

# BC65&BC95-GR

# AT Commands Manual

**NB-IoT Module Series**

Version: 1.2

Date: 2023-08-30

Status: Released



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# About the Document

## Revision History

Version	Date	Author	Description
-	2021-03-09	Theo QIN	Creation of the document
1.0	2021-04-19	Theo QIN	First official release
1.1	2021-09-22	Theo QIN	<ol style="list-style-type: none"> <li>Added a note about <b>&lt;cid&gt;</b> (Chapter 5.9);</li> <li>Added the following commands: AT+CSODCP (Chapter 5.25); AT+QNBPOWERCLASS (Chapter 5.26); AT+QCCLK (Chapter 6.6); DTLS/TLS related AT command set (Chapter 11).</li> </ol>
1.2	2023-08-30	Theo QIN	<ol style="list-style-type: none"> <li>Added the applicable module BC95-GR;</li> <li>Updated the description of parameters <b>&lt;sc_rsrp&gt;</b>, <b>&lt;sc_rsrq&gt;</b>, <b>&lt;sc_rssi&gt;</b> and <b>&lt;sc_snr&gt;</b> of AT+QENG (Chapter 5.17);</li> <li>Added a note about wake-up method of BC65 and BC95-GR modules (Chapter 6.2).</li> </ol>

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# 1 Introduction

This document presents the AT command set supported by Quectel NB-IoT BC65 and BC95-GR modules.

By default, the module supports a baud rate of 9600 bps. When powering on the module, the command **AT+IPR** can be sent by the MCU to configure the communication baud rate afterwards.

## 1.1. Definitions

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

## 1.2. AT Command Syntax

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

AT commands implemented by BC65 and BC95-GR fall into two categories syntactically: “Basic”, 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.

## ● Extended Command

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

**Table 1: Types of AT Commands**

Command Type	Syntax	Description
Test Command	<b>AT+&lt;cmd&gt;=?</b>	Test the existence of corresponding command and return information about the type, value, or range of its parameter.
Read Command	<b>AT+&lt;cmd&gt;?</b>	Check the current parameter value of a corresponding command.
Write Command	<b>AT+&lt;cmd&gt;=&lt;p1&gt;[,&lt;p2&gt;[,&lt;p3&gt;[...]]]</b>	Set user-definable parameter value.
Execution Command	<b>AT+&lt;cmd&gt;</b>	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. In such cases, only the first command should have **AT** prefix. Commands can be in upper or lower case.

Spaces should be ignored when you enter AT commands, except in 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.

### 1.3. 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>
```

### 1.4. Declaration of AT Command Examples

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

### 1.5. 3GPP Compliance

3GPP commands are compliant with the *3GPP TS 27.007*, *3GPP TS 27.005* and *ITU V.250* specifications.

## 2 General Commands

### 2.1. ATI Display Product Identification Information

This Execution Command returns product identification information.

ATI Display Product Identification Information	
Execution Command <b>ATI</b>	Response <b>Quectel_Ltd</b> <b>&lt;Object Id&gt;</b> <b>Revision: &lt;revision&gt;</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	/

#### Parameter

<b>&lt;Object Id&gt;</b>	Identification of the module.
<b>&lt;revision&gt;</b>	Revision of software release.

#### Example

```

ATI
Quectel_Ltd
Quectel_BC65
Revision: BC65PBR01A01

OK
```

## 2.2. ATE Set Command Echo Mode

This Execution Command determines whether or not the UE echoes characters received from external MCU during command state.

ATE Set Command Echo Mode	
Execution Command <b>ATE&lt;value&gt;</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	/

### Parameter

<b>&lt;value&gt;</b>	Integer type. Command echo mode.
0	Echo mode OFF
<u>1</u>	Echo mode ON

### Example

```

ATE0
OK
ATI
Quectel_Ltd
Quectel_BC65
Revision: BC65PBR01A01

OK
ATE1
OK
ATI
Quectel_Ltd
Quectel_BC65
Revision: BC65PBR01A01

OK

```

## 2.3. AT&W Store Current Parameters to User Defined Profile

This command stores the current parameter settings to a user defined profile in NVRAM. Currently the commands that can be saved via **AT&W** include: **AT+QEAUART**, **AT+CEREG**, **AT+CSCON**, **AT+QNBIOEVENT**, **AT+CTZR**, and **AT+QATWAKEUP**.

AT&W Store Current Parameters to User Defined Profile	
Execution Command <b>AT&amp;W[&lt;n&gt;]</b>	Response <b>OK</b>
Maximum Response Time	300 ms
Characteristics	/

### Parameter

<b>&lt;n&gt;</b>	Integer type.
0	Profile number to store current parameters

## 2.4. AT+CGMI Request Manufacturer Identification

This Execution Command requests manufacturer information.

AT+CGMI Request Manufacturer Identification	
Test Command <b>AT+CGMI=?</b>	Response <b>OK</b>
Execution Command <b>AT+CGMI</b>	Response <b>Quectel_Ltd</b> <b>&lt;Object Id&gt;</b> <b>Revision: RDA_8908A</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	/

### Parameter

<b>&lt;Object Id&gt;</b>	Identification of the module.
--------------------------	-------------------------------

## Example

**AT+CGMI**

Quectel\_Ltd

Quectel\_BC65

Revision: RDA\_8908A

OK

## 2.5. AT+CGMM Request Model Identification

This Execution Command requests the model information of the product.

AT+CGMM Request Model Identification	
Test Command <b>AT+CGMM=?</b>	Response <b>OK</b>
Execution Command <b>AT+CGMM</b>	Response <b>&lt;Object Id&gt;</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

**<Object Id>** Identification of the module.

## Example

**AT+CGMM**

Quectel\_BC65

OK

## 2.6. AT+CGMR Request Manufacturer Revision

This Execution Command requests the manufacturer revision, the text of which is human-readable and is not intended for microcontroller parsing.

AT+CGMR Request Manufacturer Revision	
Test Command <b>AT+CGMR=?</b>	Response <b>OK</b>
Execution Command <b>AT+CGMR</b>	Response <b>Revision: &lt;revision&gt;</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	/

### Parameter

**<revision>** Revision of software release.

### Example

```
AT+CGMR
Revision: BC65PBR01A01
OK
```

## 2.7. AT+CGSN Request Product Serial Number

This Write Command requests the IMEI (International Mobile Equipment Identity) number and related information. For a TA which does not support **<snt>**, only **ERROR** is returned.

AT+CGSN Request Product Serial Number	
Test Command <b>AT+CGSN=?</b>	Response When TE supports <b>&lt;snt&gt;</b> and the command is executed successfully: <b>+CGSN: (list of supported &lt;snt&gt;s)</b>  <b>OK</b>

	When TE does not support <b>&lt;snt&gt;</b> and the command is executed successfully: <b>OK</b>
Write Command <b>AT+CGSN=&lt;snt&gt;</b>	Response When <b>&lt;snt&gt;</b> =0: <b>&lt;sn&gt;</b>  <b>OK</b>  When <b>&lt;snt&gt;</b> =1: <b>+CGSN: &lt;imei&gt;</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Execution Command <b>AT+CGSN</b>	Response <b>&lt;sn&gt;</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

<b>&lt;snt&gt;</b>	Integer type. The serial number type that has been requested 0 Returns the 128-bit UUID 1 Returns the IMEI number
<b>&lt;sn&gt;</b>	The 128-bit UUID of the UE. The total number of characters, including line terminators. The information text shall not exceed 37 characters, and shall not contain the sequence <b>0</b> <b>&lt;CR&gt;</b> or <b>OK&lt;CR&gt;</b> .
<b>&lt;imei&gt;</b>	String type in decimal format. The IMEI number.
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.



## Example

```
AT+CGSN=1           //Request the IMEI number
+CGSN: 490154203237511

OK
```

## 2.8. AT+CMEE Report Mobile Termination Error

This Write Command disables or enables the use of final result code **+CME ERROR: <err>** as an indication of an error relating to the functionality of the MT. When enabled, MT related errors cause **+CME ERROR: <err>** final result code instead of the regular **ERROR** final result code. **ERROR** is returned normally when error is related to syntax, invalid parameters or TA functionality.

This Read Command returns the current setting of <n>.

AT+CMEE Report Mobile Termination Error	
Test Command <b>AT+CMEE=?</b>	Response <b>+CMEE:</b> (range of supported <n>s)  <b>OK</b>
Read Command <b>AT+CMEE?</b>	Response <b>+CMEE:</b> <n>  <b>OK</b>
Write Command <b>AT+CMEE=&lt;n&gt;</b>	Response Configure whether TA disables or enables the use of result code <b>+CME ERROR: &lt;err&gt;</b> as an indication of an error relating to the functionality of the ME. <b>OK</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

<n>	Integer type.
	0      Disable result code
	1      Enable result code and use numeric values
	2      Enable result code and use verbose values
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.

### Example

```

AT+CMEE?
+CMEE: 0

OK
AT+CMEE=?
+CMEE: (0-2)

OK

```

## 2.9. AT+CEER Extended Error Report

This Execution Command causes the TA to return one or more lines of information text **<report>**, determined by the MT manufacturer, which should offer the user of the TA an extended report of the reason for the following errors:

- The failure in the last call release;
- The failure in the last unsuccessful PDP context activation;
- The failure in the PDP context deactivation.

Typically, the text consists of a single line containing the cause information given by the network in textual format.

AT+CEER Extended Error Report	
Test Command <b>AT+CEER=?</b>	Response <b>OK</b>
Execution Command <b>AT+CEER</b>	Response <b>+CEER: &lt;report&gt;</b>  <b>OK</b>
Maximum Response Time	300 ms
Characteristics	/

### Parameter

<b>&lt;report&gt;</b>	Extended error report. The total number of characters in the information text, including line terminators, shall not exceed 2041 characters. The text shall not contain the sequence <b>0&lt;CR&gt;</b> or <b>OK&lt;CR&gt;</b> .
-----------------------	--

### Example

**AT+CEER**

**+CEER: EMM\_CAUSE\_EPS\_AND\_NON\_EPS\_SERVICES\_NOT\_ALLOWED**

**OK**

**AT+CEER=?**

**OK**

## 3 Serial Interface Control Commands

### 3.1. AT+IPR Set Fixed Local Rate of the TE

This Write Command sets the baud rate being used by the TE (that is, baud rate at which the module will accept AT commands).

AT+IPR Set Fixed Local Rate of the TE	
Test Command <b>AT+IPR=?</b>	Response <b>+IPR:</b> (list of supported fixed-only <rate>s)  <b>OK</b>
Read Command <b>AT+IPR?</b>	Response <b>+IPR:</b> <rate>  <b>OK</b>
Write Command <b>AT+IPR=&lt;rate&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. Remain valid after deep-sleep wakeup The configuration is saved to NVRAM automatically.

#### Parameter

<rate>	Integer type. Baud rate. 2400 4800 <u>9600</u>
--------	---

14400	
19200	
28800	
33600	
38400	
57600	
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.

**NOTE**

The setting will apply to all channels routed through the same UART connection level.

**Example**

```

AT+IPR=9600 //Set the fixed baud rate to 9600 bps.
OK
AT+IPR?
+IPR: 9600

OK
AT+IPR=?
+IPR: (2400,4800,9600,14400,19200,28800,33600,38400,57600)

OK

```

## 3.2. AT+QEAUART Set Dual UART Function

This command enables or disables the dual UART function. After the dual UART function is enabled, the main UART and the auxiliary UART can be used at the same time.

### AT+QEAUART Set Dual UART Function

Test Command	Response
AT+QEAUART=?	<b>+QEAUART:</b> (list of supported <b>&lt;mode&gt;s</b> ),(list of supported <b>&lt;baudrate&gt;s</b> ),(list of supported <b>&lt;databits&gt;s</b> ),(list of supported <b>&lt;stopbits&gt;s</b> ),(range of supported <b>&lt;parity&gt;s</b> )
	<b>OK</b>
	If there is any error: <b>ERROR</b>

	Or <b>+CME ERROR: &lt;err&gt;</b>
Read Command <b>AT+QEAUART?</b>	Response <b>+QEAUART: &lt;mode&gt;,&lt;baudrate&gt;,&lt;databits&gt;,&lt;stopbits&gt;,&lt;parity&gt;</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Write Command <b>AT+QEAUART=&lt;mode&gt;[,&lt;baudrate&gt;[,&lt;databits&gt;[,&lt;stopbits&gt;[,&lt;parity&gt;]]]]</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. Remain valid after deep-sleep wakeup. The configuration is saved to NVRAM by executing <b>AT&amp;W</b> after this command is issued.

## Parameter

<b>&lt;mode&gt;</b>	Integer type. <u>0</u> Turn off dual UART function 1 Enable dual UART function
<b>&lt;baudrate&gt;</b>	Integer type. Baud rate. 2400 4800 <u>9600</u> 14400 19200 28800 33600 38400 57600
<b>&lt;databits&gt;</b>	Integer type. Data bit. 7 <u>8</u>

<b>&lt;stopbits&gt;</b>	Integer type. Stop bit. 1 2
<b>&lt;parity&gt;</b>	Integer type. Parity bit. 0 None 1 Odd 2 Even 3 Mark
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

#### NOTE

The auxiliary UART does not receive URC, and does not support data transmission, file upload/download related commands through various protocols such as TCP, SMTP, PPP, and FILE.

#### Example

```

AT+QEAUART=1,9600           //Enable dual UART function and set baud rate to 9600
OK
AT+QEAUART?                  //Query current settings
+QEAUART: 1,9600,8,1,0

OK
AT+QEAUART=?
+QEAUART: (0,1),(2400,4800,9600,14400,19200,28800,33600,38400,57600),(7,8),(1,2),(0-3)

OK

```

# 4 (U)SIM Card Related Commands

## 4.1. AT+CPIN Enter PIN

AT+CPIN Enter PIN	
Test Command <b>AT+CPIN=?</b>	Response <b>OK</b>
Read Command <b>AT+CPIN?</b>	Response TA returns an alphanumeric string indicating whether or not some password is required. <b>+CPIN: &lt;code&gt;</b>  <b>OK</b>
Write Command <b>AT+CPIN=&lt;pin&gt;[,&lt;newpin&gt;]</b>	Response <b>+CPIN: READY</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	40 s
Characteristics	/

### Parameter

<b>&lt;code&gt;</b>	String type.	
	READY	MT is not pending for any password
	SIM PIN	MT is waiting USIM PIN to be given
	SIM PUK	MT is waiting USIM PUK to be given
	PH_SP PIN	MT is waiting service provider personalization password to be given
	SIM PIN2	MT is waiting USIM PIN 2 to be given. Possible only if the preceding



		command was acknowledged with <b>+CME ERROR: 17</b>
	SIM PUK2	MT is waiting USIM PUK 2 to be given. Possible only if the preceding command was acknowledged with error <b>+CME ERROR: 18</b>
	NO SIM	No SIM card is inserted in.
<pin>	String type. The PIN.	
<newpin>	String type. If <pin> specifies SIM PUK or SIM PUK2, <newpin> must be entered to replace the old PIN in the SIM.	
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.	

### Example

