT character sets. **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<chset>	"GSM"	GSM default alphabet
	"IRA"	International reference alphabet
	"UCS2"	UCS2 alphabet

Example

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

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

OK
```

2.25. AT+QURCCFG Configure URC Indication Option

The command is used to configure the output port of URC.

AT+QURCCFG Configure URC Indication Option	
Test Command **AT+QURCCFG=?**	Response **+QURCCFG: "urcport",("usbat","usbmodem","uart1","all")** **OK**
Write Command **AT+QURCCFG="urcport"[,<urcportvalue>]**	If the configuration parameter **<urcportvalue>** is omitted, return the current configuration: **+QURCCFG: "urcport",<urcportvalue>** **OK** If the configuration parameter **<urcportvalue>** is not omitted, response: **OK** Or **ERROR**
Maximum Response Time	300ms

Parameter

<urcportvalue>	Set URC output port	
	"usbat"	USB AT port
	"usbmodem"	USB modem port
	"uart1"	Main UART
	"all"	All port

NOTES

1. Configuration of URC output port will be saved to NVM immediately by default.
2. After configuration of URC output port is set successfully, it will take effect immediately.

Example

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

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

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

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

OK
```

3 Status Control Commands

3.1. AT+CPAS Mobile Equipment Activity Status

The command is used to query the activity status of MT.

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

Parameter

<pas>	0	Ready
	3	Ringing
	4	Call in progress or call hold

Example

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

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

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

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

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

OK
```

3.2. AT+CEER Extended Error Report

The command is used to query an extended error and report the cause of the last failed operation, such as:

- The failure to release a call
- The failure to set up a call (both mobile originated or terminated)
- The failure to modify a call by using supplementary services
- The failure to activate, register, query, deactivate or deregister a supplementary service

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

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

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

Parameter

<text>	Release cause text. Reason for the last call failure to setup or release (listed in ***Chapter 13.9***). Both CS and PS domain call types are reported. Cause data is captured from Call Manager events and cached locally to later use by this command.

3.3. AT+QCFG Extended Configuration Settings

The command is used to query and configure various settings of UE.

AT+QCFG Extended Configuration Settings	
Test Command **AT+QCFG=?**	Response **+QCFG: "gprsattach",**(list of supported **<attachmode>**s) **+QCFG: "nwscanmode",**(list of supported **<scanmode>**s)**,**(list of supported **<effect>**s) **+QCFG: "roamservice",**(list of supported **<roammode>**s)**,**(list of supported **<effect>**s) **+QCFG: "servicedomain",**(list of supported **<service>**s)**,**(list of supported **<effect>**s) **+QCFG: "band",**(list of supported **<bandval>**s)**,**(list of supported **<ltebandval>**s)**,**(list of supported **<effect>**s) **+QCFG: "hsdpacat",**(list of supported **<cat>**s) **+QCFG: "hsupacat",**(list of supported **<cat>**s) **+QCFG: "rrc",**(list of supported **<rrcr>**s) **+QCFG: "sgsn",**(list of supported **<sgsnr>**s) **+QCFG: "msc",**(list of supported **<mscr>**s) **+QCFG: "pdp/duplicatechk",**(list of supported **<enable>**s) **+QCFG: "tdscsq",**(list of supported **<value>**s) **+QCFG: "urc/ri/ring",**(list of supported **<typeri>**s)**,**(list of supported **<pulseduration>**s)**,**(list of supported **<activeduration>**s)**,**(list of supported **<inactiveduration>**s)**,**(list of supported **<ringnodisturbing>**s)

	+QCFG: "urc/ri/smsincoming",(list of supported **<typeri>**s)**,**(list of supported **<pulseduration>**s) **+QCFG: "urc/ri/other",**(list of supported **<typeri>**s)**,** (list of supported **<pulseduration>**s) **+QCFG: "risignaltype",**(list of supported **<risignatype>**s) **+QCFG: "urc/cache",**(list of supported **<value>**s) **OK**
Maximum Response Time	300ms
Reference	

3.3.1. AT+QCFG="nwscanmode" Network Search Mode Configuration

The command is used to specify the network search mode. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="nwscanmode" Network Search Mode Configuration	
Write Command **AT+QCFG="nwscanmode"[,<scanmode>[,<effect>]]**	Response If **<scanmode>** and **<effect>** are both omitted, return the current configuration: **+QCFG: "nwscanmode",<scanmode>** **OK** If **<scanmode>** and **<effect>** are not omitted, set the network search mode: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<scanmode>	Network search mode 0 Automatic 2 WCDMA only 3 LTE only
<effect>	When to take effect 0 Take effect after UE reboots

1	Take effect immediately

3.3.2. AT+QCFG="roamservice" Roam Service Configuration

The command is used to enable or disable the roam service. The configuration will take effect immediately.

AT+QCFG="roamservice" Roam Service Configuration	
Write Command **AT+QCFG="roamservice"[,<roammode>]**	Response If **<roammode>** is omitted, return the current configuration: **+QCFG: "roamservice",<roammode>** **OK** If **<roammode>** is not omitted, configure the mode of roam service: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<roammode>	The mode of roam service
	1 Disable roam service
	2 Enable roam service

3.3.3. AT+QCFG="servicedomain" Service Domain Configuration

The command is used to specify the registered service domain. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="servicedomain" Service Domain Configuration	
Write Command **AT+QCFG="servicedomain"[,<service>[,<effect>]]**	Response If **<service>** and **<effect>** are both omitted, return the current configuration: **+QCFG: "servicedomain",<service>** **OK**

	If **<service>** and **<effect>** are not omitted, the service domain of UE can be set: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<service>	Service domain of UE 0 CS only 1 PS only 2 CS & PS
<effect>	When to take effect 0 Take effect after UE reboots 1 Take effect immediately

3.3.4. AT+QCFG="band" Band Configuration

The command is used to specify the preferred frequency bands to be searched by UE. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="band" Band Configuration	
Write Command **AT+QCFG="band"[,<bandval>,<ltebandval>,<tdsbandval>[,<effect>]]**	Response If configuration parameters are omitted (that is, only execute **AT+QCFG="band"**), return current configuration: **+QCFG: "band",<bandval>,<ltebandval>,<tdsbandval>** **OK** If configuration parameters are all entered, the preferred frequency bands to be searched can be set: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<bandval>	A hexadecimal value that specifies the WCDMA frequency band. If set <bandval> to 0, it means not to change the WCDMA frequency band. 00000000 No change 00000010 WCDMA 2100 B1 00000020 WCDMA 1900 B2 00000040 WCDMA 850 B5 00000080 WCDMA 900 B8 00000200 WCDMA 1700 B4 00000800 WCDMA 1800 B3 00001000 WCDMA Japan 850 B19 00004000 WCDMA Japan 1700 B9 0000FFFF Any frequency band
<ltebandval>	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. (eg.: 0x15=0x1(LTE B1)+0x4(LTE B3)+0x10(LTE B5)) 0x1 (CM_BAND_PREF_LTE_EUTRAN_BAND1) LTE B1 0x2 (CM_BAND_PREF_LTE_EUTRAN_BAND2) LTE B2 0x4 (CM_BAND_PREF_LTE_EUTRAN_BAND3) LTE B3 0x8 (CM_BAND_PREF_LTE_EUTRAN_BAND4) LTE B4 0x10 (CM_BAND_PREF_LTE_EUTRAN_BAND5) LTE B5 0x20 (CM_BAND_PREF_LTE_EUTRAN_BAND6) LTE B6 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
<effect>	When to take effect 0 Take effect after UE reboots 1 Take effect immediately
<tdsbandval>	Not supported. The default value is 0.

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

The command is used to specify the HSDPA category. This configuration is valid only after MT is restarted.

AT+QCFG="hsdpacat" HSDPA Category Configuration	
Write Command **AT+QCFG="hsdpacat"[,<cat>]**	Response If **<cat>** is omitted, return the current configuration: **+QCFG: "hsdpacat",<cat>** **OK**

	If **<cat>** is not omitted, the HSDPA category can be set: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<cat>	HSDPA category	
	6	Category 6
	8	Category 8
	10	Category 10
	12	Category 12
	14	Category 14
	18	Category 18
	20	Category 20
	24	Category 24

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

The command is used to specify the HSUPA category. This configuration is valid only after MT is restarted.

AT+QCFG="hsupacat" HSUPA Category Configuration	
Write Command **AT+QCFG="hsupacat"[,<cat>]**	Response If **<cat>** is omitted, return the current configuration: **+QCFG: "hsupacat",<cat>** **OK** If **<cat>** is not omitted, the HSUPA category can be set: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<cat>	HSUPA category	
	5	Category 5
	6	Category 6
	7	Category 7
	8	Category 8

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

The command is used to specify the RRC release version. This configuration is valid only after MT is restarted.

AT+QCFG="rrc" RRC Release Version Configuration	
Write Command **AT+QCFG="rrc"[,<rrcr>]**	Response If **<rrcr>** is omitted, return the current configuration: **+QCFG: "rrc",<rrcr>** **OK** If **<rrcr>** is not omitted, the RRC release version can be set: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<rrcr>	RRC release version	
	0	R99
	1	R5
	2	R6
	3	R7
	4	R8
	5	R9

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

The command is used to specify the UE SGSN release version. This configuration is valid only after MT is restarted.

AT+QCFG="sgsn" UE SGSN Release Version Configuration	
Write Command **AT+QCFG="sgsn"[,<sgsnr>]**	Response If **<sgsnr>** is omitted, return the current configuration: **+QCFG: "sgsn",<sgsnr>** **OK** If **<sgsnr>** is not omitted, configure the SGSN release version: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<sgsnr>	SGSN release version	
	0	R97
	1	R99
	2	Dynamic

3.3.9. AT+QCFG="msc" UE MSC Release Version Configuration

The command is used to specify the UE MSC release version. This configuration is valid only after MT is restarted.

AT+QCFG="msc" UE MSC Release Version Configuration	
Write Command **AT+QCFG="msc"[,<mscr>]**	Response If **<mscr>** is omitted, return the current configuration: **+QCFG: "msc",<mscr>** **OK** If **<mscr>** is not omitted, the MSC release version can be set: **OK** Or **ERROR**

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

Parameter

<mscr>	MSC release version	
	0	R97
	1	R99
	2	Dynamic

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

The command is used to allow/refuse establishing multi PDNs with the same APN profile. The configuration will take effect immediately.

AT+QCFG="PDP/duplicatechk"	Establish Multi PDNs with the Same APN
Write Command **AT+QCFG="pdp/duplicatechk"[,<enable>]**	Response If **<enable>** is omitted, return the current configuration: **+QCFG: "pdp/duplicatechk",<enable>** **OK** If **<enable>** is not omitted, allow/refuse establishing multiple PDNs with the same APN profile: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<enable>	0	Refuse to establish multi PDNs with the same APN profile
	1	Allow to establish multi PDNs with the same APN profile

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

The command is used to specify the RI (ring indicator) signal output carrier.

AT+QCFG="risignaltype" RI Signal Output Carrier	
Write Command **AT+QCFG="risignaltype"[,<risignatype>]**	Response If **<risignatype>** is omitted, return the current configuration: **+QCFG: "risignaltype",<risignatype>** **OK** If **<risignatype>** is not omitted, the RI signal output carrier can be set: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<risignaltype>	RI signal output carrier.	
	"respective"	The ring indicator behaves on the port where URC is presented. For example, if a URC is presented on UART port, it is physical ring indicator. If URC is presented on USB port, it is virtual ring indicator. If URC is presented on USB AT port which does not support ring indicator, then there will be no ring indicator. **AT+QURCCFG="urcport"** can get the port on which URC is presented.
	"physical"	No matter which port URC is presented on, URC only causes the behavior of physical ring indicator.

3.3.12. AT+QCFG="urc/delay" Delay URC Indication

The command is used to delay the output of URC indication until ring indicator pulse ends.

AT+QCFG="urc/delay" Delay URC Indication	
Write Command **AT+QCFG="urc/delay"[,<enable>]**	Response If **<enable>** is omitted, return the current configuration: **+QCFG: "urc/delay",<enable>** **OK**

	If **<enable>** is not omitted, set when the URC indication will be outputted: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<enable>	0	URC indication will be output when ring indicator pulse starts.
	1	URC indication will be output when ring indicator pulse ends (only effective when the type of ring indicator is "pulse".

3.3.13. AT+QCFG="tone/incoming" Enable/Disable Ringing Tone

The command is used to enable/disable the ringing tone.

AT+ QCFG="tone/incoming" Enable/Disable Ringing Tone	
Write Command **AT+QCFG="tone/incoming"[,<enable>]**	Response If **<enable>** is omitted, return the current configuration: **+QCFG: "tone/incoming",<enable>** **OK** If **<enable>** is not omitted, enable/disable ring tone function: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**

Parameter

<enable>	0	Disable ring tone
	1	Enable local ring tone
	2	Enable ring tone

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

AT+QCFG="sarcfg" Set SAR Power Backoff Value for LTE/WCDMA Bands	
Write Command **AT+QCFG="sarcfg",<RAT>[,<max_power>,<row_grads>[,<band>]]**	Response If **<max_power>**, **<row_grads>** and **<band>** are omitted, return the current configuration: **[+QCFG: "sarcfg","lte_wcdma",<band>,<max_power>,<row_grads>]** **[…]** **OK** If **<max_power>**, **<row_grads>** and **<band>** are not omitted, set the SAR power backoff value: **OK** Or **ERROR**
Maximum Response Time	300ms

Parameter

<RAT>	The SAR power backoff value for supported LTE/WCDMA bands. "LTE_WCDMA" Set/get configuration for all supported LTE&WCDMA bands. "LTE" Set/get configuration for all supported LTE bands. "WCDMA" Set/get configuration for all supported WCDMA bands.
<max_power>	The value of SAR power backoff [level1]. The value ranges from 60 to 300 (i.e. 6dBm-30dBm). And the default value is 230 (23dBm).
<row_grads>	The reduced value for each grade. The default value is 10 (1dBm). **backoff[level$_n$] = backoff[level$_{n-1}$] - <row_grads>** The **[level$_n$]** ranges from 2 to 8.
<band>	**WCDMA:** 1 WCDMA B1 WCDMA2100 2 WCDMA B2 WCDMA1900 3 WCDMA B3 WCDMA1700s 4 WCDMA B4 WCDMA1700 5 WCDMA B5 WCDMA850 8 WCDMA B8 WCDMA900 9 WCDMA B9 WCDMA1700 11 WCDMA B11 WCDMA1500 19 WCDMA B19 WCDMA850 **LTE:** 1 LTE B1 2 LTE B2

3	LTE B3
4	LTE B4
5	LTE B5
6	LTE B6
7	LTE B7
8	LTE B8
9	LTE B9
10	LTE B10
11	LTE B11
12	LTE B12
13	LTE B13
14	LTE B14
17	LTE B17
18	LTE B18
19	LTE B19
20	LTE B20
21	LTE B21
23	LTE B23
25	LTE B25
26	LTE B26
27	LTE B27
28	LTE B28
30	LTE B30
34	LTE B34
38	LTE B38
39	LTE B39
40	LTE B40
41	LTE B41
42	LTE B42
43	LTE B43
46	LTE B46
47	LTE B47
48	LTE B48
66	LTE B66
71	LTE B71
250	LTE B250

NOTES

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

low level.
5. For detailed bands of each module supported, please refer to corresponding product specifications.

3.3.15. AT+QCFG="gpsdrx" Configure GNSS Antenna Connection Mode

The command is used to configure GNSS antenna connection mode.

AT+QCFG="gpsdrx" Configure GNSS Antenna Connection Mode	
Query Command **AT+QCFG="gpsdrx"**	Response **+QCFG: "gpsdrx",<mode>** **OK**
Write Command **AT+QCFG="gpsdrx",<mode>**	Response **OK** or **ERROR**

Parameter

<mode >	GNSS antenna connection mode. 0 GNSS antenna uses the dedicated GNSS connector. 1 GNSS antenna and DIV antenna share the DIV&GNSS connector.

NOTES

1. This command takes effect immediately.
2. This command is only supported by EM12 module.

3.4. AT+QINDCFG URC Indication Configuration

The command is used to control URC indication.

AT+QINDCFG URC Indication Configuration	
Test Command **AT+QINDCFG=?**	Response **+QINDCFG: "all",(0,1),(0,1)** **+QINDCFG: "csq",(0,1),(0,1)** **+QINDCFG: "smsfull",(0,1),(0,1)** **+QINDCFG: "ring",(0,1),(0,1)** **+QINDCFG: "smsincoming",(0,1),(0,1)** **+QINDCFG: "act",(0,1),(0,1)**

	OK
Write Command **AT+QINDCFG=<urctype>[,<enable>[,<savetonvram>]]**	Response If **<enable>** and **<savetonvram>** are omitted, the current configuration will be returned: **+QINDCFG: <urctype>,<enable>** **OK** If **<enable>** and **<savetonvram>** are not omitted, set the URC indication configurations: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<urctype>	URC type	
	"all"	Master switch of all URCs. Default is ON.
	"csq"	Indication of signal strength and channel bit error rate change (similar to **AT+CSQ**). Default is 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 is ON.
	"smsincoming"	Incoming message indication. Default is 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 type. The values are as below: "WCDMA" "HSDPA" "HSUPA" "HSDPA&HSUPA" "LTE"

		"UNKNOWN" The examples of URC are as below: **+QIND: "act","HSDPA&HSUPA"** **+QIND: "act","UNKNOWN"** The description of "act" is as below: 1. If MT does not register on network, the **<actvalue>** would be "UNKNOWN". 2. If this configuration is ON, the URC of "act" will be reported immediately. Only when the network access technology changes, a new URC will be reported.
<enable>	URC indication is ON or OFF	
	0	OFF
	1	ON
<savetonvram>	Whether to save configuration into NVM.	
	0	Not save
	1	Save

4 (U)SIM Related Commands

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

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

Parameter

<IMSI>	International Mobile Subscriber Identity (string without double quotes)

Example

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

OK
```

4.2. AT+CLCK Facility Lock

The command is used to lock/unlock or interrogate an 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".

