BG95&BG77

AT Commands Manual

LPWA Module Series

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About the Document

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1 Introduction

1.1. Scope of the Document

This document presents the AT Commands Set for the following Quectel eMTC/NB-IoT modules:

- **BG95 series:**
  BG95-M1: LTE Cat M1 only module
  BG95-M2: LTE Cat M1 and Cat NB2 module
  BG95-M3: LTE Cat M1/Cat NB2/EGPRS module
  BG95-N1*: LTE Cat NB2 only module
  BG95-M4 1): LTE Cat M1 and Cat NB2 module (450MHz supported)
  BG95-M5 1): LTE Cat M1 and Cat NB2 module (Power Class 3)
  BG95-MF 1): LTE Cat M1 and Cat NB2 module (Wi-Fi positioning)

- **BG77**: LTE Cat M1 and Cat NB2 module

Hereinafter, BG95 series is collectively called BG95 unless otherwise specified.

NOTES

1. 1) BG95-M4, BG95-M5 and BG95-MF are under planning.
2. "*" means under development.

1.2. AT Command Syntax

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

The AT Commands Set implemented by BG95/BG77 is a combination of *3GPP TS 27.007*, *3GPP TS 27.005* and *ITU-T recommendation V.25ter* as well as the AT Commands developed by Quectel.

All these AT commands can be split into three categories syntactically: "**basic**", "**S parameter**", and "**extended**". They are listed as follows:

- **Basic syntax**

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 whether received characters should be echoed back to the DTE according to the value of "**<n>**". "**<n>**" is optional and a default will be used if it is null.

- **S parameter syntax**

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

- **Extended syntax**

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

Table 1: Types of AT Commands and Responses

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

1.3. Supported Character Sets

BG95/BG77 AT command interface uses the GSM character set by default. BG95/BG77 module supports the following character sets:

- GSM format
- UCS2
- IRA

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

1.4. AT Command Interface

BG95/BG77 AT command interface includes one USB MODEM port and one main UART port. The main UART port and the USB MODEM port support AT command communication and data transfer.

1.5. Unsolicited Result Code

As an Unsolicited Result Code and a report message, URC is not issued as part of the response related to an executed AT command. URC is issued by BG95/BG77 without being requested by the TE and it is issued automatically when a certain event occurs. Typical events leading to URCs are incoming calls (**RING**), received short messages, high/low voltage alarm, high/low temperature alarm, etc.

1.6. Turn off Procedure

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

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

2 General Commands

2.1. ATI Display Product Identification Information

The command delivers a product information text.

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

Parameter

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

Example

```
ATI
Quectel
BG95M2
Revision: BG95M2LAR01A01

OK
```

2.2. AT+GMI Request Manufacturer Identification

The command returns a manufacturer identification text. See also **AT+CGMI**.

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

2.3. AT+GMM Request Model Identification

The command returns a product model identification text. It is identical with **AT+CGMM**.

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

Parameter

<objectID>	Identifier of device type

2.4. AT+GMR Request Firmware Version Identification

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

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

Parameter

<revision>	Identification text of product firmware version

Example

```
AT+GMR
BG95M2LAR01A01

OK
```

2.5. AT+CGMI Request Manufacturer Identification

The command returns a manufacturer identification text. See also **AT+GMI**.

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

	OK
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

2.6. AT+CGMM Request Model Identification

The command returns a product model identification text. It is identical with **AT+GMM**.

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

Parameter

<objectID>	Identifier of device type

2.7. AT+CGMR Request Firmware Version Identification

The command delivers a product firmware version identification text. It is identical with **AT+GMR**.

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

	OK
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<revision>	Identification text of product software version

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

The command returns the International Mobile Equipment Identity (IMEI). It is identical with **AT+CGSN**.

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

Parameter

<IMEI>	IMEI of the ME

NOTE

The serial number (IMEI) varies with the individual ME.

2.9. AT+CGSN Request Product Serial Number

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

AT+CGSN Request Product Serial Number	
Test Command **AT+CGSN=?**	Response **OK**
Execution Command **AT+CGSN**	Response **<IMEI>** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<IMEI>	IMEI of the ME

NOTE

The product serial number (IMEI) varies with the individual ME device.

2.10. AT&F Reset All AT Command Settings to Manufacturer Defaults

The command resets all current AT command settings to their manufacturer default values.

AT&F Reset All AT Command Settings to Manufacturer Defaults	
Execution Command **AT&F[<value>]**	Response TA sets all current AT command settings to manufacturer defaults. Please refer to ***Table 14*** for the list of supported AT commands. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<value>	0	Set all current AT command settings to manufacturer defaults

2.11. AT&V Display Current Configuration

The command displays the current settings of several AT command parameters, including the single-letter AT command parameters which are not readable otherwise.

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

Table 2: AT&V Response

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

OK

2.12. AT&W Store Current AT Command Settings to User Defined Profile

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

AT&W Store Current AT Command Settings to User Defined Profile	
Execution Command **AT&W[<n>]**	Response TA stores the current AT command settings to a user defined profile. Please refer to ***Table 15*** for the list of supported AT commands. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0	Profile number to store the current AT command settings

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

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

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

ATZ Restore All AT Command Settings from User Defined Profile	
Execution Command **ATZ[<value>]**	Response TA restores all current AT command settings to the user defined profile. Please refer to ***Table 16*** for the list of supported AT commands.

	OK
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<value>	0	Reset to profile number 0

2.14. ATQ Set Result Code Presentation Mode

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

ATQ Set Result Code Presentation Mode	
Execution Command **ATQ<n>**	Response This parameter setting determines whether or not the TA transmits any result code to the TE. Information text transmitted in response is not affected by this setting. If **<n>**=0: **OK** If **<n>**=1: (none)
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

2.15. ATV TA Response Format

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

The result codes, their numeric equivalents and brief descriptions of the use of each are listed in the following table.

ATV TA Response Format	
Execution Command **ATV<value>**	Response This parameter setting determines the contents of the header and trailer transmitted with result codes and information responses. When **<value>**=0 **0** When **<value>**=1 **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

Example

```
ATV1                                        //Set <value>=1
OK

AT+CSQ
+CSQ: 30,99

OK                                          //When <value>=1, the result code is OK.

ATV0                                        //Set <value>=0
0

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

Table 3: ATV0&ATV1 Result Codes Numeric Equivalents and Brief Description

ATV1	ATV0	Description
OK	0	Acknowledges execution of a command.
CONNECT	1	A connection has been established. The DCE is moving from command mode to data mode.
RING	2	The DCE has detected an incoming call signal from network.
NO CARRIER	3	The connection has been terminated or the attempt to establish a connection failed.
ERROR	4	Command not recognized, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line.
NO DIALTONE	6	No dial tone detected.
BUSY	7	Engaged (busy) signal detected.
NO ANSWER	8	“@” (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer (S7).

2.16. ATE Set Command Echo Mode

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

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

Parameter

<value>	0	Echo mode OFF

1	Echo mode ON

2.17. A/ Repeat Previous Command Line

The command repeats previous AT command line, and "/" acts as the line termination character.

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

Example