```

AT+CPIN?
+CPIN: READY

OK
AT+CPIN="12345"
+CPIN: READY

OK

```

## 4.2. AT+CIMI Request International Mobile Subscriber Identity

This command returns International Mobile Subscriber Identity (string without double quotes).

This Execution Command causes the TA to return <IMSI>, which is intended to permit the TE to identify the individual USIM card or active application in the UICC (USIM) which is attached to MT.

AT+CIMI Request International Mobile Subscriber Identity	
Test Command <b>AT+CIMI=?</b>	Response <b>OK</b>
Execution Command <b>AT+CIMI</b>	Response <b>&lt;IMSI&gt;</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	40 s

Characteristics	/
-----------------	---

## Parameter

<IMSI>	String type without double quotes. International Mobile Subscriber Identity.
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.

## Example

```
AT+CIMI
460001357924680
OK
```

## 4.3. AT+QCCID USIM Card Identification

This command reads the ICCID of the USIM card. If USIM card is absent, or the USIM card is unreadable, no data will be returned.

### AT+QCCID USIM Card Identification

Execution Command <b>AT+QCCID</b>	Response <b>+QCCID: &lt;ICCID&gt;</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

<ICCID>	String type without double quotes. USIM card identification number.
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.

### Example

**AT+QCCID**

**+QCCID: 89860317482035195410**

**OK**

# 5 Network Service Commands

## 5.1. AT+CSQ Signal Quality Report

This Execution Command returns the received signal strength level **<rss>** and the channel bit error rate **<ber>** from the MT.

AT+CSQ Signal Quality Report	
Test Command <b>AT+CSQ=?</b>	Response <b>+CSQ:</b> (range of supported <b>&lt;rss&gt;</b> s),(range of supported <b>&lt;ber&gt;</b> s)  <b>OK</b>
Execution Command <b>AT+CSQ</b>	Response <b>+CSQ:</b> <b>&lt;rss&gt;</b> , <b>&lt;ber&gt;</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

### Parameter

<b>&lt;rss&gt;</b>	Integer type. Received signal strength indication. 0      -113 dBm or less. 1      -111 dBm 2–30   -109 to -53 dBm 31     -51 dBm or greater 99     Not known or not detectable
<b>&lt;ber&gt;</b>	Integer type. Channel bit error rate (in percent).

0–7	RxQual values RXQUAL_0 to RXQUAL_7 as defined in 3GPP TS 45.008.
99	Not known or not detectable.
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.

### Example

```
AT+CSQ
+CSQ: 22,99

OK
```

#### NOTE

Currently, <ber> is not applicable for BC65 and BC95-GR modules, so its value will be not known or not detectable always (<ber>=99).

## 5.2. AT+CESQ Extended Signal Quality

This Execution Command returns received signal quality parameters.

The terminal will provide a current signal strength indicator of 0 to 99 where larger is generally better. This information is based on a single measurement, so the information can be expected to change greatly over short periods of time, and may never use all (or even the majority) of the entire possible range or codes.

AT+CESQ Extended Signal Quality	
Test Command <b>AT+CESQ=?</b>	Response <b>+CESQ:</b> (range of supported <rxlev>s),(range of supported <ber>s),(range of supported <rscp>s),(range of supported <ecno>s),(range of supported <rsrq>s),(range of supported <rsrp>s)  <b>OK</b>
Execution Command <b>AT+CESQ</b>	Response <b>+CESQ:</b> <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR:</b> <err>

Maximum Response Time	300 ms
Characteristics	/

## Parameter

<b>&lt;rxlev&gt;</b>	Integer type. Received signal strength level.
0	RSSI < -110 dBm
1	-110 dBm ≤ RSSI < -109 dBm
2	-109 dBm ≤ RSSI < -108 dBm
...	
61	-50 dBm ≤ RSSI < -49 dBm
62	-49 dBm ≤ RSSI < -48 dBm
63	-48 dBm ≤ RSSI
99	Not known or not detectable
<b>&lt;ber&gt;</b>	Integer type. Channel bit error rate (in percent).
0–7	RxQual values RXQUAL_0 to RXQUAL_7 as defined in 3GPP TS 45.008.
99	Not known or not detectable
<b>&lt;rscp&gt;</b>	Integer type. Received signal code power (see 3GPP 25.133 and 3GPP 25.123).
0	-120 dBm or less
1	-120 dBm ≤ RSCP < -119 dBm
2	-119 dBm ≤ RSCP < -118 dBm
...	
94	-27 dBm ≤ RSCP < -26 dBm
95	-26 dBm ≤ RSCP < -25 dBm
96	-25 dBm ≤ RSCP
255	Not known or not detectable
<b>&lt;ecno&gt;</b>	Integer type, Ec/No (see 3GPP 25.133)
0	-24 dBm or less
1	-24 dBm ≤ Ec/No < -23.5 dBm
2	-23.5 dBm ≤ Ec/No < -23 dBm
...	
47	-1 dBm ≤ Ec/No < -0.5 dBm
48	-0.5 dBm ≤ Ec/No < 0 dBm
49	0 dBm ≤ Ec/No
255	Not known or not detectable
<b>&lt;rsrq&gt;</b>	Integer type. Reference signal received quality (see 3GPP 36.133)
0	-19.5 dB or less
1	-19.5 dB ≤ RSRQ < -19 dB
2	-19 dB ≤ RSRQ < -18.5 dB
...	
32	-4 dB ≤ RSRQ < -3.5 dB
33	-3.5 dB ≤ RSRQ < -3 dB

	34	-3 dB ≤ RSRQ
	255	Not known or not detectable
<rsrp>	Integer type. Reference signal received power (see 3GPP 36.133).	
	0	-140 dBm or less
	1	-140 dBm ≤ RSRP < -139 dBm
	2	-139 dBm ≤ RSRP < -138 dBm
	...	
	95	-46 dBm ≤ RSRP < -45 dBm
	96	-45 dBm ≤ RSRP < -44 dBm
	97	-44 dBm ≤ RSRP
	255	Not known or not detectable
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.	

### Example

**AT+CESQ**

**+CESQ: 15,99,255,255,25,30**

**OK**

### NOTE

Currently, <ber>, <rsrp>, and <ecno> are not applicable for BC65 and BC95-GR modules, so their value will be not known or not detectable always (<ber>=99, <rsrp>=255, and <ecno>=255).

## 5.3. AT+CEREG EPS Network Registration Status

This Write Command controls the presentation of URC **+CEREG: <stat>** when <n>=1 and there is a change in the MT's EPS network registration status in E-UTRAN, or URC **+CEREG: <stat>,[<tac>],[<ci>],[<AcT>]** when <n>=2 and there is a change of the network cell in E-UTRAN. The parameters <AcT>, <tac> and <ci> are provided only if available. The value <n>=3 further extends the URC with [<cause\_type>,<reject\_cause>], when available, when the value of <stat> changes.

If the UE requests PSM for reducing its power consumption, the write command controls the presentation of an URC **+CEREG: <stat>,[<tac>],[<ci>],[<AcT>],[<cause\_type>],[<reject\_cause>],[<Active-Time>],[<Periodic-TAU>]]]**.

When <n>=4, the URC will provide the UE with additional information for the active time value and the extended periodic TAU value if there is a change of the network cell in E-UTRAN. The value <n>=5 further enhances the URC with <cause\_type> and <reject\_cause> when the value of <stat> changes. The parameters <AcT>, <tac>, <ci>, <cause\_type>, <reject\_cause>, <Active-Time> and

<Periodic-TAU> are provided only if available.

This Read Command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. Location information elements <tac>, <ci> and <AcT>, if available, are returned only when <n>=2 and MT is registered on the network. The parameters [,<cause\_type>,<reject\_cause>], if available, are returned when <n>=3.

<b>AT+CEREG EPS Network Registration Status</b>	
Test Command <b>AT+CEREG=?</b>	Response <b>+CEREG:</b> (range of supported <n>s)  <b>OK</b>
Read Command <b>AT+CEREG?</b>	Response When <n>=0, 1, 2 or 3, and the command is executed successfully: <b>+CEREG:</b> <n>,<stat>[,<tac>],<ci>,<AcT>[,<cause_type>,<reject_cause>]]  When <n>=4 or 5 and the command is executed successfully: <b>+CEREG:</b> <n>,<stat>[,<tac>],<ci>,<AcT>[,<cause_type>,<reject_cause>],[<Active-Time>],[<Periodic-TAU>]]]  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Write Command <b>AT+CEREG=&lt;n&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. Remain valid after deep-sleep wakeup. The configuration is saved to NVRAM by executing <b>AT&amp;W</b> after this command is issued.



## Parameter

<b>&lt;n&gt;</b>	Integer type <ul style="list-style-type: none"> <li>0 Disable network registration URC</li> <li>1 Enable network registration URC <b>+CEREG: &lt;stat&gt;</b></li> <li>2 Enable network registration and location information URC: <b>+CEREG: &lt;stat&gt;[,&lt;tac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;]]</b></li> <li>3 Enable network registration, location information and EMM cause value information URC: <b>+CEREG: &lt;stat&gt;[,&lt;tac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;],[&lt;cause_type&gt;,&lt;reject_cause&gt;]]</b></li> <li>4 For a UE that requests PSM, enable network registration and location information URC: <b>+CEREG: &lt;stat&gt;[,&lt;tac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;][,[,&lt;Active-Time&gt;],[&lt;Periodic-TAU&gt;]]]</b></li> <li>5 For a UE that requests PSM, enable network registration, location information and EMM cause value information URC: <b>+CEREG: &lt;stat&gt;[,&lt;tac&gt;],[&lt;ci&gt;],[&lt;AcT&gt;][,[,&lt;cause_type&gt;],[&lt;reject_cause&gt;][,[,&lt;Active-Time&gt;],[&lt;Periodic-TAU&gt;]]]]</b></li> </ul>
<b>&lt;stat&gt;</b>	Integer type. The EPS registration status. <ul style="list-style-type: none"> <li>0 Not registered, MT is not currently searching an operator to register to</li> <li>1 Registered, home network</li> <li>2 Not registered, but MT is currently trying to attach or searching an operator to register to</li> <li>3 Registration denied</li> <li>4 Unknown (e.g. out of E-UTRAN coverage)</li> <li>5 Registered, roaming</li> </ul>
<b>&lt;tac&gt;</b>	String type. Two bytes tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal).
<b>&lt;ci&gt;</b>	String type. Four bytes E-UTRAN cell ID in hexadecimal format.
<b>&lt;AcT&gt;</b>	Integer type. Access technology of the registered network. <ul style="list-style-type: none"> <li>7 E-UTRAN</li> <li>9 E-UTRAN (NB-S1 mode)</li> </ul>
<b>&lt;cause_type&gt;</b>	Integer type. The type of <b>&lt;reject_cause&gt;</b> . <ul style="list-style-type: none"> <li>0 Indicates that <b>&lt;reject_cause&gt;</b> contains an EMM cause value (see 3GPP TS 24.008 Annex G)</li> <li>1 Indicates that <b>&lt;reject_cause&gt;</b> contains a manufacturer-specific cause value</li> </ul>
<b>&lt;reject_cause&gt;</b>	Integer type. Contains the cause of the failed registration. The value is of type as defined by <b>&lt;cause_type&gt;</b> .
<b>&lt;Active-Time&gt;</b>	String type. One byte in an 8-bit format. It indicates the active time value (T3324) allocated to the UE in E-UTRAN. The active time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, please refer to the <i>GPRS Timer 2 IE</i> in 3GPP TS 24.008 Table 10.5.163/3Gpp TS 24.008, 3GPP TS 23.682 and 3GPP TS 23.401.  Bits 5 to 1 represents the binary coded timer value. Bits 8 to 6 defines the timer value unit for the GPRS timer as follows:

Bits

8 7 6

0 0 0 Value is incremented in multiples of 2 seconds

0 0 1 Value is incremented in multiples of 1 minute

0 1 0 Value is incremented in multiples of deci-hours

1 1 1 Value indicates that the timer is deactivated

**<Periodic-TAU>** String type. One byte in an 8-bit format. It indicates the extended periodic TAU value (T3412) allocated to the UE in E-UTRAN. The extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, please refer to the *GPRS Timers 3 IE in 3GPP TS 24.008 Table 10.5.163a/3GPP TS 24.008, 3GPP TS 23.682 and 3GPP TS 23.401*.

Bits 5 to 1 represent the binary coded timer value.

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

Bits

8 7 6

0 0 0 Value is incremented in multiples of 10 minutes

0 0 1 Value is incremented in multiples of 1 hour

0 1 0 Value is incremented in multiples of 10 hours

0 1 1 Value is incremented in multiples of 2 seconds

1 0 0 Value is incremented in multiples of 30 seconds

1 0 1 Value is incremented in multiples of 1 minute

1 1 0 Value is incremented in multiples of 320 hours

1 1 1 Value indicates that the timer is deactivated

**<err>** Error codes. Please refer to **Chapter 13** for details.

#### NOTE

This command is valid only under NB-IoT network. Access technology of the network can be obtained from the parameter **<Act>** in the response of **AT+COPS?**. **<Act>**=9 indicates registration under NB-IoT network; if **<Act>** is any other value, it means currently the module is not registered to the network.

#### Example

**AT+CREG=1** //Enable network registration URC.

OK

**AT+CREG?**

+CREG: 1,1

OK

**AT+CREG=?**

+CREG: (0-5)

OK

## 5.4. AT+CGATT PS Attach or Detach

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

Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.

This Read Command returns the current packet domain service state.

This Test Command requests information on the supported packet domain service states.

AT+CGATT PS Attach or Detach	
Test Command <b>AT+CGATT=?</b>	Response <b>+CGATT:</b> (list of supported <state>s)  <b>OK</b>
Read Command <b>AT+CGATT?</b>	Response <b>+CGATT:</b> <state>  <b>OK</b>
Write Command <b>AT+CGATT=&lt;state&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	90 s, determined by network.
Characteristics	/

### Parameter

<state>	Integer type. The state of PDP context activation. 0 Detached 1 Attached
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.

**NOTE**

1. The context with **<cid>=1** is automatically defined when the module starts up.
2. If any further **AT+CGATT** command is executed when an **AT+CGATT** command is being processed, an error will be returned.
3. Execute **AT+CGATT=0** to detach, but then the module will automatically re-attach.

**Example**

