# EG06xK&Ex120K&EM060K Series AT Commands Manual

**LTE-A Module Series**

Version: 1.0.0

Date: 2022-02-20

Status: Preliminary

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

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

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

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

# Legal Notices

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

# Use and Disclosure Restrictions

## License Agreements

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

## Copyright

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

## Trademarks

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

## Third-Party Rights

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

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

# Privacy Policy

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

# Disclaimer

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

# About the Document

## Revision History

| Version | Date | Author | Description |
|---|---|---|---|
| - | 2021-08-20 | Jacen HUANG/ Shaun DUAN/ Harden XU/ Yosef ZHANG/ Wolf GUAN/ Ritchie WU/ Floyd WANG | Creation of the document |
| 1.0.0 | 2022-02-20 | Jacen HUANG/ Shaun DUAN/ Harden XU/ Yosef ZHANG/ Wolf GUAN/ Ritchie WU/ Floyd WANG/ Westring LIU | Preliminary |

# Contents

# Table Index

# 1 Introduction

## 1.1. Scope of the Document

This document presents the AT command set supported by Quectel EG06xK, Ex120K and EM060K series modules.

**Table 1: Applicable Modules**

| Module Series | Module |
|---|---|
| EG06xK | EG065K Series |
| | EG060K-EA |
| Ex120K | EM120K-GL |
| | EG120K-EA |
| EM060K | EM060K-GL |

## 1.2. Definitions

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

## 1.3. 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>**. Throughout this document, only the commands and responses are presented, while carriage return and line feed characters are deliberately omitted.

The AT command set implemented by EG06xK, Ex120K and EM060K series modules 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.

AT commands implemented by EG06xK, Ex120K and EM060K series modules fall into three categories syntactically: “Basic”, “S Parameter” and “Extended”, as listed below:

- **Basic Command**

  These AT commands have the format of **AT<x><n>**, or **AT&<x><n>**, where **<x>** is the command, and **<n>** is/are the argument(s) for that command. An example of this is **ATE<n>**, which tells the DCE (Data Circuit-terminating Equipment) whether received characters should be echoed back to the DTE (Data Terminal Equipment) according to the value of **<n>**. **<n>** is optional and a default will be used if it is omitted.

- **S Parameter Syntax**

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

- **Extended Command**

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

**Table 2: Types of AT Commands**

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

| | | |
|---|---|---|
| Execution Command | **AT+<cmd>** | Return a specific information parameter or perform a specific action. |

Multiple commands can be placed on a single line using a semi-colon (**;**) between commands. Only the first command should have **AT** prefix. Commands can be in upper or lower case. When entering AT commands, spaces are ignored except the following cases:

- Within quoted strings, where spaces 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 information responses are sent before the final **OK**, **ERROR** or **+CME ERROR: <err>**.

Responses will be in the format of:

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

Or

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

## 1.5. Supported Character Sets

The AT command interface of EG06xK, Ex120K and EM060K series modules defaults to the **GSM**

character set. The module supports the following character sets:

- GSM format
- UCS2
- IRA

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

## 1.6. AT Command Interface

The AT command interface of EG06xK, Ex120K and EM060K series modules includes two USB ports (USB MODEM port and USB AT port) and one main UART port. The main UART port and two USB ports support AT command communication and data transfer.

## 1.7. Unsolicited Result Code

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

## 1.8. Turn off Procedure

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

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

## 1.9. 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 recommendation or suggestions about how you should design a program flow or what status you should set the module into. Sometimes multiple examples may be provided for one AT command. However, this does not mean that there exists a correlation among these examples and that they should be executed in a given sequence.

# 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<br>**ATI** | Response<br>TA issues product information text.<br>**Quectel**<br>**<objectID>**<br>**Revision: <revision>**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>V.25ter | |

### Parameter

| | |
|---|---|
| **<objectID>** | String type. Identifier of device type. |
| **<revision>** | String type. Identification text of product firmware version. |

### Example

```
ATI
Quectel
EG060K-EA
Revision: EG060KEAAAR01A03M2G

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***.

| AT+GMI Request Manufacturer Identification | |
|---|---|
| Test Command<br>**AT+GMI=?** | Response<br>**OK** |
| Execution Command<br>**AT+GMI** | Response<br>**Quectel**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>V.25ter | |

## 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***.

| AT+GMM Request TA Model Identification | |
|---|---|
| Test Command<br>**AT+GMM=?** | Response<br>**OK** |
| Execution Command<br>**AT+GMM** | Response<br>**<objectID>**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>V.25ter | |

### Parameter

| | |
|---|---|
| **<objectID>** | String type. Identifier of device type. |

## 2.4. AT+GMR Request MT Firmware Revision Identification

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

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

### Parameter

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

### Example

```
AT+GMR
EG060KEAAAR01A03M2G

OK
```

## 2.5. AT+CGMI Request Manufacturer Identification

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

| AT+CGMI Request Manufacturer Identification | |
|---|---|
| Test Command<br>**AT+CGMI=?** | Response<br>**OK** |
| Execution Command<br>**AT+CGMI** | Response<br>**Quectel** |

| | |
|---|---|
| | **OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

## 2.6. AT+CGMM Request MT Model Identification

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

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

**Parameter**

| | |
|---|---|
| **<objectID>** | String type. Identifier of device type. |

## 2.7. AT+CGMR Request MT Firmware Revision Identification

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

| **AT+CGMR Request MT Firmware Revision Identification** | |
|---|---|
| Test Command<br>**AT+CGMR=?** | Response<br>**OK** |
| Execution Command<br>**AT+CGMR** | Response<br>**<revision>** |

| | |
|---|---|
| | **OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

**Parameter**

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

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

This command returns the International Mobile Equipment Identity (IMEI) number of the ME. It is identical with **AT+CGSN** in ***Chapter 2.9***.

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

**Parameter**

| | |
|---|---|
| **<IMEI>** | String type. IMEI number of the ME |

**NOTE**

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

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

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

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

**Parameter**

| | |
|---|---|
| **<IMEI>** | Sting type. IMEI number of the ME |

**NOTE**

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

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

This command resets AT command settings to the default values specified by the manufacturer (See ***Table 8***).

| AT&F Reset AT Command Settings to Factory Settings | |
|---|---|
| Execution Command<br>**AT&F[<value>]** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference | |

| | |
|---|---|
| V.25ter | |

### Parameter

| | |
|---|---|
| **<value>** | Integer type.<br>0 Reset all TA command settings to factory setting |

## 2.11. AT&V Display Current Configuration

This command displays the current configurations of some AT command parameters (see ***Table 3***), even including the single-letter AT command parameters which are not readable.

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

**Table 3: AT&V Response**

| **AT&V** |
|---|
| &C: 1<br>&D: 2<br>&F: 0<br>&W: 0<br>E: 1<br>Q: 0<br>V: 1<br>X: 4<br>Z: 0<br>S0: 0<br>S3: 13<br>S4: 10<br>S5: 8<br>S6: 2<br>S7: 0 |

S8: 2
S10: 15

OK

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

This command stores the current AT command settings to a user-defined profile in non-volatile memory (See ***Table 9***). The AT command settings will be automatically restored from the user-defined profile during power-up or if **ATZ** is executed.

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

**Parameter**

| | |
|---|---|
| **<n>** | Integer type.<br>0 Profile number to store 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 their manufacturer defaults, which is similar to **AT&F**. Afterwards the AT command settings are restored from the user-defined profile in the non-volatile memory, if they have been stored with **AT&W** before (See ***Table 9***).

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

| ATZ Restore All AT Command Settings From User-defined Profile | |
|---|---|
| Execution Command<br>**ATZ[<value>]** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

| | |
|---|---|
| Reference<br>V.25ter | |

### Parameter

| | |
|---|---|
| **<value>** | Integer type.<br>0 Reset to profile number 0 |

## 2.14. ATQ Set Result Code Presentation Mode

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

| ATQ Set Result Code Presentation Mode | |
|---|---|
| Execution Command<br>**ATQ<n>** | Response<br>If **<n>**=0:<br>**OK**<br><br>If **<n>**=1:<br>(none) |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved by executing AT&W. |
| Reference<br>V.25ter | |

### Parameter

| | |
|---|---|
| **<n>** | Integer type.<br>0 Result codes are transmitted<br>1 Result codes are suppressed and not transmitted |

## 2.15. ATV MT Response Format

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

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

| ATV MT Response Format | |
|---|---|
| Execution Command<br>**ATV<value>** | Response<br>When **<value>**=0<br>**0**<br><br>When **<value>**=1<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved by executing **AT&W**. |
| Reference<br>V.25ter | |

## Parameter

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

## Example

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

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

**Table 4: The Numeric Equivalents and Brief Description of ATV0&ATV1 Result Codes**

| ATV1 | ATV0 | Description |
|---|---|---|
| OK | 0 | Acknowledges execution of a command. |

| | | |
|---|---|---|
| CONNECT | 1 | A connection has been established; the DCE is moving from command state to data state. |
| RING | 2 | The DCE has detected an incoming call signal from network. |
| NO CARRIER | 3 | The connection has been terminated or the attempt to establish a connection failed. |
| ERROR | 4 | Command not recognized, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line. |
| NO DIALTONE | 6 | No dial tone detected. |
| BUSY | 7 | Engaged (busy) signal detected. |
| NO ANSWER | 8 | @ (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer (S7). |

## 2.16. ATE Set Command Echo Mode

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

| ATE Set Command Echo Mode | |
|---|---|
| Execution Command<br>**ATE<value>** | Response<br>This setting determines whether or not the TA echoes characters received from TE during command mode.<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved by executing AT&W. |
| Reference<br>V.25ter | |

### Parameter

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

## 2.17. A/ Repeat Previous Command Line

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

| A/ Repeat Previous Command Line | |
|---|---|
| Execution Command<br>**A/** | Response<br>Repeat the previous command |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>V.25ter | |

**Example**

```
ATI
Quectel
EG060K-EA
Revision: EG060KEAAAR01A03M2G

OK
A/                                  //Repeat the previous command
Quectel
EG060K-EA
Revision: EG060KEAAAR01A03M2G

OK
```

## 2.18. AT+CFUN Set UE Functionality

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

| AT+CFUN Set UE Functionality | |
|---|---|
| Test Command<br>**AT+CFUN=?** | Response<br>**+CFUN: (**list of supported **<fun>**s**),(**list of supported **<rst>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CFUN?** | Response<br>**+CFUN: <fun>** |

| | |
|---|---|
| | **OK** |
| Write Command<br>**AT+CFUN=<fun>[,<rst>]** | Response<br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 15 s, determined by the network. |
| Characteristics | / |
| Reference<br>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 ME before setting it to **<fun>** power level<br>This is default when **<rst>** is not given |
| | 1 | Reset the ME. The device is fully functional after the reset. This value is available only for **<fun>**=1 |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

## Example

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

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

+CPIN: SIM PIN
AT+CPIN=1234
OK
```

```
+CPIN: READY

+QUSIM: 1

+QIND: PB DONE

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

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

OK
```

## 2.19. AT+CMEE Error Message Format

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

| AT+CMEE Error Message Format | |
|---|---|
| Test Command<br>**AT+CMEE=?** | Response<br>**+CMEE:** (list of supported **<n>**s)<br><br>**OK** |
| Read Command<br>**AT+CMEE?** | Response<br>**+CMEE: <n>**<br><br>**OK** |
| Write Command<br>**AT+CMEE=<n>** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

### Parameter

| | |
|---|---|
| **<n>** | Integer type. Whether to enable result code.<br>0 Disable result code and use **ERROR** instead.<br>1 Enable result code and use numeric values<br>2 Enable result code and use verbose values |
| **<err>** | Error codes. For more details, see ***Table 11***. |

### 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
```

## 2.20. AT+CSCS Select TE Character Set

This Write Command informs the MT 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<br>**AT+CSCS=?** | Response<br>**+CSCS: (**list of supported **<chset>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CSCS?** | Response<br>**+CSCS: <chset>**<br><br>**OK** |
| Write Command<br>**AT+CSCS=<chset>** | Response<br>**OK** |
| Maximum Response Time | 300 ms |

| | |
|---|---|
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

### Parameter

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

### Example

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

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

OK
```

## 2.21. AT+QURCCFG Configure URC Indication Option

This command configures the output port of URC.

| AT+QURCCFG Configure URC Indication Option | |
|---|---|
| Test Command<br>**AT+QURCCFG=?** | Response<br>**+QURCCFG: "urcport",(**list of supported **<URC_port_value>**s**)**<br><br>**OK** |
| Write Command<br>**AT+QURCCFG="urcport"[,<URC_port_value>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QURCCFG: "urcport",<URC_port_value>**<br><br>**OK**<br><br>If the optional parameter is specified, configure the output port of |

| | |
|---|---|
| | URC:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |

### Parameter

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

### Example

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

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

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

OK
```

## 2.22. AT+QMBNCFG MBN File Configuration Setting

| AT+ QMBNCFG MBN File Configuration Setting | |
|---|---|
| Test Command<br>**AT+QMBNCFG=?** | Response<br>**+QMBNCFG: "List"**<br>**+QMBNCFG: "Select",<MBN_name>**<br>**+QMBNCFG: "Deactivate"** |

| | |
|---|---|
| | **+QMBNCFG: "AutoSel",(**list of supported **<enable>**s**)**<br>**+QMBNCFG: "Delete",<MBN_name>**<br>**+QMBNCFG: "Add",<file_name>**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

### 2.22.1. AT+QMBNCFG="List" List All The MBN Files

This command queries all the imported MBN files list.

| **AT+QMBNCFG="List" List All The MBN Files** | |
|---|---|
| Write Command<br>**AT+QMBNCFG="List"** | Resopnse<br>**+QMBNCFG:"List",<index>,<selected>,<activate>,<MBN_name>,<MBN_version>,<MBN_release_date>**<br>**…**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved automatically. |

**Parameter**

| | |
|---|---|
| **<index>** | Integer type. The MBN index indicates which imported MBN file is current listed. |
| **<selected>** | Integer type. Whether the MBN file is selected. The selected but unactivated MBN file will be activated in the next module restart.<br>0 Unselected<br>1 Selected |
| **<activate>** | Integer type. Whether the MBN file is activated.<br>0 Unactivated<br>1 Activated |
| **<MBN_name>** | String type. The name of the imported MBN file. |
| **<MBN_version>** | String type. The version of the imported MBN file. |
| **<MBN_release_date>** | String type. The release date of the imported MBN file. |

**Example**

```
AT+QMBNCFG="list"
+QMBNCFG: "List",0,0,1,"ROW_Generic_3GPP",0x06010821,201706061
+QMBNCFG: "List",1,0,0,"Volte_OpenMkt-Commercial-CMCC",0x06012064,201706061
```

```
+QMBNCFG: "List",2,0,0,"OpenMkt-Commercial-CU",0x06011510,201706062
+QMBNCFG: "List",3,0,0,"Telstra-Commercial_VoLTE",0x0680010F,201710261
+QMBNCFG: "List",4,1,0,"hVoLTE-Verizon",0x060101A0,201801081

OK
```

### 2.22.2. AT+QMBNCFG="Select" Select Imported MBN File

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

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

**Parameter**

| | |
|---|---|
| **<MBN_name>** | String type. MBN file name to be selected. |

### 2.22.3. AT+QMBNCFG="Deactivate" Deactivate MBN File

This command deactivates the MBN file which is working in the module. After the MBN file is deactivated, the currently activated MBN file becomes inactive.

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

### Example

```
AT+QMBNCFG="LIST"
+QMBNCFG: "List",0,1,1,"ROW_Commercial",0x05010800,201801051

OK
AT+QMBNCFG="Deactivate"
OK
AT+QMBNCFG="List"
+QMBNCFG: "List",0,0,0,"ROW_Commercial",0x05010800,201801051

OK
```

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

The command configures Whether MBN file can be automatically selected via (U)SIM card.

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

### Parameter

| | |
|---|---|
| **<enable>** | Integer type. Enable or disable to auto active MBN file.<br>0 Disable<br>1 Enable |

## 2.22.5. AT+QMBNCFG="Add" Add a New MBN File

This command adds a new MBN file.

| AT+QMBNCFG="Add" Add a New MBN File | |
|---|---|
| Write Command<br>**AT+QMBNCFG="Add",<file_name>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |

**Parameter**

| | |
|---|---|
| **<file_name>** | String type. The name of the MBN to be added. The MBN file needs to be uploaded to the UFS space in advance. |

**Example**

```
AT+QFUPL="test.mbn",9436
CONNECT
<send MBN file,its files size is 9436Bytes>
+QFUPL: 9436,657c

OK
AT+QMBNCFG="Add","test.mbn"
OK
```

### 2.22.6. AT+QMBNCFG="Delete" Delete MBN File

This command deletes a MBN file from CEFS.

| AT+QMBNCFG="Delete" Delete MBN File | |
|---|---|
| Write Command<br>**AT+QMBNCFG="Delete",<MBN_name>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect after module is rebooted. |

**Parameter**

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

# 3 Status Control Commands

## 3.1. AT+CPAS Mobile Equipment Activity Status

This command queries the activity status of the ME.

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

### Parameter

| | | |
|---|---|---|
| **<pas>** | Integer type. ME activity status. | |
| | 0 | Ready |
| | 3 | Ringing |
| | 4 | Call in progress or call hold |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

**Example**

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

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

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

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

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

OK
```

## 3.2. AT+CEER Extended Error Report

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

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

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

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

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

**Parameter**

| | |
|---|---|
| **<text>** | Release cause text. Reason for the last call failure to setup or release (listed in ***Chapter 13.9***). Both CS and PS domain call types are reported. Cause data is captured from Call Manager events and cached locally to later use by this command. |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## 3.3. AT+QCFG Extended Configuration Settings

This command queries and configures various settings of UE.

| **AT+QCFG Extended Configuration Settings** | |
|---|---|
| Test Command<br>**AT+QCFG=?** | Response<br>**+QCFG: "hsdpacat",**(list of supported **<cat>**s)<br>**+QCFG: "hsupacat",**(list of supported **<cat>**s)<br>**+QCFG: "rrc",**(list of supported **<rrcr>**s)<br>**+QCFG: "sgsn",**(list of supported **<sgsnr>**s)<br>**+QCFG: "pdp/duplicatechk",**(list of supported **<enable>**s)<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

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

This command specifies the HSDPA category.

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

**Parameter**

| | |
|---|---|
| **<cat>** | Integer type. HSDPA category<br>6 Category 6<br>8 Category 8<br>10 Category 10<br>12 Category 12<br>14 Category 14<br>18 Category 18<br>20 Category 20<br>24 Category 24 |
| **<err>** | Error codes. For more details, see ***Table 11***. |

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

This command specifies the HSUPA category.

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

**Parameter**

| | |
|---|---|
| **<cat>** | Integer type. HSUPA category<br>5 Category 5<br>6 Category 6 |
| **<err>** | Error codes. For more details, see ***Table 11***. |

### 3.3.3. AT+QCFG="rrc" RRC Release Version Configuration

This command specifies the RRC release version.

| AT+QCFG="rrc" RRC Release Version Configuration | |
|---|---|
| Write Command<br>**AT+QCFG="rrc"[,<rrcr>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QCFG: "rrc",<rrcr>**<br><br>**OK** |

| | |
|---|---|
| | If the optional parameter is specified, configure the RRC release version:<br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect after rebooting.<br>The configuration will be saved automatically. |

**Parameter**

| | |
|---|---|
| **<rrcr>** | Integer type. RRC release version<br>0 R99<br>1 R5<br>2 R6<br>3 R7<br>4 R8 |
| **<err>** | Error codes. For more details, see ***Table 11***. |

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

This command specifies the UE SGSN release version.

| **AT+QCFG="sgsn" UE SGSN Release Version Configuration** | |
|---|---|
| Write Command<br>**AT+QCFG="sgsn"[,<sgsnr>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QCFG: "sgsn",<sgsnr>**<br><br>**OK**<br><br>If the optional parameter is specified, configure the SGSN release version:<br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or |

| | |
|---|---|
| | **+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect after rebooting.<br>The configuration will be saved automatically. |

**Parameter**

| | |
|---|---|
| **<sgsnr>** | Integer type. SGSN release version.<br>0 R97<br>1 R99<br>2 Dynamic |
| **<err>** | Error codes. For more details, see ***Table 11***. |

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

This command allows/refuses establishing multi PDNs with the same APN profile.

| **AT+QCFG="PDP/duplicatechk"** | **Establish Multi PDNs with the Same APN** |
|---|---|
| Write Command<br>**AT+QCFG="pdp/duplicatechk"[,<enable>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QCFG: "pdp/duplicatechk",<enable>**<br><br>**OK**<br><br>If the optional parameter is specified, allow/refuse establishing multiple<br>PDNs with the same APN profile:<br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |

### Parameter

| | |
|---|---|
| **<enable>** | Integer type.<br>0 Refuse to establish multi PDNs with the same APN profile<br>1 Allow to establish multi PDNs with the same APN profile |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## 3.3.6. AT+QCFG="usbspeed" Set USB Speed Mode

This command sets USB speed mode when device is inserted in a USB 3.0 port.

| AT+QCFG="usbspeed" Set USB Speed Mode | |
|---|---|
| Write Command<br>**AT+QCFG="usbspeed"[,<speed>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QCFG: "usbspeed",<speed>**<br><br>**OK**<br><br>If the optional parameter is specified, set USB speed mode:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | This command will take effect after rebooting.<br>The configuration will be saved automatically. |

### Parameter

| | |
|---|---|
| **<speed>** | String type.<br>"20" USB2.0 high speed<br>"30" USB3.0 super speed |

### Example

```
AT+QCFG="usbspeed"    //Query the current configuration.
+QCFG: "usbspeed","30"

OK
AT+QCFG="usbspeed","20"
OK
```

### 3.3.7. AT+QCFG="usbnet" Set Dial-Up Method

| AT+QCFG="usbnet" Set Dial-Up Method | |
|---|---|
| Write Command<br>**AT+QCFG="usbnet",<protocol>** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QCFG: "usbnet",<net>**<br><br>**OK**<br><br>If the optional parameter is specified, set dial-up method:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300ms |
| Characteristics | This command will take effect after rebooting.<br>The configuration will be saved automatically. |

**Parameter**

| | |
|---|---|
| **<protocol>** | Integer type. The dial-up method<br>0 RmNet interface<br>1 ECM interface<br>2 MBIM interface<br>3 RNDIS interface |

**Example**

```
AT+QCFG="usbnet"        //Query the current configuration.
+QCFG: "usbnet",2

OK
AT+QCFG="usbnet",1      //Set dial-up method to ECM.
OK
```

## 3.4. AT+QINDCFG URC Indication Configuration

This command controls URC indication.

| AT+QINDCFG URC Indication Configuration | |
|---|---|
| Test Command<br>**AT+QINDCFG=?** | Response<br>**+QINDCFG: "all",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)**<br>**+QINDCFG: "csq",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)**<br>**+QINDCFG: "smsfull",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)**<br>**+QINDCFG: "ring",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)**<br>**+QINDCFG: "smsincoming",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)**<br>**+QINDCFG: "act",(**list of supported **<enable>**s**),(**list of supported **<save_to_nvram>**s**)**<br><br>**OK** |
| Write Command<br>**AT+QINDCFG=<URC_type>[,<enable>[,<save_to_nvram>]]** | Response<br>If the optional parameters are omitted, query the current configuration:<br>**+QINDCFG: <URC_type>,<enable>**<br><br>**OK**<br><br>If any of the optional parameters is specified, set the URC indication configurations:<br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>Whether to save configuration depends on **<save_to_nvram>**. |

## Parameter

| | | |
|---|---|---|
| **<URC_type>** | String type. URC type | |
| | "all" | Master switch of all URCs. Default: ON. |
| | "csq" | Indication of signal strength and channel bit error rate change (similar to **AT+CSQ**). Default: OFF. If this configuration is ON, **+QIND: "csq",<rssi>,<ber>** is present. |

| | | |
|---|---|---|
| | "smsfull" | SMS storage full indication. Default: OFF. If this configuration is ON, **+QIND: "smsfull",<storage>** is present. |
| | "ring" | **RING** indication. Default: ON. |
| | "smsincoming" | Incoming message indication, Default: ON. Related URCs list: **+CMTI**, **+CMT**, **+CDS** |
| | "act" | Indication of network access technology change. Default: OFF. If this configuration is ON, **+QIND: "act",<actvalue>** is present. **<actvalue>** is string format. The values are as below:<br>"WCDMA"<br>"HSDPA"<br>"HSUPA"<br>"HSDPA&HSUPA"<br>"LTE"<br>"UNKNOWN"<br>The examples of URC are as below:<br>**+QIND: "act","HSDPA&HSUPA"**<br>**+QIND: "act","UNKNOWN"**<br>The description of "act" is as below:<br>1. If MT does not register on network, the **<actvalue>** would be "UNKNOWN".<br>2. If this configuration is ON, the URC of "act" will be reported immediately. Only when the network access technology changes, a new URC will be reported. |
| **<enable>** | Integer type. URC indication is ON or OFF<br>0 OFF<br>1 ON | |
| **<save_to_nvram>** | Integer type. Whether to save configuration into NVRAM.<br>0 Not save<br>1 Save | |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

## 3.5. AT+QMAP Control QCMAP Configurations

This command gets or sets configurations of QCMAP.

| **AT+QCFG get or set QCMAP configurations** | |
|---|---|
| Test Command<br>**AT+QMAP?** | Response<br>**…**<br>**+QMAP: "WWAN",**(list of supported **<status>**s)**,(1-16),<IP_family>,<IP_address>**<br>**+QMAP: "LANIP",<LAN_IP_start_address>,<LAN_IP_end_address>,<GW_IP_address>,<effect>** |

| | |
|---|---|
| | **+QMAP: "vlan",(**list of supported **<VLAN_ID>**s)**,(**list of supported **<status>**s)**,(** list of supported **<VLAN_type>**s)<br>**+QMAP: "mPDN_rule",(**range of supported **<rule_num>**s)**,(**range of supported **<profileID>**s)**,(**list of supported **<VLAN_ID>**s)**,(**range of supported **<ippt_mode>**s)**,(**list of supported **<auto>**s)**,<ippt_info>**<br>**+QMAP: "auto_connect",(**range of supported **<rule_num>**s)**,(**list of supported **<auto>**s)**,(**range of supported **<profileID>**s)**<br>**+QMAP: "mPDN_status"**<br>**+QMAP: "sfe",(**list of supported **<status>**s)**<br>**+QMAP: "domain",<domain_name>**<br>**…**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

### 3.5.1. AT+QMAP="WWAN" Query ECM Data Call Info

| **AT+QMAP="WWAN" Query ECM Data Call Info** | |
|---|---|
| Write Command<br>**AT+QMAP="WWAN"** | Response<br>**+QMAP: "WWAN",<status>,<profileID>,<IP_family>,<IP_address>**<br>**+QMAP: "WWAN",<status>,<profileID>,<IP_family>,<IP_address>**<br><br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 1 s |
| Characteristics | / |

**Parameter**

| | |
|---|---|
| **<status>** | String type. ECM data call connected status<br>0 Disconnected<br>1 Connected |
| **<profileID>** | Integer type. Value of profile ID. Range: 1–16. |
| **<IP_family>** | String type. IP type.<br>"IPV4" IPv4<br>"IPV6" IPv6 |
| **<IP_address>** | String type. Address of IPv4 or IPv6. |

### Example

```
AT+QMAP="WWAN"
+QMAP: "WWAN",1,1,"IPV4","10.125.252.107"
+QMAP: "WWAN",1,1,"IPV6","2408:84ee:32:7509:f0f8:e83d:6f9:bb33"

OK
```

## 3.5.2. AT+QMAP="LANIP" Control LAN IP Pool

| AT+QMAP="LANIP" Control LAN IP Pool | |
|---|---|
| Write Command<br>**AT+QMAP="LANIP"[,<LAN_IP_start_address>,<LAN_IP_end_address>,<GW_IP_address>[,<effect>]]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QMAP: "LANIP",<LAN_IP_start_address>,<LAN_IP_end_address>,<GW_IP_address>[,<effect>]**<br><br>**OK**<br><br>If the optional parameter is specified, control LAN IP pool:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 1 s.<br>When **<effect>** is 1, the maximum response time is 5 s. |
| Characteristics | / |

### Parameter

| | |
|---|---|
| **<LAN_IP_start_address>** | String type. Start address of pool. Dotted decimal without double quotes. |
| **<LAN_IP_end_address>** | String type. End address of pool. Dotted decimal without double quotes. |
| **<GW_IP_address>** | String type. Gateway address of pool. Dotted decimal without double quotes. |
| **<effect >** | Integer type. Effect immediately or not<br>0 Take effect after rebooting<br>1 Take effect immediately |

### Example

```
AT+QMAP="LANIP"    //Query the current pool configuration.
+QMAP: "LANIP",192.168.225.40,192.168.225.60,192.168.225.1
```

```
OK
AT+QMAP="LANIP",192.168.111.20,192.168.111.60,192.168.111.1    //The configuration takes effect immediately.
OK
AT+QMAP="LANIP",192.168.111.20,192.168.111.60,192.168.111.1,0  //The configuration takes effect after rebooting.
OK
```

### 3.5.3. AT+QMAP="vlan" Configure VLAN List

| AT+QMAP="vlan" Configure VLAN List | |
|---|---|
| Write Command<br>**AT+QMAP="vlan"[,<VLAN_ID>,<status>[,<VLAN_type>]]** | Response<br>If the optional parameters are omitted, query the current setting:<br>**+QMAP: "vlan",<VLAN_ID>**<br>**[+QMAP: "vlan",<VLAN_ID>,<VLAN_type>]**<br>**[…]**<br><br>**OK**<br><br>If the optional parameters are specified, configure VLAN list:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 5 s |
| Characteristics | This command takes effect immediately.<br>The configuration is saved automatically. |

### Parameter

| | |
|---|---|
| **<VLAN_ID>** | Integer type. VLAN index. Range: 0, 2–4095.<br>0 It is displayed in the response for display purposes, and it is expressed as a physical network card rather than a VLAN ID. it always exists. |
| **<status>** | String type. Enable or disable a specified VLAN ID.<br>"enable" Enable<br>"disable" Disable |
| **<VLAN_type>** | Integer type. VLAN type.<br>1 ETH type<br>2 ECM type |

### Example

```
AT+QMAP="vlan"      //Query the list of the enabled VLAN IDs.
```

```
+QMAP: "vlan",0
+QMAP: "vlan",2,1    //ETH type VLAN 2 (eth0.2) is enabled.
+QMAP: "vlan",3,1    //ETH type VLAN 3 (eth0.3) is enabled.

OK
AT+QMAP="vlan",3,"enable",1     //Enable vlan3 of ETH
OK
AT+QMAP="vlan",3,"disable"      //Disable vlan3 of ETH
OK
```

**NOTE**

The first time you enable or disable the first VLAN ID, the module will reboot automatically.