```
ATI
Quectel
BG95M2
Revision: BG95M2LAR01A01

OK
A/                                            //Repeat the previous command.
Quectel
BG95M2
Revision: BG95M2LAR01A01

OK
```

2.18. ATS3 Set Command Line Termination Character

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

ATS3 Set Command Line Termination Character	
Read Command **ATS3?**	Response **<n>** **OK**
Write Command **ATS3=<n>**	Response This parameter setting determines the character recognized

	by TA to terminate an incoming command line. The TA also returns this character responses and result codes. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

2.19. ATS4 Set Response Formatting Character

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

ATS4 Set Response Formatting Character	
Read Command **ATS4?**	Response **<n>** **OK**
Write Command **ATS4=<n>**	Response This parameter setting determines the character generated by the TA for result code and information text. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

2.20. ATS5 Set Command Line Editing Character

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

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

Parameter

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

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

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

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

Parameter

<value>	0	**CONNECT** result code returned only. Dial tone and busy signal detection are both disabled.
	1	**CONNECT<text>** result code returned only. Dial tone and busy signal detection are both disabled.
	2	**CONNECT<text>** result code returned. Dial tone detection is enabled, while busy signal detection is disabled.
	3	**CONNECT<text>** result code returned. Dial tone detection is disabled, while busy signal detection is enabled.
	4	**CONNECT<text>** result code returned. Dial tone and busy signal detection are both enabled.

2.22. AT+CFUN Set UE Functionality

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

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

Parameter

<fun>	0	Minimum functionality
	1	Full functionality
	4	Disable the UE from both transmitting and receiving RF signals

<rst>	0	Do not reset the UE before setting it to **<fun>** functionality level. This is the default setting when **<rst>** is not given.
	1	Reset the UE. The device is fully functional after the reset. This value is available only for **<fun>**=1.
<err>	Integer type. Error code. Please refer to ***Table 17*** for possible **<err>** values.	

Example

```
AT+CFUN=0                                          //Switch the UE to minimum functionality
OK

AT+COPS?
+COPS: 2                                           //No operator is registered

OK

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

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

+CPIN: SIM PIN

AT+CPIN=1234
OK

+CPIN: READY

+QUSIM: 1

+QIND: SMS DONE

AT+CPIN?
+CPIN: READY

OK

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

OK
```

2.23. AT+CMEE Error Message Format

The command controls the format of error result codes: **ERROR**, error numbers or verbose messages as **+CME ERROR: <err>** and **+CMS ERROR: <err>**. Please refer to ***Table 17*** for possible **<err>** values.

AT+CMEE Error Message Format	
Test Command **AT+CMEE=?**	Response **+CMEE:** (list of supported **<n>**s) **OK**
Read Command **AT+CMEE?**	Response **+CMEE: <n>** **OK**
Write Command **AT+CMEE=<n>**	Response TA disables or enables the use of result code **+CME ERROR: <err>** or **+CMS ERROR: <err>** as an indication of an error related to the functionality of the ME. **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

Example

```
AT+CMEE=0                                   //Disable result code
OK

AT+CPIN?
ERROR                                       //Only ERROR will be displayed

AT+CMEE=1                                   //Enable error result code with numeric values
OK

AT+CPIN?
+CME ERROR: 10
```

```
AT+CMEE=2                                          //Enable error result code with verbose (string) values
OK

AT+CPIN?
+CME ERROR: SIM not inserted
```

2.24. AT+CSCS Select TE Character Set

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

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

Parameter

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

Example

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

OK
```

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

AT+CSCS?
+CSCS: "UCS2"

OK
```

2.25. AT+QURCCFG Configure URC Indication Option

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

AT+QURCCFG Configure URC Indication Option	
Test Command **AT+QURCCFG=?**	Response **+QURCCFG: "urcport",("usbat","usbmodem","uart1")** **OK**
Write Command **AT+QURCCFG="urcport"[,<urcportvalue>]**	If the configuration parameter **<urcportvalue>** is omitted, return the current configuration: **+QURCCFG: "urcport",<urcportvalue>** **OK** If the configuration parameter **<urcportvalue>** is present, set the URC output port: **OK** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<urcportvalue>	URC output port	
	"usbmodem"	USB modem port
	"uart1"	Main UART

NOTES

1. Configuration of URC output port will be saved to NVRAM immediately by default.

2. After URC output port is set successfully, it will take effect immediately.

Example

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

OK

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

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

OK
```

2.26. AT+QGMR Request Modem and Application Firmware Versions

The command delivers a product firmware version identification text which includes both the modem firmware version and the application firmware version.

AT+QGMR Request Modem and Application Firmware Versions	
Test Command **AT+QGMR=?**	Response **OK**
Execution Command **AT+QGMR**	Response TA returns one line of identification text which includes both the modem firmware version and the application firmware version. **<revision>** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<revision>	Identification text of product firmware version, including both modem firmware version and application firmware version.

2.27. AT+QAPPVER Request Application Firmware Version

The command delivers the application firmware version number.

AT+QAPPVER Request Application Firmware Version	
Test Command **AT+QAPPVER=?**	Response **OK**
Execution Command **AT+QAPPVER**	Response TA returns application firmware version number. **<revision>** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<revision>	Application firmware version

3 Serial Interface Control Commands

3.1. AT&C Set DCD Function Mode

The command controls the behavior of the UE's DCD line.

AT&C Set DCD Function Mode	
Execution Command **AT&C[<value>]**	Response This parameter determines how the state of circuit 109 (DCD) relates to the detection of received line signal from the distant end. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<value>	0	DCD (data carrier detection) function is always ON
	1	DCD (data carrier detection) function is ON only in the presence of data carrier

3.2. AT&D Set DTR Function Mode

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

AT&D Set DTR Function Mode	
Execution Command **AT&D[<value>]**	Response This parameter determines how the TA responds when circuit 108/2 (DTR) is changed from low to high level during data mode. **OK**
Maximum Response Time	300ms

Reference V.25ter	

Parameter

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

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

The command determines the flow control behavior of the UART interface.