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 The command is used to lock, unlock or interrogate the MT or network facility **<fac>**. Password is normally needed to do such actions. When querying the status of network service (**<mode>**=2) the response line for 'not active' case (**<status>**=0) should be returned only if service is not active for any **<class>**. If **<mode>** is not equal to 2 and command is set successful: **OK** If **<mode>**=2 and the command is set successful: **+CLCK: <status>[,<class>]** **[…]** **OK**
Maximum Response Time	5s
Reference 3GPP TS 27.007	

Parameter

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

		to *3GPP TS 22.088*).
	"AB"	All Barring services (refer to *3GPP TS 22.030*) (applicable only for **<mode>**=0).
	"AG"	All outgoing barring services (refer to *3GPP TS 22.030*) (applicable only for **<mode>**=0).
	"AC"	All incoming barring services (refer to *3GPP TS 22.030*) (applicable only for **<mode>**=0).
	"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>	0	Unlock
	1	Lock
	2	Query status
<passwd>	Password	
<class>	1	Voice
	2	Data
	4	FAX
	7	All telephony except SMS
	8	Short message service
	16	Data circuit synchronization
	32	Data circuit asynchronization
<status>	0	OFF
	1	ON

Example

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

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

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

4.3. AT+CPIN Enter PIN

The command is used to enter a password or query whether MT requires a password or not before it can be operated. The password may be (U)SIM PIN, (U)SIM PUK, PH-SIM PIN, etc.

AT+CPIN Enter PIN	
Test Command **AT+CPIN=?**	Response **OK**
Read Command **AT+CPIN?**	Response MT returns an alphanumeric string indicating whether or not a password is required. **+CPIN: <code>** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Write Command **AT+CPIN=<pin>[,<new pin>]**	Response MT stores a password, such as (U)SIM PIN, (U)SIM PUK, which is necessary before it can be operated. If the PIN is to be entered twice, the MT shall automatically repeat the PIN. If no PIN request is pending, no action will be taken and an error message **+CME ERROR** is returned to TE. If the PIN required is (U)SIM PUK or (U)SIM PUK2, the second parameter is required. This second PIN **<new pin>**, is used to replace the old pin in the (U)SIM. **OK**
Maximum Response Time	5s
Reference 3GPP TS 27.007	

Parameter

<code>	READY	MT is not pending for any password
	SIM PIN	MT is waiting for (U)SIM PIN to be given
	SIM PUK	MT is waiting for (U)SIM PUK to be given
	SIM PIN2	MT is waiting for (U)SIM PIN2 to be given
	SIM PUK2	MT is waiting for (U)SIM PUK2 to be given
	PH-NET PIN	MT is waiting for network personalization password to be given
	PH-NET PUK	MT is waiting for network personalization unlocking password to be given

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

Example

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

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

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

OK

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

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

OK
```

4.4. AT+CPWD Change Password

The command is used to set a new password for the facility lock function defined by **AT+CLCK**.

AT+CPWD Change Password	
Test Command **AT+CPWD=?**	Response MT returns a list of pairs which present the available facilities and the maximum length of their password. **+CPWD:** (list of supported **<fac>**s)**,**(**<pwdlength>**s) **OK**
Write Command **AT+CPWD=<fac>,<oldpwd>,<newpwd>**	Response MT sets a new password for the facility lock function. **OK**
Maximum Response Time	5s
Reference 3GPP TS 27.007	

Parameter

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

Example

```
AT+CPIN?
+CPIN: READY

OK
AT+CPWD="SC","1234","4321"          //Change (U)SIM card password to "4321".
OK

//Restart MT or re-activate the (U)SIM card

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

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

+CPIN: READY
```

4.5. AT+CSIM Generic (U)SIM Access

The command is used to allow a direct control of the (U)SIM that is inserted in the currently selected card slot by a distant application on TE. TE should then keep the processing of (U)SIM information within the frame specified by GSM/UMTS.

AT+CSIM Generic (U)SIM Access	
Test Command **AT+CSIM=?**	Response **OK**
Write Command **AT+CSIM=<length>,<command>**	Response **+CSIM: <length>,<response>** **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

4.6. AT+CRSM Restricted (U)SIM Access

The command is used to offer easy and limited access to the (U)SIM database. It transmits the (U)SIM command number **<command>** and its required parameters to MT.

AT+CRSM Restricted (U)SIM Access	
Test Command **AT+CRSM=?**	Response **OK**
Write Command **AT+CRSM=<command>[,<fileId>[,<P1>,<P2>,<P3>[,<data>][,<pathId>]]]**	Response **+CRSM: <sw1>,<sw2>[,<response>]** **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<command>	(U)SIM command number	
	176	READ BINARY
	178	READ RECORD
	192	GET RESPONSE
	214	UPDATE BINARY
	220	UPDATE RECORD
	242	STATUS
	203	RETRIEVE DATA
	219	SET DATA

<fileId>	Identifier for an elementary data file on (U)SIM, if used by **<command>**.
<P1>, <P2>, <P3>	Parameters transferred by the MT to the (U)SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in *3GPP TS 51.011*.
<data>	Information which should be written to the (U)SIM (hexadecimal character format; refer to **AT+CSCS**).
<pathId>	The directory path of an elementary file on a SIM/UICC in hexadecimal format.
<sw1>, <sw2>	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.

4.7. AT+QCCID Show ICCID

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

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

Parameter

<iccid>	ICCID (Integrated Circuit Card Identifier) number of the (U)SIM card

Example

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

OK
```

4.8. AT+QPINC Display PIN Remainder Counter

The command is used to query 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: ("SC","P2")** **OK**
Read Command **AT+QPINC?**	Response **+QPINC: "SC", <pincounter>,<pukcounter>** **+QPINC: "P2", <pincounter>,<pukcounter>** **OK**
Write Command **AT+QPINC=<facility>**	Response **+QPINC: <facility>,<pincounter>,<pukcounter>** **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<facility>	"SC"	(U)SIM PIN
	"P2"	(U)SIM PIN2
<pincounter>	Number of attempts left to enter the password of PIN	
<pukcounter>	Number of attempts left to enter the password of PUK	

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

The command is used to query the initialization status of (U)SIM card.

AT+QINISTAT Query Initialization Status of (U)SIM Card	
Test Command **AT+QINISTAT=?**	Response **+QINISTAT: (0-7)** **OK**
Execution Command **AT+QINISTAT**	Response **+QINISTAT: <status>** **OK**
Maximum Response Time	300ms

Parameter

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

4.10. AT+QSIMDET (U)SIM Card Detection

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

AT+QSIMDET (U)SIM Card Detection	
Test Command **AT+QSIMDET=?**	Response **+QSIMDET: (0,1),(0,1)** **OK**
Read Command **AT+QSIMDET?**	Response **+QSIMDET: <enable>,<insertlevel>** **OK**
Write Command	Response

AT+QSIMDET=<enable>,<insertlevel>	**OK** Or **ERROR**
Maximum Response Time	300ms

Parameter

<enable>	Enable or disable (U)SIM card detection 0 Disable 1 Enable
<insertlevel>	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 **<insertlevel>** is inconsistent with hardware design.
2. Hot-swap function takes effect after the MT is restarted.

Example

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

<Remove (U)SIM card>

+CPIN: NOT READY

<Insert (U)SIM card>

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

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

The command is used to query (U)SIM card insertion status or determine whether (U)SIM card insertion status report is enabled. The configuration of this command can be saved by **AT&W**.

AT+QSIMSTAT (U)SIM Insertion Status Report	
Test Command **AT+QSIMSTAT=?**	Response **+QSIMSTAT: (0,1)** **OK**
Read Command **AT+QSIMSTAT?**	Response **+QSIMSTAT: <enable>,<insertedstatus>** **OK**
Write Command **AT+QSIMSTAT=<enable>**	Response **OK** Or **ERROR**
Maximum Response Time	300ms

Parameter

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

Example

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

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

OK

<Remove the (U)SIM card>
```

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

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

OK

<Insert a (U)SIM card>

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

+CPIN: READY

4.12. AT+QUIMSLOT Switch (U)SIM Slot

The command is used to query the slot currently used by the (U)SIM and decide which to use.

AT+QUIMSLOT Switch (U)SIM Slot	
Test Command **AT+QUIMSLOT=?**	Response **+QUIMSLOT: (1,2)** **OK**
Read Command **AT+QUIMSLOT?**	Response **+QUIMSLOT: <slot>** **OK**
Write Command **AT+QUIMSLOT=<slot>**	Response **OK** Or **ERROR**
Maximum Response Time	300ms

Parameter

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

Example

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

OK
AT+QUIMSLOT=2               //Switch to slot2.
OK
```

5 Network Service Commands

5.1. AT+COPS Operator Selection

The command is used to return the current operators and their status, and allow setting automatic or manual network selection.

AT+COPS Operator Selection	
Test Command **AT+COPS=?**	Response MT 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. **+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 MT functionality: **+CME ERROR: <err>**
Read Command **AT+COPS?**	Response MT returns the current mode and the currently selected operator. If no operator is selected, **<format>**, **<oper>** and **<Act>** are omitted. **+COPS: <mode>[,<format>[,<oper>][,<Act>]]** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Write Command **AT+COPS=<mode>[,<format>[,<oper>[,<Act>]]]**	Response MT forces an attempt to select and register the GSM/UMTS network operator. If the selected operator is not available, no

	other operator shall be selected (except **<mode>**=4). The format of selected operator name shall apply to further Read Commands (**AT+COPS?**). **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	180s, determined by the network.
Reference 3GPP TS 27.007	

Parameter

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

Example

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

```
11","46011",7),(3,"CHINA MOBILE","CMCC","46000",7),,(0-4),(0-2)

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

OK
```

5.2. AT+CREG Network Registration Status

The Read Command returns the network registration status. The Write Command sets whether to present URC or not.

AT+CREG Network Registration Status	
Test Command **AT+CREG=?**	Response **+CREG:** (list of supported **<n>**s) **OK**
Read Command **AT+CREG?**	Response MT returns the status of result code presentation and an integer **<stat>** which shows whether the network has currently indicated the registration of MT. Location information parameters **<lac>** and **<ci>** are returned only when **<n>**=2 and MT is registered on the network. **+CREG: <n>,<stat>[,<lac>,<ci>[,<Act>]]** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Write Command **AT+CREG=[<n>]**	Response MT controls the presentation of an unsolicited result code **+CREG: <stat>** when **<n>**=1 and there is a change in the MT network registration status. **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code: **+CREG: <stat>**
	2	Enable network registration unsolicited result code with location information: **+CREG: <stat>[,<lac>,<ci>[,<Act>]]**
<stat>	0	Not registered. MT is not currently searching a new operator to register to
	1	Registered, home network
	2	Not registered, but MT is currently searching a new operator to register to
	3	Registration denied
	4	Unknown
	5	Registered, roaming
<lac>	Two bytes location area code in hexadecimal format	
<ci>	28-bit (UMTS/LTE) cell ID in hexadecimal format	
<Act>	Access technology selected	
	2	UTRAN
	4	UTRAN W/HSDPA
	5	UTRAN W/HSUPA
	6	UTRAN W/HSDPA and HSUPA
	7	E-UTRAN

Example

```
AT+CREG=1
OK

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

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

5.3. AT+CSQ Signal Quality Report

The command is used to indicate the received signal strength **<rssi>** and the channel bit error rate **<ber>**.

AT+CSQ Signal Quality Report	
Test Command **AT+CSQ=?**	Response The Test Command returns values supported by MT. **+CSQ:** (list of supported **<rssi>**s),(list of supported **<ber>**s)

	OK
Execution Command **AT+CSQ**	Response The Execution Command returns received signal strength indication **<rssi>** and channel bit error rate **<ber>** from MT. **+CSQ: <rssi>,<ber>** **OK** If there is error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<rssi>	0	-113dBm or less
	1	-111dBm
	2...30	-109dBm... -53dBm
	31	-51dBm or greater
	99	Not known or not detectable
<ber>	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 and channel bit error rate is 99.

OK
```

NOTE

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

5.4. AT+CPOL Preferred Operator List

The command is used to edit and query 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>]** **…** **OK**
Write Command **AT+CPOL=<index>[,<format>[,<oper>[<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>]]]**	Response Edit the list of preferred operators: **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>** If the **<index>** is given but the **<oper>** is left out, the entry will be deleted.
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<index>	The order number of operator in the (U)SIM preferred operator list	
<format>	0	Long format alphanumeric **<oper>**
	1	Short format alphanumeric **<oper>**
	2	Numeric **<oper>**
<oper>	**<format>** indicates the format is alphanumeric or numeric (see **AT+COPS**)	
<GSM>	GSM access technology	
	0	Access technology is not selected
	1	Access technology is selected

<GSM_compact>	GSM compact access technology
	0 Access technology is not selected
	1 Access technology is selected
<UTRAN>	UTRAN access technology
	0 Access technology is not selected
	1 Access technology is selected
<E-UTRAN>	E-UTRAN access technology
	0 Access technology is not selected
	1 Access technology is selected

NOTES

1. 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.
2. **<GSM>** and **<GSM_compact>** are not supported by the modules.

5.5. AT+COPN Read Operator Names

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

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

Parameter

<numericn>	Operator names in numeric format (see **AT+COPS**)

<alphan>	Operator names in long alphanumeric format (see **AT+COPS**)

5.6. AT+CTZU Automatic Time Zone Update

The command is used to enable/disable automatic time zone update via NITZ. The configuration is stored to NVM automatically.

AT+CTZU Automatic Time Zone Update	
Test Command **AT+CTZU=?**	Response **+CTZU: (0,1)** **OK**
Write Command **AT+CTZU=<onoff>**	Response **OK** Or **ERROR**
Read Command **AT+CTZU?**	Response **+CTZU: <onoff>** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

Example

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

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

OK
AT+CTZU=1           // enable automatic time zone update
```

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

OK
```

5.7. AT+CTZR Time Zone Reporting

The command is used to control the time zone reporting of changed event. If reporting is enabled, MT returns the unsolicited result code **+CTZV: <tz>** or **+CTZE: <tz>,<dst>,<time>** whenever the time zone is changed. The configuration is stored to NVM automatically.

AT+CTZR Time Zone Reporting	
Test Command **AT+CTZR=?**	Response **+CTZR: (0-2)** **OK**
Write Command **AT+CTZR=<reporting>**	Response **OK** Or **ERROR**
Read Command **AT+CTZR?**	Response **+CTZR: <reporting>** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<reporting>	Indicate the mode of time zone reporting 0 Disable time zone reporting of changed event 1 Enable time zone reporting of changed event by unsolicited result code **+CTZV: <tz>** 2 Enable extended time zone reporting by unsolicited result code **+CTZE: <tz>,<dst>,<time>**
<tz>	Indicate the sum of the local time zone (difference between the local time and GMT is expressed in quarters of an hour) plus daylight saving time. The format is "±zz", expressed as a fixed width, two-digit integer with the range -48 ... +56. To maintain a fixed width, numbers in the range -9 ... +9 are expressed with a leading zero, e.g. "-09",

	"+00" and "+09".
<dst>	Indicate whether **<tz>** includes daylight savings adjustment 0 **<tz>** includes no adjustment for daylight saving time 1 **<tz>** includes +1 hour (equals 4 quarters in **<tz>**) adjustment for daylight saving time 2 **<tz>** includes +2 hours (equals 8 quarters in **<tz>**) adjustment for daylight saving time
<time>	Indicate the local time. The format is "YYYY/MM/DD,hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date (DD), hour (hh), minute (mm) and second (ss). This parameter can be provided by the network when delivering time zone information and will be presented in the unsolicited result code of extended time zone reporting if provided by the network.

Example

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

OK

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

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

The command is used to obtain the latest time synchronized through network.

AT+QLTS Obtain the Latest Time Synchronized through Network	
Test Command **AT+QLTS=?**	Response **+QLTS:** list of supported **<mode>**s **OK**
Execution Command **AT+QLTS**	Response The Execution Command returns the latest time that has been synchronized through network: **+QLTS: <time>,<ds>** **OK**
Write Command **AT+QLTS=<mode>**	Response **+QLTS: <time>,<ds>**

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

Parameter

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

NOTE

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

Example

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

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

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

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

OK
```

5.9. AT+QNWINFO Query Network Information

The command is used to query network information such as access technology selected, the operator and the band selected.

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

Parameter

<Act>	String type; access technology selected	
	"NONE"	
	"WCDMA"	
	"HSDPA"	
	"HSUPA"	
	"HSPA+"	
	"TDD LTE"	
	"FDD LTE"	
<oper>	Operator names in numeric format	
<band>	The band selected	
	"WCDMA 2100"	B1
	"WCDMA 1900"	B2

	"WCDMA 1800"	B3
	"WCDMA 1700 US"	B4
	"WCDMA 850"	B5
	"WCDMA 900"	B8
	"WCDMA 1700 JAPAN"	B9
	"WCDMA 850 JAPAN"	B19
	"LTE BAND 1" – "LTE BAND 66"	
<channel>	Channel ID	

NOTES

1. If the devices have not been registered on a network, the command will return +QNWINFO: No Service.
2. For detailed bands of each module supported, please refer to corresponding product specifications.

Example

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

OK
```

5.10. AT+QSPN Query the Service Provider Name

The command is used to query the service provider name.

