

# BG95-S5

# AT Commands Manual

**Satellite Communication Module Series**

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**Quectel Wireless Solutions Co., Ltd.**

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: [info@quectel.com](mailto:info@quectel.com)

**Or our local offices. For more information, please visit:**

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# 1 Introduction

## 1.1. Scope of the Document

This document presents the AT commands supported on BG95-S5 module.

## 1.2. Definitions

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

## 1.3. AT Command Syntax

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

The AT command set implemented by BG95-S5 is a combination of *3GPP TS 27.007*, *3GPP TS 27.005* and *ITU-T recommendation V.25ter* as well as the AT Commands developed by Quectel.

All these AT commands can be split into three categories syntactically: “Basic”, “S parameter”, and “Extended”. They are listed as follows:

- **Basic**

Basic command format is **AT<x><n>**, or **AT&<x><n>**, where **<x>** is the command, and **<n>** is/are the argument(s) of the command. For example, **ATE<n>** tells the DCE (Data Circuit-terminating Equipment)

whether received characters should be echoed back to the DTE (Data Terminal Equipment) according to the value of `<n>`. `<n>` is optional and a default will be used if it is omitted.

- **S parameter**

S Parameter command format is `ATS<n>=<m>`, where `<n>` is the index of the **S** register to set, and `<m>` is the value to assign to it.

- **Extended syntax**

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

**Table 1: Types of AT Commands**

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

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

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

- Within quoted strings, where they are preserved;
- Within an unquoted string or numeric parameter;
- Within an IP address;
- Within the AT command name up to and including a `=`, `?` or `=?`.

On input, at least a carriage return is required. A newline character is ignored so it is permissible to use carriage return/line feed pairs on the input.

If no command is entered after the **AT** token, **OK** will be returned. If an invalid command is entered, **ERROR** will be returned.

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

## 1.4. AT Command Responses

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

Responses will be in the format of:

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

```
<CR><LF>OK<CR><LF>
```

Or

```
<CR><LF><parameters><CR><LF>
```

```
<CR><LF>OK<CR><LF>
```

## 1.5. Declaration of AT Command Examples

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

## 1.6. Supported Character Sets

BG95-S5 AT command interface uses the GSM character set by default. BG95-S5 module supports the following character sets:

- GSM format
- UCS2
- IRA

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

## 1.7. AT Command Interface

BG95-S5 AT command interface includes one USB MODEM port and one main UART port. The main UART port and the USB MODEM port support AT command communication and data transfer.

## 1.8. 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 issued by BG95-S5 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.

## 1.9. Turn off Procedure

It is recommended to execute **AT+QPOWD** (see *document [1]* for details) 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**, do not enter any other AT commands. When the command is executed successfully, the module will output **POWERED DOWN** and set the STATUS pin as low to enter power-off state. In order to avoid data loss, it is suggested to wait for 1s at least to disconnect the power supply after the STATUS pin is set as low and the URC **POWERED DOWN** is outputted. If **POWERED DOWN** cannot be received within 65 s, the power supply shall be disconnected compulsorily.

# 2 General Commands

## 2.1. ATI Display Product Identification Information

This command delivers the product identification information text.

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

### Parameter

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

### Example

```
ATI
Quectel
BG95-S5
Revision: BG95S5LAR08A01

OK
```

## 2.2. AT+GMI Request Manufacturer Identification

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

<b>AT+GMI Request Manufacturer Identification</b>	
Test Command <b>AT+GMI=?</b>	Response <b>OK</b>
Execution Command <b>AT+GMI</b>	Response TA reports one or more lines of information text which permits the user to identify the manufacturer. <b>Quectel</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>V.25ter</i>	

## 2.3. AT+GMM Request Model Identification

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

<b>AT+GMM Request Model Identification</b>	
Test Command <b>AT+GMM=?</b>	Response <b>OK</b>
Execution Command <b>AT+GMM</b>	Response <b>&lt;objectID&gt;</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>V.25ter</i>	

### Parameter

**<objectID>** Identifier of product type.

## 2.4. AT+GMR Request Firmware Version Identification

This command returns the identification text of product firmware version. It is identical with **AT+CGMR** in *Chapter 2.7*.

<b>AT+GMR Request Firmware Version Identification</b>	
Test Command <b>AT+GMR=?</b>	Response <b>OK</b>
Execution Command <b>AT+GMR</b>	Response TA reports one line of information text which permits the user to identify the firmware version. <b>&lt;revision&gt;</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>V.25ter</i>	

### Parameter

**<revision>** Identification text of product firmware version.

### Example

```
AT+GMR
BG95S5LAR08A01

OK
```

## 2.5. AT+CGMI Request Manufacturer Identification

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

<b>AT+CGMI Request Manufacturer Identification</b>	
Test Command <b>AT+CGMI=?</b>	Response <b>OK</b>
Execution Command <b>AT+CGMI</b>	Response <b>Quectel</b>

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

## 2.6. AT+CGMM Request Model Identification

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

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

### Parameter

<objectID> Identifier of product type.

## 2.7. AT+CGMR Request Firmware Version Identification

This command returns the identification text of the product firmware version. It is identical with **AT+GMR** in *Chapter 2.4*.

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

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

**Parameter**

<revision> Identification text of product firmware version.

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

This command returns the International Mobile Equipment Identity (IMEI) number of the product in information text which permits the user to identify the individual ME device. It is identical with **AT+CGSN** in **Chapter 2.9**.

<b>AT+GSN Request International Mobile Equipment Identity (IMEI)</b>	
Test Command <b>AT+GSN=?</b>	Response <b>OK</b>
Execution Command <b>AT+GSN</b>	Response <IMEI>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>V.25ter</i>	

**Parameter**

<IMEI> IMEI number of the ME.

**NOTE**

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

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

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

### AT+CGSN Request International Mobile Equipment Identity (IMEI)

Test Command <b>AT+CGSN=?</b>	Response <b>OK</b>
Execution Command <b>AT+CGSN</b>	Response <b>&lt;IMEI&gt;</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>3GPP TS 27.007</i>	

#### Parameter

**<IMEI>** IMEI number of the ME.

**NOTE**

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

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

This command resets all current AT command settings to the default values specified by the manufacturer. Refer to **Table 17** for the list of supported AT commands.

<b>AT&amp;F Reset All AT Command Settings to Factory Settings</b>	
Execution Command <b>AT&amp;F[&lt;value&gt;]</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>V.25ter</i>	

### Parameter

<b>&lt;value&gt;</b>	Integer type.
<u>0</u>	Set all current AT command settings to factory setting

## 2.11. AT&V Display Current Configuration

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

<b>AT&amp;V Display Current Configuration</b>	
Execution Command <b>AT&amp;V</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>V.25ter</i>	

**Table 2: AT&V Response**

<b>AT&amp;V</b>
&C: 1
&D: 2
&F: 0

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

OK

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

This 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. Refer to **Table 18** for the list of supported AT commands.

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

### Parameter

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

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

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

Any additional AT command on the same command line may be ignored. Refer to **Table 19** for the list of supported AT commands.

<b>ATZ Restore All AT Command Settings from User-defined Profile</b>	
Execution Command <b>ATZ[&lt;value&gt;]</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>V.25ter</i>	

#### Parameter

<b>&lt;value&gt;</b>	Integer type. <u>0</u> Reset to profile number 0
----------------------	---

### 2.14. ATQ Set Result Code Presentation Mode

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

<b>ATQ Set Result Code Presentation Mode</b>	
Execution Command <b>ATQ&lt;n&gt;</b>	Response If <b>&lt;n&gt;=0</b> : <b>OK</b>  If <b>&lt;n&gt;=1</b> : (none)
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with <b>AT&amp;W</b> .
Reference <i>V.25ter</i>	

**Parameter**

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

## 2.15. ATV TA Response Format

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

The numeric equivalents and brief descriptions of the use of result code are listed in the following table.

ATV TA Response Format	
Execution Command <b>ATV&lt;value&gt;</b>	Response When <value>=0: <b>0</b>  When <value>=1: <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with <b>AT&amp;W</b> .
Reference <i>V.25ter</i>	

**Parameter**

<value>	Integer type.
0	Information response: <text><CR><LF> Short result code format: <numeric code><CR>
<u>1</u>	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 Equivalent and Brief Description of ATV0 and 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, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line.
NO DIALTONE	6	No dial tone detected.
BUSY	7	Engaged (busy) signal detected.
NO ANSWER	8	@ (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer (S7).

## 2.16. ATE Set Command Echo Mode

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

ATE Set Command Echo Mode	
Execution Command <b>ATE&lt;value&gt;</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with <b>AT&amp;W</b> .

Reference  
V.25ter

**Parameter**

<b>&lt;value&gt;</b>	Integer type. Whether to echo the characters received from TE.
0	Echo mode OFF
1	Echo mode ON

## 2.17. A/ Repeat Previous Command Line

This command repeats previous AT command line, and “/” acts as the line termination character.

### A/ Repeat Previous Command Line

Execution Command	Response
A/	Repeat the previous command
Characteristics	-
Reference	
V.25ter	

### Example

```

ATI
Quectel
BG95-S5
Revision: BG95S5LAR08A01

OK
A/ //Repeat the previous command.
Quectel
BG95-S5
Revision: BG95S5LAR08A01

OK
    
```

## 2.18. ATS3 Set Command Line Termination Character

This command determines the character recognized by the module 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 <b>ATS3?</b>	Response <n>  <b>OK</b>
Write Command <b>ATS3=&lt;n&gt;</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference <i>V.25ter</i>	

#### Parameter

<n> Integer type. Command line termination character.  
Range: 0–127. Default value: 13 (13=<CR>).

## 2.19. ATS4 Set Response Formatting Character

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

### ATS4 Set Response Formatting Character

Read Command <b>ATS4?</b>	Response <n>  <b>OK</b>
Write Command <b>ATS4=&lt;n&gt;</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference	

V.25ter

**Parameter**

**<n>** Integer type. Response formatting character.  
Range: 0–127. Default value: 10 (10=<LF>).

**2.20. ATS5 Set Command Line Editing Character**

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

**ATS5 Set Command Line Editing Character**

Read Command <b>ATS5?</b>	Response <b>&lt;n&gt;</b>  <b>OK</b>
Write Command <b>ATS5=&lt;n&gt;</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference V.25ter	

**Parameter**

**<n>** Integer type. Command line editing character  
Range: 0–127. Default value: 8 (8=<Backspace>).

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

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

**ATX Set CONNECT Result Code Format and Monitor Call Progress**

Execution Command <b>ATX&lt;value&gt;</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with <b>AT&amp;W</b> .
Reference <i>V.25ter</i>	

**Parameter**

<b>&lt;value&gt;</b>	Integer type.
0	<b>CONNECT</b> result code is returned only. Dial tone and busy signal detection are both disabled.
1	<b>CONNECT&lt;text&gt;</b> result code is returned only. Dial tone and busy signal detection are both disabled.
2	<b>CONNECT&lt;text&gt;</b> result code is returned. Dial tone detection is enabled, while busy signal detection is disabled.
3	<b>CONNECT&lt;text&gt;</b> result code is returned. Dial tone detection is disabled, while busy signal detection is enabled.
4	<b>CONNECT&lt;text&gt;</b> result code is returned. Dial tone and busy signal detection are both enabled.

**2.22. AT+CFUN Set UE Functionality**

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

<b>AT+CFUN Set UE Functionality</b>	
Test Command <b>AT+CFUN=?</b>	Response <b>+CFUN: (list of supported &lt;fun&gt;s),(list of supported &lt;rst&gt;s)</b>  <b>OK</b>
Read Command <b>AT+CFUN?</b>	Response <b>+CFUN: &lt;fun&gt;</b>  <b>OK</b>
Write Command <b>AT+CFUN=&lt;fun&gt;[,&lt;rst&gt;]</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>

	If there is any other error: <b>ERROR</b>
Maximum Response Time	15 s, determined by the network.
Characteristics	-
Reference	
3GPP TS 27.007	

**Parameter**

- <fun>** Integer type.
  - 0 Minimum functionality
  - 1 Full functionality
  - 4 Disable the UE from both transmitting and receiving RF signals
- <rst>** Integer type.
  - 0 Do not reset the UE before setting it to **<fun>** functionality level.
  - 1 Reset the UE before setting it to **<fun>** functionality level. The device is fully functional after the reset. This value is available only for **<fun>=1**.
- <err>** Integer type. Error code. Refer to **Table 20** for possible **<err>** values.

**Example**

```

AT+CFUN=0 //Switch the UE to minimum functionality.
OK
AT+COPS?
+COPS: 2 //No operator is registered.

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

+CPIN: SIM PIN
AT+CPIN=1234
OK

+CPIN: READY

+QUSIM: 1

+QIND: SMS DONE
    
```

**AT+CPIN?**

+CPIN: READY

OK

**AT+COPS?**

+COPS: 0,0,"CHINA MOBILE CMCC",8 //Operator is registered.

OK

## 2.23. AT+CMEE Error Message Format

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

### AT+CMEE Error Message Format

Test Command <b>AT+CMEE=?</b>	Response <b>+CMEE:</b> (list of supported <n>s)  OK
Read Command <b>AT+CMEE?</b>	Response <b>+CMEE:</b> <n>  OK
Write Command <b>AT+CMEE=&lt;n&gt;</b>	Response TA disables or enables the use of result code <b>+CME ERROR: &lt;err&gt;</b> or <b>+CMS ERROR: &lt;err&gt;</b> as an indication of an error related to the functionality of the ME. OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference <i>3GPP TS 27.007</i>	

### Parameter

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

**<err>** Integer type. Error code. Refer to **Table 20** and **Table 21** for possible **<err>** 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 module which character set is used by the TE. This enables the UE to convert character strings correctly between TE and UE character sets.

**AT+CSCS Select TE Character Set**

Test Command <b>AT+CSCS=?</b>	Response <b>+CSCS: (list of supported &lt;chset&gt;s)</b>  <b>OK</b>
Read Command <b>AT+CSCS?</b>	Response <b>+CSCS: &lt;chset&gt;</b>  <b>OK</b>
Write Command <b>AT+CSCS=&lt;chset&gt;</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

	The configuration is not saved.
Reference 3GPP TS 27.007	

**Parameter**

<b>&lt;chset&gt;</b>	String type. Character set
“GSM”	GSM default alphabet
“IRA”	International reference alphabet
“UCS2”	UCS2 alphabet

**Example**

```

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

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

AT+CSCS?
+CSCS: "UCS2"

OK
    
```

**2.25. AT+QURCCFG Configure URC Indication Option**

This command configures the output port of URC.

<b>AT+QURCCFG Configure URC Indication Option</b>	
Test Command <b>AT+QURCCFG=?</b>	Response <b>+QURCCFG: "urcport",(list of supported &lt;URC_port&gt;s)</b>  <b>OK</b>
Write Command <b>AT+QURCCFG="urcport"[,&lt;URC_port t&gt;]</b>	Response If the optional parameter is omitted, the command returns the current configuration. <b>+QURCCFG: "urcport",&lt;URC_port&gt;</b>  <b>OK</b>

	<p>If the optional parameter is specified, the command sets the URC output port.</p> <p><b>OK</b></p> <p>If there is any other error:</p> <p><b>ERROR</b></p>
Maximum Response Time	300 ms
Characteristics	<p>The command takes effect immediately.</p> <p>The configuration is saved automatically.</p>

**Parameter**

<b>&lt;URC_port&gt;</b>	String type. URC output port.
"usbmodem"	USB modem port
"uart1"	Main UART
"dam"	ATC pipe callback in quecopen

**Example**

```

AT+QURCCFG=?
+QURCCFG: "urcport",("usbmodem","uart1","dam")

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

# 3 Serial Interface Control Commands

## 3.1. AT&C Set DCD Behavior

This command controls the behavior of the UE's DCD line. It determines how the state of circuit 109 (DCD) relates to the detection of received line signal from the distant end.

AT&C Set DCD Behavior	
Execution Command <b>AT&amp;C[&lt;value&gt;]</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with <b>AT&amp;W</b> .
Reference <i>V.25ter</i>	

### Parameter

<b>&lt;value&gt;</b>	Integer type.
0	DCD function is always ON
1	DCD function is ON only in the presence of data carrier

## 3.2. AT&D Set DTR Behavior

This command determines how the TA responds when circuit 108/2 (DTR) is changed from low to high level during data mode.

AT&D Set DTR Behavior	
Execution Command <b>AT&amp;D[&lt;value&gt;]</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with <b>AT&amp;W</b> .

Reference  
V.25ter

**Parameter**

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

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

This command controls the flow control behavior of the serial port.

AT+IFC Set TE-TA Local Flow Control	
Test Command <b>AT+IFC=?</b>	Response <b>+IFC:</b> (list of supported <DCE_by_DTE>s),(list of supported <DTE_by_DCE>s)  <b>OK</b>
Read Command <b>AT+IFC?</b>	Response <b>+IFC:</b> <DCE_by_DTE>,<DTE_by_DCE>  <b>OK</b>
Write Command <b>AT+IFC=&lt;DCE_by_DTE&gt;,&lt;DTE_by_DCE&gt;</b>	Response This parameter setting determines the data flow control on the UART interface for data mode. <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference V.25ter	

**Parameter**

<b>&lt;DCE_by_DTE&gt;</b>	Integer type. Specifies the method to be used by TE when receiving data from TA <u>0</u> None 2 RTS flow control
<b>&lt;DTE_by_DCE&gt;</b>	Integer type. Specifies the method that will be used by TA when receiving data from TE <u>0</u> None 2 CTS flow control

**Example**

```

AT+IFC=2,2 //Enable hardware flow control.
OK
AT+IFC?
+IFC: 2,2
OK
    
```

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

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

**AT+ICF Set TE-TA Character Framing**

Test Command <b>AT+ICF=?</b>	Response <b>+ICF:</b> (list of supported <b>&lt;format&gt;s</b> ),(list of supported <b>&lt;parity&gt;s</b> )  <b>OK</b>
Read Command <b>AT+ICF?</b>	Response <b>+ICF:</b> <b>&lt;format&gt;</b> , <b>&lt;parity&gt;</b>  <b>OK</b>
Write Command <b>AT+ICF=&lt;format&gt;[,&lt;parity&gt;]</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Reference  
V.25ter

**Parameter**

**<format>** Integer type.  
3 8 data; 0 parity; 1 stop

**<parity>** Integer type.  
 0 Odd  
 1 Even  
 2 Mark (1)  
 3 Space (0)

**NOTE**

1. This command is valid only in command mode.
2. The **<parity>** field is ignored if no parity is specified in the **<format>** field.

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

This command queries and sets the baud rate of the UART. The specified rate takes effect following the issuance of any result code(s) associated with the current command line.

#### AT+IPR Set TE-TA Fixed Local Rate

Test Command <b>AT+IPR=?</b>	Response <b>+IPR:</b> (list of supported auto-detectable <b>&lt;rate&gt;</b> s),(list of supported fixed-only <b>&lt;rate&gt;</b> s)  <b>OK</b>
Read Command <b>AT+IPR?</b>	Response <b>+IPR:</b> <b>&lt;rate&gt;</b>  <b>OK</b>
Write Command <b>AT+IPR=&lt;rate&gt;</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

	The configurations can be saved with <b>AT&amp;W</b> .
Reference V.25ter	

**Parameter**

<b>&lt;rate&gt;</b>	Integer type. Baud rate per second. Unit: bps.
	4800
	9600
	19200
	38400
	57600
	115200
	230400
	460800
	921600
	2000000
	2900000
	3000000
	3200000
	3686400
	4000000

**NOTE**

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

**Example**

```

AT+IPR=115200 //Specify the fixed baud rate as 115200 bps.
OK
AT&W //Store the current setting, that is, remain the default baud rate per second
as 115200 bps after module resetting.
OK
AT+IPR?
+IPR: 115200
OK
    
```

**AT+IPR=115200;&W** //Specify the fixed baud rate as 115200 bps and store the current setting.  
**OK**

### 3.6. AT+QRIR Restore MAIN\_RI Behavior to Inactive

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

#### AT+QRIR Restore RI Behavior to Inactive

Test Command <b>AT+QRIR=?</b>	Response <b>OK</b>
Execution Command <b>AT+QRIR</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	-

# 4 Status Control Commands

## 4.1. AT+CPAS Query ME Activity Status

This Execution Command queries the activity status of ME.

AT+CPAS Query ME Activity Status	
Test Command <b>AT+CPAS=?</b>	Response <b>+CPAS:</b> (list of supported <b>&lt;pas&gt;</b> s)  <b>OK</b>
Execution Command <b>AT+CPAS</b>	Response TA returns the activity status of ME: <b>+CPAS: &lt;pas&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>3GPP TS 27.007</i>	

### Parameter

<b>&lt;pas&gt;</b>	Integer type. ME activity status. 0 Ready 3 Ringing 4 Call in progress or call hold
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

**Example**

```

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

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

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

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

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

OK
    
```

**4.2. AT+QINDCFG URC Indication Configuration**

This command controls URC indication.

**AT+QINDCFG URC Indication Configuration**

Test Command	Response
AT+QINDCFG=?	+QINDCFG: "all",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) +QINDCFG: "csq",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) +QINDCFG: "smsfull",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) +QINDCFG: "ring",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) +QINDCFG: "smsincoming",(list of supported <enable>s),(list of supported <save_to_NVRAM>s) +QINDCFG: "ccinfo",(list of supported <enable>s),(list of supported <save_to_NVRAM>s)

	<b>OK</b>
Write Command <b>AT+QINDCFG=&lt;URC_type&gt;[ ,&lt;enable&gt;[,&lt;save_to_NVRA M&gt;]]</b>	Response If the optional parameters are omitted, return the current configuration: <b>+QINDCFG: &lt;URC_type&gt;,&lt;enable&gt;</b>  <b>OK</b>  If any of the optional parameters is specified, set the URC indication configurations: <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. <b>&lt;save_to_NVRAM&gt;</b> determines whether to save the configuration.

**Parameter**

<b>&lt;URC_type&gt;</b>	URC type.
"all"	Main switch of all URCs. <b>&lt;enable&gt;</b> is default to be 1 (ON).
"csq"	Indication of signal strength and channel bit error rate change. <b>&lt;enable&gt;</b> is default to be 0 (OFF). If this configuration is ON, present: <b>+QIND: "csq",&lt;rssi&gt;,&lt;ber&gt;</b> . See <b>AT+CSQ</b> for details of the URC.
"smsfull"	SMS storage full indication. <b>&lt;enable&gt;</b> is default to be 0 (OFF). If this configuration is ON, present: <b>+QIND:"smsfull",&lt;storage&gt;</b> <b>&lt;storage&gt;</b> String type. SMS storage location "SM" (U)SIM card "ME" ME
"ring"	<b>RING</b> indication. <b>&lt;enable&gt;</b> is default to be 1 (ON).
"smsincoming"	Incoming message indication. <b>&lt;enable&gt;</b> is default to be 1 (ON). Related URC list: <b>+CMTI, +CMT, +CDS</b> See <b>Table 23</b> for more details of the URCs.
"ccinfo"	Indication of voice call state change. <b>&lt;enable&gt;</b> is default to be 0 (OFF). If it is 1, the URC indication is enabled and <b>+QIND: "ccinfo",&lt;id&gt;,&lt;dir&gt;,&lt;state&gt;,&lt;mode&gt;,&lt;empty&gt;,&lt;number&gt;,&lt;type&gt;[,&lt;alpha&gt;]</b> is reported.

---

<b>&lt;enable&gt;</b>	Integer type. URC indication is ON or OFF
	0 OFF
	1 ON
<b>&lt;save_to_NVRAM&gt;</b>	Whether to save the configurations into NVRAM.
	<u>0</u> Not save
	1 Save

---

# 5 (U)SIM Related Commands

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

This command requests the International Mobile Subscriber Identity (IMSI) which is intended to permit the TE to identify the individual SIM card or active application in the UICC (GSM or USIM) that is attached to MT.

### AT+CIMI Request International Mobile Subscriber Identity (IMSI)

Test Command <b>AT+CIMI=?</b>	Response <b>OK</b>
Execution Command <b>AT+CIMI</b>	Response <b>&lt;IMSI&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>3GPP TS 27.007</i>	

### Parameter

<b>&lt;IMSI&gt;</b>	International Mobile Subscriber Identity (string without double quotes).
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

### Example

```

AT+CIMI //Query IMSI number of the (U)SIM attached to MT.
460023210226023 //The IMSI number of the (U)SIM attached to MT.