```
AT+CGATT?
+CGATT: 0

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

OK
```

## 5.5. AT+QCGDEFCONT Define the Initial PDP Context

This Write Command defines the initial PDP context for the initial PDN connection at startup. When attaching to NB-IoT network, the initial PDN connection setup will be performed automatically. This command is used to set such PDN parameters which are piggybacked in the ATTACH procedure.

### AT+QCGDEFCONT Define the Initial PDP Context

Test Command <b>AT+QCGDEFCONT=?</b>	Response <b>+QCGDEFCONT:</b> (list of supported <b>&lt;PDP_type&gt;s</b> )[, <b>&lt;APN&gt;</b> ], <b>&lt;UserName&gt;</b> [, <b>&lt;pwd&gt;</b> ],(range of supported <b>&lt;authentication&gt;s</b> )]]  <b>OK</b>
Read Command <b>AT+QCGDEFCONT?</b>	Response <b>+QCGDEFCONT:</b> <b>&lt;PDP_type&gt;</b> [, <b>&lt;APN&gt;</b> ], <b>&lt;UserName&gt;</b> , <b>&lt;pwd&gt;</b> , <b>&lt;authentication&gt;</b> ]]  <b>OK</b>
Write Command <b>AT+QCGDEFCONT=&lt;PDP_type&gt;</b> <b>&gt;[,&lt;APN&gt;[, &lt;UserName&gt;,&lt;pwd&gt;</b> <b>,&lt;authentication&gt;]]</b>	Response <b>OK</b>  If there is any error:

	<b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. Remain valid after deep-sleep wakeup. The configurations are saved to NVRAM automatically.

## Parameter

<b>&lt;PDP_type&gt;</b>	String type. The type of packet data protocol. "IP" Internet Protocol ( <i>IETF STD 5</i> ) "IPV6" Internet Protocol, version 6 ( <i>IETF RFC 2460</i> ) "IPV4V6" Virtual <b>&lt;PDP_type&gt;</b> introduced to handle dual IP stack UE capability (see <i>3GPP TS 24.301</i> ) "Non-IP" Transfer of Non-IP data to external packet network (see <i>3GPP TS 24.301</i> )
<b>&lt;APN&gt;</b>	String type. The access point name. A logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.
<b>&lt;UserName&gt;</b>	String type. The username.
<b>&lt;pwd&gt;</b>	String type. The password.
<b>&lt;authentication&gt;</b>	Integer type. The authentication methods 0 NONE 1 PAP 2 CHAP 3 CHAP or PAP
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### NOTE

When **<authentication>** is set to 3, CHAP encryption is used by default. When CHAP encryption fails, PAP encryption will be used (The rejection code value returned by the network side after the protocol authentication fails should be 29; otherwise, the authentication mode will not be switched to PAP).

## 5.6. AT+CGDCONT Define PDP Context

This Write Command specifies PDP context parameters for a PDP context identified by the (local) context identification parameter **<cid>**. It also allows the TE to specify whether security protected transmission of ESM information is requested, because the PCO can include information that requires ciphering. There

can be other reasons for the UE to use security protected transmission of ESM information, e.g. if the UE needs to transfer an APN, the number of PDP contexts that may be in a defined state at the same time is given by the range returned by the Test Command.

For EPS the PDN connection and its associated EPS default bearer is identified herewith, and the **<PDP\_addr>** shall be omitted.

A special form of the Write Command, **AT+CGDCONT=<cid>** causes the values for context number **<cid>** to become undefined.

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

This Test Command returns values supported as a compound value. If the UE supports several PDP types, **<PDP\_type>**, the parameter value ranges for each **<PDP\_type>** are returned on a separate line.

By default, the context with **<cid>=1** (context number 1) is defined upon startup and does not need to be created with the **AT+CGDCONT** command. The initial PDP context has specific default settings disassociated with any other default settings of **AT+CGDCONT**. When in E-UTRAN, the initial PDP context is activated automatically by the MT following a successful registration to the network.

<b>AT+CGDCONT Define PDP Context</b>	
Test Command <b>AT+CGDCONT=?</b>	Response <b>+CGDCONT:</b> (range of supported <b>&lt;cid&gt;s</b> )[,(list of supported <b>&lt;PDP_type&gt;s</b> )[,,,[(range of supported <b>&lt;d_comp&gt;s</b> )[,(range of supported <b>&lt;h_comp&gt;s</b> )]]]]  <b>OK</b>
Read Command <b>AT+CGDCONT?</b>	Response <b>[+CGDCONT: &lt;cid&gt;,&lt;PDP_type&gt;,&lt;APN&gt;,&lt;PDP_addr&gt;,&lt;d_comp&gt;,&lt;h_comp&gt;]</b> <b>[+CGDCONT: &lt;cid&gt;,&lt;PDP_type&gt;,&lt;APN&gt;,&lt;PDP_addr&gt;,&lt;d_comp&gt;,&lt;h_comp&gt;]</b> <b>[...]</b>  <b>OK</b>
Write Command <b>AT+CGDCONT=&lt;cid&gt;,[&lt;PDP_type&gt;[,&lt;APN&gt;[,&lt;PDP_addr&gt;[,&lt;d_comp&gt;[,&lt;h_comp&gt;]]]]]</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms

Characteristics	<p>The command takes effect immediately.</p> <p>Remain valid after deep-sleep wakeup.</p> <p>The configuration(s) is not saved to NVRAM.</p>
-----------------	--

## Parameter

<cid>	Integer type. A particular PDP context definition. The parameter is local to the UE-TE interface and is used in other PDP context-related commands. Range: 1–7.
<PDP_type>	String type. The type of packet data protocol. <ul style="list-style-type: none"> <li>"IP" Internet Protocol (<i>IETF STD 5</i>)</li> <li>"IPv6" Internet Protocol, version 6 (<i>IETF RFC 2460</i>)</li> <li>"IPv4V6" Virtual &lt;PDP_type&gt; introduced to handle dual IP stack UE capability (see <i>3GPP TS 24.301</i>)</li> <li>"Non-IP" Transfer of Non-IP data to external packet network (see <i>3GPP TS 24.301</i>)</li> </ul>
<APN>	String type. The access point name. A logical name that is 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. Identify the UE in the address space applicable to the PDP. If the value is null (0.0.0.0) 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. In Read Command <PDP_addr> is returned as a null string even if an address has been allocated during the PDP startup procedure. The allocated address shall be read with <b>AT+CGPADDR</b> .
<d_comp>	Integer type. Controls PDP data compression. <ul style="list-style-type: none"> <li>0 Off</li> <li>1 On</li> <li>2 V.42bis</li> <li>3 V.44bis</li> </ul>
<h_comp>	Integer type. Controls PDP header compression. <ul style="list-style-type: none"> <li>0 Off (default if value is omitted)</li> <li>1 On</li> <li>2 RFC 1144 (applicable for SMDCP only)</li> <li>3 RFC 2507</li> <li>4 RFC 3095 (ROHC, applicable for PDCP only)</li> </ul>
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.

### NOTE

1. **AT+CGDCONT=<cid>** clears the PDP context by the specified <cid>.
2. <cid> activated by **AT+CGACT** cannot be defined or undefined until deactivated by **AT+CGACT**.
3. <cid>=1 is the initial PDP context, which is not allowed to be configured and cleared by **AT+CGDCONT**. Please configure <cid>=1 with **AT+QCGDEFCONT**.

## Example

```

AT+CGDCONT=?
+CGDCONT: (1-7) [,"IP","IPv6","IPv4V6","Non-IP"][,,[(0-3)[,(0-4)]]]

OK
AT+CGDCONT=2,"IP","CMNBIOT"
OK
AT+CGDCONT?
+CGDCONT: 2,"IP","CMNBIOT","0.0.0.0",0,0

OK

```

## 5.7. AT+CGACT PDP Context Activation/Deactivation

This Write Command activates or deactivates the specified PDP context(s). After the command is 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 requested state for any specified context cannot be achieved, an **ERROR** or **+CME ERROR** response is returned. Extended error responses are enabled by the **AT+CME** command.

If the UE is not PS attached when the activation form of the command is executed, the UE first performs a PS attach and then attempts to activate the specified contexts. If the attach fails then the MT responds with an error or, if extended error responses are enabled, with the appropriate failure-to-attach error message.

Note that in the 3GPP TS 27.007 specification there is the following statement:

For EPS, if an attempt is made to disconnect the last PDN connection, then the UE responds with **ERROR** or, if extended error responses are enabled, a **+CME ERROR**.

For EPS, the activation request for an EPS bearer resource will be answered by the network by either an EPS dedicated bearer activation or EPS bearer modification request. The request must be accepted by the UE before the PDP context can be set into established state.

If no **<cid>** is specified, the activation form of the command activates all defined non-emergency contexts, and the deactivation form of the command deactivates all active contexts.

This Read Command returns the current activation states for all the defined PDP contexts.

This Test Command requests information on the supported PDP context activation states.



## AT+CGACT PDP Context Activation/Deactivation

Test Command <b>AT+CGACT=?</b>	Response <b>+CGACT:</b> (list of supported <state>s)  <b>OK</b>
Read Command <b>AT+CGACT?</b>	Response <b>+CGACT:</b> <cid>,<state> <b>[+CGACT:</b> <cid>,<state> <b>[...]]</b>  <b>OK</b>
Write Command <b>AT+CGACT=&lt;state&gt;[,&lt;cid&gt;[,&lt;cid&gt;[,...]]]</b>	Response If context is activated successfully: <b>OK</b>  If context is deactivated successfully: <b>OK</b>  If there is any error, response: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	150 s, determined by network.
Characteristics	/

### Parameter

<b>&lt;state&gt;</b>	Integer type. The state of PDP context activation. 0 Deactivated 1 Activated
<b>&lt;cid&gt;</b>	Integer type. The particular PDP context definition (see <b>AT+CGDCONT</b> ).
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

#### NOTE

1. The context with **<cid>=1** is defined at startup automatically.
2. The last activated **<cid>** is not allowed to be deactivated.
3. Currently, only 2 active PDP contexts are allowed to exist simultaneously.
4. Before activating, make sure that the module has already attached to the network.

### Example

```

AT+CGACT=1,1
OK
AT+CGACT?
+CGACT: 1,1

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

OK

```

## 5.8. AT+CGPADDR Show PDP Address

This Execution Command returns a list of PDP addresses for the specified **<cid>**. If no **<cid>** is specified, the addresses for all defined contexts will be returned.

This Test Command returns a list of active **<cid>**s that may or may not have an IP address associated with them.

AT+CGPADDR Show PDP Address	
Test Command <b>AT+CGPADDR=?</b>	Response <b>+CGPADDR:</b> (list of active PDP <b>&lt;cid&gt;</b> s)  <b>OK</b>
Read Command <b>AT+CGPADDR?</b>	Response <b>+CGPADDR:</b> <b>&lt;cid&gt;</b> [, <b>&lt;PDP_addr_1&gt;</b> [, <b>&lt;PDP_addr_2&gt;</b> ]] [ <b>+CGPADDR:</b> <b>&lt;cid&gt;</b> [, <b>&lt;PDP_addr_1&gt;</b> [, <b>&lt;PDP_addr_2&gt;</b> ]]] [...]  <b>OK</b>
Write Command <b>AT+CGPADDR[=&lt;cid&gt;[,&lt;cid&gt;[,...]]]</b>	Response [ <b>+CGPADDR:</b> <b>&lt;cid&gt;</b> [, <b>&lt;PDP_addr_1&gt;</b> [, <b>&lt;PDP_addr_2&gt;</b> ]]] [ <b>+CGPADDR:</b> <b>&lt;cid&gt;</b> [, <b>&lt;PDP_addr_1&gt;</b> [, <b>&lt;PDP_addr_2&gt;</b> ]]] [...]  <b>OK</b>  If there is any error: <b>ERROR</b> Or

	<b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

<b>&lt;cid&gt;</b>	Integer type. Specify a particular PDP context definition (see <b>AT+CGDCONT</b> ). If no <b>&lt;cid&gt;</b> is specified, the addresses for all defined contexts are returned.
<b>&lt;PDP_addr_1&gt;/&lt;PDP_addr_2&gt;</b>	<p>String type. Identify the MT in the address space applicable to the PDP. The address may be static or dynamic.</p> <ul style="list-style-type: none"> <li>For a static address, it will be the one set by the <b>AT+CGDCONT</b> command when the context was defined.</li> <li>For a dynamic address, it will be the one assigned during the last PDP context activation that used the context definition referred to by <b>&lt;cid&gt;</b>. <b>&lt;PDP_address&gt;</b> is omitted if none is available.</li> <li>Both <b>&lt;PDP_addr_1&gt;</b> and <b>&lt;PDP_addr_2&gt;</b> are included when both IPv4 and IPv6 addresses are assigned, with <b>&lt;PDP_addr_1&gt;</b> containing the IPv4 address and <b>&lt;PDP_addr_2&gt;</b> containing the IPv6 address.</li> </ul> <p>The string is given as a dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4 for IPV4, and a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6.</p>
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### NOTE

- In dual-stack terminals (**<PDP\_type>="IPV4V6"**), the IPv6 address will be provided in **<PDP\_addr\_2>**.
- For terminals with a single IPv6 stack (**<PDP\_type>="IPV6"**) or due to backwards compatibility, the IPv6 address can be provided in **<PDP\_addr\_1>**.

## Example

```

AT+CGPADDR=1
+CMPADDR: 1,"101.43.5.1",""

OK
AT+CGPADDR=?
+CMPADDR: (1)