### 3.5.4. AT+QMAP="mPDN_rule" Configure mPDN VLAN Mapping Rule

| AT+QMAP="mPDN_rule" Configure mPDN VLAN Mapping Rule | |
|---|---|
| Write Command<br>**AT+QMAP="mPDN_rule"[,<rule_num>[,<profileID>,<VLAN_ID>,<ippt_mode>,<auto>[,<ippt_info>]]]** | Response<br>If the optional parameters are omitted, query the current setting:<br>**+QMAP: "mPDN_rule",<rule_num>,<profileID>,<VLAN_ID>,<ippt_mode>,<auto>**<br>**+QMAP: "mPDN_rule",<rule_num>,<profileID>,<VLAN_ID>,<ippt_mode>,<auto>**<br>**+QMAP: "mPDN_rule",<rule_num>,<profileID>,<VLAN_ID>,<ippt_mode>,<auto>**<br>**+QMAP: "mPDN_rule",<rule_num>,<profileID>,<VLAN_ID>,<ippt_mode>,<auto>**<br><br>**OK**<br><br>If only **<rule_num>** is specified, delete a specified mPDN rule:<br>**OK**<br><br>If the optional parameters are specified, add one mPDN vlan mapping rule:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 15 s |
| Characteristics | This command takes effect immediately.<br>The configuration is saved automatically. |

## Parameter

| | |
|---|---|
| **<rule_num>** | Integer type. mPDN rule number. Range: 0–3. |
| **<profileID>** | Integer type. Profile index. Range: 1–16. |
| **<VLAN_ID>** | Integer type. VLAN index. Range: 0, 2–4095. |
| **<ippt_mode>** | Integer type. Enable or disable ippt mode.<br>0 Disable ippt mode<br>1 Enable ippt mode (ETH)(Recommended)<br>2 Enable ippt mode (Wi-Fi can only be used when **<VLAN_ID>** is 0)<br>3 Enable ippt mode (USB/ECM) |
| **<auto>** | Integer type. Enable or disable automatic data backhaul connectivity.<br>0 Disable<br>1 Enable |
| **<ippt_info>** | String type.<br>When **<ippt_mode>** is 1/2, **<ippt_info>** is the MAC address of the peer network card bound in ippt mode.<br>When **<ippt_mode>** is 3, **<ippt_info>** is the host name of the peer bound in ippt mode.<br>When **<ippt_mode>** is 0, **<ippt_info>** does not need to be filled in.<br>When **<ippt_mode>** is not 0, if **<ippt_info>** exists, that is, an inherent device is assigned to issue an air interface IP, and other devices will obtain a private address; if it does not exist, only the first connected device will get the air interface IP, other devices will not be able to obtain IP. |

**NOTE**

When **<profileID>** is 1, the module bound to a VLAN ID other than 0 will automatically restart.

## Example

```
AT+QMAP="mPDN_rule"                    //Query current mapping rules of mPDN VLAN.
+QMAP: "mPDN_rule",0,1,0,1,1
+QMAP: "mPDN_rule",1,0,0,0,0
+QMAP: "mPDN_rule",2,0,0,0,0
+QMAP: "mPDN_rule",3,0,0,0,0

OK
AT+QMAP="mPDN_rule",0,1,0,1,1,"00:0c:29:34:d6:8b"      //Configure an mPDN rule.
OK

AT+QMAP="mPDN_rule",0                  //Delete mPDN rule number 0.
OK
```

### 3.5.5. AT+QMAP="auto_connect" Configure Automatic Data Backhaul Connectivity

| AT+QMAP="auto_connect" Configure Automatic Data Backhaul Connectivity | |
|---|---|
| Write Command<br>**AT+QMAP="auto_connect",[[<rule_num>],[<auto>[,<profileID>]]]** | Response<br>If the optional parameters are omitted, query the current setting:<br>**+QMAP: "auto_connect",<rule_num>,<auto>**<br>**+QMAP: "auto_connect",<rule_num>,<auto>**<br>**+QMAP: "auto_connect",<rule_num>,<auto>**<br>**+QMAP: "auto_connect",<rule_num>,<auto>**<br><br>**OK**<br><br>If **<auto>** and **<profileID>** are omitted, query automatic data backhaul connectivity of the specified rule number:<br>**+QMAP: "auto_connect",<rule_num>,<auto>**<br><br>**OK**<br><br>If only **<profileID>** is omitted, modify the automatic data backhaul connectivity of the corresponding profile ID in the specified rule number:<br>**OK**<br><br>If the optional parameters are specified, modify the profile ID in the specified rule:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration is saved automatically. |

**Parameter**

| | |
|---|---|
| **<rule_num>** | Integer type. mPDN rule number. Range: 0–3. |
| **<auto>** | Integer type. Enable or disable automatic data backhaul connectivity.<br>0 Disable<br>1 Enable |
| **<profileID>** | Integer type. Profile ID. Range: 1–16. |

**NOTE**

The rule number must be configured with **AT+QMAP="mPDN_rule"** in advance.

### Example

```
AT+QMAP="auto_connect"          //Query the current auto connect configuration list.
+QMAP: "auto_connect",0,0
+QMAP: "auto_connect",1,1
+QMAP: "auto_connect",2,1
+QMAP: "auto_connect",3,0

OK
AT+QMAP="auto_connect",1        //Query auto connect configuration of rule number 1.
+QMAP: "auto_connect",1,1

OK
AT+QMAP="auto_connect",2,1      //Configure auto connect of rule number 2.
OK
AT+QMAP="auto_connect",2,1,3 //Modify profile ID of rule number 2 to 3 and enable it's auto connected.
OK
```

## 3.5.6. AT+QMAP="mPDN_status" Query mPDN Status

| AT+QMAP="mPDN_status" Query mPDN Status | |
|---|---|
| Write Command<br>**AT+QMAP="mPDN_status"** | Response<br>**+QMAP: "mPDN_status",<rule_num>,<profileID>,<ippt_status>,<backhaul_status>**<br>**+QMAP: "mPDN_status",<rule_num>,<profileID>,<ippt_status>,<backhaul_status>**<br>**+QMAP: "mPDN_status",<rule_num>,<profileID>,<ippt_status>,<backhaul_status>**<br>**+QMAP: "mPDN_status",<rule_num>,<profileID>,<ippt_status>,<backhaul_status>**<br><br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 15 s |
| Characteristics | / |

### Parameter

| | |
|---|---|
| **<rule_num>** | Integer type. mPDN rule number. Range: 0–3. |
| **<profileID>** | Integer type. Profile index. Range: 1–16. |
| **<ippt_status>** | Integer type, activation status of ippt mode.<br>0 ippt mode is activated<br>1 ippt mode is not activated |
| **<backhaul_status>** | Integer type. backhaul auto connect.<br>0 Disconnected<br>1 Connected |

### Example

```
AT+QMAP="mPDN_status"    //Query current mPDN rules.
+QMAP: "mPDN_status",0,1,0,1,1
+QMAP: "mPDN_status",1,2,1,0,1
+QMAP: "mPDN_status",2,3,2,0,0
+QMAP: "mPDN_status",3,0,0,0,0

OK
```

## 3.5.7. AT+QMAP="sfe" Configure Software Acceleration Status

| AT+QMAP="sfe" Configure Software Acceleration Status | |
|---|---|
| Write Command<br>**AT+QMAP="sfe"[,<status>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QMAP: "sfe",<status>**<br><br>**OK**<br><br>If the optional parameter is specified, configure software acceleration status:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 1 s |
| Characteristics | This command takes effect immediately.<br>The configuration is saved automatically. |

### Parameter

| | |
|---|---|
| **<status>** | String type. Software acceleration status.<br>"enable" Enable<br>"disable" Disable |

### Example

```
AT+QMAP="sfe"                 //Query current software acceleration status.
+QMAP: "sfe","disable"

OK
AT+QMAP="sfe","enable"        //Enable software acceleration.
OK
```

## 3.5.8. AT+QMAP="domain" Configure Gateway Domain Name

| AT+QMAP="domain" Configure Gateway Domain Name | |
|---|---|
| Write Command<br>**AT+QMAP="domain"[,<domain_name>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QMAP: "domain",<domain_name>**<br><br>**OK**<br><br>If the optional parameter is specified, configure gateway domain name:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 1s |
| Characteristics | This command takes effect immediately.<br>The configuration is saved automatically. |

### Parameter

| | |
|---|---|
| **<domain_name>** | String type. Gateway domain name. |

### Example

```
AT+QMAP="domain"      //Read gateway domain name.
+QMAP: "domain","qualcomm.mobileap.com"
```

```
OK
AT+QMAP="domain","qualcomm.mobileap.com"   //Set gateway domain name.
OK
```

# 4 (U)SIM Related Commands

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

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

| AT+CIMI Request International Mobile Subscriber Identity (IMSI) | |
|---|---|
| Test Command<br>**AT+CIMI=?** | Response<br>**OK** |
| Execution Command<br>**AT+CIMI** | Response<br>TA returns **<IMSI>** for identifying the individual (U)SIM which is attached to ME.<br>**<IMSI>**<br><br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

### Parameter

| | |
|---|---|
| **<IMSI>** | International Mobile Subscriber Identity (string without double quotes) |
| **<err>** | Error codes. For more details, see ***Table 11***. |

### Example

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

**OK**

## 4.2. AT+CLCK Facility Lock

This command locks/unlocks or interrogates a MT or a network facility **<fac>**. Password is normally needed to do such actions. When querying the status of network service (**<mode>**=2) the response line for 'not active' case (**<status>**=0) should be returned only if service is not active for any **<class>**.

It can be aborted when network facilities are being set or interrogated. The factory default password of PF, PN, PU, PP and PC lock is "12341234".

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

### Parameter

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

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

## Example

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

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

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

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

## 4.3. AT+CPIN Enter PIN

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

| AT+CPIN Enter PIN | |
|---|---|
| Test Command<br>**AT+CPIN=?** | Response<br>**OK** |
| Read Command<br>**AT+CPIN?** | Response<br>TA returns an alphanumeric string indicating whether or not some password is required.<br>**+CPIN: <code>**<br><br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Write Command<br>**AT+CPIN=<pin>[,<new pin>]** | Response<br>TA stores a password, such as (U)SIM PIN, (U)SIM PUK, etc., which is necessary before it can be operated. If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken and an error message **+CME ERROR** is returned to TE.<br><br>If the PIN required is (U)SIM PUK or (U)SIM PUK2, the second pin is required. This second pin, **<new pin>**, is used to replace the old pin in the (U)SIM.<br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 5 s |
| Characteristics | The command takes effect immediately. |

| | |
|---|---|
| | The configuration will be saved automatically. |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | | |
|---|---|---|
| **<code>** | String without double quotes. | |
| | READY | MT is not pending for any password |
| | SIM PIN | MT is waiting for (U)SIM PIN to be given |
| | SIM PUK | MT is waiting for (U)SIM PUK to be given |
| | SIM PIN2 | MT is waiting for (U)SIM PIN2 to be given |
| | SIM PUK2 | MT is waiting for (U)SIM PUK2 to be given |
| | PH-NET PIN | MT is waiting for network personalization password to be given |
| | PH-NET PUK | MT is waiting for network personalization unblocking password to be given |
| | PH-NETSUB PIN | MT is waiting for network subset personalization password to be given |
| | PH-NETSUB PUK | MT is waiting for network subset personalization unblocking password to be given |
| | PH-SP PIN | MT is waiting for service provider personalization password to be given |
| | PH-SP PUK | MT is waiting for service provider personalization unblocking password to be given |
| | PH-CORP PIN | MT is waiting for corporate personalization password to be given |
| | PH-CORP PUK | MT is waiting for corporate personalization unblocking password to be given |
| **<pin>** | String type. Password. If the requested password was a PUK, such as (U)SIM PUK1, PH-FSIM PUK or another password, then **<pin>** must be followed by **<new pin>**. | |
| **<new pin>** | String type. New password required if the requested code was a PUK. | |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

## Example

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

OK
AT+CPIN=1234                      //Enter PIN
OK

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

```
+CPIN: READY

OK
//Enter PUK and PIN
AT+CPIN?
+CPIN: SIM PUK                          //Query PUK code is locked

OK
AT+CPIN="26601934","1234"               //Enter PUK and new PIN password
OK

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

OK
```

## 4.4. AT+CPWD Change Password

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

| AT+CPWD Change Password | |
|---|---|
| Test Command<br>**AT+CPWD=?** | Response<br>TA returns a list of pairs which present the available facilities and the maximum length of their password.<br>**+CPWD: (**list of supported **<fac>**s**),(**list of supported **<pwdlength>**s**)**<br><br>**OK** |
| Write Command<br>**AT+CPWD=<fac>,<oldpwd>,<newpwd>** | Response<br>TA sets a new password for the facility lock function.<br><br>**OK** |
| Maximum Response Time | 5 s |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |
| Reference<br>3GPP TS 27.007 | |

## Parameter

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

## Example

```
AT+CPIN?
+CPIN: READY

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

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

AT+CPIN?                            //Query PIN code is locked
+CPIN: SIM PIN

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

+CPIN: READY
```

## 4.5. AT+CSIM Generic (U)SIM Access

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

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

### Parameter

| | |
|---|---|
| **<length>** | Integer type. Length of **<command>** or **<response>** string. |
| **<command>** | String type in hexadecimal format. Command transferred by the MT to the (U)SIM in the format as described in *3GPP TS 51.011*. |
| **<response>** | Response to the command transferred by the (U)SIM to the MT in the format as described in *3GPP TS 51.011*. |
| **<err>** | Error codes. For more details, see ***Table 11***. |

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

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

| AT+CRSM Restricted (U)SIM Access | |
|---|---|
| Test Command<br>**AT+CRSM=?** | Response<br>**OK** |
| Write Command<br>**AT+CRSM=<command>[,<fileId>[,<P1>,<P2>,<P3>[,<data>][,<pathId>]]]** | Response<br>**+CRSM: <sw1>,<sw2>[,<response>]**<br><br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved. |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | |
|---|---|
| **<command>** | Integer type. (U)SIM command number<br>176 READ BINARY<br>178 READ RECORD<br>192 GET RESPONSE<br>214 UPDATE BINARY<br>220 UPDATE RECORD<br>242 STATUS |
| **<fileId>** | Integer type; identifier for an elementary data file on (U)SIM, if used by **<command>**. |
| **<P1>, <P2>, <P3>** | Integer type; parameters transferred by the MT to the (U)SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in *3GPP TS 51.011*. |
| **<data>** | Information which shall be written to the (U)SIM (hexadecimal character format; refer to **AT+CSCS**). |
| **<pathId>** | The directory path of an elementary file on a (U)SIM/UICC in hexadecimal format. |
| **<sw1>, <sw2>** | Integer type; information from the (U)SIM about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command. |
| **<response>** | Response of a successful completion of the command previously issued (hexadecimal character format; refer to **AT+CSCS**). STATUS and GET RESPONSE return data, which gives information about the current |

| | |
|---|---|
| | elementary data field. The information includes the type of file and its size (refer to *3GPP TS 51.011*). After READ BINARY, READ RECORD or RETRIEVE DATA command, the requested data will be returned. **<response>** is not returned after a successful UPDATE BINARY, UPDATE RECORD or SET DATA command. |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## 4.7. AT+QPINC Display PIN Remainder Counter

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

| **AT+QPINC Display PIN Remainder Counter** | |
|---|---|
| Test Command<br>**AT+QPINC=?** | Response<br>**+QPINC: (**list of supported **<facility>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QPINC?** | Response<br>**+QPINC: "SC", <pincounter>,<pukcounter>**<br>**+QPINC: "P2", <pincounter>,<pukcounter>**<br><br>**OK** |
| Write Command<br>**AT+QPINC=<facility>** | Response<br>**+QPINC: <facility>,<pincounter>,<pukcounter>**<br><br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will be saved automatically. |

### Parameter

| | |
|---|---|
| **<facility>** | String type.<br>"SC" (U)SIM PIN<br>"P2" (U)SIM PIN2 |
| **<pincounter>** | Integer type. Number of attempts left to enter the password of PIN. |
| **<pukcounter>** | Integer type. Number of attempts left to enter the password of PUK. |

| | |
|---|---|
| **<err>** | Error codes. For more details, see ***Table 11***. |

### Example

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

OK
```

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

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

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

### Parameter

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

### Example

```
AT+QINISTAT
+QINISTAT: 7
```

```
OK
```

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

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

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

### Parameter

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

**NOTE**

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

### Example

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

<Remove (U)SIM card>

+CPIN: NOT READY

<Insert (U)SIM card>

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

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

### Parameter

| | |
|---|---|
| **<enable>** | Integer type. Enable or disable (U)SIM inserted status report. If it is enabled, the URC **+QSIMSTAT: <enable>,<inserted_status>** will be reported when (U)SIM card is inserted or removed.<br>0 Disable |

| | | |
|---|---|---|
| | 1 | Enable |
| **<insertedstatus>** | 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 inserted status
+QSIMSTAT: 0,1

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

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

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

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

+CPIN: READY
```

## 4.11. AT+QUIMSLOT Switch (U)SIM Slot

This command queries the slot currently used by the (U)SIM and configures the (U)SIM slot to be used.

| AT+QUIMSLOT Switch (U)SIM Slot | |
|---|---|
| Test Command<br>**AT+QUIMSLOT=?** | Response<br>**+QUIMSLOT:** (list of supported **<slot>**s) |

| | |
|---|---|
| | **OK** |
| Read Command<br>**AT+QUIMSLOT?** | Response<br>**+QUIMSLOT: <slot>**<br><br>**OK** |
| Write Command<br>**AT+QUIMSLOT=<slot>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will be saved automatically. |

## Parameter

| | |
|---|---|
| **<slot>** | Integer type. Physical (U)SIM slot.<br>1 (U)SIM slot 1<br>2 (U)SIM slot 2 |

## Example

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

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

# 5 Network Service Commands

## 5.1. AT+COPS Operator Selection

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

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

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

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

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

## Parameter

| | |
|---|---|
| **<stat>** | Integer type. Availability of operators.<br>0 Unknown<br>1 Operator available<br>2 Current operator<br>3 Operator forbidden |
| **<oper>** | String type. Operator in format as per **<mode>** |
| **<mode>** | Integer type.<br>0 Automatic mode. **<oper>** field is ignored.<br>1 Manual operator selection. **<oper>** field shall be present and **<AcT>** optionally.<br>2 Manually deregister from network<br>3 Set only **<format>** (for **AT+COPS?** Read Command), and do not attempt registration/deregistration (**<oper>** and **<AcT>** fields are ignored). This value is invalid in the response of Read Command.<br>4 Manual/automatic selection. **<oper>** field shall be presented. If manual selection fails, automatic mode (**<mode>**=0) is entered |
| **<format>** | Integer type.<br>0 Long format alphanumeric **<oper>** which can be up to 16 characters long<br>1 Short format alphanumeric **<oper>**<br>2 Numeric **<oper>**. GSM location area identification number |
| **<AcT>** | Integer type.<br>Access technology selected. Values 3, 4, 5, 6 occur only in the response of Read Command while MS is in data service state and is not intended for the **AT+COPS** Write Command.<br>2 UTRAN<br>4 UTRAN W/HSDPA<br>5 UTRAN W/HSUPA<br>6 UTRAN W/HSDPA and HSUPA<br>7 E-UTRAN |
| **<err>** | Error codes. For more details, see ***Table 11*****.** |

## Example

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

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

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

OK
```

## 5.2. AT+CREG Network Registration Status

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

This Write Command sets whether to present URC or not and controls the presentation of an unsolicited result code **+CREG: <stat>** when **<n>**=1 and there is a change in the MT network registration status.

| AT+CREG Network Registration Status | |
|---|---|
| Test Command<br>**AT+CREG=?** | Response<br>**+CREG: (**list of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CREG?** | Response<br>**+CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]]**<br><br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Write Command<br>**AT+CREG[=<n>]** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

### Parameter

| | |
|---|---|
| **<n>** | Integer type |
| | 0 Disable network registration unsolicited result code |
| | 1 Enable network registration unsolicited result code: **+CREG: <stat>** |
| | 2 Enable network registration unsolicited result code with location information: **+CREG: <stat>[,<lac>,<ci>[,<AcT>]]** |
| **<stat>** | Integer type. Indicate the circuit mode registration status. |
| | 0 Not registered. MT is not currently searching a new operator to register to |
| | 1 Registered, home network |
| | 2 Not registered, but MT is currently searching a new operator to register to |
| | 3 Registration denied |
| | 4 Unknown |
| | 5 Registered, roaming |
| **<lac>** | Two bytes location area code in hexadecimal format. |
| **<ci>** | 28-bit (UMTS/LTE) cell ID in hexadecimal format. |
| **<AcT>** | Integer type. Access technology selected. |
| | 2 UTRAN |
| | 4 UTRAN W/HSDPA |
| | 5 UTRAN W/HSUPA |
| | 6 UTRAN W/HSDPA and HSUPA |
| | 7 E-UTRAN |
| **<err>** | Error codes. For more details, see ***Table 11***. |

### Example

```
AT+CREG=1
OK

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

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

## 5.3. AT+CGREG Network Registration Status

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

| AT+CGREG Network Registration Status | |
|---|---|
| Test Command<br>**AT+CGREG=?** | Response<br>**+CGREG: (**range of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CGREG?** | Response<br>**+CGREG: <n>,<stat>[,[<lac>],[<ci>],[<AcT>],[<rac>]]**<br><br>**OK** |
| Write Command<br>**AT+CGREG=[<n>]** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will be saved by **AT&W**. |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | |
|---|---|
| **<n>** | Integer type.<br>0 Disable network registration unsolicited result code<br>1 Enable network registration unsolicited result code **+CGREG:<stat>**<br>2 Enable network registration and location information unsolicited result code **+CGREG: <stat>[,<lac>,<ci>[,<AcT>],[<rac>]]** |
| **<stat>** | Integer type. Indicate the GPRS registration status.<br>0 Not registered, MT is not currently searching an operator to register to. The UE is in GMM state GMM-NULL or GMM-DEREGISTERED-INITIATED. The GPRS service is disabled; the UE is allowed to attach for GPRS if requested by the user.<br>1 Registered, home network. The UE is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED INITIATED on the home PLMN.<br>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.<br>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.<br>4 Unknown<br>5 Registered, roaming |
| **<lac>** | String type. Two bytes location area code in hexadecimal format (e.g. "00C3" equals 195 in |

| | |
|---|---|
| | decimal). |
| **<ci>** | String type. Four-byte (UMTS/LTE) cell ID in hexadecimal format. |
| **<AcT>** | Integer type. Access technology selected.<br>2 UTRAN<br>4 UTRAN W/HSDPA<br>5 UTRAN W/HSUPA<br>6 UTRAN W/HSDPA and HSUPA |
| **<rac>** | One byte routing area code in hexadecimal format. |

**Example**

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

+CGREG: 2
AT+CGATT=1
OK

+CGREG: 2,1,"D5D5","8054BBF",6,"0"
```

## 5.4. AT+CEREG EPS Network Registration Status

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

| **AT+CEREG EPS Network Registration Status** | |
|---|---|
| Test Command<br>**AT+CEREG=?** | Response<br>**+CEREG: (**range of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CEREG?** | Response<br>**+CEREG: <n>,<stat>[,<tac>,<ci>[,<AcT>]]**<br><br>**OK** |
| Write Command<br>**AT+CEREG=[<n>]** | Response<br>**OK**<br>Or<br>**ERROR** |

| | |
|---|---|
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will be saved by **AT&W**. |
| Reference<br>3GPP TS 27.007 | |

**Parameter**

| | | |
|---|---|---|
| **<n>** | Integer type. | |
| | 0 | Disable network registration unsolicited result code |
| | 1 | Enable network registration unsolicited result code **+CEREG:<stat>** |
| | 2 | Enable network registration and location information unsolicited result code **+CEREG: <stat>[,<lac>,<ci>[,<AcT>]]** |
| **<stat>** | Integer type. Indicate the EPS registration status. | |
| | 0 | Not registered, MT is not currently searching an operator to register to |
| | 1 | Registered, home network |
| | 2 | Not registered, but MT is currently trying to attach or searching an operator to register to |
| | 3 | Registration denied |
| | 4 | Unknown |
| | 5 | Registered, roaming |
| **<tac>** | String type. Two-byte tracking area code in hexadecimal format. | |
| **<ci>** | String type. Four-byte (E-UTRAN) cell ID in hexadecimal format. | |
| **<AcT>** | Access technology selected. | |
| | 7 | E-UTRAN |

## 5.5. AT+CSQ Signal Quality Report

This command indicates the received signal strength **<RSSI>** and the channel bit error rate **<ber>**. This Test Command returns values supported by MT.

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

| **AT+CSQ Signal Quality Report** | |
|---|---|
| Test Command<br>**AT+CSQ=?** | Response<br>**+CSQ: (**list of supported **<RSSI>**s**),(**list of supported **<ber>**s**)**<br><br>**OK** |
| Execution Command | Response |

| | |
|---|---|
| **AT+CSQ** | **+CSQ: <RSSI>,<ber>**<br><br>**OK**<br><br>If there is error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

### Parameter

| | | |
|---|---|---|
| **<RSSI>** | Integer type. Received signal strength indication. | |
| | 0 | -113 dBm or less |
| | 1 | -111 dBm |
| | 2...–30 | -109 dBm to -53 dBm |
| | 31 | -51 dBm or greater |
| | 99 | Not known or not detectable |
| **<ber>** | Integer type. Channel bit error rate (in percent). | |
| | 0–7 | As RxQual values in the table in *3GPP TS 45.008 subclause 8.2.4* |
| | 99 | Not known or not detectable |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

### Example

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

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

OK
```

## 5.6. AT+CPOL Preferred Operator List

This command edits and queries the list of preferred operators.

| **AT+CPOL Preferred Operator List** | |
|---|---|
| Test Command | Response |

| | |
|---|---|
| **AT+CPOL=?** | **+CPOL: (**list of supported **<index>**s**),(**list of supported **<format>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CPOL?** | Response<br>**+CPOL: <index>,<format>,<oper>[,<GSM>,<GSM_compact,<UTRAN>,<E-UTRAN>]**<br>**[…]**<br><br>**OK** |
| Write Command<br>**AT+CPOL=<index>[,<format>[,<oper>[<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>]]]** | Response<br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>**<br><br>If the **<index>** is given but the **<oper>** is omitted, the entry will be deleted. |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | |
|---|---|
| **<index>** | Integer type; the order number of operators in the (U)SIM preferred operator list |
| **<format>** | Integer type.<br>0 Long format alphanumeric **<oper>**<br>1 Short format alphanumeric **<oper>**<br>2 Numeric **<oper>** |
| **<oper>** | String type. **<format>** indicates the format is alphanumeric or numeric (see **AT+COPS**) |
| **<GSM>** | Integer type. GSM access technology<br>0 Access technology is not selected<br>1 Access technology is selected |
| **<GSM_compact>** | Integer type. GSM compact access technology<br>0 Access technology is not selected<br>1 Access technology is selected |
| **<UTRAN>** | Integer type. UTRAN access technology<br>0 Access technology is not selected<br>1 Access technology is selected |
| **<E-UTRAN>** | Integer type. E-UTRAN access technology |

| | | |
|---|---|---|
| | 0 | Access technology is not selected |
| | 1 | Access technology is selected |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

**NOTE**

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

## 5.7. AT+CPLS Selection of Preferred PLMN List

This command selects one PLMN selector with Access Technology list in the SIM card or active application in the UICC (GSM or USIM), that is used by **AT+CPOL**.

| **AT+CPLS Selection of Preferred PLMN List** | |
|---|---|
| Test Command<br>**AT+CPLS=?** | Response<br>**+CPLS:** (range of supported **<list>**s)<br><br>**OK** |
| Read Command<br>**AT+CPLS?** | Response<br>**+CPLS: <list>**<br><br>**OK** |
| Write Command<br>**AT+CPLS=<list>** | Response<br>**OK**<br>Or<br>**ERROR**<br><br>If there is any error related to MT functionality:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

### Parameter

| | | |
|---|---|---|
| **<list>** | Integer type. | |
| | 0 | User controlled PLMN selector with Access Technology $EF_{PLMNwAcT}$, if not found in the SIM/UICC then PLMN preferred list $EF_{PLMNsel}$ (this file is only available in SIM card or GSM application selected in UICC) |
| | 1 | Operator controlled PLMN selector with Access Technology $EF_{OPLMNwAcT}$ |
| | 2 | HPLMN selector with Access Technology $EF_{HPLMNwAcT}$ |

## 5.8. AT+COPN Read Operator Names

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

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

**Parameter**

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

## 5.9. AT+CTZU Automatic Time Zone Update

This Write Command enables/disables automatic time zone update via NITZ.