OK
    
```

## 5.2. AT+CLCK Facility Lock

This command locks, unlocks or interrogates an MT or a network facility **<fac>**. Password is normally needed to do such actions. When querying the status of a 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>**. The command 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 <b>AT+CLCK=?</b>	Response <b>+CLCK: (list of supported &lt;fac&gt;s)</b>  <b>OK</b>
Write Command <b>AT+CLCK=&lt;fac&gt;,&lt;mode&gt;[,&lt;passwd&gt;[,&lt;class&gt;]]</b>	Response If <b>&lt;mode&gt;</b> is not 2 and the command is set successfully: <b>OK</b>  If <b>&lt;mode&gt;=2</b> and the command is set successfully: <b>+CLCK: &lt;status&gt;[,&lt;class&gt;]</b> <b>[+CLCK: &lt;status&gt;[, &lt;class&gt;]]</b> <b>[...]</b>  <b>OK</b>
Maximum Response Time	5 s
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference <i>3GPP TS 27.007</i>	

### Parameter

<b>&lt;fac&gt;</b>	String type. Facility lock type.
"SC"	(U)SIM (lock SIM/UICC card installed in the currently selected card slot) (SIM/UICC asks password in MT power-up and when this lock command is issued).
"AO"	BAOC (Barr All Outgoing Calls) (see <i>3GPP TS 22.088 [6] clause 1</i> ).
"OI"	BOIC (Barr Outgoing International Calls) (see <i>3GPP TS 22.088 [6] clause 1</i> ).
"OX"	BOIC-exHC (Barr Outgoing International Calls except to Home Country) (see <i>3GPP TS 22.088 [6] clause 1</i> ).
"AI"	BAIC (Barr All Incoming Calls) (see <i>3GPP TS 22.088 [6] clause 2</i> ).
"IR"	BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (see <i>3GPP TS 22.088 [6] clause 2</i> ).

"AB"	All Barring services (see <i>3GPP TS 22.030 [19]</i> ) (applicable only for <b>&lt;mode&gt;=0</b> ).
"AG"	All outGoing barring services (see <i>3GPP TS 22.030 [19]</i> ) (applicable only for <b>&lt;mode&gt;=0</b> ).
"AC"	All inComing barring services (see <i>3GPP TS 22.030 [19]</i> ) (applicable only for <b>&lt;mode&gt;=0</b> ).
"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 <b>&lt;passwd&gt;</b> ).
"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 (see <i>3GPP TS 22.022 [33]</i> ).
"PU"	Network sUbsEt Personalization (see <i>3GPP TS 22.022 [33]</i> ).
"PP"	Service Provider Personalization (see <i>3GPP TS 22.022 [33]</i> ).
"PC"	Corporate Personalization (see <i>3GPP TS 22.022 [33]</i> ).
<b>&lt;mode&gt;</b>	Integer type. Operation mode.
0	Unlock
1	Lock
2	Query status
<b>&lt;passwd&gt;</b>	String type. Password. This parameter can be omitted when <b>&lt;mode&gt;=2</b> .
<b>&lt;class&gt;</b>	Integer type. A sum of integers each representing a class of information.
1	Voice
2	Data
4	Fax
<u>7</u>	All telephony except SMS
8	Short message service
16	Data circuit synchronization
32	Data circuit asynchronization
<b>&lt;status&gt;</b>	Integer type. Current status of the specified <b>&lt;class&gt;</b> .
0	OFF
1	ON

**NOTE**

Only "SC" lock is supported currently.

**Example**

```

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

OK
AT+CLCK="SC",1,"1234" //Lock (U)SIM card, and the password is 1234.
    
```

```

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

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

### 5.3. AT+CPIN Enter PIN

This command sends to the MT a password which is necessary before it can be operated, or queries whether the 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.

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

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

AT+CPIN Enter PIN	
Test Command <b>AT+CPIN=?</b>	Response <b>OK</b>
Read Command <b>AT+CPIN?</b>	Response <b>+CPIN: &lt;code&gt;</b>  <b>OK</b>
Write Command <b>AT+CPIN=&lt;pin&gt;[,&lt;newpin&gt;]</b>	Response <b>OK</b>  <b>+CPIN: READY</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	5 s
Characteristics	-
Reference <i>3GPP TS 27.007</i>	

**Parameter**

<b>&lt;code&gt;</b>	String without double quotes. Indicates whether or not a password is required.
READY	MT is not pending for any password
SIM PIN	MT is waiting (U)SIM PIN to be given
SIM PUK	MT is waiting (U)SIM PUK to be given
SIM PIN2	MT is waiting (U)SIM PIN2 to be given
SIM PUK2	MT is waiting (U)SIM PUK2 to be given
PH-NET PIN	MT is waiting network personalization password to be given
PH-NET PUK	MT is waiting network personalization unblocking password to be given
PH-NETSUB PIN	MT is waiting network subset personalization password to be given
PH-NETSUB PUK	MT is waiting network subset personalization unblocking password to be given
PH-SP PIN	MT is waiting service provider personalization password to be given
PH-SP PUK	MT is waiting service provider personalization unblocking password to be given
PH-CORP PIN	MT is waiting corporate personalization password to be given
PH-CORP PUK	MT is waiting corporate personalization unblocking password to be given
<b>&lt;pin&gt;</b>	String type. Password. If the requested password was a PUK, such as (U)SIM PUK1, PH-FSIM PUK or another password, then <b>&lt;pin&gt;</b> must be followed by <b>&lt;newpin&gt;</b> .
<b>&lt;newpin&gt;</b>	String type. New password required if the requested code was a PUK.
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

**Example**

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

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

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

OK

//Enter PUK and PIN
```

```

AT+CPIN?
+CPIN: SIM PUK //Waiting for (U)SIM PUK 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
    
```

### 5.4. AT+CPWD Change Password

The Write Command sets a new password for the facility lock function defined by **AT+CLCK**.

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

AT+CPWD Change Password	
Test Command <b>AT+CPWD=?</b>	Response <b>+CPWD:</b> (list of supported <fac>s),<pwdlength>  <b>OK</b>
Write Command <b>AT+CPWD=&lt;fac&gt;,&lt;oldpwd&gt;,&lt;newpwd&gt;</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	5 s
Characteristics	-
Reference <i>3GPP TS 27.007</i>	

**Parameter**

<b>&lt;fac&gt;</b>	String type. Facility lock type.
"SC"	(U)SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command is issued)
"AO"	BAOC (Barr All Outgoing Calls) (see 3GPP TS 22.088 [6] clause 1)
"OI"	BOIC (Barr Outgoing International Calls) (see 3GPP TS 22.088 [6] clause 1).
"OX"	BOIC-exHC (Barr Outgoing International Calls except to Home Country) (see 3GPP TS 22.088 [6] clause 1).
"AI"	BAIC (Barr All Incoming Calls) (see 3GPP TS 22.088 [6] clause 2).
"IR"	BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (see 3GPP TS 22.088 [6] clause 2).
"AB"	All Barring services (see 3GPP TS 22.030 [19]) (applicable only for <mode>=0).
"AG"	All outGoing barring services (see 3GPP TS 22.030 [19]) (applicable only for <mode>=0).
"AC"	All inComing barring services (see 3GPP TS 22.030 [19]) (applicable only for <mode>=0)
"P2"	(U)SIM PIN2
<b>&lt;pwdlength&gt;</b>	Integer type. Maximum length of password.
<b>&lt;oldpwd&gt;</b>	String type. Password specified for the facility from the user interface or with command.
<b>&lt;newpwd&gt;</b>	String type. New password.

**NOTE**

Only "SC" lock is supported currently.

**Example**

```

AT+CPIN?
+CPIN: READY

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

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

## 5.5. AT+CRSM Restricted (U)SIM Access

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

AT+CRSM Restricted (U)SIM Access	
Test Command <b>AT+CRSM=?</b>	Response <b>OK</b>
Write Command <b>AT+CRSM=&lt;command&gt;[,&lt;fileId&gt;[,&lt;P1&gt;,&lt;P2&gt;,&lt;P3&gt;[,&lt;data&gt;][, &lt;pathId&gt;]]]</b>	Response <b>+CRSM: &lt;sw1&gt;,&lt;sw2&gt;[,&lt;response&gt;]</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	-
Reference	<i>3GPP TS 27.007</i>

### Parameter

<b>&lt;command&gt;</b>	Integer type. (U)SIM command number. 176 READ BINARY 178 READ RECORD 192 GET RESPONSE 214 UPDATE BINARY 220 UPDATE RECORD 242 STATUS
<b>&lt;fileId&gt;</b>	Integer type. Identifier for an elementary data file on (U)SIM, if used by <command>.
<b>&lt;P1&gt;/&lt;P2&gt;/&lt;P3&gt;</b>	Integer type. Parameters transferred by the MT to the (U)SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in <i>3GPP TS 51.011 [28]</i> .
<b>&lt;data&gt;</b>	Information which shall be written to the (U)SIM (hexadecimal character format; refer to <b>AT+CSCS</b> ).
<b>&lt;pathId&gt;</b>	String type. The directory path of an elementary file on the SIM/UICC in hexadecimal format.
<b>&lt;sw1&gt;/&lt;sw2&gt;</b>	Integer type. Information from the (U)SIM about the execution of the actual

command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command.

**<response>** Response of a successful completion of the command previously issued (hexadecimal character format; refer to **AT+CSCS**). STATUS and GET RESPONSE return data, which gives information about the current elementary data field. The information includes the type of file and its size (refer to 3GPP TS 51.011 [28]). After READ BINARY, READ RECORD or RETRIEVE DATA command, the requested data will be returned. **<response>** will not be returned after a successful UPDATE BINARY, UPDATE RECORD or SET DATA command.

**<err>** Integer type. Error code. Refer to **Table 20** for possible **<err>** values.

## 5.6. AT+QCCID Show ICCID

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

AT+QCCID Show ICCID	
Test Command <b>AT+QCCID=?</b>	Response <b>OK</b>
Execution Command <b>AT+QCCID</b>	Response <b>+QCCID: &lt;ICCID&gt;</b>  <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	-

### Parameter

**<ICCID>** The ICCID number of the current (U)SIM card.

### Example

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

## 5.7. AT+QPINC Display PIN Remainder Counter

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

<b>AT+QPINC Display PIN Remainder Counter</b>	
Test Command <b>AT+QPINC=?</b>	Response <b>+QPINC:</b> (list of supported <facility>s)  <b>OK</b>
Read Command <b>AT+QPINC?</b>	Response <b>+QPINC:</b> "SC",<PIN_counter>,<PUK_counter> <b>+QPINC:</b> "P2",<PIN_counter>,<PUK_counter>  <b>OK</b>
Write Command <b>AT+QPINC=&lt;facility&gt;</b>	Response <b>+QPINC:</b> <facility>,<PIN_counter>,<PUK_counter>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	-

### Parameter

<facility>	String type. "SC" (U)SIM PIN "P2" (U)SIM PIN2
<PIN_counter>	Number of attempts left to enter the password of PIN.
<PUK_counter>	Number of attempts left to enter the password of PUK.
<err>	Integer type. Error code. Refer to <b>Table 20</b> for possible <err> values.

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

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

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

### Parameter

<b>&lt;status&gt;</b>	Integer type. Initialization status of (U)SIM card. Actual value is the sum of several of the following three kinds (3 = 1 + 2 means CPIN READY & SMS initialization completed). 0 Initial state 1 CPIN READY. Operation like lock/unlock PIN is allowed 2 SMS initialization completed
-----------------------	--

## 5.9. AT+QSIMDET (U)SIM Card Detection

This command enables (U)SIM card hot-plug 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.

<b>AT+QSIMDET (U)SIM Card Detection</b>	
Test Command <b>AT+QSIMDET=?</b>	Response <b>+QSIMDET: (list of supported &lt;enable&gt;s),(list of supported &lt;insert_level&gt;s)</b>  <b>OK</b>
Read Command <b>AT+QSIMDET?</b>	Response <b>+QSIMDET: &lt;enable&gt;,&lt;insert_level&gt;</b>  <b>OK</b>

Write Command <b>AT+QSIMDET=&lt;enable&gt;,&lt;insert_level&gt;</b> >	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	This command takes effect after rebooting. The configuration is saved automatically.

**Parameter**

<b>&lt;enable&gt;</b>	Integer type. Enables or disables (U)SIM card detection. 0 Disable 1 Enable
<b>&lt;insert_level&gt;</b>	Integer type. The level of (U)SIM card detection pin when a (U)SIM card is inserted. 0 Low level 1 High level

**NOTE**

Hot-plug function is invalid if the configured value of **<insert\_level>** is inconsistent with hardware design.

**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 and if PIN1 of the (U)SIM card is unlocked
+CPIN: READY
```

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

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

**AT+QSIMSTAT (U)SIM Card Insertion Status Report**

Test Command <b>AT+QSIMSTAT=?</b>	Response <b>+QSIMSTAT: (list of supported &lt;enable&gt;s)</b>
--------------------------------------	---

	<b>OK</b>
Read Command <b>AT+QSIMSTAT?</b>	Response <b>+QSIMSTAT: &lt;enable&gt;,&lt;inserted_status&gt;</b>
	<b>OK</b>
Write Command <b>AT+QSIMSTAT=&lt;enable&gt;</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after rebooting; The configuration is saved automatically.

**Parameter**

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

**Example**

```

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

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

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

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

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

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

+CPIN: READY
```

# 6 Network Service Commands

## 6.1. AT+CREG Network Registration Status

The Write Command controls the presentation of an unsolicited result code **+CREG: <stat>** when **<n>=1** and there is a change in the MT's circuit mode network registration status in GERAN/E-UTRAN, or unsolicited result code **+CREG: <stat>[,<lac>],[<ci>],[<AcT>]]** when **<n>=2** and there is a change of the network cell in GERAN/E-UTRAN.

<b>AT+CREG Network Registration Status</b>	
Test Command <b>AT+CREG=?</b>	Response <b>+CREG: (list of supported &lt;n&gt;s)</b>  <b>OK</b>
Read Command <b>AT+CREG?</b>	Response <b>+CREG: &lt;n&gt;,&lt;stat&gt;[,&lt;lac&gt;,&lt;ci&gt;[,&lt;AcT&gt;]]</b>  <b>OK</b>
Write Command <b>AT+CREG[=&lt;n&gt;]</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with <b>AT&amp;W</b> .
Reference	<i>3GPP TS 27.007</i>

### Parameter

<b>&lt;n&gt;</b>	Integer type.
0	Disable network registration unsolicited result code
1	Enable network registration unsolicited result code: <b>+CREG:&lt;stat&gt;</b>
2	Enable network registration and location information unsolicited result code: <b>+CREG: &lt;stat&gt;[,&lt;lac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;]]</b>

<b>&lt;stat&gt;</b>	Integer type. Circuit mode registration status.
0	Not registered. MT is not currently searching an operator to register to
1	Registered, home network
2	Not registered, but MT is currently trying to attach the network or searching an operator to register to
3	Registration denied
4	Unknown
5	Registered, roaming
<b>&lt;lac&gt;</b>	String type. Two-byte location area code in hexadecimal format.
<b>&lt;ci&gt;</b>	String type. Four-byte GERAN/E-UTRAN cell ID in hexadecimal format.
<b>&lt;AcT&gt;</b>	Integer type. Access technology of the serving cell.
0	GSM
8	eMTC
9	NB-IoT
14	IoT-NTN

## 6.2. AT+COPS Operator Selection

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

The Test Command returns a set of five parameters, each representing an operator presenting in the network. The set consists of an integer indicating the availability of the operator **<stat>**, long and short alphanumeric format of the name of the operator, numeric format representation of the operator and access technology. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in the order of: home network, networks referenced in (U)SIM and other networks.

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

The Write Command forces an attempt to select and register the GSM/LTE and IoT-NTN network operator. If the selected operator is not available, no other operator shall be selected (except **<mode>=4**). The format of selected operator name shall apply to further Read Commands (**AT+COPS?**).

AT+COPS Operator Selection	
Test Command <b>AT+COPS=?</b>	Response <b>+COPS:</b> [(list of supported <b>&lt;stat&gt;</b> s,long alphanumeric <b>&lt;oper&gt;</b> s,short alphanumeric <b>&lt;oper&gt;</b> ,numeric <b>&lt;oper&gt;</b> ],[ <b>&lt;Act&gt;</b> ]s][,,(list of supported <b>&lt;mode&gt;</b> s),(list of supported <b>&lt;format&gt;</b> s)]  <b>OK</b>

	<p>If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b></p> <p>If there is any other error: <b>ERROR</b></p>
<p>Read Command <b>AT+COPS?</b></p>	<p>Response <b>+COPS: &lt;mode&gt;[,&lt;format&gt;[,&lt;oper&gt;][,&lt;Act&gt;]]</b></p> <p><b>OK</b></p> <p>If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b></p>
<p>Write Command <b>AT+COPS=&lt;mode&gt;[,&lt;format&gt;[,&lt;oper&gt;[,&lt;Act&gt;]]]</b></p>	<p>Response <b>OK</b></p> <p>If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b></p>
Maximum Response Time	180 s, determined by the network.
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference	<i>3GPP TS 27.007</i>

**Parameter**

<b>&lt;stat&gt;</b>	Integer type.
0	Unknown
1	Operator available
2	Current operator
3	Operator forbidden
<b>&lt;oper&gt;</b>	String type. Operator in format as per <b>&lt;mode&gt;</b>
<b>&lt;mode&gt;</b>	Integer type.
0	Automatic mode. <b>&lt;oper&gt;</b> field can be ignored.
1	Manual operator selection. <b>&lt;oper&gt;</b> field shall be presented and <b>&lt;Act&gt;</b> optionally.
2	Manual deregister from network.
3	Set only <b>&lt;format&gt;</b> (for <b>AT+COPS?</b> Read Command), and do not attempt to register/deregister ( <b>&lt;oper&gt;</b> and <b>&lt;Act&gt;</b> fields are ignored). This value is invalid in the response of the Read Command.
4	Manual/automatic selection. <b>&lt;oper&gt;</b> field shall be presented. If manual selection fails, automatic mode ( <b>&lt;mode&gt;=0</b> ) is entered.
<b>&lt;format&gt;</b>	Integer type.
0	Long format alphanumeric <b>&lt;oper&gt;</b> which can be up to 16 characters.
1	Short format alphanumeric <b>&lt;oper&gt;</b>

	2	Numeric <b>&lt;oper&gt;</b> . GSM location area identification number.
<b>&lt;Act&gt;</b>		Integer type. Access technology selected.
	0	GSM
	8	eMTC
	9	NB-IoT
	14	IoT-NTN
<b>&lt;err&gt;</b>		Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

**Example**

```

AT+COPS=? //List all current network operators
+COPS: (3,"CHN-UNICOM","UNICOM",46001,0),(3,"CHINA MOBILE","CMCC",46000,0),(1,"CH
N-CT","CT",46011,9),(0,1,2,3,4),(0,1,2)

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

OK
    
```

**6.3. AT+CSQ Signal Quality Report**

The Execution Command returns the received signal strength indication **<rss>** and the channel bit error rate **<ber>** from the ME.

AT+CSQ Signal Quality Report	
Test Command <b>AT+CSQ=?</b>	Response <b>+CSQ: (list of supported &lt;rss&gt;s),(list of supported &lt;ber&gt;s)</b>  <b>OK</b>
Execution Command <b>AT+CSQ</b>	Response <b>+CSQ: &lt;rss&gt;,&lt;ber&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	-
Reference	3GPP TS 27.007

**Parameter**

<b>&lt;rsqi&gt;</b>	Integer type. Received signal strength level.
0	-113 dBm or less
1	-111 dBm
2–30	-109 to -53 dBm
31	-51 dBm or greater
99	Not known or not detectable
<b>&lt;ber&gt;</b>	Integer type. Channel bit error rate (in percent)
0–7	As RxQual values in the table in <i>3GPP TS 45.008 subclause 8.2.4</i>
99	Not known or not detectable
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

**Example**

```

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

OK
AT+CSQ
+CSQ: 28,99 //The current signal strength indication is 28 (-57 dBm) and channel bit error
rate is 99 (not known or not detectable).

OK
    
```

**NOTE**

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

**6.4. AT+CPOL Preferred Operator List**

This command edits and queries the list of preferred operators.

<b>AT+CPOL Preferred Operator List</b>	
Test Command <b>AT+CPOL=?</b>	Response <b>+CPOL:</b> (list of supported <b>&lt;index&gt;s</b> ),(list of supported <b>&lt;format&gt;s</b> )  <b>OK</b>
Read Command <b>AT+CPOL?</b>	Response <b>[+CPOL:</b> <b>&lt;index&gt;</b> , <b>&lt;format&gt;</b> , <b>&lt;oper&gt;</b> ][, <b>&lt;GSM&gt;</b> ], <b>&lt;GSM_comp</b>

	<p>act,&lt;UTRAN&gt;,&lt;E-UTRAN&gt;                  [+CPOL: &lt;index&gt;,&lt;format&gt;,&lt;oper&gt;[,&lt;GSM&gt;,&lt;GSM_compact&gt;,&lt;UTRAN&gt;,&lt;E-UTRAN&gt;]                  [...]]</p> <p><b>OK</b></p>
<p>Write Command  <b>AT+CPOL=&lt;index&gt;[,&lt;format&gt;[,&lt;oper&gt;[&lt;GSM&gt;,&lt;GSM_compact&gt;,&lt;UTRAN&gt;,&lt;E-UTRAN&gt;]]]</b></p>	<p>Response</p> <p>If all parameters after &lt;index&gt; are omitted, delete the specified entry:  <b>OK</b></p> <p>If specified all parameters, edit the list of preferred operators:  <b>OK</b></p> <p>If there is an error related to ME functionality:  <b>+CME ERROR: &lt;err&gt;</b></p> <p>If there is any other error:  <b>ERROR</b></p>
Maximum Response Time	300 ms
Characteristics	-
Reference	3GPP TS 27.007

**Parameter**

<index>	Integer type. The order number of operator in the (U)SIM preferred operator list.
<format>	Integer type. Format of operator name. 0 Long format alphanumeric <oper> 1 Short format alphanumeric <oper> 2 Numeric <oper>
<oper>	String type. Operation name. <format> indicates the format is alphanumeric or numeric (see <b>AT+COPS</b> )
<GSM>	Integer type. GSM access technology. 0 Access technology is not selected 1 Access technology is selected
<GSM_compact>	Integer type. GSM compact access technology. 0 Access technology is not selected 1 Access technology is selected
<UTRAN>	Integer type. UTRAN access technology. 0 Access technology is not selected 1 Access technology is selected

<b>&lt;E-UTRAN&gt;</b>	Integer type. E-UTRAN access technology
0	Access technology is not selected
1	Access technology is selected

**NOTE**

1. The access technology selection parameters **<GSM>**, **<GSM\_compact>**, **<UTRAN>** and **<E-UTRAN>** are required for SIM cards or UICCs containing PLMN selector with access technology.
2. The parameter **<UTRAN>** is invalid.

### 6.5. AT+COPN Read Operator Names

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

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

#### Parameter

<b>&lt;numericn&gt;</b>	String type. Operator in numeric format (see <b>AT+COPS</b> ).
<b>&lt;alphan&gt;</b>	String type. Operator in long alphanumeric format (see <b>AT+COPS</b> ).
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

## 6.6. AT+CTZU Automatic Time Zone Update

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

<b>AT+CTZU Automatic Time Zone Update</b>	
Test Command <b>AT+CTZU=?</b>	Response <b>+CTZU:</b> (list of supported <onoff>s)  <b>OK</b>
Read Command <b>AT+CTZU?</b>	Response <b>+CTZU:</b> <onoff>  <b>OK</b>
Write Command <b>AT+CTZU=&lt;onoff&gt;</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference	3GPP TS 27.007

### Parameter

<b>&lt;onoff&gt;</b>	Integer type. The mode of automatic time zone update.
0	Disable automatic time zone update via NITZ
<u>1</u>	Enable automatic time zone update via NITZ
3	Enable automatic time zone update via NITZ and update LOCAL time to RTC

### Example

```

AT+CTZU?
+CTZU: 0

OK
AT+CTZU=?
+CTZU: (0,1,3)

OK
AT+CTZU=1
OK
    
```

AT+CTZU?

+CTZU: 1

OK

## 6.7. AT+CPSMS Power Saving Mode Setting

This command controls the setting of the UE's Power Saving Mode (PSM) parameters.

### AT+CPSMS Power Saving Mode Setting

Test Command <b>AT+CPSMS=?</b>	Response <b>+CPSMS:</b> (list of supported <mode>s),(list of supported <Requested_Periodic-RAU>s),(list of supported <Requested_GPRS-READY-timer>s),(list of supported <Requested_Periodic-TAU>s),(list of supported <Requested_Active-Time>s)  <b>OK</b>
Read Command <b>AT+CPSMS?</b>	Response <b>+CPSMS:</b> <mode>,[<Requested_Periodic-RAU>],[<Requested_GPRS-READY-timer>],[<Requested_Periodic-TAU>],[<Requested_Active-Time>]  <b>OK</b>
Write Command <b>AT+CPSMS=[&lt;mode&gt;],[&lt;Requested_Periodic-RAU&gt;],[&lt;Requested_GPRS-READY-timer&gt;],[&lt;Requested_Periodic-TAU&gt;],[&lt;Requested_Active-Time&gt;]]]]]</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference <i>3GPP TS 27.007</i>	

### Parameter

<mode>	Integer type. Disable or enable the use of PSM in the UE. 0 Disable the use of PSM 1 Enable the use of PSM
--------	--

- <Requested\_Periodic-RAU>** String type. One byte in an 8-bit format. Requested extended periodic RAU value (T3312) to be allocated to the UE in GERAN.  
 (e.g. "01000111" equals 70 hours)  
 Bits 5 to 1 represent the binary coded timer value.  
 Bits 6 to 8 define the timer value unit as follows:  
**Bits 8 7 6**  
 0 0 0 value is incremented in multiples of 10 minutes  
 0 0 1 value is incremented in multiples of 1 hour  
 0 1 0 value is incremented in multiples of 10 hours  
 0 1 1 value is incremented in multiples of 2 seconds  
 1 0 0 value is incremented in multiples of 30 seconds  
 1 0 1 value is incremented in multiples of 1 minute
- <Requested\_GPRS-READY-timer>** String type. One byte in an 8-bit format. Requested GPRS READY timer value (T3314) to be allocated to the UE in GERAN.  
 (e.g. "01001010" equals 1 hours)  
 Bits 5 to 1 represent the binary coded timer value.  
 Bits 6 to 8 define the timer value unit as follows:  
**Bits 8 7 6**  
 0 0 0 value is incremented in multiples of 2 seconds  
 0 0 1 value is incremented in multiples of 1 minute  
 0 1 0 value is incremented in multiples of decihours  
 1 1 1 value indicates that the timer is deactivated
- <Requested\_Periodic-TAU>** String type. One byte in an 8-bit format. Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN.  
 (e.g. "00001010" equals 100 minutes)  
 Bits 5 to 1 represent the binary coded timer value.  
 Bits 6 to 8 define the timer value unit as follows:  
**Bits 8 7 6**  
 0 0 0 value is incremented in multiples of 10 minutes  
 0 0 1 value is incremented in multiples of 1 hour  
 0 1 0 value is incremented in multiples of 10 hours  
 0 1 1 value is incremented in multiples of 2 seconds  
 1 0 0 value is incremented in multiples of 30 seconds  
 1 0 1 value is incremented in multiples of 1 minute
- <Requested\_Active-Time>** String type. One byte in an 8-bit format. Requested Active Time value (T3324) to be allocated to the UE.  
 (e.g. "00001111" equals 30 seconds)  
 Bits 5 to 1 represent the binary coded timer value.  
 Bits 6 to 8 define the timer value unit as follows:  
**Bits 8 7 6**  
 0 0 0 value is incremented in multiples of 2 seconds  
 0 0 1 value is incremented in multiples of 1 minute  
 0 1 0 value is incremented in multiples of decihours  
 1 1 1 value indicates that the timer is deactivated.

**Example**