AT+IFC Set TE-TA Local Data Flow Control	
Test Command **AT+IFC=?**	Response **+IFC:** (list of supported **<dce_by_dte>**s),(list of supported **<dte_by_dce>**s) **OK**
Read Command **AT+IFC?**	Response **+IFC: <dce_by_dte>,<dte_by_dce>** **OK**
Write Command **AT+IFC=<dce_by_dte>,<dte_by_dce>**	Response This parameter setting determines the data flow control on the UART interface for data mode. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

Example

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

AT+IFC?
+IFC: 2,2

OK
```

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

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

AT+ICF Set TE-TA Control Character Framing	
Test Command **AT+ICF=?**	Response **+ICF:** (list of supported **<format>**s),(list of supported **<parity>**s) **OK**
Read Command **AT+ICF?**	Response **+ICF: <format>,<parity>** **OK**
Write Command **AT+ICF=[<format>,[<parity>]]**	Response This parameter setting determines the serial interface character framing format and parity received by TA from TE. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

NOTES

1. The command is applied for command mode.
2. The **<parity>** field is ignored if no parity is specified in the **<format>** field.

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

The command is used to query and set the baud rate of the UART. The default baud rate value (**<rate>**) is 115200bps. The setting of **<rate>** will not be restored with **AT&F**.

AT+IPR Set TE-TA Fixed Local Rate	
Test Command **AT+IPR=?**	Response **+IPR:** (list of supported auto detectable **<rate>**s),(list of supported fixed-only **<rate>**s) **OK**
Read Command **AT+IPR?**	Response **+IPR: <rate>** **OK**
Write Command **AT+IPR=<rate>**	Response This parameter setting determines the data rate of the TA on the UART interface. After the delivery of any result code associated with the current command line, the rate of command takes effect. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<rate>	Baud rate per second 9600 19200 38400 57600 115200 230400 460800

921600
2900000
3000000
3200000
3686400
4000000

NOTES

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

Example

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

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

3.6. AT+QRIR* Restore RI Behavior to Inactive

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

AT+QRIR* Restore RI Behavior to Inactive	
Test Command **AT+QRIR=?**	Response **OK**
Execution Command **AT+QRIR**	Response **OK**

	If there is any other error: **ERROR**
Maximum Response Time	300ms

NOTE

"*" means under development.

4 Status Control Commands

4.1. AT+CPAS Mobile Equipment Activity Status

The Execution Command queries the module's activity status.

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

Parameter

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

Example

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