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

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

### Parameter

| | | |
|---|---|---|
| **<onoff>** | Integer type. Indicates the mode of automatic time zone update. | |
| | 0 | Disable automatic time zone update via NITZ. |
| | 1 | Enable automatic time zone update via NITZ |

### Example

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

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

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

OK
```

## 5.10. AT+CTZR Time Zone Reporting

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

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

## Parameter

| | |
|---|---|
| **<reporting>** | Integer type. Indicates the mode of time zone reporting<br>0 Disable time zone reporting of changed event<br>1 Enable time zone reporting of changed event by unsolicited result code **+CTZV: <tz>**<br>2 Enable extended time zone reporting by unsolicited result code **+CTZE: <tz>,<dst>,<time>** |
| **<tz>** | String type. Indicate the sum of the local time zone (difference between the local time and GMT is expressed in quarters of an hour) plus daylight saving time. The format is "±zz", expressed as a fixed width, two-digit integer with the range -48...+56. To maintain a fixed width, numbers in the range -9 to +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09". |
| **<dst>** | Integer type, indicates whether **<tz>** includes daylight savings adjustment<br>0 **<tz>** includes no adjustment for Daylight Saving Time<br>1 **<tz>** includes +1 hour (equals 4 quarters in **<tz>**) adjustment for daylight saving time<br>2 **<tz>** includes +2 hours (equals 8 quarters in **<tz>**) adjustment for daylight saving time |
| **<time>** | 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). This parameter can be provided by the network when |

| | |
|---|---|
| | delivering time zone information and will be presented in the unsolicited result code of extended time zone reporting if provided by the network. |

**Example**

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

OK

+CTZE: "+32",0,"2018/03/23,06:51:13"          //Extended time zone and local time reporting by URC.
```

## 5.11. AT+QLTS Obtain the Latest Time Synchronized through Network

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

| AT+QLTS Obtain the Latest Time Synchronized through Network | |
|---|---|
| Test Command<br>**AT+QLTS=?** | Response<br>**+QLTS: (**list of supported **<mode>**s**)**<br><br>**OK** |
| Execution Command<br>**AT+QLTS** | Response<br>**+QLTS: <time>,<ds>**<br><br>**OK** |
| Write Command<br>**AT+QLTS=<mode>** | Response<br>**+QLTS: <time>,<ds>**<br><br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

## Parameter

| | |
|---|---|
| **<mode>** | Integer type. Query network time mode<br>0 Query the latest time that has been synchronized through network<br>1 Query the current GMT time calculated from the latest time that has been synchronized through network<br>2 Query the current LOCAL time calculated from the latest time that has been synchronized through network |
| **<time>** | String type value. Format is "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” |
| **<ds>** | Integer type. Daylight saving time. |
| **<err>** | Error codes. For more details, see ***Table 11***. |

**NOTE**

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

## Example

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

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

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

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

**OK**

## 5.12. AT+QNWINFO Query Network Information

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

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

### Parameter

| | |
|---|---|
| **<AcT>** | String type. Access technology selected<br>"NONE"<br>"WCDMA"<br>"TDD LTE"<br>"FDD LTE" |
| **<oper>** | String type. Operator in numeric format |
| **<band>** | String type. Band selected<br>"WCDMA_I_2100"<br>"WCDMA_II_1900"<br>"WCDMA_III_1800"<br>"WCDMA_IV_1700_US"<br>"WCDMA_V_850"<br>"WCDMA_VI_800"<br>"WCDMA_VII_2600"<br>"WCDMA_VIII_900"<br>"WCDMA_IX_1700_JAPAN"<br>"WCDMA_XI_1500"<br>"WCDMA_XIX_850_JAPAN"<br>“LTE BAND 1” – “LTE BAND 66” |
| **<channel>** | Integer type. Channel ID |

**NOTE**

If the devices have not been registered network, the command will return **+QNWINFO: No Service**.

### Example

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

OK
```

## 5.13. AT+QSPN Query the Service Provider Name

This command queries the service provider name.

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

### Parameter

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

**NOTE**

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

**Example**

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

OK
```

## 5.14. AT+QENG Query Network Information

This command obtains the network information.

| AT+QENG Query Network Information | |
|---|---|
| Test Command<br>**AT+QENG=?** | Response<br>**+QENG: (**list of supported **<cell_type>**s**)**<br><br>**OK** |
| Write Command<br>Query the information of serving cell<br>**AT+QENG="servingcell"** | Response<br><br>In LTE mode:<br>**+QENG: "servingcell",<state>,"LTE",<is_tdd>,<MCC>,<MNC>,<cellID>,<PCID>,<earfcn>,<freq_band_ind>,<UL_bandwidth>,<DL_bandwidth>,<TAC>,<RSRP>,<RSRQ>,<RSSI>,<SINR>,<tx_power>,<srxlev>**<br><br>In WCDMA mode:<br>**+QENG: "servingcell",<state>,"WCDMA",<MCC>,<MNC>,<LAC>,<cellID>,<uarfcn>,<PSC>,<RAC>,<RSCP>,<ecio>,<phych>,<SF>,<slot>,<speech_code>,<comMod>**<br><br>**OK** |
| Write Command<br>Query the information of neighbour cells<br>**AT+QENG="neighbourcell"** | Response<br>In LTE mode:<br>**[+QENG: "neighbourcell intra","LTE",<earfcn>,<PCID>,<RSRQ>,<RSRP>,<RSSI>,<SINR>,<srxlev>,<cell_resel_priority>,<s_non_intra_search>,<thresh_serving_low>,<s_intra_search>…]**<br>**[+QENG: "neighbourcell inter","LTE",<earfcn>,<PCID>,<**<br>**<RSRQ>,<RSRP>,<RSSI>,<SINR>,<srxlev>,<cell_resel_p** |

| | |
|---|---|
| | **riority>,<threshX_low>,<threshX_high>**<br>**…]**<br>**[+QENG:"neighbourcell","WCDMA",<uarfcn>,<cell_resel_priority>,<thresh_Xhigh>,<thresh_Xlow>,<PSC>,<RSCP><ecno>,<srxlev>**<br>**…]**<br><br>In WCDMA mode:<br>**[+QENG:"neighbourcell","WCDMA",<uarfcn>,<srxqual>,<PSC>,<RSCP>,<ecno>,<set>,<rank>,<srxlev>**<br>**…]**<br>**[+QENG: "neighbourcell","LTE",<earfcn>,<cellID>,<RSRP>,<RSRQ>,<s_rxlev>**<br>**…]**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

## Parameter

| | |
|---|---|
| **<cell_type>** | String type. The information of different cells.<br>"servingcell" The information of 3G/4G serving cells<br>"neighbourcell" The information of 3G/4G neighbour cells |
| **<state>** | String type. UE state.<br>"SEARCH" UE is searching but could not (yet) find a suitable 3G/4G cell.<br>"LIMSRV" UE is camping on a cell but has not registered on the network.<br>"NOCONN" UE is camping on a cell and has registered on the network, and it is in idle mode.<br>"CONNECT" UE is camping on a cell and has registered on the network, and a call is in progress. |
| **<is_tdd>** | String type. LTE TDD or FDD mode |
| **<MCC>** | 16-bit unsigned integer. Mobile Country Code (first part of the PLMN code) |
| **<MNC>** | 16-bit unsigned integer. Mobile Network Code (second part of the PLMN code) |
| **<LAC>** | String type in hexadecimal format. Location Area Code. The parameter determines the two bytes location area code in hexadecimal format (e.g. 00C1 equals 193 in decimal) of the cell that was scanned. Range: 0–65535. **<cellID>**<br>String type in hexadecimal format. Cell ID. The parameter determines the 16-bit (GSM) or 28-bit (UMTS) cell ID. Range: 0–0xFFFFFFF. |
| **<PCID>** | Physical cell ID |
| **<uarfcn>** | Integer type. The parameter determines the UTRA-ARFCN of the cell that was scanned |

| | |
|---|---|
| **<earfcn>** | Integer type. The parameter determines the E-UTRA-ARFCN of the cell that was scanned |
| **<freq_band_ind>** | Integer type. E-UTRA frequency band (see *3GPP 36.101*) |
| **<UL_bandwidth>** | Integer type. UL bandwidth<br>0 1.4MHz<br>1 3MHz<br>2 5MHz<br>3 10MHz<br>4 15MHz<br>5 20MHz |
| **<DL_bandwidth>** | Integer type. DL bandwidth<br>0 1.4 MHz<br>1 3 MHz<br>2 5 MHz<br>3 10 MHz<br>4 15 MHz<br>5 20 MHz |
| **<TAC>** | Tracking Area Code (see *3GPP 23.003*) |
| **<PSC>** | Integer type. The parameter determines the primary scrambling code of the cell that was scanned |
| **<RAC>** | Integer type. Routing Area Code. Range 0–255. |
| **<RSCP>** | Integer type. The parameter determines the Received Signal Code Power level of the cell that was scanned |
| **<ecio>** | Integer type. Carrier to noise ratio in dB=measured Ec/Io value in dB. |
| **<RSRP>** | Reference Signal Received Power (see *3GPP 36.214*) |
| **<RSRQ>** | Reference Signal Received Quality (see 3GPP *36.214*) |
| **<RSSI>** | Integer type. The parameter shows the Received Signal Strength Indication |
| **<SINR>** | Integer type. Logarithmic value of SINR, Values are in 1/5th of a dB. Range: 0-250 which translates to -20dB – +30dB. |
| **<tx_power>** | TX power value in 1/10 dBm. It is the maximum of all UL channel TX power. The **<tx_power>** value is only meaningful when the device is in traffic. |
| **<phych>** | Integer type.Physical channel<br>0 DPCH<br>1 FDPCH |
| **<SF>** | Integer type. Spreading factor.<br>0 SF_4<br>1 SF_8<br>2 SF_16<br>3 SF_32<br>4 SF_64<br>5 SF_128<br>6 SF_256<br>7 SF_512<br>8 UNKNOWN |

| | |
|---|---|
| **<slot>** | Integer type.<br>0–16 slot format for DPCH.<br>0–9 slot format for FDPCH |
| **<speech_code>** | Destination number on which call is to be deflected |
| **<ComMod>** | Integer type. Number format. Compress mode<br>0 Not support compress mode<br>1 Support compress mode |
| **<srxqual>** | Receiver automatic gain control on the camped frequency. |
| **<ecno>** | Integer type. Carrier to noise ratio in dB = measured Ec/Io value in dB. |
| **<set>** | Integer type. 3G neighbour cell set<br>1 Active set<br>2 Synchronous neighbour set<br>3 Asynchronous neighbour set |
| **<rank>** | Rank of this cell as neighbour for inter-RAT cell reselection |
| **<s_rxlev>** | Suitable receive level for inter frequency cell |
| **<threshX_low>** | To be considered for reselection. The suitable receive level value of an evaluated lower priority cell must be greater than this value. |
| **<threshX_high>** | To be considered for reselection. The suitable receive level value of an evaluated higher priority cell must be greater than this value. |
| **<thresh_Xhigh>** | Reselection threshold for high priority layers. |
| **<thresh_Xlow>** | Reselection threshold for low priority layers. |
| **<cpich_rscp>** | Absolute power level of the common pilot channel as received by the UE in dBm x10. |
| **<cpich_ecno>** | Ratio of the received energy per PN chip for the common pilot channel to the total received power spectral density at the UE antenna connector in dB x10. |
| **<srxlev>** | Number format. Select receive level value for base station in dB (see *3GPP 25.304*). |
| **<cell_resel_priority>** | Integer type. Cell reselection priority. Range: 0–7. |
| **<s_non_intra_search>** | Threshold to control non-intra frequency searches. |
| **<thresh_serving_low>** | Specifies the suitable receive level threshold (in dB) used by the UE on the serving cell when reselecting towards a lower priority RAT/frequency. |
| **<s_intra_search>** | Cell selection parameter for the intra frequency cell. |

**NOTE**

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

## Example

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

OK
```

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

OK
```

## 5.15. AT+QCSQ Report Signal Quality

This command queries and reports the signal strength of the current service network. If the MT is registered with multiple networks in different service modes, users can query the signal strength of networks in each mode. No matter whether the MT is registered with a network or not, users can run this command to query the signal strength or allow the MT to unsolicited report 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 Report Signal Quality | |
|---|---|
| Test Command<br>**AT+QCSQ=?** | Response<br>**+QCSQ:** (list of supported **<sysmode>**s)<br><br>**OK** |
| Read Command<br>**AT+QCSQ?** | Response<br>**+QCSQ: <enable>**<br><br>**OK** |
| Execution Command<br>**AT+QCSQ** | Response<br>**+QCSQ: <sysmode>[,<value1>[,<value2>[,<value3>[,<value4>]]]]**<br><br>**OK** |
| Write Command<br>**AT+QCSQ=<enable>** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

### Parameter

| | | |
|---|---|---|
| **<sysmode>** | String type value indicating the service mode in which the MT will unsolicitedly report the signal strength. | |
| | "NOSERVICE" | NOSERVICE mode |
| | "WCDMA" | WCDMA mode |
| | "LTE" | LTE mode |
| **<value1>,<vaule2>,<value3>,<value4>** | The signal strength type corresponding to each service | |

| | |
|---|---|
| | mode, please refer to ***Table 5*** for details. |
| **<enable>** | URC report<br>0 Disable URC report<br>1 Enable URC report |
| **<wcdma_rscp>** | Integer type. Received signal code power, which is available for WCDMA mode. |
| **<wcdma_ecio>** | Integer type. Downlink carrier-to-interference ratio, which are available for WCDMA mode. |
| **<lte_rsrp>** | Integer type. Reference signal received power (RSRP) in dBm, which is available for LTE mode. |
| **<lte_sinr>** | Integer type. Signal to interference plus noise ratio (SINR) in dBm, which is available for LTE mode. |
| **<lte_rsrq>** | Integer type. Reference signal received quality (RSRQ) in dB. |

**Table 5: Signal Strength Type Corresponding to Different Service Modes**

| <sysmode> | <value1> | <value2> | <value3> | <value4> |
|---|---|---|---|---|
| "NOSERVICE" | Null | Null | Null | Null |
| "WCDMA" | **<wcdma_rssi>** | **<wcdma_rscp>** | **<wcdma_ecio>** | Null |
| "LTE" | **<lte_rssi>** | **<lte_rsrp>** | **<lte_sinr>** | **<lte_rsrq>** |

**NOTE**

1. URC reporting format is **+QCSQ: <sysmode>[,<value1>[,<value2>[,<value3>[,<value4>]]]]**, which allows the MT to unsolicitedly report the current signal strength when the strength changes.
2. This Write Command controls URC indication which is turned off by default (**<enable>**=0). If **<enable>**=1, the MT can unsolicitedly report the current signal strength when the strength changes.

## Example

```
AT+QCSQ                    //Query signal.
+QCSQ: "LTE",-52,-81,195,-10

OK
AT+QCSQ?                   //Query URC configuration.
+QCSQ: 0

OK
AT+QCSQ=?                  //List of supported <sysmode>s.
+QCSQ: "NOSERVICE","WCDMA","LTE"

OK
```

## 5.16. AT+QCAINFO Query Carrier Aggregation Parameters

This command queries carrier aggregation parameters.

| AT+QCAINFO Query Carrier Aggregation Parameters | |
|---|---|
| Test Command<br>**AT+QCAINFO=?** | Response<br>**OK** |
| Execution Command<br>**AT+QCAINFO** | Response<br>**+QCAINFO: "PCC",<freq>,<bandwidth>,<band>,<pcell_state>,<PCID>,<RSRP>,<RSRQ>,<RSSI>,<SINR>**<br>**+QCAINFO: "SCC",<freq>,<bandwidth>,<band>,<scell_state>,<PCID>,<RSRP>,<RSRQ>,<RSSI>,<SINR>**<br>**[+QCAINFO: "SCC",<freq>,<bandwidth>,<band>,<scell_state>,<PCID>,<RSRP>,<RSRQ>,<RSSI>,<SINR>[…]]**<br><br>**OK**<br><br>If no second cell was active:<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

### Parameter

| | |
|---|---|
| **<PCC>** | Primary carrier component |
| **<SCC>** | Secondary carrier component |
| **<freq>** | EARFCN |
| **<bandwidth>** | Integer type. Bandwidth |
| | 6 1.4 MHZ |
| | 15 3 MHZ |
| | 25 5 MHZ |
| | 50 10 MHZ |
| | 75 15 MHZ |
| | 100 20 MHZ |
| **<band>** | String type. Band information. |
| **<pcell_state>** | String type. Primary cell state |
| | 0 No serving |
| | 1 Registered |
| **<scell_state>** | Integer type. Secondary cell state |
| | 0 Deconfigured |

| | |
|---|---|
| | 1 Configured deactivated<br>2 Configured activated |
| **<PCID>** | Integer type. Physical Cell ID |
| **<rsrp>** | Integer type. Reference Signal Received Power (see *3GPP 36.214*) |
| **<rsrq>** | Integer type. Reference Signal Received Quality (see *3GPP 36.214*) |
| **<rssi>** | Integer type. The parameter shows the Received Signal Strength Indication |
| **<sinr>** | Integer type. Logarithmic value of SINR. Values are in 1/5th of a dB. Range: 0–250, which translates to -20dB to +30dB. |

## 5.17. AT+QNWPREFCFG Network Searching Preferences

This command configures the network searching preferences.

| **AT+QNWPREFCFG Configure Network Searching Preferences** | |
|---|---|
| Test Command<br>**AT+QNWPREFCFG=?** | Response<br>**+QNWPREFCFG: "gw_band",(**list of supported **<gw_band>**s**)**<br>**+QNWPREFCFG: "lte_band",(**list of supported **<LTE_band>**s**)**<br>**+QNWPREFCFG: "mode_pref",(**list of supported **<mode_pref>**s**)**<br>**+QNWPREFCFG: "srv_domain",(**range of supported **<srv_domain>**s**)**<br>**+QNWPREFCFG: "voice_domain",(**range of supported **<voice_domain>**s**)**<br>**+QNWPREFCFG: "roam_pref",(**list of supported **<roam_pref>**s**)**<br>**+QNWPREFCFG: "ue_usage_setting",(**list of supported **<setting>**s**)**<br>**+QNWPREFCFG: "policy_band"**<br>**+QNWPREFCFG: "ue_capability_band"**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

### 5.17.1. AT+QNWPREFCFG="gw_band" WCDMA Band Configuration

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

| **AT+QNWPREFCFG="gw_band" WCDMA Band Configuration** | |
|---|---|
| Write Command<br>**AT+QNWPREFCFG="gw_band"[,<gw_band>]** | Response<br>If the optional parameter is omitted, query the current configuration: |

| | |
|---|---|
| | **+QNWPREFCFG: "gw_band",<gw_band>**<br><br>**OK**<br><br>If the optional parameter is specified, configure the preferred WCDMA bands to be searched:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |

### Parameter

| | |
|---|---|
| **<gw_band>** | String type. Use the colon as a separator to list the WCDMA Bands to be configured. The parameter format is **B1:B2:…:BN**. |

**NOTE**

EG06xK, Ex120K and EM060K series modules support the following WCDMA bands:

| | |
|---|---|
| B1 | WCDMA 2100 band |
| B2 | WCDMA 1900 band |
| B3 | WCDMA 1800 band |
| B4 | WCDMA 1700 band |
| B5 | WCDMA 850 band |
| B6 | WCDMA 800 band |
| B8 | WCDMA 900 band |
| B19 | WCDMA Japan 850 band |

### Example

```
AT+QNWPREFCFG="gw_band"          //Query the currently configured WCDMA bands of the UE.
+QNWPREFCFG: "gw_band",1:2:3:4:5:6:7:8:9:19

OK
AT+QNWPREFCFG="gw_band",1:2      //Set WCDMA B1 and B2.
OK
```

## 5.17.2. AT+QNWPREFCFG="lte_band" LTE Band Configuration

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

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

### Parameter

| | |
|---|---|
| **<LTE_band>** | String type. Use the colon as a separator to list the LTE bands to be configured. The parameter format is **B1:B2:…:BN**. |

**NOTE**

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

### Example

```
AT+QNWPREFCFG="lte_band"                    //Query the currently configured LTE bands of the UE.
+QNWPREFCFG:  "lte_band",1:2:3:4:5:7:8:12:13:14:17:18:19:20:25:26:28:29:30:32:34:38:39:40:41:42:66:71

OK
AT+QNWPREFCFG="lte_band",1:2                //Set LTE B1 and LTE B2.
OK
```

## 5.17.3. AT+QNWPREFCFG="mode_pref" Network Search Mode Configuration

This command specifies the network search mode.

| AT+QNWPREFCFG="mdoe_pref" | Network Search Mode Configuration |
|---|---|
| Write Command<br>**AT+QNWPREFCFG="mode_pref"[,<mode_pref>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QNWPREFCFG: "mode_pref",<mode_pref>**<br><br>**OK**<br>If the optional parameter is specified, configure the network search mode:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |

**Parameter**

| | | |
|---|---|---|
| **<mode_pref>** | String type. The RATs supported by the module are as follows: | |
| | AUTO | WCDMA & LTE |
| | WCDMA | WCDMA only |
| | LTE | LTE only |

**Example**

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

OK
AT+QNWPREFCFG="mode_pref",LTE                //Set RAT to LTE only.
OK
```

### 5.17.4. AT+QNWPREFCFG="srv_domain" Service Domain Configuration

This command specifies the registered service domain.

| AT+QNWPREFCFG="srv_domain" | Service Domain Configuration |
|---|---|
| Write Command<br>**AT+QNWPREFCFG="srv_domain"[,<srv_domain>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QNWPREFCFG: "srv_domain",<srv_domain>** |

| | |
|---|---|
| | **OK**<br>If the optional parameter is specified, configure the service domain of UE:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |

### Parameter

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

### Example

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

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

## 5.17.5. AT+QNWPREFCFG="voice_domain" Voice Domain Configuration

This command specifies the voice domain of UE.

| AT+QNWPREFCFG="voice_domain" Voice Domain Configuration | |
|---|---|
| Write Command<br>**AT+QNWPREFCFG="voice_domain"[,<voice_domain>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QNWPREFCFG: "voice_domain",<voice_domain>**<br><br>**OK**<br>If the optional parameter is specified, configure the voice domain of UE:<br>**OK**<br>Or |

| | |
|---|---|
| | **ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |

### Parameter

| | | |
|---|---|---|
| **<voice_domain>** | Integer type. Service domain of UE. | |
| | 0 | CS voice only |
| | 1 | IMS PS voice only |
| | 2 | CS voice preferred |
| | 3 | IMS voice preferred |

### Example

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

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

## 5.17.6. AT+QNWPREFCFG="roam_pref" Roaming Preference Configuration

This command specifies the roaming preference of UE.

| **AT+QNWPREFCFG="roam_pref"** | **Roaming Preference Configuration** |
|---|---|
| Write Command<br>**AT+QNWPREFCFG="roam_pref"[,<roam_pref>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QNWPREFCFG: "roam_pref",<roam_pref>**<br><br>**OK**<br>If the optional parameter is specified, configure the roaming preference of UE:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |

### Parameter

| | | |
|---|---|---|
| **<roam_pref>** | Integer type. Roaming preference of UE. | |
| | 1 | Roam only on home network |
| | 3 | Roam on affiliate network |
| | 255 | Roam on any network |

### Example

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

OK
AT+QNWPREFCFG="roam_pref",1        // Roam only on home network
OK
```

## 5.17.7. AT+QNWPREFCFG="ue_usage_setting" UE Usage Setting Configuration

This command specifies the usage setting of UE.

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

### Parameter

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

### Example

```
AT+QNWPREFCFG="ue_usage_setting"          //Query the current configuration
+QNWPREFCFG: "ue_usage_setting",1

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

## 5.17.8. AT+QNWPREFCFG="policy_band" Read Carrier Policy Band

This command queries the band configured in the carrier policy.

| AT+QNWPREFCFG="policy_band" | Read Carrier Policyman Band |
|---|---|
| Write Command<br>**AT+QNWPREFCFG="policy_band"** | Response<br>**+QNWPREFCFG: "gw_band",<gw_band>**<br>**+QNWPREFCFG: "lte_band",<LTE_band>**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

### Parameter

| | |
|---|---|
| **<gw_band>** | String type. Use the colon as a separator to list the WCDMA bands to be configured. The parameter format is **B1:B2:…:BN**. |
| **<LTE_band>** | String type. Use the colon as a separator to list the LTE bands to be configured. The parameter format is **B1:B2:…:BN**. |

**NOTE**

The module supports the following WCDMA bands:
B1 WCDMA 2100 band
B2 WCDMA 1900 band
B3 WCDMA 1800 band
B4 WCDMA 1700 band
B5 WCDMA 850 band
B6 WCDMA 800 band
B8 WCDMA 900 band
B19 WCDMA Japan 850 band
The LTE bands supported by the module are: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, 39, B40, B41, B42, B43, B48, B66 and B71.

### Example

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

OK
```

### 5.17.9. AT+QNWPREFCFG="ue_capability_band" Query UE Capability Band

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

| AT+QNWPREFCFG="ue_capability_band" Query UE Capability Band | |
|---|---|
| Write Command<br>**AT+QNWPREFCFG="ue_capability_band"** | Response<br>**+QNWPREFCFG: "gw_band",<gw_band>**<br>**+QNWPREFCFG: "lte_band",<LTE_band>**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

### Parameter

| | |
|---|---|
| **<gw_band>** | String type. Use the colon as a separator to list the WCDMA bands to be configured. The parameter format is **B1:B2:…:BN**. |
| **<LTE_band>** | String type. Use the colon as a separator to list the LTE bands to be configured. The parameter format is **B1:B2:…:BN**. |

**NOTE**

The module supports the following WCDMA bands:
B1 WCDMA 2100 band
B2 WCDMA 1900 band
B3 WCDMA 1800 band
B4 WCDMA 1700 band
B5 WCDMA 850 band
B6 WCDMA 800 band
B8 WCDMA 900 band
B19 WCDMA Japan 850 band
The LTE bands supported by the module are: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, 39, B40, B41, B42, B43, B48, B66 and B71.

### Example

```
AT+QNWPREFCFG="ue_capability_band"
+QNWPREFCFG: "gw_band",1:8
+QNWPREFCFG: "lte_band",1:3:8

OK
```

## 5.18. AT+QNWCFG="up/down" Get Average UL and DL Rate

This commands queries and configures the average uplink rate and downlink rate in delta time.

| AT+QNWCFG="up/down" Get Average UL and DL Rate | |
|---|---|
| Test Command<br>**AT+QNWCFG=?** | Response<br>**+QNWCFG: "up_down",<uplink_rate>,<downlink_rate>,(**range of supported **<time_interval>**s**)**<br>…<br>**OK** |
| Execution Command<br>**AT+QNWCFG="up/down"[, <time_interval>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QNWCFG: "up_down",<uplink_rate>,<downlink_rate>,<time_interval>**<br>**OK**<br><br>If the optional parameter is specified, set the average uplink rate and downlink rate in delta time:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | This command takes effect immediately.<br>The configuration will not be saved. |

### Parameter

| | |
|---|---|
| **<uplink_rate>** | Integer type. Average rate of uplink in delta time. Unit: bit/s. |
| **<downlink_rate>** | Integer type. Average rate of downlink in delta time. Unit: bit/s. |
| **<time_interval>** | Integer type. Time interval to calculate the average rate automatically.<br>Range: 1–60. Default: 2. Unit: second. |

### Example

```
AT+QNWCFG=?                 //Test command
+QNWCFG: "up_down",<uplink_rate>,<downlink_rate>,(1-60)

OK
AT+QNWCFG="up_down"         //Query the current setting.
+QNWCFG: "up_down",2056,384,2

OK
AT+QNWCFG="up_down",5       //Configure the time interval to 5 seconds.
OK
AT+QNWCFG="up_down"         //Query the current setting.
+QNWCFG: "up_down",2056,384,5

OK
```

# 6 Call Related Commands

**NOTE**

Call related AT commands are not supported on EG065K series, EM120K or EM060K-GL modules.

## 6.1. ATA Answer an Incoming Call

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

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

**NOTE**

1. Any additional commands on the same command line are ignored.
2. This command may be aborted generally when the module receives a character during command execution. However, the command will not be aborted during some connection establishments such as handshaking.