```
AT+CPSMS=1,,,"0000100","00001111" //Set the requested T3412 value to 40 minutes, and set the
requested T3324 value to 30 seconds.
OK
```

**6.8. AT+QPSMS Power Saving Mode Setting**

Quectel extended AT command for PSM setting. The Write Command controls the setting of the module's Power Saving Mode (PSM) parameters. It is similar with **AT+CPSMS**.

**AT+QPSMS Power Saving Mode Setting**

Test Command <b>AT+QPSMS=?</b>	Response <b>+QPSMS:</b> (list of supported <mode>s),(list of supported <Requested_Periodic-RAU>s),(list of supported <Requested_GPRS-READY-timer>s),(list of supported <Requested_Periodic-TAU>s),(list of supported <Requested_Active-Time>s)  <b>OK</b>
Read Command <b>AT+QPSMS?</b>	Response <b>+QPSMS:</b> <mode>,[<Network_Periodic-RAU>],[<Network_GPRS-READY-timer>],[<Network_Periodic-TAU>],[<Network_Active-Time>]  <b>OK</b>
Write Command <b>AT+QPSMS=[&lt;mode&gt;],[&lt;Requested_Periodic-RAU&gt;],[&lt;Requested_GPRS-READY-timer&gt;],[&lt;Requested_Periodic-TAU&gt;],[&lt;Requested_Active-Time&gt;]]]]]</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

**Parameter**

<mode>	Integer type. Disable or enable the use of PSM in the UE. <u>0</u> Disable the use of PSM 1 Enable the use of PSM
--------	---

<b>&lt;Requested_Periodic-RAU&gt;</b>	<p>String type. One byte in an 8-bit format. Requested extended periodic RAU value (T3312) to be allocated to the UE in GERAN. (e.g. "01000111" equals 70 hours)</p> <p>Bits 5 to 1 represent the binary coded timer value.</p> <p>Bits 6 to 8 define the timer value unit as follows:</p> <p><b>Bits 8 7 6</b></p> <ul style="list-style-type: none"> <li>0 0 0 value is incremented in multiples of 10 minutes</li> <li>0 0 1 value is incremented in multiples of 1 hour</li> <li>0 1 0 value is incremented in multiples of 10 hours</li> <li>0 1 1 value is incremented in multiples of 2 seconds</li> <li>1 0 0 value is incremented in multiples of 30 seconds</li> <li>1 0 1 value is incremented in multiples of 1 minute</li> </ul>
<b>&lt;Requested_GPRS-READY-timer&gt;</b>	<p>String type. One byte in an 8-bit format. Requested GPRS READY timer value (T3314) to be allocated to the UE in GERAN. (e.g. "01001010" equals 1 hours)</p> <p>Bits 5 to 1 represent the binary coded timer value.</p> <p>Bits 6 to 8 define the timer value unit as follows:</p> <p><b>Bits 8 7 6</b></p> <ul style="list-style-type: none"> <li>0 0 0 value is incremented in multiples of 2 seconds</li> <li>0 0 1 value is incremented in multiples of 1 minute</li> <li>0 1 0 value is incremented in multiples of decihours</li> <li>1 1 1 value indicates that the timer is deactivated.</li> </ul>
<b>&lt;Requested_Periodic-TAU&gt;</b>	<p>String type. One byte in an 8-bit format. Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN. (e.g. "00001010" equals 100 minutes)</p> <p>Bits 5 to 1 represent the binary coded timer value.</p> <p>Bits 6 to 8 define the timer value unit as follows:</p> <p><b>Bits 8 7 6</b></p> <ul style="list-style-type: none"> <li>0 0 0 value is incremented in multiples of 10 minutes</li> <li>0 0 1 value is incremented in multiples of 1 hour</li> <li>0 1 0 value is incremented in multiples of 10 hours</li> <li>0 1 1 value is incremented in multiples of 2 seconds</li> <li>1 0 0 value is incremented in multiples of 30 seconds</li> <li>1 0 1 value is incremented in multiples of 1 minute</li> </ul>
<b>&lt;Requested_Active-Time&gt;</b>	<p>String type. One byte in an 8-bit format. Requested Active Time value (T3324) to be allocated to the UE. (e.g. "00001111" equals 1 minute)</p> <p>Bits 5 to 1 represent the binary coded timer value.</p> <p>Bits 6 to 8 define the timer value unit as follows:</p> <p><b>Bits 8 7 6</b></p> <ul style="list-style-type: none"> <li>0 0 0 value is incremented in multiples of 2 seconds</li> <li>0 0 1 value is incremented in multiples of 1 minute</li> <li>0 1 0 value is incremented in multiples of decihours</li> <li>1 1 1 value indicates that the timer is deactivated.</li> </ul>

<Network_Periodic-RAU>	Integer type. Extended periodic RAU value (T3312) to be allocated to the UE in GERAN, and the value is specified by network.
<Network_GPRS-READY-timer>	Integer type. GPRS READY timer value (T3314) to be allocated to the UE in GERAN, and the value is specified by network.
<Network_Periodic-TAU>	Integer type. Extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN, and the value is specified by network.
<Network_Active-Time>	Integer type. Active timer value (T3324) to be allocated to the UE in E-UTRAN, and the value is specified by network.

**NOTE**

**AT+QPSMS?** can read the timer value only after the value is allocated by the network. If the value is not allocated by the network, **+QPSMS: 1,,,** will be returned.

**Example**

```

AT+QPSMS=1,,"0000100","00001111" //Set the requested T3412 value to 40 minutes, and set the
                                     requested T3324 value to 30 seconds.
OK
AT+QPSMS? //Query the PSM mode and the periodic-TAU and active
                                     time specified by the network.
+QPSMS: 1,,"86400", "2"
OK
    
```

**6.9. AT+QPSMCFG PSM Feature and Minimum Threshold Value Setting**

This command sets NV#73769 (PSM configuration) parameters. You can use this AT command to enable or disable PSM function and set the minimum threshold value to enter PSM.

<b>AT+QPSMCFG PSM Feature and Minimum Threshold Value Setting</b>	
Test Command <b>AT+QPSMCFG=?</b>	Response <b>+QPSMCFG:</b> (list of supported <threshold>s),(list of supported <PSM_version>s)  <b>OK</b>
Read Command	Response

AT+QPSMCFG?	+QPSMCFG: <threshold>,<PSM_version>  OK
Write Command AT+QPSMCFG=[<threshold>[,<PSM_version>]]	Response OK  If there is any other error: ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.

**Parameter**

<threshold>	Integer type. Minimum threshold value to enter PSM. Range: 20–4294967295. Unit: second.
<PSM_version>	Integer type. Bitmask to indicate PSM modes (1: Enable; 0: Disable). Each bit is configured independently. Range: 0–15. Default value: 4. Bit 0 – PSM without network coordination Bit 1 – Rel-12 PSM without context retention Bit 2 – Rel-12 PSM with context retention Bit 3 – PSM in between eDRX cycles

**Example**

```
AT+QPSMCFG=100 //Set the threshold to 100 seconds.
OK
AT+QPSMCFG? //Query the threshold value and PSM mode.
+QPSMCFG: 100,5
OK
```

**6.10. AT+QPSMEXTCFG Modem Optimization**

This command configures PSM, and it is mainly used to set extended parameters for modem optimizations.

**AT+QPSMEXTCFG Modem Optimization**

Test Command AT+QPSMEXTCFG=?	Response +QPSMEXTCFG: (list of supported <PSM_opt_mask>s),(list of supported <max_oos_full_scans>s),(list of supported
---------------------------------	---

	<p>&lt;PSM_duration_due_to_oos&gt;s),(list of supported &lt;PSM_randomization_window&gt;s),(list of supported &lt;max_oos_time&gt;s),(list of supported &lt;eMTC_early_wakeup_time&gt;s)</p> <p><b>OK</b></p>
<p>Write Command  <b>AT+QPSMEXTCFG=[&lt;PSM_opt_mask&gt;[,&lt;max_oos_full_scans&gt;[,&lt;PSM_duration_due_to_oos&gt;[,&lt;PSM_randomization_window&gt;[,&lt;max_oos_time&gt;[,&lt;eMTC_early_wakeup_time&gt;]]]]]]</b></p>	<p>Response</p> <p><b>OK</b></p> <p>If there is any other error:</p> <p><b>ERROR</b></p>
<p>Read Command  <b>AT+QPSMEXTCFG?</b></p>	<p>Response</p> <p><b>+QPSMEXTCFG: &lt;PSM_opt_mask&gt;,&lt;max_oos_full_scans&gt;,&lt;PSM_duration_due_to_oos&gt;,&lt;PSM_randomization_window&gt;,&lt;max_oos_time&gt;,&lt;eMTC_early_wakeup_time&gt;</b></p> <p><b>OK</b></p>
Maximum Response Time	300 ms
Characteristics	<p>The command takes effect immediately.</p> <p>The configuration is saved automatically.</p>

**Parameter**

<b>&lt;PSM_opt_mask&gt;</b>	<p>Integer type. Range: 0–15. Default value: 14.</p> <p>1<sup>st</sup> bit of the parameter is used to enable/disable (0: disable; 1: enable) PSM ENTER request without sending PSM_READY_REQ to NAS. This is a quick PSM operation.</p> <p>2<sup>nd</sup> bit of the parameter is used to enable/disable (0: disable; 1: enable) Out of Service (OoS) status indication from Modem to AP.</p> <p>3<sup>rd</sup> bit of the parameter is used to enable/disable (0: disable; 1: enable) limited service status indication from Modem to AP.</p> <p>4<sup>th</sup> bit the parameter is used to enable/disable (0: disable; 1: enable) deep-sleep mode if PSM cycle is less than the threshold value. If enabled, the device will be in deep-sleep mode before it enters PSM because of reaching the threshold value.</p>
<b>&lt;max_oos_full_scans&gt;</b>	<p>Integer type. Maximum number of full scans to wait before modem declares SYS_PSM_STATUS_OOS to clients. Range: 1–100. Default value: 2.</p>
<b>&lt;PSM_duration_due_to_oos&gt;</b>	<p>Integer type. PSM cycle used by PSM daemon upon OOS/Limited Service indication, due to service outage. Range: 2*<b>&lt;threshold&gt;</b>–2147483647. Default value: 120. Unit: second.</p>

<PSM_randomization_window>	Integer type. PSM wakeup randomization window to avoid network congestion due to all the PSM devices waking up at the same time. Range: 1–1000. Default value: 5. Unit: second.
<max_oos_time>	Integer type. Maximum time in seconds to wait before declaring SYS_PSM_STATUS_OOS to clients. Range: 60–65535. Default value: 120. Unit: second.
<eMTC_early_wakeup_time>	Integer type. Device wakes up early to account for boot-up and acquisition delay. While programming PMIC, PSM daemon reduces PSM cycle by this duration. Range: 1–1000. Default value: 3. Unit: second.

**NOTE**

If there is no SIM card inserted in the module, the PSM function cannot be supported.

**Example**

```
AT+QPSMEXTCFG=14,2,120
OK
AT+QPSMEXTCFG?
+QPSMEXTCFG: 14,2,120,5,120,3
OK
```

**6.11. AT+CEDRXS e-I-DRX Setting**

This command controls the setting of the UE’s e-I-DRX (extended Idle-mode DRX) parameters.

<b>AT+CEDRXS e-I-DRX Setting</b>	
Test Command <b>AT+CEDRXS=?</b>	Response <b>+CEDRXS:</b> (list of supported <mode>s),(list of supported <AcT-type>s),(list of supported <Requested_eDRX_value>s)  <b>OK</b>
Write Command <b>AT+CEDRXS=&lt;mode&gt;[,&lt;AcT-type&gt;[,&lt;Requested_eDRX_value&gt;]]</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>

Read Command <b>AT+CEDRXS?</b>	Response <b>[+CEDRXS: &lt;AcT-type&gt;,&lt;Requested_eDRX_value&gt; [+CEDRXS: &lt;AcT-type&gt;,&lt;Requested_eDRX_value&gt; [...]]]</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.007	

**Parameter**

<b>&lt;mode&gt;</b>	Integer type. Disable or enable the use of e-I-DRX in the UE.
0	Disable the use of e-I-DRX
1	Enable the use of e-I-DRX
2	Enable the use of e-I-DRX and enable the unsolicited result code <b>+CEDRXP: &lt;AcT-type&gt;[,&lt;Requested_eDRX_value&gt;[,&lt;NW-provided_eDRX_value&gt;[,&lt;Paging_time_window&gt;]]]</b>
3	Disable the use of e-I-DRX and discard all parameters for e-I-DRX or, reset to the default values
<b>&lt;AcT-type&gt;</b>	Integer type. The type of access technology.
0	Access technology is not using eDRX. This parameter value is only used in the unsolicited result code
4	eMTC
5	NB-IoT
6	IoT-NTN
<b>&lt;Requested_eDRX_value&gt;</b>	String type. Half a byte in a 4-bit format.
	<b>Bit</b>
	4    3    2    1    E-UTRAN e-I-DRX cycle length duration
	0    0    0    0    5.12 seconds
	0    0    0    1    10.24 seconds
	0    0    1    0    20.48 seconds
	0    0    1    1    40.96 seconds
	0    1    0    0    61.44 seconds
	0    1    0    1    81.92 seconds
	0    1    1    0    102.4 seconds
	0    1    1    1    122.88 seconds
	1    0    0    0    143.36 seconds
	1    0    0    1    163.84 seconds
	1    0    1    0    327.68 seconds
	1    0    1    1    655,36 seconds

	1	1	0	0	1310.72 seconds
	1	1	0	1	2621.44 seconds
	1	1	1	0	5242.88 seconds
	1	1	1	1	10485.76 seconds
<b>&lt;NW-provided_eDRX_value&gt;</b>	String type. Half a byte in a 4-bit format.				
	<b>Bit</b>				
	4	3	2	1	E-UTRAN e-I-DRX cycle length duration
	0	0	0	0	5.12 seconds
	0	0	0	1	10.24 seconds
	0	0	1	0	20.48 seconds
	0	0	1	1	40.96 seconds
	0	1	0	0	61.44 seconds
	0	1	0	1	81.92 seconds
	0	1	1	0	102.4 seconds
	0	1	1	1	122.88 seconds
	1	0	0	0	143.36 seconds
	1	0	0	1	163.84 seconds
	1	0	1	0	327.68 seconds
	1	0	1	1	655,36 seconds
	1	1	0	0	1310.72 seconds
	1	1	0	1	2621.44 seconds
	1	1	1	0	5242.88 seconds
	1	1	1	1	10485.76 seconds

<b>&lt;Paging_time_window&gt;</b>	String type. Half a byte in a 4-bit format.				
	eMTC mode				
	<b>Bit</b>				
	4	3	2	1	Paging Time Window length
	0	0	0	0	1.28 seconds
	0	0	0	1	2.56 seconds
	0	0	1	0	3.84 seconds
	0	0	1	1	5.12 seconds
	0	1	0	0	6.4 seconds
	0	1	0	1	7.68 seconds
	0	1	1	0	8.96 seconds
	0	1	1	1	10.24 seconds
	1	0	0	0	11.52 seconds
	1	0	0	1	12.8 seconds
	1	0	1	0	14.08 seconds
	1	0	1	1	15.36 seconds
	1	1	0	0	16.64 seconds
	1	1	0	1	17.92 seconds
	1	1	1	0	19.20 seconds
	1	1	1	1	20.48 seconds
	NB-IoT mode				

Bit				
4	3	2	1	Paging Time Window length
0	0	0	0	2.56 seconds
0	0	0	1	5.12 seconds
0	0	1	0	7.68 seconds
0	0	1	1	10.24 seconds
0	1	0	0	12.8 seconds
0	1	0	1	15.36 seconds
0	1	1	0	17.92 seconds
0	1	1	1	20.48 seconds
1	0	0	0	23.04 seconds
1	0	0	1	25.6 seconds
1	0	1	0	28.16 seconds
1	0	1	1	30.72 seconds
1	1	0	0	33.28 seconds
1	1	0	1	35.84 seconds
1	1	1	0	38.4 seconds
1	1	1	1	40.96 seconds

IoT-NTN mode

Bit				
4	3	2	1	Paging Time Window length
0	0	0	0	2.56 seconds
0	0	0	1	5.12 seconds
0	0	1	0	7.68 seconds
0	0	1	1	10.24 seconds
0	1	0	0	12.8 seconds
0	1	0	1	15.36 seconds
0	1	1	0	17.92 seconds
0	1	1	1	20.48 seconds
1	0	0	0	23.04 seconds
1	0	0	1	25.6 seconds
1	0	1	0	28.16 seconds
1	0	1	1	30.72 seconds
1	1	0	0	33.28 seconds
1	1	0	1	35.84 seconds
1	1	1	0	38.4 seconds
1	1	1	1	40.96 seconds

**Example**

```
AT+CEDRXS=1,5,"0000" //Set the requested e-I-DRX value to 5.12 seconds.
OK
```

## 6.12. AT+QPTWEDRXS Paging Time Window Value and eDRX Setting

This command controls the setting of the UE's paging time window (PTW) value and eDRX parameters, and whether the UE wants to apply PTW and eDRX or not, as well as the requested PTW and eDRX cycle for each specified type of access technology.

It also controls the presentation of the URC **+QPTWEDRXP: <AcT-type>[,<Requested\_paging\_time\_window>[,<Requested\_eDRX\_value>[,<NW-provided\_eDRX\_value>[,<Paging\_time\_window>]]]]** when **<mode>=2** and there is a change in the paging time window and eDRX parameters provided by the network.

A special form of the command can be given as **AT+QPTWEDRXS=3**. In this form, paging time window and eDRX will be disabled and data for all parameters in **AT+QPTWEDRXS** will be removed or, if available, set to the default values.

The Read Command returns the current settings for each defined value of **<AcT-type>**.

The Test Command returns the supported **<mode>**s and the value ranges for the access technology and the requested paging time window and requested eDRX value as compound values.

### AT+QPTWEDRXS Paging Time Window Value and eDRX Setting

<p>Test Command <b>AT+QPTWEDRXS=?</b></p>	<p>Response <b>+QPTWEDRXS:</b> (list of supported <b>&lt;mode&gt;</b>s),(list of supported <b>&lt;AcT-type&gt;</b>s),(list of supported <b>&lt;Requested_paging_time_window&gt;</b>s),(list of supported <b>&lt;Requested_eDRX_value&gt;</b>s)  <b>OK</b></p>
<p>Read Command <b>AT+QPTWEDRXS?</b></p>	<p>Response <b>+QPTWEDRXS:</b> <b>&lt;AcT-type&gt;</b>,<b>&lt;Requested_paging_time_window&gt;</b>,<b>&lt;Requested_eDRX_value&gt;</b>[,<b>&lt;NW-provided_eDRX_value&gt;</b>][,<b>&lt;Paging_time_window&gt;</b>]  <b>OK</b>  If there is any error: <b>+CME ERROR:&lt;err&gt;</b>  If there is any other error: <b>ERROR</b></p>
<p>Write Command <b>AT+QPTWEDRXS=&lt;mode&gt;[,&lt;AcT-type&gt;[,&lt;Requested_paging_time_window</b></p>	<p>Response <b>OK</b></p>

>[,<Requested_eDRX_value>]]]	<p>If there is any error: <b>+CME ERROR:&lt;err&gt;</b></p> <p>If there is any other error: <b>ERROR</b></p>
Maximum Response Time	300 ms
Characteristics	<p>The command takes effect immediately.</p> <p>The configuration is saved automatically.</p>
Reference	

**Parameter**

<b>&lt;mode&gt;</b>	<p>Integer type. Indicates to disable or enable the use of requested paging time window and eDRX in the UE. This parameter is applicable to all specified types of access technology, i.e. the most recent setting of <b>&lt;mode&gt;</b> will take effect for all specified values of <b>&lt;AcT&gt;</b> returned by <b>AT+QNWINFO</b>.</p> <p>0 Disable the use of requested paging time window and eDRX</p> <p>1 Enable the use of requested paging time window and eDRX</p> <p>2 Enable the use of requested paging time window and eDRX, and enable the URC: <b>+QPTWEDRXP: &lt;AcT-type&gt;[,&lt;Requested_paging_time_window&gt;[,&lt;Requested_eDRX_value&gt;[,&lt;NW-provided_eDRX_value&gt;[,&lt;Paging_time_window&gt;]]]]]</b></p> <p>3 Disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the default values.</p>														
<b>&lt;AcT-type&gt;</b>	<p>Integer type. Indicates the type of access technology. This AT command is used to specify the relationship between the type of access technology and the requested eDRX value.</p> <p>0 Access technology is not using eDRX. This parameter value is only used in the unsolicited result code.</p> <p>4 eMTC</p> <p>5 NB-IoT</p> <p>6 IoT-NTN</p>														
<b>&lt;Requested_paging_time_window&gt;</b>	<p>String type. Half a byte in a 4-bit format.</p> <p>eMTC mode</p> <table border="1"> <thead> <tr> <th>Bit</th> <th></th> </tr> </thead> <tbody> <tr> <td>4 3 2 1</td> <td>Paging Time Window length</td> </tr> <tr> <td>0 0 0 0</td> <td>1.28 seconds</td> </tr> <tr> <td>0 0 0 1</td> <td>2.56 seconds</td> </tr> <tr> <td>0 0 1 0</td> <td>3.84 seconds</td> </tr> <tr> <td>0 0 1 1</td> <td>5.12 seconds</td> </tr> <tr> <td>0 1 0 0</td> <td>6.4 seconds</td> </tr> </tbody> </table>	Bit		4 3 2 1	Paging Time Window length	0 0 0 0	1.28 seconds	0 0 0 1	2.56 seconds	0 0 1 0	3.84 seconds	0 0 1 1	5.12 seconds	0 1 0 0	6.4 seconds
Bit															
4 3 2 1	Paging Time Window length														
0 0 0 0	1.28 seconds														
0 0 0 1	2.56 seconds														
0 0 1 0	3.84 seconds														
0 0 1 1	5.12 seconds														
0 1 0 0	6.4 seconds														

0 1 0 1	7.68 seconds
0 1 1 0	8.96 seconds
0 1 1 1	10.24 seconds
1 0 0 0	11.52 seconds
1 0 0 1	12.8 seconds
1 0 1 0	14.08 seconds
1 0 1 1	15.36 seconds
1 1 0 0	16.64 seconds
1 1 0 1	17.92 seconds
1 1 1 0	19.20 seconds
1 1 1 1	20.48 seconds

## NB-IoT mode

**Bit**

4 3 2 1	Paging Time Window length
0 0 0 0	2.56 seconds
0 0 0 1	5.12 seconds
0 0 1 0	7.68 seconds
0 0 1 1	10.24 seconds
0 1 0 0	12.8 seconds
0 1 0 1	15.36 seconds
0 1 1 0	17.92 seconds
0 1 1 1	20.48 seconds
1 0 0 0	23.04 seconds
1 0 0 1	25.6 seconds
1 0 1 0	28.16 seconds
1 0 1 1	30.72 seconds
1 1 0 0	33.28 seconds
1 1 0 1	35.84 seconds
1 1 1 0	38.4 seconds
1 1 1 1	40.96 seconds

## IoT-NTN mode

**Bit**

4 3 2 1	Paging Time Window length
0 0 0 0	2.56 seconds
0 0 0 1	5.12 seconds
0 0 1 0	7.68 seconds
0 0 1 1	10.24 seconds
0 1 0 0	12.8 seconds
0 1 0 1	15.36 seconds
0 1 1 0	17.92 seconds
0 1 1 1	20.48 seconds
1 0 0 0	23.04 seconds
1 0 0 1	25.6 seconds
1 0 1 0	28.16 seconds

---

1 0 1 1	30.72 seconds
1 1 0 0	33.28 seconds
1 1 0 1	35.84 seconds
1 1 1 0	38.4 seconds
1 1 1 1	40.96 seconds

**<Requested\_eDRX\_value>** String type. Half a byte in a 4-bit format.

**Bit**

4 3 2 1	E-UTRAN eDRX cycle length duration
0 0 0 0	5.12 seconds
0 0 0 1	10.24 seconds
0 0 1 0	20.48 seconds
0 0 1 1	40.96 seconds
0 1 0 0	61.44 seconds
0 1 0 1	81.92 seconds
0 1 1 0	102.4 seconds
0 1 1 1	122.88 seconds
1 0 0 0	143.36 seconds
1 0 0 1	163.84 seconds
1 0 1 0	327.68 seconds
1 0 1 1	655.36 seconds
1 1 0 0	1310.72 seconds
1 1 0 1	2621.44 seconds
1 1 1 0	5242.88 seconds
1 1 1 1	10485.76 seconds

**<NW-provided\_eDRX\_value>** String type. Half a byte in a 4-bit format.

**Bit**

4 3 2 1	E-UTRAN eDRX cycle length duration
0 0 0 0	5.12 seconds
0 0 0 1	10.24 seconds
0 0 1 0	20.48 seconds
0 0 1 1	40.96 seconds
0 1 0 0	61.44 seconds
0 1 0 1	81.92 seconds
0 1 1 0	102.4 seconds
0 1 1 1	122.88 seconds
1 0 0 0	143.36 seconds
1 0 0 1	163.84 seconds
1 0 1 0	327.68 seconds
1 0 1 1	655.36 seconds
1 1 0 0	1310.72 seconds
1 1 0 1	2621.44 seconds
1 1 1 0	5242.88 seconds
1 1 1 1	10485.76 seconds

**<Paging\_time\_window>** String type. Half a byte in a 4-bit format.

## eMTC mode

**Bit**

4 3 2 1	Paging Time Window length
0 0 0 0	1.28 seconds
0 0 0 1	2.56 seconds
0 0 1 0	3.84 seconds
0 0 1 1	5.12 seconds
0 1 0 0	6.4 seconds
0 1 0 1	7.68 seconds
0 1 1 0	8.96 seconds
0 1 1 1	10.24 seconds
1 0 0 0	11.52 seconds
1 0 0 1	12.8 seconds
1 0 1 0	14.08 seconds
1 0 1 1	15.36 seconds
1 1 0 0	16.64 seconds
1 1 0 1	17.92 seconds
1 1 1 0	19.20 seconds
1 1 1 1	20.48 seconds

## NB-IoT mode

**Bit**

4 3 2 1	Paging Time Window length
0 0 0 0	2.56 seconds
0 0 0 1	5.12 seconds
0 0 1 0	7.68 seconds
0 0 1 1	10.24 seconds
0 1 0 0	12.8 seconds
0 1 0 1	15.36 seconds
0 1 1 0	17.92 seconds
0 1 1 1	20.48 seconds
1 0 0 0	23.04 seconds
1 0 0 1	25.6 seconds
1 0 1 0	28.16 seconds
1 0 1 1	30.72 seconds
1 1 0 0	33.28 seconds
1 1 0 1	35.84 seconds
1 1 1 0	38.4 seconds
1 1 1 1	40.96 seconds

## IoT-NTN mode

**Bit**

4 3 2 1	Paging Time Window length
0 0 0 0	2.56 seconds
0 0 0 1	5.12 seconds
0 0 1 0	7.68 seconds

---

0 0 1 1	10.24 seconds
0 1 0 0	12.8 seconds
0 1 0 1	15.36 seconds
0 1 1 0	17.92 seconds
0 1 1 1	20.48 seconds
1 0 0 0	23.04 seconds
1 0 0 1	25.6 seconds
1 0 1 0	28.16 seconds
1 0 1 1	30.72 seconds
1 1 0 0	33.28 seconds
1 1 0 1	35.84 seconds
1 1 1 0	38.4 seconds
1 1 1 1	40.96 seconds

**<err>** Integer type. Error code. Refer to **Table 20** for possible **<err>** values.

### 6.13. AT+CEDRXRDP Read Dynamic Parameters

The Execution Command returns **<AcT-type>**, **<Requested\_eDRX\_value>**, **<NW-provided\_eDRX\_value>** and **<Paging\_time\_window>** if e-I-DRX is used for the cell that the MS is currently registered to.

AT+CEDRXRDP Read Dynamic Parameters	
Test Command <b>AT+CEDRXRDP=?</b>	Response <b>OK</b>
Execution Command <b>AT+CEDRXRDP</b>	Response <b>+CEDRXRDP: &lt;AcT-type&gt;[,&lt;Requested_eDRX_value&gt;[,&lt;NW-provided_eDRX_value&gt;[,&lt;Paging_time_window&gt;]]]</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-
Reference <i>3GPP TS 27.007</i>	

#### Parameter

<b>&lt;AcT-type&gt;</b>	Integer type. The type of access technology.
0	Access technology is not using eDRX
4	eMTC
5	NB-IoT
6	IoT-NTN

**<Requested\_eDRX\_value>** String type. Half a byte in a 4-bit format.

Bit				
4	3	2	1	E-UTRAN e-I-DRX cycle length duration
0	0	0	0	5.12 seconds
0	0	0	1	10.24 seconds
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	0	61.44 seconds
0	1	0	1	81.92 seconds
0	1	1	0	102.4 seconds
0	1	1	1	122.88 seconds
1	0	0	0	143.36 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655.36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

**<NW-provided\_eDRX\_value>** String type. Half a byte in a 4-bit format.

Bit				
4	3	2	1	E-UTRAN e-I-DRX cycle length duration
0	0	0	0	5.12 seconds
0	0	0	1	10.24 seconds
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	0	61.44 seconds
0	1	0	1	81.92 seconds
0	1	1	0	102.4 seconds
0	1	1	1	122.88 seconds
1	0	0	0	143.36 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655.36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

**<Paging\_time\_window>** String type. Half a byte in a 4-bit format.  
eMTC mode

Bit				
4	3	2	1	Paging Time Window length
0	0	0	0	1.28 seconds
0	0	0	1	2.56 seconds

0	0	1	0	3.84 seconds
0	0	1	1	5.12 seconds
0	1	0	0	6.4 seconds
0	1	0	1	7.68 seconds
0	1	1	0	8.96 seconds
0	1	1	1	10.24 seconds
1	0	0	0	11.52 seconds
1	0	0	1	12.8 seconds
1	0	1	0	14.08 seconds
1	0	1	1	15.36 seconds
1	1	0	0	16.64 seconds
1	1	0	1	17.92 seconds
1	1	1	0	19.20 seconds
1	1	1	1	20.48 seconds

NB-IoT mode

**Bit**

4	3	2	1	Paging Time Window length
0	0	0	0	2.56 seconds
0	0	0	1	5.12 seconds
0	0	1	0	7.68 seconds
0	0	1	1	10.24 seconds
0	1	0	0	12.8 seconds
0	1	0	1	15.36 seconds
0	1	1	0	17.92 seconds
0	1	1	1	20.48 seconds
1	0	0	0	23.04 seconds
1	0	0	1	25.6 seconds
1	0	1	0	28.16 seconds
1	0	1	1	30.72 seconds
1	1	0	0	33.28 seconds
1	1	0	1	35.84 seconds
1	1	1	0	38.4 seconds
1	1	1	1	40.96 seconds

IoT-NTN mode

**Bit**

4	3	2	1	Paging Time Window length
0	0	0	0	2.56 seconds
0	0	0	1	5.12 seconds
0	0	1	0	7.68 seconds
0	0	1	1	10.24 seconds
0	1	0	0	12.8 seconds
0	1	0	1	15.36 seconds
0	1	1	0	17.92 seconds
0	1	1	1	20.48 seconds

1	0	0	0	23.04 seconds
1	0	0	1	25.6 seconds
1	0	1	0	28.16 seconds
1	0	1	1	30.72 seconds
1	1	0	0	33.28 seconds
1	1	0	1	35.84 seconds
1	1	1	0	38.4 seconds
1	1	1	1	40.96 seconds

## 6.14. AT+CTZR Time Zone Reporting

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

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

### Parameter

<b>&lt;reporting&gt;</b>	Integer type. Indicates the mode of time zone reporting. <ul style="list-style-type: none"> <li><u>0</u> Disable time zone change event reporting</li> <li>1 Enable time zone change event reporting by unsolicited result code <b>+CTZV: &lt;tz&gt;</b></li> <li>2 Enable extended time zone and local time reporting by unsolicited result code: <b>+CTZE: &lt;tz&gt;,&lt;dst&gt;,&lt;time&gt;</b></li> </ul>
--------------------------	--

<b>&lt;tz&gt;</b>	String type. Represents 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 " $\pm$ zz", expressed as a fixed width, two-digit integer within the range -48 to +56. To maintain a fixed width, numbers in the range -9 to +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09".
<b>&lt;dst&gt;</b>	Integer type. Indicates whether <b>&lt;tz&gt;</b> includes daylight savings adjustment. 0 <b>&lt;tz&gt;</b> includes no adjustment for daylight saving time 1 <b>&lt;tz&gt;</b> includes +1 hour (equals 4 quarters in <b>&lt;tz&gt;</b> ) adjustment for daylight saving time 2 <b>&lt;tz&gt;</b> includes +2 hours (equals 8 quarters in <b>&lt;tz&gt;</b> ) adjustment for daylight saving time
<b>&lt;time&gt;</b>	String type. Represents the local time. The format is "YYYY/MM/DD, hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date (DD), hour (hh), minute (mm) and second (ss). The local time can be derived by the MT from information provided by the network at the time of delivering time zone information and will be present in the unsolicited result code for extended time zone and local time reporting if the universal time is provided by the network.

**Example**