OK

```

## 5.9. AT+QICSGP Configure PDP Context

This command configures PDP context and is used only when APN username and password need to be configured. Otherwise, please use the command **AT+CGDCONT** to define the PDP context.

AT+QICSGP Configure PDP Context	
Test Command <b>AT+QICSGP=?</b>	Response <b>+QICSGP:</b> (range of supported <contextID>s)[, (range of supported <context_type>s),<APN>[,<username>,<password>[,range of supported <authentication>s]]]  <b>OK</b>
Write Command Configure the context <b>AT+QICSGP=&lt;contextID&gt;[,&lt;context_type&gt;,&lt;APN&gt;[,&lt;username&gt;,&lt;password&gt;[,&lt;authentication&gt;]]]</b>	Response If the optional parameters are omitted, query the current configuration: <b>+QICSGP:</b> <context_type>,<APN>[,<username>,<password>[,<authentication>]]  <b>OK</b>  If any of the optional parameters are specified, set the context: <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. Remain valid after deep-sleep wakeup. The configurations are not saved to NVRAM.

### Parameter

<contextID>	Integer type. The context ID. Range: 1–7.
<context_type>	Integer type. The protocol types.
1	IPv4
2	IPv4v6
3	IPv6

<b>&lt;APN&gt;</b>	String type. The access point name. A logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.
<b>&lt;username&gt;</b>	String type. The username.
<b>&lt;password&gt;</b>	String type. The password.
<b>&lt;authentication&gt;</b>	Integer type. The authentication methods. <div> 0 NONE  1 PAP  2 CHAP  3 CHAP or PAP </div>
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### Example

```

AT+QICSGP=2,1,"UNINET",,,1 //Configure context 2. APN is "UNINET" for China Unicom.
OK
AT+QICSGP=2 //Query the configuration of context 2.
+QICSGP: 1,"UNINET",,,1
OK

```

#### NOTE

1. If the PDP context is not configured by **AT+QICSGP**, the configuration cannot be read by this AT command.
2. When **<authentication>** is set to 3, CHAP encryption is used by default. When CHAP encryption fails, PAP encryption will be used (the rejection code value returned by the network side after the protocol authentication fails should be 29, otherwise, the authentication mode will not be switched to PAP).
3. **<cid>=1** is the initial PDP context, which is not allowed to be configured and cleared by **AT+QICSGP**. Please configure **<cid>=1** with **AT+QCGDEFCONT**.

## 5.10. AT+CSCON Signaling Connection Status

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

This Write Command controls the presentation of an URC. If **<n>=1**, **+CSCON: <mode>** is sent from the

MT when the connection mode of the MT is changed.

This Read Command returns the status of result code presentation and an integer **<mode>** which shows whether the MT is currently in idle mode or connection mode.

<b>AT+CSCON Signaling Connection Status</b>	
Test Command <b>AT+CSCON=?</b>	Response <b>+CSCON:</b> (list of supported <b>&lt;n&gt;s</b> )  <b>OK</b>
Read Command <b>AT+CSCON?</b>	Response <b>+CSCON:</b> <b>&lt;n&gt;</b> , <b>&lt;mode&gt;</b>  <b>OK</b> If there is any error: <b>ERROR</b> Or <b>+CME ERROR:</b> <b>&lt;err&gt;</b>
Write Command <b>AT+CSCON=&lt;n&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR:</b> <b>&lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. Remain valid after deep-sleep wakeup. The configuration is saved to NVRAM by executing <b>AT&amp;W</b> after this command is issued.

## Parameter

<b>&lt;n&gt;</b>	Integer type. Enable/disable the signaling connection status URC. 0    Disable the URC <b>+CSCON: &lt;mode&gt;</b> 1    Enable the URC <b>+CSCON: &lt;mode&gt;</b>
<b>&lt;mode&gt;</b>	Integer type. The signaling connection status. 0    Idle 1    Connected
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### Example

```

AT+CSCON=0
OK
AT+CSCON?
+CSCON: 0,1

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

OK
AT+CSCON=1
OK
AT+CSCON?
+CSCON: 1,1

OK

```

## 5.11. AT+COPS Operator Selection

This Write command forces an attempt to select and register the EPS network operator using the USIM card installed in the currently selected card slot. **<mode>** is used to select whether the selection is done automatically by the MT or is forced by this command to operator **<oper>** (it shall be given in format **<format>**) to a certain access technology, indicated in **<AcT>**. If the selected operator is not available, no other operator shall be selected (except **<mode>**=4). If the selected access technology is not available, then the same operator shall be selected in other access technology. The selected operator name format shall also apply to further read commands (**AT+COPS?**). **<mode>**=2 forces an attempt to deregister from the network. The selected mode affects all further network registration (e.g. after **<mode>**=2, MT shall be unregistered until **<mode>**=0 or 1 is selected). This command should be abortable when registration/deregistration attempt is made.

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

This Test Command returns a set of five parameters, each representing an operator present in the network. A set consists of an integer indicating the availability of the operator **<stat>**, long and short alphanumeric format of the operator's name, numeric format representation of the operator and access technology. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in the order of: home network, networks referenced in USIM or active application in the UICC (USIM) in the following order: HPLMN selector, user controlled PLMN selector, operator controlled PLMN selector and PLMN selector (in the USIM), and other networks.

The **<AcT>** access technology selected parameters should only be used in terminals capable of registering to more than one access technology. Selection of **<AcT>** does not limit the capability of cell reselections, even though an attempt is made to select an access technology, the phone may still re-select a cell in another access technology.

AT+COPS Operator Selection	
Test Command <b>AT+COPS=?</b>	Response <b>+COPS:</b> [list of supported ( <b>&lt;stat&gt;</b> ,long alphanumeric <b>&lt;oper&gt;</b> ,short alphanumeric <b>&lt;oper&gt;</b> ,numeric <b>&lt;oper&gt;</b> )s][,(range of supported <b>&lt;mode&gt;</b> s),(range of supported <b>&lt;format&gt;</b> s)]  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Read Command <b>AT+COPS?</b>	Response <b>+COPS:</b> <b>&lt;mode&gt;</b> [, <b>&lt;format&gt;</b> , <b>&lt;oper&gt;</b> , <b>&lt;AcT&gt;</b> ]  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Write Command <b>AT+COPS=&lt;mode&gt;[,&lt;format&gt;[,&lt;oper&gt;[  ,&lt;AcT&gt;]]]</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	630 s
Characteristics	The command takes effect immediately. Remain valid after deep-sleep wakeup. The configuration(s) is not saved to NVRAM.



## Parameter

<b>&lt;mode&gt;</b>	Integer type. <ul style="list-style-type: none"> <li>0 Automatic (&lt;oper&gt; is ignored)</li> <li>1 Manual (&lt;oper&gt; shall be present, and &lt;AcT&gt; is optional)</li> <li>2 Deregister from network</li> <li>3 Set only &lt;format&gt; (for Read Command <b>AT+COPS?</b>), this value is not applicable in read command response</li> <li>4 Manual/automatic selected (&lt;oper&gt; shall be present). If the manual selection fails, automatic mode (&lt;mode&gt;=0) is entered</li> </ul>
<b>&lt;format&gt;</b>	Integer type. <oper> format configuration. <ul style="list-style-type: none"> <li>0 Long alphanumeric</li> <li>1 Short alphanumeric</li> <li>2 Numeric</li> </ul>
<b>&lt;oper&gt;</b>	String type. <format> indicates if the format is numeric; numeric format is the NB-IoT network location area identification number which consists of a three BCD digit ITU-T country code coded, plus a two or three BCD digit network code, which is administration specific. <oper> field could not be present when <mode>=0.
<b>&lt;stat&gt;</b>	Integer type <ul style="list-style-type: none"> <li>0 Unknown</li> <li>1 Operator Available</li> <li>2 Operator Current</li> <li>3 Operator Forbidden</li> </ul>
<b>&lt;AcT&gt;</b>	Integer type. Access technology selected <ul style="list-style-type: none"> <li>7 E-UTRAN</li> <li>9 E-UTRAN (NB-S1 mode)</li> </ul>
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### NOTE

This Test Command can only be executed in idle state; otherwise an error will be returned.

## Example

```

AT+COPS=0
OK
AT+COPS?
+COPS: 0,2,"46000",9
OK

```

## 5.12. AT+CPSMS Power Saving Mode Setting

whether the UE wants to apply PSM or not, as well as the requested extended periodic TAU value in E-UTRAN and the requested Active Time value. See the URCs provided by **AT+CEREG** for the Active Time value, and the extended periodic TAU value that are allocated to the UE by the network in E-UTRAN.

A special form of the command can be given as **AT+CPSMS=2**. In this form the use of PSM will be disabled and data for all parameters in **AT+CPSMS** command will be removed or, if available, set to the default values.

This Read Command returns the current parameter values.

This Test Command returns the supported **<mode>s** and the value ranges for the requested extended periodic TAU value in E-UTRAN and the requested Active Time value as compound values.

<b>AT+CPSMS Power Saving Mode Setting</b>	
Test Command <b>AT+CPSMS=?</b>	Response <b>+CPSMS:</b> (range of supported <b>&lt;mode&gt;s</b> ),,(range of supported <b>&lt;Requested_Periodic-TAU&gt;s</b> ),(range of supported <b>&lt;Requested_Active-Time&gt;s</b> )  <b>OK</b>
Read Command <b>AT+CPSMS?</b>	Response <b>+CPSMS:</b> <b>&lt;mode&gt;</b> [,,[ <b>&lt;Requested_Periodic-TAU&gt;</b> ],[ <b>&lt;Requested_Active-Time&gt;</b> ]  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Write Command <b>AT+CPSMS=&lt;mode&gt;[,,,&lt;Requested_Periodic-TAU&gt;[,&lt;Requested_Active-Time&gt;]]</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

Remain valid after deep-sleep wakeup.  
The configurations are saved to NVRAM automatically.

## Parameter

<b>&lt;mode&gt;</b>	Integer type. Disable or enable the use of PSM in the UE
0	Disable the use of PSM
1	Enable the use of PSM
2	Disable the use of PSM and discard all parameters for PSM or, if available, reset to the default values.
<b>&lt;Requested_Periodic-TAU&gt;</b>	String type. One byte in an 8-bit format. Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN. (e.g. "01000111" equals 70 hours). Bits 5 to 1 represent the binary coded timer value Bits 6 to 8 define the timer value unit as follows: Bits
	8 7 6
	0 0 0 Value is incremented in multiples of 10 minutes
	0 0 1 Value is incremented in multiples of 1 hour
	0 1 0 Value is incremented in multiples of 10 hours
	0 1 1 Value is incremented in multiples of 2 seconds
	1 0 0 Value is incremented in multiples of 30 seconds
	1 0 1 Value is incremented in multiples of 1 minute
	1 1 0 Value is incremented in multiples of 320 hours
	1 1 1 Value indicates that the timer is deactivated
<b>&lt;Requested_Active-Time&gt;</b>	String type. One byte in an 8-bit format. Requested active time value (T3324) to be allocated to the UE. (e.g. "00100100" equals 4 minutes). Bits 5 to 1 represent the binary coded timer value. Bits 6 to 8 defines the timer value unit for the GPRS timer as follows: Bits
	8 7 6
	0 0 0 Value is incremented in multiples of 2 seconds
	0 0 1 Value is incremented in multiples of 1 minute
	0 1 0 Value is incremented in multiples of deci-hours
	1 1 1 Value indicates that the timer is deactivated
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### NOTE

**AT+CPSMS?** can only return the mode value 0 or 1 currently.

### Example

```

AT+CPSMS=1,,,"01000011","01000011"
OK
AT+CPSMS?
+CPSMS: 1,,,"01000011","01000011"

OK
AT+CPSMS=?
+CPSMS: (0-2),,,"00000000"- "11111111"),("00000000"- "11111111")

OK

```

## 5.13. AT+CEDRXS eDRX Setting

This Write Command controls the setting of the UE's eDRX parameters. The command controls whether the UE wants to apply eDRX or not, as well as the requested eDRX value for each specified type of access technology.

This Write Command also controls the presentation of the URC:

**+CEDRXP: <AcT-type>[,<Requested\_eDRX\_value>[,<NW-provided\_eDRX\_value>[,<Paging\_time\_window>]]]**

when **<n>=2** and there is a change in the eDRX parameters provided by the network.

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

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

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

<b>AT+CEDRXS eDRX Setting</b>	
Test Command <b>AT+CEDRXS=?</b>	Response <b>+CEDRXS:</b> (range of supported <b>&lt;mode&gt;s</b> ),(list of supported <b>&lt;AcT-type&gt;s</b> ),(range of supported <b>&lt;Requested_eDRX_value&gt;s</b> )  <b>OK</b>
Read Command <b>AT+CEDRXS?</b>	Response <b>+CEDRXS:</b> <b>&lt;mode&gt;</b> , <b>&lt;AcT-type&gt;</b> , <b>&lt;Requested_eDRX_value&gt;</b>

	<b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Write Command <b>AT+CEDRXS=&lt;mode&gt;[,&lt;AcT-type&gt;[,&lt;Requested_eDRX_value&gt;]]</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. Remain valid after deep-sleep wakeup. The configurations are saved to NVRAM automatically.

## Parameter

<b>&lt;mode&gt;</b>	Integer type. Disable or enable the use of eDRX in the UE. This parameter is applicable to all specified types of access technology, i.e. the most recent setting of <b>&lt;mode&gt;</b> will take effect for all specified values of <b>&lt;AcT-type&gt;</b> .  0    Disable the use of eDRX <u>1</u> Enable the use of eDRX 2    Enable the use of eDRX and enable the URC: <b>+CEDRXP: &lt;AcT-type&gt;[,&lt;Requested_eDRX_value&gt;[,&lt;NW-provided_eDRX_value&gt;[,&lt;Paging_time_window&gt;]]]</b>  3    Disable the use of eDRX and discard all parameters for eDRX or, if available, reset to default values.																									
<b>&lt;AcT-type&gt;</b>	Integer type. Indicates the type of access technology. <b>AT+CEDRXS?</b> is used to specify the relationship between the type of access technology and the requested eDRX value.  0    Access technology is not using eDRX. This parameter value is only used in the URC.  5    E-UTRAN (NB-S1 mode)																									
<b>&lt;Requested_eDRX_value&gt;</b>	String type. Half a byte in a 4-bit format. NB-S1 mode. Bits <table><tr><td>4</td><td>3</td><td>2</td><td>1</td><td>E-UTRAN eDRX cycle length duration</td></tr><tr><td>0</td><td>0</td><td>1</td><td>0</td><td>20.48 seconds</td></tr><tr><td>0</td><td>0</td><td>1</td><td>1</td><td>40.96 seconds</td></tr><tr><td>0</td><td>1</td><td>0</td><td>1</td><td>81.92 seconds</td></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td><td>163.84 seconds</td></tr></table>	4	3	2	1	E-UTRAN eDRX cycle length duration	0	0	1	0	20.48 seconds	0	0	1	1	40.96 seconds	0	1	0	1	81.92 seconds	1	0	0	1	163.84 seconds
4	3	2	1	E-UTRAN eDRX cycle length duration																						
0	0	1	0	20.48 seconds																						
0	0	1	1	40.96 seconds																						
0	1	0	1	81.92 seconds																						
1	0	0	1	163.84 seconds																						

	1	0	1	0	327.68 seconds
	1	0	1	1	655.36 seconds
	1	1	0	0	1310.72 seconds
	1	1	0	1	2621.44 seconds
	1	1	1	0	5242.88 seconds
	1	1	1	1	10485.76 seconds
<NW-provided_eDRX_value>	String type. Half a byte in a 4-bit format. NB-S1 mode.				
	Bits				
	4	3	2	1	E-UTRAN eDRX cycle length duration
	0	0	1	0	20.48 seconds
	0	0	1	1	40.96 seconds
	0	1	0	1	81.92 seconds
	1	0	0	1	163.84 seconds
	1	0	1	0	327.68 seconds
	1	0	1	1	655.36 seconds
	1	1	0	0	1310.72 seconds
	1	1	0	1	2621.44 seconds
	1	1	1	0	5242.88 seconds
	1	1	1	1	10485.76 seconds
<Paging_time_window>	String type. Half a byte in a 4-bit format. NB-S1 mode.				
	Bits				
	4	3	2	1	Paging Time Window length
	0	0	0	0	2.56 seconds
	0	0	0	1	5.12 seconds
	0	0	1	0	7.68 seconds
	0	0	1	1	10.24 seconds
	0	1	0	0	12.8 seconds
	0	1	0	1	15.36 seconds
	0	1	1	0	17.92 seconds
	0	1	1	1	20.48 seconds
	1	0	0	0	23.04 seconds
	1	0	0	1	25.6 seconds
	1	0	1	0	28.16 seconds
	1	0	1	1	30.72 seconds
	1	1	0	0	33.28 seconds
	1	1	0	1	35.84 seconds
	1	1	1	0	38.4 seconds
	1	1	1	1	40.96 seconds
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.				

### Example