**Example**

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

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

## 6.2. ATD Originate a Call

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

| ATD Originate a Call | |
|---|---|
| Execution Command<br>**ATD<n>[<mgsm>][;]** | Response<br>If no dial tone and **ATX2** or **ATX4** is set:<br>**NO DIALTONE**<br><br>If busy and **ATX3** or **ATX4** is set:<br>**BUSYBUSY**<br><br>If a connection cannot be established:<br>**NO CARRIER**<br>If connection is successful and there is a non-voice call:<br>**CONNECT<text>**<br>And MT switches to data mode.<br>Note: **<text>** outputs only when **<value>** is greater than 0 in **ATX<value>** parameter setting.<br>When MT returns to command mode after call release:<br>**OK**<br><br>If connection is successful and there is a voice call:<br>**OK** |

| | |
|---|---|
| Maximum Response Time | 5 s, determined by the network. |
| Characteristics | / |
| Reference<br>V.25ter | |

## Parameter

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

**NOTE**

1. When being executed, this command may be aborted generally by the module's receiving of an **ATH** or a character. However, the command will not be aborted during some connection establishments such as handshaking.
2. Parameter "**I**" and "**i**" are only valid when no "*****" or "**#**" code is within the dial string.
3. See **ATX** for setting result code and call monitoring parameters.
4. Responses returned after dialing with **ATD**:
   For voice call, two different response modes can be determined. MT returns **OK** immediately either after dialing was completed or after the call was established. The setting is controlled by **AT+COLP**, of which default is **AT+COLP=0** which causes the MT to return **OK** immediately after the dialing was completed. Otherwise, MT returns **OK**, **BUSY**, **NO DIAL TONE**, or **NO CARRIER**.
5. Using **ATD** during an active voice call:

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

## Example

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

## 6.3. ATH Disconnect Existing Connection

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

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

**Parameter**

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

## 6.4. AT+CVHU Voice Hang up Control

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

| AT+CVHU Voice Hang up Control | |
|---|---|
| Test Command<br>**AT+CVHU=?** | Response<br>**+CVHU: (**list of supported **<mode>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CVHU?** | Response<br>**+CVHU: <mode>**<br><br>**OK** |
| Write Command<br>**AT+CVHU=<mode>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

**Parameter**

| | |
|---|---|
| **<mode>** | Integer type.<br>0 **ATH** can be used to disconnect the voice call<br>1 **ATH** is ignored with the response **OK** returned only |

## 6.5. AT+CHUP Hang up Calls

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

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

**Example**

| | |
|---|---|
| **RING** | //Incoming call. |
| **AT+CHUP** | //Hang up the call. |
| **OK** | |

## 6.6. ATS0 Set Number of Rings Before Automatic Answering

This command controls automatic answering mode for the incoming calls.

| **ATS0 Set Number of Rings Before Automatic Answering** | |
|---|---|
| Read Command<br>**ATS0?** | Response<br>**<n>**<br><br>**OK** |

| | |
|---|---|
| Write Command<br>**ATS0=<n>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>V.25ter | |

### Parameter

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

**NOTE**

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

### Example

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

RING                            //A call is coming.
##0

RING
##0

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

## 6.7. ATS6 Set Pause Before Blind Dialing

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

| ATS6 Set Pause Before Blind Dialing | |
|---|---|
| Read Command | Response |

| | |
|---|---|
| **ATS6?** | **<n>**<br><br>**OK** |
| Write Command<br>**ATS6=<n>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>V.25ter | |

### Parameter

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

## 6.8. ATS7 Set Time to Wait for Connection Completion

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

| **ATS7 Set Time to Wait for Connection Completion** | |
|---|---|
| Read Command<br>**ATS7?** | Response<br>**<n>**<br><br>**OK** |
| Write Command<br>**ATS7=<n>** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>V.25ter | |

### Parameter

| | |
|---|---|
| **<n>** | Integer type. |

| | |
|---|---|
| 0 | Disabled |
| 1–255 | Duration of seconds to wait for connection completion |

## 6.9. ATS8 Set the Time to Wait for Comma Dial Modifier

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

| ATS8 Set the Time to Wait for Comma Dial Modifier | |
|---|---|
| Read Command<br>**ATS8?** | Response<br>**<n>**<br><br>**OK** |
| Write Command<br>**ATS8=<n>** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>V.25ter | |

**Parameter**

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

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

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

| ATS10 Set Disconnection Delay after Indicating the Absence of Data Carrier | |
|---|---|
| Read Command<br>**ATS10?** | Response<br>**<n>** |

| | |
|---|---|
| | **OK** |
| Write Command<br>**ATS10=<n>** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>V.25ter | |

**Parameter**

| | |
|---|---|
| **<n>** | Integer type.<br>1–15–254 Duration of tenths of seconds to wait before disconnecting after UE has indicated the absence of received line signal |

## 6.11. AT+CSTA Select Type of Address

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

| **AT+CSTA Select Type of Address** | |
|---|---|
| Test Command<br>**AT+CSTA=?** | Response<br>**+CSTA:** (list of supported **<type>**s)<br><br>**OK** |
| Read Command<br>**AT+CSTA?** | Response<br>**+CSTA: <type>**<br><br>**OK** |
| Write Command<br>**AT+CSTA=[<type>]** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

### Parameter

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

## 6.12. AT+CLCC List Current Calls of MT

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

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

### Parameter

| | | |
|---|---|---|
| **<idx>** | Integer type. The call identification number as described in *3GPP TS 22.030* can be used in **AT+CHLD** operations. | |
| **<dir>** | Integer type. | |
| | 0 | Mobile originated (MO) call |
| | 1 | Mobile terminated (MT) call |
| **<stat>** | Integer type. State of the call. | |
| | 0 | Active |
| | 1 | Held |
| | 2 | Dialing (MO call) |
| | 3 | Alerting (MO call) |
| | 4 | Incoming (MT call) |
| | 5 | Waiting (MT call) |

| | |
|---|---|
| **<mode>** | Integer type. Bearer/teleservice.<br>0 Voice<br>1 Data<br>2 FAX |
| **<mpty>** | Integer type.<br>0 Call is not one of multiparty (conference) call parties<br>1 Call is one of multiparty (conference) call parties |
| **<number>** | Phone number in string type in format specified by **<type>**. |
| **<type>** | Type of address of octet in integer format (See *3GPP TS 24.008 subclause 10.5.4.7* for details). Usually, it has three kinds of values:<br>129 Unknown type<br>145 International type (contains the character "+")<br>161 National type |
| **<alpha>** | Alphanumeric representation for **<number>** corresponding to the entry found in phonebook. |
| **<err>** | Error codes. For more details, see ***Table 11***. |

**Example**

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

OK
```

## 6.13. AT+CR Service Reporting Control

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

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

| **AT+CR Service Reporting Control** | |
|---|---|
| Test Command<br>**AT+CR=?** | Response<br>**+CR: (**list of supported **<mode>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CR?** | Response<br>**+CR: <mode>** |

| | |
|---|---|
| | **OK** |
| Write Command<br>**AT+CR=[<mode>]** | Response<br>MT controls whether intermediate result code **+CR: <serv>** is returned from TA to TE or not when a call is set up.<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

**Parameter**

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

## 6.14. AT+CRC Set Extended Format of Incoming Call Indication

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

| **AT+CRC Set Extended Format of Incoming Call Indication** | |
|---|---|
| Test Command<br>**AT+CRC=?** | Response<br>**+CRC:** (list of supported **<mode>**s)<br>**OK** |
| Read Command<br>**AT+CRC?** | Response<br>**+CRC: <mode>**<br>**OK** |
| Write Command<br>**AT+CRC=[<mode>]** | Response<br>**OK** |

| | |
|---|---|
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved automatically. |
| Reference<br>3GPP TS 27.007 | |

### Parameter

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

### Example

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

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

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

## 6.15. AT+CRLP Select Radio Link Protocol Parameter

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

| AT+CRLP Select Radio Link Protocol Parameter |
|---|

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

## Parameter

| | | |
|---|---|---|
| **<iws>** | Integer type. Interworking Window Size (IWF to MS window size). | |
| | 0–61 | Interworking window size |
| | 0–240–488 | For **<ver>**=2 |
| **<mws>** | Integer type. Mobile Window Size (MS to IWF window size). | |
| | 0–61 | Mobile window size |
| | 0–240–488 | For **<ver>**=2 |
| **<T1>** | Integer type. | |
| | 38–48–255 | Acknowledgment timer T1 in a unit of 10ms |

| | | |
|---|---|---|
| | 42–52–255 | For **<ver>**=2 |
| **<N2>** | Integer type. | |
| | 1– -6–55 | Retransmission attempts N2 |
| **<ver>** | Integer type. RLP version number. | |
| | 0–2 | RLP version number |

## 6.16. AT+QECCNUM Configure Emergency Call Numbers

This command queries, adds and deletes ECC phone numbers (emergency call numbers).

| **AT+QECCNUM Configure Emergency Call Numbers** | |
|---|---|
| Test Command<br>**AT+QECCNUM=?** | Response<br>**+QECCNUM: (**list of supported **<mode>**s**)**<br><br>**OK** |
| Write Command<br>**AT+QECCNUM=<mode>[,<type>[,<eccnum1>[,<eccnum2>[,…[,<eccnumN>]]]]]** | Response<br>If **<mode>**=0, **<type>** is specified and **<eccnumN>** is omitted, query the current ECC number type:<br>**+QECCNUM: <type>,<eccnum1>,<eccnum2>[,…]**<br><br>**OK**<br><br>If **<mode>**=1, **<type>**=0 or 1, and at least one **<eccnumN>** is specified, add ECC numbers with (U)SIM card or ECC numbers without (U)SIM card:<br>**OK**<br>Or<br>**ERROR**<br><br>If **<mode>**=2, **<type>**=0 or 1, and at least one **<eccnumN>** is specified, delete ECC numbers with (U)SIM card or ECC numbers without (U)SIM card:<br>**OK**<br>or<br>**ERROR**<br><br>If **<mode>**=3, **<type>** and **<eccnumN>** are both omitted, reset ECC numbers and the reset will take effect after rebooting:<br>**OK**<br>Or |

| | |
|---|---|
| | **ERROR** |
| Write Command<br>**AT+QECCNUM=<mode>[,<type>,<eccnum1>,<category>]** | Response<br>If **<mode>**=4, **<type>**, **<eccnumN>** and **<category>** are specified, add an ECC number with assigned category:<br>**OK**<br>Or<br>**ERROR**<br><br>If **<mode>**=5, **<type>**, **<eccnumN>** and **<category>** are omitted, query all the ECC numbers and their categories:<br>**+QECCNUM: 0,<eccnum1>,<category>[,…]**<br>**+QECCNUM: 1,<eccnum1>,<category>[,…]**<br>**+QECCNUM: 2,<eccnum1>,<category>[,…]**<br>**+QECCNUM: 3,<eccnum1>,<category>[,…]**<br><br>**OK** |
| Read Command<br>**AT+QECCNUM?** | Response<br>**+QECCNUM: 0,<eccnum1>,<eccnum2>[,…]**<br>**+QECCNUM: 1,<eccnum1>,<eccnum2>[,…]**<br><br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

## Parameter

| | |
|---|---|
| **<mode>** | Integer type. ECC number operations.<br>0 Query ECC numbers.<br>1 Add ECC numbers with default category.<br>2 Delete ECC numbers.<br>3 Reset the ECC number list.<br>4 Add an ECC number with specified category.<br>5 Query all emergency call numbers and the category. |
| **<type>** | Integer type. ECC number type.<br>0 ECC numbers from the module (dial without (U)SIM card inserted)<br>1 ECC numbers from the module (dial with (U)SIM card inserted)<br>2 ECC numbers from the network (dial with (U)SIM card inserted)<br>3 ECC numbers from the (U)SIM card (dial with (U)SIM card inserted) |
| **<category>** | Integer type. ECC number category.<br>0 Default<br>1 Police<br>2 Ambulance |

| | |
|---|---|
| | 4 Fire Brigade<br>8 Marine Guard<br>16 Mountain Rescue<br>32 Manually initiated eCall<br>64 Automatically initiated eCall |
| **<eccnumN>** | String type. ECC numbers (e.g.,"110", "119"). |

**NOTE**

1. Only the ECC numbers stored in the module with/without (U)SIM card can be modified.
2. If a number to be added into the type of ECC numbers with (U)SIM card exists in the module, or has gotten from network and (U)SIM card, it cannot be added.
3. The priority for reading ECC number list: ECC numbers from the network > ECC numbers from the (U)SIM card> ECC numbers stored in the module with/without (U)SIM card.

### Example

```
AT+QECCNUM=?                    //Query the supported ECC number operation mode.
+QECCNUM: (0-5)

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

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

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

OK
AT+QECCNUM=5                    //Query all emergency call numbers and corresponding category.
+QECCNUM: 0,"911",0,"112",0,"00",0,"08",0,"110",0,"999",0,"118",0,"119",0
+QECCNUM: 1,"911",0,"112",0,"234",0
```

```
+QECCNUM: 2,"110",1,"120",2,"119",4,"122",8,"999",16
+QECCNUM: 3,"112",0,"000",0,"08",0,"118",0,"122",0,"911",0,"999",0,"119",0,"120",0,"110",0

OK
AT+QECCNUM=4,1,"123",1          //Add ECC number "123" of the Police category into ECC numbers
OK                                with (U)SIM card.
AT+QECCNUM=5                    //Query all emergency call numbers and corresponding category.
+QECCNUM: 0,"911",0,"112",0,"00",0,"08",0,"110",0,"999",0,"118",0,"119",0
+QECCNUM: 1,"911",0,"112",0,"234",0,"123",1
+QECCNUM: 2,"110",1,"120",2,"119",4,"122",8,"999",16
+QECCNUM: 3,"112",0,"000",0,"08",0,"118",0,"122",0,"911",0,"999",0,"119",0,"120",0,"110",0

OK
AT+QECCNUM=3                    //Reset the ECC number list, and such reset will take effect after rebooting.
OK
```

## 6.17. AT^DSCI Call Status Indication

This command indicates the call status.

| AT^DSCI Call Status Indication | |
|---|---|
| Test Command<br>**AT^DSCI=?** | Response<br>**^DSCI: (**list of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT^DSCI?** | Response<br>**^DSCI: <n>**<br><br>**OK** |
| Write Command<br>**AT^DSCI=[<n>]** | Response<br>**OK** |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved. |
| Reference | |

### Parameter

| | |
|---|---|
| **<n>** | Integer type. Enable/disable the URC of DSCI.<br>0 Disable<br>1 Enable |

**NOTE**

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

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

Parameters

| | |
|---|---|
| **<id>** | Integer type. Call ID |
| **<dir>** | Integer type. Call direction<br>0 Mobile originated call<br>1 Mobile terminated call |
| **<stat>** | Integer type. Call state<br>1 CALL_LOCAL_HOLD<br>2 CALL_ORIGINAL<br>3 CALL_CONNECT<br>4 CALL_INCOMING<br>5 CALL_WAITING<br>6 CALL_END<br>7 CALL_ALERTING |
| **<type>** | Integer type. Call type<br>0 Voice call<br>1 PS call |
| **<number>** | String type. Phone number |
| **<num_type>** | Integer type. Type of address of octet in integer format (See *3GPP TS 24.008*). Usually, it has three kinds of values:<br>129 Unknown type<br>145 International type (contains the character "+")<br>161 National type |

## Example

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

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

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

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

ATH
OK
```

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

//Incoming call
**RING**

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

**RING**

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

**NO CARRIER**

# 7 Phonebook Commands

## 7.1. AT+CNUM Subscriber Number

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

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

### Parameter

| | |
|---|---|
| **<alpha>** | Optional alphanumeric string associated with **<number>**; the used character set should be the one selected with **AT+CSCS**. |
| **<number>** | String type. Phone number of format specified by **<type>.** |
| **<type>** | Type of address of octet in integer format (Refer to *3GPP TS 24.008*). Usually, it has three kinds of values:<br>129 Unknown type<br>145 International type (contains the character "+")<br>161 National type |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## 7.2. AT+CPBF Find Phonebook Entries

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

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

### Parameter

| | |
|---|---|
| **<nlength>** | Integer type. Indicate the maximum length of field **<number>.** |
| **<tlength>** | Integer type. Indicate the maximum length of field **<text>.** |
| **<findtext>** | String type. The field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**. |
| **<index>** | Integer type. In the range of location numbers of phone book memory. |
| **<type>** | Type of address of octet in integer format (See *3GPP TS 24.008*). Usually, it has three kinds of values:<br>129 Unknown type<br>145 International type (contains the character “+”)<br>161 National type |
| **<text>** | Integer type. The field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**. |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## 7.3. AT+CPBR Read Phonebook Entries

This command reads phonebook entries in location number range **<index1>... <index2>** from the current phonebook memory storage selected with **AT+CPBS**. If **<index2>** is omitted, only location **<index1>** will be returned.

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

### Parameter

| | |
|---|---|
| **<index>** | Integer type. Location numbers of phonebook memory. |
| **<nlength>** | Integer type. Indicate the maximum length of field **<number>.** |
| **<tlength>** | Integer type. Indicate the maximum length of field **<text>.** |
| **<index1>** | Integer type. The first phonebook record to read. |
| **<index2>** | Integer type. The last phonebook record to read. |
| **<type>** | Type of address of octet in integer format (See *3GPP TS 24.008*). Usually, it has three kinds of values:<br>129 Unknown type<br>145 International type (contains the character "+")<br>161 National type |
| **<text>** | String type. The field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**. |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## 7.4. AT+CPBS Select Phonebook Memory Storage

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

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

### Parameter

| | |
|---|---|
| **<storage>** | String type. |

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

## 7.5. AT+CPBW Write Phonebook Entry

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

| **AT+CPBW Write Phonebook Entry** | |
|---|---|
| Test Command<br>**AT+CPBW=?** | Response<br>**+CPBW: (**range of supported **<index>**s**),<nlength>,(**list of supported **<type>**s**),<tlength>**<br><br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Write Command<br>**AT+CPBW=[<index>][,<number>[,<type>[,<text>]]]** | Response<br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

| Reference |
| --- |
| 3GPP 27.007 |

## Parameter

| | |
| --- | --- |
| **<index>** | Integer type. in the range of location numbers of phone book memory. If **<index>** is not given, the first free entry will be used. If **<index>** is given as the only parameter, the phonebook entry specified by **<location>** is deleted. |
| **<nlength>** | Integer type. Indicate the maximum length of field **<number>** |
| **<tlength>** | Integer type. Indicate the maximum length of field **<text>** |
| **<type>** | Type of address of octet in integer format (Refer to *3GPP TS 24.008*). Usually, it has three kinds of values:<br>129 Unknown type<br>145 International type (contains the character "+")<br>161 National type |
| **<text>** | String type field of maximum length **<tlength>** in current TE character set specified by **AT+CSCS**. |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## Example

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

# 8 Short Message Service Commands

## 8.1. AT+CSMS Select Message Service

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

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

### Parameter

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

| | | |
|---|---|---|
| | 1 | *3GPP TS 23.040* and *3GPP TS 23.041* (the syntax of SMS AT commands is compatible with *3GPP TS 27.005 Phase 2+ version*; the requirement of **<service>** setting 1 is mentioned under corresponding command descriptions). |
| **<mt>** | Integer type. Mobile terminated messages | |
| | 0 | Type not supported |
| | 1 | Type supported |
| **<mo>** | Integer type. Mobile originated messages | |
| | 0 | Type not supported |
| | 1 | Type supported |
| **<bm>** | Integer type. Broadcast type messages | |
| | 0 | Type not supported |
| | 1 | Type supported |
| **<err>** | Error codes. For more details, see ***Table 12***. | |

**Example**

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

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

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

OK
```

## 8.2. AT+CMGF Message Format

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

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

| AT+CMGF Message Format | |
|---|---|
| Test Command<br>**AT+CMGF=?** | Response<br>**+CMGF: (**list of supported **<mode>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CMGF?** | Response<br>**+CMGF: <mode>**<br><br>**OK** |
| Write Command<br>**AT+CMGF[=<mode>]** | Response<br>TA sets parameter to denote which kind of I/O format of messages is used.<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.005 | |

**Parameter**

| | | |
|---|---|---|
| **<mode>** | Integer type. | |
| | 0 | PDU mode |
| | 1 | Text mode |

## 8.3. AT+CSCA Service Center Address

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

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

| | |
|---|---|
| | If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300ms |
| Reference<br>3GPP TS 27.005 | |

### Parameter

| | |
|---|---|
| **<sca>** | Service center address. 3GPP TS 24.011 RP SC address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *3GPP TS 27.007*). The type of address is given by **<tosca>**. |
| **<tosca>** | Type of service center address. 3GPP TS 24.011 RP SC address Type-of-Address octet in integer format (default refer to **<toda>**). |
| **<err>** | Error codes. For more details, see ***Table 11***. |

### Example

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

OK
```

## 8.4. AT+CPMS Preferred Message Storage

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

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

| | |
|---|---|
| | **OK** |
| Write Command<br>**AT+CPMS=<mem1>[,<mem2>[,<mem3>]]** | Response<br>TA selects memory storages **<mem1>**, **<mem2>** and **<mem3>** to be used for reading, writing, etc.<br>**+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>**<br><br>**OK**<br><br>If there is any error related to ME functionality:<br>**+CMS ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will be saved automatically. |
| Reference<br>3GPP TS 27.005 | |

## Parameter

| | |
|---|---|
| **<mem1>** | String type. Messages to be read and deleted from this memory storage<br>"SM" (U)SIM message storage<br>"ME" Mobile equipment message storage<br>"MT" Same as "ME" storage<br>"SR" SMS status report storage location |
| **<mem2>** | String type. Messages will be written and sent to this memory storage<br>"SM" (U)SIM message storage<br>"ME" Mobile equipment message storage<br>"MT" Same as "ME" storage<br>"SR" SMS status report storage location |
| **<mem3>** | String type. Received messages will be placed in this memory storage if routing to PC is not set (**AT+CNMI**)<br>"SM" (U)SIM message storage<br>"ME" Mobile equipment message storage<br>"MT" Same as "ME" storage<br>"SR" SMS status report storage location |
| **<usedx>** | Integer type, number of current messages in **<memx>** |
| **<totalx>** | Integer type, total number of messages which can be stored in **<memx>** |
| **<err>** | Error codes. For more details, see ***Table 12***. |

## Example

```
AT+CPMS?                    //Query the current SMS message storage.
```

```
+CPMS: "ME",0,255,"ME",0,255,"ME",0,255

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

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

OK
```

## 8.5. AT+CMGD Delete Messages

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

| AT+CMGD Delete Messages | |
|---|---|
| Test Command<br>**AT+CMGD=?** | Response<br>**+CMGD: (**range of supported **<index>**s**),(**range of supported **<delflag>**s**)**<br><br>**OK** |
| Write Command<br>**AT+CMGD=<index>[,<delflag>]** | Response<br>TA deletes message from preferred message storage **<mem1>** location **<index>**.<br>**OK**<br><br>If there is any error related to ME functionality:<br>**+CMS ERROR:<err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.005 | |

### Parameter

| | |
|---|---|
| **<index>** | Integer type value in the range of location numbers supported by the associated memory. |
| **<delflag>** | Integer type. Delete flag. |

| | | |
|---|---|---|
| | 0 | Delete the message specified in **<index>** |
| | 1 | Delete all read messages from **<mem1>** storage |
| | 2 | Delete all read messages from **<mem1>** storage and sent mobile originated messages |
| | 3 | Delete all read messages from **<mem1>** storage, sent and unsent mobile originated messages |
| | 4 | Delete all messages from **<mem1>** storage |
| **<err>** | Error codes. For more details, see ***Table 12***. | |

**NOTE**

Operation of **<delflag>** depends on the storage of deleted messages.

**Example**

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

## 8.6. AT+CMGL List Messages

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

| **AT+CMGL List Messages** | |
|---|---|
| Test Command<br>**AT+CMGL=?** | Response<br>**+CMGL: (**list of supported **<stat>**s**)**<br><br>**OK** |
| Write Command<br>**AT+CMGL[=<stat>]** | Response<br>If in text mode (**AT+CMGF=1**) and the command is executed successfully:<br>For SMS-SUBMITs and/or SMS-DELIVERs:<br>**+CMGL: <index>,<stat>,<oa/da>,[<alpha>],[<scts>][,<toa/toda>,<length>]<CR><LF><data>[<CR><LF>]**<br>**[...]** |

| | |
|---|---|
| | For SMS-STATUS-REPORTs:<br>**+CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[<CR><LF>]**<br>**[...]**<br><br>For SMS-COMMANDs:<br>**+CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF>]**<br>**[…]**<br><br>For CBM storage:<br>**+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[<CR><LF>]**<br>**[…]**<br><br>**OK**<br><br>If in PDU mode (**AT+CMGF=0**) and the command is executed successfully:<br>**+CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu>[<CR><LF>]**<br>**[...]**<br><br>**OK**<br><br>If there is any error related to ME functionality:<br>**+CMS ERROR: <err>** |
| Execution Command<br>**AT+CMGL** | Response<br>List all messages with "REC UNREAD" status from message storage **<mem1>**, and then the status in the storage changes to "REC READ". |
| Maximum Response Time | 300 ms. |
| Characteristics | / |
| Reference<br>3GPP TS 27.005 | |

## Parameter

| | | |
|---|---|---|
| **<stat>** | In text mode: | |
| | "REC UNREAD" | Received unread messages |
| | "REC READ" | Received read messages |
| | "STO UNSENT" | Stored unsent messages |
| | "STO SENT" | Stored sent messages |

| | | |
|---|---|---|
| | "ALL" | All messages |
| | In PDU mode: | |
| | 0 | Received unread messages |
| | 1 | Received read messages |
| | 2 | Stored unsent messages |
| | 3 | Stored sent messages |
| | 4 | All messages |
| **<index>** | Integer type. In the range of location numbers supported by the associated memory | |
| **<da>** | Destination Address. *3GPP TS 23.040* TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *3GPP TS 27.007*); type of address is given by **<toda>**. | |
| **<oa>** | Originating address. *3GPP TS 23.040* TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *TS 27.007*); type of address is given by **<tooa>**. | |
| **<alpha>** | String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry found in MT phonebook; implementation of this feature is manufacturer specified; the used character set should be the one selected with command Select TE Character Set **AT+CSCS** (see definition of this command in *3GPP TS 27.007*). | |
| **<scts>** | Service center time stamp. *3GPP TS 23.040* TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**). | |
| **<toda>** | Type of recipient address. *3GPP TS 24.011* TP-Recipient-Address Type-of-Address octet in integer format. | |
| **<tooa>** | Type of originating address. *3GPP TS 24.011* TP-Originating-Address Type-of-Address octet in integer format (default refer to **<toda>**). | |
| **<length>** | Message length, integer type. Indicate in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters; or in PDU mode (**AT+CMGF=0**) the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length). | |
| **<data>** | In the case of SMS: 3GPP TS 23.040 TP-User-Data in text mode responses; format:<br>- If **<dcs>**, indicates that 3GPP TS 23.038 GSM 7-bit default alphabet is used and **<fo>** indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set.<br>- If TE character set other than "HEX" (refer to **AT+CSCS** command in *3GPP TS 27.007*): ME/TA converts GSM alphabet into current TE character set according to rules of ***Annex A*** in *3GPP TS 27.007*.<br>- If TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character Π (GSM 7 bit default alphabet 23) is presented as 17 (IRA 49 and 55)).<br>- If **<dcs>**, indicates that 8-bit or UCS2 data coding scheme is used, or **<fo>** indicates that *3GPP TS 23.040* TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).<br>In the case of CBS: *3GPP TS 23.041* CBM Content of Message in text mode responses; | |

| | |
|---|---|
| | format:<br>- If **<dcs>**, indicates that *3GPP TS 23.038* GSM 7-bit default alphabet is used:<br>- If TE character set other than "HEX" (refer to **AT+CSCS** command in *3GPP TS27.007*): ME/TA converts GSM alphabet into current TE character set according to rules of ***Annex A*** in *3GPP TS 27.007*.<br>- If TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7-bit default alphabet into two IRA character long hexadecimal number. |
| **<pdu>** | In the case of SMS: *3GPP TS 24.011* SC address followed by *3GPP TS 23.040* TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) *3GPP TS 27.007*. |
| **<fo>** | Depends on the command or result code: first octet of *3GPP TS 23.040 [3]* SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format. |
| **<mr>** | *3GPP TS 23.040 [3]* TP-Message-Reference in integer format |
| **<ra>** | *3GPP TS 23.040 [3]* TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in *3GPP TS 27.007 [9]*); type of address given by **<tora>** |
| **<tora>** | *3GPP TS 24.011 [6]* TP-Recipient-Address Type-of-Address octet in integer format (see **<toda>** by default) |
| **<scts>** | *3GPP TS 23.040 [3]* TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**) |
| **<dt>** | *3GPP TS 23.040 [3]* TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g., 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08". |
| **<st>** | *3GPP TS 23.040 [3]* TP-Status in integer format. |
| **<ct>** | *3GPP TS 23.040 [3]* TP-Command-Type in integer format (default 0) |
| **<sn>** | *3GPP TS 23.041 [4]* CBM Serial Number in integer format. |
| **<mid>** | *3GPP TS 23.041 [4]* CBM Message Identifier in integer format. |
| **<page>** | *3GPP TS 23.041 [4]* CBM Page Parameter bits 4–7 in integer format. |
| **<pages>** | *3GPP TS 23.041 [4]* CBM Page Parameter bits 0–3 in integer format. |
| **<err>** | Error codes. For more details, see ***Table 12***. |

**NOTE**

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

## Example

```
AT+CMGF=1                    //Set SMS message format as text mode.
OK
```

| | |
|---|---|
| **AT+CMGL="ALL"**<br>**+CMGL: 1,"STO UNSENT","",,**<br>**<This is a test from Quectel>**<br>**+CMGL: 2,"STO UNSENT","",,**<br>**<This is a test from Quectel>**<br>**OK** | //List all messages from message storage. |

## 8.7. AT+CMGR Read Messages

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

| **AT+CMGR Read Messages** | |
|---|---|
| Test Command<br>**AT+CMGR=?** | Response<br>**OK** |
| Write Command<br>**AT+CMGR=<index>** | Response<br>TA returns SMS message with location value **<index>** from message storage **<mem1>** to the TE. If status of the message is "REC UNREAD", status in the storage changes to "REC READ".<br>If in text mode (**AT+CMGF=1**) and the command is executed successfully:<br>For SMS-DELIVER:<br>**+CMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>**<br><br>**OK**<br><br>For SMS-SUBMIT:<br>**+CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>**<br><br>**OK**<br><br>For SMS-STATUS-REPORTs:<br>**+CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>**<br><br>**OK** |

| | |
|---|---|
| | For SMS-COMMANDs:<br>**+CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]**<br><br>**OK**<br><br>For CBM storage:<br>**+CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>**<br><br>**OK**<br><br>If in PDU mode (**AT+CMGF=0**) and command is executed successfully:<br>**+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu>**<br><br>**OK**<br><br>If there is any error related to ME functionality:<br>**+CMS ERROR: <err>** |
| Maximum Response Time | Depends on the length of message content. |
| Characteristics | / |
| Reference<br>3GPP TS 27.005 | |