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

Parameter

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

NOTES

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

Example

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

OK
```

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

The command is used to obtain the network information, such as serving cell, neighbour cells.

AT+QENG Query Primary Serving Cell and Neighbour Cell Information	
Test Command **AT+QENG=?**	Response **+QENG:** (list of supported **<celltype>**s) **OK**
Write Command Query the serving cell information **AT+QENG="servingcell"**	**Response** In LTE mode: **+QENG: "servingcell",<state>,"LTE",<is_tdd>,<mcc>,<mnc>,<cellid>,<pcid>,<earfcn>,<freq_band_ind>,<ul_bandwidth>,<dl_bandwidth>,<tac>,<rsrp>,<rsrq>,<rssi>,<sinr>,<cqi>,<tx_power>,<srxlev>** In WCDMA mode:

	+QENG: "servingcell",<state>,"WCDMA",<mcc>,<mnc>,<lac>,<cellid>,<uarfcn>,<psc>,<rac>,<rscp>,<ecio>,<phych>,<sf>,<slot>,<speech_code>,<comMod> **OK**
Write Command Query the information of neighbour cells **AT+QENG="neighbourcell"**	**Response** In LTE mode: **[+QENG: "neighbourcell intra","LTE",<earfcn>,<pcid>,<rsrq>,<rsrp>,<rssi>,<sinr>,<srxlev>,<cell_resel_priority>,<s_non_intra_search>,<thresh_serving_low>,<s_intra_search>…** **[+QENG: "neighbourcell inter","LTE",<earfcn>,<pcid>,<rsrq>,<rsrp>,<rssi>,<sinr>,<srxlev>,<cell_resel_priority>,<threshX_low>,<threshX_high>** **…** **[+QENG:"neighbourcell","WCDMA",<uarfcn>,<cell_resel_priority>,<thresh_Xhigh>,<thresh_Xlow>,<psc>,<rscp><ecno>,<srxlev>** **…** In WCDMA mode: **[+QENG:"neighbourcell","WCDMA",<uarfcn>,<srxqual>,<psc>,<rscp>,<ecno>,<set>,<rank>,<srxlev>** **…** **[+QENG: "neighbourcell","LTE",<earfcn>,<cellid>,<rsrp>,<rsrq>,<s_rxlev>** **…** **OK**
Reference	

Parameter

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

<is_tdd>	LTE TDD or FDD mode
<mcc>	Mobile Country Code (first part of the PLMN code) "-" Invalid
<mnc>	Number format. Mobile Network Code (second part of the PLMN code) "-" Invalid
<lac>	Location Area Code. The parameter determines the two bytes location area code in hexadecimal format (e.g. 00C1 equals 193 in decimal) of the cell that was scanned. Range: 0-65535 "-" Cannot get the invalid value
<cellid>	Cell ID. The parameter determines the 16-bit (GSM) or 28-bit (UMTS) cell ID. Range: 0-0xFFFFFFF. "-" Invalid
<pcid>	Physical cell ID
<uarfcn>	The parameter determines the UTRA-ARFCN of the cell that was scanned
<earfcn>	The parameter determines the E-UTRA-ARFCN of the cell that was scanned
<freq_band_ind>	E-UTRA frequency band (see *3GPP 36.101*)
<ul_bandwidth>	UL bandwidth 0 1.4MHz 1 3MHz 2 5MHz 3 10MHz 4 15MHz 5 20MHz
<dl_bandwidth>	DL bandwidth 0 1.4MHz 1 3MHz 2 5MHz 3 10MHz 4 15MHz 5 20MHz
<tac>	Tracking Area Code (see *3GPP 23.003* ***Section 19.4.2.3***)
<psc>	The parameter determines the primary scrambling code of the cell that was scanned
<rac>	Routing Area Code. Range 0-255.
<rscp>	The parameter determines the Received Signal Code Power level of the cell that was scanned.
<ecio>	Carrier to noise ratio in dB=measured Ec/Io value in dB.
<rsrp>	Reference Signal Received Power (see *3GPP 36.214*)
<rsrq>	Reference Signal Received Quality (see 3GPP *36.214*)
<rssi>	The par ameter indicates the Received Signal Strength Indication
<sinr>	Logarithmic value of SINR. Range: -20~+30. Unit: dB.
<cqi>	Channel Quality Indication, Range: 1-30.
<tx_power>	Tx power value in 1/10 dBm. It is the maximum of all UL channel tx power. The tx_power value is only meaningful when the device is in traffic.

<phych>	Physical channel 0 DPCH 1 FDPCH
<sf>	Spreading factor. 0 SF_4 1 SF_8 2 SF_16 3 SF_32 4 SF_64 5 SF_128 6 SF_256 7 SF_512 8 UNKNOWN
<slot>	(0-16): slot format for DPCH. (0-9): slot format for FDPCH
<speech_code>	Destination number on which call is to be deflected
<comMod>	Number format. Compress mode 0 Not support compress mode 1 Support compress mode
<srxqual>	Receiver automatic gain control on the camped frequency.
<ecno>	Carrier to noise ratio in dB = measured Ec/Io value in dB.
<set>	3G neighbour cell set 1 Active set 2 Synchronous neighbour set 3 Asynchronous neighbour set
<rank>	Rank of this cell as neighbour for inter-RAT cell reselection
<srxlev>	Suitable receive level for inter frequency cell
<threshX_low>	To be considered for reselection. The suitable receive level value of an evaluated lower priority cell must be greater than this value.
<threshX_high>	To be considered for reselection. The suitable receive level value of an evaluated higher priority cell must be greater than this value.
<thresh_Xhigh>	Reselection threshold for high priority layers.
<thresh_Xlow>	Reselection threshold for low priority layers.
<cpich_rscp>	Absolute power level of the common pilot channel as received by the UE in dBm x10.
<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 x10.
<srxlev>	Select receive level value for base station in dB (see *3GPP 25.304*).
<cell_resel_priority>	Cell reselection priority. Range: 0-7.
<s_non_intra_search>	Threshold to control non-intra frequency searches.
<thresh_serving_low>	Specifies the suitable receive level threshold (in dB) used by the UE on the serving cell when reselecting towards a lower priority RAT/frequency.
<s_intra_search>	Cell selection parameter for the intra frequency cell.

NOTE

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

Example

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

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

OK
```

5.12. AT+QCAINFO Query Carrier Aggregation Parameters

The command is used to query carrier aggregation parameters.

AT+QCAINFO Query Carrier Aggregation Parameters	
Test Command **AT+QCAINFO=?**	Response **OK**
Execution Command **AT+QCAINFO**	Response **+QCAINFO:** **"PCC",<freq>,<bandwidth>,<band>,<pcell_state>,<pcid>,<rsrp>,<rsrq>,<rssi>,<sinr>** **"SCC",<freq>,<bandwidth>,<band>,<scell_state>,<pcid>,<rsrp>,<rsrq>,<rssi>,<sinr>** **["SCC",<freq>,<bandwidth>,<band>,<scell_state>,<pcid>,<rsrp>,<rsrq>,<rssi>,<sinr>** **[…]]** **OK** If no secondary cell was active: **OK**
Reference	

Parameter

<PCC>	Primary carrier component
<SCC>	Secondary carrier component
<freq>	EARFCN
<bandwidth>	Bandwidth
	6 1.4MHz
	15 3MHz
	25 5MHz
	50 10MHz
	75 15MHz
	100 20MHz
<band>	DL Band information.
	LTE BAND 1
	LTE BAND 2
	LTE BAND 3
	…
	LTE BAND 66
<pcell_state>	Primary cell state
	0 No serving
	1 Registered
<scell_state>	Secondary cell state
	0 Deconfigured
	1 Configured deactivated
	2 Configured activated
<pcid>	Physical Cell ID
<rsrp>	Reference Signal Received Power (see *3GPP 36.214*)
<rsrq>	Reference Signal Received Quality (see *3GPP 36.214*)
<rssi>	Received Signal Strength Indication
<sinr>	Logarithmic value of SINR. Values are in 1/5th of a dB. Range: 0-250, which translates to -20dB -+30dB.

5.13. AT+QNETINFO="servingcell" Query Serving Cell Information

The command is used to query primary and secondary serving cells.

AT+QNETINFO="servingcell" Query Serving Cell Information	
Test Command **AT+QNETINFO=?**	Response **…** **+QNETINFO: "servingcell"** **…** **OK**

Write Command	Response
AT+QNETINFO="servingcell"	Query the serving cell information **+QNETINFO: "servingcell",<state>["LTE",<is_tdd>,<mcc>,<mnc>** **+QNETINFO: "servingcell", "PCC",<cellid>,<pcid>,<earfcn>,<freq_band_ind>,<rsrp>,<rsrq>,<rssi>,<sinr>,<dl_bandwidth>,<ul_bandwidth>,<tac>,<srxlev>]** **[+QNETINFO: "servingcell","SCC",<cellid>,<pcid>,<earfcn>,<freq_band_ind>,<rsrp>,<rsrq>,<rssi>,<sinr>,<dl_bandwidth>** **[…]]** **[…]]** **OK**

Parameter

<state>	UE state. "SEARCH" UE is searching but could not (yet) find a suitable 3G/4G cell. "LIMSRV" UE is camping on a cell but has not registered on the network. "NOCONN" UE is camping on a cell and has registered on the network, and it is in idle mode. "CONNECT" UE is camping on a cell and has registered on the network, and a voice call is in progress.
<is_tdd>	LTE mode TDD FDD
<mcc>	Mobile Country Code (first part of the PLMN code)
<mnc>	Mobile Network Code (second part of the PLMN code)
<cellid>	Cell ID. The parameter determines the 16-bit (GSM) or 28-bit (UMTS) cell ID. Range: 0-0xFFFFFFF.
<pcid>	Physical Cell ID
<earfcn>	The parameter determines the E-UTRA-ARFCN of the cell that was scanned
<freq_band_ind>	E-UTRA frequency band (see *3GPP 36.101*)
<rsrp>	Reference Signal Received Power (see *3GPP 36.214*)
<rsrq>	Reference Signal Received Quality (see *3GPP 36.214*)
<rssi>	Received Signal Strength Indication
<sinr>	Logarithmic value of SINR. Values are in 1/5th of a dB. Range 0-250, which translates to -20dB - +30dB.
<dl_bandwidth>	DL bandwidth 0 1.4MHz 1 3MHz 2 5MHz

	3	10MHz
	4	15MHz
	5	20MHz
<ul_bandwidth>	Number format. UL bandwidth	
	0	1.4MHz
	1	3MHz
	2	5MHz
	3	10MHz
	4	15MHz
	5	20MHz
<tac>	Tracking Area Code (see 3GPP 23.003)	
<srxlev>	Select RX Level Value for base station in dB (see 3GPP 25.304).	

5.14. AT+QPING Ping a Remote Server

The command is used to test the Internet protocol reachability of a host. Before using ping tools, the host should activate the context corresponding to <contextID> via AT+QIACT. It will return the result during the set value of <timeout>.

AT+QPING Ping a Remote Server	
Test Command **AT+QPING=?**	Response **+QPING: (1-16),<host>,(1-255),(1-10)** **OK**
Write Command **AT+QPING=<contextID>,<host>[,<timeout>[,<pingnum>]]**	Response If ping a remote server successfully, response: **OK** **[+QPING: <result>[,<IP_address>,<bytes>,<time>,<ttl>]<CR><LF>…]** **+QPING: <finresult>[,<sent>,<rcvd>,<lost>,<min>,<max>,<avg>]** Or **ERROR**

Parameter

<contextID>	Integer type. The context ID. The range is 1-16.
<host>	The host address in string type. The format is a domain name or a dotted decimal IP address.

<timeout>	Integer type. Set the maximum time to wait for the response of each ping request. The range is 1-255, and the default value is 4. If this parameter is not set, the default value will be used.Unit: second.
<pingnum>	Integer type. Set the maximum number of time for sending ping request. The range is 1-10, and the default value is 4. If this parameter is not set, the default value will be used.
<result>	The result of each ping request. 0 Received the ping response from the server. In this case, it is followed by **<IP_address>,<bytes>,<time>,<ttl>** Others Please refer to ***Chapter 2***.
<IP_address>	The IP address of the remote server formatted as a dotted decimal IP.
<bytes>	The length of each sent ping request. Unit: byte.
<time>	The time wait for the response of the ping request. Unit: ms.
<ttl>	Time to live value of the response packet for the ping request.
<finresult>	The final result of the command. 0 It is finished normally. It is successful to activate the context and find the host. In this case, it is followed by **<sent>,<rcvd>,<lost>,<min>,<max>,<avg>**. Others Please refer to ***Chapter 2***.
<sent>	Total number of sent ping requests.
<rcvd>	Total number of the ping requests that received the response.
<lost>	Total number of the ping requests that are timeout.
<min>	The minimum response time. Unit: ms.
<max>	The maximum response time. Unit: ms.
<avg>	The average response time. Unit: ms.

Example

```
AT+QIACT=1
OK

AT+QIACT?
+QIACT: 1,1,1,"10.168.121.86"

OK

AT+QPING=1,"www.baidu.com"
OK

+QPING: 0,"14.215.177.38",32,39,255

+QPING: 0,"14.215.177.38",32,42,255

+QPING: 0,"14.215.177.38",32,41,255
```

```
+QPING: 0,"14.215.177.38",32,38,255

+QPING: 0,4,4,0,38,42,39
```

6 Call Related Commands

6.1. ATA Answer an Incoming Call

The command is used to connect the MT to an incoming voice or data call indicated by a **RING** URC.

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

NOTES

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

Example

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

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

6.2. ATD Originate a Call

The command is be used to set up outgoing voice and data calls. Supplementary services can also be controlled with this command.

ATD Originate a Call	
Execution Command **ATD<n>[<mgsm>][;]**	Response This command is used to set up outgoing voice, data or fax calls. It also serves to control supplementary services. If no dial tone and ATX2 or ATX4 is set: **NO DIALTONE** If busy and ATX3 or ATX4 is set: **BUSYBUSY** If a connection cannot be established: **NO CARRIER** If connection is successful and there is a non-voice call: **CONNECT<text>** And MT switches to data mode. Note: **<text>** outputs only when **<value>** is greater than 0 in **ATX<value>** parameter setting. When MT returns to command mode after call release: **OK** If connection is successful and there is a voice call: **OK**
Maximum Response Time	5s, determined by the network.

Reference
V.25ter

Parameter

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

NOTES

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

Example

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

6.3. ATH Disconnect Existing Connection

The command is used to disconnect 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	90s, determined by the network.
Reference V.25ter	

Parameter

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

6.4. AT+CVHU Voice Hang up Control

The command is used to control 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	300ms
Reference 3GPP TS 27.007	

Parameter

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

6.5. AT+CHUP Hang up Calls

The command is used to cancel all voice calls in the state of Active, Waiting and Held. For data disconnections, use **ATH**.

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

Example

```
RING                    //Incoming call.

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

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

The **+++** character sequence supports the MT to switch from data mode to AT command mode. It allows executing AT commands while maintaining the data connection with the remote device.

+++ Switch from Data Mode to Command Mode	
Execution Command **+++**	Response This command is only available when MT is in data mode. The "**+++**" character sequence makes the MT to cancel the data flow over the AT interface and switch to command mode. This allows executing AT command while maintaining the data connection with the remote server. **OK**
Maximum Response Time	300ms
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 other characters cannot 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.

6.7. ATO Switch from Command Mode to Data Mode

The command is used to resume the connection and switch back from command mode to data mode.

ATO Switch from Command Mode to Data Mode	
Execution Command **ATO[n]**	Response MT resumes the connection and switches back to data mode from command mode. If connection is not successfully resumed: **NO CARRIER** If connection is successfully resumed, MT returns to data mode from command mode **CONNECT <text>**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0	Switch from command mode to data mode

NOTE

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

6.8. ATS0 Set Number of Rings before Automatically Answering Call

The command is used to control automatic answering mode for the incoming calls.

ATS0 Set Number of Rings before Automatically Answering Call	
Read Command **ATS0?**	Response **<n>** **OK**
Write Command **ATS0=<n>**	Response This parameter setting determines the number of rings before auto-answer. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0	Automatic answering is disabled
	1-255	Enable automatic answering on the ring number specified

NOTE

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

Example

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

RING                    //A call is coming
##0                     //Dual card single standby is supported currently, therefore only one (U)SIM card is active. ##0 indicates that the activated (U)SIM card has received an
```

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

6.9. ATS6 Set Pause before Blind Dialing

The 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	300ms
Reference V.25ter	

Parameter

<n>	0-2-10	Number of seconds to wait before blind dialing

6.10. ATS7 Set Time to Wait for Connection Completion

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

ATS7 Set Time to Wait for Connection Completion	
Read Command **ATS7?**	Response **<n>** **OK**

Write Command **ATS7=<n>**	Response This parameter setting determines the amount of time (unit: second) to wait for the connection completion in case of answering or originating a call. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0	Disabled
	1-255	Duration of seconds to wait for connection completion

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

The 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	300ms
Reference V.25ter	

Parameter

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

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

The command is used to determine the duration (unit: tenths of a second) during which the UE remains connected in absence of a data carrier.

ATS10 Set Disconnection Delay after Indicating the Absence of Data Carrier	
Read Command **ATS10?**	Response **<n>** **OK**
Write Command **ATS10=<n>**	Response This parameter setting determines the amount of time (unit: tenths of a second) during which the MT will remain connected in absence of a data carrier. If the data carrier is once more detected before disconnection, the MT remains connected. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

6.13. AT+CSTA Select Type of Address

The command is used to select the type of number for further dialing commands **ATD** according to 3GPP Specifications. The Test Command returns values supported a compound value.

AT+CSTA Select Type of Address	
Test Command **AT+CSTA=?**	Response **+CSTA:** (list of supported **<type>**s) **OK**
Read Command	Response

AT+CSTA?	**+CSTA: <type>** **OK**
Write Command **AT+CSTA=<type>**	Response **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

6.14. AT+CLCC List Current Calls of MT

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

AT+CLCC List Current Calls of MT	
Test Command **AT+CLCC=?**	Response **OK**
Execution Command **AT+CLCC**	Response MT returns a list of current calls of MT. If the command is executed successfully, but no calls are existed, then no information will be responded but **OK** response will be sent to TE. **[+CLCC : <id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>]]** **...** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<idx>	The call identification number as described in *3GPP TS 22.030* can be used in **AT+CHLD** command operations.	
<dir>	0	Mobile originated (MO) call
	1	Mobile terminated (MT) call
<stat>	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>	Bearer/teleservice	
	0	Voice
	1	Data
	2	FAX
<mpty>	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 for **<number>** corresponding to the entry found in phonebook.	

Example

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

OK
```

6.15. AT+CR Service Reporting Control

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

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

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

Parameter

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

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

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

AT+CRC Set Cellular Result Codes for Incoming Call Indication	
Test Command **AT+CRC=?**	Response **+CRC:** (list of supported **<mode>**s)

	OK
Read Command **AT+CRC?**	Response **+CRC: <mode>** **OK**
Write Command **AT+CRC=[<mode>]**	Response MT controls whether the extended format of incoming call indication is used or not. **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<mode>	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 TE.
ATH
OK
AT+CRC=0                    //Disable extended format.
OK

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

6.17. AT+CRLP Select Radio Link Protocol Parameter

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

AT+CRLP Select Radio Link Protocol Parameter	
Test Command **AT+CRLP=?**	Response MT returns values supported. RLP (Radio Link Protocol) versions 0 and 1 share the same parameter set. MT returns only one line for this set (during which **<ver>** is not presented). **+CRLP:** (list of supported **<iws>**s),(list of supported **<mws>**s),(list of supported **<T1>**s),(list of supported **<N2>**s),**<ver>** **+CRLP:** (list of supported **<iws>**s),(list of supported **<mws>**s),(list of supported **<T1>**s),(list of supported **<N2>**s),**<ver>** **+CRLP:** (list of supported **<iws>**s),(list of supported **<mws>**s),(list of supported **<T1>**s),(list of supported **<N2>**s),**<ver>** **OK**
Read Command **AT+CRLP?**	Response MT returns current settings for RLP version. RLP versions 0 and 1 share the same parameter set. TA returns only one line for this set (during which **<ver>** is not presented). **+CRLP: <iws>,<mws>,<T1>,<N2>,<ver>** **...** **OK**
Write Command **AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>]]]]]**	Response TA sets radio link protocol (RLP) parameters used when non-transparent data calls are set up. **OK**
Maximum Response Time	300ms
Reference 3GPP TS27.007	

Parameter

<iws>	0-61	Interworking window size (IWF to MS)
	0-240-488	For **<ver>**=2

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

6.18. AT+QECCNUM Configure Emergency Call Numbers

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

The maximal supported ECC numbers of each type is 20.

AT+QECCNUM Configure Emergency Call Numbers	
Test Command **AT+QECCNUM=?**	Response **+QECCNUM: (0-2)** **OK**
Write Command **AT+QECCNUM=<mode>,<type>[,<eccnum1>[,<eccnum2>,…[,<eccnumN>]]]**	Response If **<mode>** is equal to 0, query the ECC numbers. In this case, **<eccnumN>** should be omitted **+QECCNUM: <type>,<eccnum1>,<eccnum2>[…]** **OK** If **<mode>** is not equal to 0: **<mode>**=1 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>[…]** **…** **OK**

Maximum Response Time	300ms

Parameter

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

Example

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

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

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

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

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

OK
```

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

The command is used to 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 MT functionality: **+CME ERROR: <err>**
Maximum Response Time	90s, determined by network.
Reference	

Parameter

<cause>	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>	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.	
	0	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.