```

AT+CEDRXS=1,5,"0101"
OK
AT+CEDRXS?
+CEDRXS: 1,5,"0101"

OK
AT+CEDRXS=?
+CEDRXS: (0-3),(5),("0000"-"1111")

OK

```

## 5.14. AT+CEDRXRDP eDRX Read Dynamic Parameters

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

If the cell that the MS is currently registered to is not using eDRX, **<AcT-type>=0** will be returned.

AT+CEDRXRDP eDRX Read Dynamic Parameters	
Test Command <b>AT+CEDRXRDP=?</b>	Response <b>OK</b>
Execution Command <b>AT+CEDRXRDP</b>	Response <b>+CEDRXRDP: &lt;AcT-type&gt;[,&lt;Requested_eDRX_value&gt;[,&lt;NW-provided_eDRX_value&gt;[,&lt;Paging_time_window&gt;]]]</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

<AcT-type>	Integer type. The type of access technology. <b>AT+CEDRXS?</b> is used to specify the relationship between the type of access technology and the requested eDRX value. 0 Access technology is not using eDRX. This parameter value is only used in the URC 5 E-UTRAN (NB-S1 mode)
<Requested_eDRX_value>	String type. Half a byte in a 4-bit format. Bits 4 3 2 1 E-UTRAN eDRX cycle length duration 0 0 1 0 20.48 seconds 0 0 1 1 40.96 seconds 0 1 0 1 81.92 seconds 1 0 0 1 163.84 seconds 1 0 1 0 327.68 seconds 1 0 1 1 655.36 seconds 1 1 0 0 1310.72 seconds 1 1 0 1 2621.44 seconds 1 1 1 0 5242.88 seconds 1 1 1 1 10485.76 seconds
<NW-provided_eDRX_value>	String type. Half a byte in a 4-bit format. Bits 4 3 2 1 E-UTRAN eDRX cycle length duration 0 0 1 0 20.48 seconds 0 0 1 1 40.96 seconds 0 1 0 1 81.92 seconds 1 0 0 1 163.84 seconds 1 0 1 0 327.68 seconds 1 0 1 1 655.36 seconds 1 1 0 0 1310.72 seconds 1 1 0 1 2621.44 seconds 1 1 1 0 5242.88 seconds 1 1 1 1 10485.76 seconds
<Paging_time_window>	String type. Half a byte in a 4-bit format. Bits 4 3 2 1 Paging time window length 0 0 0 0 2.56 seconds 0 0 0 1 5.12 seconds 0 0 1 0 7.68 seconds 0 0 1 1 10.24 seconds 0 1 0 0 12.8 seconds 0 1 0 1 15.36 seconds 0 1 1 0 17.92 seconds 0 1 1 1 20.48 seconds



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

<err>

Error codes. Please refer to **Chapter 13** for details.

### Example

**AT+CEDRXRDP**

+CEDRXRDP: 5,"0010","1110","0101"

OK

**AT+CEDRXRDP=?**

OK

## 5.15. AT+QBAND Get and Set Mobile Operation Band

This command gets the currently registered band or sets the bands to be locked.

<b>AT+QBAND Get and Set Mobile Operation Band</b>	
Test Command <b>AT+QBAND=?</b>	Response <b>+QBAND:</b> (range of supported <band_number>s),(list of supported <operating_bands>s)  <b>OK</b>
Read Command <b>AT+QBAND?</b>	Response <b>+QBAND:</b> <operating_bands>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR:</b> <err>
Write Command <b>AT+QBAND=&lt;band_number&gt;[,&lt;band_number&gt;[,&lt;band_number&gt;[,...]]]</b>	Response <b>OK</b>  If there is any error:

	<b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. Remain valid after deep-sleep wakeup. The configurations are saved to NVRAM automatically.

## Parameter

<b>&lt;band_number&gt;</b>	Integer type. Indicating preferred band number to be searched. 0 All bands 1–5 Number of bands to be locked
<b>&lt;band&gt;</b>	Integer type. The currently preferred NB-IoT band to be searched. Valid values: 3, 5, 8, 20 and 28.
<b>&lt;operating_bands&gt;</b>	Integer type. The band(s) being used. Valid values: 3, 5, 8, 20 and 28.
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

## Example

```

AT+QBAND=?           //Query the list of supported bands.
+QBAND: (0-5),(3,5,8,20,28)

OK
AT+QBAND=1,20        //Set the band to be used.
OK
AT+QBAND?            //Query the band being used.
+QBAND: 20

OK

```

## 5.16. AT+QLOCKF Lock NB-IoT Frequency

This command locks UE to specific frequency and optionally to Cell ID.

### AT+QLOCKF Lock NB-IoT Frequency

Test Command <b>AT+QLOCKF=?</b>	Response <b>+QLOCKF:</b> (list of supported <mode>s)[,](range of supported <earfcn_offset>s)[,]
------------------------------------	--

	<b>OK</b>
Read command <b>AT+QLOCKF?</b>	Response <b>+QLOCKF: &lt;mode&gt;[,&lt;earfcn&gt;,&lt;earfcn_offset&gt;[,&lt;pci&gt;]]</b>
	<b>OK</b>
Write Command <b>AT+QLOCKF=&lt;mode&gt;[,&lt;earfcn&gt;,&lt;earfcn_offset&gt;[,&lt;pci&gt;]]</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. Remain valid after deep-sleep wakeup. The configurations are saved to NVRAM automatically.

## Parameter

<b>&lt;mode&gt;</b>	Integer type. Indicating activate/remove lock 0 Remove lock 1 Activate lock
<b>&lt;earfcn&gt;</b>	Integer type. Indicating requested EARFCN on which to lock. Range: 0–262143.
<b>&lt;earfcn_offset&gt;</b>	Integer type. Indicating requested EARFCN offset 0 Offset of -10 1 Offset of -9.5 ... 19 Offset of -0.5 ... 37 Offset of 8.5 38 Offset of 9
<b>&lt;pci&gt;</b>	Integer type. The physical cell ID. Range: 0–503.
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

## 5.17. AT+QENG Engineering Mode

This command queries current modem status information for serving cell and current network status in Engineering Mode.

AT+QENG Engineering Mode	
Test Command <b>AT+QENG=?</b>	<p>Response</p> <p><b>+QENG:</b> (list of supported &lt;mode&gt;s)</p> <p><b>OK</b></p>
Write Command <b>AT+QENG=&lt;mode&gt;</b>	<p>Response</p> <p>When &lt;mode&gt;=0:</p> <p><b>+QENG: 0,&lt;sc_earfcn&gt;,,&lt;sc_pci&gt;,&lt;sc_cellid&gt;,[&lt;sc_rsrp&gt;],[&lt;sc_rsrq&gt;],[&lt;sc_rssi&gt;],[&lt;sc_snr&gt;],&lt;sc_band&gt;,&lt;sc_tac&gt;,[&lt;sc_ecl&gt;], [&lt;sc_tx_pwr&gt;]</b></p> <p><b>[+QENG: 1,&lt;nc_earfcn&gt;,,&lt;nc_pci&gt;,&lt;nc_rsrp&gt;,...]</b></p> <p><b>OK</b></p> <p>When &lt;mode&gt;=1:</p> <p><b>+QENG: 2,&lt;RLC_UL_BLER&gt;,&lt;RLC_DL_BLER&gt;,&lt;MAC_UL_BLER&gt;,&lt;MAC_DL_BLER&gt;,&lt;MAC_UL_total_bytes&gt;,&lt;MAC_DL_total_bytes&gt;,&lt;MAC_UL_total_HARQ_TX&gt;,&lt;MAC_DL_total_HARQ_TX&gt;,&lt;MAC_UL_HARQ_re_TX&gt;,&lt;MAC_DL_HARQ_re_TX&gt;,&lt;RLC_UL_tput&gt;,&lt;RLC_DL_tput&gt;,&lt;MAC_UL_tput&gt;,&lt;MAC_DL_tput&gt;</b></p> <p><b>OK</b></p> <p>If there is any error:</p> <p><b>ERROR</b></p> <p>Or</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>
Maximum Response Time	300 ms
Characteristics	/

### Parameter

<mode>	Integer type. Indicating the requested engineering information.
	0 Display radio information for serving and neighbor cells
	1 Display data transfer information only if the modem is in RRC-CONNECTED state

---

<b>&lt;sc_earfcn&gt;</b>	Integer type. Indicating the EARFCN for serving cell. Range: 0–262143.
<b>&lt;sc_pci&gt;</b>	Integer type. Indicating the serving cell physical cell ID. Range: 0–503.
<b>&lt;sc_cellid&gt;</b>	String type. Four-byte (28-bit) cell ID in hexadecimal format for serving cell.
<b>&lt;sc_rsrp&gt;</b>	Signed integer indicating serving cell RSRP value in units of dBm (can be negative value).
<b>&lt;sc_rsrq&gt;</b>	Signed integer indicating serving cell RSRQ value in units of dB (can be negative value).
<b>&lt;sc_rssi&gt;</b>	Signed integer indicating serving cell RSSI value in units of dBm (can be negative value).
<b>&lt;sc_snr&gt;</b>	Signed integer value. Last SNR value for serving cell in units of dB.
<b>&lt;sc_band&gt;</b>	Integer type. Current serving cell band
<b>&lt;sc_tac&gt;</b>	String type; two-byte tracking area code (TAC) in hexadecimal format (e.g. "00C3" equals 195 in decimal).
<b>&lt;sc_ecl&gt;</b>	Integer type. Last Enhanced Coverage Level (ECL) value for serving cell. Range: 0–2.
<b>&lt; sc_tx_pwr &gt;</b>	Signed integer value indicating current UE transmit power. Units of dBm Centibels relative to one milliwatt (can be negative value).
<b>&lt;nc_earfcn &gt;</b>	Integer type. Indicating the EARFCN for neighbor cell. Range: 0–262143.
<b>&lt;nc_earfcn_offset &gt;</b>	Integer type. Indicating the EARFCN offset for neighbor cell.
<b>&lt;nc_pci &gt;</b>	Integer type. Indicating the neighbor cell physical cell ID. Range: 0–503.
<b>&lt;nc_rsrp&gt;</b>	Signed integer indicating neighbor cell RSRP value in units of dBm (can be negative value).
<b>&lt;RLC_UL_BLER&gt;</b>	Integer type. Representing percentage (range 0 to 100). UL block error rate (as per IRQ) in RLC. Calculated over all established RLC AM radio bearers. Calculated from the beginning of successfully established/resumed RRC connection or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Only valid in RRC-CONNECTED state.
<b>&lt;RLC_DL_BLER&gt;</b>	Integer type. Representing percentage (range 0 to 100). DL block error rate (as per ARQ) in RLC. Calculated over all established RLC AM radio bearers. Calculated from the beginning of successfully established/resumed RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state.
<b>&lt;MAC_UL_BLER&gt;</b>	Integer type. Representing percentage (range 0 to 100). UL block error rate (as per HARQ) in MAC for UL-SCH. Calculated from the beginning of successfully established/resumed/re-established RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state.
<b>&lt;MAC_DL_BLER&gt;</b>	Integer type. Representing percentage (range 0 to 100). DL block error rate (as per HARQ) in MAC for DL-SCH, excluding BCCH. Calculated from the beginning of successfully established/resumed/re-established RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state.
<b>&lt;MAC_UL_total_bytes&gt;</b>	Integer type. Total number of transport block bytes (re)transmitted on UL-SCH. Calculated for UL-SCH over all HARQ transmissions and

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	retransmissions. Calculated from the beginning of successfully established/resumed/re-established RRC connection, or since previous AT+QENG query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Unit: bytes.
<b>&lt;MAC_DL_total_bytes&gt;</b>	Integer type. Total number of transport block bytes (re)transmitted on DL-SCH, excluding BCCH. Calculated from the beginning of successfully established/resumed/re-established RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Unit: bytes.
<b>&lt;MAC_UL_total_HARQ_TX&gt;</b>	Integer type. Total number of HARQ (re)transmissions for transport blocks on UL-SCH. Calculated from the beginning of successfully established/resumed/re-established RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Unit: Number of retransmissions.
<b>&lt;MAC_DL_total_HARQ_TX&gt;</b>	Integer type. Total number of HARQ (re)transmissions for transport blocks on DL-SCH, excluding BCCH. Calculated from the beginning of successfully established/resumed/re-established RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Number of retransmissions.
<b>&lt;MAC_UL_HARQ_re_TX&gt;</b>	Integer type. Number of HARQ retransmissions for transport blocks on UL-SCH. Calculated from the beginning of successfully established/resumed/re-established RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Unit: Number of retransmissions.
<b>&lt;MAC_DL_HARQ_re_TX&gt;</b>	Integer type. Number of HARQ retransmissions for transport blocks on DL-SCH, excluding BCCH. Calculated from the beginning of successfully established/resumed/re-established RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Unit: Number of retransmissions.
<b>&lt;RLC_UL_tput&gt;</b>	Integer type. RLC uplink throughput. Calculated over all established RLC AM radio bearers. Calculated from the beginning of successfully established/resumed RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Unit: kbits/s.
<b>&lt;RLC_DL_tput&gt;</b>	Integer type. RLC downlink throughput. Calculated over all established RLC AM radio bearers. Calculated from the beginning of successfully established/resumed RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Unit: kbits/s.
<b>&lt;MAC_UL_tput&gt;</b>	Integer type. UL throughput in MAC for UL-SCH. Calculated from the beginning of successfully established/resumed/re-established RRC connection, or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Unit: kbits/s.
<b>&lt;MAC_DL_tput&gt;</b>	Integer type. DL throughput in MAC for DL-SCH, excluding BCCH. Calculated from the beginning of successfully established/resumed/re-established RRC connection,

	or since previous <b>AT+QENG</b> query with <b>&lt;mode&gt;=1</b> , whichever is later. Available only in RRC-CONNECTED state. Unit: kbits/s.
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

## 5.18. AT+QNBIOTEVENT Enable/Disable NB-IoT Related Event Report

This command enables and disables the specific event report.

AT+QNBIOTEVENT Enable/Disable NB-IoT Related Event Report	
Test Command <b>AT+QNBIOTEVENT=?</b>	Response <b>+QNBIOTEVENT:</b> (list of supported <b>&lt;enable&gt;s</b> ),(list of supported <b>&lt;event&gt;s</b> )  <b>OK</b>
Read Command <b>AT+QNBIOTEVENT?</b>	Response <b>+QNBIOTEVENT:</b> <b>&lt;enable&gt;</b> , <b>&lt;event&gt;</b>  <b>OK</b>
Write Command <b>AT+QNBIOTEVENT=&lt;enable&gt;,&lt;event&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. Remain valid after deep-sleep wakeup. The configuration is saved to NVRAM by executing <b>AT&amp;W</b> after this command is issued.

### Parameter

<b>&lt;enable&gt;</b>	Integer type. 0 Disable the indication of specific event 1 Enable the indication of specific event by URC: <b>+QNBIOTEVENT: &lt;event_value&gt;</b>
<b>&lt;event&gt;</b>	Integer type. Indicate the report event. 1 PSM state
<b>&lt;event_value&gt;</b>	String type. When <b>&lt;event&gt;=1</b> , <b>&lt;event_value&gt;</b> is "ENTER PSM" or "EXIT PSM".

**<err>** Error codes. Please refer to **Chapter 13** for details.

## 5.19. AT+QCSEARFCN Clear Stored NB-IoT EARFCN List

This command clears stored EARFCN list for the UE.

AT+QCSEARFCN Clear Stored NB-IoT EARFCN List	
Test Command <b>AT+QCSEARFCN=?</b>	Response <b>+QCSEARFCN:</b> (list of supported <b>&lt;mode&gt;s</b> )  <b>OK</b>
Write Command <b>AT+QCSEARFCN=&lt;mode&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots.

### Parameter

<b>&lt;mode&gt;</b>	Integer type. Indicating the clearing of stored NB-IoT EARFCN list. 0 Clear stored NB-IoT EARFCN list
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### Example