```
OK
RING

AT+CLCC
+CLCC: 1,1,4,0,0,“15695519173”,161

OK

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

OK

AT+CLCC
+CLCC: 1,0,0,0,0,“10010”,129

OK

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

OK
```

4.2. AT+QCFG Extended Configuration Settings

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

AT+QCFG Extended Configuration Settings	
Test Command **AT+QCFG=?**	Response **+QCFG: "nwscanmode"**,(list of supported **<scanmode>**s),(list of supported **<effect>**s) **+QCFG: "nwscanseq"**,(list of supported **<scanseq>**s),(list of supported **<effect>**s) **+QCFG: "servicedomain"**,(list of supported **<servicedomain>**s**),(**list of supported **<effect>**s) **+QCFG: "roamservice"**,(list of supported **<roamservice>**s),(list of supported **<effect>**s) **+QCFG: "band"**,(list of supported **<gsmbandval>**s**),(**list of supported **<emtcbandval>**s**),(**list of supported **<nbiotbandval>s),**(list of supported **<effect>**s) **+QCFG: "msc"**,(list of supported **<mscr>**s),list of supported

	<rrcr>s) **+QCFG: "sgsn"**,(list of supported **<sgsnr>**s) **+QCFG: "celevel"**,(list of supported **<celevel>**s) **+QCFG: "pdp/duplicatechk"**,(list of supported **<enable>**s) **+QCFG: "iotopmode"**,(list of supported **<iotopmode>**s),(list of supported **<effect>**s) **+QCFG: "nb/bandprior"**,(list of supported **<band_priority_seq>**s) **+QCFG: "psm/urc"**,(list of supported **<mode>**s) **+QCFG: "urc/ri/ring"**,(list of supported **<typeri>**s),(list of supported **<pulseduration>**s),(list of supported **<activeduration>**s),(list of supported **<inactiveduration>**s),(list of supported **<ringnodisturbing>**s) **+QCFG: "urc/ri/smsincoming"**,(list of supported **<typeri>**s),(list of supported **<pulseduration>**s) **+QCFG: "urc/ri/other"**,(list of supported **<typeri>**s),(list of supported **<pulseduration>**s) **+QCFG: "risignaltype"**,(list of supported **<risignatype>**s) **+QCFG: "urc/delay"**,(list of supported **<mode>**s) **+QCFG: "ims"**,(list of supported **<mode>**s) **+QCFG: "ledmode"**,(list of supported **<led_mode>**s) **+QCFG: "cmux/urcport"**,(list of supported **<urc_port>**s) **+QCFG: "apready"**,(list of supported **<mode>**s)**,**(list of supported **<level>**s),(list of supported **<internal>**s) **OK**
Maximum Response Time	300ms

4.2.1. AT+QCFG="nwscanseq" Configure RAT Searching Sequence

The command specifies the searching sequence of RATs. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="nwscanseq" Configure RAT Searching Sequence	
Write Command **AT+QCFG="nwscanseq"[,<scanseq>[,effect]]**	Response If **<scanseq>** and **<effect>** are both omitted, return the current configuration: **+QCFG: "nwscanseq",<scanseq>** **OK** If **<scanseq>** and **<effect>** are present, configure the RAT

	searching sequence: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<scanseq>	Number format. RAT search sequence. (e.g.: 020301 stands for eMTC → NB-IoT → GSM)) 00 Automatic (eMTC → NB-IoT → GSM) 01 GSM (For BG95-M3 only) 02 eMTC 03 NB-IoT
<effect>	Number format. When to take effect. 0 Take effect after UE reboots 1 Take effect immediately

NOTES

1. This command is invalid on BG95-M1 and BG95-N1.
2. GSM RAT (**<scanseq>**=02) is valid on BG95-M3 only.

4.2.2. AT+QCFG="nwscanmode" Configure RAT(s) to be Searched

The command specifies the RAT(s) allowed to be searched. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="nwscanmode" Configure RAT(s) to be Searched	
Write Command **AT+QCFG="nwscanmode"[,<scanmode>[,<effect>]]**	Response If **<scanmode>** and **<effect>** are both omitted, return the current configuration: **+QCFG: "nwscanmode",<scanmode>** **OK** If **<scanmode>** and **<effect>** are present, configure the RAT(s) to be searched:

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

Parameter

<scanmode>	Number format. RAT(s) to be searched.	
	0	Automatic
	1	GSM only
	3	LTE only
<effect>	Number format. When to take effect.	
	0	Take effect after UE reboots
	1	Take effect immediately

NOTE

This command is valid on BG95-M3 only.

4.2.3. AT+QCFG="iotopmode" Configure Network Category to be Searched under LTE RAT

The command specifies the network category to be searched under LTE RAT. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="iotopmode" Configure Network Category to be Searched under LTE RAT	
Write Command **AT+QCFG="iotopmode"[,<mode>[,<effect>]]**	Response If **<mode>** and **<effect>** are both omitted, return the current configuration: **+QCFG: "iotopmode",<mode>** **OK** If **<mode>** and **<effect>** are present, configure the network category to be searched under LTE RAT: **OK**

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

Parameter

<mode>	Number format. Network category to be searched under LTE RAT. 0 eMTC 1 NB-IoT 2 eMTC and NB-IoT
<effect>	Number format. When to take effect. 0 Take effect after UE reboots 1 Take effect immediately

NOTE

This command is invalid on BG95-M1 and BG95-N1.

4.2.4. AT+QCFG="roamservice"* Roam Service Configuration

The command is used to enable or disable the roam service. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="roamservice"* Roam Service Configuration	
Write Command **AT+QCFG="roamservice"[,<roammode>[,<effect>]]**	Response If **<roammode>** and **<effect>** are both omitted, return the current configuration: **+QCFG: "roamservice",<roammode>** **OK** If **<roammode>** and **<effect>** are present, configure the mode of roam service: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**

	If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<roammode>	Number format. The mode of roam service. 1 Disable roam service 2 Enable roam service 255 Auto
<effect>	Number format. When to take effect. 0 Take effect after UE reboots 1 Take effect immediately

NOTE

"*" means under development.

4.2.5. AT+QCFG="band" Band Configuration

The command specifies the frequency bands allowed to be searched. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="band" Band Configuration	
Write Command **AT+QCFG="band"[,<gsmbandval>,<emtcbandval>,<nbiotbandval>[,<effect>]]**	Response If configuration parameters and **<effect>** are omitted (that is, only execute **AT+QCFG="band"**), return the current configuration: **+QCFG: "band",<gsmbandval>,<emtcbandval>,<nbiotbandval>** **OK** If configuration parameters are all entered, configure the frequency bands allowed to be searched: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error:

	ERROR
Maximum Response Time	300ms

Parameter

<gsmbandval>	A hexadecimal value that specifies the GSM frequency band. If it is set to 0, it means not to change GSM frequency band (eg.: 0x0a=0x02(GSM1800)+ 0x08(GSM1900)). This parameter is valid on BG95-M3 only. 00000000 No change 00000001 GSM 900MHz 00000002 GSM 1800MHz 00000004 GSM 850MHz 00000008 GSM 1900MHz 0000000F Any frequency band