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 of which call 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 existing calls. Disconnect cause is "normal call clearing"
OK
AT+CLCC
OK
```

6.20. AT^DSCI Call Status Indication

The command is used to indicate the call status.

AT^DSCI Call Status Indication	
Test Command **AT^DSCI=?**	Response **^DSCI: (0,1)** **OK**
Read Command **AT^DSCI?**	Response **^DSCI: <n>** **OK**
Write Command **AT^DSCI=<n>**	Response MT enables or disables the presentation of the DSCI at TE. **OK**
Reference	

Parameter

<n>	0	DSCI not supported
	1	DSCI supported

NOTE

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

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

Parameters

<id> Call ID

<dir> Call direction

0 Mobile originated call

1 Mobile terminated call

<stat> Call state

1 CALL_LOCAL_HOLD

2 CALL_ORIGINAL

3 CALL_CONNECT

4 CALL_INCOMING

5 CALL_WAITING

6 CALL_END

7 CALL_ALERTING

8 CALL_REMOTE_HOLD

9 CALL_BOTH_HOLD

<type> Call type

0 Voice call

1 PS call

<number> Phone number

<num_type> Type of address of octet in integer format (See *3GPP TS 24.008*). Usually, it has three kinds of values:

129 Unknown type

145 International type (contains the character "+")

161 National type

Example

```
//Dial a call
AT^DSCI=1                          //Enable DSCI.
OK
ATD10086;                          //Dial 10086.
OK

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

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

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

```
ATH
OK

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

//Incoming call
RING

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

RING

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

NO CARRIER
```

6.21. AT+QCHLDIPMPTY Remove a Participant from the Conference Call

The command is used to remove a participant from the conference call. It is only for VoLTE.

AT+QCHLDIPMPTY Remove a Participant from the Conference Call	
Test Command **AT+QCHLDIPMPTY=?**	Response **+QCHLDIPMPTY: <number>** **OK**
Write Command **AT+QCHLDIPMPTY=<number>**	Response **OK** Or **ERROR**
Maximum Response Time	300ms

Parameter

<number>	A call number

7 Phonebook Commands

7.1. AT+CNUM Subscriber Number

The command is used to get the subscribers' own number(s) from the (U)SIM.

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

7.2. AT+CPBF Find Phonebook Entries

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

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

Parameter

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

7.3. AT+CPBR Read Phonebook Entries

The command is used to read 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>** will be returned.

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

Parameter

<index>	In the range of location numbers of phone book memory
<nlength>	Indicate the maximum length of field **<number>**
<tlength>	Indicate the maximum length of field **<text>**
<index1>	The first phonebook record to be read
<index2>	The last phonebook record to be read
<type>	Type of address of octet in integer format (See *3GPP TS 24.008*). Usually, it has three kinds of values: 129 Unknown type 145 International type (contains the character "+") 161 National type
<text>	The field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**.

7.4. AT+CPBS Select Phonebook Memory Storage

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

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

Parameter

<storage>	"SM"	(U)SIM phonebook
	"DC"	MT dialed calls list (**AT+CPBW** may not be applicable to this storage)
	"FD"	(U)SIM fix dialing-phone book (**AT+CPBW** operation needs the authority of PIN2)

	"LD" (U)SIM last-dialing-phone book (**AT+CPBW** may not be applicable to this storage) "MC" MT missed (unanswered) calls list (**AT+CPBW** may not be applicable to this storage) "ME" Mobile equipment phonebook "RC" MT received calls list (**AT+CPBW** may not be applicable to this storage) "EN" (U)SIM (or MT) emergency number (**AT+CPBW** may not be applicable to this storage) "ON" (U)SIM own numbers (MSISDNs) list
<used>	Indicates the total number of used locations in selected memory
<total>	Indicates the total number of locations in selected memory

7.5. AT+CPBW Write Phonebook Entry

The command is used to write 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:** (The range of supported **<index>**s),**<nlength>,**(list of supported **<type>**s),**<tlength>** **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Write Command **AT+CPBW=[<index>][,<number>[,<type>[,<text>]]]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP 27.007	

Parameter

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

Example

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

8 Short Message Service Commands

8.1. AT+CSMS Select Message Service

The command is used to select message service **<service>** and query the types of messages supported by MT.

AT+CSMS Select Message Service	
Test Command **AT+CSMS=?**	Response **+CSMS:** (list of supported **<service>**s) **OK**
Read Command **AT+CSMS?**	Response **+CSMS: <service>,<mt>,<mo>,<bm>** **OK**
Write Command **AT+CSMS=<service>**	Response **+CSMS: <mt>,<mo>,<bm>** **OK** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<service>	Type of message service	
	0	*3GPP TS 23.040* and *3GPP TS 23.041* (the syntax of SMS AT commands is compatible with *3GPP TS 27.005 Phase 2 version 4.7.0*; Phase 2+ features which do not require new command syntax can be supported, e.g. correct routing of messages with new Phase 2+ data coding schemes).
	1	*3GPP TS 23.040* and *3GPP TS 23.041* (the syntax of SMS AT commands is

		compatible with *3GPP TS 27.005 Phase 2+ version*; the requirement of **<service>** setting 1 is mentioned under corresponding command descriptions).
<mt>	Mobile terminated messages	
	0	Type not supported
	1	Type supported
<mo>	Mobile originated messages	
	0	Type not supported
	1	Type supported
<bm>	Broadcast type messages	
	0	Type not supported
	1	Type supported

Example

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

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

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

OK
```

8.2. AT+CMGF Message Format

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

The format of messages can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters). Text mode uses the value of parameter **<chset>** specified by command **AT+CSCS** to inform the character set to be used in the message body in the TA-TE interface.

AT+CMGF Message Format	
Test Command	Response
AT+CMGF=?	**+CMGF:** (list of supported **<mode>**s)

	OK
Read Command **AT+CMGF?**	Response **+CMGF: <mode>** **OK**
Write Command **AT+CMGF=[<mode>]**	Response MT sets parameter to decide which kind of I/O format of messages is used. **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<mode>	0	PDU mode
	1	Text mode

8.3. AT+CSCA Service Center Address

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

AT+CSCA Service Center Address	
Test Command **AT+CSCA=?**	Response **OK**
Read Command **AT+CSCA?**	Response **+CSCA: <sca>,<tosca>** **OK**
Write Command **AT+CSCA=<sca>[,<tosca>]**	Response **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

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

Example

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

OK
```

8.4. AT+CPMS Preferred Message Storage

The command is used to select memory storages **<mem1>**, **<mem2>** and **<mem3>** to be used for reading, writing, etc.

AT+CPMS Preferred Message Storage	
Test Command **AT+CPMS=?**	Response **+CPMS:** (list of supported **<mem1>**s),(list of supported **<mem2>**s),(list of supported **<mem3>**s) **OK**
Read Command **AT+CPMS?**	Response **+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>** **OK**
Write Command **AT+CPMS=<mem1>[,<mem2>[,<mem3>]]**	Response MT selects memory storages **<mem1>**, **<mem2>** and **<mem3>** to be used for reading, writing, etc. **+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>** **OK**

	If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<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
	"SR"	SMS status report storage location
<mem2>	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>	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>	The number of current messages in **<memx>**	
<totalx>	The total number of messages which can be stored in **<memx>**	

Example

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

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

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

OK
```

8.5. AT+CMGD Delete Messages

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

AT+CMGD Delete Messages	
Test Command **AT+CMGD=?**	Response **+CMGD:** (list of supported **<index>**s),(list of supported **<delflag>**s) **OK**
Write Command **AT+CMGD=<index>[,<delflag>]**	Response MT deletes message from preferred message storage **<mem1>** location **<index>**. **OK** If there is any error related to MT functionality: **+CMS ERROR:<err>**
Maximum Response Time	300ms Note: Operation of **<delflag>** depends on the storage of deleted messages.
Reference 3GPP TS 27.005	

Parameter

<index>	Integer type value in the range of location numbers supported by the associated memory.	
<delflag>	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

Example

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

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

8.6. AT+CMGL List Messages

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

	If there is any error related to MT 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	300ms. Note: Operation of **<stat>** depends on the storage of listed messages.
Reference 3GPP TS 27.005	

Parameter

<stat>	In text mode:	
	"REC UNREAD"	Received unread messages
	"REC READ"	Received read messages
	"STO UNSENT"	Stored unsent messages
	"STO SENT"	Stored sent messages
	"ALL"	All messages
	In PDU mode:	
	0	Received unread messages
	1	Received read messages
	2	Stored unsent messages
	3	Stored sent messages
	4	All messages
<index>	In the range of location numbers supported by the associated memory	
<da>	Destination Address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *3GPP TS 27.007*); type of address is given by **<toda>**.	
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *TS 27.007*); type of address is given by **<tooa>**.	
<alpha>	String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry found in MT phonebook; implementation of this feature is manufacturer specified; the used character set should be the one selected with command Select TE Character Set **AT+CSCS** (see definition of this command in *3GPP TS 27.007*).	
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**).	
<toda>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address	

	octet in integer format.
<tooa>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer to **<toda>**).
<length>	Message length, integer type. Indicate the length of the message body <data> in the text mode (AT+CMGF=1); or the length of the actual TP data unit in octets in PDU mode (**AT+CMGF=0**) (i.e. the RP layer SMSC address octets are not counted in the length).
<data>	In the case of SMS: 3GPP TS 23.040 TP-User-Data in text mode responses; format: - If **<dcs>**, indicates that 3GPP TS 23.038 GSM 7-bit default alphabet is used and **<fo>** indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set. - If TE character set other than "HEX" (refer to **AT+CSCS** command in *3GPP TS 27.007*): ME/TA converts GSM alphabet into current TE character set according to rules of ***Annex A*** in *3GPP TS 27.007*. - If TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character Π (GSM 7 bit default alphabet 23) is presented as 17 (IRA 49 and 55)). - If **<dcs>**, indicates that 8-bit or UCS2 data coding scheme is used, or **<fo>** indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: 3GPP TS 23.041 CBM Content of Message in text mode responses; format: - If **<dcs>**, indicates that 3GPP TS 23.038 GSM 7-bit default alphabet is used: - If TE character set other than "HEX" (refer to **AT+CSCS** command in *3GPP TS27.007*): ME/TA converts GSM alphabet into current TE character set according to rules of ***Annex A*** in *3GPP TS 27.007*. - If TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7-bit default alphabet into two IRA character long hexadecimal number.
<pdu>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) 3GPP TS 27.007
<fo>	Depends on the command or result code: first octet of *3GPP TS 23.040 [3]* SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format.
<mr>	*3GPP TS 23.040 [3]* TP-Message-Reference in integer format
<ra>	*3GPP TS 23.040 [3]* TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in *3GPP TS 27.007 [9]*); type of address given by **<tora>**
<tora>	*3GPP TS 24.011 [6]* TP-Recipient-Address Type-of-Address octet in integer format (default refer **<toda>**)
<scts>	*3GPP TS 23.040 [3]* TP-Service-Centre-Time-Stamp in time-string format (refer

	<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.

Example

```
AT+CMGF=1                          //Set SMS message format as text mode.
OK
AT+CMGL="ALL"                      //List all messages from message storage.
+CMGL: 1,"STO UNSENT","",,

<This is a test from Quectel>

+CMGL: 2,"STO UNSENT","",,

<This is a test from Quectel>

OK
```

8.7. AT+CMGR Read Messages

The 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 will change to "REC READ".

AT+CMGR Read Messages	
Test Command **AT+CMGR=?**	Response **OK**
Write Command **AT+CMGR=<index>**	Response MT returns SMS message with location value **<index>** from message storage **<mem1>** to the TE. If status of the message is "REC UNREAD", status in the storage will change to "REC READ". If in text mode (**AT+CMGF=1**) and the command is executed successfully: For SMS-DELIVER: **+CMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pi**

	d>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> **OK** For SMS-SUBMIT: **+CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>** **OK** For SMS-STATUS-REPORTs: **+CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>** **OK** For SMS-COMMANDs: **+CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]** **OK** For CBM storage: **+CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>** **OK** If in PDU mode (**AT+CMGF=0**) and command is executed successfully: **+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu>** **OK** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	Depends on the length of message content.
Reference 3GPP TS 27.005	

Parameter

<index>	In the range of location numbers supported by the associated memory.
<stat>	In text mode
	"REC UNREAD" Received unread messages
	"REC READ" Received read messages
	"STO UNSENT" Stored unsent messages
	"STO SENT" Stored sent messages
	"ALL" All messages
	In PDU mode
	0 Received unread messages
	1 Received read messages
	2 Stored unsent messages
	3 Stored sent messages
	4 All messages
<alpha>	String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry found in MT phonebook. Implementation of this feature is manufacturer specified. The used character set should be the one selected with **AT+CSCS** command (see definition of this command in *3GPP TS 27.007*).
<da>	Destination address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<toda>**.
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<tooa>**.
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**).
<fo>	First octet. Depending on the command or result code: First octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted.
<pid>	Protocol identifier. 3GPP TS 23.040 TP-Protocol-Identifier in integer format (default 0).
<dcs>	Data coding scheme. Depending on the command or result code: 3GPP TS 23.038 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format.
<vp>	Validity period. Depending on SMS-SUBMIT **<fo>** setting: 3GPP TS 23.040 TP-Validity-Period either in integer format or in time-string format (refer to **<dt>**).
<mn>	Message number. 3GPP TS 23.040 TP-Message-Number in integer format.
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<ra>	Recipient address. 3GPP TS 23.040 TP-Recipient-Address Address-Value field in string format. BCD numbers (or GSM default alphabet characters) are converted to

	characters of the currently selected TE character set (refer to **AT+CSCS** command). The type of address is given by **<tora>**.
<tora>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format (default refer **<toda>**).
<toda>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.
<tooa>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default 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. Indicates 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)).
<dt>	*3GPP TS 23.040 [3]* TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss zz", during which characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals 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.
<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.

Example

```
+CMTI: "SM",3                                   //Indicate that new message has been received and saved
                                                  to <index>=3 of "SM".
AT+CSDH=1
OK
AT+CMGR=3                                       //Read message
+CMGR: "REC UNREAD","+8615021012496",,"13/12/13,15:06:37+32",145,4,0,0,"+8613800210500",145,27

<This is a test from Quectel>
```

OK

8.8. AT+CMGS Send Messages

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

AT+CMGS Send Messages	
Test Command **AT+CMGS=?**	Response **OK**
Write Command 1) If in text mode (**AT+CMGF=1**): **AT+CMGS=<da>[,<toda>]**<CR> text is entered **<Ctrl+Z/ESC>** **<ESC>** means quit without sending 2) If in PDU mode (**AT+CMGF=0**): **AT+CMGS=<length>**<CR> PDU is given **<Ctrl+Z/ESC>**	Response MT sends message from TE to the network (SMS-SUBMIT). Message reference value **<mr>** is returned to the TE on successful message delivery. Optionally (when **AT+CSMS <service>** value is 1 and the network supports) **<scts>** will be returned. Values can be used to identify message upon unsolicited delivery status report result code. 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 MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	120s, determined by the network.
Reference 3GPP TS 27.005	

Parameter

<da>	Destination address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in

	string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *3GPP TS 27.007*); type of address is given by **<toda>**.
<toda>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.
<length>	Message length. Indicates in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters; or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.

Example

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

OK
```

8.9. AT+CMMS Send More Messages

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

AT+CMMS Send More Messages	
Test Command **AT+CMMS=?**	Response **+CMMS:** (list of supported**<n>**s) **OK**
Read Command **AT+CMMS?**	Response **+CMMS: <n>** **OK**
Write Command **AT+CMMS=<n>**	Response **OK** Or

	ERROR If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	120s, determined by network.
Reference 3GPP TS 27.005	

Parameter

<n>	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); then ME shall close the link and MT switches **<n>** back to 0 automatically.
	2	Feature enabled. If the time between the response of the latest 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 MT will not switch **<n>** back to 0 automatically.

NOTE

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

8.10. AT+CMGW Write Messages to Memory

The command is used to 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 Messages to Memory	
Test Command **AT+CMGW=?**	Response **OK**
Write Command 1) If in text mode (**AT+CMGF=1**): **AT+CMGW=<oa/da>[,<tooa/toda>[,<stat>]]**<CR> text is entered	Response MT transmits SMS message (either SMS-DELIVER or SMS-SUBMIT) from TE to memory storage **<mem2>**, and then the memory location **<index>** of the stored message is returned. By default the message status will be set to 'stored

<Ctrl+Z/ESC> **<ESC>** quits without sending 2) If in PDU mode (**AT+CMGF=0**): **AT+CMGW=<length>[,<stat>]**<CR> PDU is given **<Ctrl+Z/ESC>**	unsent', but parameter **<stat>** also allows other status values to be given. If message writing is successful: **+CMGW: <index>** **OK** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

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

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

<tooa> Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer to **<toda>**).

<stat>

PDU mode	Text mode	Explanation
0	"REC UNREAD"	Received unread messages
1	"REC READ"	Received read messages
2	"STO UNSENT"	Stored unsent messages
3	"STO SENT"	Stored sent messages
4	"ALL"	All messages

<toda> Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.

<length> Message length. Indicates in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).

<pdu> In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.04TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).

<index> Index of message in selected storage <mem2>.