## Parameter

| | | |
|---|---|---|
| **<index>** | Integer type value in the range of location numbers supported by the associated memory. | |
| **<stat>** | In text mode | |
| | "REC UNREAD" | Received unread messages |
| | "REC READ" | Received read messages |
| | "STO UNSENT" | Stored unsent messages |
| | "STO SENT" | Stored sent messages |
| | "ALL" | All messages |
| | In PDU mode | |
| | 0 | Received unread messages |
| | 1 | Received read messages |
| | 2 | Stored unsent messages |
| | 3 | Stored sent messages |
| | 4 | All messages |
| **<alpha>** | String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry | |

| | |
|---|---|
| | found in MT phonebook. Implementation of this feature is manufacturer specified. The used character set should be the one selected with **AT+CSCS** command (see definition of this command in *3GPP TS 27.007*). |
| **<da>** | Destination address. *3GPP TS 23.040* TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<toda>**. |
| **<oa>** | Originating address. *3GPP TS 23.040* TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<tooa>**. |
| **<scts>** | Service center time stamp. *3GPP TS 23.040* TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**). |
| **<fo>** | First octet. Depending on the command or result code: First octet of *3GPP TS 23.040* SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted. |
| **<pid>** | Protocol identifier. *3GPP TS 23.040* TP-Protocol-Identifier in integer format. Default: 0.. |
| **<dcs>** | Data coding scheme. Depending on the command or result code: *3GPP TS 23.038* SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format. |
| **<vp>** | Validity period. Depending on SMS-SUBMIT **<fo>** setting: 3GPP TS 23.040 TP-Validity-Period either in integer format or in time-string format (refer to **<dt>**). |
| **<mn>** | Message number. *3GPP TS 23.040* TP-Message-Number in integer format. |
| **<mr>** | Message reference. *3GPP TS 23.040* TP-Message-Reference in integer format. |
| **<ra>** | Recipient address. *3GPP TS 23.040* TP-Recipient-Address Address-Value field in string format. BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command). The type of address is given by **<tora>**. |
| **<tora>** | Type of recipient address. *3GPP TS 24.011* TP-Recipient-Address Type-of-Address octet in integer format (default refer **<toda>**). |
| **<toda>** | Type of recipient address. *3GPP TS 24.011* TP-Recipient-Address Type-of-Address octet in integer format. |
| **<tooa>** | Type of originating address. *3GPP TS 24.011* TP-Originating-Address Type-of-Address octet in integer format (default refer to **<toda>**). |
| **<sca>** | Service center address. *3GPP TS 24.011* RP SC address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<tosca>**. |
| **<tosca>** | Type of service center address. *3GPP TS 24.011* RP SC address Type-of-Address octet in integer format (default refer to **<toda>**). |
| **<length>** | Message length. Integer type. Indicating in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**) the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets |

| | |
|---|---|
| | are not counted in the length). |
| **<data>** | The text of short message. Please refer ***Chapter 13.8*** for details. |
| **<pdu>** | In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). |
| **<dt>** | *3GPP TS 23.040 [3]* TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss zz", during which characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08". |
| **<st>** | *3GPP TS 23.040 [3]* TP-Status in integer format. |
| **<ct>** | *3GPP TS 23.040 [3]* TP-Command-Type in integer format. Default: 0. |
| **<sn>** | *3GPP TS 23.041 [4]* CBM Serial Number in integer format. |
| **<mid>** | *3GPP TS 23.041 Section 9.4.1.2.2*. Message Identifier Range: 0–65535. |
| **<page>** | *3GPP TS 23.041 [4]* CBM Page Parameter bits 4–7 in integer format. |
| **<pages>** | *3GPP TS 23.041 [4]* CBM Page Parameter bits 0–3 in integer format. |
| **<cdata>** | *3GPP TS 23.040 [3]* TP-Command-Data in text mode responses; ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) |
| **<err>** | Error codes. For more details, see ***Table 12***. |

### Example

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

<This is a test from Quectel>

OK
```

## 8.8. AT+CMGS Send Messages

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

message upon unsolicited delivery status report result code.

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

## Parameter

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

| | |
|---|---|
| **<mr>** | Message reference. *3GPP TS 23.040* TP-Message-Reference in integer format. |
| **<err>** | Error codes. For more details, see ***Table 12***. |

### Example

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

> <This is a test from Quectel>             //Enter in text, <CTRL+Z> send message, <ESC> quits
                                              without sending
+CMGS: 247

OK
```

## 8.9. AT+CMMS Send More Messages

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

| **AT+CMMS Send More Messages** | |
|---|---|
| Test Command<br>**AT+CMMS=?** | Response<br>**+CMMS: (**list of supported**<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CMMS?** | Response<br>**+CMMS: <n>**<br><br>**OK** |
| Write Command<br>**AT+CMMS=<n>** | Response<br>**OK**<br>Or<br>**ERROR**<br><br>If there is any error related to ME functionality:<br>**+CMS ERROR: <err>** |
| Maximum Response Time | 120 s, determined by network. |
| Characteristics | / |
| Reference | |

| 3GPP TS 27.005 | |
|---|---|

### Parameter

| | |
|---|---|
| **<n>** | Integer type.<br>0 Feature disabled<br>1 Keep enabled until the time between the response of the latest message send command (**AT+CMGS**, **AT+CMSS**, etc.) and the next send command exceeds 1-5 seconds (the exact value is up to ME implementation); then ME shall close the link and TA switches **<n>** back to 0 automatically.<br>2 Feature enabled. If the time between the response of the latest message send command and the next send command exceeds 1-5 seconds (the exact value is up to ME implementation), ME shall close the link but TA will not switch **<n>** back to 0 automatically. |
| **<err>** | Error codes. For more details, see ***Table 12***. |

**NOTE**

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

## 8.10. AT+CMGW Write Messages to Memory

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

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

| **AT+CMGW Write Messages to Memory** | |
|---|---|
| Test Command<br>**AT+CMGW=?** | Response<br>**OK** |
| Write Command<br>1) If in text mode (**AT+CMGF=1**):<br>**AT+CMGW=<oa/da>[,<tooa/toda>[,<stat>]]**<CR><br>text is specified<br>**<Ctrl+Z/ESC>**<br>**<ESC>** quits without sending<br><br>2) If in PDU mode (**AT+CMGF=0**): | Response<br>TA transmits SMS message (either SMS-DELIVER or SMS-SUBMIT) from TE to memory storage **<mem2>**, and then the memory location **<index>** of the stored message is returned. By default the message status will be set to 'stored unsent', but parameter **<stat>** also allows other status values to be given.<br><br>If writing is successful: |

| | |
|---|---|
| **AT+CMGW=<length>[,<stat>]**<CR><br>PDU is given **<Ctrl+Z/ESC>** | **+CMGW: <index>**<br><br>**OK**<br><br>If there is any error related to ME functionality:<br>**+CMS ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.005 | |

## Parameter

| | |
|---|---|
| **<da>** | Destination address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<toda>**. |
| **<oa>** | Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address given by **<tooa>**. |
| **<tooa>** | Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer to **<toda>**). |
| **<stat>** | PDU mode / Text mode / Explanation<br>0 / "REC UNREAD" / Received unread messages<br>1 / "REC READ" / Received read messages<br>2 / "STO UNSENT" / Stored unsent messages<br>3 / "STO SENT" / Stored sent messages<br>4 / "ALL" / All messages |
| **<toda>** | Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format. |
| **<length>** | Message length. Integer type, indicating in the text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length). |
| **<pdu>** | In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.04TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). |
| **<index>** | Index of message in selected storage **<mem2>**. |
| **<err>** | Error codes. For more details, see ***Table 12***. |

**Example**

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

+CMGW: 4

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

+CMGW: 5

OK
```

## 8.11. AT+CMSS Send Messages from Storage

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

| AT+CMSS Send Messages from Storage | |
|---|---|
| Test Command<br>**AT+CMSS=?** | Response<br>**OK** |
| Write Command<br>**AT+CMSS=<index>[,<da>[,<toda>]]** | Response<br>TA sends message with location value **<index>** from message storage **<mem2>** to the network (SMS-SUBMIT). If new recipient address **<da>** is given, it shall be used instead of the one stored with the message. Reference value **<mr>** is returned to the TE on successful message delivery. Values can be used to identify message upon unsolicited delivery status report result code.<br>If in text mode (**AT+CMGF=1**) and sent successfully:<br>**+CMSS: <mr>[,<scts>]**<br><br>**OK** |

| | |
|---|---|
| | If in PDU mode (**AT+CMGF=0**) and sent successfully:<br>**+CMSS: <mr>[,<ackpdu>]**<br><br>**OK**<br><br>If there is any error related to ME functionality:<br>**+CMS ERROR: <err>** |
| Maximum Response Time | 120 s, determined by network. |
| Characteristics | / |
| Reference<br>3GPP TS 27.005 | |

## Parameter

| | |
|---|---|
| **<index>** | Integer type in the range of location numbers supported by the associated memory. |
| **<da>** | Destination Address. *3GPP TS 23.040* TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **AT+CSCS** in *3GPP TS 27.007*); type of address is given by **<toda>**. |
| **<toda>** | Type of recipient address. *3GPP TS 24.011* TP-Recipient-Address Type-of-Address octet in integer format. |
| **<mr>** | Message reference. *3GPP TS 23.040* TP-Message-Reference in integer format. |
| **<scts>** | Service center time stamp. *3GPP TS 23.040* TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**). |
| **<ackpdu>** | Format is same for **<pdu>** in case of SMS, but without *3GPP TS 24.011* SC address field and parameter shall be bounded by double quote characters like a normal string type parameter. |
| **<err>** | Error codes. For more details, see ***Table 12***. |

## Example

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

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

```
+CMSS: 54

OK
```

## 8.12. AT+CNMA New Message Acknowledgement to 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.

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

### Parameter

| | | |
|---|---|---|
| **<n>** | String type. Parameter required only for PDU mode | |
| | 0 | Command operates similarly as in text mode |
| | 1 | Send positive (**RP-ACK**) acknowledgement to the network. Accepted only in PDU mode |

| | |
|---|---|
| 2 | Send negative (**RP-ERROR**) acknowledgement to the network. Accepted only in PDU mode. |
| **<err>** | Error codes. For more details, see ***Table 12***. |

**NOTE**

The Execution and Write commands shall only be used when **AT+CSMS** parameter **<service>** equals 1 (phase 2+) and an appropriate URC has been issued by the 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
AT+CMGF=1
OK
AT+CSDH=1
OK
+CMT: "+8615021012496",,"13/03/18,17:07:21+32",145,4,0,0,"+8613800551500",145,28
This is a test from Quectel.          //Short message is outputted directly when SMS is incoming.
AT+CNMA                               //Send ACK to the network.
OK
AT+CNMA
+CMS ERROR: 340                       //The second time return error; it needs ACK only once.
```

## 8.13. AT+CNMI SMS Event Reporting Configuration

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

| AT+CNMI SMS Event Reporting Configuration | |
|---|---|
| Test Command<br>**AT+CNMI=?** | Response<br>**+CNMI: (**range of supported **<mode>**s**),(**range of supported **<mt>**s**),(**list of supported **<bm>**s**),(**range of supported |

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

## Parameter

| | |
|---|---|
| **<mode>** | Integer type.<br>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.<br>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.<br>2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE. |
| **<mt>** | Integer type. The rules for storing received SMS depend on its data coding scheme (refer to *3GPPTS 23.038*) and preferred memory storage (**AT+CPMS**) setting, and the value is:<br>0 No SMS-DELIVER indications are routed to the TE.<br>1 If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed |

| | | |
|---|---|---|
| | | to the TE by using unsolicited result code: **+CMTI: <mem>,<index>** |
| | 2 | SMS-DELIVERs (except class 2) are routed directly to the TE using unsolicited result code: **+CMT: [<alpha>],<length><CR><LF><pdu>** (PDU mode enabled) or **+CMT: <oa>,[<alpha>],<scts>[,*<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>*]<CR><LF><data>** (text mode enabled; about the parameters in italics, please refer to **AT+CSDH** command). Class 2 messages result in indication as defined in **<mt>**=1. |
| | 3 | Class 3 SMS-DELIVERs are routed directly to TE by using unsolicited result codes defined in **<mt>**=2. Messages of other classes result in indication as defined in **<mt>**=1. |
| **<bm>** | Integer type. The rules for storing received CBMs depend on its data coding scheme (refer to *3GPP TS 23.038*) and the setting of Select CBM Types (**AT+CSCB**); and the value is: | |
| | 0 | No CBM indications are routed to the TE. |
| | 2 | New CBMs are routed directly to the TE using unsolicited result code:<br>**+CBM: <length><CR><LF><pdu>** (PDU mode);<br>or **+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>** (text mode) |
| **<ds>** | Integer type. | |
| | 0 | No SMS-STATUS-REPORTs are routed to the TE. |
| | 1 | SMS-STATUS-REPORTs are routed to the TE using unsolicited result code:<br>**+CDS: <length><CR><LF><pdu>** (PDU mode)<br>**+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,,<st>** (text mode) |
| | 2 | If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:<br>**+CDSI: <mem>,<index>** |
| **<bfr>** | Integer type. | |
| | 0 | TA buffer of unsolicited result codes defined within this command is flushed to the TE when **<mode>** 1...2 is entered (**OK** response shall be given before flushing the codes). |
| | 1 | TA buffer of unsolicited result codes defined within this command is cleared when **<mode>** 1...2 is entered. |
| **<err>** | Error codes. For more details, see ***Table 12***. | |

**NOTE**

Unsolicited result code:

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

## Example

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

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

## 8.14. AT+CSCB Select Cell Broadcast Message Types

This Write Command selects which types of CBMs are to be received by the ME. This command writes the parameters in NON-VOLATILE memory.

| AT+CSCB Select Cell Broadcast Message Types | |
|---|---|
| Test Command<br>**AT+CSCB=?** | Response<br>**+CSCB: (**list of supported **<mode>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CSCB?** | Response<br>**+CSCB: <mode>,<mids>,<dcss>**<br><br>**OK** |
| Write Command<br>**AT+CSCB=<mode>[,mids>[,<dcss>]]** | Response<br>**OK**<br><br>If there is any error related to ME functionality:<br>**+CMS ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.005 | |

### Parameter

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

| | |
|---|---|
| | **<dcs>**) (default is empty string), e.g. "0-3,5" |
| **<err>** | Error codes. For more details, see ***Table 12***. |

## 8.15. AT+CSDH Show SMS Text Mode Parameters

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

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

### Parameter

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

### Example

```
AT+CSDH=0
OK
AT+CMGR=2
```

```
+CMGR: "STO UNSENT" ,"",

<This is a test from Quectel>

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

<This is a test from Quectel>

OK
```

## 8.16. AT+CSMP Set SMS Text Mode Parameters

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

| AT+CSMP Set SMS Text Mode Parameters | |
|---|---|
| Test Command<br>**AT+CSMP=?** | Response<br>**OK** |
| Read Command<br>**AT+CSMP?** | Response<br>**+CSMP: <fo>,<vp>,<pid>,<dcs>**<br><br>**OK** |
| Write Command<br>**AT+CSMP=<fo>[,<vp>[,<pid>[,<dcs>]]]** | Response<br>TA selects values for additional parameters needed when SM is sent to the network or placed in a storage when text mode is selected (**AT+CMGF=1**). It is possible to set the validity period starting from when the SM is received by the SMSC (**<vp>** ranges from 0 to 255) or define the absolute time of the validity period termination (**<vp>** is a string).<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.005 | |

### Parameter

| | |
|---|---|
| **<fo>** | First octet. Depending on the command or result code: First octet of *3GPP TS 23.040* |

| | |
|---|---|
| | SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, SMS-COMMAND in integer format. If a valid value has been entered once, parameter can be omitted. |
| **<vp>** | Validity period. Depending on SMS-SUBMIT **<fo>** setting: *3GPP TS 23.040* TP-Validity-Period either in integer format or in time-string format (refer to **<dt>**). |
| **<pid>** | Integer type. 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. |

## 8.17. AT+QCMGS Send Concatenated Messages

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

| **AT+QCMGS Send Concatenated Messages** | |
|---|---|
| Test Command<br>**AT+QCMGS=?** | Response<br>**OK** |
| Write Command<br>If text mode (**+CMGF=1**):<br>**AT+QCMGS=<da>[,<toda>],<uid>,<msg_seg>,<msg_total>**<CR><br>text is specified<br>**<Ctrl+Z/ESC>** | Response<br>If in text mode (**AT+CMGF**=1) and sent successfully:<br>**+QCMGS: <mr>**<br><br>**OK**<br>Or<br>**ERROR**<br><br>If there is any error related to ME functionality:<br>**+CMS ERROR: <err>** |
| Maximum Response Time | 120 s, determined by network. |
| Characteristics | / |

### Parameter

| | |
|---|---|
| **<uid>** | Integer type. Message identification in the user data header (UDH). Range: 0–255. This parameter is defined and inputted by the user. All segments of a same concatenated message must have the same **<uid>**. Different concatenated messages should have different **<uid>**. |

| | |
|---|---|
| **<msg_seg>** | Integer type. Sequence number of a concatenated message. Range: 0–7. **<msg_seg>**=0 means: ignore the value and regard it as a non-concatenated message. |
| **<msg_total>** | Integer type. The total number of the segments of one concatenated message. Range: 0–7. **<msg_total>**=0 or 1 means: ignore the value and regard it as a non-concatenated message. |
| **<da>** | Please refer to **AT+CMGS**. |
| **<toda>** | Please refer to **AT+CMGS**. |
| **<mr>** | Please refer to **AT+CMGS**. |
| **<err>** | Error codes. For more details, see ***Table 12***. |

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

## Example

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

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

**+QCMGS: 191**

**OK**

## 8.18. AT+QCMGR Read Concatenated Messages

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

| AT+QCMGR Read Concatenated Messages | |
|---|---|
| Test Command<br>**AT+QCMGR=?** | Response<br>**OK** |
| Write Command<br>**AT+QCMGR=<index>** | Response<br>In text mode (**AT+CMGF=1**) and command is executed successfully:<br>For SMS-DELIVER:<br>**+QCMGR: <stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>][,<uid>,<msg_seg>,<msg_total>]<CR><LF><data>**<br><br>**OK**<br>For SMS-SUBMIT:<br>**+QCMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>][,<uid>,<msg_seg>,<msg_total>]<CR><LF><data>**<br><br>**OK**<br>For SMS-STATUS-REPORTs:<br>**+QCMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>**<br><br>**OK**<br>For SMS-COMMANDs:<br>**+QCMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]**<br><br>**OK**<br><br>Else, if there is any error related to ME functionality:<br>**+CMS ERROR: <err>** |

| | |
|---|---|
| Maximum Response Time | Depends on the length of message content. |
| Characteristics | / |

## Parameter

| | |
|---|---|
| **<uid>** | Integer type. Message identification in the user data header (UDH). Range: 0–65535 (see NOTES). All segments of a same concatenated message have same **<uid>**. Different concatenated messages should have different **<uid>**. |
| **<msg_seg>** | Integer type. Sequence number of a concatenated message. Range: 1–7. |
| **<msg_total>** | Integer type. The total number of the segments of one concatenated message. Range: 2–7.<br>Other parameters please refer to **AT+CMGR** |
| **<err>** | Error codes. For more details, see ***Table 12***. |

**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-bit or 16-bit **<uid>**. So its maximal value is 255 with 8-bit and 65535 with 16-bit.
2. If the message to be read is not a concatenated message, **<uid>**, **<msg_seg>** and **<msg_total>** would not be shown in the result.

## Example

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

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

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

OK
```

# 9 Packet Domain Commands

## 9.1. AT+CGATT Attachment or Detachment of PS

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

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

### Parameter

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

| | |
|---|---|
| **<err>** | Other values are reserved and will result in an **ERROR** response to the Write Command Error codes. For more details, see ***Table 11***. |

### Example

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

OK
```

## 9.2. AT+CGDCONT Define PDP Contexts

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

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

| **AT+CGDCONT Define PDP Contexts** | |
|---|---|
| Test Command<br>**AT+CGDCONT=?** | Response<br>**+CGDCONT: (**range of supported **<cid>**s**),<PDP_type>,<APN>,<PDP_addr>,(**range of supported **<data_comp>**s**),(**range of supported **<head_comp>**s**),(**list of supported **<IPv4_addr_alloc>**s**),(**list of supported **<request_type>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CGDCONT?** | Response<br>**+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<data_comp>,<head_comp>,<IPv4_addr_alloc>,<request_type>**<br>**[…]**<br><br>**OK** |
| Write Command<br>**AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<data_comp>[,<head_comp>,<IPv4_addr_alloc>,<request_type>]]]]]** | Response<br>**OK**<br>Or<br>**ERROR** |

| | |
|---|---|
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will be saved automatically. |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | |
|---|---|
| **<cid>** | Integer type. PDP context identifier, a numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value=1) is returned by the test form of the command. |
| **<PDP_type>** | String type. Packet data protocol type, a string parameter which specifies the type of packet data protocol.<br>"IP" IPv4. Internet Protocol (IETF STD 5)<br>"PPP"<br>"IPV6"<br>"IPV4V6" |
| **<APN>** | String type. Access point name, a string parameter that is a logical name used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested. |
| **<PDP_addr>** | String type. Identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The allocated address may be read using the **AT+CGPADDR**. |
| **<data_comp>** | Integer type. Controls PDP data compression (applicable for SNDCP only) (refer to *3GPP TS 44.065*).<br>0 Off (Default if value is omitted)<br>1 On (Manufacturer preferred compression)<br>2 V.42bis<br>3 V.44 (Not supported currently) |
| **<head_comp>** | Integer type. Controls PDP header compression (refer to 3GPP TS 44.065 and *3GPP TS 25.323*).<br>0 Off<br>1 On<br>2 RFC1144<br>3 RFC2507<br>4 RFC3095 |
| **<IPv4_addr_alloc>** | Integer type. Controls how the MT/TA requests to get the IPv4 address information<br>0 IPv4 address allocation through NAS signaling<br>1 IPv4 address allocated through DHCP |
| **<request_type>** | Integer type. Indicates the type of PDP context activation request for the PDP context. |

| | |
|---|---|
| 0 | PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP context is for new PDP context establishment or for handover is implementation specific) |
| 1 | PDP context is for emergency bearer services |

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

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

This Write Command specifies a profile for the context **<cid>**. A special form of the Write Command, **AT+CGQREQ=<cid>** causes the requested profile for context number **<cid>** to become undefined. The Read Command returns the current settings for each defined context. Details can be found in *3GPP TS 23.107* and all parameters are saved in NV automatically.

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

## Parameter

| | |
|---|---|
| **<cid>** | Integer type. Specify a particular PDP context definition (see **AT+CGDCONT**) |
| **<PDP_type>** | String type. Packet Data Protocol type<br>"IP" IPV4. Internet Protocol (IETF STD 5)<br>"PPP"<br>"IPV6"<br>"IPV4V6" |
| **<precedence>** | Integer type. Specify the precedence class<br>0 Network subscribed value<br>1 High Priority. Service commitments shall be maintained ahead of precedence classes 2 and 3<br>2 Normal priority. Service commitments shall be maintained ahead of precedence class 3<br>3 Low priority. Service commitments shall be maintained |
| **<delay>** | Integer type. Specify the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. For the details, please refer to ***Table 6***.<br>0 Network subscribed value<br>1–4 Please refer to ***Table 6***. |
| **<reliability>** | Integer type. Specify the reliability class.<br>0 Network subscribed value<br>1 Non real-time traffic, error-sensitive application that cannot cope with data loss<br>2 Non real-time traffic, error-sensitive application that can cope with infrequent data loss<br>3 Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS<br>4 Real-time traffic, error-sensitive application that can cope with data loss<br>5 Real-time traffic, error non-sensitive application that can cope with data loss |
| **<peak>** | Integer type. Specify the peak throughput class, in octets per second.<br>0 Network subscribed value<br>1 Up to 1 000 (8 kbit/s)<br>2 Up to 2 000 (16 kbit/s)<br>3 Up to 4 000 (32 kbit/s)<br>4 Up to 8 000 (64 kbit/s)<br>5 Up to 16 000 (128 kbit/s)<br>6 Up to 32 000 (256 kbit/s)<br>7 Up to 64 000 (512 kbit/s)<br>8 Up to 128 000 (1024 kbit/s)<br>9 Up to 256 000 (2048 kbit/s) |
| **<mean>** | Integer type. Specify the mean throughput class, in octets per hour.<br>0 Network subscribed value<br>1 100 (about 0.22 bit/s) |

| | | |
|---|---|---|
| | 2 | 200 (about 0.44 bit/s) |
| | 3 | 500 (about 1.11 bit/s) |
| | 4 | 1 000 (about 2.2 bit/s) |
| | 5 | 2 000 (about 4.4 bit/s) |
| | 6 | 5 000 (about 11.1 bit/s) |
| | 7 | 10 000 (about 22 bit/s) |
| | 8 | 20 000 (about 44 bit/s) |
| | 9 | 50 000 (about 111 bit/s) |
| | 10 | 100 000 (about 0.22 kbit/s) |
| | 11 | 200 000 (about 0.44 kbit/s) |
| | 12 | 500 000(about 1.11 kbit/s) |
| | 13 | 1000 000 (about 2.2 kbit/s) |
| | 14 | 2 000 000 (about 4.4 kbit/s) |
| | 15 | 5 000 000 (about 11.1 kbit/s) |
| | 16 | 10 000 000 (about 22 kbit/s) |
| | 17 | 20 000 000 (about 44 kbit/s) |
| | 18 | 50 000 000 (about 111 kbit/s) |
| | 31 | Best effort |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

**Table 6: Delay Class**

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

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

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

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

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

### Parameter

| | |
|---|---|
| **<cid>** | Integer type. Specify a particular PDP context definition (see **AT+CGDCONT**) |
| **<PDP_type>** | String type. Packet Data Protocol type<br>"IP" IPv4. Internet Protocol (IETF STD 5)<br>"PPP" |

| | |
|---|---|
| | "IPV6"<br>"IPV4V6" |
| **<precedence>** | Integer type. Specify the precedence class<br>0 Network subscribed value<br>1 High Priority. Service commitments shall be maintained ahead of precedence classes 2 and 3<br>2 Normal priorities. Service commitments shall be maintained ahead of precedence class 3<br>3 Low priority. Service commitments shall be maintained |
| **<delay>** | Integer type. Specify the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. For details, please refer to ***Table 6***.<br>0 Network subscribed value |
| **<reliability>** | Integer type. Specify the reliability class.<br>0 Network subscribed value<br>1 Non real-time traffic and error-sensitive application that cannot cope with data loss<br>2 Non real-time traffic and error-sensitive application that can cope with infrequent data loss<br>3 Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS<br>4 Real-time traffic and error-sensitive application that can cope with data loss<br>5 Real-time traffic and error non-sensitive application that can cope with data loss |
| **<peak>** | Integer type. Specify the peak throughput class, in octets per second.<br>0 Network subscribed value<br>1 Up to 1 000 (8 kbit/s)<br>2 Up to 2 000 (16 kbit/s)<br>3 Up to 4 000 (32 kbit/s)<br>4 Up to 8 000 (64 kbit/s)<br>5 Up to 16 000 (128 kbit/s)<br>6 Up to 32 000 (256 kbit/s)<br>7 Up to 64 000 (512 kbit/s)<br>8 Up to 128 000 (1024 kbit/s)<br>9 Up to 256 000 (2048 kbit/s) |
| **<mean>** | Integer type. Specify the mean throughput class, in octets per hour.<br>0 Network subscribed value<br>1 100 (about 0.22 bit/s)<br>2 200 (about 0.44 bit/s)<br>3 500 (about 1.11 bit/s)<br>4 1 000 (about 2.2 bit/s)<br>5 2 000 (about 4.4 bit/s)<br>6 5 000 (about 11.1 bit/s)<br>7 10 000 (about 22 bit/s) |

| | | |
|---|---|---|
| | 8 | 20 000 (about 44 bit/s) |
| | 9 | 50 000 (about 111 bit/s) |
| | 10 | 100 000 (about 0.22 kbit/s) |
| | 11 | 200 000 (about 0.44 kbit/s) |
| | 12 | 500 000(about 1.11 kbit/s) |
| | 13 | 1000 000 (about 2.2 kbit/s) |
| | 14 | 2 000 000 (about 4.4 kbit/s) |
| | 15 | 5 000 000 (about 11.1 kbit/s) |
| | 16 | 10 000 000 (about 22 kbit/s) |
| | 17 | 20 000 000 (about 44 kbit/s) |
| | 18 | 50 000 000 (about 111 kbit/s) |
| | 31 | Best effort |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

## 9.5. AT+CGEQREQ 3G Quality of Service Profile (Requested)

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

| **AT+CGEQREQ 3G Quality of Service Profile (Requested)** | |
|---|---|
| Test Command<br>**AT+CGEQREQ=?** | Response<br>**+CGEQREQ: <PDP_type>,(**range of supported **<Traffic class>**s**),(**range of supported **<Maximum bitrate UL>**s**),(**range of supported **<Maximum bitrate DL>**s**),(**range of supported **<Guaranteed bitrate UL>**s**),(**range of supported **<Guaranteed bitrate DL>**s**),(**range of supported **<Delivery order>**s**),(**list of supported **<Maximum SDU size>**s**),(**list of supported **<SDU error ratio>**s**),(**list of supported **<Residual bit error ratio>**s**),(**range of supported **<Delivery of erroneous SDUs>**s**),(**list of supported **<Transfer delay>**s**),(**range of supported **<Traffic handling priority>**s**),(**list of supported **<Source statistics descriptor>**s**),(**list of supported **<Signalling indication>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CGEQREQ?** | Response<br>**[+CGEQREQ: <cid>,<Traffic class>,<Maximum bitrate UL>,<Maximum bitrate DL>, <Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority>,<Source statistics descriptor>,<Si** |