```

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

OK
+CTZE: "+32",0,"2013/08/23,06:51:13"
    
```

**6.15. AT+QNWINFO Query Network Information**

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

AT+QNWINFO Query Network Information	
Test Command <b>AT+QNWINFO=?</b>	Response <b>OK</b>
Execution Command <b>AT+QNWINFO</b>	Response <b>+QNWINFO: &lt;AcT&gt;,&lt;oper&gt;,&lt;band&gt;,&lt;channel&gt;</b>  <b>OK</b>

Maximum Response Time	300 ms
Characteristics	-

**Parameter**

<b>&lt;AcT&gt;</b>	String type. Access technology selected. "No Service" "GSM" "GPRS" "EDGE" "eMTC" "NBloT" "NTN NBloT"
<b>&lt;oper&gt;</b>	String type. Operator in numeric format.
<b>&lt;band&gt;</b>	String type. Band selected. "GSM 850" "GSM 900" "GSM 1800" "GSM 1900" "LTE BAND 1" – "LTE BAND 85" "NTN NBloT BAND 23" "NTN NBloT BAND 255" "NTN NBloT BAND 256"
<b>&lt;channel&gt;</b>	Integer type. Channel ID.

**Example**

```

AT+QNWINFO=?
OK
AT+QNWINFO
+QNWINFO: "NTN NBloT", "46000", "NTN NBloT BAND 23", 7500
OK
    
```

**6.16. AT+QCSQ Query and Report Signal Strength**

This command queries and reports the signal strength of the current service network. If the MT is registered on multiple networks in different service modes, you can query the signal strength of networks in each mode. No matter whether the MT is registered on a network or not, the command can be run to query the signal strength or allow the MT to report the URC indicating the detected signal strength if the MT camps on the network. If the MT is not using any service network or the service mode is uncertain, "NOSERVICE"

will be returned as the query result.

**AT+QCSQ Query and Report Signal Strength**

Execution Command <b>AT+QCSQ</b>	Response <b>+QCSQ: &lt;sysmode&gt;[,&lt;value1&gt;[,&lt;value2&gt;[,&lt;value3&gt;[,&lt;value4&gt;]]]]</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-

**Parameter**

**<sysmode>** A string type value indicating the service mode in which the MT will unsolicited report the signal strength.

"NOSERVICE" NO SERVICE mode  
 "GSM" GSM/GPRS/EDGE mode  
 "eMTC" eMTC mode  
 "NBloT" NB-LoT mode  
 "NTN NBloT" loT-NTN mode

**<value1>/<value2>/<value3>/<value4>** The following table lists the signal strength type corresponding to each service mode.

<sysmode>	<value1>	<value2>	<value3>	<value4>
"NOSERVICE"	-	-	-	-
"GSM"	<GSM_RSSI>	-	-	-
"eMTC"	<LTE_RSSI>	<LTE_RSRP>	<LTE_SINR>	<LTE_RSRQ>
"NBloT"	<LTE_RSSI>	<LTE_RSRP>	<LTE_SINR>	<LTE_RSRQ>
"NTN NBloT"	<LTE_RSSI>	<LTE_RSRP>	<LTE_SINR>	<LTE_RSRQ>

**<GSM\_RSSI>/<LTE\_RSSI>** An integer indicating the received signal strength. These parameters are available for GSM, LTE and NTN mode respectively.

**<LTE\_RSRP>** An integer indicating the reference signal received power (RSRP). This parameter is available for LTE and NTN mode.

**<LTE\_SINR>** An integer indicating the signal to interference plus noise ratio (SINR). Logarithmic value of SINR. Values are in 1/5th of a dB. Range: 0–250 which translates to -20 dB to +30 dB.

**<LTE\_RSRQ>** An integer indicating the reference signal received quality (RSRQ) in dB.

**Example**

```
AT+QCSQ //Execute the command to query signal
+QCSQ: "eMTC",-52,-81,195,-10
```

OK

```
AT+QCSQ=? //List of supported <sysmode>s
+QCSQ: "NOSERVICE","GSM","eMTC","NBloT","NTN NBloT"
```

OK

## 6.17. AT+QCSCON Signaling Connection Status

This command gives details of the terminal's perceived radio connection status. It returns an indication of the current state. Note that this state is only updated when radio events, such as sending and receiving, take place. This means that the current state may be out of date. The terminal may think it is "Connected" yet cannot currently use a base station due to a change in the link quality.

### AT+QCSCON Signalling Connection Status

Test Command <b>AT+QCSCON=?</b>	Response <b>+QCSCON:</b> (list of supported <n>s)  <b>OK</b>
Read Command <b>AT+QCSCON?</b>	Response <b>+QCSCON:</b> <n>,<mode>  <b>OK</b>  If there is any error: <b>+CME ERROR:</b> <err>
Write Command <b>AT+QCSCON=&lt;n&gt;</b>	Response <b>OK</b> If there is any error: <b>+CME ERROR:</b> <err>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

#### Parameter

<n> Integer type. Enables or disables the report of URC **+QCSCON: <n>,<mode>**.  
0 Disable

	1	Enable
<b>&lt;mode&gt;</b>	Integer type. indicates the signaling connection status.	
	0	Idle
	1	Connected
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.	

**Example**

```

AT+QCSCON=?
+QCSCON: (0,1)

OK
AT+QCSCON?
+QCSCON: 0,0

OK
AT+QCSCON=1
OK
AT+QIOPEN=1,0,"TCP","220.180.239.212",8433,0,1
OK

+QCSCON: 1,1 //RRC connection setup

+QIOPEN: 0,0

+QCSCON: 1,0 //RRC connection release
    
```

**6.18. AT+QLTS Obtain the Latest Time Synchronized Through Network**

The Execution Command returns the latest time synchronized through network.

**AT+QLTS Obtain the Latest Time Synchronized Through Network**

Test Command <b>AT+QLTS=?</b>	Response <b>+QLTS:</b> (list of supported <b>&lt;mode&gt;</b> s)  <b>OK</b>
Execution Command <b>AT+QLTS</b>	Response <b>+QLTS:</b> <b>&lt;time&gt;</b> , <b>&lt;dst&gt;</b>  <b>OK</b>
Write Command <b>AT+QLTS=&lt;mode&gt;</b>	Response <b>+QLTS:</b> <b>&lt;time&gt;</b> , <b>&lt;dst&gt;</b>

	<p><b>OK</b></p> <p>If there is an error related to ME functionality:  <b>+CME ERROR: &lt;err&gt;</b></p> <p>If there is any other error:  <b>ERROR</b></p>
Maximum Response Time	300 ms
Characteristics	-

**Parameter**

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

**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: "2020/06/02,01:47:33+32,0"

OK
AT+QLTS=0         //Query the latest time synchronized through network. It offers the same function
                  as Execution Command AT+QLTS.
    
```

```
+QLTS: "2020/06/02,01:47:33+32,0"

OK
AT+QLTS=1 //Query the current GMT time calculated from the latest time that has been
           //synchronized through network.
+QLTS: "2020/06/02,01:48:36+32,0"

OK
AT+QLTS=2 //Query the current LOCAL time calculated from the latest time that has been
           //synchronized through network.
+QLTS: "2020/06/02,09:48:51+32,0"

OK
```

### 6.19. AT+QCOPS Scan Current Available Networks

This command triggers carrier scan, scanning a list of network information for all available carriers at the current physical location, regardless of whether SIM card is inserted.

#### AT+QCOPS Scan Current Available Network

<p>Test Command <b>AT+QCOPS=?</b></p>	<p>Response <b>+QCOPS:</b> (list of supported &lt;scan_mode&gt;s)</p> <p><b>OK</b></p> <p>If there is any error: <b>ERROR</b></p>
<p>Write Command <b>AT+QCOPS=&lt;scan_mode&gt;</b></p>	<p>Response If a network is detected, the number of cells is displayed. <b>+QCOPS:</b> &lt;num&gt;</p> <p>If &lt;scan_mode&gt;=0 (in the automatic mode): <b>OK</b></p> <p><b>+QCOPS:</b> &lt;num&gt;</p> <p>[<b>+QCOPS:</b> "GSM",&lt;MCC&gt;,&lt;MNC&gt;,&lt;ARFCN&gt;,&lt;LAC&gt;,&lt;cell_ID&gt;,&lt;BSIC&gt;,&lt;rx_lev&gt;,&lt;cell_is_barred&gt;,&lt;GPRS_is_supported&gt;]</p> <p>[<b>+QCOPS:</b> "eMTC",&lt;MCC&gt;,&lt;MNC&gt;,&lt;TAC&gt;,&lt;EARFCN&gt;,&lt;PCI&gt;,&lt;cell_ID&gt;,&lt;RSRP&gt;,&lt;RSRQ&gt;,&lt;RSSI&gt;,&lt;cell_is_barred&gt;,</p>

<bandwidth>]

[+QCOPS: "NBloT",<MCC>,<MNC>,<TAC>,<EARFCN>,<PCI>,<cell\_ID>,<RSRP>,<RSRQ>,<RSSI>,<cell\_is\_barred>]

[+QCOPS: "NTN NBloT",<MCC>,<MNC>,<TAC>,<EARFCN>,<PCI>,<cell\_ID>,<RSRP>,<RSRQ>,<RSSI>,<cell\_is\_barred>]

[...]

If <scan\_mode>=1 (in the GSM network mode):

OK

+QCOPS: <num>

[+QCOPS: "GSM",<MCC>,<MNC>,<ARFCN>,<LAC>,<cell\_ID>,<BSIC>,<rx\_lev>,<cell\_is\_barred>,<GPRS\_is\_supported>]

[...]

If <scan\_mode>=2 (in the eMTC network mode):

OK

+QCOPS: <num>

[+QCOPS: "eMTC",<MCC>,<MNC>,<TAC>,<EARFCN>,<PCI>,<cell\_ID>,<RSRP>,<RSRQ>,<RSSI>,<cell\_is\_barred>,<bandwidth>]

[...]

If <scan\_mode>=3 (in the NB-IoT network mode):

OK

+QCOPS: <num>

[+QCOPS: "NBloT",<MCC>,<MNC>,<TAC>,<EARFCN>,<PCI>,<cell\_ID>,<RSRP>,<RSRQ>,<RSSI>,<cell\_is\_barred>]

[...]

	<p>If <b>&lt;scan_mode&gt;</b>=4 (in the LTE only mode):</p> <p><b>OK</b></p> <p><b>+QCOPS: &lt;num&gt;</b></p> <p><b>[+QCOPS: "eMTC",&lt;MCC&gt;,&lt;MNC&gt;,&lt;TAC&gt;,&lt;EARFCN&gt;,&lt;PCI&gt;,&lt;cell_ID&gt;,&lt;RSRP&gt;,&lt;RSRQ&gt;,&lt;RSSI&gt;,&lt;cell_is_barred&gt;,&lt;bandwidth&gt;]</b></p> <p><b>[+QCOPS: "NBIoT",&lt;MCC&gt;,&lt;MNC&gt;,&lt;TAC&gt;,&lt;EARFCN&gt;,&lt;PCI&gt;,&lt;cell_ID&gt;,&lt;RSRP&gt;,&lt;RSRQ&gt;,&lt;RSSI&gt;,&lt;cell_is_barred&gt;]</b></p> <p><b>[...]</b></p> <p>If <b>&lt;scan_mode&gt;</b>=5 (in the IoT-NTN network mode):</p> <p><b>OK</b></p> <p><b>+QCOPS: &lt;num&gt;</b></p> <p><b>[+QCOPS: "NTN NBIoT",&lt;MCC&gt;,&lt;MNC&gt;,&lt;TAC&gt;,&lt;EARFCN&gt;,&lt;PCI&gt;,&lt;cell_ID&gt;,&lt;RSRP&gt;,&lt;RSRQ&gt;,&lt;RSSI&gt;,&lt;cell_is_barred&gt;]</b></p> <p><b>[...]</b></p> <p>If there is any error:</p> <p><b>ERROR</b></p>
Maximum Response Time	300 ms
Characteristics	-

**Parameter**

<b>&lt;scan_mode&gt;</b>	Integer type. The mode of scanning surrounding cell.
0	Automatic mode
1	GSM network mode
2	eMTC network mode
3	NB-IoT network mode
4	LTE only mode
5	IoT-NTN network mode
<b>&lt;num&gt;</b>	Integer type. Number of detected network cells.

<MCC>	Integer type. A three-digit value indicating mobile country code.												
<MNC>	Integer type. A two-digit or three-digit value indicating the mobile network code.												
<ARFCN>	Integer type. Absolute radio frequency channel number. The parameter determines the ARFCN of the cell that was scanned. Range: 0–1023.												
<LAC>	Integer type. Two-byte location area code in hexadecimal format.												
<cell_ID>	Integer type. Cell ID in hexadecimal format.												
<BSIC>	Integer type. Base station identification code.												
<rx_lev>	Integer type. Received signal strength level.												
<TAC>	Integer type. Two-byte tracking area code in hexadecimal format.												
<EARFCN>	Integer type. E-UTRA absolute radio frequency channel number.												
<PCI>	Integer type. Physical cell identity.												
<RSRP>	Integer type. Reference signal received power.												
<RSRQ>	Integer type. Reference signal received quality.												
<RSSI>	Integer type. Received signal strength indication.												
<cell_is_barred>	Integer type. This parameter indicates whether the cell is barred or not for camping.												
<GPRS_is_supported>	Integer type. This parameter indicates whether the cell supports GPRS.												
<bandwidth>	Integer type. Current network bandwidth. <table border="0" style="margin-left: 20px;"> <tr> <td>0</td> <td>1.4 Mbps</td> </tr> <tr> <td>1</td> <td>3 Mbps</td> </tr> <tr> <td>2</td> <td>5 Mbps</td> </tr> <tr> <td>3</td> <td>10 Mbps</td> </tr> <tr> <td>4</td> <td>15 Mbps</td> </tr> <tr> <td>5</td> <td>20 Mbps</td> </tr> </table>	0	1.4 Mbps	1	3 Mbps	2	5 Mbps	3	10 Mbps	4	15 Mbps	5	20 Mbps
0	1.4 Mbps												
1	3 Mbps												
2	5 Mbps												
3	10 Mbps												
4	15 Mbps												
5	20 Mbps												

**NOTE**

1. The scan results will be presented in the form of URC. If one scan is not completed, the next scan cannot be performed.
2. <scan\_mode> is specified based on the configurations of **AT+QCFG="nwscanmode"**, **AT+QCFG="iotopmode"** and **AT+QCFG="band"**. In addition, these commands can also be used to stop scanning. See *document [12]* for details.
3. Do not execute data services during network scanning.
4. If no network is available, **+QCOPS: No Service** is reported.
5. There is a guard timer for every RAT scan to control scan time. For example, the guard timer for CAT-M is 5 minutes, for NB-IoT is 6 minutes, and for GSM is 3 minutes.
6. The scan result displays a maximum of 8 available networks for each RAT.
7. The module cannot process downlink paging message from network during network scanning.

**Example**

```
AT+QCOPS=1
```

```
OK
```

```
+QCOPS: No Service
```

```
AT+QCOPS=2
```

```
OK
```

```
+QCOPS: 1
```

```
+QCOPS: eMTC,460,00,1,6300,31,1A2E0A6,-96,-5,-78,0,3
```

```
AT+QCOPS=3
```

```
OK
```

```
+QCOPS: 2
```

```
+QCOPS: NBloT,460,00,4C10,3686,207,84845B2,-127,-17,-110,0
```

```
+QCOPS: NBloT,505,01,2,9510,51,1A2D01,-131,-16,-114,0.
```

# 7 Short Message Service Commands

## 7.1. AT+CSMS Select Message Service

This command selects message service and returns the types of messages supported by the MT.

<b>AT+CSMS Select Message Service</b>	
Test Command <b>AT+CSMS=?</b>	Response <b>+CSMS:</b> (list of supported <b>&lt;service&gt;s</b> )  <b>OK</b>
Read Command <b>AT+CSMS?</b>	Response <b>+CSMS:</b> <b>&lt;service&gt;</b> , <b>&lt;mt&gt;</b> , <b>&lt;mo&gt;</b> , <b>&lt;bm&gt;</b>  <b>OK</b>
Write Command <b>AT+CSMS=&lt;service&gt;</b>	Response <b>+CSMS:</b> <b>&lt;mt&gt;</b> , <b>&lt;mo&gt;</b> , <b>&lt;bm&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference	
<i>3GPP TS 27.005</i>	

### Parameter

<b>&lt;service&gt;</b>	Integer type. Type of message service. <u>0</u> <i>3GPP TS 23.040 and 3GPP TS 23.041</i> (the syntax of SMS AT commands is compatible with <i>3GPP TS 27.005 Phase 2 version 4.7.0</i> ; Phase 2+ features)
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		which do not require new command syntax may be supported, e.g. correct routing of messages with new Phase 2+ data coding schemes).
	1	3GPP TS 23.040 and 3GPP TS 23.041 (the syntax of SMS AT commands is compatible with 3GPP TS 27.005 Phase 2+ version; the requirement of <b>&lt;service&gt;</b> setting 1 is mentioned under corresponding command descriptions).
<b>&lt;mt&gt;</b>	Integer type. Mobile terminated messages.	
	0	Type not supported
	<u>1</u>	Type supported
<b>&lt;mo&gt;</b>	Integer type. Mobile originated messages.	
	0	Type not supported
	<u>1</u>	Type supported
<b>&lt;bm&gt;</b>	Integer type. Broadcast type messages.	
	0	Type not supported
	<u>1</u>	Type supported
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values.	

**Example**

```

AT+CSMS=? //Query the type of message services supported by the module
+CSMS: (0,1)

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

OK
AT+CSMS? //Read the current setting.
+CSMS: 1,1,1,1

OK
    
```

**7.2. AT+CMGF Message Format**

This command specifies the input and output formats of 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 **<chset>** specified by **AT+CSCS** to inform the character set to be used in the message body in the TA-TE interface.