```
AT+QCSEARFCN=0
OK
```



## 5.20. AT+QCFG Extended Configuration Settings

This command configures settings of the UE.

AT+QCFG Extended Configuration Settings	
Test Command <b>AT+QCFG=?</b>	Response <b>+QCFG:</b> (list of supported <b>&lt;function&gt;s</b> ),(list of supported <b>&lt;value&gt;s</b> )  <b>OK</b>
Write Command <b>AT+QCFG=&lt;function&gt;[,&lt;value&gt;]</b>	Response If the optional parameter is omitted, query the current configuration: <b>+QCFG: &lt;value&gt;</b>  <b>OK</b>  If the optional parameter is specified, configure the function: <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. Remain valid after deep-sleep wakeup. The configuration is saved to NVRAM automatically.

### Parameter

<b>&lt;function&gt;</b>	String type. The function to be configured. "EPCO"		
<b>&lt;value&gt;</b>	Integer type. Value to configure <b>&lt;function&gt;</b> .		
	<b>&lt;function&gt;</b>	<b>&lt;value&gt;</b>	Description
	"EPCO"	0	Disable EPCO
		1	Enable EPCO
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.		

### Example

```
AT+QCFG="EPCO"
+QCFG: 0

OK
AT+QCFG="EPCO",1
OK
```

#### NOTE

If the network does not support EPCO, EPCO will be disabled after the module attaches to network even if EPCO is enabled (by **AT+QCFG="EPCO",1**).

## 5.21. AT+CCIOTOPT CloT Optimization Configuration

This Write Command controls which CloT EPS optimizations that the UE indicates as supported and preferred in the ATTACH REQUEST and TRACKING AREA UPDATE REQUEST messages. The command also allows reporting of the CloT EPS optimizations that are supported by the network. UE supporting CloT functionality support control plane CloT EPS optimization or user plane CloT EPS optimization or both (see *3GPP TS 24.301, sub-clause 9.9.3.34*). Based on the application characteristics the UE may prefer to be registered for control plane CloT EPS optimization or for user plane CloT EPS optimization (see *3GPP TS 24.301, sub-clause 9.9.3.0B*).

Further the network may support control plane CloT EPS optimization or user plane CloT EPS optimization or both (see *3GPP TS 24.301, sub-clause 9.9.3.12A*).

This Write Command also controls the URC **+CCIOTOPTI**. An URC **+CCIOTOPTI:<supported\_Network\_opt>** indicates the supported CloT EPS optimization by the network.

This Read Command returns the current settings for supported and preferred CloT EPS optimization and the current status of URC **+CCIOTOPTI**.

### AT+CCIOTOPT CloT Optimization Configuration

Test Command <b>AT+CCIOTOPT=?</b>	Response <b>+CCIOTOPT:</b> (list of supported <n>s),(list of supported <supported_UE_opt>s),(list of supported <preferred_UE_opt>s)  <b>OK</b>
Read Command <b>AT+CCIOTOPT?</b>	Response <b>+CCIOTOPT:</b> <n>,<supported_UE_opt>,<preferred_UE_o

	pt>
	OK
Write Command <b>AT+CCIOTOPT=&lt;n&gt;[,&lt;supported_UE_opt&gt;[,&lt;preferred_UE_opt&gt;]]</b>	Response When <n>=0 or 2: <b>OK</b>  When <n>=1: <b>OK</b>  <b>+CCIOTOPTI: &lt;supported_Network_opt&gt;</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. Remain valid after deep-sleep wakeup. The configurations are saved to NVRAM automatically.

## Parameter

<b>&lt;n&gt;</b>	Integer type. Enable/disable reporting of URC <b>+CCIOTOPTI</b> . <u>0</u> Disable reporting 1    Enable reporting 2    Disable reporting and reset the parameters for CloT EPS optimization to the default values
<b>&lt;supported_UE_opt&gt;</b>	Integer type. Indicates the UE's support for CloT EPS optimizations. 0    Control plane and user plane CloT are not supported <u>1</u> Support control plane CloT EPS optimization 2    Support user plane CloT EPS optimization 3    Support both control plane and user plane CloT EPS optimizations
<b>&lt;preferred_UE_opt&gt;</b>	Integer type. Indicates the UE's preference for CloT EPS optimizations. 0    No Preference <u>1</u> Preference for control plane CloT EPS optimization 2    Preference for user plane CloT EPS optimization
<b>&lt;supported_Network_opt&gt;</b>	Integer type. indicates the Network support for CloT EPS optimizations. 0    No support 1    Support for control plane CloT EPS optimization 2    Support for user plane CloT EPS optimization 3    Support for both control plane CloT EPS optimization and user plane CloT EPS optimization

<err>

Error codes. Please refer to **Chapter 13** for details.

**NOTE**

Since NB-IoT must support control plane CloT, **<supported\_UE\_opt>** is invalid when configured to 0 or 2.

## 5.22. AT+CTZR Time Zone Reporting

This Write Command enables/disables the reporting of time zone change event. If the reporting is enabled, the MT will return the URC **+CTZV: <tz>** whenever the time zone is changed.

AT+CTZR Time Zone Reporting	
Test Command <b>AT+CTZR=?</b>	Response <b>+CTZR:</b> (list of supported <onoff>s)  <b>OK</b>
Read Command <b>AT+CTZR?</b>	Response <b>+CTZR:</b> <onoff>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR:</b> <err>
Write Command <b>AT+CTZR=&lt;onoff&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR:</b> <err>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately Remain valid after deep-sleep wakeup. The configuration is saved to NVRAM by executing <b>AT&amp;W</b> after this command is issued.

## Parameter

<b>&lt;onoff&gt;</b>	Integer type. 0    Disable time zone change event reporting 1    Enable time zone change event reporting by URC <b>+CTZV: &lt;tz&gt;</b> .
<b>&lt;tz&gt;</b>	String type. Represents the sum of the local time zone (difference between the local time and GMT expressed in quarters of an hour) plus daylight saving time. The format is " $\pm$ zz", expressed as a fixed width, two digits integer with the range -48 ~ +56. To maintain a fixed width, numbers in the range -9 ~ +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09".
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

## Example

```
AT+CTZR=?
```

```
+CTZR: (0,1)
```

```
OK
```

```
AT+CTZR=0
```

```
OK
```

```
AT+CTZR?
```

```
+CTZR: 0
```

```
OK
```

## 5.23. AT+CGAPNRC APN Rate Control

This Write Command returns the APN rate control parameters (see *3GPP TS 24.008*) associated with the provided context identifier **<cid>**, while the Execution Command will return the APN rate control parameters of all active PDP contexts.

This Test Command returns a list of **<cid>** associated with secondary and non-secondary active PDP contexts.

<b>AT+CGAPNRC APN Rate Control</b>	
Test Command <b>AT+CGAPNRC=?</b>	Response <b>+CGAPNRC:</b> (list of <b>&lt;cid&gt;</b> s associated with active contexts)  <b>OK</b>
Write Command <b>AT+CGAPNRC=&lt;cid&gt;</b>	Response <b>+CGAPNRC:</b> <b>&lt;cid&gt;</b> [,<Additional_exception_reports>[,<U

	<p><b>plink_time_unit&gt;[,&lt;Maximum_uplink_rate&gt;]]]</b></p> <p><b>OK</b></p> <p>If there is any error:</p> <p><b>ERROR</b></p> <p>Or</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>
Execution Command <b>AT+CGAPNRC</b>	<p>Response</p> <p><b>+CGAPNRC: &lt;cid&gt;[,&lt;Additional_exception_reports&gt;[,&lt;Uplink_time_unit&gt;[,&lt;Maximum_uplink_rate&gt;]]]</b></p> <p><b>[+CGAPNRC: &lt;cid&gt;[,&lt;Additional_exception_reports&gt;[,&lt;Uplink_time_unit&gt;[,&lt;Maximum_uplink_rate&gt;]]]]</b></p> <p><b>[...]</b></p> <p><b>OK</b></p> <p>If there is any error:</p> <p><b>ERROR</b></p> <p>Or</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

<b>&lt;cid&gt;</b>	Integer type. The particular PDP context definition (see <b>AT+CGDCONT</b> command).
<b>&lt;Additional_exception_reports&gt;</b>	<p>Integer type. Indicates whether or not additional exception reports are allowed to be sent when the maximum uplink rate is reached. This refers to bit 4 of octet 1 of the APN rate control parameters IE as specified in <i>3GPP TS 24.008 subclause 10.5.6.3.2</i>.</p> <p>0 Additional exception reports at maximum rate reached are not allowed to be sent.</p> <p>1 Additional exception reports at maximum rate reached are allowed to be sent.</p>
<b>&lt;Uplink_time_unit&gt;</b>	<p>Integer type. Specifies the time unit to be used for the maximum uplink rate. This refers to bits 1 to 3 of octet 1 of the APN rate control parameters IE as specified in <i>3GPP TS 24.008 subclause 10.5.6.3.2</i>.</p> <p>0 Unrestricted</p> <p>1 Minute</p>

	2	Hour
	3	Day
	4	Week
<b>&lt;Maximum_uplink_rate&gt;</b>	Integer type. Specifies the maximum number of messages the UE is restricted to send per uplink time unit. This refers to octet 2 to 4 of the APN rate control parameters IE as specified in <i>3GPP TS 24.008 subclause 10.5.6.3.2</i> .	
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.	

## 5.24. AT+QSPCHSC Set Scrambling Algorithm

This command selects new or old scrambling code. The scrambling code has been updated by 3GPP, so the UE needs to select the correct code for network.

<b>AT+QSPCHSC Set Scrambling Algorithm</b>	
Test Command <b>AT+QSPCHSC=?</b>	Response <b>+QSPCHSC:</b> (list of supported <b>&lt;mode&gt;s</b> )  <b>OK</b>
Read Command <b>AT+QSPCHSC?</b>	Response <b>+QSPCHSC:</b> <b>&lt;mode&gt;</b>  <b>OK</b>
Write Command <b>AT+QSPCHSC=&lt;mode&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. Remain valid after deep-sleep wakeup. The configuration is saved to NVRAM automatically.

### Parameter

<b>&lt;mode&gt;</b>	Integer type.
	0 Old algorithm
	<u>1</u> New algorithm

**<err>** Error codes. Please refer to **Chapter 13** for details.

## 5.25. AT+CSODCP Send Originating Data via Control Plane

This Write Command is used by the TE to transmit data over control plane. Context identifier **<cid>** is used to link the data to particular context.

This command optionally indicates that the application on the MT expects that the exchange of data: will be completed with this uplink data transfer; or will be completed with the next reception of downlink data.

This command also optionally indicates whether or not the data to be transmitted is exception data. This command causes transmission of an ESM DATA TRANSPORT message, as defined in 3GPP TS 24.301.

<b>AT+CSODCP Send Originating Data via Control Plane</b>	
Test Command <b>AT+CSODCP=?</b>	Response <b>+CSODCP:</b> (range of supported <b>&lt;cid&gt;s</b> ),(range of supported <b>&lt;cpdata_length&gt;s</b> ),"<cpdata>",(range of supported <b>&lt;RAI&gt;s</b> ),(list of supported <b>&lt;type_of_user_data&gt;s</b> )  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Write Command <b>AT+CSODCP=&lt;cid&gt;,&lt;cpdata_length&gt;,"&lt;cpdata&gt;"[,&lt;RAI&gt;[,&lt;type_of_user_data&gt;]]</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

### Parameter

<b>&lt;cid&gt;</b>	Integer type. A numeric parameter which specifies a particular PDP context or EPS bearer context definition. <b>&lt;cid&gt;</b> is local to the TE-MT interface and identifies the PDP or EPS bearer contexts which have been set up via AT
--------------------	---



	command (see <b>AT+CGDCONT</b> ). Range: 0–7.
<b>&lt;cpdata_length&gt;</b>	Integer type. Indicates the number of octets of the <b>&lt;cpdata&gt;</b> information element. Range: 0–1500. When there is no data to transmit, the value shall be set to zero.
<b>&lt;cpdata&gt;</b>	String of octets. Contains the user data container contents (see <i>3GPP TS 24.301 subclause 9.9.4.24</i> for details). When there is no data to transmit, the <b>&lt;cpdata&gt;</b> shall be an empty string ("" ). This parameter shall not be subject to conventional character conversion as per <b>AT+CSCS</b> (see <i>3GPP TS 27.005</i> for details). The coding format of the user data container and the maximum length of <b>&lt;cpdata&gt;</b> are implementation specific.
<b>&lt;RAI&gt;</b>	Integer type. Indicates the value of the release assistance indication, refer to <i>3GPP TS 24.301 subclause 9.9.4.25</i> for details. <u>0</u> No information available. 1 The MT expects that exchange of data will be completed with the transmission of the ESM DATA TRANSPORT message. 2 The MT expects that exchange of data will be completed with the receipt of an ESM DATA TRANSPORT message.
<b>&lt;type_of_user_data&gt;</b>	Integer type. Indicates whether the user data transmitted is regular or exceptional. <u>0</u> Regular data 1 Exception data
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### Example