<emtcbandval>	A hexadecimal value that specifies the eMTC frequency band. If it is set to 0 or 0x40000000, it means not to change the frequency band. (eg.: 0x15=0x01(LTE B1)+0x04(LTE B3)+0x10(LTE B5)) 0x1 (CM_BAND_PREF_LTE_EUTRAN_BAND1) LTE B1 0x2 (CM_BAND_PREF_LTE_EUTRAN_BAND2) LTE B2 0x4 (CM_BAND_PREF_LTE_EUTRAN_BAND3) LTE B3 0x8 (CM_BAND_PREF_LTE_EUTRAN_BAND4) LTE B4 0x10 (CM_BAND_PREF_LTE_EUTRAN_BAND5) LTE B5 0x80 (CM_BAND_PREF_LTE_EUTRAN_BAND8) LTE B8 0x800 (CM_BAND_PREF_LTE_EUTRAN_BAND12) LTE B12 0x1000 (CM_BAND_PREF_LTE_EUTRAN_BAND13) LTE B13 0x2000 (CM_BAND_PREF_LTE_EUTRAN_BAND14) LTE B14 0x20000 (CM_BAND_PREF_LTE_EUTRAN_BAND18) LTE B18 0x40000 (CM_BAND_PREF_LTE_EUTRAN_BAND19) LTE B19 0x80000 (CM_BAND_PREF_LTE_EUTRAN_BAND20) LTE B20 0x1000000 (CM_BAND_PREF_LTE_EUTRAN_BAND25) LTE B25 0x2000000 (CM_BAND_PREF_LTE_EUTRAN_BAND26) LTE B26 0x4000000 (CM_BAND_PREF_LTE_EUTRAN_BAND27) LTE B27 0x8000000 (CM_BAND_PREF_LTE_EUTRAN_BAND28) LTE B28 0x40000000 (CM_BAND_PREF_LTE_EUTRAN_BAND31) LTE B31 0x20000000000000000 (CM_BAND_PREF_LTE_EUTRAN_BAND66) LTE B66 0x800000000000000000 (CM_BAND_PREF_LTE_EUTRAN_BAND72) LTE B72 0x1000000000000000000 (CM_BAND_PREF_LTE_EUTRAN_BAND73) LTE B73 0x1000000000000000000000 (CM_BAND_PREF_LTE_EUTRAN_BAND85) LTE B85

	0x4000000000000000000000 No change 0x4001C2000000000F0E389F (CM_BAND_PREF_ANY) Any frequency band_
<nbiotbandval>	A hexadecimal value that specifies the NB-IoT frequency band. If it is set to 0 or 0x40000000, it means not to change the frequency band. 0x1 (CM_BAND_PREF_LTE_EUTRAN_BAND1) LTE B1 0x2 (CM_BAND_PREF_LTE_EUTRAN_BAND2) LTE B2 0x4 (CM_BAND_PREF_LTE_EUTRAN_BAND3) LTE B3 0x8 (CM_BAND_PREF_LTE_EUTRAN_BAND4) LTE B4 0x10 (CM_BAND_PREF_LTE_EUTRAN_BAND5) LTE B5 0x80 (CM_BAND_PREF_LTE_EUTRAN_BAND8) LTE B8 0x800 (CM_BAND_PREF_LTE_EUTRAN_BAND12) LTE B12 0x1000 (CM_BAND_PREF_LTE_EUTRAN_BAND13) LTE B13 0x20000 (CM_BAND_PREF_LTE_EUTRAN_BAND18) LTE B18 0x40000 (CM_BAND_PREF_LTE_EUTRAN_BAND19) LTE B19 0x80000 (CM_BAND_PREF_LTE_EUTRAN_BAND20) LTE B20 0x1000000 (CM_BAND_PREF_LTE_EUTRAN_BAND25) LTE B25 0x2000000 (CM_BAND_PREF_LTE_EUTRAN_BAND26) LTE B26 0x8000000 (CM_BAND_PREF_LTE_EUTRAN_BAND28) LTE B28 0x40000000 (CM_BAND_PREF_LTE_EUTRAN_BAND31) LTE B31 0x20000000000000000 (CM_BAND_PREF_LTE_EUTRAN_BAND66) LTE B66 0x400000000000000000 (CM_BAND_PREF_LTE_EUTRAN_BAND71) LTE B71 0x800000000000000000 (CM_BAND_PREF_LTE_EUTRAN_BAND72) LTE B72 0x1000000000000000000 (CM_BAND_PREF_LTE_EUTRAN_BAND73) LTE B73 0x1000000000000000000000 (CM_BAND_PREF_LTE_EUTRAN_BAND85) LTE B85 0x4000000000000000000000 No change 0x4001C2000000004E0E189F (CM_BAND_PREF_ANY) Any frequency band
<effect>	When to take effect 0 Take effect after UE reboots 1 Take effect immediately

NOTES

1. **<gsmbandval>** is valid on BG95-M3 only, and is invalid in BG77 and other BG95 variants.
2. **<emtcbandval>** is invalid on BG95-N1.
3. **<nbiotbandval>** is invalid on BG95-M1.

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

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

AT+QCFG="servicedomain" Service Domain Configuration	
Write Command **AT+QCFG="servicedomain"[,<service>[,<effect>]]**	Response If **<service>** and **<effect>** are both omitted, return the current configuration: **+QCFG: "servicedomain",<service>** **OK** If **<service>** and **<effect>** are present, configure the service domain of UE: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

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

4.2.7. AT+QCFG="nb/bandprior"* Configure Band Scan Priority under NB-IoT

The command specifies the band to be scanned with priority under NB-IoT. This configuration is valid only after the module is restarted.

AT+QCFG="nb/bandprior"* Configure Band Scan Priority under NB-IoT	
Write Command **AT+QCFG="nb/bandprior"[,<band_value>]**	Response If **<band_value>** is omitted, return the current configuration: **+QCFG: “nb/bandprior”,<band_value>**

	OK If there is any other error: **ERROR** If **<band_value>** is present, configure the NB-IoT band to be scanned with priority. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<band_value>	NB-IoT band value	
	01	Band 1
	02	Band 2
	03	Band 3
	04	Band 4
	05	Band 5
	08	Band 8
	0C	Band 12
	0D	Band 13
	12	Band 18
	13	Band 19
	14	Band 20
	19	Band 25
	1A	Band 26
	1C	Band 28
	1F	Band 31
	42	Band 66
	47	Band 71
	48	Band 72
	49	Band 73
	55	Band 85

NOTES

1. This command is invalid on BG95-M1.
2. "*" means under development.

4.2.8. AT+QCFG="psm/urc" Enable/Disable PSM Entering Indication

The command is used to enable or disable the output of URC **+QPSMTIMER: <tau_timer>,<T3324_timer>** which is used to indicate the TAU duration and Active time duration for the module's PSM.

When PSM function is enabled and RRC connection release is received, the active timer (T3324) will be started, and the indication URC will be reported.

AT+QCFG="psm/urc" Enable/Disable PSM Entering Indication	
Write Command **AT+QCFG="psm/urc"[,<enable>]**	Response If **<enable>** is omitted, return the current configuration: **+QCFG: "psm/urc",<enable>** **OK** If **<enable>** is present, configure whether to enable PSM entering indication. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<enable>	Enable or disable the output of URC **+QPSMTIMER: <tau_timer>,<T3324_timer>**. If enabled, the URC will be reported when RRC connection release is received. 0 Disable 1 Enable

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

The command specifies the UE SGSN release version. This configuration is valid only after the module is restarted.

AT+QCFG="sgsn"* UE SGSN Release Version Configuration	
Write Command **AT+QCFG="sgsn"[,<sgsnr>]**	Response If **<sgsnr>** is omitted, return the current configuration: **+QCFG: "sgsn",<sgsnr>** **OK** If **<sgsnr>** is present, configure the SGSN release version: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

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

NOTE

"*" means under development.

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

The command specifies the UE MSC release version. This configuration is valid only after the module is restarted.

AT+QCFG="msc"* UE MSC Release Version Configuration	
Write Command **AT+QCFG="msc"[,<mscr>]**	Response If **<mscr>** is omitted, return the current configuration: **+QCFG: "msc",<mscr>** **OK** If **<mscr>** is present, configure the MSC release version: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

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

NOTE

"*" means under development.

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

The command allows/refuses establishing multiple PDNs with the same APN profile. The configuration will take effect immediately.

AT+QCFG="PDP/duplicatechk"* Establish Multi PDNs with the Same APN	
Write Command **AT+QCFG="pdp/duplicatechk"[,<enable>]**	Response If **<enable>** is omitted, return the current configuration: **+QCFG: "pdp/duplicatechk",<enable>** **OK**

	If **<enable>** is present, allow/refuse establishing multiple PDNs with the same APN profile: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

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

NOTE

"*" means under development.

4.2.12. AT+QCFG="ledmode" Configure NETLIGHT Output Mode

This command is used to configure the output mode of NETLIGHT pin.

AT+QCFG="ledmode" Configure NETLIGHT Output Mode	
Write Command **AT+QCFG="ledmode"[,<mode>]**	Response If **<mode>** is omitted, return the current configuration: **+QCFG: "ledmode",<mode>** **OK** If **<value>** is present, configure NETLIGHT LED mode: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Reference	

Parameter

<value>	Number format. Output mode of NETLIGHT pin. 0 Flicker mode by default. 1 Output high level when attached to the network and low level in other conditions.

Example