<b>AT+CMGF Message Format</b>	
Test Command <b>AT+CMGF=?</b>	Response <b>+CMGF:</b> (list of supported <b>&lt;mode&gt;</b> s)  <b>OK</b>
Read Command <b>AT+CMGF?</b>	Response <b>+CMGF:</b> <b>&lt;mode&gt;</b>  <b>OK</b>
Write Command <b>AT+CMGF[=&lt;mode&gt;]</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.005	

**Parameter**

<b>&lt;mode&gt;</b>	Integer type.
0	PDU mode
1	Text mode

**7.3. 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.

<b>AT+CSCA Service Center Address</b>	
Test Command <b>AT+CSCA=?</b>	Response <b>OK</b>
Read Command	Response

AT+CSCA?	+CSCA: <sca>,<tosca>  OK
Write Command AT+CSCA=<sca>[,<tosca>]	Response OK  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.005	

**Parameter**

<sca>	Service center address. 3GPP TS 24.011 RP SC address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to <b>AT+CSCS</b> in 3GPP TS 27.007); 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>).
<err>	Integer type. Error code. Refer to <b>Table 20</b> for possible <err> values.

**Example**

```

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

## 7.4. AT+CPMS Preferred Message Storage

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

AT+CPMS Preferred Message Storage	
Test Command <b>AT+CPMS=?</b>	Response <b>+CPMS:</b> (list of supported <mem1>s),(list of supported <mem2>s),(list of supported <mem3>s)  <b>OK</b>
Read Command <b>AT+CPMS?</b>	Response <b>+CPMS:</b> <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>  <b>OK</b>
Write Command <b>AT+CPMS=&lt;mem1&gt;[,&lt;mem2&gt;[,&lt;mem3&gt;]]</b>	Response <b>+CPMS:</b> <used1>,<total1>,<used2>,<total2>,<used3>,<total3>  <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference 3GPP TS 27.005	

### Parameter

<b>&lt;mem1&gt;</b>	String Type. Messages to be read and deleted from this memory storage. "SM" (U)SIM message storage "ME" Mobile equipment message storage "MT" The same as "ME" storage "SR" Status report storage
<b>&lt;mem2&gt;</b>	String Type. Messages will be written and sent to this memory storage. "SM" (U)SIM message storage

	"ME"	Mobile equipment message storage
	"MT"	Same as "ME" storage
	"SR"	Status report storage
<mem3>	String Type. Received messages will be placed in this memory storage if routing to PC is not set ( <b>AT+CNMI</b> ).	
	"SM"	(U)SIM message storage
	"ME"	Mobile equipment message storage
	"MT"	Same as "ME" storage
	"SR"	Status report storage
<usedx>	Integer type. Number of current messages in <memx>.	
<totalx>	Integer type. Total number of messages which can be stored in <memx>.	
<err>	Integer type. Error code. Refer to <b>Table 21</b> for possible <err> values.	

**Example**

```

AT+CPMS? //Query the current SMS message storage
+CPMS: "ME",0,23,"ME",0,23,"ME",0,23

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
    
```

**7.5. AT+CMGD Delete Messages**

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

<b>AT+CMGD Delete Messages</b>	
Test Command <b>AT+CMGD=?</b>	Response <b>+CMGD:</b> (list of supported <index>s),(list of supported <delflag>s)  <b>OK</b>
Write Command <b>AT+CMGD=&lt;index&gt;[,&lt;delflag&gt;]</b>	Response <b>OK</b>

	<p>If there is an error related to ME functionality: <b>+CMS ERROR:&lt;err&gt;</b></p> <p>If there is any other error: <b>ERROR</b></p>
Maximum Response Time	<p>300ms. Note: Operation of <b>&lt;delflag&gt;</b> depends on the storage of deleted messages.</p>
Characteristics	-
Reference	3GPP TS 27.005

**Parameter**

<b>&lt;index&gt;</b>	Integer type value in the range of location numbers supported by the associated memory.
<b>&lt;delflag&gt;</b>	Integer type. Delete flag.
0	Delete the message specified in <b>&lt;index&gt;</b>
1	Delete all read messages from <b>&lt;mem1&gt;</b> storage
2	Delete all read messages from <b>&lt;mem1&gt;</b> storage and sent mobile originated messages
3	Delete all read messages from <b>&lt;mem1&gt;</b> storage, sent and unsent mobile originated messages
4	Delete all messages from <b>&lt;mem1&gt;</b> storage
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values.

**Example**

```

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

**7.6. AT+CMGL List Messages**

The Write 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 **AT+CMGL** without status value **<stat>**, it will report the list of SMS with "REC UNREAD" status.

**AT+CMGL List Messages**

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

	<p><b>du&gt;</b>  <b>[+CMGL: &lt;index&gt;,&lt;stat&gt;,[&lt;alpha&gt;],&lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;p</b>  <b>du&gt;</b>  <b>[...]]</b></p> <p><b>OK</b></p> <p>If there is an error related to ME functionality:  <b>+CMS ERROR: &lt;err&gt;</b></p>
Maximum Response Time	<p>300 ms.                  Note: Operation of <b>&lt;stat&gt;</b> depends on the storage of listed messages.</p>
Characteristics	-
Reference	<p>3GPP TS 27.005</p>

**Parameter**

<b>&lt;stat&gt;</b>	<p>Integer type in PDU mode, or string type in text mode. The status of message in memory; Defined values:</p> <table border="1"> <thead> <tr> <th>PDU mode</th> <th>Text mode</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>"REC UNREAD"</td> <td>Received unread messages</td> </tr> <tr> <td>1</td> <td>"REC READ"</td> <td>Received read messages</td> </tr> <tr> <td>2</td> <td>"STO UNSENT"</td> <td>Stored unsent messages</td> </tr> <tr> <td>3</td> <td>"STO SENT"</td> <td>Stored sent messages</td> </tr> <tr> <td>4</td> <td>"ALL"</td> <td>All messages</td> </tr> </tbody> </table>	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
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																	
<b>&lt;index&gt;</b>	Integer type. In the range of location numbers supported by the associated memory.																		
<b>&lt;da&gt;</b>	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 <b>AT+CSCS</b> in 3GPP TS 27.007). Type of address is given by <b>&lt;toda&gt;</b> .																		
<b>&lt;oa&gt;</b>	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 <b>AT+CSCS</b> in 3GPP TS 27.007). The type of address is given by <b>&lt;tooa&gt;</b> .																		
<b>&lt;alpha&gt;</b>	String type alphanumeric representation of <b>&lt;da&gt;</b> or <b>&lt;oa&gt;</b> 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 <b>AT+CSCS</b> command (see definition of this command in 3GPP TS 27.007).																		
<b>&lt;scts&gt;</b>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to <b>&lt;dt&gt;</b> ).																		
<b>&lt;toda&gt;</b>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.																		

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<b>&lt;toa&gt;</b>	Type of originating address. <i>3GPP TS 24.011</i> TP-Originating-Address Type-of-Address octet in integer format (default refer to <b>&lt;toa&gt;</b> ).
<b>&lt;length&gt;</b>	Integer type. Message length. In the text mode ( <b>AT+CMGF=1</b> ) the length of the message body <b>&lt;data&gt;</b> ; or in PDU mode ( <b>AT+CMGF=0</b> ) the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<b>&lt;data&gt;</b>	<p>In the case of SMS: <i>3GPP TS 23.040</i> TP-User-Data in text mode responses; format:</p> <ul style="list-style-type: none"> <li>- If <b>&lt;dc&gt;</b>, indicates that <i>3GPP TS 23.038</i> GSM 7-bit default alphabet is used and <b>&lt;fo&gt;</b> indicates that <i>3GPP TS 23.040</i> TP-User-Data-Header-Indication is not set.</li> <li>- If TE character set other than "HEX" (refer to <b>AT+CSCS</b> command in <i>3GPP TS 27.007</i>): ME/TA converts GSM alphabet into current TE character set according to rules of in <i>3GPP TS 27.007 Annex A</i>.</li> <li>- 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 II (GSM 7-bit default alphabet 23) is presented as 17 (IRA 49 and 55)).</li> <li>- If <b>&lt;dc&gt;</b>, indicates that 8-bit or UCS2 data coding scheme is used, or <b>&lt;fo&gt;</b> indicates that <i>3GPP TS 23.040</i> 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)).</li> </ul> <p>In the case of CBS: <i>3GPP TS 23.041</i> CBM Content of Message in text mode responses; format:</p> <ul style="list-style-type: none"> <li>- If <b>&lt;dc&gt;</b>, indicates that <i>3GPP TS 23.038</i> GSM 7-bit default alphabet is used.</li> <li>- If TE character set other than "HEX" (refer to <b>AT+CSCS</b> in <i>3GPP TS 27.007</i>): ME/TA converts GSM alphabet into current TE character set according to rules of <i>3GPP TS 27.007 Annex A</i>.</li> <li>- 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.</li> <li>- If <b>&lt;dc&gt;</b>, indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number.</li> </ul>
<b>&lt;pdu&gt;</b>	In the case of SMS: <i>3GPP TS 24.011</i> SC address followed by <i>3GPP TS 23.040</i> 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)).
<b>&lt;fo&gt;</b>	Depending on the command or result code: First octet of <i>3GPP TS 23.040</i> SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted.
<b>&lt;mr&gt;</b>	<i>3GPP TS 23.040</i> TP-Message-Reference in integer format.
<b>&lt;ra&gt;</b>	<i>3GPP TS 23.040</i> 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 <b>AT+CSCS</b> ). The type of address is given by <b>&lt;tora&gt;</b> .
<b>&lt;tora&gt;</b>	<i>3GPP TS 24.011</i> TP-Recipient-Address Type-of-Address octet in integer format (default refer to <b>&lt;toa&gt;</b> ).
<b>&lt;scts&gt;</b>	Service center time stamp. <i>3GPP TS 23.040</i> TP-Service-Centre-Time-Stamp in

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	time-string format (refer to <b>&lt;dt&gt;</b> ).
<b>&lt;dt&gt;</b>	3GPP TS 23.040 [3] TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08".
<b>&lt;st&gt;</b>	3GPP TS 23.040 [3] TP-Status in integer format.
<b>&lt;ct&gt;</b>	3GPP TS 23.040 [3] TP-Command-Type in integer format (default 0).
<b>&lt;sn&gt;</b>	3GPP TS 23.041 [4] CBM Serial Number in integer format.
<b>&lt;mid&gt;</b>	3GPP TS 23.041 [4] CBM Message Identifier in integer format.
<b>&lt;page&gt;</b>	3GPP TS 23.041 [4] CBM Page Parameter bits 4–7 in integer format.
<b>&lt;pages&gt;</b>	3GPP TS 23.041 [4] CBM Page Parameter bits 0–3 in integer format.
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values.

**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
    
```

**7.7. AT+CMGR Read Messages**

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

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

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

**Parameter**

<b>&lt;index&gt;</b>	Integer type. In the range of location numbers supported by the associated memory.
<b>&lt;stat&gt;</b>	Integer type in PDU mode, or string type in text mode. The status of message in

memory; Defined values:

PDU mode	Text mode	Explanation
<u>0</u>	<u>"REC UNREAD"</u>	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

- <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 to **<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. <i>3GPP TS 24.011</i> 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 <b>AT+CSCS</b> command in <i>3GPP TS 27.007</i> ). The type of address is given by <tosca>.
<tosca>	Type of service center address. <i>3GPP TS 24.011</i> RP SC address Type-of-Address octet in integer format (default refer to <toda>).
<length>	Integer type. Message length. In the text mode ( <b>AT+CMGF=1</b> ) the length of the message body <data> (or <cdata>) in characters; or in PDU mode ( <b>AT+CMGF=0</b> ) 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>	<p>In the case of SMS: <i>3GPP TS 23.040</i> TP-User-Data in text mode responses; format:</p> <ul style="list-style-type: none"> <li>- If &lt;dcs&gt;, indicates that <i>3GPP TS 23.038</i> GSM 7-bit default alphabet is used and &lt;fo&gt; indicates that <i>3GPP TS 23.040</i> TP-User-Data-Header-Indication is not set.</li> <li>- If TE character set other than "HEX" (refer to <b>AT+CSCS</b> command in <i>3GPP TS 27.007</i>): ME/TA converts GSM alphabet into current TE character set according to rules of in <i>3GPP TS 27.007 Annex A</i>.</li> <li>- 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 II (GSM 7 bit default alphabet 23) is presented as 17 (IRA 49 and 55)).</li> <li>- If &lt;dcs&gt;, indicates that 8-bit or UCS2 data coding scheme is used, or &lt;fo&gt; indicates that <i>3GPP TS 23.040</i> 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)).</li> </ul> <p>In the case of CBS: <i>3GPP TS 23.041</i> CBM Content of Message in text mode responses; format:</p> <ul style="list-style-type: none"> <li>- If &lt;dcs&gt;, indicates that <i>3GPP TS 23.038</i> GSM 7-bit default alphabet is used:</li> <li>- If TE character set other than "HEX" (refer to <b>AT+CSCS</b> in <i>3GPP TS 27.007</i>): ME/TA converts GSM alphabet into current TE character set according to rules of <i>3GPP TS 27.007 Annex A</i>.</li> <li>- 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.</li> <li>- If &lt;dcs&gt;, indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number.</li> </ul>
<pdu>	In the case of SMS: <i>3GPP TS 24.011</i> SC address followed by <i>3GPP TS 23.040</i> 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>	<i>3GPP TS 23.040 [3]</i> 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>	<i>3GPP TS 23.040 [3]</i> TP-Status in integer format.
<ct>	<i>3GPP TS 23.040 [3]</i> TP-Command-Type in integer format (default 0).
<cdata>	<i>3GPP TS 23.040 [3]</i> TP-Command-Data in text mode responses; ME/TA converts each

	8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))
<sn>	3GPP TS 23.041 [4] CBM Serial Number in integer format
<mid>	3GPP TS 23.041 [4] CBM Message Identifier in integer format
<page>	3GPP TS 23.041 [4] CBM Page Parameter bits 4-7 in integer format
<pages>	3GPP TS 23.041 [4] CBM Page Parameter bits 0-3 in integer format
<err>	Integer type. Error code. Refer to <b>Table 21</b> for possible <err> values.

**Example**

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

AT+CSDH=1
OK
AT+CMGR=3 //Read the message
+CMGR: "REC UNREAD","+8615021012496",,"13/12/13,15:06:37+32",145,4,0,0,"+861380021050
0",145,27

<This is a test from Quectel>

OK
```

**7.8. AT+CMGS Send Messages**

This Write Command sends a short message from TE to network (SMS-SUBMIT). The message reference <mr> is returned to the TE on successful message delivery. Optionally (when AT+CSMS <service> value is 1 and network supports) <scts> is returned. The values can be used to identify message upon unsolicited delivery status report result code.

AT+CMGS Send Messages	
Test Command <b>AT+CMGS=?</b>	Response <b>OK</b>
Write Command If in text mode (AT+CMGF=1): <b>AT+CMGS=&lt;da&gt;[,&lt;toda&gt;]</b> After > is responded, input the text message. After that, tap <b>ctrl</b> and <b>Z</b> to send the message. Sending can be cancelled by tapping <b>ESC</b> , and the abortion is acknowledged with <b>OK</b> ,	Response If the message is sent successfully: <b>+CMGS: &lt;mr&gt;[,&lt;scts&gt;]</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>
Write Command	Response

<p>If in PDU mode (<b>AT+CMGF=0</b>):  <b>AT+CMGS=&lt;length&gt;</b>                  After &gt; is responded, input the PDU.                  After that, tap <b>ctrl</b> and <b>Z</b> to indicate the ending of PDU and begin to send the message. Sending can be cancelled by tapping <b>ESC</b>, and the abortion is acknowledged with <b>OK</b>, though the message will not be sent.</p>	<p>If the message is sent successfully:  <b>+CMGS: &lt;mr&gt;[,&lt;scts&gt;]</b>   <b>OK</b>                   If there is an error related to ME functionality:  <b>+CMS ERROR: &lt;err&gt;</b></p>
Maximum Response Time	240 s, determined by the network.
Characteristics	-
Reference	
3GPP TS 27.005	

**Parameter**

<b>&lt;da&gt;</b>	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 <b>AT+CSCS</b> in 3GPP TS 27.007). The type of address is given by <b>&lt;toda&gt;</b> .
<b>&lt;toda&gt;</b>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.
<b>&lt;length&gt;</b>	Integer type. Message length. In the text mode ( <b>AT+CMGF=1</b> ) the length of the text message in characters; or in PDU mode ( <b>AT+CMGF=0</b> ), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<b>&lt;mr&gt;</b>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<b>&lt;scts&gt;</b>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to <b>&lt;dt&gt;</b> in <b>AT+CMGL</b> ).
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values. Refer to <b>AT+CGMR</b> for Other parameters.

**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. Tap ctrl and Z to send message, or
                                ESC to quit without sending.
+CMGS: 247
    
```

OK

## 7.9. AT+CMMS Send More Messages

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

<b>AT+CMMS Send More Messages</b>	
Test Command <b>AT+CMMS=?</b>	Response <b>+CMMS:</b> (list of supported<n>s)  <b>OK</b>
Read Command <b>AT+CMMS?</b>	Response <b>+CMMS:</b> <n>  <b>OK</b>
Write Command <b>AT+CMMS=&lt;n&gt;</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	120 s, determined by the network.
Characteristics	-
Reference 3GPP TS 27.005	

### Parameter

<n>	Integer type
0	Feature disabled
1	Keep enabled until the time between the response of the latest message sending command ( <b>AT+CMGS</b> , <b>AT+CMSS</b> , etc.) and the next sending command exceeds 1-5 s (the exact value is up to ME implementation); then ME shall close the link and TA switches <n> back to 0 automatically.
2	Feature enabled. If the time between the response of the latest message sending command and the next sending command exceeds 1-5 s (the exact value is up to ME implementation), the ME shall close the link but TA will not switch <n> back to 0

automatically.

**<err>** Integer type. Error code. Refer to **Table 21** for possible **<err>** values.

**NOTE**

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

## 7.10. AT+CMGW Write Messages to Memory

This command stores short messages (either SMS-DELIVER or SMS-SUBMIT) to memory storage **<mem2>** (refer to **AT+CPMS** for details), and then the memory location **<index>** of the stored message is returned. The message status will be set to 'stored unsent' by default, but the parameter **<stat>** also allows other status values to be given.

The entering of text is done similarly as 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>]]]**

After **>** is responded, input the text message. After that, tap **ctrl and Z** to transmit the message to memory storage **<mem2>**. Transmitting can be cancelled by tapping **ESC**, and the abortion is acknowledged with **OK**, though the message will not be transmitted.

Response

If message writing is successful:

**+CMGW: <index>**

**OK**

If there is an error related to ME functionality:

**+CMS ERROR: <err>**

2) If in PDU mode (**AT+CMGF=0**):

**AT+CMGW=<length>[,<stat>]**

After **>** is responded, input the PDU. After that, tap **ctrl and Z** to indicate the ending of PDU and begin to transmit the message to memory storage **<mem2>**. Transmitting can be cancelled by tapping **ESC**, and the abortion is acknowledged with **OK**, though the message will not be transmitted.

Maximum Response Time	300 ms
Characteristics	-
Reference	3GPP TS 27.005

**Parameter**

<b>&lt;da&gt;</b>	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 <b>AT+CSCS</b> command in 3GPP TS 27.007). The type of address is given by <b>&lt;toda&gt;</b> .																		
<b>&lt;oa&gt;</b>	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 <b>AT+CSCS</b> command in 3GPP TS 27.007). The type of address is given by <b>&lt;tooa&gt;</b> .																		
<b>&lt;tooa&gt;</b>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer to <b>&lt;toda&gt;</b> ).																		
<b>&lt;stat&gt;</b>	Integer type in PDU mode, or string type in text mode. The status of message in memory; Defined values: <table border="1"> <thead> <tr> <th>PDU mode</th> <th>Text mode</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>"REC UNREAD"</td> <td>Received unread messages</td> </tr> <tr> <td>1</td> <td>"REC READ"</td> <td>Received read messages</td> </tr> <tr> <td>2</td> <td>"STO UNSENT"</td> <td>Stored unsent messages</td> </tr> <tr> <td>3</td> <td>"STO SENT"</td> <td>Stored sent messages</td> </tr> <tr> <td>4</td> <td>"ALL"</td> <td>All messages</td> </tr> </tbody> </table>	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
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																	
<b>&lt;toda&gt;</b>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.																		
<b>&lt;length&gt;</b>	Integer type. Message length. In the text mode ( <b>AT+CMGF=1</b> ) the length of the text message in characters; or in PDU mode ( <b>AT+CMGF=0</b> ), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).																		
<b>&lt;pdu&gt;</b>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.04 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).																		
<b>&lt;index&gt;</b>	Integer type. Index of message in selected storage <b>&lt;mem2&gt;</b> .																		
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values.																		

**Example**

```
AT+CMGF=1 //Set SMS message format to 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. Tap ctrl and Z to transmit the message to
                                memory storage <mem2>.
+CMGW: 4
OK
AT+CMGF=0 //Set SMS message format as PDU mode
OK
AT+CMGW=18
> 0051FF0000008000A0500030002016D4B8BD5
+CMGW: 5
OK
    
```

### 7.11. AT+CMSS Send Messages from Storage

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

AT+CMSS Send Messages from Storage	
Test Command <b>AT+CMSS=?</b>	Response <b>OK</b>
Write Command <b>AT+CMSS=&lt;index&gt;[,&lt;da&gt;[,&lt;toda&gt;]]</b>	Response If in text mode ( <b>AT+CMGF=1</b> ) and the message is sent successfully: <b>+CMSS: &lt;mr&gt;[,&lt;scts&gt;]</b>  <b>OK</b>  If in PDU mode ( <b>AT+CMGF=0</b> ) and the message is sent successfully: <b>+CMSS: &lt;mr&gt; [,&lt;ackpdu&gt;]</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>
Maximum Response Time	120 s, determined by the network.

Characteristics	-
Reference	
3GPP TS 27.005	

**Parameter**

<b>&lt;index&gt;</b>	Integer type. In the range of location numbers supported by the associated memory.
<b>&lt;da&gt;</b>	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 <b>AT+CSCS</b> command in 3GPP TS 27.007). The type of address is given by <b>&lt;toda&gt;</b> .
<b>&lt;toda&gt;</b>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.
<b>&lt;mr&gt;</b>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<b>&lt;scts&gt;</b>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to <b>&lt;dt&gt;</b> ).
<b>&lt;ackpdu&gt;</b>	The format is same as <b>&lt;pdu&gt;</b> 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.
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values.

**Example**

```

AT+CMGF=1 //Set SMS message format to text mode
OK
AT+CSCS="GSM" //Set character set to GSM which is used by the TE
OK
AT+CMGW="15021012496"
<This is a test from Quectel> //Enter the message and tap Ctrl + Z to send message
+CMGW: 4
OK
AT+CMSS=4 //Send the message of index 4 from memory storage.
+CMSS: 54
OK
    
```

## 7.12. AT+CNMA New Message Acknowledgement to UE/TE

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

<b>AT+CNMA New Message Acknowledgement to UE/TE</b>	
Test Command <b>AT+CNMA=?</b>	Response <b>+CNMA:</b> (list of supported <b>&lt;n&gt;s</b> )  <b>OK</b>
Execution Command <b>AT+CNMA</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Write Command <b>AT+CNMA=&lt;n&gt;</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	-
Reference 3GPP TS 27.005	

### Parameter

<b>&lt;n&gt;</b>	Integer type. Parameter required only for PDU mode 0 Command operates similarly as in text mode 1 Send positive ( <b>RP-ACK</b> ) acknowledgement to the network. Accepted only in PDU mode. 2 Send negative ( <b>RP-ERROR</b> ) acknowledgement to the network. Accepted only in PDU mode.
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values.

**NOTE**

The Execution and Write Commands shall only be used when **AT+CSMS** parameter **<service>** equals to 1 (phase 2+) and an appropriate URC has been issued by the module, i.e.:

+CMT for <mt>=2 incoming message classes 0, 1, 3 and none;

+CMT for <mt>=3 incoming message classes 0 and 3;

+CDS for <ds>=1.

**Example**

```

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

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

+CMT: "+8615021012496" ,,"13/03/18,17:07:21+32",145,4,0,0,"+8613800551500",145,28
This is a test from Quectel.           //A 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.
    