<mem2>	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

Example

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

> <This is a test from Quectel>             //Enter in text. Use <CTRL+Z> to write message or
                                            <ESC> to quit without sending.
+CMGW: 4

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

+CMGW: 5

OK
```

8.11. AT+CMSS Send Messages from Storage

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

AT+CMSS Send Messages from Storage	
Test Command **AT+CMSS=?**	Response **OK**
Write Command **AT+CMSS=<index>[,<da>[,<toda>]]**	Response MT sends message with location value **<index>** from message storage **<mem2>** to the network (SMS-SUBMIT). If new recipient address **<da>** is given, it should be used instead of the one stored with the message. Reference value

	<mr> is returned to the TE on successful message delivery. Values can be used to identify message upon unsolicited delivery status report result code. If in text mode (**AT+CMGF=1**) and 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 MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	120s, determined by network.
Reference 3GPP TS 27.005	

Parameter

<index>	Integer type in the range of location numbers supported by the associated memory.
<da>	Destination Address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *3GPP TS 27.007*); type of address is given by **<toda>**.
<toda>	Type of destination address. 3GPP TS 24.011 TP-Detination-Address Type-of-Address octet in integer format.
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**).
<ackpdu>	Format is same for **<pdu>** in case of SMS, but without 3GPP TS 24.011 SC address field and parameter shall be bounded by double quote characters like a normal string type parameter.
<mem2>	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

Example

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

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

OK
```

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

The command is used to 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 will send an **RP-ERROR** message to the network. The UE will automatically disable routing to the TE by setting both **<mt>** and **<ds>** values of **AT+CNMI** to 0.

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

	+CMS ERROR: <err>
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<n>	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.

NOTE

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

Example

```
AT+CSMS=1
OK
AT+CNMI=1,2,0,0,0
OK
AT+CMGF=1
OK
AT+CSDH=1
OK
+CMT: "+8615021012496",,"13/03/18,17:07:21+32",145,4,0,0,"+8613800551500",145,28
This is a test from Quectel.          //Short message is outputted directly when SMS is incoming.
AT+CNMA                               //Send ACK to the network.
OK
AT+CNMA
+CMS ERROR: 340                       //The second time return error; it needs ACK only once.
```

8.13. AT+CNMI SMS Event Reporting Configuration

The command is used to select 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:** (list of supported **<mode>**s),(list of supported **<mt>**s),(list of supported **<bm>**s),(list of supported **<ds>**s),(list of supported **<bfr>**s) **OK**
Read Command **AT+CNMI?**	Response **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>** **OK**
Write Command **AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]**	Response MT selects the procedure on how the received new messages from the network are indicated to the TE when TE is active, e.g. DTR is at low level (ON). If TE is inactive (e.g. DTR is at high level (OFF)), message receiving should be done as specified in *3GPP TS 23.038*. **OK** Or **ERROR** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<mode>	0	Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.
	1	Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in data mode). Otherwise forward them directly to TE.

	2	Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in data mode) and flush them to the TE after reservation. Otherwise forward them directly to TE.
<mt>	The rules for storing received SMS depend on its data coding scheme (refer to *3GPPTS 23.038*) and preferred memory storage (**AT+CPMS**) setting, and the value is:	
	0	No SMS-DELIVER indications are routed to TE.
	1	If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE by using unsolicited result code: **+CMTI: <mem>,<index>**
	2	SMS-DELIVERs (except class 2) are routed directly to the TE using unsolicited result code: **+CMT: [<alpha>],<length><CR><LF><pdu>** (PDU mode enabled) or **+CMT: <oa>,[<alpha>],<scts>[,*<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>*]<CR><LF><data>** (text mode enabled; about the parameters in italics, please refer to **AT+CSDH** command). 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>	The rules for storing received CBMs depend on its data coding scheme (refer to *3GPP TS 23.038*) and the setting of Select CBM Types (**AT+CSCB**); and the value is:	
	0	No CBM indications are routed to the TE.
	2	New CBMs are routed directly to the TE using unsolicited result code: **+CBM: <length><CR><LF><pdu>** (PDU mode); or **+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>** (text mode)
<ds>	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>	0	TA buffer of unsolicited result codes defined within this command is flushed to the TE when **<mode>** 1...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...2 is entered.

NOTE

Unsolicited result code:

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

Example

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

8.14. AT+CSCB Select Cell Broadcast Message Types

The command is used to select which types of CBMs are to be received by the ME. The command writes the parameters in NVM.

AT+CSCB Select Cell Broadcast Message Types	
Test Command **AT+CSCB=?**	Response It returns supported modes as a compound value. **+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 MT selects which types of CBMs are to be received by the ME. **OK** If there is any error related to MT functionality: **+CMS ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<mode>	0	Message types specified in **<mids>** and **<dcss>** are accepted
	1	Message types specified in **<mids>** and **<dcss>** are not accepted
<mids>	All different possible combinations of CBM message identifiers (refer to **<mid>**) (default is empty string), e.g. "0,1,5,320-478,922"	
<dcss>	All different possible combinations of CBM data coding schemes (refer to **<dcs>**) (default is empty string), e.g. "0-3,5"	

8.15. AT+CSDH Show SMS Text Mode Parameters

The command is used to control 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	300ms
Reference 3GPP TS 27.005	

Parameter

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

Example

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

<This is a test from Quectel>

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

<This is a test from Quectel>

OK
```

8.16. AT+CSMP Set SMS Text Mode Parameters

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

AT+CSMP Set SMS Text Mode Parameters	
Test Command **AT+CSMP=?**	Response **OK**
Read Command **AT+CSMP?**	Response **+CSMP: <fo>,<vp>,<pid>,<dcs>** **OK**
Write Command **AT+CSMP=<fo>[,<vp>[,<pid>[,<dcs>]]]**	Response MT selects values for additional parameters needed when SM is sent to the network or placed in a storage when text mode is selected (**AT+CMGF=1**). It is possible to set the validity period starting from when the SMS is received by the SMSC (**<vp>** ranges from 0 to 255) or define the absolute time of the validity period termination (**<vp>** is a string). **OK**
Maximum Response Time	300ms
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 Packet Domain Commands

9.1. AT+CGATT Attachment or Detachment of PS

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

AT+CGATT Attachment or Detachment of PS	
Test Command **AT+CGATT=?**	Response **+CGATT:** (list of supported **<state>**s) **OK**
Read Command **AT+CGATT?**	Response **+CGATT: <state>** **OK**
Write Command **AT+CGATT=<state>**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	140s, determined by the network.
Reference 3GPP TS 27.007	

Parameter

<state>	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

Example

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

OK
```

9.2. AT+CGDCONT Define PDP Contexts

The command is used to specify 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.

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

AT+CGDCONT Define PDP Contexts	
Test Command **AT+CGDCONT=?**	Response **+CGDCONT:** (range of supported **<cid>**s),**<PDP_type>,<APN>,<PDP_addr>,**(list of supported **<data_comp>**s),(list of supported **<head_comp>**s),(list of supported **<IPv4AddrAlloc>**s),(list of supported **<request_type>**s) **OK**
Read Command **AT+CGDCONT?**	Response **+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<data_comp>,<head_comp>** **[…]** **OK**
Write Command **AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<data_comp>[,<head_comp>]]]]]**	Response **OK** Or **ERROR**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<cid>	PDP context identifier, a numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of supported values (minimum value=1) is returned by the test form of the command.
<PDP_type>	Packet data protocol type, a string parameter which specifies the type of packet data protocol. "IP" IPV4. Internet Protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6"
<APN>	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>	A string parameter identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The allocated address may be read using the **AT+CGPADDR** command.
<data_comp>	A numeric parameter that controls PDP data compression (applicable for SNDCP only) (refer to *3GPP TS 44.065*). 0 Off 1 On 2 V.42bis 3 V.44 (Not supported currently)
<head_comp>	A numeric parameter that controls PDP header compression (refer to 3GPP TS 44.065 and *3GPP TS 25.323*). 0 Off 1 On 2 RFC1144 3 RFC2507 4 RFC3095
<IPv4AddrAlloc>	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>	Indicate the type of PDP context activation request for the PDP context 0 PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP context is for new PDP context establishment or for handover is implementation specific) 1 PDP context is for emergency bearer services

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

The command is used to allow 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. The Read Command returns the current settings for each defined context. Details can be found in *3GPP TS 23.107* and all parameters are saved in NVM automatically.

AT+CGQREQ Quality of Service Profile (Requested)	
Test Command **AT+CGQREQ=?**	Response **+CGQREQ: <PDP_type>,**(list of supported **<precedence>**s)**,**(list of supported **<delay>**s)**,**(list of supported **<reliability>**s)**,**(list of supported **<peak>**s)**,**(list of supported **<mean>**s) **OK**
Read Command **AT+CGQREQ?**	Response **[+CGQREQ: <cid>,<precedence>,<delay>,>reliability>,<peak>,<mean>]** **[…]** **OK**
Write Command **AT+CGQREQ=<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]**	Response **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<cid>	A numeric parameter which specifies a particular PDP context definition (see **AT+CGDCONT** command)
<PDP_type>	Packet Data Protocol type "IP" IPV4. Internet Protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6"

<precedence>	A numeric parameter which 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 should be maintained ahead of precedence class 3 3 Low priority. Service commitments should be maintained
<delay>	A numeric parameter which specifies the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. For the details, please refer to ***Table 4***. 0 Network subscribed value 1-4 Please refer to ***Table 4***.
<reliability>	A numeric parameter which 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>	A numeric parameter which specifies the peak throughput class, in octets per second. 0 Network subscribed value 1 Up to 1 000 (8 kbit/s) 2 Up to 2 000 (16 kbit/s) 3 Up to 4 000 (32 kbit/s) 4 Up to 8 000 (64 kbit/s) 5 Up to 16 000 (128 kbit/s) 6 Up to 32 000 (256 kbit/s) 7 Up to 64 000 (512 kbit/s) 8 Up to 128 000 (1024 kbit/s) 9 Up to 256 000 (2048 kbit/s)
<mean>	A numeric parameter which 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

Table 4: Delay Class

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

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

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

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

AT+CGQMIN Quality of Service Profile (Minimum Acceptable)	
Test Command **AT+CGQMIN=?**	Response **+CGQMIN: <PDP_type>,**(list of supported **<precedence>**s)**,**(list of supported **<delay>**s)**,**(list of supported **<reliability>**s)**,**(list of supported **<peak>**s)**,**(list of supported **<mean>**s) **OK**
Read Command **AT+CGQMIN?**	Response **[+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>]** **[…]** **OK**
Write Command **AT+CGQMIN=<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]**	Response **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<cid>	A numeric parameter which specifies a particular PDP context definition (see **AT+CGDCONT** command)
<PDP_type>	Packet Data Protocol type "IP" IPV4. Internet Protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6"
<precedence>	A numeric parameter which 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 should be maintained ahead of precedence class 3 3 Low priority. Service commitments should be maintained
<delay>	A numeric parameter which specifies the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. For the detail please refer to ***Table 4***.

	0	Network subscribed value
<reliability>	A numeric parameter which 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>	A numeric parameter which specifies the peak throughput class, in octets per second.	
	0	Network subscribed value
	1	Up to 1 000 (8 kbit/s)
	2	Up to 2 000 (16 kbit/s)
	3	Up to 4 000 (32 kbit/s)
	4	Up to 8 000 (64 kbit/s)
	5	Up to 16 000 (128 kbit/s)
	6	Up to 32 000 (256 kbit/s)
	7	Up to 64 000 (512 kbit/s)
	8	Up to 128 000 (1024 kbit/s)
	9	Up to 256 000 (2048 kbit/s)
<mean>	A numeric parameter which specifies the mean throughput class, in octets per second.	
	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

9.5. AT+CGACT Activate or Deactivate PDP Contexts

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

AT+CGACT Activate or Deactivate PDP Contexts	
Test Command **AT+CGACT=?**	Response **+CGACT:** (list of supported **<state>**s) **OK**
Read Command **AT+CGACT?**	Response **+CGACT: <cid>,<state>[<CR><LF>]** **[…]** **OK**
Write Command **AT+CGACT=<state>,<cid>**	Response **OK** Or **NO CARRIER** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	150s, determined by network.
Reference 3GPP TS 27.007	

Parameter

<state>	Indicate the state of PDP context activation 0 Deactivated 1 Activated Other values are reserved and will result in an **ERROR** response to the Write Command
<cid>	A numeric parameter which specifies a particular PDP context definition (see **AT+CGDCONT** command)

Example

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

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

9.6. AT+CGDATA Enter Data State

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

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

AT+CGDATA Enter Data State	
Test Command **AT+CGDATA=?**	Response **+CGDATA:** (list of supported **<L2P>**s) **OK**
Write Command **AT+CGDATA=<L2P>,<cid>**	Response **CONNECT** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Reference 3GPP TS 27.007	

Parameter

<L2P>	A string parameter that indicates the layer 2 protocol to be used between TE and MT: PPP (Point to Point protocol) for a PDP such as IP Other values are not supported and will result in an **ERROR** response to the execution command
<cid>	A numeric parameter which specifies a particular PDP context definition (see **AT+CGDCONT** command)

9.7. AT+CGPADDR Show PDP Address

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

AT+CGPADDR Show PDP Address	
Test Command **AT+CGPADDR=?**	Response **+CGPADDR:** (list of defined **<cid>**s) **OK**
Write Command **AT+CGPADDR[=<cid>[,<cid>[,…]]]**	Response **+CGPADDR: <cid>,<PDP_addr>** **[…]** **OK** Or **ERROR**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<cid>	A numeric parameter which specifies a particular PDP context definition (see **AT+CGDCONT** command)
<PDP_addr>	A string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the **AT+CGDCONT** command when the context was defined. For a dynamic address it will be the one assigned

during the last PDP context activation that used the context definition referred to by **<cid>**. **<PDP_addr>** is omitted if none is available.

Example

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

OK
```

9.8. AT+CGREG GPRS Network Registration Status

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

AT+CGREG GPRS 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	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code **+CGREG:<stat>**
	2	Enable network registration and location information unsolicited result code **+CGREG: <stat>[,<lac>,<ci>[,<Act>]]**
<stat>	0	Not registered, MT is not currently searching an operator to register to. The UE is in GMM state GMM-NULL or GMM-DEREGISTERED-INITIATED. The GPRS service is disabled; the UE is allowed to attach for GPRS if requested by the user.
	1	Registered, home network. The UE is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED INITIATED on the home PLMN.
	2	Not registered, but MT is currently trying to attach or searching an operator to register to. The UE is in GMM state GMM-DEREGISTERED or GMM-REGISTERED-INITIATED. The GPRS service is enabled, but an allowable PLMN is currently not available. The UE will start a GPRS attach as soon as an allowable PLMN is available.
	3	Registration denied. The UE is in GMM state GMM-NULL. The GPRS service is disabled; and the UE is not allowed to attach for GPRS if requested by the user.
	4	Unknown
	5	Registered, roaming
<lac>	Two bytes location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)	
<ci>	28-bit (UMTS/LTE) cell ID in hexadecimal format	
<Act>	Access technology selected	
	2	UTRAN
	4	UTRAN W/HSDPA
	5	UTRAN W/HSUPA
	6	UTRAN W/HSDPA and HSUPA
<rac>	One byte routing area code in hexadecimal format.	

NOTE

If the MT also supports one or more of the circuit mode services in GERAN/UTRAN, EPS services in E-UTRAN, the **AT+CREG** command and **+CREG:** result codes, the **AT+CEREG** command and **+CEREG:** result codes and the command apply to the registration status and location information for those services.

Example

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

+CGREG: 2
```

```
AT+CGATT=1
OK

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

9.9. AT+CGEREP Packet Domain Event Reporting

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

AT+CGEREP Packet Domain Event Reporting	
Test Command **AT+CGEREP=?**	Response **+CGEREP:** (list 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	300ms
Reference 3GPP TS 27.007	

Parameter

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

		otherwise forward them directly to the TE.
<bfr>	0	MT buffer of unsolicited result codes defined within this command is cleaned when **<mode>** 1 or 2 is entered.
	1	MT buffer of unsolicited result codes defined within this command is flushed to the TE when **<mode>** 1 or 2 is entered (**OK** response shall be given before flushing the codes).

NOTE

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

1. **+CGEV: REJECT <PDP_type>, <PDP_addr>**: A network request for PDP context activation occurred when the MT was unable to report it to the TE with a **+CRING** unsolicited result code and was automatically rejected.
   Note: This event is not applicable for EPS.
2. **+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]**: The network has requested a context reactivation. The **<cid>** used to reactivate the context is provided if known to the MT.
   Note: This event is not applicable for EPS.
3. **+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]**: The network has forced a context deactivation. The **<cid>** used to activate the context is provided if known to the MT.
4. **+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]**: The mobile equipment has forced a context deactivation. The **<cid>** used to activate the context is provided if known to the MT.
5. **+CGEV: NW DETACH**: The network has forced a Packet Domain detach. This implies that all active contexts have been deactivated. These are not reported separately.
6. **+CGEV: ME DETACH**: The mobile equipment has forced a Packet Domain detach. This implies that all active contexts have been deactivated. These are not reported separately.
7. **+CGEV: NW CLASS <class>**: The network has forced a change of MS class. The highest available class is reported (see **AT+CGCLASS**).
8. **+CGEV: ME CLASS <class>**: The mobile equipment has forced a change of MS class. The highest available class is reported (see **AT+CGCLASS**).
9. **+CGEV: NW PDN ACT <cid>**: The network has activated a context. The context represents a Primary PDP context in GSM/UMTS. This event is not applicable for EPS.
10. **+CGEV: ME PDN ACT <cid>[,<reason>**: The mobile termination has activated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS.
11. **+CGEV: NW PDN DEACT <cid>**: The network has deactivated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS.
12. **+CGEV: ME PDN DEACT <cid>**: The mobile termination has deactivated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS.

Parameter

<PDP_type>	Packet data protocol type. A string parameter which specifies the type of packet data protocol. "IP" IPv4

	"PPP"	PPP
	"IPV6"	IPv6
	"IPV4V6"	IPv4v6
<PDP_addr>	A string parameter identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP.	
<cid>	PDP context identifier. A numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value=1) is returned by the test form of **AT+CGDCONT** command.	
<class>	A string parameter which indicates the GPRS mobile class.	
	A	Class A (highest)
	B	Class B
	C	Class C in GPRS and circuit switched alternate mode
	CG	Class C in GPRS only mode
	CC	Class C in circuit switched only mode (lowest)

Example

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

OK
AT+CGEREP?
+CGEREP: 0,0

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

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

+CGEV: PDN DEACT2
```

9.10. AT+CGSMS Select Service for MO SMS Messages

The command is used to specify the service or service preference that the MT will use to send MO (mobile originated) SMS messages.

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

Parameter

<service>	A numeric parameter which indicates the service or service preference to be used	
	0	Packet Domain
	1	Circuit switched
	2	Packet Domain preferred (use circuit switched if GPRS not available)
	3	Circuit switch preferred (use Packet Domain if circuit switched not available)

9.11. AT+CEREG EPS Network Registration Status

The command is query 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>[,<lac>,<ci>[,<Act>]]** **OK**
Write Command **AT+CEREG=[<n>]**	Response **OK** Or **ERROR**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code **+CEREG:<stat>**
	2	Enable network registration and location information unsolicited result code **+CEREG: <stat>[,<lac>,<ci>[,<Act>]]**
<stat>	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
<lac>	Two-byte tracking area code in hexadecimal format	
<ci>	28-bit (E-UTRAN) cell ID in hexadecimal format.	
<Act>	Access technology selected	
	7	E-UTRAN
<tac>	Two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal).	