```
AT+QCFG="ledmode",1          //Set the NETLIGHT mode.
OK

AT+QCFG="ledmode"            //Query the current configuration.
+QCFG: "ledmode",1

OK
```

4.2.13. AT+QCFG="ims"* IMS Function Control

The command is used to enable or disable IMS function. It also enables the NVRAM about IMS to be set through the configuration of MBN files when **<value>** is set to be 0.

AT+QCFG="ims"* IMS Function Control	
Write Command **AT+QCFG="ims"[,<value>]**	Response If **<value>** is omitted, return the current configuration: **+QCFG: "ims",<value>,<volte_state>** **OK** If **<value>** is present, configure IMS function control parameter: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Reference	

Parameter

<value>	IMS function configuration parameter	
	0	The NVRAM about IMS can be set through the configuration of MBN files
	1	Enable IMS function
	2	Disable IMS function
<volte_state>	VoLTE state	
	0	VoLTE is not ready
	1	VoLTE is ready

NOTES

1. This command is invalid on BG95-N1.
2. "*" means under development.

4.2.14. AT+QCFG="urc/ri/ring" RI Behavior When the RING URC is Presented

AT+QCFG="urc/ri/ring", **AT+QCFG="urc/ri/smsincoming"** and **AT+QCFG="urc/ri/other"** are used to control the RI (ring indicator) behavior when a URC is reported. These configurations will be stored into NVRAM automatically. The ring indicator is active low. **AT+QCFG="urc/ri/ring"** specifies the RI behavior when the URC **RING** is presented to indicate an incoming call.

The sum of parameters **<activeduration>** and **<inactiveduration>** determines the interval time of **RING** indications when a call is coming.

AT+QCFG="urc/ri/ring" RI Behavior When the RING URC is Presented	
Write Command **AT+QCFG="urc/ri/ring"[,<typeri>[,<pulseduration>[,<activeduration>[,<inactiveduration>[,<ringnodisturbing>]]]]]**	Response If **<typeri>**, **<pulseduration>**, **<activeduration>**, **<inactiveduration>** and **<ringnodisturbing>** are omitted, return the current configuration: **+QCFG: "urc/ri/ring",<typeri>,<pulseduration>,<activeduration>,<inactiveduration>,<ringnodisturbing>,<pulsecount>** **OK** If all configuration parameters are entered, set the RI behavior when the **RING** URC is presented: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**

	If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<typeri>	RI behavior when URCs are presented	
	"off"	No change. Ring indicator keeps inactive.
	"pulse"	Pulse. Pulse width determined by **<pulseduration>**.
	"always"	Change to active. RI behavior can be restored to inactive by **AT+QRIR**.
	"auto"	When **RING** is presented to indicate an incoming call, the ring indicator changes to and keeps active. When ring of the incoming call ends, either answering or hanging up the incoming call, the ring indicator will change to inactive.
	"wave"	When **RING** is presented to indicate an incoming call, the ring indicator outputs a square wave. Both **<activeduration>** and **<inactiveduration>** are used to set parameters of the square wave. When the ring of incoming call ends, either answering or hanging up the incoming call, the ring indicator will change to inactive.
<pulseduration>	The width of pulse. The value ranges from 1 to 2000ms and the default is 120ms. This parameter is only meaningful when **<typeri>** is “pulse”. If this parameter is not needed, it can be set as null.	
<activeduration>	The active duration of square wave. The value ranges from 1 to 10000ms, and the default is 1000ms. This parameter is only meaningful when **<typeri>** is “wave”.	
<inactiveduration>	The inactive duration of square wave. The value ranges from 1 to 10000ms, and the default is 5000ms. This parameter is only meaningful when **<typeri>** is “wave”.	
<ringnodisturbing>	Set whether the ring indicator behavior could be disturbed. This parameter is only meaningful when **<typeri>** is configured to “auto” or “wave”. For example, when **<typeri>** is configured to “wave”, if the square wave needs not to be disturbed by other URCs (including SMS related URCs), then **<ringnodisturbing>** should be set to "on".	
	"off"	RI behavior can be disturbed by other URCs when the behavior is caused by an incoming call ringing.
	"on"	RI behavior cannot be disturbed by other URCs when the behavior is caused by an incoming call ringing.
<pulsecount>	The count of pulse. This parameter is only meaningful when **<typeri>** is “pulse”. The value ranges from 1 to 5 and the default is 1. The interval time between two pulses is equal to **<pulseduration>**.	

4.2.15. AT+QCFG="urc/ri/smsincoming" RI Behavior When Incoming SMS URCs are Presented

The command specifies the RI (ring indicator) behavior when related incoming message URCs are presented. Incoming message URCs include **+CMTI**, **+CMT**, **+CDS**, and **+CBM**.

AT+QCFG="urc/ri/smsincoming" RI Behavior When Incoming SMS URCs are Presented	
Write Command **AT+QCFG="urc/ri/smsincoming"[,<typeri>[,<pulseduration>]]**	Response If **<typeri>** and **<pulseduration>** are omitted, return the current configuration: **+QCFG: "urc/ri/smsincoming",<typeri>,<pulseduration>,<pulsecount>** **OK** If **<typeri>** and **<pulseduration>** are present, set the RI behavior when incoming SMS URCs are presented: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<typeri>	RI behavior when URCs are presented	
	"off"	No change. Ring indicator keeps inactive.
	"pulse"	Pulse. Pulse width determined by **<pulseduration>**.
	"always"	Change to active. RI behavior can be restored to inactive by **AT+QRIR**.
<pulseduration>	The width of pulse. The value ranges from 1 to 2000ms and the default is 120ms. This parameter is only meaningful when **<typeri>** is “pulse”.	
<pulsecount>	The count of pulse. This parameter is only meaningful when **<typeri>** is “pulse”. The value ranges from 1 to 5 and the default is 1. The interval time between two pulses is equal to **<pulseduration>**.	

4.2.16. AT+QCFG="urc/ri/other" RI Behavior when Other URCs are Presented

The command specifies the RI (ring indicator) behavior when other URCs are presented.

AT+QCFG="urc/ri/other" RI Behavior when Other URCs are Presented	
Write Command **AT+QCFG="urc/ri/other"[,<typeri>[,<pulseduration>]]**	Response If **<typeri>** and **<pulseduration>** are omitted, return the current configuration: **+QCFG: "urc/ri/other",<typeri>,<pulseduration>,<pulsecount>** **OK** If **<typeri>** and **<pulseduration>** are present, set the RI behavior when other URCs are presented: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<typeri>	RI behavior when URCs are presented	
	"off"	No change. Ring indicator keeps inactive.
	"pulse"	Pulse. Pulse width determined by **<pulseduration>**.
<pulseduration>	The width of pulse. The value ranges from 1 to 2000ms and the default is 120ms. This parameter is only meaningful when **<typeri>** is “pulse”.	
<pulsecount>	The count of pulse. This parameter is only meaningful when **<typeri>** is “pulse”. The value ranges from 1 to 5 and the default is 1. The interval time between two pulses is equal to **<pulseduration>**.	

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

The command specifies the RI (ring indicator) signal output carrier.

AT+QCFG="risignaltype" RI Signal Output Carrier	
Write Command **AT+QCFG="risignaltype",[<risignatype>]**	Response If **<risignatype>** is omitted, return the current configuration: **+QCFG: "risignaltype",<risignatype>** **OK** If **<risignatype>** is present, configure the RI signal output carrier: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<risignaltype>	RI signal output carrier.	
	"respective"	The ring indicator behaves on the port where URC is presented. For example, if URC is presented on UART port, it is physical ring indicator. If URC is presented on USB modem port, it is virtual ring indicator. **AT+QURCCFG="urcport"** can get the port on which URC is presented.
	"physical"	No matter on which port URC is presented, URC only causes the behavior of physical ring indicator.

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

The command can delay the output of URC indication until ring indicator pulse ends.

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

	If **<enable>** is present, set when the URC indication will be outputted: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Reference	

Parameter

<enable>	0	URC indication will be outputted when ring indicator pulse starts.
	1	URC indication will be outputted when ring indicator pulse ends (only effective when the type of ring indicator is “pulse”. Please refer to **AT+QCFG="urc/ri/ring"**, **AT+QCFG="urc/ri/smsincoming"** and **AT+QCFG="urc/ri/other"** for more details).

4.2.19. AT+QCFG="psm/enter" Trigger the Module into PSM Immediately

The command controls whether to trigger the module into PSM mode immediately after the RRC connection release is received.

When **<mode>** is specified as 1, the module will skip active timer (T3324) and enter PSM immediately after RRC connection release is received.

AT+QCFG="psm/enter" Trigger the Module into PSM Immediately	
Write Command **AT+QCFG="psm/enter"[,<mode>]**	Response If **<mode>** is omitted, return the current configuration: **+QCFG: "psm/enter",<mode>** **OK** If **<mode>** is present, configure whether to trigger the module into PSM immediately after the RRC release. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error:

	ERROR
Maximum Response Time	300ms

Parameter

<mode>	Numeric type. Whether to trigger the module into PSM immediately.	
	0	Enter PSM after T3324 expires
	1	Enter PSM immediately after RRC connection release is received.

NOTE

When **AT+QCFG="psm/urc",1** and **AT+QCFG="psm/enter",1** are executed at the same time, there will be a possibility that the URC **+QPSMTIMER** cannot be output due to the immediate entering of PSM.

4.2.20. AT+QCFG="rrcabort" Abort RRC Connection

The command is used to abort RRC connection.

AT+QCFG="rrcabort" Abort RRC Connection	
Write Command **AT+QCFG="rrcabort"[,<mode>]**	Response If **<mode>** is omitted, return the current configuration: **+QCFG: "rrcabort",<mode>** **OK** If **<mode>** is present, configure whether to abort RRC connection: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Reference	

Parameter

<mode>	0	UE releases RRC connection after receiving RRCConnectionRelease
	1	UE aborts RRC connection immediately

4.2.21. AT+QCFG="nccconf" Configure NB-IoT Features

The command is used to configure NB-IoT features.

AT+QCFG="nccconf" Configure NB-IoT Features	
Write Command **AT+QCFG="nccconf"[,<cap_val>]**	Response If **<cap_val>** is omitted, return the current configuration: **+QCFG: "nccconf",<cap_val>** **OK** If **<cap_val>** is present, configure NB-IoT features: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Reference	

Parameter

<cap_val>	Hexadecimal value. If any bit is set to 1, it means the corresponding feature is enabled, otherwise it means disabled. The specific meanings are as follows:	
	Bit 0	Enable or disable the use of EMM_CP_CIOT
	Bit 1	Enable or disable the use of EMM_UP_CIOT
	Bit 2	Enable or disable the use of EMM_S1_U
	Bit 3	Enable or disable the use of EMM_ER_WITHOUT_PDN
	Bit 4	Enable or disable the use of EMM_HC_CP_CIOT
	Bit 5	Enable or disable the use of EMM_SMS_ONLY
	Bit 6	Enable or disable the use of EMM_PNB_CP_CIOT
	Bit 7	Enable or disable the use of EMM_PNB_UP_CIOT
	Bit 8	Enable or disable the use of EMM_EPCO_CIOT

4.3. AT+QINDCFG URC Indication Configuration

The command is used to control URC indication.

AT+QINDCFG URC Indication Configuration	
Test command **AT+QINDCFG=?**	Response **+QINDCFG: "all",(0,1),(0,1)** **+QINDCFG: "csq",(0,1),(0,1)** **+QINDCFG: "smsfull",(0,1),(0,1)** **+QINDCFG: "ring",(0,1),(0,1)** **+QINDCFG: "smsincoming",(0,1),(0,1)** **OK**
Write command **AT+QINDCFG=<urctype>[,<enable>[,<savetonvram>]]**	Response If **<enable>** and **<savetonvram>** are omitted, the current configuration will be returned: **+QINDCFG: <urctype>,<enable>** **OK** If **<enable>** and **<savetonvram>** are present, set the URC indication configurations: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<urctype>	URC type	
	"all"	Main switch of all URCs. Default is ON.
	"csq"	Indication of signal strength and channel bit error rate change (similar to **AT+CSQ**). Default is OFF. If this configuration is ON, present: **+QIND: "csq",<rssi>,<ber>**
	"smsfull"	SMS storage full indication. Default is OFF. If this configuration is ON, present: **+QIND: "smsfull",<storage>**

	"ring"	**RING** indication. Default is ON.
	"smsincoming"	Incoming message indication. Default is ON. Related URCs list: **+CMTI**, **+CMT**, **+CDS**
<enable>	URC indication is ON or OFF	
	0	OFF
	1	ON
<savetonvram>	Whether to save the configurations into NVRAM.	
	0	Not save
	1	Save

5 (U)SIM Related Commands

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

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

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

Parameter

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

Example

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

OK
```