```

**7.13. AT+CNMI New Message Indications to TE**

This command selects the procedure on how receiving of new messages from the network is 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 [2]*.

**AT+CNMI New Message Indications to TE**

Test Command <b>AT+CNMI=?</b>	Response <b>+CNMI:</b> (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)  <b>OK</b>
Read Command <b>AT+CNMI?</b>	Response <b>+CNMI:</b> <mode>,<mt>,<bm>,<ds>,<bfr>  <b>OK</b>

Write Command <b>AT+CNMI</b> [=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.005	

**Parameter**

<b>&lt;mode&gt;</b>	Integer type. 0 Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications. 1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in data mode). Otherwise forward them directly to the TE. 2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.
<b>&lt;mt&gt;</b>	Integer type. The rules for storing received SMs depend on its data coding scheme (refer to 3GPP TS 23.038 [2]), preferred memory storage ( <b>AT+CPMS</b> ) setting and this value. 0 No SMS-DELIVER indications are routed to the TE. 1 If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE by using unsolicited result code: <b>+CMTI: &lt;mem&gt;,&lt;index&gt;</b> 2 SMS-DELIVERs (except class 2) are routed directly to the TE using unsolicited result code: <b>+CMT: [&lt;alpha&gt;,&lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;</b> (PDU mode enabled) or <b>+CMT: &lt;oa&gt;,&lt;alpha&gt;,&lt;scts&gt;,&lt;toa&gt;,&lt;fo&gt;,&lt;pid&gt;,&lt;dc&gt;,&lt;sca&gt;,&lt;tosca&gt;,&lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;data&gt;</b> (text mode enabled; about parameters in italics, refer to <b>AT+CSDH</b> ). Class 2 messages result in indication as defined in <b>&lt;mt&gt;=1</b> . 3 Class 3 SMS-DELIVERs are routed directly to TE by using unsolicited result codes defined in <b>&lt;mt&gt;=2</b> . Messages of other classes result in indication as defined in <b>&lt;mt&gt;=1</b> .
<b>&lt;bm&gt;</b>	Integer type. The rules for storing received CBMs depend on its data coding scheme (refer to 3GPP TS 23.038 [2]), the setting of Select CBM Types ( <b>AT+CSCB</b> ) and this value. 0 No CBM indications are routed to the TE. 2 New CBMs are routed directly to the TE using unsolicited result code:

		<b>+CBM: &lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;</b> (PDU mode); or
		<b>+CBM: &lt;sn&gt;,&lt;mid&gt;,&lt;dcs&gt;,&lt;page&gt;,&lt;pages&gt;&lt;CR&gt;&lt;LF&gt;&lt;data&gt;</b> (text mode)
<b>&lt;ds&gt;</b>	Integer type.	
	<u>0</u>	No SMS-STATUS-REPORTs are routed to the TE.
	1	SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: <b>+CDS: &lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;</b> (PDU mode) <b>+CDS: &lt;fo&gt;,&lt;mr&gt;,[&lt;ra&gt;],[&lt;tora&gt;],&lt;scts&gt;,&lt;st&gt;</b> (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: <b>+CDSI: &lt;mem&gt;,&lt;index&gt;</b>
<b>&lt;bfr&gt;</b>	Integer type.	
	<u>0</u>	TA buffer of unsolicited result codes defined within this command is flushed to the TE when <b>&lt;mode&gt;</b> 1 or 2 is entered (OK response shall be given before flushing codes).
the	1	TA buffer of unsolicited result codes defined within this command is cleared when <b>&lt;mode&gt;</b> 1 or 2 is entered.
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values.	

**NOTE**

Unsolicited result code:	
<b>+CMTI: &lt;mem&gt;,&lt;index&gt;</b>	Indicates that a new message has been received
<b>+CMT: [&lt;alpha&gt;],&lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;</b>	A short message is outputted directly
<b>+CBM: &lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;</b>	Cell broadcast message is outputted directly

**Example**

```

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

**7.14. AT+CSDH Show Text Mode Parameters**

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

AT+CSDH Show Text Mode Parameters	
Test Command	Response
AT+CSDH=?	<b>+CSDH:</b> (list of supported <b>&lt;show&gt;</b> s)

	OK
Read Command <b>AT+CSDH?</b>	Response <b>+CSDH: &lt;show&gt;</b>
	OK
Write Command <b>AT+CSDH[=&lt;show&gt;]</b>	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference <i>3GPP TS 27.005</i>	

**Parameter**

- <show>** Integer type.
- 0 Do not show header values defined in commands **AT+CSCA**, **AT+CSMP** (**<sca>**, **<tosca>**, **<fo>**, **<vp>**, **<pid>**, **<dcs>**) and **<length>**, **<toda>** or **<toa>** in **+CMT**, **+CMGL**, **+CMGR** result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs, in **+CMGR** result code, do not show **<pid>**, **<mn>**, **<da>**, **<toda>**, **<length>** or **<cdata>**.
  - 1 Show the values in result codes.

**Example**

```

AT+CSDH=0 //Set to disable the presenting of text mode parameters
OK
AT+CMGR=2
+CMGR: "STO UNSENT", "",
<This is a test from Quectel>
OK
AT+CSDH=1 //Set to enable the presenting of text mode parameters
OK
AT+CMGR=2
+CMGR: "STO UNSENT", "",128,17,0,0,143,"+8613800551500",145,18
<This is a test from Quectel>
OK
    
```

## 7.15. AT+CSMP Set Text Mode Parameters

This command selects values for additional parameters needed when SM is sent to the network or placed in a storage when text mode is selected (**AT+CMGF=1**). It is possible to set the validity period starting from when the SM is received by the SMSC (**<vp>** is in range 0 to 255) or define the absolute time of the validity period termination (**<vp>** is a string).

<b>AT+CSMP Set Text Mode Parameters</b>	
Test Command <b>AT+CSMP=?</b>	Response <b>OK</b>
Read Command <b>AT+CSMP?</b>	Response <b>+CSMP: &lt;fo&gt;,&lt;vp&gt;,&lt;pid&gt;,&lt;dcs&gt;</b>  <b>OK</b>
Write Command <b>AT+CSMP=&lt;fo&gt;[,&lt;vp&gt;[,&lt;pid&gt;[,&lt;dcs&gt;]]</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference <i>3GPP TS 27.005</i>	

### Parameter

<b>&lt;fo&gt;</b>	First octet. Depending on the command or result code: first octet of <i>3GPP TS 23.040 [3]</i> SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted.
<b>&lt;vp&gt;</b>	Validity period. Depending on SMS-SUBMIT <b>&lt;fo&gt;</b> setting: <i>3GPP TS 23.040 [3]</i> TP-Validity-Period either in integer format or in time-string format (refer to <b>&lt;dt&gt;</b> ).
<b>&lt;pid&gt;</b>	Protocol identifier. <i>3GPP TS 23.040 [3]</i> TP-Protocol-Identifier in integer format (default 0).
<b>&lt;dcs&gt;</b>	Data coding scheme. Depending on the command or result code: <i>3GPP TS 23.038 [2]</i> SMS Data Coding Scheme (default 240), or Cell Broadcast Data Coding Scheme in integer format.

## 7.16. AT+QCMGS Send Concatenated Messages

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

<b>AT+QCMGS Send Concatenated Messages</b>	
Test Command <b>AT+QCMGS=?</b>	Response <b>OK</b>
Write Command If in text mode ( <b>AT+CMGF=1</b> ): <b>AT+QCMGS=&lt;da&gt;[,&lt;toda&gt;][,&lt;uid&gt;,&lt;msg_seg&gt;,&lt;msg_total&gt;]&lt;CR&gt;</b> After > is responded, input the text message. After that, tap <b>ctrl</b> and <b>Z</b> to send the message. Sending can be cancelled by tapping <b>ESC</b> , and the abortion is acknowledged with <b>OK</b> , though the message will not be sent.	Response If in text mode ( <b>AT+CMGF=1</b> ) and the message is sent successfully: <b>+QCMGS: &lt;mr&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	120 s, determined by the network.
Characteristics	-

### Parameter

<b>&lt;uid&gt;</b>	Integer type. Message identification in the user data header (UDH). Range: 0–255. This parameter is defined and inputted by the user. All segments of a same concatenated message must have the same <b>&lt;uid&gt;</b> . Different concatenated messages should have different <b>&lt;uid&gt;</b> .
<b>&lt;msg_seg&gt;</b>	Integer type. Sequence number of a concatenated message. Range: 0–7. <b>&lt;msg_seg&gt;=0</b> means: ignore the value and regarded it as a non-concatenated message.
<b>&lt;msg_total&gt;</b>	Integer type. The total number of the segments of one concatenated message. Range: 0–7. <b>&lt;msg_total&gt;=0</b> or <b>1</b> means: ignore the value and regard it as a non-concatenated message.
<b>&lt;da&gt;,&lt;toda&gt;,&lt;mr&gt;</b>	Refer to <b>AT+CMGS</b> .
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values.

**NOTE**

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

**Example**

```

AT+CMGF=1 //Set SMS message format as text mode
OK
AT+CSCS="GSM" //Set character set as GSM which is used by the TE
OK
AT+QCMGS="15056913384",120,1,2 <CR> //Input 120 for <uid>, send the first segment of the
concatenated SMS

<This is a test from Quectel> //Enter the message and tap Ctrl + Z to send message
+QCMGS: 190

OK
AT+QCMGS="15056913384",120,2,2 <CR> //Send the second segment of the concatenated SMS.

<This is a test from Quectel> //Enter the message and tap Ctrl + Z to send message
+QCMGS: 191

OK
    
```

## 7.17. AT+QCMGR Read Concatenated Messages

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

<b>AT+QCMGR Read Concatenated Messages</b>	
Test Command <b>AT+QCMGR=?</b>	Response <b>OK</b>
Write Command <b>AT+QCMGR=&lt;index&gt;</b>	<p>Response</p> <p>If in text mode (<b>AT+CMGF=1</b>) and the command is executed successfully:</p> <p>For SMS-DELIVER:</p> <p><b>+QCMGR: &lt;stat&gt;,&lt;oa&gt;,[&lt;alpha&gt;],&lt;scts&gt;[,&lt;tooa&gt;,&lt;fo&gt;,&lt;pid&gt;,&lt;dc&gt;,&lt;dcs&gt;,&lt;sca&gt;,&lt;tosca&gt;,&lt;length&gt;][,&lt;uid&gt;,&lt;msg_seg&gt;,&lt;msg_total&gt;]&lt;CR&gt;&lt;LF&gt;&lt;data&gt;</b></p> <p><b>OK</b></p> <p>For SMS-SUBMIT:</p> <p><b>+QCMGR: &lt;stat&gt;,&lt;da&gt;,[&lt;alpha&gt;][,&lt;toda&gt;,&lt;fo&gt;,&lt;pid&gt;,&lt;dcs&gt;,[&lt;vp&gt;],&lt;sca&gt;,&lt;tosca&gt;,&lt;length&gt;][,&lt;uid&gt;,&lt;msg_seg&gt;,&lt;msg_total&gt;]&lt;CR&gt;&lt;LF&gt;&lt;data&gt;</b></p> <p><b>OK</b></p> <p>For SMS-STATUS-REPORTs:</p> <p><b>+QCMGR: &lt;stat&gt;,&lt;fo&gt;,&lt;mr&gt;,[&lt;ra&gt;],[&lt;tora&gt;],&lt;scts&gt;,&lt;dt&gt;,&lt;st&gt;</b></p> <p><b>OK</b></p> <p>For SMS-COMMANDs:</p> <p><b>+QCMGR: &lt;stat&gt;,&lt;fo&gt;,&lt;ct&gt;[,&lt;pid&gt;,[&lt;mn&gt;],[&lt;da&gt;],[&lt;toda&gt;],&lt;length&gt;]&lt;CR&gt;&lt;LF&gt;&lt;cdata&gt;</b></p> <p><b>OK</b></p> <p>If there is an error related to ME functionality:</p> <p><b>+CMS ERROR: &lt;err&gt;</b></p>
Maximum Response Time	Depends on the length of message content.

Characteristics

-

**Parameter**

<b>&lt;uid&gt;</b>	Integer type. Message identification in the user data header (UDH). Range: 0–65535 (see NOTES). All segments of a same concatenated message have same <b>&lt;uid&gt;</b> . Different concatenated messages should have different <b>&lt;uid&gt;</b> .
<b>&lt;msg_seg&gt;</b>	Integer type. Sequence number of a concatenated message. Range: 1–7.
<b>&lt;msg_total&gt;</b>	Integer type. The total number of the segments of one concatenated message. Range: 2–7.
<b>&lt;stat&gt;,&lt;oa&gt;,....</b>	Refer to <b>AT+CMGR</b> .
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values. Other parameters, please refer to <b>AT+CMGR</b> .

**NOTE**

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

**Example**

```
+CMTI: "SM",3 //The first segment of a concatenated message comes
+CMTI: "SM",4 //The second segment of a concatenated message comes

AT+QCMGR=3 //Read the first segment of the concatenated message
+QCMGR: "REC UNREAD","+8615056913384","13/07/30,14:44:37+32",120,1,2
ABCD

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

OK
```

## 7.18. AT+QSMSCONCAS Send Long Messages

This command sends a long message from TE to network (SMS-SUBMIT). The message reference **<mr>** is returned to the TE on successful message delivery. Optionally (when **AT+CSMS <service>** value is 1 and network supports) **<scts>** is returned. The values can be used to identify message upon unsolicited delivery status report result code.

<b>AT+QSMSCONCAS Send Long Messages</b>	
Test Command <b>AT+QSMSCONCAS=?</b>	Response <b>OK</b>
Write Command If in text mode ( <b>AT+CMGF=1</b> ): <b>AT+QSMSCONCAS=&lt;da&gt;[,&lt;toda&gt;]</b> After > is responded, input the text message. After that, tap <b>ctrl and Z</b> to send the message. Sending can be cancelled by tapping <b>ESC</b> , and the abortion is acknowledged with <b>OK</b> , but the message will not be sent.	Response If the message is sent successfully: <b>+QSMSCONCAS: &lt;mr&gt;[,&lt;scts&gt;]</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>
Write Command If in PDU mode ( <b>AT+CMGF=0</b> ): <b>AT+QSMSCONCAS=&lt;length&gt;</b> After > is responded, input the PDU. After that, tap <b>ctrl and Z</b> to indicate the ending of PDU and begin to send the message. Sending can be cancelled by tapping <b>ESC</b> , and the abortion is acknowledged with <b>OK</b> , but the message will not be sent.	Response If the message is sent successfully: <b>+QSMSCONCAS: &lt;mr&gt;[,&lt;scts&gt;]</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CMS ERROR: &lt;err&gt;</b>
Maximum Response Time	120 s, determined by the network.
Characteristics	-
Reference <i>3GPP TS 27.005</i>	

### Parameter

<b>&lt;da&gt;</b>	Destination address. <i>3GPP TS 23.040</i> 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 <b>AT+CSCS</b> in <i>3GPP TS 27.007</i> ). The type of address is given by <b>&lt;toda&gt;</b> .
<b>&lt;toda&gt;</b>	Type of destination address. <i>3GPP TS 24.011</i> TP-Destination-Address Type-of-Address octet in integer format.

<b>&lt;length&gt;</b>	Integer type. Message length. In the text mode ( <b>AT+CMGF=1</b> ) the length of the text message in characters; or in PDU mode ( <b>AT+CMGF=0</b> ), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<b>&lt;mr&gt;</b>	Message reference. <i>3GPP TS 23.040</i> TP-Message-Reference in integer format.
<b>&lt;scts&gt;</b>	Service center time stamp. <i>3GPP TS 23.040</i> TP-Service-Centre-Time-Stamp in time-string format (refer to <b>&lt;dt&gt;</b> in <b>AT+CMGL</b> ).
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 21</b> for possible <b>&lt;err&gt;</b> values. Refer to <b>AT+CGMR</b> for other parameters.

**NOTE**

The maximum number of characters that can be entered in a long message is: 153×10 (GSM 7-bit encoding), 1345 (8-bit encoding), 67×5 (UCS2 encoding).

**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+QSMSCONCAS="15021012496"
> <This is a test from Quectel> //Enter text message. Tap CTRL and Z to send
message, or tap ESC to quit without sending
+QSMSCONCAS: 247
OK
    
```

# 8 Packet Domain Commands

## 8.1. AT+CGATT PS Attach or Detach

This command attaches the MT to, or detaches the MT from, the Packet Domain service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the **OK** response is returned. If the requested state cannot be achieved, an **ERROR** or **+CME ERROR** response is returned.

AT+CGATT PS Attach or Detach	
Test Command <b>AT+CGATT=?</b>	Response <b>+CGATT:</b> (list of supported <b>&lt;state&gt;s</b> )  <b>OK</b>
Read Command <b>AT+CGATT?</b>	Response <b>+CGATT:</b> <b>&lt;state&gt;</b>  <b>OK</b>
Write Command <b>AT+CGATT=&lt;state&gt;</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	140 s, determined by the network.
Characteristics	-
Reference	3GPP TS 27.007

### Parameter

<b>&lt;state&gt;</b>	Integer type. The state of PS attachment. 0 Detached 1 Attached Other values are reserved and will result in an <b>ERROR</b> response to the Write Command.
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

**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
    
```

**8.2. AT+CGDCONT Define PDP Context**

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

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

<b>AT+CGDCONT Define PDP Context</b>	
Test Command <b>AT+CGDCONT=?</b>	Response <b>+CGDCONT:</b> (list of supported <b>&lt;cid&gt;</b> s), <b>&lt;PDP_type&gt;</b> , <b>&lt;APN&gt;</b> , <b>&lt;PDP_addr&gt;</b> , (list of supported <b>&lt;data_comp&gt;</b> s), (list of supported <b>&lt;head_comp&gt;</b> s),(list of supported <b>&lt;IPv4AddrAlloc&gt;</b> s)  <b>OK</b>
Read Command <b>AT+CGDCONT?</b>	Response <b>+CGDCONT:</b> <b>&lt;cid&gt;</b> , <b>&lt;PDP_type&gt;</b> , <b>&lt;APN&gt;</b> , <b>&lt;PDP_addr&gt;</b> , <b>&lt;data_comp&gt;</b> , <b>&lt;head_comp&gt;</b> , <b>&lt;IPv4AddrAlloc&gt;</b> [...]  <b>OK</b>
Write Command <b>AT+CGDCONT=&lt;cid&gt;[,&lt;PDP_type&gt;[,&lt;APN&gt;[,&lt;PDP_addr&gt;[,&lt;data_comp&gt;[,&lt;head_comp&gt;[,&lt;IPv4AddrAlloc&gt;]]]]]</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference	
<i>3GPP TS 27.007</i>	

**Parameter**

<b>&lt;cid&gt;</b>	Integer type. PDP context identifier, which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1) is returned by the test form of the command. Range: 1–15.										
<b>&lt;PDP_type&gt;</b>	Packet data protocol type. A string parameter which specifies the type of packet data protocol. <table border="0" style="margin-left: 20px;"> <tr><td>"IP"</td><td>IPv4</td></tr> <tr><td>"PPP"</td><td>PPP</td></tr> <tr><td>"IPv6"</td><td>IPv6</td></tr> <tr><td>"IPv4v6"</td><td>IPv4v6</td></tr> <tr><td>"Non-IP"</td><td>Non-IP</td></tr> </table>	"IP"	IPv4	"PPP"	PPP	"IPv6"	IPv6	"IPv4v6"	IPv4v6	"Non-IP"	Non-IP
"IP"	IPv4										
"PPP"	PPP										
"IPv6"	IPv6										
"IPv4v6"	IPv4v6										
"Non-IP"	Non-IP										
<b>&lt;APN&gt;</b>	String type. Access point name, 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.										
<b>&lt;PDP_addr&gt;</b>	String type. Identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The allocated address may be read using the <b>AT+CGPADDR</b> command.										
<b>&lt;data_comp&gt;</b>	A numeric parameter that controls PDP data compression (applicable for SNDTCP only) (refer to <i>3GPP TS 44.065 [61]</i> ). <table border="0" style="margin-left: 20px;"> <tr><td>0</td><td>OFF (Default value if the parameter is omitted)</td></tr> <tr><td>1</td><td>ON (Manufacturer preferred compression)</td></tr> <tr><td>2</td><td>V.42bis</td></tr> </table>	0	OFF (Default value if the parameter is omitted)	1	ON (Manufacturer preferred compression)	2	V.42bis				
0	OFF (Default value if the parameter is omitted)										
1	ON (Manufacturer preferred compression)										
2	V.42bis										
<b>&lt;head_comp&gt;</b>	Integer type. Controls PDP header compression (refer to <i>3GPP TS 44.065 [61]</i> and <i>3GPP TS 25.323 [62]</i> ). <table border="0" style="margin-left: 20px;"> <tr><td>0</td><td>OFF</td></tr> <tr><td>1</td><td>ON</td></tr> <tr><td>2</td><td>RFC 1144</td></tr> <tr><td>3</td><td>RFC 2507</td></tr> <tr><td>4</td><td>RFC 3095</td></tr> </table>	0	OFF	1	ON	2	RFC 1144	3	RFC 2507	4	RFC 3095
0	OFF										
1	ON										
2	RFC 1144										
3	RFC 2507										
4	RFC 3095										
<b>&lt;IPv4AddrAlloc&gt;</b>	Integer type. Controls how the MT/TA requests to get the IPv4 address information. <table border="0" style="margin-left: 20px;"> <tr><td>0</td><td>IPv4 address allocation through NAS signaling</td></tr> </table>	0	IPv4 address allocation through NAS signaling								
0	IPv4 address allocation through NAS signaling										

**8.3. AT+CGACT PDP Context Activate or Deactivate**

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

contexts.

AT+CGACT PDP Context Activate or Deactivate	
Test Command <b>AT+CGACT=?</b>	Response <b>+CGACT:</b> (list of supported <state>s)  <b>OK</b>
Read Command <b>AT+CGACT?</b>	Response <b>+CGACT:</b> <cid>,<state> <b>[+CGACT:</b> <cid>,<state> <b>[...]]</b>  <b>OK</b>
Write Command <b>AT+CGACT=&lt;state&gt;,&lt;cid&gt;</b>	Response <b>OK</b> Or <b>ERROR</b>  If there is an error related to ME functionality: <b>+CME ERROR:</b> <err>
Maximum Response Time	150 s, determined by the network.
Characteristics	-
Reference <i>3GPP TS 27.007</i>	

### Parameter

<b>&lt;state&gt;</b>	Integer type. Indicates the state of PDP context activation. 0 Deactivated 1 Activated Other values are reserved and will result in an <b>ERROR</b> response to the Write Command
<b>&lt;cid&gt;</b>	Integer type. Specifies a particular PDP context definition (see <b>AT+CGDCONT</b> ).
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

### Example

```

AT+CGDCONT=1,"IP","UNINET" //Define a PDP context
OK
AT+CGACT=1,1 //Activate the PDP
OK
AT+CGACT=0,1 //Deactivate the PDP
OK
    
```

## 8.4. AT+CGPADDR Show PDP Addresses

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

AT+CGPADDR Show PDP Addresses	
Test Command <b>AT+CGPADDR=?</b>	Response <b>+CGPADDR:</b> (list of defined <b>&lt;cid&gt;</b> s)  <b>OK</b>
Write Command <b>AT+CGPADDR[=&lt;cid&gt;[,&lt;cid&gt;[,...]]]</b>	Response <b>+CGPADDR: &lt;cid&gt;,&lt;PDP_addr&gt;</b> <b>[+CGPADDR: &lt;cid&gt;,&lt;PDP_addr&gt;</b> <b>[...]]</b>  <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	-
Reference	<i>3GPP TS 27.007</i>

### Parameter

<b>&lt;cid&gt;</b>	Integer type. Specifies a particular PDP context definition (see <b>AT+CGDCONT</b> ).
<b>&lt;PDP_addr&gt;</b>	String type. Identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the <b>AT+CGDCONT</b> 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 <b>&lt;cid&gt;</b> . <b>&lt;PDP_address&gt;</b> is omitted if none is available.

### Example

```

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

OK

## 8.5. AT+CGREG EGPRS Network Registration Status

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

AT+CGREG EGPRS Network Registration Status	
Test Command <b>AT+CGREG=?</b>	Response <b>+CGREG:</b> (list of supported <n>s)  <b>OK</b>
Read Command <b>AT+CGREG?</b>	Response: When <n>=0, 1, or 2 and the command is executed successfully: <b>+CGREG: &lt;n&gt;,&lt;stat&gt;[,&lt;lac&gt;,&lt;ci&gt;,&lt;AcT&gt;]</b>  <b>OK</b>  When <n>=4 and the command is executed successfully: <b>+CGREG: &lt;n&gt;,&lt;stat&gt;[,&lt;lac&gt;,&lt;ci&gt;,&lt;AcT&gt;][,],[&lt;Active-Time&gt;],[&lt;Periodic-RAU&gt;],[&lt;GPRS-READY-timer&gt;]]]</b>  <b>OK</b>
Write Command <b>AT+CGREG[=&lt;n&gt;]</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with <b>AT&amp;W</b> .
Reference <i>3GPP TS 27.007</i>	

### Parameter

<b>&lt;n&gt;</b>	Integer type. <u>0</u> Disable network registration unsolicited result code
------------------	--

- 1 Enable network registration unsolicited result code: **+CGREG: <stat>**
- 2 Enable network registration and location information unsolicited result code: **+CGREG: <stat>,[<lac>],[<ci>],[<AcT>]**
- 4 For a UE that wants to apply PSM, enable network registration and location information unsolicited result code: **+CGREG: <stat>,[<lac>],[<ci>],[<AcT>][,],[<Active-Time>],[<Periodic-RAU>],[<GPRS-READY-timer>]]]**

**<stat>** Integer type. Indicates the EGPRS registration status.

- 0 Not registered. MT is not currently searching an operator to register to. The UE is in GMM state GMM-NULL or GMM-DEREGISTERED-INITIATED. The GPRS service is disabled, but the UE is allowed to attach for GPRS if requested by the user.
- 1 Registered, home network. The UE is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED on the home PLMN.
- 2 Not registered, but MT is currently trying to attach or searching an operator to register to. The UE is in GMM state GMM-DEREGISTERED or GMM-REGISTERED-INITIATED. The GPRS service is enabled, but an allowable PLMN is currently not available. The UE will start a GPRS attach as soon as an allowable PLMN is available.
- 3 Registration denied. The UE is in GMM state GMM-NULL. The GPRS service is disabled, and the UE is not allowed to attach for GPRS if requested by the user.
- 4 Unknown
- 5 Registered, roaming

**<lac>** String type. Two-byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

**<ci>** String type. Four-byte cell ID in hexadecimal format.

**<AcT>** Integer type. Access technology of the serving cell.

- 0 GSM
- 8 eMTC (Not applicable)
- 9 NB-IoT (Not applicable)
- 14 IoT-NTN (Not applicable)

**<Active-Time>** String type. One byte in an 8-bit format. Active Time value (T3324) to be allocated to the UE.  
 (e.g. "00001111" equals 30 seconds)  
 Bits 5 to 1 represent the binary coded timer value.  
 Bits 6 to 8 define the timer value unit as follows:

**Bits 8 7 6**

- 0 0 0 value is incremented in multiples of 2 seconds
- 0 0 1 value is incremented in multiples of 1 minute
- 0 1 0 value is incremented in multiples of decihours
- 1 1 1 value indicates that the timer is deactivated.

**<Periodic-RAU>** String type. One byte in an 8-bit format. Extended periodic RAU value (T3312) to be allocated to the UE in GERAN.  
 (e.g. "01000111" equals 70 hours)

Bits 5 to 1 represent the binary coded timer value.

Bits 6 to 8 define the timer value unit as follows:

**Bits 8 7 6**

- 0 0 0 value is incremented in multiples of 10 minutes
- 0 0 1 value is incremented in multiples of 1 hour
- 0 1 0 value is incremented in multiples of 10 hours
- 0 1 1 value is incremented in multiples of 2 seconds
- 1 0 0 value is incremented in multiples of 30 seconds
- 1 0 1 value is incremented in multiples of 1 minute

**<GPRS-READY-timer>** String type. One byte in an 8-bit format. GPRS READY timer value (T3314) to be allocated to the UE in GERAN.

(e.g. "01001010" equals 1 hours)

Bits 5 to 1 represent the binary coded timer value.

Bits 6 to 8 define the timer value unit as follows:

**Bits 8 7 6**

- 0 0 0 value is incremented in multiples of 2 seconds
- 0 0 1 value is incremented in multiples of 1 minute
- 0 1 0 value is incremented in multiples of decihours
- 1 1 1 value indicates that the timer is deactivated

**Example**

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

+CGREG: 2
AT+CGATT=1
OK

+CGREG: 1,"FFFE","82E76B2",9
```

**8.6. AT+CGEREP Packet Domain Event Reporting**

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

**AT+CGEREP Packet Domain Event Reporting**

Test Command	Response
--------------	----------

AT+CGEREP=?	+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  If there is any error: ERROR
Execution Command AT+CGEREP	Response OK
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.
Reference 3GPP TS 27.007	

**Parameter**

<b>&lt;mode&gt;</b>	Integer type. <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>2 Buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in data mode) and flush them to the TE when MT-TE link becomes available. Otherwise forward them directly to the TE.</li> </ul>
<b>&lt;bfr&gt;</b>	Integer type. <ul style="list-style-type: none"> <li>0 MT buffer of unsolicited result codes defined within this command is cleared when &lt;mode&gt; 1 or 2 is entered.</li> <li>1 MT buffer of unsolicited result codes defined within this command is flushed to the TE when &lt;mode&gt; 1 or 2 is entered (OK response shall be given before flushing the codes).</li> </ul>

**NOTE**

The unsolicited result codes and the corresponding events are defined as follows:  
 1. **+CGEV: REJECT <PDP\_type>,<PDP\_addr>**: A network request for PDP context activation

occurred when the MT was unable to report it to the TE with a **+CRING** unsolicited result code and was automatically rejected.