```
AT+CSODCP=?
+CSODCP: (0-7),(0-1500),"<cpdata>",(0-2),(0,1)

OK
```

## 5.26. AT+QNBPOWERCLASS Set Band Power

The Write Command sets the output power of a specified frequency band. The Read Command lists the output power of all the frequency bands supported.

<b>AT+QNBPOWERCLASS Set Band Power</b>	
Test Command <b>AT+QNBPOWERCLASS=?</b>	Response <b>+QNBPOWERCLASS:</b> (list of supported<band>s),(list of supported <power_class>s)  <b>OK</b>

	<p>If there is any error:</p> <p><b>ERROR</b></p> <p>Or</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>
<p>Read Command</p> <p><b>AT+QNBPOWERCLASS?</b></p>	<p>Response</p> <p><b>+QNBPOWERCLASS: &lt;band&gt;,&lt;power_class&gt;</b></p> <p>[...]</p> <p><b>OK</b></p> <p>If there is any error:</p> <p><b>ERROR</b></p> <p>Or</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>
<p>Write Command</p> <p><b>AT+QNBPOWERCLASS=[&lt;band&gt;,&lt;power_class&gt;</b></p>	<p>Response</p> <p><b>OK</b></p> <p>If there is any error:</p> <p><b>ERROR</b></p> <p>Or</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>
Maximum Response Time	300 ms
Characteristics	<p>The command takes effect after the module reboots.</p> <p>Remain valid after deep-sleep wakeup.</p> <p>The configuration is saved to NVRAM automatically.</p>

## Parameter

<b>&lt;band&gt;</b>	Integer type. Frequency band, as the key to mapping. Range: 3, 5, 8, 20, 28.
<b>&lt;power_class&gt;</b>	Integer type. The output power of the frequency band. Range: 14, 20, 23. Default: 23. Unit: dBm.
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### NOTE

1. If **<band>** is omitted, then all the bands supported will be configured to the output power specified.
2. The output power of 14 dBm cannot be configured for a single frequency band. Therefore, if the output power of 14 dBm is to be configured, then all bands supported should be configured to 14 dBm simultaneously.
3. If all bands supported are configured to 14 dBm, then configuring the output power of the specified band to a different value will cause other bands to return to the default value of 23 dbm.

# 6 Hardware Related Commands

## 6.1. AT+CFUN Set UE Functionality

This Write Command selects the level of functionality in the MT. Level "Full functionality" is where the highest level of power is drawn. "Minimum functionality" is where minimum power is drawn.

This Read Command returns the current setting of **<fun>**.

AT+CFUN Set UE Functionality	
Test Command <b>AT+CFUN=?</b>	Response <b>+CFUN:</b> (list of supported <b>&lt;fun&gt;s</b> ),(list of supported <b>&lt;rst&gt;s</b> )  <b>OK</b>
Read Command <b>AT+CFUN?</b>	Response <b>+CFUN:</b> <b>&lt;fun&gt;</b>  <b>OK</b>
Write Command <b>AT+CFUN=&lt;fun&gt;[,&lt;rst&gt;]</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	90 s, determined by network.
Characteristics	/

### Parameter

<b>&lt;fun&gt;</b>	Integer type. UE functionality level. 0 Minimum functionality 1 Full functionality
<b>&lt;rst&gt;</b>	Integer type. Whether to reset the UE.

<u>0</u>	Do not reset the UE after setting it to <b>&lt;fun&gt;</b> power level
<u>1</u>	Reset the UE after setting it to <b>&lt;fun&gt;</b> power level
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### Example

```

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

OK
AT+CFUN=1
OK
AT+CFUN?
+CFUN: 1

OK

```

## 6.2. AT+QSCCLK Configure Sleep Mode

This command configures sleep mode of the UE.

<b>AT+QSCCLK Configure Sleep Mode</b>	
Test Command <b>AT+QSCCLK=?</b>	Response <b>+QSCCLK:</b> (range of supported <b>&lt;n&gt;s</b> )  <b>OK</b>
Read Command <b>AT+QSCCLK?</b>	Response <b>+QSCCLK:</b> <b>&lt;n&gt;</b>  <b>OK</b>
Write Command <b>AT+QSCCLK=&lt;n&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately (when <b>&lt;n&gt;=1</b> is switched to <b>&lt;n&gt;=2</b> , the command takes effect after the module reboots, or vice versa).

Remain valid after deep-sleep wakeup.  
The configuration is saved to NVRAM automatically.

## Parameter

<b>&lt;n&gt;</b>	Integer type. Whether to enable sleep mode.
0	Disable sleep mode
1	Enable light sleep and deep sleep
2	Enable light sleep only, wakeup by Main UART
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### NOTE

1. UART does not work during deep sleep mode. Therefore, when executing **AT+QSCLK=1**, please make sure the UART has been waken up first before sending an AT command.
2. When **AT+QSCLK=0**, UART is always working. If it is intended to make the module enter sleep mode, please resend **AT+QSCLK=1** or **2**.
3. Switching between **<n>=1** and **<n>=2** requires a rebooting to take effect.
4. The BC65 module is waked up from deep sleep by driving PSM\_EINT pin low, and the BC95-GR module is waked up from deep sleep by MCU sending an AT command to the module (this command will be discarded and not be printed in UART).

## Example

```
AT+QSCLK=1
OK
```

## 6.3. AT+QRST Reset the Module

This command resets the module immediately.

### AT+QRST Reset the Module

Test Command <b>AT+QRST=?</b>	Response <b>+QRST:</b> (list of supported <b>&lt;mode&gt;s</b> )  <b>OK</b>
Write Command <b>AT+QRST=&lt;mode&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b>

	Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

<b>&lt;mode&gt;</b>	Integer type. <u>1</u> Reset the module immediately.
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

## 6.4. AT+QPOWD Power off the Module

This command powers off or resets the module.

<b>AT+QPOWD Power off the Module</b>	
Test Command <b>AT+QPOWD=?</b>	Response <b>+QPOWD: (range of supported &lt;op&gt;s)</b>  <b>OK</b>
Write Command <b>AT+QPOWD=&lt;op&gt;</b>	Response When <op>=0: <b>OK</b>  When <op>=1: <b>NORMAL POWER DOWN</b>  When <op>=2: <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	1 s
Characteristics	/

## Parameter

<b>&lt;op&gt;</b>	Integer type. 0 Urgent power off (without URC <b>NORMAL POWER DOWN</b> returned) 1 Normal power off (with URC <b>NORMAL POWER DOWN</b> returned) 2 Reset the UE
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

## Example

```
AT+QPOWD=0
OK
```

## 6.5. AT+CCLK Return Current Date and Time

This Read Command returns the current setting of the clock. The clock will be set automatically once the UE has connected to the network.

<b>AT+CCLK Return Current Date and Time</b>	
Test Command <b>AT+CCLK=?</b>	Response <b>OK</b>
Read Command <b>AT+CCLK?</b>	Response <b>+CCLK: &lt;time&gt;</b>  <b>OK</b>
Write Command <b>AT+CCLK=&lt;time&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

<b>&lt;time&gt;</b>	String type. Current time in the format "yy/MM/dd,hh:mm:ss", where the characters, from left to right, indicate year (yy), month (MM), day (dd), hour (hh), minute (mm) and second (ss).
---------------------	--

## Example

```
AT+CCLK=?
OK
AT+CCLK="19/05/06,22:10:00"
OK
```

## 6.6. AT+QCCLK Set and Get Current Date and UTC

This Write Command sets the real-time clock of MT. If such setting fails, an MT error **+CME ERROR: <err>** is returned.

This Read Command returns the current date and UTC (Universal Time Coordinated) of the clock.

AT+QCCLK Set and Get Current Date and UTC	
Test Command <b>AT+QCCLK=?</b>	Response <b>OK</b>
Read Command <b>AT+QCCLK?</b>	Response <b>+QCCLK: &lt;time&gt;</b>  <b>OK</b>
Write Command <b>AT+QCCLK=&lt;time&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

**<time>** String type. Current time in the format "yy/MM/dd,hh:mm:ss±zz", where the characters, from left to right, indicate year (yy), month (MM), day (dd), hour (hh), minute (mm), second (ss) and time zone (zz). Time zone indicates the difference, expressed in quarters of an hour, between the local time and GMT(value range from -96 to +96). E.g., 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08".



## Example

```
AT+QCCLK=?
OK
AT+QCCLK="19/05/06,22:10:00+08"
OK
```

## 6.7. AT+CBC Query Power Supply Voltage

This command queries the voltage of power supply.

AT+CBC Query Power Supply Voltage	
Test Command <b>AT+CBC=?</b>	Response <b>+CBC:</b> (range of supported <b>&lt;bcs&gt;s</b> ),(range of supported <b>&lt;bcl&gt;s</b> ), <b>&lt;voltage&gt;</b>  <b>OK</b>
Execution Command <b>AT+CBC</b>	Response <b>+CBC:</b> <b>&lt;bcs&gt;</b> , <b>&lt;bcl&gt;</b> , <b>&lt;voltage&gt;</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	/

## Parameter

<b>&lt;bcs&gt;</b>	Integer type. Battery charge status. 0 ME is not charging 1 ME is charging 2 Charging has been finished 3 Charging adapter is connected, charging has finished 4 Charging error, charging is interrupted 5 False charging temperature, charging is interrupted while the temperature is beyond the allowed range
<b>&lt;bcl&gt;</b>	Integer type. Battery charge level in percentage.

	0	Battery is exhausted, or MT does not have a battery connected
	1–100	Battery has 1–100 percent of capacity remaining
<voltage>	Integer type. Battery voltage. Unit: mV.	
<err>	Error codes. Please refer to <b>Chapter 13</b> for details.	

**NOTE**

As BC65 and BC95-GR modules do not support battery charging, <bcs> and <bcl> are invalid and will always be 0, while the <voltage> still indicates the correct voltage of power supply.

**Example**

```
AT+CBC
+CBC: 0,0,3856

OK
```

## 6.8. AT+QATWAKEUP Enable/Disable Deep Sleep Wakeup Indication

This command enables/disables an URC on a channel that indicates the modem is fully woken up after a deep sleep or enters the deep sleep mode.

AT+QATWAKEUP Enable/Disable Deep Sleep Wakeup Indication	
Test Command <b>AT+QATWAKEUP=?</b>	Response <b>+QATWAKEUP:</b> (list of supported <enable>s)  <b>OK</b>
Read Command <b>AT+QATWAKEUP?</b>	Response <b>+QATWAKEUP:</b> <enable>  <b>OK</b>
Write Command <b>AT+QATWAKEUP=&lt;enable&gt;</b>	Response <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

The configuration is saved to NVRAM by executing **AT&W** after this command is issued.

### Parameter

<b>&lt;enable&gt;</b>	Integer type. Enable or disable the indication on this channel when modem wakes up from deep sleep. 0    Disable 1    Enable
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

### Example

```

AT+QATWAKEUP=1      //Enable wakeup indication

OK
+QATSLEEP            //When the module succeeds in entering deep sleep mode (PM3 state), this
                     URC will be reported.

+QATSLEEPFAIL        //When the module fails to enter deep sleep mode (PM3 state), this URC will
                     be reported.