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

## Parameter

| | |
|---|---|
| **<cid>** | 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 |
| **<PDP_type>** | String type. Packet data protocol type, a string parameter which specifies the type of packet data protocol<br>"IP" IPv4. Internet Protocol (IETF STD 5)<br>"PPP"<br>"IPV6"<br>"IPV4V6" |
| The following parameters are defined in *3GPP TS 23.107* | |
| **<Traffic class>** | Integer type. Indicate the type of application for which the UMTS bearer service is optimized (refer to *3GPP TS 24.008 subclause 10.5.6.5*). If the parameter is specified as conversational or streaming, then the Guaranteed and Maximum bitrate parameters should also be provided.<br>0 Conversational<br>1 Streaming<br>2 Interactive<br>3 Background |

| | |
|---|---|
| | 4 Subscribed value |
| **<Maximum bitrate UL>** | Integer type. Indicate the maximum number of kbits/s delivered to UMTS (uplink traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (e.g., **AT+CGEQREQ=…,32,…**).<br>0 Subscribed value<br>1–11520 |
| **<Maximum bitrate DL>** | Integer type. Indicate the maximum number of kbits/s delivered by UMTS (downlink traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (e.g., **AT+CGEQREQ=…,32,…**).<br>0 Subscribed value<br>1–42200 |
| **<Guaranteed bitrate UL>** | Integer type. Indicate the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at an SAP (provided that there is data to deliver). As an example, a bit rate of 32kbit/s would be specified as 32 (e.g., **AT+CGEQREQ=…,32,…**).<br>0 Subscribed value<br>1–11520 |
| **<Guaranteed bitrate DL>** | Integer type. Indicate the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at an SAP (provided that there is data to deliver). As an example, a bit rate of 32 kbit/s would be specified as 32 (e.g., **AT+CGEQREQ=…,32,…**).<br>0 Subscribed value<br>1~42200 |
| **<Delivery order>** | Integer type. Indicate whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer to *3GPP TS 24.008 subclause 10.5.6.5*).<br>0 No<br>1 Yes<br>2 Subscribed value |
| **<Maximum SDU size>** | Integer type. Indicate the maximum allowed SDU size in octets. If the parameter is set to 0 the subscribed value will be requested (refer to *3GPP TS 24.008 subclause 10.5.6.5*).<br>0 Subscribed value<br>10–1520 (This value needs to be divisible by 10 without remainder)<br>1520 |
| **<SDU error ratio>** | String type. Indicate the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as "mEe". As an example a target SDU error ratio of $5 \times 10^{-3}$ would be specified as "5E3" (e.g., **AT+CGEQREQ=…,"5E3",…**).<br>"0E0" Subscribed value<br>"1E1"<br>"1E2"<br>"7E3" |

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

| | | |
|---|---|---|
| **<Signalling Indication>** | 0 | Characteristics of SDUs is unknown |
| | 1 | Characteristics of SDUs correspond to a speech source |
| | Integer type. Indicate signaling content of submitted SDUs for a PDP context. | |
| | 0 | PDP context is not optimized for signaling |
| | 1 | PDP context is optimized for signaling |

## 9.6. AT+CGEQMIN 3G Quality of Service Profile (Minimum Acceptable)

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

| **AT+CEGQMIN 3G Quality of Service Profile (Minimum Acceptable)** | |
|---|---|
| Test Command<br>**AT+CGEQMIN=?** | Response<br>**+CGEQMIN: <PDP_type>,(**range of supported **<Traffic class>**s**),(**range of supported **<Maximum bitrate UL>**s**),(**list of supported **<Maximum bitrate DL>**s**),(**list of supported **<Guaranteed bitrate UL>**s**),(**list of supported **<Guaranteed bitrate DL>**s**),(**list of supported **<Delivery order>**s**),(**list of supported **<Maximum SDU size>**s**),(**list of supported **<SDU error ratio>**s**),(**list of supported **<Residual bit error ratio>**s**),(**list of supported **<Delivery of erroneous SDUs>**s**),(**list of supported **<Transfer delay>**s**),(**list of supported **<Traffic handling priority>**s**),(**list of supported **<Source statistics descriptor>**s**),(**list of supported **<Signalling indication>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CGEQMIN?** | Response<br>**[+CGEQMIN: <cid>,<Traffic class>,<Maximum bitrate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority>,<Source statistics descriptor>,<Signalling indication>]**<br>**[…]**<br><br>**OK** |
| Write Command<br>**AT+CGEQMIN=[<cid>[,<Traffic clas** | Response<br>**OK** |

| | |
|---|---|
| **s>[,<Maximum bitrate UL>[,<Maximum bitrate DL>[,<Guaranteed bitrate UL>[,<Guaranteed bitrate DL>[,<Delivery order>[,<Maximum SDU size>[,<SDU error ratio>[,<Residual bit error ratio>[,<Delivery of erroneous SDUs>[,<Transfer delay>[,<Traffic handling priority>[,<Source statistics descriptor>[,<Signalling indication>]]]]]]]]]]]]]]** | If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will be saved automatically. |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | |
|---|---|
| **<cid>** | PDP context identifier, a numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1) is returned by the test form of the command |
| **<PDP_type>** | Packet data protocol type, a string parameter which specifies the type of packet data protocol.<br>"IP" IPv4. Internet Protocol (IETF STD 5)<br>"PPP"<br>"IPV6"<br>"IPV4V6" |
| The following parameters are defined in *3GPP TS 23.107.* | |
| **<Traffic class>** | Integer type, indicates the type of application for which the UMTS bearer service is optimized (refer to *3GPP TS 24.008 subclause 10.5.6.5*). If the parameter is specified as conversational or streaming, then the Guaranteed and Maximum bitrate parameters should also be provided.<br>0 Conversational<br>1 Streaming<br>2 Interactive<br>3 Background<br>4 Subscribed value |
| **<Maximum bitrate UL>** | Integer type. Indicate the maximum number of kbits/s delivered to UMTS (up-link traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (e.g., **AT+CGEQREQ=…,32,…**). |

| | |
|---|---|
| | 0 Subscribed value<br>1–11520 |
| **<Maximum bitrate DL>** | Integer type. Indicate the maximum number of kbits/s delivered by UMTS (downlink traffic) at an SAP. As an example, a bit rate of 32 kbit/s would be specified as 32 (e.g., **AT+CGEQREQ=…,32,…**).<br>0 Subscribed value<br>1–42200 |
| **<Guaranteed bitrate UL>** | Integer type. Indicate the guaranteed number of kbits/s delivered to UMTS (uplink traffic) at an SAP (provided that there is data to deliver). As an example, a bit rate of 32 kbit/s would be specified as 32 (e.g., **AT+CGEQREQ=…,32,…**).<br>0 Subscribed value<br>1–11520 |
| **<Guaranteed bitrate DL>** | Integer type. Indicate the guaranteed number of kbits/s delivered by UMTS (downlink traffic) at an SAP (provided that there is data to deliver). As an example, a bit rate of 32 kbit/s would be specified as 32 (e.g., **AT+CGEQREQ=…,32,…**).<br>0 Subscribed value<br>1–42200 |
| **<Delivery order>** | Integer type. Indicate whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer to *3GPP TS 24.008 subclause 10.5.6.5*).<br>0 No<br>1 Yes<br>2 Subscribed value |
| **<Maximum SDU size>** | Integer type. Indicate the maximum allowed SDU size in octets. If the parameter is set to 0 the subscribed value will be requested (*refer to 3GPP TS 24.008 subclause 10.5.6.5*).<br>0 Subscribed value<br>10–1520 (This value needs to be divisible by 10 without remainder)<br>1502 |
| **<SDU error ratio>** | String type. Indicate the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as mEe. As an example a target SDU error ratio of 5 × $10^{-3}$ would be specified as "5E3" (e.g. **AT+CGEQREQ=…,"5E3",…**).<br>"0E0" Subscribed value<br>"1E2"<br>"7E3"<br>"1E3"<br>"1E4"<br>"1E5"<br>"1E6"<br>"1E1" |

| | |
|---|---|
| **<Residual bit error ratio>** | String type. Indicate the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, it indicates the bit error ratio in the delivered SDUs. The value is specified as mEe. As an example a target residual bit error ratio of $5 \times 10^{-3}$ would be specified as "5E3" (e.g. **AT+CGEQREQ=…,"5E3",…**).<br>"0E0" Subscribed value<br>"5E2"<br>"1E2"<br>"5E3"<br>"4E3"<br>"1E3"<br>"1E4"<br>"1E5"<br>"1E6"<br>"6E8" |
| **<Delivery of erroneous SDUs>** | Integer type. Indicate whether SDUs detected as erroneous shall be delivered or not (refer to *3GPP TS 24.008 subclause 10.5.6.5*).<br>0 No<br>1 Yes<br>2 No detect<br>3 Subscribed value |
| **<Transfer delay>** | Integer type. Indicate the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds. If the parameter is set to 0 the subscribed value will be requested (refer to *3GPP TS 24.008 subclause 10.5.6.5*).<br>0 Subscribed value<br>10–150 (This value needs to be divisible by 10 without remainder)<br>200–950 (This value needs to be divisible by 50 without remainder)<br>1000–4000 (This value needs to be divisible by 100 without remainder) |
| **<Traffic handling priority>** | Integer type. Specify the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers. If the parameter is set to 0 the subscribed value will be requested (refer to *3GPP TS 24.008 subclause 10.5.6.5*).<br>0 Subscribed<br>1 Priority level 1<br>2 Priority level 2<br>3 Priority level 3 |
| **<Source Statistics Descriptor>** | Integer type. Specify characteristics of the source of the submitted SDUs for a PDP context.<br>0 Characteristics of SDUs are unknown<br>1 Characteristics of SDUs corresponds to a speech source |
| **<Signalling Indication>** | Integer type. Indicate signaling content of submitted SDUs for a PDP context. |

| | | |
|---|---|---|
| | 0 | PDP context is not optimized for signaling |
| | 1 | PDP context is optimized for signaling |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

## 9.7. AT+CGACT Activate or Deactivate PDP Contexts

This command activates or deactivates the specified PDP context(s). After the command has been completed, the MT 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 specifies the activation/deactivation form of the command, it will activate or deactivate all defined contexts.

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

### Parameter

| | | |
|---|---|---|
| **<state>** | Integer type. Indicates the state of PDP context activation | |
| | 0 | Deactivated |
| | 1 | Activated |

| | |
|---|---|
| | Other values are reserved and will result in an **ERROR** response to the Write Command |
| **<cid>** | Integer type. Specify a particular PDP context definition (see **AT+CGDCONT**) |
| **<err>** | Error codes. For more details, see ***Table 11***. |

**Example**

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

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

## 9.8. AT+CGDATA Enter Data State

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

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

| **AT+CGDATA Enter Data State** | |
|---|---|
| Test Command<br>**AT+CGDATA=?** | Response<br>**+CGDATA: (**list of supported **<L2P>**s**)**<br><br>**OK** |
| Write Command<br>**AT+CGDATA=<L2P>,<cid>** | Response<br>**CONNECT**<br><br>If there is any error:<br>**ERROR** |

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

**Parameter**

| | |
|---|---|
| **<L2P>** | String type. Indicate the layer 2 protocol to be used between the TE and MT:<br>PPP Point to Point protocol for a PDP such as IP<br>Other values are not supported and will result in an **ERROR** response to the Execution Command |
| **<cid>** | Integer type. Specify a particular PDP context definition (see **AT+CGDCONT**) |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## 9.9. AT+CGPADDR Show PDP Address

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

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

### Parameter

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

### Example

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

OK
```

## 9.10. AT+CGCLASS GPRS Mobile Station Class

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

| **AT+CGCLASS GPRS Mobile Station Class** | |
|---|---|
| Test Command<br>**AT+CGCLASS=?** | Response<br>**+CGCLASS:** (list of supported **<class>**s)<br><br>**OK** |
| Read Command<br>**AT+CGCLASS?** | Response<br>**+CGCLASS: <class>**<br><br>**OK** |
| Write Command<br>**AT+CGCLASS=<class>** | Response<br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |

| | |
|---|---|
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |
| Reference<br>3GPP TS 27.007 | |

**Parameter**

| | |
|---|---|
| **<class>** | String type. Indicate the GPRS mobile class (Functionality in descending order)<br>"A" Class A |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## 9.11. AT+CGEREP Report Packet Domain

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 specified.

| **AT+CGEREP Report Packet Domain Event** | |
|---|---|
| Test Command<br>**AT+CGEREP=?** | Response<br>**+CGEREP: (**range of supported **<mode>**s**),(**list of supported **<bfr>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CGEREP?** | Response<br>**+CGEREP: <mode>,<bfr>**<br><br>**OK**<br>Or<br>**ERROR** |
| Write Command<br>**AT+CGEREP=mode[,<bfr>]** | Response<br>**OK**<br>Or<br>**ERROR** |
| Execution Command<br>**AT+CGEREP** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | | |
|---|---|---|
| **<mode>** | Integer type. | |
| | 0 | Buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE. |
| | 1 | Discard unsolicited result codes when MT-TE link is reserved (e.g., in on-line data mode); otherwise forward them directly to the TE. |
| | 2 | Buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g., in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE. |
| **<bfr>** | Integer type. | |
| | 0 | MT buffer of unsolicited result codes defined within this command is cleared when **<mode>** 1 or 2 is entered. |
| | 1 | MT buffer of unsolicited result codes defined within this command is flushed to the TE when **<mode>** 1 or 2 is entered (**OK** response shall be given before flushing the codes). |

**NOTE**

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

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

**Parameter**

| | |
|---|---|
| **<PDP_type>** | String type. Packet data protocol type. A string parameter which specifies the type of packet data protocol.<br>"IP" IPv4<br>"PPP" PPP<br>"IPV6" IPv6<br>"IPV4V6" IPv4v6 |
| **<PDP_addr>** | String type. Identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP. |
| **<cid>** | Integer type. PDP context identifier. Specify a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value=1) is returned by the test form of **AT+CGDCONT**. |
| **<class>** | String type. Indicate the GPRS mobile class.<br>A Class A (highest) |

**Example**

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

OK
AT+CGEREP?               //Query the current configuration.
+CGEREP: 0,0

OK
AT+CGEREP=2,1            //Report packet domain event.
OK
AT+CGACT=1,2             //Activated a context.
OK

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

+CGEV: PDN DEACT2
```

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

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

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

**Parameter**

| | |
|---|---|
| **<service>** | Integer type. Indicate the service or service preference to be used<br>0 GPRS<br>1 Circuit switch<br>2 GPRS preferred (use circuit switched if GPRS not available)<br>3 Circuit switch preferred (use GPRS if circuit switched not available) |
| **<err>** | Error codes. For more details, see ***Table 11***. |

## 9.13. AT+QGDCNT Packet Data Counter

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

| AT+QCAINFO Query Carrier Aggregation Parameters | |
|---|---|
| Test Command<br>**AT+QGDCNT=?** | Response<br>**+QGDCNT: (0,1)** |

| | |
|---|---|
| | **OK** |
| Read Command<br>**AT+QGDCNT?** | Response<br>**+QGDCNT: <bytes_sent>,<bytes_recv>**<br><br>**OK** |
| Write Command<br>**AT+QGDCNT=<op>** | Response<br>**OK**<br>Or<br>**ERROR**<br><br>If there is an error related to ME functionality:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

## Parameter

| | |
|---|---|
| **<op>** | A numeric parameter. The operation about data counter<br>0 Reset the data counter<br>1 Save the results of data counter to NV. |
| **<bytes_sent>** | A numeric parameter. The amount of sent bytes. |
| **<bytes_recv>** | A numeric parameter. The amount of received bytes. |

**NOTES**

1. Please not frequently execute command AT+QGDCNT=1; because this command save data to NVRAM. And frequent writing of flash will reduce the flash service life.
2. When module is power down, **<bytes_sent>** and **<bytes_recv>** will be loaded from results of data counter in NV. The default result in NV is 0.

## Example

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

OK
```

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

OK

AT+QGDCNT=1     //Save the results to NV
OK
AT+QGDCNT=0     //Reset counter
OK
```

# 10 Supplementary Service Commands

**NOTE**

Supplementary service related AT commands are not supported on EG065K series, EM120K or EM060K-GL modules.

## 10.1. AT+CCFC Call Forwarding Number and Conditions Control

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

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

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

## Parameter

| | | |
|---|---|---|
| **<reads>** | Integer type. | |
| | 0 | Unconditional |
| | 1 | Mobile busy |
| | 2 | No reply |
| | 3 | Not reachable |
| | 4 | All call forwarding (see *3GPP TS 22.030*) |
| | 5 | All conditional call forwarding (see *3GPP TS 22.030*) |
| **<mode>** | Integer type. | |
| | 0 | Disable |
| | 1 | Enable |
| | 2 | Query status |
| | 3 | Registration |
| | 4 | Erasure |
| **<number>** | String type. Phone number of forwarding address in format specified by **<type>**. | |
| **<type>** | Integer type. Type of address; default value is 145 when dialing string includes international access code character "**+**"; otherwise, 129. | |
| **<subaddr>** | String type. Sub-address in the format specified by **<satype>**. | |
| **<satype>** | Integer type. Type of sub-address. | |
| **<classx>** | Integer type. Each represents a class of information. | |
| | 1 | Voice (telephony) |
| | 2 | Data (refers to all bearer services; and this may only see some bearer services if TA does not support values 16, 32, 64 and 128 with **<mode>**=2) |
| | 4 | Fax (facsimile services) |
| | 7 | Voice, data and fax |
| | 8 | Short message service |
| | 16 | Data circuit synchronization |
| | 32 | Data circuit asynchronization |
| | 64 | Dedicated packet access |
| | 128 | Dedicated PAD access |
| **<time>** | Integer type. | |
| | 1–30 | When "no reply", "all call forwarding" or "all conditional call forwarding" is enabled or queried, this gives the time in seconds to wait before call is forwarded, default |

| | |
|---|---|
| | value is 20 |
| **<status>** | Integer type.<br>0 Not active<br>1 Active |
| **<err>** | Error codes. For more details, see ***Table 12***. |

**Example**

```
AT+CCFC=0,3,"15021012496"          //Register the destination number for unconditional call
OK                                   forwarding (CFU).
AT+CCFC=0,2                        //Query the status of CFU without specifying <class>.
+CCFC: 1,1,"+8615021012496",145,,,

OK
AT+CCFC=0,4                        //Erase the registered CFU destination number.
OK
AT+CCFC=0,2                        //Query the status and there is no destination number.
+CCFC: 0,255

OK
```

## 10.2. AT+CCWA Call Waiting Control

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

| **AT+CCWA Call Waiting Control** | |
|---|---|
| Test Command<br>**AT+CCWA=?** | Response<br>**+CCWA: (**list of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CCWA?** | Response<br>**+CCWA: <n>**<br><br>**OK** |
| Write Command<br>**AT+CCWA=[<n>[,<mode>[,<class>]]]** | Response<br>TA controls the call waiting supplementary service. Activation, deactivation and status query are supported.<br>If **<mode>** is not equal to 2 and the command is executed successfully:<br>**OK** |

| | |
|---|---|
| | If **<mode>**=2 and the command is executed successfully:<br>**+CCWA: <status>,<class1>**<br>**[<CR><LF>+CCWA: <status>,<class2>**<br>**[...]]**<br><br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | |
|---|---|
| **<n>** | Integer type.<br>0 Disable presentation of an unsolicited result code<br>1 Enable presentation of an unsolicited result code |
| **<mode>** | Integer type. When **<mode>** is omitted, network is not interrogated.<br>0 Disable<br>1 Enable<br>2 Query status |
| **<classx>** | Integer type. Each integer represents a class of information.<br>1 Voice (telephony)<br>2 Data (refers to all bearer services; and this may only see some bearer services if TA does not support values 16, 32, 64 and 128 with **<mode>**=2)<br>4 Fax (facsimile services)<br>7 Voice, data and fax<br>8 Short message service<br>16 Data circuit synchronization<br>32 Data circuit asynchronization<br>64 Dedicated packet access<br>128 Dedicated PAD access |
| **<status>** | Integer type. Indicate whether the status of the command is enabled or not.<br>0 Disable<br>1 Enable |
| **<number>** | String type. Phone number of calling address in format specified by **<type>**. |
| **<type>** | Type of address octet in integer format.<br>128 Type specified by the network<br>129 Unknown type (ISDN format number)<br>145 International number type (ISDN format) |

| | |
|---|---|
| **<alpha>** | Optional string type alphanumeric representation of **<number>** corresponding to the entry found in phonebook. |
| **<CLI_validity>** | Integer type. Provide details why **<number>** does not contain a calling party BCD number (see *3GPP TS 24.008 [8] subclause 10.5.4.30*).<br>0 CLI valid<br>1 CLI has been withheld by the originator (see *3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008* code "Reject by user")<br>2 CLI is not available due to interworking problems or limitations of originating network (see *3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008* code "Interaction with other service")<br>3 CLI is not available due to calling party being of type payphone (see *3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008* code "Coin line/payphone")<br>4 CLI is not available due to other reasons (see *3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008* code "Unavailable")<br>When CLI is not available (**<CLI_validity>**=2, **<CLI_validity>**=3 or **<CLI_validity>**=4), **<number>** shall be an empty string ("") and **<type>** value will not be significant. Nevertheless, TA may return the recommended value 128 for **<type>** (TON/NPI unknown in accordance with 3*GPP TS 24.008 [8] subclause 10.5.4.7*).<br>When CLI has been withheld by the originator, (**<CLI_validity>**=1) and the CLIP is provisioned with the "override category" option (see *3GPP TS 22.081 [3] and 3GPP TS 23.081 [40]*), **<number>** and **<type>** is provided. Otherwise, TA shall return the same setting for **<number>** and **<type>** as if the CLI is not available. |
| **<subaddr>** | String type. Subaddress of format specified by **<satype>**. |
| **<satype>** | Integer type. Subaddress octet (see *3GPP TS 24.008 [8] subclause 10.5.4.8*). |
| **<priority>** | Optional digit type parameter indicating that the eMLPP priority level of the incoming call. The priority level values are as defined in eMLPP specification *3GPP TS 22.067 [54]*. |
| **<err>** | Error codes. For more details, see ***Table 11***. |

**NOTE**

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

## Example

```
AT+CCWA=1,1                    //Enable presentation of an unsolicited result code.
```

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

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

## 10.3. AT+CHLD Call Related Supplementary Services

This command allows the control of the following call related services:

- A call can be temporarily disconnected from the MT but the connection is retained by the network;
- Multiparty conversation (conference calls);
- The served subscriber who has two calls (one held and the other either active or alerting) can connect the other parties and release the served subscriber's own connection.

Calls can be put on hold, recovered, released and added to a conversation, and transferred similarly as defined in *3GPP TS 22.030*.

This is based on the GSM/UMTS supplementary services HOLD (Call Hold; see *3GPP TS 22.083 clause 2*), MPTY (MultiParty; see *3GPP TS 22.084*) and ECT (Explicit Call Transfer; see *3GPP TS 22.091*). The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standards. Call Hold, MultiParty and Explicit Call Transfer are only applicable to teleservice 11.

| **AT+CHLD Call Related Supplementary Services** | |
|---|---|
| Test Command<br>**AT+CHLD=?** | Response<br>**+CHLD: (**list of supported **<n>**s**)**<br><br>**OK** |
| Write Command<br>**AT+CHLD=[<n>]** | Response<br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

**Parameter**

| | | |
|---|---|---|
| **<n>** | Integer type. | |
| | 0 | Terminate all held calls or UDUB (User Determined User Busy) for a waiting call. If a call is waiting, terminate the waiting call. Otherwise, terminate all held calls (if any) |
| | 1 | Terminate all active calls (if any) and accept the other call (waiting call or held call). |
| | 1X | Terminate the specific call number X (X = 1–7) |
| | 2 | Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call. |
| | 2X | Place all active calls except call X (X = 1–7) on hold |
| | 3 | Add the held call to the active calls |
| | 4 | Connect the two calls and disconnects the subscriber from both calls (ECT) |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

## Example

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

+CCWA: "02154450293",129,1                 //Indication of a call that has been waiting.
AT+CHLD=2                                  //Place the active call on hold and accept the waiting call as
                                             the active call.
OK
AT+CLCC
+CLCC: 1,0,1,0,0,"10086",129               //The first call is on hold.
+CLCC: 2,1,0,0,0,"02154450293",129         //The second call is active.

OK
AT+CHLD=21                                 //Place the active call except call X = 1 on hold.
OK
AT+CLCC
+CLCC: 1,0,0,0,0,"10086",129               //The first call is active.
+CLCC: 2,1,1,0,1,"02154450293",129         //The second call is on hold.

OK
AT+CHLD=3                                  //Add a held call to the active calls in order to set up a
                                             conference (multiparty) call.
OK
AT+CLCC
+CLCC: 1,0,0,0,1,"10086",129
+CLCC: 2,1,0,0,1,"02154450293",129

OK
```

## 10.4. AT+CLIP Calling Line Identification Presentation

This command refers to the GSM/UMTS supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call. It has no effect on the execution of the supplementary service CLIP in the network.

| AT+CLIP Calling Line Identification Presentation | |
|---|---|
| Test Command<br>**AT+CLIP=?** | Response<br>**+CLIP: (**list of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CLIP?** | Response<br>**+CLIP: <n>,<m>**<br><br>**OK** |
| Write Command<br>**AT+CLIP=[<n>]** | Response<br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 15 s, determined by network. |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

### Parameter

| | |
|---|---|
| **<n>** | Integer type. Configure/show the result code presentation status to the TE.<br>0 Disable unsolicited result codes<br>1 Enable unsolicited result codes |
| **<m>** | Integer type. The subscriber CLIP service status in the network.<br>0 CLIP not provisioned<br>1 CLIP provisioned<br>2 Unknown (e.g., no network, etc.) |
| **<number>** | String type. Phone number calling address in format specified by **<type>**. |
| **<subaddr>** | String type. Sub-address of format specified by **<satype>**. |
| **<satype>** | Type of sub-address octet in integer format (see *3GPP TS 24.008 subclause 10.5.4.8*) |
| **<type>** | Type of address octet in integer format.<br>129 Unknown type (ISDN format)<br>145 International number type (ISDN format) |

| | |
|---|---|
| | 161 National number |
| **<alpha>** | String type alphanumeric representation of **<number>** corresponding to the entry found in phone book. |
| **<CLI_validity>** | Integer type. This parameter can provide details why **<number>** does not contain a calling party BCD number.<br>0 CLI valid<br>1 CLI has been withheld by the originator<br>2 CLI is not available due to interworking problems or limitations of originating network |
| **<err>** | Error codes. For more details, see ***Table 11***. |

**NOTE**

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

**Example**

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

RING

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

## 10.5. AT+CLIR Calling Line Identification Restriction

This command refers to the CLIR supplementary service (Calling Line Identification Restriction) according to *3GPP TS 22.081* and the OIR supplementary service (Originating Identification Restriction) according to *3GPP TS 24.607* that allows a calling subscriber to enable or disable the presentation of the calling line identity (CLI) to the called party when originating a call.

The Write Command overrides the CLIR subscription (default is restricted or allowed) when temporary mode is provisioned as a default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite command.

| AT+CLIR Calling Line Identification Restriction | |
|---|---|
| Test Command | Response |

| | |
|---|---|
| **AT+CLIR=?** | **+CLIR: (**range of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CLIR?** | Response<br>**+CLIR: <n>,<m>**<br><br>**OK** |
| Write Command<br>**AT+CLIR=<n>** | Response<br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 15 s, determined by network. |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

**Parameter**

| | | |
|---|---|---|
| **<n>** | Integer type. Set the adjustment for outgoing calls. | |
| | 0 | Presentation indicator is used according to the subscription of the CLIR service |
| | 1 | CLIR invocation |
| | 2 | CLIR suppression |
| **<m>** | Integer type. Show the subscriber CLIR service status in the network. | |
| | 0 | CLIR not provisioned |
| | 1 | CLIR provisioned in permanent mode |
| | 2 | Unknown (e.g., no network, etc.) |
| | 3 | CLIR temporary mode presentation restricted |
| | 4 | CLIR temporary mode presentation allowed |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

## 10.6. AT+COLP Connected Line Identification Presentation

This command enables/disables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call, referring to the GSM/UMTS supplementary service COLP (Connected Line Identification Presentation). MT enables or disables the presentation of the COL (Connected Line) at the TE for a mobile originating a call. It has no effect on the execution of the supplementary service COLR in the network.

| AT+COLP Connected Line Identification Presentation | |
|---|---|
| Test Command<br>**AT+COLP=?** | Response<br>**+COLP: (**list of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+COLP?** | Response<br>**+COLP: <n>,<m>**<br><br>**OK** |
| Write Command<br>**AT+COLP=[<n>]** | Response<br>**OK** |
| Maximum Response Time | 15 s, determined by network. |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | |
|---|---|
| **<n>** | Integer type. Set/present the result code presentation status in the MT.<br>0 Disable<br>1 Enable |
| **<m>** | Integer type. Parameter presents the subscriber COLP service status in the network.<br>0 COLP not provisioned<br>1 COLP provisioned<br>2 Unknown (e.g., no network, etc.) |
| **<number>** | String type. Phone number; calling address in format specified by **<type>**. |
| **<type>** | Integer type. Type of address octet.<br>129 Unknown type (ISDN format number)<br>145 International number type (ISDN format) |
| **<subaddr>** | String type. Sub-address of format specified by **<satype>**. |
| **<satype>** | Type of sub-address octet in integer format (see *3GPP TS 24.008 subclause 10.5.4.8*). |
| **<alpha>** | Optional string type alphanumeric representation of **<number>** corresponding to the entry found in phone book. |

**NOTE**

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

### Example

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

OK
```

## 10.7. AT+CSSN Supplementary Service Notifications

This command enables/disables the presentation of notification result codes from TA to TE.