5.2. AT+CLCK Facility Lock

The command is used to lock, unlock or interrogate an MT or a network facility **<fac>**. It can be aborted when network facilities are being set or interrogated. The factory default password of PF, PN, PU, PP and PC lock is "12341234".

AT+CLCK Facility Lock	
Test Command **AT+CLCK=?**	Response **+CLCK:** (list of supported **<fac>**s) **OK**
Write Command **AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]**	Response This command is used to lock, unlock or interrogate the ME or network facility **<fac>**. Password is normally needed to do such actions. When querying the status of network service (**<mode>**=2) the response line for 'not active' case (**<status>**=0) should be returned only if service is not active for any **<class>**. If **<mode>** is not equal to 2 and the command is executed successfully: **OK** If **<mode>**=2 and the command is executed successfully: **+CLCK: <status>[,<class>]** **[+CLCK: <status>[, <class>]]** **[…]** **OK**
Maximum Response Time	5s
Reference 3GPP TS 27.007	

Parameter

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

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

Example

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

OK

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

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

```
OK

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

5.3. AT+CPIN Enter PIN

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

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

Parameter

<code>	READY	MT is not pending for any password
	SIM PIN	MT is waiting for (U)SIM PIN to be given
	SIM PUK	MT is waiting for (U)SIM PUK to be given

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

Example

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

OK

AT+CPIN=1234                            //Enter PIN
OK

+CPIN: READY

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

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

OK
```

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

+CPIN: READY

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

OK
```

5.4. AT+CPWD   Change Password

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

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

Parameter

<fac>	"SC"	(U)SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command is issued)
	"AO"	BAOC (Bar All Outgoing Calls, refer to *3GPP TS 22.088* ***clause 1***)
	"OI"	BOIC (Bar Outgoing International Calls, refer to *3GPP TS 22.088* ***clause 1***)
	"OX"	BOIC-exHC (Bar Outgoing International Calls except to Home Country, refer to *3GPP TS 22.088* ***clause 1*****)**
	"AI"	BAIC (Bar All Incoming Calls, refer to *3GPP TS 22.088* ***clause 2***)
	"IR"	BIC-Roam (Bar Incoming Calls when Roaming outside the home country, refer to *3GPP TS 22.088* ***clause 2***)
	"AB"	All barring services (refer to *3GPP TS 22.030*, applicable only for **<mode>**=0)

	“AG”	All outgoing barring services (refer to *3GPP TS 22.030*, applicable only for **<mode>**=0)
	“AC	All incoming barring services (refer to *3GPP TS 22.030*, applicable only for **<mode>**=0)
	“P2”	(U)SIM PIN2
<pwdlength>	Integer type. Maximum length of password.	
<oldpwd>	Password specified for the facility from the user interface or with command.	
<newpwd>	New password.	

Example

```
AT+CPIN?
+CPIN: READY

OK

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

OK

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

+CPIN: READY
```

5.5. AT+CRSM Restricted (U)SIM Access

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

AT+CRSM Restricted (U)SIM Access	
Test Command **AT+CRSM=?**	Response **OK**
Write Command **AT+CRSM=<command>[,<fileId>[,<P1>,<P2>,<P3>[,<data>][,<pathId>]]]**	Response **+CRSM: <sw1>,<sw2>[,<response>]** **OK**

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

Parameter

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

5.6. AT+QCCID Show ICCID

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

AT+QCCID Show ICCID	
Test Command **AT+QCCID=?**	Response **OK**
Execution Command **AT+QCCID**	Response **+QCCID: <iccid>** **OK** If there is any other error: **ERROR**
Maximum Response Time	300ms

Example

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

OK
```

5.7. AT+QPINC Display PIN Remainder Counter

The command can query the number of attempts left to enter the password of (U)SIM PIN/PUK.