Note: This event is not applicable for EPS.

2. **+CGEV: NW REACT <PDP\_type>,<PDP\_addr>,[<cid>]**: The network has requested a context reactivation. The **<cid>** used to reactivate the context is provided if known to the MT.

Note: This event is not applicable for EPS.

3. **+CGEV: NW DEACT <PDP\_type>,<PDP\_addr>,[<cid>]**: The network has forced a context deactivation. The **<cid>** used to activate the context is provided if known to the MT.
4. **+CGEV: ME DEACT <PDP\_type>,<PDP\_addr>,[<cid>]**: The mobile equipment has forced a context deactivation. The **<cid>** used to activate the context is provided if known to the MT.
5. **+CGEV: NW DETACH**: The network has forced a Packet Domain detach. This implies that all active contexts have been deactivated. These are not reported separately.
6. **+CGEV: ME DETACH**: The mobile equipment has forced a Packet Domain detach. This implies that all active contexts have been deactivated. These are not reported separately.
7. **+CGEV: NW CLASS <class>**: The network has forced a change of MS class. The highest available class is reported (see **AT+CGCLASS**).
8. **+CGEV: ME CLASS <class>**: The mobile equipment has forced a change of MS class. The highest available class is reported (see **AT+CGCLASS**).
9. **+CGEV: PDN ACT <cid>**: Activated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM.
10. **+CGEV: PDN DEACT <cid>**: Deactivated a context. The context represents a PDN connection in LTE or a primary PDP context in GSM.

**Parameter**

<b>&lt;PDP_type&gt;</b>	Packet data protocol type. A string parameter which specifies the type of packet data protocol. "IP" IPv4 "PPP" PPP "IPV6" IPv6 "IPV4V6" IPv4v6
<b>&lt;PDP_addr&gt;</b> If	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.
<b>&lt;cid&gt;</b> context other PDP value=1) is	PDP context identifier. A numeric parameter which specifies a particular PDP definition. The parameter is local to the TE-MT interface and is used in context-related commands. The range of permitted values (minimum returned by the test form of <b>AT+CGDCONT</b> command).
<b>&lt;class&gt;</b>	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=?
+CGEREP: (0-2),(0,1)

OK
AT+CGEREP?
+CGEREP: 0,0

OK
    
```

### 8.7. AT+CGSMS Select Service for MO SMS Messages

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

<b>AT+CGSMS Select Service for MO SMS Messages</b>	
Test Command <b>AT+CGSMS=?</b>	Response <b>+CGSMS:</b> (range of currently available <service>s)  <b>OK</b>
Read Command <b>AT+CGSMS?</b>	Response <b>+CGSMS:</b> <service>  <b>OK</b>
Write Command <b>AT+CGSMS=[&lt;service&gt;]</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved automatically.
Reference	3GPP TS 27.007

**Parameter**

<b>&lt;service&gt;</b>	Integer type. Indicates the service or service preference to be used.
0	GPRS
1	Circuit switch
2	GPRS preferred (use circuit switched if GPRS is not available)
3	Circuit switch preferred (use GPRS if circuit switched is not available)
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

**NOTE**

The circuit switched service route is the default method.

### 8.8. AT+CEREG EPS Network Registration Status

This command queries the LTE 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.

If the UE wants to apply PSM for reducing its power consumption, see **AT+CPSMS** command and 3GPP TS 23.682 [149], this command controls the presentation of an unsolicited result code **+CEREG: <stat>,[<tac>],[<ci>],[<AcT>],[<Active-Time>],[<Periodic-TAU>]** when **<n>=4** and there is a change of the network cell in E-UTRAN.

<b>AT+CEREG EPS Network Registration Status</b>	
Test Command <b>AT+CEREG=?</b>	Response <b>+CEREG:</b> (list of supported <b>&lt;n&gt;</b> s)  <b>OK</b>
Read Command <b>AT+CEREG?</b>	Response When <b>&lt;n&gt;=0, 1, or 2</b> and the command is executed successfully: <b>+CEREG: &lt;n&gt;,&lt;stat&gt;,[&lt;tac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;]</b>  When <b>&lt;n&gt;=4</b> and the command is executed successfully: <b>+CEREG: &lt;n&gt;,&lt;stat&gt;,[&lt;tac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;],[&lt;Active-Time&gt;],[&lt;Periodic-TAU&gt;]</b>  <b>OK</b>

Write Command <b>AT+CEREG[=&lt;n&gt;]</b>	Response <b>OK</b> Or <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration can be saved with <b>AT&amp;W</b> .
Reference 3GPP TS 27.007	

**Parameter**

<b>&lt;n&gt;</b>	Integer type. <ul style="list-style-type: none"> <li>0 Disable network registration unsolicited result code</li> <li>1 Enable network registration unsolicited result code: <b>+CEREG: &lt;stat&gt;</b></li> <li>2 Enable network registration and location information unsolicited result code: <b>+CEREG: &lt;stat&gt;,[&lt;tac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;]</b></li> <li>4 For a UE that has applied PSM, and network assigns T3324 to UE, enable network registration and location information unsolicited result code: <b>+CEREG: &lt;stat&gt;,[&lt;tac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;][,],[&lt;Active-Time&gt;],[&lt;Periodic-TAU&gt;]]]</b></li> </ul>
<b>&lt;stat&gt;</b>	Integer type. <ul style="list-style-type: none"> <li>0 Not registered. MT is not currently searching an operator to register to.</li> <li>1 Registered, home network</li> <li>2 Not registered, but MT is currently trying to attach or searching an operator to register to</li> <li>3 Registration denied</li> <li>4 Unknown</li> <li>5 Registered, roaming</li> </ul>
<b>&lt;tac&gt;</b>	String type. Two-byte tracking area code in hexadecimal format.
<b>&lt;ci&gt;</b>	String type. Four-byte E-UTRAN cell ID in hexadecimal format.
<b>&lt;AcT&gt;</b>	Access technology selected <ul style="list-style-type: none"> <li>0 GSM (Not applicable)</li> <li>8 eMTC</li> <li>9 NB-IoT</li> <li>14 IoT-NTN</li> </ul>
<b>&lt;Active-Time&gt;</b>	String type. One byte in an 8-bit format. Active Time value (T3324) to be allocated to the UE. (e.g. "00001111" equals to 1 minute) Bits 5 to 1 represent the binary coded timer value. Bits 6 to 8 define the timer value unit as follows: Bits 8 7 6

0 0 0 value is incremented in multiples of 2 seconds

0 0 1 value is incremented in multiples of 1 minute

0 1 0 value is incremented in multiples of decihours

1 1 1 value indicates that the timer is deactivated.

**<Periodic-TAU>** String type. One byte in an 8-bit format. Extend periodic TAU value (T3412\_ext) to be allocated to the UE in E-UTRAN.

(e.g. "00001010" equals to 100 minutes)

Bits 5 to 1 represent the binary coded timer value.

Bits 6 to 8 define the timer value unit as follows:

Bits

8 7 6

0 0 0 value is incremented in multiples of 10 minutes

0 0 1 value is incremented in multiples of 1 hour

0 1 0 value is incremented in multiples of 10 hours

0 1 1 value is incremented in multiples of 2 seconds

1 0 0 value is incremented in multiples of 30 seconds

1 0 1 value is incremented in multiples of 1 minute

---

# 9 Hardware Related Commands

## 9.1. AT+CCLK Clock

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

AT+CCLK Clock	
Test Command <b>AT+CCLK=?</b>	Response <b>OK</b>
Read Command <b>AT+CCLK?</b>	Response <b>+CCLK: &lt;time&gt;</b>  <b>OK</b>
Write Command <b>AT+CCLK=&lt;time&gt;</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	-
Reference	
3GPP TS 27.007	

### Parameter

<b>&lt;time&gt;</b>	String type. The format is “yy/MM/dd, hh:mm:ss±zz”, indicating year (last two-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 6 <sup>th</sup> , 1994, 22:10:00 GMT+2 hours equals to “94/05/06,22:10:00+08”.
<b>&lt;err&gt;</b>	Integer type. Error code. Refer to <b>Table 20</b> for possible <b>&lt;err&gt;</b> values.

Example

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

OK
```

## 9.2. AT+CBC Battery Charge

This command returns battery charge status (<bc>) and battery charge level (<bcl>) of the MT.

AT+CBC Battery Charge	
Test Command <b>AT+CBC=?</b>	Response <b>+CBC:</b> (list of supported <bc>),(list of supported <bcl>),<voltage>  <b>OK</b>
Execution Command <b>AT+CBC</b>	Response <b>+CBC:</b> <bc>,<bcl>,<voltage>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR:</b> <err>
Maximum Response Time	300 ms
Characteristics	-
Reference	3GPP TS 27.007

### Parameter

<bc>	Integer type. Battery charge status 0 ME is not charging 1 ME is charging 2 Charging has been finished
<bcl>	Battery charge level 0 - 100 Battery has 0 - 100 percent of capacity remaining
<voltage>	Battery voltage (mV)
<err>	Integer type. Error code. Refer to <b>Table 20</b> for possible <err> values.

### 9.3. AT+QADC Read ADC Value

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

AT+QADC Read ADC Value	
Test Command <b>AT+QADC=?</b>	Response <b>+QADC: (0)</b>  <b>OK</b>
Read Command <b>AT+QADC=&lt;port&gt;</b>	Response <b>+QADC: &lt;status&gt;,&lt;value&gt;</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	-

#### Parameter

<b>&lt;port&gt;</b>	Channel number of the ADC. 0    ADC Channel 0
<b>&lt;status&gt;</b>	Indicate whether the ADC value is read successfully. 0    Fail 1    Success
<b>&lt;value&gt;</b>	The voltage of specified ADC channel. Unit: mV.

**NOTE**

For more details about the pin number, see the corresponding hardware design.

### 9.4. AT+QSCLK Configure Whether or Not to Enter Sleep Mode

This command is used to control whether the module enters sleep mode. When entering sleep mode is enabled and MAIN\_DTR is pulled up, the module enters sleep mode directly. If entering sleep mode is enabled and MAIN\_DTR is pulled down, there is a need to pull up the MAIN\_DTR pin first to make the module enter sleep mode.

<b>AT+QSCLK Configure Whether or Not to Enter Sleep Mode</b>	
Test Command <b>AT+QSCLK=?</b>	Response <b>+QSCLK:</b> (list of supported <n>s)  <b>OK</b>
Read Command <b>AT+QSCLK?</b>	Response <b>+QSCLK:</b> <n>  <b>OK</b>
Write Command <b>AT+QSCLK=&lt;n&gt;</b>	Response <b>OK</b>  If there is any other error: <b>ERROR</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

**Parameter**

<n>	Integer type.
0	Disable sleep mode
1	Enable sleep mode. It is controlled by MAIN_DTR.

**9.5. AT+QTEMP Read Temperature**

This command reads the temperature of PMIC, XO, PA and baseband. (Only the firmware version on R02 baseline supports reading the temperature of baseband.)

<b>AT+QTEMP Read Temperature</b>	
Test Command <b>AT+QTEMP=?</b>	Response <b>OK</b>
Execution Command <b>AT+QTEMP</b>	Response <b>+QTEMP:</b> <pmic_temp>,<xo_temp>,<pa_temp>  <b>OK</b>  If there is any error: <b>ERROR</b>

Maximum Response Time	300 ms
Characteristics	-

**Parameter**

<pmic_temp>	PMIC temperature. Unit: degrees Celsius.
<xo_temp>	XO temperature. Unit: degrees Celsius.
<pa_temp>	PA temperature. Unit: degrees Celsius.

**9.6. AT+QCTEMP Configure Temperature Threshold**

This command configures the warning threshold for a specific temperature type and whether to enable the corresponding function of the temperature warning.

**AT+QCTEMP Configure Temperature Threshold**

<p>Test Command</p> <p><b>AT+QCTEMP=?</b></p>	<p>Response</p> <p><b>+QCTEMP: 0</b>,(list of supported &lt;threshold&gt;s),(list of supported &lt;state&gt;s)</p> <p><b>+QCTEMP: 1</b>,(list of supported &lt;threshold&gt;s),(list of supported &lt;state&gt;s)</p> <p><b>+QCTEMP: 2</b>,(list of supported &lt;threshold&gt;s),(list of supported &lt;state&gt;s)</p> <p><b>OK</b></p>
<p>Read Command</p> <p><b>AT+QCTEMP?</b></p>	<p>Response</p> <p><b>+QCTEMP: 0</b>,&lt;threshold&gt;,&lt;state&gt;</p> <p><b>+QCTEMP: 1</b>,&lt;threshold&gt;,&lt;state&gt;</p> <p><b>+QCTEMP: 2</b>,&lt;threshold&gt;,&lt;state&gt;</p> <p><b>OK</b></p>
<p>Write Command</p> <p><b>AT+QCTEMP=&lt;threshold_type&gt;[,&lt;threshold&gt;,&lt;state&gt;]</b></p>	<p>Response</p> <p>If the optional parameters are omitted, query the warning threshold and warning enabling state corresponding to a specific temperature type:</p> <p><b>+QCTEMP: &lt;threshold_type&gt;,&lt;threshold&gt;,&lt;state&gt;</b></p> <p><b>OK</b></p> <p>If the optional parameters are specified, configure the</p>

	temperature threshold: <b>OK</b>
Maximum Response Time	200 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

**Parameter**

<b>&lt;threshold_type&gt;</b>	Integer type. Type of temperature warning threshold. 0 PMIC temperature warning threshold 1 XO temperature warning threshold 2 PA temperature warning threshold
<b>&lt;threshold&gt;</b>	Integer type. Temperature threshold. Range: 60–100. Default value: 85.
<b>&lt;state&gt;</b>	Integer type. It indicates the corresponding function of <b>&lt;threshold_type&gt;</b> is enabled or disabled. 0 The function is disabled 1 The function is enabled. The URC is reported only once when the temperature reaches the set threshold.

**NOTE**

- This command is only for the firmware versions on R02 baseline.
- When the temperature reaches the set threshold, the URC is reported as follows:
  - **+QIND: "OVER PMIC TEMPERATURE WARNING"**
  - **+QIND: "OVER OX TEMPERATURE WARNING"**
  - **+QIND: "OVER PA TEMPERATURE WARNING"**

**Example**

```

AT+QCTEMP=? //Test command, used to query threshold setting range.
+QCTEMP: 0,(60-100),(0,1)
+QCTEMP: 1,(60-100),(0,1)
+QCTEMP: 2,(60-100),(0,1)

OK
AT+QCTEMP=0,70,1 //Set the PMIC temperature warning voltage to 70°C.
OK
AT+QCTEMP=0 //Query the PMIC temperature warning threshold and state.
+QCTEMP 0,70,1 //0 indicates the function type of PMIC temperature, 70°C indicates the threshold for PMIC temperature warning, and 1 indicates that the PMIC warning function is enabled. When the temperature reaches the set threshold, the URC will be reported once.

OK
AT+QCTEMP? //Read command.
    
```

```

+QCTEMP: 0,70,1
+QCTEMP: 1,85,1
+QCTEMP: 2,85,1

OK

//Adjust the PMIC temperature to over 70°C
+QIND: "OVER PMIC TEMPERATURE WARNING"

//Adjust the PMIC temperature to below 70°C
+QIND: "NORMAL PMIC TEMPERATURE WARNING"

//Adjust the XO temperature to over 85°C
+QIND: "OVER XO TEMPERATURE WARNING"

//Adjust the PA temperature to over 85°C
+QIND: "OVER PA TEMPERATURE WARNING"
AT+QCTEMP=1,80,1 //The function of the XO temperature warning is enabled. When the
OK               temperature reaches the set threshold, the URC will be reported only
                once.
    
```

### 9.7. AT+QVBATT Configure the Voltage Threshold

The command configures the high and low voltage threshold of warning and power-down.

#### AT+QVBATT Configure the Voltage Threshold

Test Command <b>AT+QVBATT=?</b>	Response <b>+QVBATT: 0,</b> (list of supported <threshold>s),(list of supported <state>s) <b>+QVBATT: 1,</b> (list of supported <threshold>s),(list of supported <state>s) <b>+QVBATT: 2,</b> (list of supported <threshold>s),(list of supported <state>s) <b>+QVBATT: 3,</b> (list of supported <threshold>s),list of supported <state>s)  OK
Read Command <b>AT+QVBATT?</b>	Response <b>+QVBATT: 0,&lt;threshold&gt;,&lt;state&gt;</b> <b>+QVBATT: 1,&lt;threshold&gt;,&lt;state&gt;</b> <b>+QVBATT: 2,&lt;threshold&gt;,&lt;state&gt;</b> <b>+QVBATT: 3,&lt;threshold&gt;,&lt;state&gt;</b>

	<b>OK</b>
Read Command Read the threshold and state corresponding to each type of voltage warning	Response <b>+QVBATT: &lt;threshold_type&gt;,&lt;threshold&gt;,&lt;state&gt;</b>
<b>AT+QVBATT=&lt;threshold_type&gt;</b>	<b>OK</b>
Write Command <b>AT+QVBATT=&lt;threshold_type&gt;,&lt;threshold&gt;,&lt;state&gt;</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

**Parameter**

<b>&lt;threshold_type&gt;</b>	Integer type. Type of voltage threshold configuration. 0 Configure the low voltage warning threshold 1 Configure the low voltage power-down threshold 2 Configure the high voltage warning threshold 3 Configure the high voltage power-down threshold
<b>&lt;threshold&gt;</b>	Integer type. Voltage threshold. Unit: mV. When <b>&lt;threshold_type&gt;</b> =0, the range of <b>&lt;threshold&gt;</b> is from 3350 to 3500 and the default value is 3500. When <b>&lt;threshold_type&gt;</b> =1, the range of <b>&lt;threshold&gt;</b> is from 3000 to 3300 and the default value is 3300. When <b>&lt;threshold_type&gt;</b> =2, the range of <b>&lt;threshold&gt;</b> is from 4450 to 4580 and the default value is 4580. When <b>&lt;threshold_type&gt;</b> =3, the range of <b>&lt;threshold&gt;</b> is from 4600 to 4800 and the default value is 4800.
<b>&lt;state&gt;</b>	Integer type. The corresponding function of <b>&lt;threshold_type&gt;</b> is enabled or disabled. 0 The function is disabled 1 The function is enabled. The URC is reported all the time when the voltage reaches the configured threshold 2 The function is enabled. The URC is reported only once when the voltage reaches the configured threshold

**NOTE**

1. When the battery voltage reaches the configured threshold, the URC is reported as follows:
  - **+QIND: "UNDER VOLTAGE WARNING"**      Low voltage warning
  - **+QIND: "UNDER VOLTAGE POWER DOWN"**      Power-down due to low voltage
  - **+QIND: "OVER VOLTAGE WARNING"**      High voltage warning
  - **+QIND: "OVER VOLTAGE POWER DOWN"**      Power-down due to high voltage
2. When the battery voltage reaches the configured threshold, the module not only reports URC, but also resets or powers off.

**Example**

```

AT+QVBATT=? //Test command.
+QVBATT: 0,(3350-3500),(0-2)
+QVBATT: 1,(3000-3300),(0-2)
+QVBATT: 2,(4450-4580),(0-2)
+QVBATT: 3,(4600-4800),(0-2)

OK
AT+QVBATT=0,3490,1 //Set the low voltage warning threshold to 3490 mV.
OK
AT+QVBATT=0 //Query the low voltage warning threshold and state.
+QVBATT: 0,3490,1 //The threshold of the low voltage warning is 3490 mV,
warning is enabled and the URC is reported all the time.

OK
AT+QVBATT? //Read command.
+QVBATT: 0,3490,1
+QVBATT: 1,3300,1
+QVBATT: 2,4500,1
+QVBATT: 3,4700,1

OK

//Adjust the power voltage to below 3300 mV
+QIND : "UNDER VOLTAGE POWER DOWN"

//Adjust the power voltage to between 3300 mV and 3490 mV
+QIND : "UNDER VOLTAGE WARNING"

//Adjust the power voltage to between 4500 mV and 4700 mV
+QIND : "OVER VOLTAGE WARNING"

//Adjust the power voltage to over 4700 mV
    
```

**+QIND : "OVER VOLTAGE POWER DOWN"**

**AT+QVBATT=1,3300,0** //The low voltage power-down is turned off.

OK

**AT+QVBATT=1** //Query the low voltage power-down threshold and state.

**+QVBATT: 1,3300,0** //The threshold of the low voltage power-down is 3300 mV and the low voltage power-down is turned off.

OK

**AT+QVBATT?** //Read command.

**+QVBATT: 0,3490,1**

**+QVBATT: 1,3300,0** //The low voltage power-down is turned off.

**+QVBATT: 2,4500,1**

**+QVBATT: 3,4700,1**

OK

**AT+QVBATT=1,3300,2** //Set the low voltage power-down threshold to 3300 mV, turn on the low voltage power-down and the URC is reported only one time.

OK

**AT+QVBATT=1** //Query the low voltage warning threshold and state.

**+QVBATT: 1,3300,2** //The low voltage power-down threshold is 3300 mV, the low voltage power-down is turned on and the URC is reported only one time.

OK

# 10 DFOTA Related AT Command

Refer to *document [2]* for details of DFOTA function.

Table 4: DFOTA Related AT Command

Command	Description
<b>AT+QFOTADL</b>	Upgrade firmware via DFOTA
<b>AT+QCFGEXT="fota_apn"</b>	Configure IP family and APN for DFOTA
<b>AT+QCFGEXT="fota_http_header"</b>	Configure HTTP(S) header for DFOTA over HTTP(S)
<b>AT+QCFGEXT="fota_wd_gpio"</b>	Configure watch dog pin and feeding interval during DFOTA
<b>AT+QCFGEXT="sni"</b>	Configure Whether to enable server name indication for DFOTA

# 11 FTP(S) Related AT Commands

Refer to **document [3]** for details of FTP(S) function.

Table 5: FTP(S) Related AT Commands

Command	Description
AT+QFTPCFG	Configure parameters for FTP(S) server
AT+QFTPOPEN	Login to FTP(S) server
AT+QFTPCWD	Configure the current directory on FTP(S) server
AT+QFTPPWD	Get the current directory on FTP(S) server
AT+QFTPPUT	Upload a file to FTP(S) server
AT+QFTPGET	Download a file from FTP(S) server
AT+QFTPSIZE	Get the file size on FTP(S) server
AT+QFTPDEL	Delete a file on FTP(S) server
AT+QFTPMKDIR	Create a folder on FTP(S) server
AT+QFTPRMDIR	Delete a folder on FTP(S) server
AT+QFTPLIST	List content of a directory on FTP(S) server
AT+QFTPNLIST	List file names of a directory on FTP(S) server
AT+QFTPMLSD	List standardized file and directory information
AT+QFTPMDTM	Get the file modification time on FTP(S) server
AT+QFTPRENAME	Rename a file or folder on FTP(S) server
AT+QFTPLEN	Get the length of transferred data
AT+QFTPSTAT	Get the status of FTP(S) server
AT+QFTPCLOSE	Log out from FTP(S) server

# 12 HTTP(S) Related AT Commands

Refer to **document [4]** for details of HTTP(S) function.