+QATWAKEUP            //The module has been fully woken up and is ready to receive AT commands/
                     data

```

## 6.9. AT+QLEDMODE Configure Network-Status-Indication Light

This command enables or disables network-status-indication light.

### AT+QLEDMODE Configure Network-Status-Indication Light

Test Command <b>AT+QLEDMODE=?</b>	Response <b>+QLEDMODE:</b> (list of supported <n>s)  <b>OK</b>
Read Command <b>AT+QLEDMODE?</b>	Response <b>+QLEDMODE:</b> <n>  <b>OK</b>
Write Command <b>AT+QLEDMODE=&lt;n&gt;</b>	Response <b>OK</b>

	If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. Remain valid after deep-sleep wakeup. The configuration is saved to NVRAM automatically.

## Parameter

<b>&lt;n&gt;</b>	Integer type. Whether to enable the network-status-indication light. 0    Disable 1    Enable
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

## Example

```
AT+QLEDMODE=1
OK
```

## 6.10. AT+QADC Read ADC

This command reads ADC.

<b>AT+QADC Read ADC</b>	
Test Command <b>AT+QADC=?</b>	Response <b>+QADC: (list of supported&lt;status&gt;s),(range of supported &lt;value&gt;s)</b>  <b>OK</b>
Read Command <b>AT+QADC?</b>	Response <b>+QADC: &lt;status&gt;,&lt;value&gt;</b>  <b>OK</b>  If there is any error: <b>ERROR</b> Or <b>+CME ERROR: &lt;err&gt;</b>

Maximum Response Time	2 s
Characteristics	/

## Parameter

<b>&lt;status&gt;</b>	Integer type. Whether the voltage is acquired successfully. 0 Failed 1 Succeeded
<b>&lt;value&gt;</b>	Integer type. The acquired voltage. Range: 0–1890. Unit: mV.
<b>&lt;err&gt;</b>	Error codes. Please refer to <b>Chapter 13</b> for details.

# 7 TCP/IP Related Commands

For more information about the TCP/IP feature, see [document \[1\]](#).

**Table 2: TCP/IP related Commands**

Commands	Description
AT+QIOPEN	Open a Socket
AT+QICLOSE	Close a Socket
AT+QISTATE	Query Socket Status
AT+QISEND	Send Text String Data
AT+QIRD	Retrieve the Received TCP/IP Data
AT+QISENDEX	Send Hex String Data
AT+QISWTMD	Switch Data Access Modes
AT+QPING	Ping a Remote Server
AT+QNTTP	Synchronize Local Time with NTP Server
AT+QIDNSGIP	Get IP Address by Domain Name
AT+QICFG	Configure Optional Parameters
AT+QIGETERROR	Query the Last Error Code
AT+QIDNSCFG	Configure DNS Server Function

## 8 DFOTA Related Commands

For more information about the DFOTA function, see *document [2]*.

Table 3: DFOTA Related Commands

Commands	Description
AT+QFOTADL	Firmware download and upgrade

# 9 MQTT Related Commands

For more information on MQTT function, see *document [3]*.

**Table 4: MQTT Related Commands**

Commands	Description
AT+QMTCFG	Configure Optional Parameters of MQTT
AT+QMTOPEN	Open a Network for MQTT Client
AT+QMTCLOSE	Close a Network for MQTT Client
AT+QMTCONN	Connect a Client to MQTT Server
AT+QMTDISC	Disconnect a Client from MQTT Server
AT+QMTSUB	Subscribe to Topics
AT+QMTUNS	Unsubscribe from Topics
AT+QMTPUB	Publish Messages



# 10 FILE Related Commands

For more information on FS function, see **document [4]**.

**Table 5: File System Related Commands**

Commands	Description
AT+QFLST	List Files
AT+QFLDS	Get Space information of the Storage
AT+QFUPL	Upload a File to the Storage
AT+QFDWL	Download File from the Storage
AT+QFDEL	Delete a File from the Storage
AT+QFMOV	Move a File from RAM to UFS
AT+QFOPEN	Open a File
AT+QFREAD	Read a File
AT+QFWRITE	Write a File
AT+QFSEEK	Set the Offset of the File Pointer
AT+QFCLOSE	Close a File
AT+QFPOSITION	Get the Current Offset of the File Pointer
AT+QFFLUSH	Force to Write Data Remaining in the File Buffer
AT+QFTUCAT	Truncate a File from the File Pointer
AT+QFRENAME	Rename a File

# 11 DTLS/SSL Related Commands

For more information on DTLS/SSL function, see *document [5]*.

**Table 6: DTLS/SSL Related Commands**

Commands	Description
AT+QSSLCFG	Configure Parameters of an SSL Context
AT+QSSLOPEN	Open an SSL Socket to Connect a Remote Server
AT+QSSLSEND	Send Data through SSL Connection
AT+QSSLCLOSE	Close an SSL Connection

# 12 Examples

## 12.1. Network Attachment

Currently, the modules only support automatic registration on network after powering on.

### 12.1.1. Automatic Network Attachment with Manual Query of Network Attachment State

Below is a simple example of the module automatically attaching to network. During the process, it is only needed to query settings and confirm whether the module has attached to network with the following commands:

```
//Power on
RDY

+CFUN: 1

+CPIN: READY
AT
OK //Successfully synchronized
AT+CIMI //Query the IMSI number
460012345678969

OK
AT+CESQ //Query the signal strength
+CESQ: 36,99,255,255,53

OK
AT+QENG=0 //Display radio information for serving and neighbor cells
+QENG: 0,3734,,105,"82e76b2",-71,22,-56,22,8,"4c10",1,-6

OK
AT+CGATT? //Query whether the network is activated: 1 means attached to network
successfully, while 0 means detached.
+CGATT: 1

OK
```

```

AT+CREG? //Query the network registration status
+CREG: 0,1 //0 indicates that the URC is disabled and 1 indicates that the module is
              registered on network

OK
AT+CSCON? //Query the signal connection status
+CSCON: 0,1 //0 indicates that the URC is disabled and 1 indicates that the signaling
              connection status is "Connected"

OK

```

### 12.1.2. Automatic Network Attachment with URC State Report

The following shows a simple example of the module automatically attaching to network with URC state reports. During the process, there is no need to query settings and confirm whether the module has attached to network manually. The network attachment state is reported via URC.

```

//Power on
RDY

+CFUN: 1

+CPIN: READY
//Configure the APN for initial attachment
//Once set, the configurations are saved to NVM automatically
//The setting takes effect after restart or re-registration
AT+QCGDEFCONT="IP","CMNBIOT"
OK
AT+QRST=1 //Reset the module immediately
OK

RDY

+CFUN: 1

+CPIN: READY
AT+CIMI //Query the IMSI number.
460012345678969

OK
AT+CREG=1 //Set to automatically report network registration status, that is, when the
              module is registered on the network, a URC is reported.

OK
AT+CSCON=1 //Set to automatically report signaling connection status, that is, when the
              module is in connected or idle state, a URC is reported.

```

```

OK

+CSCON: 1                //The MT is connected.

+CEREG: 1                //The MT is registered.
AT+CESQ                 //Query the signal strength.
+CESQ: 36,99,255,255,25,53

OK
AT+QENG=0               //Display radio information for serving and neighbor cells
+QENG: 0,3734,,105,"82e76b2",-71,22,-56,22,8,"4c10",1,-6

OK
AT+CGATT?               //Query whether the network is activated
+CGATT: 1               //1 indicates that the network is activated

OK
AT+CEREG?               //Query the network registration status
+CEREG: 1,1             //The first 1 indicates that the URC is enabled and the second 1 indicates that
                        //the module is registered on network

OK
AT+CSCON?               //Query the signal connection status
+CSCON: 1,1             //The first 1 indicates that the URC is enabled and the second 1 indicates that
                        //the signaling connection status is "Connected"

OK

```

### 12.1.3. Attach to Network with Specified PLMN

The following shows a simple example for automatic network attachment with specified PLMN:

```

//Power on
RDY

+CFUN: 1

+CPIN: READY
//Configure the APN for initial attachment
//Once set, the configurations are saved to NVM automatically
//The setting takes effect after restart or re-registration
AT+QCGDEFCONT="IP","CMNBIOT"
OK
AT+QRST=1
OK

```

RDY

+CFUN: 1

+CPIN: READY

**AT+CIMI** //Query the IMSI number.  
460012345678969

OK

**AT+COPS=1,2,"46000"** //Specify PLMN

OK

**AT+CESQ** //Query the signal strength.  
+CESQ: 36,99,255,255,25,53

OK

**AT+QENG=0** //Display radio information for serving and neighbor cells  
+QENG: 0,3734,,105,"82e76b2",-71,22,-56,22,8,"4c10",1,-6

OK

**AT+CGATT?** //Query whether the network is activated: 1 means attached to network successfully, while 0 means detached.

+CGATT: 1

OK

**AT+CEREG?** //Query the network registration status  
+CEREG: 0,1 //0 indicates that the URC is disabled and 1 indicates that the module is registered on network

OK

**AT+CSCON?** //Query the signal connection status  
+CSCON: 0,1 //0 indicates that the URC is disabled and 1 indicates that the signaling connection status is "Connected"

OK

#### 12.1.4. Attach to Network with Specified EARFCN/PCI

//Power on

RDY

+CFUN: 1

+CPIN: READY

```

//Configure the APN for initial attachment
//Once set, the configurations are saved to NVM automatically
//The setting takes effect after restart or re-registration
AT+QCGDEFCONT="IP","CMNBIOT"
OK
AT+Qrst=1
OK

RDY

+CFUN: 1

+CPIN: READY
AT+CIMI                                //Query the IMSI number.
460012345678969

OK
AT+QLOCKF=1,3734,19,105                //Specify the EARFCN, offset and PCI.
OK
AT+CESQ                                //Query the signal strength.
+CESQ: 36,99,255,255,25,53

OK
AT+QENG=0                                //Display radio information for serving and neighbor cells.
+QENG: 0,3734,,105,"82e76b2",-71,22,-56,22,8,"4c10",1,-6

OK
AT+CGATT?                                //Query whether the network is activated: 1 means attached to
                                         network successfully, while 0 means detached
+CGATT: 1

OK
AT+CEREG?                                //Query the network registration status
+CEREG: 0,1                                //0 indicates that the URC is disabled and 1 indicates that the module
                                         is registered on network

OK
AT+CSCON?                                //Query the signal connection status
+CSCON: 0,1                                //0 indicates that the URC is disabled and 1 indicates that the
                                         signaling connection status is "Connected"

OK

```

### 12.1.5. Attach to Network with Specified Band

```
//Power on
RDY

+CFUN: 1

+CPIN: READY
//Configure the APN for initial attachment
//Once set, the configurations are saved to NVM automatically
//The setting takes effect after restart or re-registration
AT+QCGDEFCONT="IP","CMNBIOT"
OK
AT+QRST=1                      //Reset the module immediately
OK

RDY

+CFUN: 1

+CPIN: READY
AT+QBAND=?                     //Query supported bands
+QBAND: (0-5)[,(3,5,8,20,28)]

OK
AT+QBAND=1,5                   //Sets the band to be used
OK
AT+QBAND?                      //Query the band being used
+QBAND: 5

OK
```



# 13 Summary of <err> Codes

This chapter introduces the <err> codes related to BC65 and BC95-GR modules. The error codes listed in the following two tables are compliant with the 3GPP specifications. Customers can refer to *3GPP TS 27.007 V13.5.0, sub-clause 9.2* for all possible <err> values.

**Table 7: General <err> Codes (27.007)**

<err> Codes	Description
3	Operation not allowed
4	Operation not supported
10	USIM not inserted
13	USIM failure
14	USIM busy
22	Not found
24	Text overlong
49	Execution not supported
50	Execution failed
51	AT command no memory
52	Option not supported
53	Parameter invalid
58	Invalid command line

**Table 8: Specific <err> Codes for BC65 and BC95-GR Modules**

<err> Codes	Description
111	PLMN not allowed
112	Location area not allowed

113	Roaming not allowed in this location area
132	Service option not supported
133	Requested service option not subscribed
149	PDP authentication failure
160	AT command cannot actioned
264	USIM verification failed
265	USIM unblock failed
301	SMS service reserved
302	Operation not allowed
304	Invalid PDU parameter
305	Invalid TXT parameter
310	USIM not inserted
311	USIM pin required
312	PH USIM pin required
313	USIM failed
314	USIM busy
315	USIM wrong
332	Network timeout
517	Invalid PDU character

#### NOTE

**AT+CME=<n>** disables (<n>=0) or enables (<n>=1 or <n>=2) the use of final result code **+CME ERROR: <err>**. When error occurs, numeric values will be returned if <n>=1, and verbose values will be returned if <n>=2.

# 14 Appendix A References

**Table 9: Related Documents**

Document Name
[1] Quectel_BC65&BC92&BC95-GR_TCP(IP)_Application_Note
[2] Quectel_BC65&BC92&BC95-GR_DFOTA_Application_Note
[3] Quectel_BC65&BC92&BC95-GR_MQTT_Application_Note
[4] Quectel_BC65&BC92&BC95-GR_FILE_Application_Note
[5] Quectel_BC65&BC95-GR_SSL_Application_Note

**Table 10: Terms and Abbreviations**

Abbreviation	Description
3GPP	3 <sup>rd</sup> Generation Partnership Project
ADC	Analog-to-Digital Converter
APN	Access Point Name
ARQ	Automatic Repeat Request
BCCH	Broadcast Control Channel
BCD	Binary Coded Decimal
CHAP	Challenge-Handshake Authentication Protocol
CIoT	Cellular Internet of Things
DCE	Data Circuit-terminating Equipment
DFOTA	Delta Firmware Upgrade Over-The-Air
DL	DownLink
DL-SCH	Downlink-Shared Channel

DNS	Domain Name Server
DTE	Data Terminal Equipment
EARFCN	E-UTRAN Absolute Radio Frequency Channel Number
ECL	Enhanced Coverage Level
eDRX	extended Discontinuous Reception
EMM	EPS Mobility Management
ePCO	extended Protocol Configuration Option
EPS	Evolved Packet System
ESM	EPS Session Management
E-UTRAN	Evolved Universal Terrestrial Radio Access Network
GGSN	Gateway GPRS Support Node
GMT	Greenwich Mean Time
HARQ	Hybrid Automatic Repeat reQuest
HPLMN	Home Public Land Mobile Network
HTTP	Hypertext Transfer Protocol
ICCID	Integrated Circuit Card Identifier
ID	Identifier
IE	Information Element
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
IRQ	Interrupt Request
MAC	Medium Access Control
MCU	Microprogrammed Control Unit
ME	Mobile Equipment
MQTT	Message Queuing Telemetry Transport

MS	Mobile Station
MT	Mobile Termination
NB-IoT	Narrow Band Internet of Thing
NTP	Network Time Protocol
NVM	Non-Volatile Memory
NVRAM	Non-Volatile Random Access Memory
PAP	Password Authentication Protocol
PCI	Physical Cell Identity
PCO	Protocol Configuration Options
PDCP	Packet Data Convergence Protocol
PDN	Packet Data Network
PDP	Packet Data Protocol
PDU	Packet Data Unit
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PPP	Point-to-Point Protocol
PS	Packet Switch
PSM	Power Saving Mode
PUK	PIN Unlock Key
RAM	Random Access Memory
RFC	Request for Comments
RLC	Radio Link Control
ROHC	Robust Header Compression
RRC	Radio Resource Control
RSRP	Reference Signal Receiving Power
RSRQ	Reference Signal Receiving Quality
RSSI	Received Signal Strength Indication
RxQual	Receive Quality

SMS	Short Message Service
SMTP	Simple Mail Transfer Protocol
SNDCP	SubNetwork Dependent Convergence Protocol
SNR	Signal-to-Noise Ratio
TA	Terminal Adapter
TAC	Tracking Area Code
TAU	Tracking Area Update
TE	Terminal Equipment
TCP	Transmission Control Protocol
UART	Universal Asynchronous Receiver/Transmitter
UDP	User Datagram Protocol
UE	User Equipment
UFS	Universal Flash Storage
UICC	Universal Integrated Circuit Card
UL	UpLink
UL-SCH	Uplink-Shared Channel
URC	Unsolicited Result Code
USIM	Universal Subscriber Identity Module
UTC	Universal Time Coordinated
UUID	Universally Unique Identifier