9.12. AT+QGDCNT Packet Data Counter

The command is used to allow the application to check how much bytes are sent to or received by MT.

AT+QGDCNT Packet Data Counter	
Test Command **AT+QGDCNT=?**	Response **+QGDCNT: (0,1)** **OK**
Read Command **AT+QGDCNT?**	Response **+QGDCNT: <bytes_sent>,<bytes_recv>** **OK**
Write Command **AT+QGDCNT=<op>**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference	

Parameter

<op>	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** command.
<bytes_sent>	The amount of sent bytes.
<bytes_recv>	The amount of received bytes.

NOTE

When MT is powered on, **<bytes_sent>** and **<bytes_recv>** will be 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 counter
OK
```

9.13. AT+QAUGDCNT Auto Save Packet Data Counter

The command is used to allow **AT+QGDCNT** to save results to NVM automatically.

AT+QAUGDCNT Auto Save Packet Data Counter	
Test Command **AT+QAUGDCNT=?**	Response **+QAUGDCNT: (0,30-65535)** **OK**
Read Command **AT+QAUGDCNT?**	Response **+QAUGDCNT: <value>** **OK**
Write Command **AT+QAUGDCNT=<value>**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference	

Parameter

<value>	Default value is 0. The parameter is the time-interval for **AT+QGDCNT** command to save results to NVM automatically. If it is set to 0, auto-save feature would be disabled. Unit is second.

NOTE

The configuration would not be saved into NVM.

Example

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

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

OK
```

9.14. AT+QMTUINFO Query MTU Value

The command is used to query MTU (Maximum Transmission Unit) value from the network.

AT+QMTUINFO Query MTU Value	
Test Command **AT+QMTUINFO=?**	Response **OK**
Read Command **AT+QMTUINFO[?]**	Response **+QMTUINFO:<pdp_cid>,<mtu_ipv4>,<mtu_ipv6>** **OK** If no network is active: **OK**
Reference	

Parameter

<pdp_cid>	PDP context identifier, a numeric parameter which specifies a particular PDP context.
<mtu_ipv4>	MTU value of IPv4 interface.
<mtu_ipv6>	MTU value of IPv6 interface.

NOTES

1. If only IPv4 iface was activated by the network, the **<mtu_ipv6>** was replaced by "-".
2. If just IPv6 iface was activated by the network, the **<mtu_ipv4>** was replaced by "-".

Example

```
AT+QMTUINFO=?
OK
AT+QMTUINFO              //Query MTU value
+QMTUINFO: 1,1460,1460
+QMTUINFO: 2,1460,-
+QMTUINFO: 3,- ,1460

OK
```

9.15. AT$QCRMCALL Start or Stop an RmNet Call

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

AT$QCRMCALL Start or Stop a RmNet Call	
Test Command **AT$QCRMCALL=?**	Response **$QCRMCALL: (0-1),(1-8),(1-3),(1-2),(1-42),,** **OK**
Read Command **AT$QCRMCALL?**	Response If a RmNet call has been established: **$QCRMCALL :<instance>,<call_type>** **OK** If the establishment of RmNet call failed: **OK**
Write Command **AT$QCRMCALL=<action>,<instance>[,<ip_Type>[,<tech_pref>[,<profile_num>]]]**	Response **OK** Or **ERROR**
Reference	

Parameter

<action>	Start or stop a RmNet call 0 Stop an RmNet call 1 Start an RmNet call
<instance>	Currently this parameter only can be set to 1.
<ip_type>	IP types

	1 Call type is IPv4 2 Call type is IPv6 3 Call type is IPv4v6
<tech_pref>	Technology type preferred 2 3GPP (WCDMA/LTE)
<profile_num>	Profile number. Range is 1-24.
<call_type>	Call types 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),(1-42),,

OK
AT$QCRMCALL=1,1,1,2,1          //Start an IPv4 RmNet call
$QCRMCALL: 1,V4

OK
AT$QCRMCALL?                   //Query the current RmNet call
$QCRMCALL: 1,V4

OK
```

9.16. AT+QNETDEVSTATUS Query RmNet Device Status

The command is used to query RmNet device status.

AT+QNETDEVSTATUS Query RmNet Device Status	
Test Command **AT+QNETDEVSTATUS=?**	Response **+QNETDEVSTATUS:(0,1)** **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** Or

	+QNETDEVSTATUS: <on_off> **OK**
Write Command **AT+QNETDEVSTATUS=<on_off>**	Response **OK** Or **ERROR**
Reference	

Parameter

<on_off>	URC of RmNet device status
	0 Disable RmNet device status URC
	1 Enable RmNet device status URC
<state>	RmNet call status
	0 A RmNet call is disconnected
	1 A RmNet call is ready and MCU can get IP addresses by DHCP or QMI
	2 A RmNet call is connected
<ip_type>	IP type
	4 Call type is IPv4
	6 Call type is IPv6
<instance>	RmNet call instance. **<instance>** is always 1 in general.

NOTE

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

Example

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

OK
AT+QNETDEVSTATUS?           //Read command
+QNETDEVSTATUS: 0

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

```
OK
AT$QCRMCALL=1,1,1,2,1          //Start an IPv4 RmNet call.
$QCRMCALL: 1,V4

OK

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

+QNETDEVSTATUS: 1,2,4,1        //MCU gets IP addresses from the MT.
AT+QNETDEVSTATUS?              //Read command
+QNETDEVSTATUS: 1,2,4,1

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

+QNETDEVSTATUS: 1,0,4,1        //The MT reports URC of RmNet call disconnection.
AT+QNETDEVSTATUS?              //Read command
+QNETDEVSTATUS: 1

OK
```

10 Supplementary Service Commands

10.1. AT+CCFC Call Forwarding Number and Conditions Control

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

AT+CCFC Call Forwarding Number and Conditions Control	
Test Command **AT+CCFC=?**	Response **+CCFC:** (list of supported **<reads>**s) **OK**
Write Command **AT+CCFC=<reads>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,time]]]]]]**	Response MT controls the call forwarding supplementary service. Registration, erasure, activation, deactivation, and status query are supported. If **<mode>** is not equal to 2 and the command is executed successfully: **OK** If **<mode>**=2 and the command is executed successfully (only in connection with **<reads>=**(0-3)): For registered call forwarding numbers: **+CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]<CR><LF>** **...** **OK** If no call forwarding 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 MT functionality:

	+CME ERROR: <err>
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<reads>	0	Unconditional
	1	Mobile busy
	2	No reply
	3	Not reachable
	4	All call forwarding (refer 3GPP TS 22.030))
	5	All conditional call forwarding (refer 3GPP TS 22.030))
<mode>	0	Disable
	1	Enable
	2	Query status
	3	Registration
	4	Erasure
<number>	String type phone number of forwarding address in format specified by **<type>**	
<type>	Type of address in integer format; default value is 145 when dialing string includes international access code character "**+**"; otherwise 129	
<subaddr>	Sub-address in the format specified by **<satype>**	
<satype>	Type of sub-address in integer	
<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>	1…30	When "no reply" (**<reads>**=no reply) is enabled or queried, this parameter gives the time in seconds to wait before call is forwarded; default value is 20
<status>	0	Not active
	1	Active

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
```

10.2. AT+CCWA Call Waiting Control

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

AT+CCWA Call Waiting Control	
Test Command **AT+CCWA=?**	Response **+CCWA:** (list of supported **<n>**s) **OK**
Read Command **AT+CCWA?**	Response **+CCWA: <n>** **OK**
Write Command **AT+CCWA=[<n>][,<mode>[,<class>]]**	Response TA controls the call waiting supplementary service. Activation, deactivation and status query are supported. If **<mode>** is not equal to 2 and the command is executed successfully: **OK** If **<mode>**=2 and the command is executed successfully: **+CCWA: <status>,<class1><CR><LF>** **...** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	0	Disable presentation of an unsolicited result code
	1	Enable presentation of an unsolicited result code
<mode>	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 sync
	32	Data circuit async
<status>	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	

NOTES

1. **<status>**=0 should be returned only if the service is not active for any **<class>** i.e. **+CCWA: 0, 7** will be returned in this case.
2. When **<mode>**=2, all active call waiting classes will be reported. In this mode the command is aborted by pressing any key.
3. Unsolicited result code:
   When the presentation call waiting at the MT is enabled (and call waiting is enabled) and a terminating call set up during an established call, an unsolicited result code is returned:
   +CCWA: <number>,<type>,<class>[,<alpha>]

Example

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

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

10.3. AT+CHLD Call Related Supplementary Services

The command is used to allow 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.

AT+CHLD Call Related Supplementary Services	
Test Command **AT+CHLD=?**	Response **+CHLD:** (list of supported **<n>**s) **OK**
Write Command **AT+CHLD=[<n>]**	Response MT controls the supplementary services call hold, multiparty and explicit call transfer. Calls can be put on hold, recovered, released, added to conversation and transferred. **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
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	Connect the two calls and disconnects the subscriber from both calls (ECT)

Example

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

+CCWA: "02154450293",129,1                 //Indication of a call that has been waiting.
AT+CHLD=2                                  //Place the active call on hold and accept the waiting call as the active call.

OK
AT+CLCC
+CLCC: 1,0,1,0,0,"10086",129               //The first call is on hold.

+CLCC: 2,1,0,0,0,"02154450293",129         //The second call is active.

OK
AT+CHLD=21                                 //Place the active call except call X=1 on hold.
OK
AT+CLCC
+CLCC: 1,0,0,0,0,"10086",129               //The first call is active.

+CLCC: 2,1,1,0,1,"02154450293",129         //The second call is on hold.

OK
AT+CHLD=3                                  //Add a held call to the active calls in order to set up a conference (multiparty) call.

OK
AT+CLCC
+CLCC: 1,0,0,0,1,"10086",129
+CLCC: 2,1,0,0,1,"02154450293",129

OK
```

10.4. AT+CLIP Calling Line Identification Presentation

The command refers to the GSM/UMTS supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call.

AT+CLIP Calling Line Identification Presentation	
Test Command **AT+CLIP=?**	Response **+CLIP:** (list of supported **<n>**s) **OK**
Read Command **AT+CLIP?**	Response **+CLIP: <n>,<m>** **OK**
Write Command **AT+CLIP=<n>**	Response MT enables or disables the presentation of the calling line identity (CLI) at the TE. It has no effect on the execution of the supplementary service CLIP in the network. **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	15s, determined by network.
Reference 3GPP TS 27.007	

Parameter

<n>	0	Suppress unsolicited result codes
	1	Display unsolicited result codes
<m>	0	CLIP not provisioned
	1	CLIP provisioned
	2	Unknown
<number>	Phone number in string type of calling address in format specified by **<type>**	
<subaddr>	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>	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

NOTE

When the presentation of the CLIP at the TE is enabled (and calling subscriber allows), an unsolicited result code is returned after every **RING** (or **+CRING: <type>**) at a mobile terminating call:
+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI validity>

Example

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

RING

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

10.5. AT+CLIR Calling Line Identification Restriction

The 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.

AT+CLIR Calling Line Identification Restriction	
Test Command **AT+CLIR=?**	Response **+CLIR:** (list of supported **<n>**s) **OK**
Read Command **AT+CLIR?**	Response **+CLIR: <n>,<m>** **OK**

Write Command **AT+CLIR=[<n>]**	Response MT disables or enables the presentation of the calling line identity (CLI) to the called party when originating a call. The 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. **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	15s, determined by network.
Reference 3GPP TS 27.007	

Parameter

<n>	Parameter sets the adjustment for outgoing calls	
	0	Presentation indicator is used according to the subscription of the CLIR service
	1	CLIR invocation
	2	CLIR suppression
<m>	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

10.6. AT+COLP Connected Line Identification Presentation

The command is used to enable/disable a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call, referring to the GSM/UMTS supplementary service COLP (Connected Line Identification Presentation).

AT+COLP Connected Line Identification Presentation	
Test Command **AT+COLP=?**	Response **+COLP:** (list of supported **<n>**s) **OK**
Read Command	Response

AT+COLP?	**+COLP: <n>,<m>** **OK**
Write Command **AT+COLP=[<n>]**	Response MT enables or disables the presentation of the COL (Connected Line) at the TE for a mobile originating a call. It has no effect on the execution of the supplementary service COLR in the network. Intermediate result code is returned from TA to TE before any +CR or V.25ter responses. **OK**
Maximum Response Time	15s, determined by network.
Reference 3GPP TS 27.007	

Parameter

<n>	Parameter sets/presents the result code presentation status in the MT	
	0	Disable
	1	Enable
<m>	Parameter presents the subscriber COLP service status in the network	
	0	COLP not provisioned
	1	COLP provisioned
	2	Unknown (e.g. no network, etc.)
<number>	Phone number in string type, format specified by **<type>**	
<type>	Type of address octet in integer format	
	129	Unknown type (IDSN format number)
	145	International number type (ISDN format)
<subaddr>	Sub-address of format specified by **<satype>**	
<satype>	Type of sub-address octet in integer format (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

When enabled (and called subscriber allows), an intermediate result code is returned before any +CR or V.25ter responses:
+COLP: <number>,<type>,[<subaddr>],[<satype>],[<alpha>]

Example

```
AT+CPBW=1,"02151082965",129,"QUECTEL"
OK
AT+COLP=1
OK
ATD02151082965;
+COLP: "02151082965",129,,,"QUECTEL"

OK
```

10.7. AT+CSSN Supplementary Service Notifications

The command is used to enable/disable the presentation of notification result codes from TA to TE.

AT+CSSN Supplementary Service Notifications	
Test Command **AT+CSSN=?**	Response **+CSSN:** (list of supported **<n>**s),(list of supported **<m>**s) **OK**
Read Command **AT+CSSN?**	Response **+CSSN: <n>,<m>** **OK**
Write Command **AT+CSSN=<n>[,<m>]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	Integer type, sets/indicates the **+CSSI** intermediate result code presentation status to the TE 0 Disable 1 Enable

<m>	Integer type, sets/indicates the **+CSSU** unsolicited result code presentation status to the TE 0 Disable 1 Enable
<code1>	Integer type, it is manufacturer specified and supports the following codes: 0 Unconditional call forwarding is active 1 Some of the conditional call forwarding are active 2 Call has been forwarded 3 Waiting call is pending 5 Outgoing call is barred
<code2>	Integer type, it is manufacturer specific and supports the following codes: 0 The incoming call is a forwarded call 2 Call has been put on hold (during a voice call) 3 Call has been retrieved (during a voice call) 5 Held call was terminated by another party 10 Additional incoming call forwarded

NOTES

1. When **<n>**=1 and a supplementary service notification is received after a mobile originated call setup, the **+CSSI** intermediate result code is sent to TE before any other MO call setup result codes:
   +CSSI: <code1>
2. When **<m>**=1 and a supplementary service notification is received during a mobile terminated call setup or during a call, the **+CSSU** unsolicited result code is sent to TE:
   +CSSU: <code2>

10.8. AT+CUSD Unstructured Supplementary Service Data

The command is used to allow control of the Unstructured Supplementary Service Data (USSD) according to *3GPP TS 22.090*. Both network and mobile initiated operations are supported.

Parameter **<mode>** is used to disable/enable the presentation of an unsolicited result code. The value **<mode>**=2 is used to cancel an ongoing USSD session. For a USSD response from the network, or a network initiated operation, the format is: **+CUSD: <status>[,<rspstr>,[<dcs>]]**.

When **<reqstr>** is given, a mobile initiated USSD string or a response USSD string to a network initiated operation is sent to the network. The response USSD string from the network is returned in a subsequent **+CUSD** URC.

AT+CUSD Unstructured Supplementary Service Data	
Test Command **AT+CUSD=?**	Response **+CUSD:** (list of supported **<mode>**s) **OK**
Read Command **AT+CUSD?**	Response **+CUSD: <mode>** **OK**
Write Command **AT+CUSD=[<mode>[,<reqstr>[,<dcs>]]]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	120s, determined by the network.
Reference 3GPP TS 27.007	

Parameter

<mode>	Set/indicate the result code presentation status to the TE
	0 Disable the result code presentation to the TE
	1 Enable the result code presentation to the TE
	2 Cancel session (not applicable to Read Command response)
<reqstr>	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>	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

11 Audio Commands

11.1. AT+CLVL Loudspeaker Volume Level Selection

The command is used to select the volume level of the internal loudspeaker of MT.

AT+CLVL Loudspeaker Volume Level Selection	
Test Command **AT+CLVL=?**	Response **+CLVL:** (list of supported**<level>**s) **OK**
Read Command **AT+CLVL?**	Response **+CLVL: <level>** **OK**
Write Command **AT+CLVL=<level>**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<level>	Value (0-3-5) with manufacturer specific range (Smallest value represents the lowest sound level)

11.2. AT+CMUT Mute Control

The command is used to enable/disable 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 MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	0	Mute OFF
	1	Mute ON

NOTE

This parameter will not be saved and must be set during the call.

11.3. AT+QAUDLOOP Enable/Disable Audio Loop Test

The command is used to enable/disable audio loop test.

AT+QAUDLOOP Enable/Disable Audio Loop Test	
Test Command **AT+QAUDLOOP=?**	Response **+QAUDLOOP: (0,1)** **OK**
Read Command **AT+QAUDLOOP?**	Response **+QAUDLOOP: <enable>** **OK**
Write Command **AT+QAUDLOOP=<enable>**	Response **OK** Or **ERROR**
Maximum Response Time	300ms

Parameter

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

NOTE

This parameter will not be saved.

11.4. AT+VTS DTMF and Tone Generation

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

AT+VTS DTMF and Tone Generation	
Test Command **AT+VTS=?**	Response **+VTS: (0-9,A-D,*,#),(0-255)** **OK**
Write Command **AT+VTS=<dtmfstring>[,<duration>]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	Depends on the length of **<dtmfstring>** and **<duration>**.
Reference 3GPP TS 27.007	

Parameter

<dtmfstring>	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. The value ranges from 0 to 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**.

Example

```
ATD12345678900;                 //Dial
OK

<Call connected>

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

11.5. AT+VTD Set Tone Duration

The command is used to set 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: (0-255),(0-255)** **OK**
Read Command **AT+VTD?**	Response **+VTD: <duration>,<interval>** **OK**
Write Command **AT+VTD=<duration>[,<interval>]**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<duration>	The duration tone in 1/10 seconds with tolerance. The value range: 0-255, and the default is 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**. The value range is 0-255, and the default is 0.