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

### Parameter

| | |
|---|---|
| **<n>** | Integer type. Set/indicate the **+CSSI** intermediate result code presentation status to the TE.<br>0 Disable |

| | |
|---|---|
| | 1 Enable |
| **<m>** | Integer type. Set/indicate the **+CSSU** unsolicited result code presentation status to TE.<br>0 Disable<br>1 Enable |
| **<code1>** | Integer type. It is manufacturer specified and supports the following codes:<br>0 Unconditional call forwarding is active<br>1 Some of the conditional call forwarding are active<br>2 Call has been forwarded<br>3 Call is waiting<br>5 Outgoing call is barred |
| **<code2>** | Integer type. It is manufacturer specific and supports the following codes:<br>0 The incoming call is a forwarded call<br>2 Call has been put on hold (during a voice call)<br>3 Call has been retrieved (during a voice call)<br>5 Held call was terminated by another party<br>10 Additional incoming call forwarded |
| **<err>** | Error codes. For more details, see ***Table 11***. |

**NOTE**

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

## 10.8. AT+CUSD Unstructured Supplementary Service Data

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

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

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

| **AT+CUSD Unstructured Supplementary Service Data** |
|---|

| | |
|---|---|
| Test Command<br>**AT+CUSD=?** | Response<br>**+CUSD: (**range of supported **<mode>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CUSD?** | Response<br>**+CUSD: <mode>**<br><br>**OK** |
| Write Command<br>**AT+CUSD=[<mode>[,<reqstr>[,<dcs>]]]** | Response<br>**OK**<br><br>If there is any error:<br>**ERROR**<br>Or<br>**+CME ERROR: <err>** |
| Maximum Response Time | 120 s, determined by the network. |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

## Parameter

| | |
|---|---|
| **<mode>** | Integer type. Set/indicate the result code presentation status to the TE.<br>0 Disable the result code presentation to the TE<br>1 Enable the result code presentation to the TE<br>2 Cancel session (not applicable to Read Command response) |
| **<reqstr>** | String type. Unstructured Supplementary Service Data (USSD) to be sent to the network. If this parameter is omitted, network is not interrogated. |
| **<rspstr>** | String type. Unstructured Supplementary Service Data (USSD) received from the network |
| **<dcs>** | Integer type. 3GPP TS 23.038 Cell Broadcast Data Coding Scheme (default 15) |
| **<status>** | Integer type. USSD response from the network or the network-initiated operation<br>0 No further user action required (network initiated USSD Notify, or no further information needed after mobile initiated operation)<br>1 Further user action required (network initiated USSD Request, or further information needed after mobile initiated operation)<br>2 USSD terminated by network<br>3 Another local client has responded<br>4 Operation not supported<br>5 Network time out |
| **<err>** | Error codes. For more details, see ***Table 11***. |

# 11 Audio Commands

**NOTE**

Audio related AT commands are not supported on EG065K series, EM120K or EM060K-GL modules.

## 11.1. AT+CLVL Loudspeaker Volume Level Selection

This command selects the volume level of the internal loudspeaker of MT.

| AT+CLVL Loudspeaker Volume Level Selection | |
|---|---|
| Test Command<br>**AT+CLVL=?** | Response<br>**+CLVL: (**list of supported **<level>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CLVL?** | Response<br>**+CLVL: <level>**<br><br>**OK**<br>Or<br>**ERROR** |
| Write Command<br>**AT+CLVL=<level>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will be saved automatically. |
| Reference<br>3GPP TS 27.007 | |

### Parameter

| | |
|---|---|
| **<level>** | Integer type. Volume level with manufacturer specific range (Smallest value represents the |

| | |
|---|---|
| | lowest sound level). Range: 0–5; Default: 3. |

## 11.2. AT+CMUT Mute Control

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

| AT+CMUT Mute Control | |
|---|---|
| Test Command<br>**AT+CMUT=?** | Response<br>**+CMUT: (**list of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+CMUT?** | Response<br>**+CMUT: <n>**<br><br>**OK** |
| Write Command<br>**AT+CMUT=<n>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will not be saved automatically. |
| Reference<br>3GPP TS 27.007 | |

**Parameter**

| | | |
|---|---|---|
| **<n>** | Integer type. | |
| | 0 | Mute off |
| | 1 | Mute on |

## 11.3. AT+QAUDLOOP Enable/Disable Audio Loopback Test

This command enables/disables audio loopback test.

| AT+QAUDLOOP Enable/Disable Audio Loop Test | |
|---|---|
| Test Command<br>**AT+QAUDLOOP=?** | Response<br>**+QAUDLOOP: (**list of supported **<enable>**s**)** |

| | |
|---|---|
| | **OK** |
| Read Command<br>**AT+QAUDLOOP?** | Response<br>**+QAUDLOOP: <enable>**<br><br>**OK** |
| Write Command<br>**AT+QAUDLOOP=<enable>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved. |

**Parameter**

| | |
|---|---|
| **<enable>** | Integer type. Enable or disable audio loopback test.<br>0 Disable audio loopback test<br>1 Enable audio loopback test |

## 11.4. AT+QAUDMOD Set Audio Mode

This command sets the audio mode required for the connected device.

| **AT+QAUDMOD Set Audio Mode** | |
|---|---|
| Test Command<br>**AT+QAUDMOD=?** | Response<br>**+QAUDMOD: (**range of supported **<mode>**s**)**<br><br>**OK** |
| Read command<br>**AT+QAUDMOD?** | Response<br>**+QAUDMOD: <mode>**<br><br>**OK** |
| Write Command<br>**AT+QAUDMOD=<mode>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. |

| | |
|---|---|
| | The parameters will be saved. |

**Parameter**

| | |
|---|---|
| **<mode>** | Integer type. Indicate the current configured audio mode of echo canceller, noise suppressor, digital gain and parameter calibration.<br>0 Handset<br>1 Headset<br>2 Speaker<br>3 VCO<br>4 Bluetooth<br>5 Voice over USB<br>6 Full TTY<br>7 HCO<br>8 FAX |

## 11.5. AT+QDAI Digital Audio Interface Configuration

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

| **AT+QDAI Digital Audio Interface Configuration** | |
|---|---|
| Test Command<br>**AT+QDAI=?** | Response<br>**+QDAI: (**range of supported **<io>**s**),(**list of supported **<mode>**s**),(**list of supported **<fsync>**s**),(**range of supported **<clock>**s**),(**list of supported **<format>**s**),(**list of supported **<sample>**s**),(**list of supported **<num_slots>**s**),(**range of supported **<slot_mapping0>**s**),(**range of supported **<slot_mapping1>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QDAI?** | Response<br>**+QDAI: <io>[,<mode>,<fsync>,<clock>,<format>,<sample>,<num_slots>,<slot_mapping0>[,<slot_mapping1>]]**<br><br>**OK** |
| Write Command | Response |

| | |
|---|---|
| **AT+QDAI=<io>[,<mode>,<fsync>,<clock>[,<format>[,<sample>[,<num_slots>,<slot_mapping0>[,<slot_mapping1>]]]]]** | **OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect after rebooting.<br>The configurations will be saved automatically. |

## Parameter

| | |
|---|---|
| **<io>** | Codec. It can be set to x, 1–6. (Not supported currently) |
| **<mode>** | Integer type.<br>0 Master mode<br>1 Slave mode |
| **<fsync>** | Integer type.<br>0 Primary mode (short-synchronization)<br>1 Auxiliary mode (long-synchronization) |
| **<clock>** | Integer type. Clock frequency.<br>0 128 kHz (Not supported currently)<br>1 256 kHz<br>2 512 kHz<br>3 1024 kHz<br>4 2048 kHz<br>5 4096 kHz |
| **<format>** | Integer type. Data format.<br>0 16-bit linear |
| **<sample>** | Integer type.<br>0 8 kHz<br>1 16 kHz |
| **<num_slots>** | Integer type.<br>1 Number of slot<br>2 Number of slot (Set to 2 when use **<slot_mappinp1>**) |
| **<slot_mapping0>** | Integer type. Slot mapping value. Range: 1–16. |
| **<slot_mapping1>** | Integer type. Slot mapping value. Range: 2–16. |

**NOTES**

1. 4096 kHz clock frequency is only applicable for 16 kHz sampling rate.
2. Bit per frame = **<clock>**/**<sample>**. For example, if **<clock>** is 2048 kHz and **<sample>** is 8 kHz, bit per frame will be 256. Bit per frame should be greater than 16.
3. If slave mode is selected, master and synchronization clock should be provided for the MT.
4. When a recommended codec is selected and 16 kHz sampling rate is required, input **<sample>**.

Currently the MT only supports 16 kHz (**AT+QDAI=x,0,0,5,0,1**).

### Example

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

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

OK
AT+QDAI=x,1,0,4,0,0,1,1         //Set AUX PCM interface to slave, short-sync, 8 kHz sample, 2048kHz
                                  BCLK.
OK
AT+QDAI=x,0,0,4,0,1,1,1         //Configure one slot.
OK
AT+QDAI=x,0,0,4,0,1,2,1,3       //Configure two slots.
OK
```

## 11.6. AT+QSIDET Set Side Tone Gain in Current Mode

This command sets the side tone gain value in current mode.

| AT+QSIDET Set Side Tone Gain in Current Mode | |
|---|---|
| Test Command<br>**AT+QSIDET=?** | Response<br>**+QSIDET: (**range of supported **<st_gain>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QSIDET?** | Response<br>**+QSIDET: <st_gain>**<br><br>**OK** |
| Write Command<br>**AT+QSIDET=<st_gain>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. |

| | |
|---|---|
| | The configuration will be saved. |

**Parameter**

| | |
|---|---|
| **<st_gain>** | Integer type. Indicate the configured side tone gain in current mode. Range: 0–65535. Default: 1298. |

## 11.7. AT+QMIC Set Uplink Gains of Microphone

This command sets the uplink gains of microphone.

| **AT+QMIC Set Uplink Gains of Microphone** | |
|---|---|
| Test Command<br>**AT+QMIC=?** | Response<br>**+QMIC: (**range of supported **<txgain>**s**),(**range of supported **<txdgain>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QMIC?** | Response<br>**+QMIC: <tx_gain>,<txdgain>**<br><br>**OK** |
| Write Command<br>**AT+QMIC=<txgain>[,<txdgain>]** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations are not saved. |

**Parameter**

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

**NOTE**

This command only takes effect dynamically during the call, and does not take effect when you configure it before the call. If you configure it before the call, the default values are restored after the call is started.

## 11.8. AT+QIIC IIC Read and Write

This command configures the codec via IIC interface.

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

### Parameter

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

| | |
|---|---|
| **<value>** | Hex integer type.<br>0–0xFFFF Data value |

### Example

```
AT+QIIC=1,0x18,0x0c,1          //Read 1-byte register content of the register's location: slave
                                 address: 0x18, register address: 12.
+QIIC: 0x50

OK
AT+QIIC=0,0x18,0x0c,1,0x5f     //Write 1-byte register content of the register's location: slave address:
                                 0x18, register address: 12, value to write is 0x5f.
OK
```

## 11.9. AT+QTONEDET Enable/Disable DTMF Detection

This command enables or disables DTMF detection. When you enable this function, DTMF tones sent by the other party will be detected, and report DTMF tones on the serial port that you assigned.

| AT+ QTONEDET Enable/Disable DTMF Detection | |
|---|---|
| Test Command<br>**AT+QTONEDET=?** | Response<br>**+QTONEDET: (**list of supported **<enable>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QTONEDET?** | Response<br>**+QTONEDET: <enable>**<br><br>**OK** |
| Write Command<br>**AT+QTONEDET=<enable>** | Response<br>**OK**<br>**ERROR** |
| Maximum Response Time | 300ms |
| Characteristics | The command takes effect immediately.<br>The configurations will not be saved. |

### Parameter

| | |
|---|---|
| **<enable>** | Integer type. Enable/disable DTMF detection<br>0 Disable<br>1 Enable |

**NOTE**

DTMF characters - ASCII:

| DTMF | ASCII | DTMF | ASCII |
|---|---|---|---|
| 0 | 48 | 8 | 56 |
| 1 | 49 | 9 | 57 |
| 2 | 50 | A | 65 |
| 3 | 51 | B | 66 |
| 4 | 52 | C | 67 |
| 5 | 53 | D | 68 |
| 6 | 54 | * | 42 |
| 7 | 55 | # | 35 |

## 11.10. AT+QLDTMF Play Local DTMF Tone

This command plays a local DTMF string, and stops playing the DTMF tone.

| AT+QLDTMF Play local DTMF Tone | |
|---|---|
| Test Command<br>**AT+QLDTMF=?** | Response<br>**+QLDTMF: (**list of supported **<n>**s**),(**list of supported **<DTMF_string >**s**)**<br><br>**OK** |
| Write Command<br>**AT+QLDTMF=<n>,<DTMF_string>[,<y>]** | Response<br>**OK**<br><br>After the DTMF tone is completely played:<br>**+QLDTMF: 5** |
| Execute Command<br>**AT+QLDTMF** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved. |

### Parameter

| | |
|---|---|
| **<n>** | Integer type. Indicate every DTMF's play time and mute time. The mute times Ranges: 0–1000. Unit: 1/100 second when **<y>** is set to 1, or 1/10 second when |

| | |
|---|---|
| | **<y>** is not set. |
| **<DTMF_string>** | String type. DTMF tone string. Maximum length: 16 characters, separated by comma. DTMF tone string includes **0-9**,*,#,**A-D**. |
| **<y>** | Integer type. If the parameter is omitted, it means the unit of **<n>** is 1/10 second. |

### Example

```
AT+QLDTMF=?
+QLDTMF: (1-1000),(0-9,*,#,A-D)

OK
AT+QLDTMF=2,"AB12#"          //Play local DTMF tone (A,B,1,2,#), the play time & mute time is 200 ms.
OK
AT+QLDTMF                    //Stop playing local DTMF tone.
OK
```

## 11.11. AT+QAUDRD Record Media File

This command records the uplink or downlink speech during a voice call or records sound from local microphone in idle state and saves it to files.

| AT+QAUDRD Record Media File | |
|---|---|
| Test Command<br>**AT+QAUDRD=?** | Response<br>**+QAUDRD: (**list of supported **<control>**s**),<file_name>,(**list of supported **<format>**s**),(**list of supported **<dlink>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QAUDRD?** | Response<br>**+QAUDRD: <state>**<br><br>**OK** |
| Write Command<br>**AT+QAUDRD=<control>[,<file_name>[,<format>[,<dlink>]]]** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will not be saved. |

### Parameter

| | |
|---|---|
| **<state>** | Integer type. Whether the module is recording<br>0 Module is not in recording<br>1 Module is in recording |
| **<control>** | Integer type. Start or stop recording<br>0 Stop recording<br>1 Start to record |
| **<file_name>** | String type. Name of the file to be recorded. |
| **<format>** | Integer type. Recording format of the file.<br>13 WAV_PCM16 |
| **<dlink>** | Integer type. Record downlink sound.<br>0 Record uplink sound<br>1 Record downlink sound |

**NOTE**

1. **<file_name>** is the path to save the recording file, and the default path is in the */cache/ufs* directory.
2. If the recording file's name and format is same with an existed file or an unknown error occur, the module will report URC **+QAUDRIND: 0,1**.

**Example**

```
AT+QAUDRD=1,"A.wav",13,0        //Record the uplink sound, format wav, and store it in /cache/ufs.
OK
AT+QAUDRD=0                     //Stop recording.
OK
AT+QAUDRD=1,"B.wav",13,1        //Record the downlink sound, format wav, and store it in /cache/ufs.
OK
AT+QAUDRD=0                     //Stop recording.
OK
```

## 11.12. AT+QPSND Play Wave File

This command plays the local wave file.

| AT+QPSND Play Wave File | |
|---|---|
| Test Command<br>**AT+QPSND=?** | Response<br>**+QPSND: (**list of supported **<control>s),<file_name>,(**list of |

| | |
|---|---|
| | supported **<repeat>**s**),(**list of supported **<ulmute>**s**),(**list of supported **<dlmute>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QPSND?** | Response<br>**+QPSND: <state>**<br><br>**OK** |
| Write Command<br>**AT+QPSND=<control>,<file_name>,<repeat>[,<ulmute>[,<dlmute>]]** | Response<br>**OK**<br><br>If there is error:<br>**+CME ERROR: <err>**<br><br>After the Wave file is completely played:<br>**+QPSND: 0** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

## Parameter

| | |
|---|---|
| **<state>** | Integer type. Whether the module is playing the wave file<br>0 Not playing<br>1 Playing |
| **<control>** | Integer type. Start or stop playing<br>0 Stop playing<br>1 Start playing |
| **<file_name>** | String type. Name of the file to be played |
| **<repeat>** | Integer type. Repeat play or not<br>0 Play only once<br>1 Repeat play |
| **<ulmute>** | Integer type. Whether to mute uplink sound or not<br>0 Mute<br>1 Not mute |
| **<dlmute>** | Integer type. Whether to mute the downlink sound or not<br>0 Mute<br>1 Not mute |
| **<err>** | Error code. For more details, see ***Table 11***. |

**NOTE**

1. The default play path of **<file_name>** is the */cache/ufs* directory.
2. The module only supports 8K liner, mono wave format.

### Example

```
AT+QPSND=1,"A.wav",0          //Play a wave file which is stored in /cache/ufs.
OK

+QPSND: 0

AT+QPSND=1,"A.wav",0,1,1      //Play a wave file to far-end when a call is ongoing.
OK

+QPSND: 0
```

## 11.13. AT+QCFG="pcmclk" Configure PCM Clock Signal

This command enables or disables PCM clock output when there is no calling and audio play.

| AT+QCFG="pcmclk" Configure PCM Clock Signal | |
|---|---|
| Write Command<br>**AT+QCFG="pcmclk"[,<PCM_clkout>]** | Response<br>If the optional parameter is omitted, query the current configuration:<br>**+QCFG: "pcmclk",<PCM_clkout>**<br><br>**OK**<br><br>If the optional parameter is specified, configure PCM clock signal:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will not be saved. |

### Parameter

| | |
|---|---|
| **<PCM_clkout>** | Integer type. Enable/disable PCM clock output. |

| | |
|---|---|
| 0 | Disable PCM clock output |
| 1 | Enable PCM clock output |

**NOTE**

If PCM clock output is enabled, the frequency of PCM_CLK is 2048 KHz, and the frequency of PCM_SYNC is 8 KHz.

## 11.14. AT+QAUDPLAY Play Media File

This command plays local media file.

| AT+QAUDPLAY Play Media File | |
|---|---|
| Test Command<br>**AT+QAUDPLAY=?** | Response<br>**+QAUDPLAY: <file_name>,(**list of supported **<repeat>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QAUDPLAY?** | Response<br>**+QAUDPLAY: <state>**<br><br>**OK** |
| Write Command<br>**AT+QAUDPLAY=<file_name>,<repeat>** | Response<br>**OK**<br><br>After the media file is completely played:<br>**+QAUDPLAY: 0** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

### Parameter

| | |
|---|---|
| **<state>** | Integer type. Whether the module is playing the media file |
| | 0 Not playing |
| | 1 Playing |
| **<file_name>** | String type. Name of the file to be played. |
| **<repeat>** | Integer type. Repeat to play the media file or not |
| | 0 Play only once |
| | 1 Repeat |

**NOTE**

**<file_name>** includes file path, file name and file suffix. The default play path is the */cache/ufs* directory.

**Example**

```
AT+QAUDPLAY="A.wav",0     //Play a wave file which is stored in UFS only once.
OK

+QAUDPLAY: 0

AT+QAUDPLAY="A.wav",1     //Play a wave file which is stored in UFS and repeat it.
OK

+QAUDPLAY: 0
```

## 11.15. AT+QAUDSTOP Stop Playing Media File

This command stops playing the media file.

| AT+QAUDSTOP Stop Playing Media File Play | |
|---|---|
| Test Command<br>**AT+QAUDSTOP=?** | Response<br>**OK** |
| Write Command<br>**AT+QAUDSTOP** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

## 11.16. AT+QAUDPLAYGAIN Set Audio Playing Gain

This command sets audio playing gain to change audio playing volume.

| AT+QAUDPLAYGAIN Set Audio Playing Gain | |
|---|---|
| Test Command<br>**AT+QAUDPLAYGAIN=?** | Response<br>**+QAUDPLAYGAIN: (**range of supported **<audplay_gain>**s**)**<br><br>**OK** |

| | |
|---|---|
| Read Command<br>**AT+QAUDPLAYGAIN?** | Response<br>**+QAUDPLAYGAIN: <audplay_gain>**<br><br>**OK** |
| Write Command<br>**AT+QAUDPLAYGAIN=<audplay_gain>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effects immediately.<br>The configuration will not be saved. |

### Parameter

| | |
|---|---|
| **<audplay_gain>** | Integer type. Audio playing gain. Range: 0 – 65535. The default value varies from different audio modes. |

### Example

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

OK
AT+QAUDPLAYGAIN?                 //Query the current value. The default value might be different in different audio modes.
+QAUDPLAYGAIN: 8192

OK
AT+QAUDPLAYGAIN=4096             //Set audio playing gain to 4096.
OK
AT+QAUDPLAYGAIN?                 //Query the current configuration.
+QAUDPLAYGAIN: 4096

OK
```

## 11.17. AT+QAUDRDGAIN Set Audio Recording Gain

This command sets audio recording gain to change audio recording volume.

| AT+QAUDPLAYGAIN Set Audio Recording Gain | |
|---|---|
| Test Command<br>**AT+QAUDRDGAIN=?** | Response<br>**+QAUDRDGAIN: (**range of supported **<audrd_gain>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QAUDRDGAIN?** | Response<br>**+QAUDRDGAIN: <audrd_gain>**<br><br>**OK** |
| Write Command<br>**AT+QAUDRDGAIN=<audrd_gain>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effects immediately.<br>The configuration will not be saved. |

## Parameter

| | |
|---|---|
| **<audrd_gain>** | Integer type. Audio recording gain. Range: 0 – 65535. The default value varies from different audio modes. |

## Example

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

OK
AT+QAUDRDGAIN?                  //Query the current value. The default value might be different in
                                different audio modes.
+QAUDRDGAIN: 8192

OK
AT+QAUDRDGAIN=4096              // Set audio record gain to 4096.
OK
AT+QAUDRDGAIN?                  //Query the current configuration.
+QAUDRDGAIN: 4096

OK
```

## 11.18. AT+QRXGAIN Set Downlink Gain of RX

This command sets RX digital gains to change the downlink volume.

| AT+QRXAGIN Set Downlink Gains of RX | |
|---|---|
| Test Command<br>**AT+QRXGAIN=?** | Response<br>**+QRXGAIN: (**range of supported **<rxgain>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QRXGAIN?** | Response<br>**+QRXGAIN: <rxgain>**<br><br>**OK** |
| Write Command<br>**AT+QRXGAIN=<rxgain>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations are not saved. |

### Parameter

| | |
|---|---|
| **<rxgain>** | Integer type. Downlink digital gains. Range: 0 – 65535. The default value varies from different audio modes. |

**NOTE**

This command only takes effect dynamically during the call, and does not take effect when you configure it before the call. If you configure it before the call, the default values are restored after the call is started.

### Example

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

OK
AT+QRXGAIN?                 //Query current value; the default value might be different in different
                              audio modes.
+QRXGAIN: 36864

OK
```

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

OK
```

## 11.19. AT+QAUDCFG Query and Configure Audio Tuning Process

| AT+QAUDCFG Query and Configure Audio Tuning Process | |
|---|---|
| Test Command<br>**AT+QAUDCFG=?** | 响应<br>**+QAUDCFG: "toneswitch",(**list of supported **<level>**s**)**<br>**+QAUDCFG: "slic/AudLoop",(**list of supported **<enable>**s**)**<br>**+QAUDCFG: "slic/LF_Ring",(**list of supported **<state>**s**)**<br>**+QAUDCFG: "slic_IndRep",(**list of supported **<op>**s**)**<br>**+QAUDCFG: "slic_cid",(**range of supported **<num>**s**)** |
| Maximum Response Time | 300 ms |

### 11.19.1. AT+QAUDCFG="toneswitch" Switch On/Off Ring Tone

The command switches on/off the ring tone.

| AT+QAUDCFG="toneswitch" Switch On/Off Ring Tone | |
|---|---|
| Test Command<br>**AT+QAUDCFG=?** | Response<br>**+QAUDCFG: "toneswitch",(**list of supported **<level>**s**)**<br><br>**OK** |
| Write Command<br>**AT+QAUDCFG="toneswitch"[,<value>]** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will not be saved. |

### Parameter

| | |
|---|---|
| **<value>** | Integer type. Switch on or off the ring tone.<br>0 Switch off the ring tone<br>1 Switch on the ring tone |

### Example

```
AT+QAUDCFG=?                          //Test command.
+QAUDCFG: "toneswitch",(0-1)

OK
AT+QAUDCFG="toneswitch",1             //Switch on the ring tone.
OK
AT+ QAUDCFG="toneswitch"              //Query the current status of the ring tone.
+QAUDCFG: 1

OK
```

## 11.19.2. AT+QAUDCFG="slic/AudLoop" Control Audio Loop Tone Test Function of Analog Phone and Dial Tone

This command configures the audio loop tone test of an analog phone. Compared to codec scenarios, this command controls audio loop tone test function of an analog telephone and automatically enables/disables dial tone.

| **AT+QAUDCFG="slic/AudLoop" Control Audio Loop Tone Test Function of Analog Phone and Dial Tone** | |
|---|---|
| Write Command<br>**AT+QAUDCFG="slic/AudLoop"[,<enable>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QAUDCFG: "slic/AudLoop",<enable>**<br><br>**OK**<br><br>If the optional parameter is specified, set audio loop tone test function of analog:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved. |

### Parameter

| | |
|---|---|
| **<enable>** | Integer type. Whether to enable audio loop tone test function of an analog telephone and automatically enable/disable dial tone.<br>0 Disable audio loop tone test function of an analog telephone and automatically enable dial tone<br>1 Enable audio loop tone test function of an analog telephone and automatically disable dial tone |

**NOTE**

1. The dial tone refers to the prompt tone of an analog phone after picking up the phone and before dialing, which is used to prompt the user to dial.
2. The audio loop tone is used to test whether the audio playback and recording functions are normal.

### Example

```
AT+QAUDCFG="slic/AudLoop",1      //Enable audio loop tone test function of an analog telephone and automatically disables dial tone.

OK
AT+QAUDCFG="slic/AudLoop"        // Query the current configuration.
+QAUDCFG: "slic/AudLoop",1

OK
```

## 11.19.3. AT+QAUDCFG="slic/LF_Ring" Set State Register

This command sets the linefeed operating state register of the SLIC chip.

| AT+QAUDCFG="slic/LF_Ring" Set State Register | |
|---|---|
| Write Command<br>**AT+QAUDCFG="slic/LF_Ring"[,<state>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QAUDCFG: "slic/LF_Ring",<state>**<br><br>**OK**<br><br>If the optional parameter is specified, set state register:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. |

| | |
|---|---|
| | The configuration will not be saved. |

### Parameter

| | |
|---|---|
| **<state>** | Integer type. Set the linefeed operating state register of the SLIC chip.<br>0 FORWARD ACTIVE. It enables on-hook/off-hook detection feature. When in-hook, the audio function is disabled. When off-hook, the audio function is enabled.<br>1 RINGING. It indicates that the analog phone detects the TIP/RING telephone line, and when it is in the RINGING state, it will generate ring tone to remind the user that there is currently an incoming call. |

**NOTE**

1. Currently this command only supports FORWARD ACTIVE and RINGING states. When the analog phone is on-hook and there is no incoming call, it is in FORWARD ACTIVE state; when the analog phone is on-hook and there is an incoming call, it is in RINGING state.
2. The command takes effect only when SLIC analog phone is working.

### Example

```
AT+QAUDCFG="slic/LF_Ring",1        //Set the linefeed operating state to RINGING.
OK
AT+QAUDCFG="slic/LF_Ring"          //Query current linefeed operating state.
AT+QAUDCFG="slic/LF_Ring",1

OK
```

## 11.19.4. AT+QAUDCFG="slic_IndRep" Enable/Disable Event Report of SLIC Analog Phone

This command enables or disables the reporting of SLIC analog phone event. Currently only the events of DTMF, on-hook, off- hook and flash are supported

| **AT+QAUDCFG="slic_IndRep" Enable/Disable Event Report of SLIC Analog Phone** | |
|---|---|
| Test Command<br>**AT+QAUDCFG="slic_IndRep"[,<op>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QAUDCFG: "slic_IndRep",<op>**<br><br>**OK**<br><br>If the optional parameter is specified, enable or disable the |

| | |
|---|---|
| | reporting of SLIC analog phone event:<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved. |

### Parameter

| | |
|---|---|
| **<op>** | Integer type. Enable or disable the reporting of SLIC analog phone event.<br>0 Disable<br>1 Enable |

**NOTE**

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

### Example

```
AT+QAUDCFG="slic_IndRep",1          //Enable the reporting of SLIC analog phone event.
OK
+QIND: "SLIC Hook off"              //Hook off the phone, the URC of hook off event is received.

+QIND: "SLIC DTMF",1                //Press key 1, the URC of DTMF 1 event is received.