Table 6: HTTP(S) Related AT Commands

Command	Description
<b>AT+QHTTPCFG</b>	Configure parameters for HTTP(S) server
<b>AT+QHTTPURL</b>	Set URL of HTTP(S) server
<b>AT+QHTTPGET</b>	Send GET request to HTTP(S) server
<b>AT+QHTTPPOST</b>	Send POST request to HTTP(S) server via UART/USB
<b>AT+QHTTPPOSTFILE</b>	Send POST request to HTTP(S) server via file
<b>AT+QHTTPPUT</b>	Send PUT request to HTTP(S) server via UART/USB
<b>AT+QHTTPPUTFILE</b>	Send PUT request to HTTP(S) server via File
<b>AT+QHTTPREAD</b>	Read response from HTTP(S) server via UART/USB
<b>AT+QHTTPREADFILE</b>	Store the response from HTTP(S) server to a file

# 13 TCP(IP) Related AT Commands

Refer to **document [5]** for details of TCP(IP) function.

Table 7: TCP/IP Related AT Commands

Command	Description
AT+QICSGP	Configure parameters of a TCP/IP context
AT+QIACT	Activate a PDP context
AT+QIDEACT	Deactivate a PDP context
AT+QIOPEN	Open a socket service
AT+QICLOSE	Close a socket service
AT+QISTATE	Query socket service status
AT+QISEND	Send data
AT+QIRD	Retrieve the received TCP/IP data
AT+QISENDEX	Send hex string data
AT+QISWTMD	Switch data access mode
AT+QPING	Ping a remote server
AT+QNTP	Synchronize local time with NTP server
AT+QIDNSCFG	Configure address of DNS server
AT+QIDNSGIP	Get IP address by domain name
AT+QICFG	Configure optional parameters
AT+QISDE	Control whether to echo the data for AT+QISEND
AT+QIGETERROR	Query the last error code

# 14 GNSS Related AT Commands

Refer to *document [6]* for details of GNSS function.

Table 8: GNSS Related AT Commands

Command	Description
AT+QGPSCFG	Configure GNSS
AT+QGPSDEL	Delete assistance data
AT+QGPS	Turn on GNSS
AT+QGPSEND	Turn off GNSS
AT+QGPSLOC	Acquire positioning information
AT+QGPSGNMEA	Acquire NMEA sentences
AT+QGPSXTRA	Enable gpsOneXTRA assistance function
AT+QGPSXTRATIME	Inject gpsOneXTRA time
AT+QGPSXTRADATA	Inject gpsOneXTRA data file
AT+QCFGEXT	Query and Configure Extended Settings for GNSS

# 15 SSL Related AT Commands

Refer to *document [7]* for details of SSL function.

Table 9: SSL Related AT Commands

Command	Description
<b>AT+QSSLCFG</b>	Configure parameters of an SSL context
<b>AT+QSSLOPEN</b>	Open an SSL socket to connect remote server
<b>AT+QSSLEND</b>	Send data via SSL connection
<b>AT+QSSLRECV</b>	Receive data via SSL connection
<b>AT+QSSLCLOSE</b>	Close an SSL connection
<b>AT+QSSLSTATE</b>	Query the state of SSL connection
<b>AT+ QSSLCRYPT</b>	Encrypt/Decrypt data with a specified algorithm

# 16 FILE Related AT Commands

Refer to **document [8]** for details of FILE function.

Table 10: FILE Related AT Commands

Command	Description
AT+QFLDS	Get the space information of storage
AT+QFLST	List file information
AT+QFDEL	Delete files
AT+QFUPL	Upload a file
AT+QFDWL	Download a file
AT+QFOPEN	Open a file
AT+QFREAD	Read a file
AT+QFWRITE	Write a file
AT+QFSEEK	Set file pointer to a position
AT+QFPOSITION	Get the offset of a file pointer
AT+QFTUCAT	Truncate a file from the file pointer
AT+QFCLOSE	Close a file
AT+QFCRC	Calculate the CRC of a specified UFS file
AT+QFCPY	Make a copy of a specified file

# 17 MQTT Related AT Commands

Refer to *document [9]* for details of MQTT function.

Table 11: MQTT Related AT Commands

Command	Description
<b>AT+QMTCFG</b>	Configure optional parameters of MQTT
<b>AT+QMTOPEN</b>	Open a network for MQTT client
<b>AT+QMTCLOSE</b>	Close a network for MQTT client
<b>AT+QMTCONN</b>	Connect a client to MQTT server
<b>AT+QMTDISC</b>	Disconnect a client from MQTT server
<b>AT+QMTSUB</b>	Subscribe to topics
<b>AT+QMTUNS</b>	Unsubscribe from topics
<b>AT+QMT PUB</b>	Publish messages (Data Mode)
<b>AT+QMT PUBEX</b>	Publish messages (Command Mode)
<b>AT+QMTRECV</b>	Read messages from buffers

# 18 CoAP Related AT Commands

Refer to *document [10]* for details of CoAP function.

Table 12: CoAP Related AT Commands

Command	Description
AT+QCOAPOPEN	Create a CoAP session
AT+QCOAPCLOSE	Disconnect from CoAP server
AT+QCOAPHEADER	Configure header of CoAP message
AT+QCOAPOPTION	Configure options of CoAP message
AT+QCOAPSEND	Send CoAP message
AT+QCOAPCFG	Configure optional parameters of CoAP client

# 19 LwM2M Related AT Commands

Refer to *document [11]* for details of LwM2M function.

Table 13: LwM2M Related AT Commands

Command	Description
AT+QLWCFG	Configure optional parameters of LwM2M client
AT+QLWSVC	Select LwM2M client functionality

# 20 Extended Configuration Commands

Refer to *document [12]&[13]* for details of the extended configuration commands:

Table 14: Extended Configuration Commands

Command	Description
AT+QCFG="nwscanmode"	Configure RAT(s) to be searched
AT+QCFG="servicedomain"	Service domain configuration
AT+QCFG="nwscanseq"	Configure RATs searching sequence
AT+QCFG="band"	Band configuration
AT+QCFG="iotopmode"	Configure network category to be searched under LTE RAT
AT+QCFG="celevel"	Query NB-IoT coverage enhancement level
AT+QCFG="nccconf"	Configure NB-IoT features
AT+QCFG="psm/enter"	Trigger the module into PSM immediately
AT+QCFG="psm/urc"	Enable/Disable PSM entering indication
AT+QCFG="simeffect"	Enable/Disable RAT search order stored in (U)SIM cards
AT+QCFG="lapiconf"	Configure low access priority indication feature
AT+QCFG="nasconfig"	Configure NAS related parameters
AT+QCFG="irat/timer"	Configure high-priority RAT search timer
AT+QCFG="nb1/bandprior"	Configure band scan priority under NB-IoT
AT+QCFG="emmcause"	Get the EMM cause value
AT+QCFG="sibinfo"	Query SIB information
AT+QCFG="emmtimer"	Query EMM timer
AT+QCFG="msclass"	Configure multislot class
AT+QCFG="ims"	Query IMS registration state

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<b>AT+QCFG="snrscan"</b>	Configure band scan level under NB-IoT
<b>AT+QCFG="fgiconfig"</b>	Configure feature group indicators
<b>AT+QCFG="sim/onchip"</b>	Enable/Disable on-chip SIM
<b>AT+QCFG="bandrestore"</b>	Restore default band configuration
<b>AT+QCFG="bip/auth"</b>	Configure the auth type in BIP process
<b>AT+QCFG="timer"</b>	Query the T3402 timer
<b>AT+QCFG="timeupdate"</b>	Control automatic time update via NITZ or GNSS
<b>AT+QCFG="msc"</b>	Configure UE MSC release version
<b>AT+QCFG="sgsn"</b>	Configure UE SGSN release version
<b>AT+QCFG="lte/bandprior"</b>	Configure LTE band priority
<b>AT+QCFG="psm_rtc_adjust_ctrl"</b>	Enable/Disable RTC adjustment in PSM
<b>AT+QCFG="rf/tuner_cfg"</b>	Set the mapping between RF tuner and RF bands
<b>AT+QCFG="timesave"</b>	Control whether to save the NITZ timestamp automatically
<b>AT+QCFG="urc/ri/ring"</b>	Configure MAIN_RI behavior in case of RING URC
<b>AT+QCFG="urc/ri/smsincoming"</b>	Configure MAIN_RI behavior in case of incoming SMS URCs
<b>AT+QCFG="urc/ri/other"</b>	Configure MAIN_RI behavior in case of other URCs
<b>AT+QCFG="risignaltype"</b>	Configure MAIN_RI signal output carrier
<b>AT+QCFG="urc/delay"</b>	When to output URC
<b>AT+QCFG="ledmode"</b>	Configure NET_STATUS output mode
<b>AT+QCFG="gpio"</b>	Configure GPIO status
<b>AT+QCFG="airplanecontrol"</b>	Enable/disable airplane mode control via W_DISABLE#
<b>AT+QCFG="cmux/urcport"</b>	Configure output port of URCs in MUX Mode
<b>AT+QCFG="apready"</b>	Configure AP_READY behavior
<b>AT+QCFG="psm/urc"</b>	Enable/disable PSM entering indication
<b>AT+QCFG="uartcfg"</b>	Control DCD/RI/DTR/RTS/CTS function
<b>AT+QCFG="dbgctl"</b>	Configure log output level

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<b>AT+QCFG="cmux/flowctrl"</b>	Configure hardware flow control for CMUX mode
<b>AT+QCFG="fast/poweroff"</b>	Control fast shutdown function
<b>AT+QCFGEXT="addgeo"</b>	Add a geo-fence
<b>AT+QCFGEXT="deletegeo"</b>	Delete a geo-fence
<b>AT+QCFGEXT="querygeo"</b>	Query the position with respect to geo-fence
<b>AT+QCFGEXT="nipdcfg"</b>	Configure NIDD connection
<b>AT+QCFGEXT="nipd"</b>	Open or close NIDD connection
<b>AT+QCFGEXT="nipds"</b>	Send MO non-IP data
<b>AT+QCFGEXT="nipdr"</b>	Retrieve MT non-IP data
<b>AT+QCFGEXT="dump"</b>	Enable/Disable dump mode
<b>AT+QCFGEXT="quecopen"</b>	Enable/Disable QuecOpen function
<b>AT+QCFGEXT="disusb"</b>	Enable/Disable USB function
<b>AT+QCFGEXT="usb/event"</b>	Get USB events
<b>AT+QCFGEXT="pwm"</b>	Configure PWM function
<b>AT+QCFGEXT="usbnet"</b>	Configure USB composition
<b>AT+QCFGEXT="dnsc_timeout"</b>	Configure DNS session timeout
<b>AT+QCFGEXT="ap_os_version"</b>	Query APPS Operation System Version
<b>AT+QCFGEXT="fota_apn"</b>	Configure IP family and APN for DFOTA
<b>AT+QCFGEXT="sni"</b>	Enable/Disable server name indication for DFOTA downloading over HTTP(s)
<b>AT+QCFGEXT="fota_http_header"</b>	Configure application HTTP header for DFOTA downloading over HTTP(s)
<b>AT+QCFGEXT="fota_wd_gpio"</b>	Configure watch dog pin and feeding interval during DFOTA

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# 21 Appendix

## 21.1. References

**Table 15: Related Documents**

Document Name
[1] Quectel_BG95-S5_Fast_Shutdown_Application_Note
[2] Quectel_BG95-S5_DFOTA_Application_Note
[3] Quectel_BG95-S5_FTP(S)_Application_Note
[4] Quectel_BG95-S5_HTTP(S)_Application_Note
[5] Quectel_BG95-S5_TCP(IP)_Application_Note
[6] Quectel_BG95-S5_GNSS_Application_Note
[7] Quectel_BG95-S5_SSL_Application_Note
[8] Quectel_BG95-S5_FILE_Application_Note
[9] Quectel_BG95-S5_MQTT_Application_Note
[10] Quectel_BG95-S5_CoAP_Application_Note
[11] Quectel_BG95-S5_LwM2M_Application_Note
[12] Quectel_BG95-S5_QCFG_AT_Commands_Manual
[13] Quectel_BG95-S5_QCFGEXT_AT_Commands_Manual

**Table 16: Terms and Abbreviations**

Abbreviation	Description
3GPP	3rd Generation Partnership Project

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ACK	Acknowledgement
AM	Acknowledgement Mode
APDU	Application Protocol Data Unit
APN	Access Point Name
AS	Access Stratum
BCD	Binary-Coded Decimal
CHAP	Challenge-Handshake Authentication Protocol
CN	Core Network
DCE	Data Communications Equipment
DF	Dedicated File
DHCP	Dynamic Host Configuration Protocol
DL	Downlink
DTE	Data Terminal Equipment
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
ECL	Enhanced Coverage Level
EMM	EPS Mobility Management
EPS	Evolved Packet System
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
eDRX	Extended Discontinuous Reception
EF	Elementary File
EGPRS	Enhanced General Packet Radio Service
ePCO	Extended Protocol Configuration Options
EPS	Evolved Packet System
ESM	EPS Session Management
GERAN	GSM/EDGE Radio Access Network

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GGSN	Gateway GPRS Support Node
GMT	Greenwich Mean Time
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HARQ	Hybrid Automatic Repeat Request
HPLMN	Home Public Land Mobile Network
ICCID	Integrated Circuit Card Identity
ICMP	Internet Control Messages Protocol
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
IE	Information Element
IM	Intermodulation/IP Multimedia
IMEI	International Mobile Equipment Identity
IMEISV	International Mobile Equipment Identity and Software Version
IMSI	International Mobile Subscriber Identity
MS	Mobile Station
MT	Mobile Termination
MTU	Maximum Transfer Unit
NAS	Non-Access Stratum
NASCONFIG	Non-Access Stratum Configuration
NB-IoT	Narrowband Internet of Things
NSLPI	NAS Signaling Low Priority Indication
NVRAM	Non-Volatile Random Access Memory
OOS	Out of Service
OOSA	Out of Service Area
OPLMN	Operator Controlled PLMN

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PAD	Packet Assembler/Disassembler
PAP	Password Authentication Protocol
PCI	Physical Cell Identification
PCO	Protocol Configuration Options
P-CSCF	Proxy Call Session Control Function
PDCCH	Physical Downlink Control Channel
PDCP	Packet Data Convergence Protocol
PDN	Public Data Network
PDP	Packet Data Protocol
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PSM	Power Saving Mode
PSD	Packet Switch Domain
PSK	Pre-Shared key
PUK	PIN Unlock Key
QCI	Quality of Service Class Indication
RAI	Release Assistance Indication
RFC	Request for Comments
RLC	Radio Link Control
ROHC	Robust Head Compression
RRC	Radio Resource Control
RSCP	Received Signal Code Power
RSRP	Received Signal Received Power
RSRQ	Reference Signal Received Quality
RSSI	Received Signal Strength Indicator

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RTC	Real Time Clock
SINR	Signal-to-interference-plus-noise Ratio
SMSC	Short Message Service Center
SNDCP	Sub-Network Dependent Convergence Protocol
SNR	Signal-to-Noise Ratio
SVN	Software Version Number
TA	Terminal Adapter (typically the module)
TAC	Tracking Area Code
TCP	Transmission Control Protocol
TE	Terminal Equipment (typically the MCU/external processor)
TTL	Time to Live
UDP	User Datagram Protocol
UE	User Equipment
UICC	Universal Integrated Circuit Card
UL	Uplink
UPLMN	User Controlled PLMN
URC	Unsolicited Result Code
UTC	Universal Time Coordinated
UUID	Universally Unique Identifier
VPLMN	Visited Public Land Mobile Network

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## 21.2. Factory Default Settings Restorable with AT&F

Table 17: 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+CMEE	<n>	1
AT+CSCS	<chset>	"GSM"
AT+CSTA	<type>	129
AT+CR	<mode>	0
AT+CRC	<mode>	0

AT+CSMS	<service>	0
AT+CMGF	<mode>	0
AT+CSMP	<fo>,<vp>,<pid>,<dcs>	17,167,0,0
AT+CSDH	<show>	0
AT+CSCB	<mode>	0
AT+CPMS	<mem1>,<mem2>,<mem3>	"ME","ME","ME"
AT+CNMI	<mode>,<mt>,<bm>,<ds>,<bfr>	2,1,0,0,0
AT+CMMS	<n>	0
AT+CVHU	<mode>	0
AT+CTZR	<reporting>	0
AT+CPBS	<storage>	ME
AT+CGEREP	<mode>,<brf>	0,0
AT+CEREG	<n>	0
AT+CUSD	<mode>	0
AT+CLVL	<level>	3
AT+QAUDMOD	<mode>	0
AT+QAUDLOOP	<enable>	0

### 21.3. AT Command Settings Storable with AT&W

Table 18: 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+IPR	<rate>	No
AT+CREG	<n>	No
AT+CGREG	<n>	No
AT+CEREG	<n>	No

## 21.4. AT Command Settings Restorable with ATZ

Table 19: AT Command Settings Restorable 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

## 21.5. Summary of CME ERROR Codes

Final result code **+CME ERROR: <err>** indicates an error related to mobile equipment or network. The operation of **+CME ERROR: <err>** final result code is similar to the regular **ERROR** result code: if **+CME ERROR: <err>** is the result code for any of the commands in a command line, none of the following commands in the same command line is executed (neither **ERROR** nor **OK** result code shall be returned as a result of a completed command line execution). The format of **<err>** can be either numeric or verbose. This is set with **AT+CMEE**.

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 20: 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

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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

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Corporate personalization PUK required

## 21.6. Summary of CMS ERROR Codes

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

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

**Table 21: 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 allow
530	GPRS is suspended
531	ME storage full

## 21.7. Summary of URC

Table 22: Summary of URC

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

3	<b>+CGREG: &lt;stat&gt;</b>	Indicate network registration status of the ME	<b>AT+CGREG=1</b>
4	<b>+CGREG: &lt;stat&gt;[,&lt;lac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;],[&lt;rac&gt;]]</b>	Indicate network registration and location information of the ME	<b>AT+CGREG=2</b>
5	<b>+CTZV: &lt;tz&gt;</b>	Time zone reporting	<b>AT+CTZR=1</b>
6	<b>+CTZE: &lt;tz&gt;,&lt;dst&gt;,&lt;time&gt;</b>	Extended time zone reporting	<b>AT+CTZR=2</b>
7	<b>+CMTI: &lt;mem&gt;,&lt;index&gt;</b>	New message is received, and saved to memory	<b>See AT+CNMI</b>
8	<b>+CMT: [&lt;alpha&gt;],&lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;</b>	New short message is received and output directly to TE (PDU mode)	<b>See AT+CNMI</b>
9	<b>+CMT: &lt;oa&gt;,&lt;alpha&gt;,&lt;scts&gt;,&lt;tooa&gt;,&lt;fo&gt;,&lt;pid&gt;,&lt;dcsc&gt;,&lt;sca&gt;,&lt;tosca&gt;,&lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;data&gt;</b>	New short message is received and output directly to TE (Text mode)	<b>See AT+CNMI</b>
10	<b>+CBM: &lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;</b>	New CBM is received and output directly (PDU mode)	<b>See AT+CNMI</b>
11	<b>+CBM: &lt;sn&gt;,&lt;mid&gt;,&lt;dcsc&gt;,&lt;page&gt;,&lt;pages&gt;&lt;CR&gt;&lt;LF&gt;&lt;data&gt;</b>	New CBM is received and output directly to TE (Text mode)	<b>See AT+CNMI</b>
12	<b>+CDS: &lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;</b>	New CDS is received and output directly (PDU mode)	<b>See AT+CNMI</b>
13	<b>+CDS: &lt;fo&gt;,&lt;mr&gt;,&lt;ra&gt;,&lt;to ra&gt;,&lt;scts&gt;,&lt;st&gt;</b>	New CDS is received and output directly to TE (Text mode)	<b>See AT+CNMI</b>
14	<b>+CDSI: &lt;mem&gt;,&lt;index&gt;</b>	New message status report is received, and saved to memory	<b>See AT+CNMI</b>
15	<b>+CRING: &lt;type&gt;</b>	An incoming call is indicated to the TE with unsolicited result code instead of the normal RING	<b>AT+CRC=1</b>
16	<b>APP RDY</b>	AP core initialization is successful	-
17	<b>RDY</b>	ME initialization is successful	-
18	<b>+CFUN: 1</b>	All function of the ME is available	-
19	<b>+CPIN: &lt;state&gt;</b>	SIM card pin state	-
20	<b>+QIND: SMS DONE</b>	SMS initialization finished	-
21	<b>POWERED DOWN</b>	Module power down	<b>AT+QPOWD</b>
22	<b>+CGEV: REJECT &lt;PDP_type&gt;,&lt;PDP_addr&gt;</b>	A network request for PDP activation, and was automatically rejected.	<b>AT+CGEREP=2,1</b>

23	<b>+CGEV: NW REACT</b> <PDP_type>,<PDP_addr>,<cid>	The network request PDP reactivation	<b>AT+CGEREP=2,1</b>
24	<b>+CGEV: NW DEACT</b> <PDP_type>,<PDP_addr>,<cid>	The network has forced a context deactivation	<b>AT+CGEREP=2,1</b>
25	<b>+CGEV: ME DEACT</b> <PDP_type>,<PDP_addr>,<cid>	The ME has forced a context deactivation.	<b>AT+CGEREP=2,1</b>
26	<b>+CGEV: NW DETACH</b>	The network has forced a Packet Domain detach.	<b>AT+CGEREP=2,1</b>
27	<b>+CGEV: ME DETACH</b>	The mobile equipment has forced a Packet Domain detach.	<b>AT+CGEREP=2,1</b>
28	<b>+CGEV: NW CLASS</b> <class>	The network has forced a change of MS class.	<b>AT+CGEREP=2,1</b>
29	<b>+CGEV: ME CLASS</b> <class>	The mobile equipment has forced a change of MS class.	<b>AT+CGEREP=2,1</b>

## 21.8. 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 (16bit). **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 23: 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 24: The Input Conversions Table (DCS=GSM 7 bit and AT+CSCS="GSM")**

	0	1	2	3	4	5	6	7
0	00	10	20	30	40	50	60	70
1	01	11	21	31	41	51	61	71
2	02	12	22	32	42	52	62	72
3	03	13	23	33	43	53	63	73
4	04	14	24	34	44	54	64	74
5	05	15	25	35	45	55	65	75
6	06	16	26	36	46	56	66	76
7	07	17	27	37	47	57	67	77
8	08	18	28	38	48	58	68	78
9	09	19	29	39	49	59	69	79
A	0A	Submit	2A	3A	4A	5A	6A	7A
B	0B	Cancel	2B	3B	4B	5B	6B	7B
C	0C	1C	2C	3C	4C	5C	6C	7C
D	0D	1A	2D	3D	4D	5D	6D	7D
E	0E	1E	2E	3E	4E	5E	6E	7E
F	0F	1F	2F	3F	4F	5F	6F	7F

**Table 25: The Output Conversions Table (DCS=GSM 7 bit and AT+CSCS="GSM")**

	0	1	2	3	4	5	6	7
0	00	10	20	30	40	50	60	70
1	01	11	21	31	41	51	61	71
2	02	12	22	32	42	52	62	72
3	03	13	23	33	43	53	63	73
4	04	14	24	34	44	54	64	74

5	05	15	25	35	45	55	65	75
6	06	16	26	36	46	56	66	76
7	07	17	27	37	47	57	67	77
8	08	18	28	38	48	58	68	78
9	09	19	29	39	49	59	69	79
A	0D0A		2A	3A	4A	5A	6A	7A
B	0B		2B	3B	4B	5B	6B	7B
C	0C	1C	2C	3C	4C	5C	6C	7C
D	0D	1A	2D	3D	4D	5D	6D	7D
E	0E	1E	2E	3E	4E	5E	6E	7E
F	0F	1F	2F	3F	4F	5F	6F	7F

**Table 26: GSM Extended Characters (GSM Encode)**

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

	0	1	2	3	4	5	6	7
0		20	20	30	00	50	20	70
1	20	20	21	31	41	51	61	71
2	20	20	22	32	42	52	62	72
3	20	20	23	33	43	53	63	73
4	20	20	02	34	44	54	64	74
5	20	20	25	35	45	55	65	75
6	20	20	26	36	46	56	66	76
7	20	20	27	37	47	57	67	77
8	Backspace	20	28	38	48	58	68	78
9	20	20	29	39	49	59	69	79
A	0A	Submit	2A	3A	4A	5A	6A	7A
B	20	Cancel	2B	3B	4B	1B3C	6B	1B28
C	20	20	2C	3C	4C	1B2F	6C	1B40
D	0D	20	2D	3D	4D	1B3E	6D	1B29
E	20	20	2E	3E	4E	1B14	6E	1B3D
F	20	20	2F	3F	4F	11	6F	20

Table 28: IRA Extended Characters

	A	B	C	D	E	F
0	20	20	20	20	7F	20
1	40	20	20	5D	20	7D
2	20	20	20	20	20	08
3	01	20	20	20	20	20
4	24	20	5B	20	7B	20
5	03	20	0E	20	0F	20
6	20	20	1C	5C	1D	7C
7	5F	20	09	20	20	20
8	20	20	20	0B	04	0C
9	20	20	1F	20	05	06
A	20	20	20	20	20	20
B	20	20	20	20	20	20
C	20	20	20	5E	07	7E
D	20	20	20	20	20	20
E	20	20	20	20	20	20
F	20	60	20	1E	20	20

Table 29: The Output Conversions Table (DCS=GSM 7 bit and AT+CSCS="IRA")

	0	1	2	3	4	5	6	7
0	40	20	20	30	A1	50	BF	70
1	A3	5F	21	31	41	51	61	71
2	24	20	22	32	42	52	62	72
3	A5	20	23	33	43	53	63	73
4	E8	20	A4	34	44	54	64	74

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

**Table 30: GSM Extended Characters (ISO-8859-1/Unicode)**

	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

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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"**.