NOTE

These parameters will not be saved.

11.6. AT+QAUDMOD Set Audio Mode

The command is used to set the audio mode required for the connected device. It will take effect at next sound activity.

AT+QAUDMOD Set Audio Mode	
Test Command **AT+QAUDMOD=?**	Response **+QAUDMOD:** (list of supported **<mode>**s) **OK**
Read command **AT+QAUDMOD?**	Response **+QAUDMOD: <mode>** **OK**
Write Command **AT+QAUDMOD=<mode>**	Response **OK** Or **ERROR** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference Quectel	

Parameter

<mode>	Indicate the current configured audio mode 0 Echo canceller, noise suppressor, digital gain and calibration parameter for Handset 1 Echo canceller, noise suppressor, digital gain and calibration parameter for Headset 2 Echo canceller, noise suppressor, digital gain and calibration parameter for Speaker 3 Turn off all audio processing functions

11.7. AT+QDAI Digital Audio Interface Configuration

The command is used to configure the digital audio interface. When there is no codec on board, customers can define the PCM formats by themselves. In the following conditions, the MT can be used directly with default settings (master mode, short-synchronization, 2048KHz clock frequency, 16-bit liner data format, 8KHz sampling rate).

AT+QDAI Digital Audio Interface Configuration	
Test Command **AT+QDAI=?**	Response **+QDAI:** (list of supported **<io>**),(list of supported **<mode>**),(list of supported **<fsync>**),(list of supported **<clock>**),(list of supported **<format>**),(list of supported **<sample>**),(list of supported **<num_slots>**),(list of supported **<slot_mapping0>**),(list of supported **<slot_mapping1>**) **OK**
Read Command **AT+QDAI?**	Response **+QDAI: <io>[,<mode>,<fsync>,<clock>,<format>,<sample>,<num_slots>,<slot_mapping0>,<slot_mapping1>]** **OK**
Write Command **AT+QDAI=<io>[,<mode>,<fsync>,<clock>[,<format>[,<sample>[,<num_slots>,<slot_mapping0>[,<slot_mapping1>]]]]]**	Response **OK** Or **ERROR**
Maximum Response Time	300ms
Reference Quectel	

Parameter

<io>	x	Unused (1-6 can be set)
<mode>	0	Master mode
	1	Slave mode
<fsync>	0	Primary mode (short-synchronization)
	1	Auxiliary mode (long-synchronization)
<clock>	Clock frequency	
	0	128KHz
	1	256KHz
	2	512KHz
	3	1024KHz
	4	2048KHz
	5	4096KHz
<format>	Data format	
	0	16-bit linear
<sample>	0	8KHz
	1	16KHz
<num_slots>	1	Number of slot

	2 Number of slot (Set to 2 when use **<slot_mappinp1>)**
<slot_mapping0>	Slot mapping value. Range: 1-16.
<slot_mapping1>	Slot mapping value. Range: 2-16.

NOTES

1. The parameter settings will be saved to NVM immediately by default, and will take effect after the MT is reset.
2. 4096KHz clock frequency is only applicable for 16kHz sampling rate.
3. 128KHz clock frequency is not supported.
4. Bit per frame=**<clock>**/**<sample>**. For example, if **<clock>** is 2048kHz and **<sample>** is 8kHz, 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 MT.
6. When a recommended codec is selected and 16kHz sampling rate is desired, please input **<sample>**. Currently the MT only supports 16kHz (**AT+QDAI=x,0,0,5,0,1**).

Example

```
AT+QDAI=?                       //Query the range.
+QDAI: x,(0,1),(0,1),(0-5),(0-2),(0,1),(1-2),(1-16),(2-16)

OK
AT+QDAI?                        //Query the current interface configuration.
+QDAI: x,0,0,4,0,0,1,1

OK
AT+QDAI=x,1,0,4,0,0,1,1         //Set AUX PCM interface to slave, short-sync, 8kHz sample, 2048kHz
                                  BCLK.
OK
AT+QDAI=x,0,0,4,0,1,1,1         //Configure one slot.

OK
AT+QDAI=x,0,0,4,0,1,2,1,3       //Configure two slots.

OK
```

11.8. AT+QEEC Set Echo Cancellation Parameters

The command is used to set echo cancellation parameters.

AT+QEEC Set Echo Cancellation Parameters	
Test Command **AT+QEEC=?**	Response **+QEEC: (0-49),(0-65535)** **OK**
Read Command **AT+QEEC?**	Response **+QEEC: <index>,<value>** **...** **OK**
Write Command **AT+QEEC=<index>,<value>**	Response **OK** Or **ERROR**

Parameter

<index>	Indicate the parameter's index. Range: 0-50
<value>	Indicate the parameter's value. Range: 0-65535

NOTE

These parameters will not be saved.

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
```

11.9. AT+QSIDET Set the Side Tone Gain in Current Mode

The command is used to set the side tone gain value in current mode. It will take effect at next sound activity.

AT+QSIDET Set the Side Tone Gain in Current Mode	
Test Command **AT+QSIDET=?**	Response **+QSIDET:** (list of supported **<st_gain>**s) **OK**
Read Command **AT+QSIDET?**	Response **+QSIDET: <st_gain>** **OK**
Write Command **AT+QSIDET=<st_gain>**	Response **OK** Or **ERROR**
Maximum Response Time	300ms
Reference Quectel	

Parameter

<st_gain>	Indicate the configured side tone gain in current mode Range: 0-65535. Default value might be different in different audio modes.

NOTE

This parameter will not be saved.

11.10. AT+QMIC Set Uplink Gains of Microphone

The command is used to set the uplink gains of microphone.

AT+QMIC Set Uplink Gains of Microphone	
Test Command **AT+QMIC=?**	Response **+QMIC: (0-65535),(0-65535)** **OK**
Read Command **AT+QMIC?**	Response **+QMIC: <txgain>,<txdgain>** **OK**
Write Command **AT+QMIC=<txgain>[,<txdgain>]**	Response **OK** Or **ERROR**
Maximum Response Time	300ms

Parameter

<txgain>	Indicate uplink codec gain and the range is 0-65535. The default value might be different in different audio modes.
<txdgain>	Indicate uplink digital gain and the range is 0-65535. The default value might be different in different audio modes.

NOTE

These parameters will not be saved.

11.11. AT+QRXGAIN Set Downlink Gains of RX

The command is used to set RX digital gains to change the downlink volume.

AT+QRXAGIN Set Downlink Gains of RX	
Test Command **AT+QRXGAIN=?**	Response **+QRXGAIN: (0-65535)** **OK**
Read Command **AT+QRXGAIN?**	Response **+QRXGAIN: <rxgain>**

	OK
Write Command **AT+QRXGAIN=<rxgain>**	Response **OK** Or **ERROR**
Maximum Response Time	300ms
Reference	

Parameter

<rxgain>	Indicate downlink digital gains. Range: 0-65535. The default value might be different in different audio modes.

NOTE

This parameter will not be saved.

Example

```
AT+QRXGAIN=?                    //Test command
+QRXGAIN: (0-65535)

OK
AT+QRXGAIN?                     //Query the current value. The default value might be different in
                                  different audio modes.
+QRXGAIN: 20577

OK
AT+QRXGAIN=8192                 //Set digital gain to 8192.
OK
AT+QRXGAIN?                     //Query the current configuration.
+QRXGAIN: 8192

OK
```

11.12. AT+QIIC IIC Read & Write

The command is used to configure the codec via IIC interface.

AT+QIIC IIC Read & Write	
Test Command **AT+QIIC=?**	Response **+QIIC: (0,1),(0-0xFF),(0-0xFF),(1,2),(0-0xFFFF)** **OK**
Write Command **AT+QIIC=<rw>,<device>,<addr>,<bytes>[,<value>]**	Response If all configuration parameters are entered: **OK** If all configuration parameters are omitted: **+QIIC: <value>** **OK**
Maximum Response Time	300ms

Parameter

<rw>	0	Write command
	1	Read command
<device>	0-0xFF	7-bit device address
<addr>	0-0xFF	Register address
<bytes>	1	Read bytes
	2	Write bytes
<value>	0-0xFFFF	Data value

NOTE

These parameters will not be saved.

Example

```
AT+QIIC=1,0x18,15,1,38          //Read register value, slave address: 0x18, register address: 15,
                                  read two bytes.
+QIIC: 0x0026

OK
```

```
AT+QIIC=0,0x18,15,2,38          //Write register value, slave address: 0x18, register address: 15,
                                  write two bytes.
OK
```

11.13. AT+QTONEDET Enable/Disable DTMF Detection

The command is used to enable or disable DTMF detection. When this function is enabled, DTMF tones sent by other side will be detected, and it will be 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	300ms
Reference Quectel	

Parameter

<enable>	Enable/disable DTMF detection	
	0	Disable
	1	Enable

NOTES

1. This setting will take effect immediately. And it will revert to the default values after resetting the MT.
2. 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

11.14. AT+QLDTMF Play Local DTMF

The command is used to play a local DTMF string, and the maximum length is 20 characters. It can be used to stop playing the DTMF string.

AT+QLDTMF Play Local DTMF	
Test Command **AT+QLDTMF=?**	Response **+QLDTMF: (1-1000),(0-9,*,#,A-G)** **OK**
Write Command **AT+QLDTMF=<n>,<DTMF_string>[,<y>]**	Response **OK** If there is error related to MT functionality: **+CME ERROR: <err>** After the DTMF string is completely played: **+QLDTMF: 5**
Execute Command **AT+QLDTMF**	Response **OK**
Maximum Response Time	300ms

Parameter

<n>	Indicates every DTMF's play time and mute time. The range is 1 -1000, and the unit is 1/100 second when <y> is set to 1, or 1/10 second when <y> is not set.	
<DTMF_string>	Maximum 20 DTMF strings, separated by comma. DTMF format: **0-9,*,#,A-G**. The string should be enclosed in quotation marks ("...")	
<err>	901	Audio unknown error
	902	Audio invalid parameters
	903	Audio operation is not supported
	904	Audio device is busy

NOTE

These parameters will not be saved.

Example

```
AT+QLDTMF=?                          //Query the range.
+QLDTMF: (1-1000),(0-9,*,#,A-G)

OK
AT+QLDTMF=2,"A,B,1,2,#"              //Play "A,B,1,2,#". The play time & the mute time are 200ms
                                     separately.
OK
AT+QLDTMF                            //Stop playing.
OK
```

11.15. AT+QLTONE Play a Local Customized Tone

The command is used to play a customized tone, use **<period_on>** to indicate play time and **<period_off>** to indicate mute time, and **<time>** to indicate repeat times.

AT+QLTONE Play a Local Customized Tone	
Test Command **AT+QLTONE=?**	Response **+QLTONE: (0,1),(100-4000),(0-1000),(0-1000),(0-65535)** **OK**
Write Command **AT+QLTONE=<mode>[,<frequency>,<period_on>,<period_off>,<times>]**	Response **OK** If there is error related to MT functionality: **+CME ERROR: <err>** After the tone is completely played: **+QLTONE: 0**
Maximum Response Time	300ms
Reference	

Parameter

<mode>	0	Stop playing
	1	Start to play
<frequency>	Tone's frequency. The range is 100-4000, and the unit is Hz.	
<period_on>	Tone's play time on time. The range is 0-1000, and the unit is ms.	
<period_off>	Tone's mute time. The range is 0-1000, and the unit is ms.	
<times>	Tone's total time. The ranges is 0-65535.	
<err>	901	Audio unknown error
	902	Audio invalid parameters
	903	Audio operation not supported
	904	Audio device busy

NOTE

These parameters will not be saved.

Example

```
AT+QLTONE=?                          //Query the range.
+QLTONE: (0,1),(100-4000),(0-1000),(0-1000),(0-65535)

OK
AT+QLTONE=1,1000,200,300,3000        //Play a 1000Hz tone. The play time is 200ms and the mute time
                                       is 300ms. Repeat 3000times.
OK

+QLTONE:0
AT+QLTONE=0                          //Stop playing.
OK
```

11.16. AT+QAUDCFG Configure Audio Related Settings

The command is used to query and configure audio related settings.

AT+QAUDCFG Configure Audio Related Settings	
Test Command **AT+QAUDCFG=?**	Response **+QAUDCFG: "voltedtmfcfg",(0-400,0-9999)** **OK**
Maximum Response Time	300ms
Reference	

11.16.1. AT+QAUDCFG="voltedtmfcfg" Configure VoLTE DTMF Tone

The command is used to set the duration and the volume of VoLTE DTMF tone for the MT. If the duration and the volume have never been set or the duration is set to 0, the duration of VoLTE DTMF tone will be controlled by the network. The default duration is 500ms and the default volume is 5000.

AT+QAUDCFG="voltedtmfcfg" Configure VoLTE DTMF Tone	
Write Command **AT+QAUDCFG="voltedtmfcfg"[,<duration>,<volume>]**	Response If **<duration>** and **<volume>** are omitted, return current configuration: **+QAUDCFG: "voltedtmfcfg",<duration>,<volume>** **OK** If **<duration>** and **<volume>** are not omitted, set the duration and the volume: **OK** If there is any error: **ERROR**

Parameter

<duration>	Duration of VoLTE DTMF tone in 2.5ms per unit (that is, the value is incremented in multiplies of 2.5ms). If this value is set to 0, the duration will be controlled by the network, not exceeding the default value 200 (ie. 500ms). Range: 0-400
<volume>	Volume of VoLTE DTMF tone. If this value is not set before, it will be the default value 5000. Range: 0~9999

NOTES

1. The time interval between two DTMF tones of VoLTE will be a little bit longer than the duration.
2. These parameters will be saved.

Example

```
AT+QAUDCFG="voltedtmfcfg",40,5000        //Set VoLTE DTMF tone duration as 100ms and volume as 5000.

OK
AT+QAUDCFG="voltedtmfcfg"                //Query the current configuration.
+QCFG: "voltedtmfcfg", 40,5000

OK
```

12 Hardware Related Commands

12.1. AT+QPOWD Power off

The command is used to power off the MT. The UE will return **OK** immediately when the command is executed. Then the UE will deactivate the network. After it is completed, the UE outputs **POWERED DOWN** message and enters into power-off state. The maximum time for unregistering network is 60 seconds. To avoid data loss, the power supply for the module cannot be disconnected before the URC **POWERED DOWN** is outputted.

AT+QPOWD Power off	
Test Command **AT+QPOWD=?**	Response **+QPOWD: (0,1)** **OK**
Write Command **AT+QPOWD=[<n>]**	Response **OK** **POWERED DOWN**
Maximum Response Time	300ms
Reference	

Parameter

<n>	0	Immediate power down
	1	Normal power down

12.2. AT+CCLK Clock

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

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

Parameter

<time>	String type value, format is "yy/MM/dd,hh:mm:ss±zz", indicating year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range: -48...+56). E.g. May 6th, 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08".

Example

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

OK
```

12.3. AT+CBC Battery Charge

The command returns battery charge status **<bcs>** and battery charge level **<bcl>** of the MT.

AT+CBC Battery Charge	
Test Command **AT+CBC=?**	Response **+CBC:** (list of supported **<bcs>**s),(list of supported **<bcl>**s),<**voltage**>

	OK
Execution Command **AT+CBC**	Response **+CBC: <bcs>,<bcl>,<voltage>** **OK** If there is any error related to MT functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<bcs>	Battery charge status	
	0	MT is not charging
	1	MT is charging
	2	Charging has been finished
<bcl>	Battery charge level	
	0-100	Battery has 0-100 percent of remaining capacity.
<voltage>	Battery voltage (mV)	

12.4. AT+QADC Read ADC Value

The command is used to read the voltage value of ADC channel.

AT+QADC Read ADC Value	
Test Command **AT+QADC=?**	Response **+QADC: (0,1)** **OK**
Read Command **AT+QADC=<port>**	Response **+QADC: <status>,<value>** **OK**
Maximum Response Time	300ms

Parameter

<port>	Channel number of the ADC. 0 ADC Channel 0 1 ADC Channel 1
<status>	Indicate whether the ADC value read is successful. 0 Failed 1 Successful
<value>	The voltage of specified ADC channel. Unit is mV.

NOTE

This command is not supported by EM12 module.

12.5. AT+QSCLK Enable/Disable Entering Sleep Mode

The command is used to control whether MT enters sleep mode. When entering into sleep mode is enabled, the MT can directly enter into sleep mode.

AT+QSCLK Enable/Disable Entering Sleep Mode	
Test Command **AT+QSCLK=?**	Response **+QSCLK:** (list of supported **<n>**s) **OK**
Read Command **AT+QSCLK?**	Response **+QSCLK: <n>, <saved>** **OK**
Write Command **AT+QSCLK=<n>[,<saved>]**	Response **OK**
Maximum Response Time	300ms
Reference Quectel	

Parameter

<n>	Slow clock mode. 0 Disable slow clock 1 Enable slow clock. It is controlled by DTR.

<saved>	Whether to save the configuration into NVM.	
	0	Not to save
	1	Save

12.6. AT+QTEMP Get the Temperature of MT

The command is used to get the temperature of MT.

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

Parameter

<sensor>	Sensor type.	
	"xo_therm_buf"	XO crystal
	"mdm_case_therm"	BB chip
	"pa_therm1"	PA chip
	"tsens_tz_sensor0"	The first detection point on PCB board
	"tsens_tz_sensor1"	The second detection point on PCB board
	"tsens_tz_sensor2"	The third detection point on PCB board
	"tsens_tz_sensor3"	The forty detection point on PCB board
	"tsens_tz_sensor4"	The fifth detection point on PCB board
<temp>	Temperature value. Units are in degrees C.	

Example

```
AT+QTEMP
OK

+QTEMP: "xo_therm_buf","26"

+QTEMP: "mdm_case_therm","26"
```

```
+QTEMP: "pa_therm1","26"

+QTEMP: "tsens_tz_sensor0","29"

+QTEMP: "tsens_tz_sensor1","28"

+QTEMP: "tsens_tz_sensor2","28"

+QTEMP: "tsens_tz_sensor3","28"

+QTEMP: "tsens_tz_sensor4","28"
```

12.7. AT+QPMUGPIO Set the PMU GPIO Output Value

The command is used to set the PMU GPIO output value.

AT+PMUGPIO Set the PMU GPIO Output Value	
Test Command **AT+QPMUGPIO=?**	Response **+ QPMUGPIO: (0,1),<gpio_num>** **OK**
Write Command **AT+QPMUGPIO=<value>,<gpio_num>**	Response **OK**
Maximum Response Time	300ms
Reference Quectel	

Parameter

<value>	PMU GPIO output value. 0 The PMU GPIO pin outputs high voltage level. 1 The PMU GPIO pin outputs low voltage level.
<gpio_num>	The PMU GPIO number. Range: 1-10. 3 WWAN_LED# (pin 10) of EM12 Others Reserved

NOTE

The command is applicable to EM12 only.