+QIND: "SLIC Flash Key"             //Press the flash key, the URC of flash event is received.
```

## 11.19.5. AT+QAUDCFG="slic_cid" Test Caller ID Function of SLIC

This command tests the caller ID function of SLIC.

| AT+QAUDCFG="slic_cid" Test Caller ID Function of SLIC | |
|---|---|
| Write Command<br>**AT+QAUDCFG="slic_cid",<num>** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved. |

### Parameter

| | |
|---|---|
| **<num>** | String type. The phone number of caller ID. Maximum length: 15 bytes. |

**NOTE**

1. During the test and before the caller ID is displayed, the SLIC will be forced to ring once.
2. The command takes effect only when SLIC analog phone is working.

### Example

```
AT+QAUDCFG="slic_cid","012345678901234"
OK
```

## 11.20. AT+QSLIC Enable/Disable SLIC

This command enables or disables the SLIC.

| AT+QSLIC Enable/Disable SLIC | |
|---|---|
| Test Command<br>**AT+QSLIC=?** | Response<br>**+QSLIC: (**list of supported **<enable>**s**),(**range of supported **<SLIC_type>**s**),(**list of supported **<region>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QSLIC?** | Response<br>**+QSLIC: <enable>[,<SLIC_type>][,<region>]**<br><br>**OK** |
| Write Command<br>**AT+QSLIC=<enable>,<SLIC_type>[,<region>]** | Response<br>**OK**<br>Or<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately<br>The configuration will be saved automatically. |
| Reference<br>Quectel | |

### Parameter

| | |
|---|---|
| **<enable>** | Integer type. Enable or disable SLIC.<br>0 Disable<br>1 Enable |
| **<SLIC_type>** | Integer type. Set SLIC platform type. It is valid only when **<enable>**=1.<br>0 Reserved<br>1 LE9641 (Currently not supported)<br>2 SI32185<br>3 LE9643 |
| **<region>** | Integer type. Configure the region of SI32185. It is valid only when **<SLIC_type>** is 2.<br>0 China<br>1 France |

**NOTE**

When querying the status of SI32185, if **<region>** is 0, the current region configuration will not be displayed; otherwise, it will be displayed.

### Example

```
AT+QSLIC=?                  //Test command.
+QSLIC: (0,1),(0-3),(0,1)

OK
AT+QSLIC=0,2                //Disable SLIC.
OK
AT+QSLIC=1,2                //Enable SLIC and set the SLIC platform type to SI32185.
OK
AT+QSLIC=1,2,1              //Enable SLIC, set the SLIC platform type to SI32185 and configure the region
                              to France
OK
AT+QSLIC?                   //Query the current configurations.
+QSLIC: 1,2

OK
```

# 12 Hardware Related Commands

## 12.1. AT+QPOWD Power Off

This command powers off the MT. The UE returns **OK** immediately when the command is executed. Then the UE deactivates the network. After the deactivation is completed, the UE outputs **POWERED DOWN** and enters into the power-off state. The maximum time for unregistering network is 60 seconds. To avoid data loss, the power supply for the module cannot be disconnected before the URC **POWERED DOWN** is outputted.

| AT+QPOWD Power Off | |
|---|---|
| Test Command<br>**AT+QPOWD=?** | Response<br>**+QPOWD: (**list of supported **<n>**s**)**<br><br>**OK** |
| Execution Command<br>**AT+QPOWD=[<n>]** | Response<br>**OK**<br><br>**POWERED DOWN** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference | |

### Parameter

| | | |
|---|---|---|
| **<n>** | Integer type. | |
| | 0 | Immediately power down |
| | 1 | Normal power down |

## 12.2. AT+CCLK Clock

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

| AT+CCLK Clock | |
|---|---|
| Test Command<br>**AT+CCLK=?** | Response<br>**OK** |
| Read Command<br>**AT+CCLK?** | Response<br>**+CCLK: <time>**<br><br>**OK** |
| Write Command<br>**AT+CCLK=<time>** | Response<br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

### Parameter

| | |
|---|---|
| **<time>** | String type value, format is "yy/MM/dd,hh:mm:ss±zz", indicating year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -48 to +56). For example, May 6th, 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08". |
| **<err>** | Error codes. For more details, see ***Table 11***. |

### Example

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

OK
```

## 12.3. AT+CBC Battery Charge

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

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

| | |
|---|---|
| | **<bcl>**s),**<voltage>**<br><br>**OK** |
| Execution Command<br>**AT+CBC** | Response<br>**+CBC: <bcs>,<bcl>,<voltage>**<br><br>**OK**<br><br>If there is any error:<br>**+CME ERROR: <err>** |
| Maximum Response Time | 300ms |
| Characteristics | / |
| Reference<br>3GPP TS 27.007 | |

**Parameter**

| | | |
|---|---|---|
| **<bcs>** | Integer type. Battery charge status. | |
| | 0 | ME is not charging |
| | 1 | ME is charging |
| | 2 | Charging has finished |
| **<bcl>** | Integer type. Battery charge level. | |
| | 0–100 | Battery has 0–100 percent of capacity remaining vent |
| **<voltage>** | Battery voltage. Unit: mV. | |
| **<err>** | Error codes. For more details, see ***Table 11***. | |

## 12.4. AT+QADC Read ADC Value

This command reads the voltage value of ADC channel.

| **AT+QADC Read ADC Value** | |
|---|---|
| Test Command<br>**AT+QADC=?** | Response<br>**+QADC: (**list of supported **<port>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QADC=<port>** | Response<br>**+QADC: <status>,<value>**<br><br>**OK** |

| | |
|---|---|
| Maximum Response Time | 300 ms |
| Characteristics | / |

**Parameter**

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

## 12.5. AT+QSCLK Enable/Disable Low Power Mode

This command enables or disables low power mode. When low power mode is enabled, and both DTR and WAKEUP_IN are pulled up, the module directly enters into sleep mode. If low power mode is enabled, but both DTR and WAKEUP_IN are pulled down, only after the DTR and the WAKEUP_IN are pulled up, can the module enter into low power mode.

| **AT+QSCLK Enable/Disable Low Power Mode** | |
|---|---|
| Test Command<br>**AT+QSCLK=?** | Response<br>**+QSCLK: (**list of supported **<n>**s**)**<br><br>**OK** |
| Read Command<br>**AT+QSCLK?** | Response<br>**+QSCLK: <n>**<br><br>**OK** |
| Write Command<br>**AT+QSCLK=<n>** | Response<br>**OK** |
| Maximum Response Time | 300 ms |
| Characteristics | / |
| Reference<br>Quectel | |

## Parameter

| | | |
|---|---|---|
| **<n>** | Integer type. Disable or enable low power mode. | |
| | 0 | Disable |
| | 1 | Enable. It is controlled by DTR pin and WAKEUP_IN pin. |

# 13 Appendix

## 13.1. References

**Table 7: Terms and Abbreviations**

| Abbreviation | Description |
|---|---|
| 3GPP | 3rd Generation Partnership Project |
| ACK | Acknowledge Character |
| ADC | Analog To Digital Converter |
| APN | Access Point Name |
| ARFCN | Absolute Radio-Frequency Channel Number |
| ASCII | American Standard Code for Information Interchange |
| BAIC | Bar All Incoming Calls |
| BAOC | Bar All Outgoing Calls |
| BCD | Binary Coded Decimal |
| BCLK | Bus Clock |
| BOIC | Bar Outgoing International Calls |
| CBM | Cell Broadcast Message |
| CFU | Call Forwarding Unconditional |
| CLI | Calling Line Identity |
| CLIP | Calling Line Identification Presentation |
| CLIR | Calling Line Identification Restriction |

| | |
|---|---|
| COL | Connected Line |
| COLP | Connected Line Identification Presentation |
| COLR | Connected Line Identification Restriction |
| CS | Circuit Switch |
| DCE | Data Communication Equipment |
| DHCP | Dynamic Host Configuration Protocol |
| DSC | Data Coding Scheme |
| DTE | Data Terminal Equipment |
| DTMF | Dual-Tone Multifrequency |
| DTR | Data Terminal Ready |
| EARFCN | E-UTRA Absolute Radio Frequency Channel Number |
| ECC | Emergency Communications Center |
| ECT | Explicit Call Transfer |
| eMLPP | Enhanced Multi-Level Precedence and Pre-emption Service |
| EONS | Enhanced Operator Name String |
| EPS | Evolved Packet System |
| E-UTRAN | Evolved Universal Terrestrial Radio Access Network |
| FDD | Frequency Division Duplex |
| GERAN | GSM/EDGE Radio Access Network |
| GPIO | (General-Purpose Input/Output) an uncommitted digital signal pin on an integrated circuit or electronic circuit board whose behavior—including whether it acts an input or output |
| GPRS | General Packet Radio Service |
| GSM | Global System for Mobile Communications |
| HCO | Hearing Carry-Over |
| HSDPA | High Speed Downlink Packet Access |

| | |
|---|---|
| HSUPA | High Speed Uplink Packet Access |
| ID | Mostly refers to Identifier in terms of software |
| IIC | Inter-Integrated Circuit |
| IMEI | International Mobile Equipment Identity |
| IMS | IP Multimedia Subsystem |
| IMSI | International Mobile Subscriber Identity |
| IPv4 | Internet Protocol version 4 |
| IPv6 | Internet Protocol version 6 |
| IRA | International Reference Alphabet (7-bit coded character set) |
| ISDN | Integrated Services Digital Network |
| IWF | Interworking Function |
| LTE | (Long-Term Evolution) a 4G mobile communications standard. |
| MBN | Modem Configuration Binary |
| ME | Mobile Equipment |
| MO | Mobile originated |
| MPTY | MultiParty |
| MS | Mobile Station |
| MSISDN | Mobile Subscriber International Integrated Service Digital Network Number |
| MT | Mobile Terminal |
| NAS | Network Attached Storage |
| NPI | Numbering Plan Identification |
| NVM | Non-Volatile Memory |
| NVRAM | Non-Volatile Random Access Memory |
| OIR | Originating Identification Restriction |
| PC | Personal Computer |

| | |
|---|---|
| PCM | Pulse Code Modulation |
| PDN | Public Data Network |
| PDP | Packet Data Protocol |
| PDU | Protocol Data Unit |
| PF | Paging Frame |
| PIN | Personal Identification Number |
| PLMN | Public Land Mobile Network |
| PN | Personal Network |
| PPP | Point-to-Point Protocol |
| PS | Packet Switch |
| PSC | Primary Synchronization Code |
| PUK | PIN Unlock Key |
| QoS | Quality of Service |
| RAT | Radio Access Technology |
| RLP | Radio Link Protocol |
| RPLMN | Registered PLMN |
| RRC | Radio Resource Control |
| RTC | Real Time Clock |
| RX | Receive |
| SAP | Service Access Point |
| SC | Service Center |
| SDU | Service Data Unit |
| SGSN | Serving GPRS Support Node |
| SINR | Signal to Interference plus Noise Ratio |
| SMS | Short Messaging Service |

| | |
|---|---|
| SMSC | Short Message Service Center |
| SNDCP | Sub Network Dependence Convergence Protocol |
| TA | Terminal Adapter |
| TDD | Time Division Duplex |
| TE | Terminal Equipment |
| TON | Type of Number |
| TP | Touch Panel |
| TX | Transmission |
| UART | Universal Asynchronous Receiver/Transmitter. A digital protocol which we use to transfer data between two devices |
| UCS2 | Universal Character Set (UCS-2) Format |
| UDH | User Data Header |
| UDUB | User Determined User Busy |
| UE | User Equipment |
| UFS | Universal Flash Storage |
| UICC | Universal Integrated Circuit Card |
| UMTS | Universal Mobile Telecommunications System (UMTS) is a third-generation mobile cellular system for networks based on the GSM standard |
| URC | Unsolicited Result Code |
| USB | Universal Serial Bus |
| (U)SIM | (Universal) Subscriber Identity Module |
| USSD | Unstructured Supplementary Service Data |
| UTRAN | Universal Terrestrial Radio Access Network |
| VCO | Voice Carry-Over |
| WCDMA | Wideband Code Division Multiple Access |

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

**Table 8: Factory Default Settings Restorable with AT&F**

| AT Command | Parameters | Factory Defaults |
|---|---|---|
| ATE | <value> | 1 |
| ATQ | <n> | 0 |
| ATV | <value> | 1 |
| AT+CREG | <n> | 0 |
| AT+CGREG | <n> | 0 |
| AT+CMEE | <n> | 1 |
| AT+CSCS | <chset> | “GSM” |
| AT+CSMS | <service>,<mt>,<mo>,<bm> | 0,1,1,1 |
| AT+CMGF | <mode> | 0 |
| AT+CSMP | <fo>,<vp>,<pid>,<dcs> | 17,167,0,0 |
| AT+CSDH | <show> | 0 |
| AT+CSCB | <mode>,<mids>,<dcss> | 0,””,”” |
| AT+CPMS | <mem1>,<mem2>,<mem3> | “ME”,“ME”,“ME” |
| AT+CNMI | <mode>,<mt>,<bm>,<ds>,<bfr> | 2,1,0,0,0 |
| AT+CMMS | <n> | 0 |
| AT+CTZR | <reporting> | 0 |
| AT+CPBS | <storage> | SM |
| AT+CGEREP | <mode>,<brf> | 0,0 |
| AT+CEREG | <n> | 0 |

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

**Table 9: AT Command Settings Storable with AT&W**

| AT Command | Parameters | Display with AT&V |
|---|---|---|
| ATE | <value> | Yes |
| ATQ | <n> | Yes |
| ATV | <value> | Yes |
| AT+CREG | <n> | No |
| AT+CGREG | <n> | No |
| AT+CEREG | <n> | No |

## 13.4. AT Command Settings Storable with ATZ

**Table 10: AT Command Settings Storable with ATZ**

| AT Command | Parameters | Factory Defaults |
|---|---|---|
| ATE | <value> | 1 |
| ATQ | <n> | 0 |
| ATV | <value> | 1 |
| AT+CREG | <n> | 0 |
| AT+CGREG | <n> | 0 |
| AT+CEREG | <n> | 0 |

## 13.5. Summary of CME ERROR Codes

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

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

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

| Code of <err> | Meaning |
|---|---|
| 0 | Phone failure |
| 1 | No connection to phone |
| 2 | Phone-adaptor link reserved |
| 3 | Operation not allowed |
| 4 | Operation not supported |
| 5 | PH-SIM PIN required |
| 6 | PH-FSIM PIN required |
| 7 | PH-FSIM PUK required |
| 10 | (U)SIM not inserted |
| 11 | (U)SIM PIN required |
| 12 | (U)SIM PUK required |
| 13 | (U)SIM failure |
| 14 | (U)SIM busy |
| 15 | (U)SIM wrong |
| 16 | Incorrect password |
| 17 | (U)SIM PIN2 required |
| 18 | (U)SIM PUK2 required |
| 20 | Memory full |

| | |
|---|---|
| 21 | Invalid index |
| 22 | Not found |
| 23 | Memory failure |
| 24 | Text string too long |
| 25 | Invalid characters in text string |
| 26 | Dial string too long |
| 27 | Invalid characters in dial string |
| 30 | No network service |
| 31 | Network timeout |
| 32 | Network not allowed - emergency calls only |
| 40 | Network personalization PIN required |
| 41 | Network personalization PUK required |
| 42 | Network subset personalization PIN required |
| 43 | Network subset personalization PUK required |
| 44 | Service provider personalization PIN required |
| 45 | Service provider personalization PUK required |
| 46 | Corporate personalization PIN required |
| 47 | Corporate personalization PUK required |
| 901 | Audio unknown error |
| 902 | Audio invalid parameters |
| 903 | Audio operation is not supported |
| 904 | Audio device is busy |

## 13.6. Summary of CMS ERROR Codes

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

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

**Table 12: Different Coding Schemes of +CMS ERROR: <err>**

| Code of <err> | Meaning |
|---|---|
| 300 | ME failure |
| 301 | SMS ME reserved |
| 302 | Operation not allowed |
| 303 | Operation not supported |
| 304 | Invalid PDU mode |
| 305 | Invalid text mode |
| 310 | (U)SIM not inserted |
| 311 | (U)SIM pin necessary |
| 312 | PH (U)SIM pin necessary |
| 313 | (U)SIM failure |
| 314 | (U)SIM busy |
| 315 | (U)SIM wrong |
| 316 | (U)SIM PUK required |
| 317 | (U)SIM PIN2 required |
| 318 | (U)SIM PUK2 required |
| 320 | Memory failure |
| 321 | Invalid memory index |
| 322 | Memory full |
| 330 | SMSC address unknown |

| | |
|---|---|
| 331 | No network |
| 332 | Network timeout |
| 500 | Unknown |
| 512 | (U)SIM not ready |
| 513 | Message length exceeds |
| 514 | Invalid request parameters |
| 515 | ME storage failure |
| 517 | Invalid service mode |
| 528 | More message to send state error |
| 529 | MO SMS is not allowed |
| 531 | ME storage full |

## 13.7. Summary of URC

**Table 13: Summary of URC**

| Index | URC Display | Meaning | Condition |
|---|---|---|---|
| 1 | +CREG: <stat> | Indicate registration status of the ME | AT+CREG=1 |
| 2 | +CREG: <stat>[,<lac>,<ci>[,<AcT>]] | After cell neighborhood changing shows whether the network has currently indicated the registration of the ME, with location area code | AT+CREG=2 |
| 3 | +CGREG: <stat> | Indicate network registration status of the ME | AT+CGREG=1 |
| 4 | +CGREG: <stat>[,<lac>,<ci>[,<AcT>]] | Indicate network registration and location information of the ME | AT+CGREG=2 |
| 5 | +CTZV: <tz> | Time zone reporting | AT+CTZR=1 |
| 6 | +CTZE: <tz>,<dst>,<time> | Extended time zone reporting | AT+CTZR=2 |
| 7 | +CMTI: <mem>,<index> | New message is received, and saved | See AT+CNMI |

| | | | |
|---|---|---|---|
| | | to memory | |
| 8 | +CMT: [<alpha>],<length><CR><LF><pdu> | New short message is received and output directly to TE (PDU mode) | See AT+CNMI |
| 9 | +CMT: <oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> | New short message is received and output directly to TE (Text mode) | See AT+CNMI |
| 10 | +CBM: <length><CR><LF><pdu> | New CBM is received and output directly (PDU mode) | See AT+CNMI |
| 11 | +CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> | New CBM is received and output directly to TE (Text mode) | See AT+CNMI |
| 12 | +CDS: <length><CR><LF><pdu> | New CDS is received and output directly (PDU mode) | See AT+CNMI |
| 13 | +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> | New CDS is received and output directly to TE (Text mode) | See AT+CNMI |
| 14 | +CDSI: <mem>,<index> | New message status report is received, and saved to memory | See AT+CNMI |
| 18 | +CRING: <type> | An incoming call is indicated to the TE with unsolicited result code instead of the normal RING | AT+CRC=1 |
| 25 | +CFUN: 1 | All function of the ME is available | N/A |
| 26 | +CPIN: <state> | (U)SIM card pin state | N/A |
| 27 | +QIND: SMS DONE | SMS initialization finished | N/A |
| 28 | +QIND: PB DONE | Phonebook initialization finished | N/A |
| 29 | ^DSCI: <id>,<dir>,<stat>,<type>,<number>,<num_type> | Call status indication. | AT^DSCI=1 |
| 30 | POWERED DOWN | Module power down | AT+QPOWD |
| 31 | +CGEV: REJECT <PDP_type>,<PDP_addr> | A network request for PDP activation, and was automatically rejected. | AT+CGEREP=2,1 |
| 32 | +CGEV: NW REACT <PDP_type>,<PDP_addr>,[<cid>] | The network request PDP reactivation | AT+CGEREP=2,1 |
| 33 | +CGEV: NW DEACT <PDP_type>,<PDP_addr>,[<cid>] | The network has forced a context deactivation | AT+CGEREP=2,1 |
| 34 | +CGEV: ME DEACT <PDP_type>,<PDP_addr>,[<cid>] | The ME has forced a context deactivation. | AT+CGEREP=2,1 |
| 35 | +CGEV: NW DETACH | The network has forced a Packet Domain detach. | AT+CGEREP=2,1 |

| | | | |
|---|---|---|---|
| 36 | +CGEV: ME DETACH | The mobile equipment has forced a Packet Domain detach. | AT+CGEREP=2,1 |
| 37 | +CGEV: NW CLASS <class> | The network has forced a change of MS class. | AT+CGEREP=2,1 |
| 38 | +CGEV: ME CLASS <class> | The mobile equipment has forced a change of MS class. | AT+CGEREP=2,1 |
| 39 | +QSIMSTAT: <enable>,<inserted_status> | (U)SIM inserted status report | AT+QSIMSTAT? |
| 40 | +QTEMP: <sensor>,<temp> | Temperature information | AT+QTEMP |

## 13.8. SMS Character Sets Conversions

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

**Table 14: The Way of SMS Text Input or Output**

| DCS | AT+CSCS | The Way of SMS Text Input or Output |
|---|---|---|
| GSM 7-bit | GSM | Input or output GSM character sets. |
| GSM 7-bit | IRA | Input or output IRA character sets.<br>Input: UE will convert IRA characters to GSM characters.<br>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’.<br>Input: UE will convert the UCS2 hex string to GSM characters.<br>Output: UE will convert the GSM characters to UCS2 hex string. |
| UCS2 | - | Ignore the value of AT+CSCS, input or output a hex string similar to PDU mode. So only support characters ‘0’-‘9’ and ‘A’-‘F’. |
| 8-bit | - | Ignore the value of AT+CSCS, input or output a hex string similar to PDU mode. So only support characters ‘0’-‘9’ and ‘A’-‘F’. |

When DCS=GSM 7-bit, the input or output needs conversion. The detailed conversion tables are shown as below.

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

| No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 0 | 00 | 10 | 20 | 30 | 40 | 50 | 60 | 70 |
| 1 | 01 | 11 | 21 | 31 | 41 | 51 | 61 | 71 |
| 2 | 02 | 12 | 22 | 32 | 42 | 52 | 62 | 72 |
| 3 | 03 | 13 | 23 | 33 | 43 | 53 | 63 | 73 |
| 4 | 04 | 14 | 24 | 34 | 44 | 54 | 64 | 74 |
| 5 | 05 | 15 | 25 | 35 | 45 | 55 | 65 | 75 |
| 6 | 06 | 16 | 26 | 36 | 46 | 56 | 66 | 76 |
| 7 | 07 | 17 | 27 | 37 | 47 | 57 | 67 | 77 |
| 8 | 08 | 18 | 28 | 38 | 48 | 58 | 68 | 78 |
| 9 | 09 | 19 | 29 | 39 | 49 | 59 | 69 | 79 |
| A | 0A | Submit | 2A | 3A | 4A | 5A | 6A | 7A |
| B | 0B | Cancel | 2B | 3B | 4B | 5B | 6B | 7B |
| C | 0C | 1C | 2C | 3C | 4C | 5C | 6C | 7C |
| D | 0D | 1A | 2D | 3D | 4D | 5D | 6D | 7D |
| E | 0E | 1E | 2E | 3E | 4E | 5E | 6E | 7E |
| F | 0F | 1F | 2F | 3F | 4F | 5F | 6F | 7F |

**Table 16: The Output Conversions Table (DCS=GSM 7-bit and AT+CSCS="GSM")**

| No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 0 | 00 | 10 | 20 | 30 | 40 | 50 | 60 | 70 |
| 1 | 01 | 11 | 21 | 31 | 41 | 51 | 61 | 71 |
| 2 | 02 | 12 | 22 | 32 | 42 | 52 | 62 | 72 |
| 3 | 03 | 13 | 23 | 33 | 43 | 53 | 63 | 73 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | 04 | 14 | 24 | 34 | 44 | 54 | 64 | 74 |
| 5 | 05 | 15 | 25 | 35 | 45 | 55 | 65 | 75 |
| 6 | 06 | 16 | 26 | 36 | 46 | 56 | 66 | 76 |
| 7 | 07 | 17 | 27 | 37 | 47 | 57 | 67 | 77 |
| 8 | 08 | 18 | 28 | 38 | 48 | 58 | 68 | 78 |
| 9 | 09 | 19 | 29 | 39 | 49 | 59 | 69 | 79 |
| A | 0D0A | | 2A | 3A | 4A | 5A | 6A | 7A |
| B | 0B | | 2B | 3B | 4B | 5B | 6B | 7B |
| C | 0C | 1C | 2C | 3C | 4C | 5C | 6C | 7C |
| D | 0D | 1A | 2D | 3D | 4D | 5D | 6D | 7D |
| E | 0E | 1E | 2E | 3E | 4E | 5E | 6E | 7E |
| F | 0F | 1F | 2F | 3F | 4F | 5F | 6F | 7F |

**Table 17: GSM Extended Characters**

| No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 1B40 | | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | 1B14 | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | 1B28 | | | | | |
| 9 | | | 1B29 | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | |
| B | | | | | | | | |
| C | | | | 1B3C | | | | |
| D | | | | 1B3D | | | | |
| E | | | | 1B3E | | | | |
| F | | | 1B2F | | | | | |

**Table 18: The Input Conversions Table (DCS=GSM 7-bit and AT+CSCS="IR)**

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

**Table 19: IRA Extended Characters**

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

**Table 20: The Output Conversions Table (DCS=GSM 7-bit and AT+CSCS="IRA")**

| No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 0 | 40 | 20 | 20 | 30 | A1 | 50 | BF | 70 |
| 1 | A3 | 5F | 21 | 31 | 41 | 51 | 61 | 71 |
| 2 | 24 | 20 | 22 | 32 | 42 | 52 | 62 | 72 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3 | A5 | 20 | 23 | 33 | 43 | 53 | 63 | 73 |
| 4 | E8 | 20 | A4 | 34 | 44 | 54 | 64 | 74 |
| 5 | E9 | 20 | 25 | 35 | 45 | 55 | 65 | 75 |
| 6 | F9 | 20 | 26 | 36 | 46 | 56 | 66 | 76 |
| 7 | EC | 20 | 27 | 37 | 47 | 57 | 67 | 77 |
| 8 | F2 | 20 | 28 | 38 | 48 | 58 | 68 | 78 |
| 9 | C7 | 20 | 29 | 39 | 49 | 59 | 69 | 79 |
| A | 0D0A | | 2A | 3A | 4A | 5A | 6A | 7A |
| B | D8 | | 2B | 3B | 4B | C4 | 6B | E4 |
| C | F8 | C6 | 2C | 3C | 4C | D6 | 6C | F6 |
| D | 0D | E6 | 2D | 3D | 4D | D1 | 6D | F1 |
| E | C5 | DF | 2E | 3E | 4E | DC | 6E | FC |
| F | E5 | C9 | 2F | 3F | 4F | A7 | 6F | E0 |

**Table 21: GSM Extended Characters**

| No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 7C | | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | 5E | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | 7B | | | | | |

| | | |
|---|---|---|
| 9 | 7D | |
| A | | |
| B | | |
| C | | 5B |
| D | | 7E |
| E | | 5D |
| F | 5C | |

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

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

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

## 13.9. Release Cause Text List of AT+CEER

**Table 22: Release Cause Text List of AT+CEER**

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

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

| |
|---|
| Operator determined barring |
| Normal call clearing |
| User busy |
| No user responding |
| User alerting, no answer |
| Call rejected |
| Number changed |
| Non selected user clearing |
| Destination out of order |
| Invalid/incomplete number |
| Facility rejected |
| Response to status enquiry |
| Normal, unspecified |
| No circuit/channel available |
| Network out of order |
| Temporary failure |
| Switching equipment congestion |
| Access information discarded |
| Requested circuit/channel not available |
| Resources unavailable, unspecified |
| Quality of service unavailable |
| Requested facility not subscribed |
| Incoming calls barred within the CUG |
| Bearer capability not authorized |
| Bearer capability not available |

| |
|---|
| Service/option not available |
| Bearer service not implemented |
| ACM >= ACM max |
| Requested facility not implemented |
| Only RDI bearer is available |
| Service/option not implemented |
| Invalid transaction identifier value |
| User not member of CUG |
| Incompatible destination |
| Invalid transit network selection |
| Semantically incorrect message |
| Invalid mandatory information |
| Message non-existent/not implemented |
| Message type not compatible with state |
| IE non-existent/not implemented |
| Conditional IE error |
| Message not compatible with state |
| Recovery on timer expiry |
| Protocol error, unspecified |
| Interworking, unspecified |
| **CS Network Reject** |
| IMSI unknown in HLR |
| Illegal MS |
| IMSI unknown in VLR |
| IMEI not accepted |

| |
|---|
| Illegal ME |
| GPRS services not allowed |
| GPRS and non GPRS services not allowed |
| MS identity cannot be derived |
| Implicitly detached |
| PLMN not allowed |
| Location area not allowed |
| Roaming not allowed |
| GPRS services not allowed in PLMN |
| No suitable cells in location area |
| MSC temporary not reachable |
| Network failure |
| MAC failure |
| Synch failure |
| Congestion |
| GSM authentication unacceptable |
| Service option not supported |
| Requested service option not subscribed |
| Service option temporary out of order |
| Call cannot be identified |
| No PDP context activated |
| Semantically incorrect message |
| Invalid mandatory information |
| Message type non-existent |
| Message type not compatible with state |

| |
|---|
| Information element non-existent |
| Message not compatible with state |
| RR release indication |
| RR random access failure |
| RRC release indication |
| RRC close session indication |
| RRC open session failure |
| Low level failure |
| Low level failure no redial allowed |
| Invalid SIM |
| No service |
| Timer T3230 expired |
| No cell available |
| Wrong state |
| Access class blocked |
| Abort message received |
| Other cause |
| Timer T303 expired |
| No resources |
| Release pending |
| Invalid user data |
| **PS Internal Cause** |
| Invalid connection identifier |
| Invalid NSAPI |
| Invalid primary NSAPI |

| |
|---|
| PDP establish timeout |
| Invalid field |
| SNDCP failure |
| RAB setup failure |
| No GPRS context |
| PDP activate timeout |
| PDP modify timeout |
| PDP inactive max timeout |
| PDP lower layer error |
| PDP duplicate |
| Access technology change |
| PDP unknown reason |
| **CS PS Network Cause** |
| LLC or SNDCP failure |
| Insufficient resources |
| Missing or unknown APN |
| Unknown PDP address or PDP type |
| User authentication failed |
| Activation rejected by GGSN |
| Activation rejected, unspecified |
| Service option not supported |
| Requested service option not subscribed |
| Service option temporary out of order |
| NSAPI already used (not sent) |
| Regular deactivation |

| |
|---|
| QoS not accepted |
| Network failure |
| Reactivation required |
| Feature not supported |
| Semantic error in the TFT operation |
| Syntactical error in the TFT operation |
| Unknown PDP context |
| PDP context without TFT already activated |
| Semantic errors in packet filter |
| Syntactical errors in packet filter |
| Invalid transaction identifier |
| Semantically incorrect message |
| Invalid mandatory information |
| Message non-existent/not implemented |
| Message type not compatible with state |
| IE non-existent/not implemented |
| Conditional IE error |
| Message not compatible with state |
| Protocol error, unspecified |