Example

```
AT+QPMUGPIO=0,3     //Set the PMU GPIO number 3 (WWAN_LED# of EM12) output high.
OK
```

12.8. AT+QSAR Enable/Disable the SAR Power Backoff

The command is used to enable or disable the SAR power backoff.

AT+QSAR Enable/Disable the SAR Power Backoff	
Test Command **AT+QSAR=?**	Response **+QSAR: (0-8),(0,1)** **OK**
Read Command **AT+QSAR?**	Response **+QSAR: <level>** **OK**
Write Command **AT+QSAR=<level>[,<saved>]**	Response **OK** Or **ERROR** If there is an error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	
Reference	

Parameter

<level>	0	Disable SAR power backoff.
	1-8	SAR power backoff level. The value of the power backoff is determined by **AT+QCFG="sarcfg"** command.
<saved>	Whether to save the configuration into NVM.	
	0	Not to save
	1	Save

13 Appendix

13.1. References

Table 5: Related Documents

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

Table 6: Terms and Abbreviations

Abbreviation	Description
AMR	Adaptive Multi-Rate
APN	Access Point Name
CSD	Circuit Switch Data
DCD	Dynamic Content Delivery
DCE	Data Communication Equipment
DTE	Data Terminal Equipment

DTR	Data Terminal Ready
ECT	Explicit Call Transfer supplementary service
GPRS	General Packet Radio Service
ME	Mobile Equipment
MS	Mobile Station
MT	Mobile Terminal
NVM	Non-Volatile Memory
PDN	Public Data Network
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PSC	Primary Synchronization Code
RLP	Radio Link Protocol
RTS/CTS	Request To Send/Clear To Send
SAR	Specific Absorption Rate
SGSN	Serving GPRS Support Node
SMS	Short Messaging Service
TA	Terminal Adapter
TCP	Transmission Control Protocol
TE	Terminal Equipment
UDP	User Datagram Protocol
UE	User Equipment
URC	Unsolicited Result Code

13.2. Factory Default Settings Restorable with AT&F

Table 7: Factory Default Settings Restorable with AT&F

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATS0	<n>	0
ATS3	<n>	13
ATS4	<n>	10
ATS5	<n>	8
ATS6	<n>	2
ATS7	<n>	0
ATS8	<n>	2
ATS10	<n>	15
ATV	<value>	1
ATX	<value>	4
AT&C	<value>	1
AT&D	<value>	1
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>,<mt>,<mo>,<bm>	0,1,1,1
AT+CMGF	<mode>	0
AT+CSMP	<fo>,<vp>,<pid>,<dcs>	17,167,0,0
AT+CSDH	<show>	0
AT+CSCB	<mode>,<mids>,<dcss>	0,"",""
AT+CPMS	<mem1>,<mem2>,<mem3>	"ME","ME","ME"
AT+CNMI	<mode>,<mt>,<bm>,<ds>,<bfr>	2,1,0,0,0
AT+CMMS	<n>	0
AT+CVHU	<mode>	0
AT+CLIP	<n>	0
AT+COLP	<n>	0
AT+CLIR	<n>	0
AT+CSSN	<n><m>	0,0
AT+CTZR	<reporting>	0
AT+CPBS	<storage>	SM
AT+CGEREP	<mode>,<brf>	0,0
AT+CEREG	<n>	0
AT+CCWA	<n>	0
AT+CUSD	<mode>	0
AT+CLVL	<level>	3
AT+QAUDMOD	<mode>	0
AT+QAUDLOOP	<enable>	0

13.3. AT Command Settings Storable with AT&W

Table 8: AT Command Settings Storable with AT&W

AT Command	Parameters	Display with AT&V
ATE	<value>	Yes
ATQ	<n>	Yes
ATS0	<n>	Yes
ATS7	<n>	Yes
ATS10	<n>	Yes
ATV	<value>	Yes
ATX	<value>	Yes
AT&C	<value>	Yes
AT&D	<value>	Yes
AT+CREG	<n>	No
AT+CGREG	<n>	No
AT+CEREG	<n>	No
AT+QSIMSTAT	<enable>	No

13.4. AT Command Settings Storable with ATZ

Table 9: AT Command Settings Storable with ATZ

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0

ATS0	<n>	0
ATS7	<n>	0
ATS10	<n>	15
ATV	<value>	1
ATX	<value>	4
AT&C	<value>	1
AT&D	<value>	1
AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+CEREG	<n>	0

13.5. Summary of CME ERROR Codes

Final result code **+CME ERROR: <err>** indicates an error related to mobile equipment or network. The operation is similar to **ERROR** result code. None of the following commands in the same command line is executed. Neither **ERROR** nor **OK** result code should be returned.

<err> values are mostly used by common message commands. The following table lists most of general and GRPS related **ERROR** codes. For some GSM protocol failure cause described in GSM specifications, the corresponding **ERROR** codes are not included.

Table 10: Different Coding Schemes of +CME ERROR: <err>

Code of <err>	Meaning
0	Phone failure
1	No connection to phone
2	Phone-adaptor link reserved
3	Operation not allowed
4	Operation not supported

5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	(U)SIM not inserted
11	(U)SIM PIN required
12	(U)SIM PUK required
13	(U)SIM failure
14	(U)SIM busy
15	(U)SIM wrong
16	Incorrect password
17	(U)SIM PIN2 required
18	(U)SIM PUK2 required
20	Memory full
21	Invalid index
22	Not found
23	Memory failure
24	Text string too long
25	Invalid characters in text string
26	Dial string too long
27	Invalid characters in dial string
30	No network service
31	Network timeout
32	Network not allowed - emergency calls only
40	Network personalization PIN required
41	Network personalization PUK required

42	Network subset personalization PIN required
43	Network subset personalization PUK required
44	Service provider personalization PIN required
45	Service provider personalization PUK required
46	Corporate personalization PIN required
47	Corporate personalization PUK required

13.6. Summary of CMS ERROR Codes

Final result code **+CMS ERROR: <err>** indicates an error related to mobile equipment or network. The operation is similar to **ERROR** result code. None of the following commands in the same command line is executed. Neither **ERROR** nor **OK** result code should be returned.

<err> values are mostly used by common message commands:

Table 11: Different Coding Schemes of +CMS ERROR: <err>

Code of <err>	Meaning
300	ME failure
301	SMS ME reserved
302	Operation not allowed
303	Operation not supported
304	Invalid PDU mode
305	Invalid text mode
310	(U)SIM not inserted
311	(U)SIM pin necessary
312	PH (U)SIM pin necessary
313	(U)SIM failure

314	(U)SIM busy
315	(U)SIM wrong
316	(U)SIM PUK required
317	(U)SIM PIN2 required
318	(U)SIM PUK2 required
320	Memory failure
321	Invalid memory index
322	Memory full
330	SMSC address unknown
331	No network
332	Network timeout
500	Unknown
512	(U)SIM not ready
513	Message length exceeds
514	Invalid request parameters
515	ME storage failure
517	Invalid service mode
528	More message to send state error
529	MO SMS is not allowed
531	ME storage full

13.7. Summary of URC

Table 12: Summary of URC

Index	URC Display	Meaning	Condition
1	+CREG: <stat>	Indicate registration status of the MT	AT+CREG=1
2	+CREG: <stat>[,<lac>,<ci>[,<Act>]]	After cell neighborhood changing shows whether the network has currently indicated the registration of the MT, with location area code	AT+CREG=2
3	+CGREG: <stat>	Indicate network registration status of the MT	AT+CGREG=1
4	+CGREG: <stat>[,<lac>,<ci>[,<Act>]]	Indicate network registration and location information of the MT	AT+CGREG=2
5	+CTZV: <tz>	Time zone reporting	AT+CTZR=1
6	+CTZE: <tz>,<dst>,<time>	Extended time zone reporting	AT+CTZR=2
7	+CMTI: <mem>,<index>	New message is received, and saved to memory	See AT+CNMI
8	+CMT: [<alpha>],<length><CR><LF><pdu>	New short message is received and output directly to TE (PDU mode)	See AT+CNMI
9	+CMT: <oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>	New short message is received and output directly to TE (Text mode)	See AT+CNMI
10	+CBM: <length><CR><LF><pdu>	New CBM is received and output directly (PDU mode)	See AT+CNMI
11	+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>	New CBM is received and output directly to TE (Text mode)	See AT+CNMI
12	+CDS: <length><CR><LF><pdu>	New CDS is received and output directly (PDU mode)	See AT+CNMI
13	+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>	New CDS is received and output directly to TE (Text mode)	See AT+CNMI
14	+CDSI: <mem>,<index>	New message status report is received, and saved to memory	See AT+CNMI
15	^HCDS: <oa>,<scts>,<lang>, <fmt>,<length>,<prt>,<prv>,<type>,<sta	New CDS is received and output directly to TE (In CDMA Text mode)	See AT+CNMI

	t><CR><LF><data>		
16	+COLP: <number>,<type>,[<subaddr>],[<satype>],[<alpha>]	The presentation of the COL (connected line) at the TE for a mobile originated call	AT+COLP=1
17	+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI validity>	Mobile terminating call indication	AT+CLIP=1
18	+CRING: <type>	An incoming call is indicated to the TE with unsolicited result code instead of the normal RING	AT+CRC=1
29	+CCWA: <number>,<type>,<class>[,<alpha>]	Call waiting indication	AT+CCWA=1,1
20	+CSSI: <code1>	Shows the +CSSI intermediate result code presentation status to the TE	AT+CSSN=1
21	+CSSU: <code2>	Shows the +CSSU unsolicited result code presentation status to the TE	AT+CSSN=<n>,1
22	+CUSD: <status>[,<rspstr>,[<dcs>]]	USSD response from the network, or a network initiated operation	AT+CUSD=1
23	RDY	MT initialization is successful	N/A
25	+CFUN: 1	All function of the MT is available	N/A
26	+CPIN: <state>	(U)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	AT+CGEREP=2,1

		MS class.	
37	+CGEV: ME CLASS <class>	The mobile equipment has forced a change of MS class.	AT+CGEREP=2,1
38	+QTEMP: <sensor>,<temp>	Temperature information	See AT+QTEMP

13.8. SMS Character Sets Conversions

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

Table 13: 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 14: The Input Conversions Table (DCS=GSM 7-bit and AT+CSCS="GSM")

No.	0	1	2	3	4	5	6	7
0	00	10	20	30	40	50	60	70

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

Table 15: The Output Conversions Table (DCS=GSM 7-bit and AT+CSCS="GSM")

No.	0	1	2	3	4	5	6	7
0	00	10	20	30	40	50	60	70
1	01	11	21	31	41	51	61	71
2	02	12	22	32	42	52	62	72
3	03	13	23	33	43	53	63	73
4	04	14	24	34	44	54	64	74
5	05	15	25	35	45	55	65	75
6	06	16	26	36	46	56	66	76

7	07	17	27	37	47	57	67	77
8	08	18	28	38	48	58	68	78
9	09	19	29	39	49	59	69	79
A	0D0A		2A	3A	4A	5A	6A	7A
B	0B		2B	3B	4B	5B	6B	7B
C	0C	1C	2C	3C	4C	5C	6C	7C
D	0D	1A	2D	3D	4D	5D	6D	7D
E	0E	1E	2E	3E	4E	5E	6E	7E
F	0F	1F	2F	3F	4F	5F	6F	7F

Table 16: GSM Extended Characters (GSM Encode)

No.	0	1	2	3	4	5	6	7
0					1B40			
1								
2								
3								
4		1B14						
5								
6								
7								
8			1B28					
9			1B29					
A								
B								
C				1B3C				

D			1B3D				
E			1B3E				
F		1B2F					

Table 17: The Input Conversions Table (DCS=GSM 7-bit and AT+CSCS="IRA")

No.	0	1	2	3	4	5	6	7
0		20	20	30	00	50	20	70
1	20	20	21	31	41	51	61	71
2	20	20	22	32	42	52	62	72
3	20	20	23	33	43	53	63	73
4	20	20	02	34	44	54	64	74
5	20	20	25	35	45	55	65	75
6	20	20	26	36	46	56	66	76
7	20	20	27	37	47	57	67	77
8	backspace	20	28	38	48	58	68	78
9	20	20	29	39	49	59	69	79
A	0A	Submit	2A	3A	4A	5A	6A	7A
B	20	Cancel	2B	3B	4B	1B3C	6B	1B28
C	20	20	2C	3C	4C	1B2F	6C	1B40
D	0D	20	2D	3D	4D	1B3E	6D	1B29
E	20	20	2E	3E	4E	1B14	6E	1B3D
F	20	20	2F	3F	4F	11	6F	20

Table 18: IRA Extended Characters

No.	A	B	C	D	E	F
0	20	20	20	20	7F	20
1	40	20	20	5D	20	7D
2	20	20	20	20	20	08
3	01	20	20	20	20	20
4	24	20	5B	20	7B	20
5	03	20	0E	20	0F	20
6	20	20	1C	5C	1D	7C
7	5F	20	09	20	20	20
8	20	20	20	0B	04	0C
9	20	20	1F	20	05	06
A	20	20	20	20	20	20
B	20	20	20	20	20	20
C	20	20	20	5E	07	7E
D	20	20	20	20	20	20
E	20	20	20	20	20	20
F	20	60	20	1E	20	20

Table 19: The Output Conversions Table (DCS=GSM 7-bit and AT+CSCS="IRA")

No.	0	1	2	3	4	5	6	7
0	40	20	20	30	A1	50	BF	70
1	A3	5F	21	31	41	51	61	71
2	24	20	22	32	42	52	62	72
3	A5	20	23	33	43	53	63	73

4	E8	20	A4	34	44	54	64	74
5	E9	20	25	35	45	55	65	75
6	F9	20	26	36	46	56	66	76
7	EC	20	27	37	47	57	67	77
8	F2	20	28	38	48	58	68	78
9	C7	20	29	39	49	59	69	79
A	0D0A		2A	3A	4A	5A	6A	7A
B	D8		2B	3B	4B	C4	6B	E4
C	F8	C6	2C	3C	4C	D6	6C	F6
D	0D	E6	2D	3D	4D	D1	6D	F1
E	C5	DF	2E	3E	4E	DC	6E	FC
F	E5	C9	2F	3F	4F	A7	6F	E0

Table 20: GSM Extended Characters (ISO-8859-1/Unicode)

No.	0	1	2	3	4	5	6	7
0					7C			
1								
2								
3								
4		5E						
5								
6								
7								
8			7B					
9			7D					

A		
B		
C		5B
D		7E
E		5D
F	5C	

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

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

The difference is the way of SMS text input or output. Please refer to ***Table 14*** for more details.

13.9. Release Cause Text List of AT+CEER

Table 21: Release Cause Text List of AT+CEER

CS Internal Cause
No cause information available (default)
Phone is offline
No service available
Network release, no reason given
Received incoming call
Client ended call
UIM not present
Access attempt already in progress

Access failure, unknown source
Concur service not supported by network
No response received from network
GPS call ended for user call
SMS call ended for user call
Data call ended for emergency call
Rejected during redirect or handoff
Lower-layer ended call
Call origination request failed
Client rejected incoming call
Client rejected setup indication
Network ended call
No funds available
No service available
Full service not available
Maximum packet calls exceeded
Video connection lost
Video protocol closed after setup
Video protocol setup failure
Internal error
CS Network Cause
Unassigned/unallocated number
No route to destination
Channel unacceptable
Operator determined barring

Normal call clearing
User busy
No user responding
User alerting, no answer
Call rejected
Number changed
Non selected user clearing
Destination out of order
Invalid/incomplete number
Facility rejected
Response to status enquiry
Normal, unspecified
No circuit/channel available
Network out of order
Temporary failure
Switching equipment congestion
Access information discarded
Requested circuit/channel not available
Resources unavailable, unspecified
Quality of service unavailable
Requested facility not subscribed
Incoming calls barred within the CUG
Bearer capability not authorized
Bearer capability not available
Service/option not available

Bearer service not implemented
ACM >= ACM max
Requested facility not implemented
Only RDI bearer is available
Service/option not implemented
Invalid transaction identifier value
User not member of CUG
Incompatible destination
Invalid transit network selection
Semantically incorrect message
Invalid mandatory information
Message non-existent/not implemented
Message type not compatible with state
IE non-existent/not implemented
Conditional IE error
Message not compatible with state
Recovery on timer expiry
Protocol error, unspecified
Interworking, unspecified
CS Network Reject
IMSI unknown in HLR
Illegal MS
IMSI unknown in VLR
IMEI not accepted
Illegal ME

GPRS services not allowed
GPRS and non GPRS services not allowed
MS identity cannot be derived
Implicitly detached
PLMN not allowed
Location area not allowed
Roaming not allowed
GPRS services not allowed in PLMN
No suitable cells in location area
MSC temporary not reachable
Network failure
MAC failure
Synch failure
Congestion
GSM authentication unacceptable
Service option not supported
Requested service option not subscribed
Service option temporary out of order
Call cannot be identified
No PDP context activated
Semantically incorrect message
Invalid mandatory information
Message type non-existent
Message type not compatible with state
Information element non-existent

Message not compatible with state
RR release indication
RR random access failure
RRC release indication
RRC close session indication
RRC open session failure
Low level failure
Low level failure no redial allowed
Invalid SIM
No service
Timer T3230 expired
No cell available
Wrong state
Access class blocked
Abort message received
Other cause
Timer T303 expired
No resources
Release pending
Invalid user data
PS Internal Cause
Invalid connection identifier
Invalid NSAPI
Invalid primary NSAPI
PDP establish timeout

Invalid field
SNDCP failure
RAB setup failure
No GPRS context
PDP activate timeout
PDP modify timeout
PDP inactive max timeout
PDP lower layer error
PDP duplicate
Access technology change
PDP unknown reason
CS PS Network Cause
LLC or SNDCP failure
Insufficient resources
Missing or unknown APN
Unknown PDP address or PDP type
User authentication failed
Activation rejected by GGSN
Activation rejected, unspecified
Service option not supported
Requested service option not subscribed
Service option temporary out of order
NSAPI already used (not sent)
Regular deactivation
QoS not accepted

Network failure
Reactivation required
Feature not supported
Semantic error in the TFT operation
Syntactical error in the TFT operation
Unknown PDP context
PDP context without TFT already activated
Semantic errors in packet filter
Syntactical errors in packet filter
Invalid transaction identifier
Semantically incorrect message
Invalid mandatory information
Message non-existent/not implemented
Message type not compatible with state
IE non-existent/not implemented
Conditional IE error
Message not compatible with state
Protocol error, unspecified