AT+QPINC Display PIN Remainder Counter	
Test Command **AT+QPINC=?**	Response **+QPINC: ("SC","P2")** **OK**
Read Command **AT+QPINC?**	Response **+QPINC: "SC", <pincounter>,<pukcounter>** **+QPINC: "P2", <pincounter>,<pukcounter>** **OK**
Write Command **AT+QPINC=<facility>**	Response **+QPINC: <facility>,<pincounter>,<pukcounter>**

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

Parameter

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

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

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

AT+QINISTAT Query Initialization Status of (U)SIM Card	
Test Command **AT+QINISTAT=?**	Response **+QINISTAT: (0-3)** **OK**
Execution Command **AT+QINISTAT**	Response **+QINISTAT: <status>** **OK**
Maximum Response Time	300ms

Parameter

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

5.9. AT+QSIMDET (U)SIM Card Detection

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

AT+QSIMDET (U)SIM Card Detection	
Test Command **AT+QSIMDET=?**	Response **+QSIMDET: (0,1),(0,1)** **OK**
Read Command **AT+QSIMDET?**	Response **+QSIMDET: <enable>,<insertlevel>** **OK**
Write Command **AT+QSIMDET=<enable>,<insertlevel>**	Response **OK** If there is any other error: **ERROR**
Maximum Response Time	300ms

Parameter

<enable>	Enable or disable (U)SIM card detection 0 Disable 1 Enable
<insertlevel>	The level of (U)SIM card detection pin when a (U)SIM card is inserted 0 Low level 1 High level

NOTES

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

Example

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

```
<Remove (U)SIM card>

+CPIN: NOT READY

<Insert (U)SIM card>

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

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

The command queries (U)SIM card insertion status and determines whether (U)SIM card insertion status report is enabled. The configuration of this command can be saved by **AT&W**.

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

Parameter

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

Example

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

OK

AT+QSIMDET=1,0
OK

AT+QSIMSTAT=1                   //Enable (U)SIM card insertion status report
OK

AT+QSIMSTAT?
+QSIMSTAT: 1,1

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

+CPIN: NOT READY

AT+QSIMSTAT?
+QSIMSTAT: 1,0

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

+CPIN: READY
```

6 Network Service Commands

6.1. AT+CREG Network Registration Status

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

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

Parameter

<n>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code: **+CREG:<stat>**
	2	Enable network registration and location information unsolicited result code: **+CREG: <stat>[,<lac>,<ci>[,<AcT>]]**
<stat>	0	Not registered. MT is not currently searching an operator to register to.
	1	Registered, home network.
	2	Not registered, but MT is currently trying to attach the network or searching an

		operator to register to.
	3	Registration denied
	4	Unknown
	5	Registered, roaming
<lac>	String type. Two-byte location area code in hexadecimal format.	
<ci>	String type. Four-byte GERAN/E-UTRAN cell ID in hexadecimal format.	
<AcT>	Access technology selected	
	0	GSM
	8	eMTC
	9	NB-IoT

6.2. AT+COPS Operator Selection

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

AT+COPS Operator Selection	
Test Command **AT+COPS=?**	Response TA returns a set of five parameters, each representing an operator presenting in the network. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in the order of: home network, networks referenced in (U)SIM and other networks. **+COPS:** (list of supported **<stat>**, long alphanumeric **<oper>**, short alphanumeric **<oper>**, numeric **<oper>**s)[,**< Act>**])s] [,,(list of supported **<mode**>s),(list of supported **<format>**s)] **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**
Read Command **AT+COPS?**	Response TA returns the current mode and the currently selected operator. If no operator is selected, then **<format>**, **<oper>** and **<Act>** are omitted. **+COPS: <mode>[,<format>[,<oper>][,<Act>]]** **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**
Write Command	Response

AT+COPS=<mode>[,<format>[,<oper>[,<Act>]]]	TA forces an attempt to select and register the GSM/LTE network operator. If the selected operator is not available, no other operator shall be selected (except **<mode>**=4). The format of selected operator name shall apply to further Read Command (**AT+COPS?**). **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	180s, determined by the network.
Reference 3GPP TS 27.007	

Parameter

<stat>	0	Unknown
	1	Operator available
	2	Current operator
	3	Operator forbidden
<oper>	Operator in format as per **<mode>**	
<mode>	0	Automatic mode. **<oper>** field is ignored.
	1	Manual operator selection. **<oper>** field shall be presented and <**Act**> optionally.
	2	Manual deregister from network.
	3	Set only **<format>** (for **AT+COPS?** Read Command), and do not attempt to register/deregister (**<oper>** and **<Act>** fields are ignored). This value is invalid in the response of the Read Command.
	4	Manual/automatic selection. **<oper>** field shall be presented. If manual selection fails, automatic mode (**<mode>**=0) is entered.
<format>	0	Long format alphanumeric **<oper>** which can be up to 16 characters long
	1	Short format alphanumeric **<oper>**
	2	Numeric **<oper>**. GSM location area identification number.
<Act>	Access technology selected.	
	0	GSM
	8	eMTC
	9	NB-IoT

Example

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

```
OK

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

OK
```

6.3. AT+CSQ Signal Quality Report

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

AT+CSQ Signal Quality Report	
Test Command **AT+CSQ=?**	Response The Test Command returns values supported by the TA. **+CSQ:** (list of supported **<rssi>**s),(list of supported **<ber>**s) **OK**
Execution Command **AT+CSQ**	Response The Execution Command returns received signal strength indication **<rssi>** and channel bit error rate **<ber>** from the ME. **+CSQ: <rssi>,<ber>** **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<rssi>	Integer type. Received signal strength level.	
	0	-113dBm or less
	1	-111dBm
	2...30	-109... -53dBm
	31	-51dBm or greater
	99	Not known or not detectable
<ber>	Integer type. Channel bit error rate (in percent)	

	0...7	As RxQual values in the table in *3GPP TS 45.008 subclause 8.2.4*
	99	Not known or not detectable

Example

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

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

NOTE

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

6.4. AT+CIND* Indicator Control

The command returns the status of MT indicators.

AT+CIND* Indicator Control	
Test Command **AT+CIND=?**	Response **+CIND:** (**<descr>**,(list of supported **<ind>**s))[,(**<descr>**,(list of supported **<ind>s**))[,...]] **OK**
Read Command **AT+CIND?**	Response **+CIND: <ind>[,<ind>[,...]]** **OK**
Reference	

Parameter

<ind>	Integer type. Indicators, which shall be in the range of corresponding **<descr>**.	
<descr>	Description of indicators and their **<ind>** ranges:	
	"battchg"	Battery charge level (0-5)

	"signal"	Signal quality (0-5)
	"service"	Service availability (0-1)
	"call"	Call in progress (0-1)
	"roam"	Roaming indicator (0-1)
	"smsfull"	A short message memory storage in the MT has become full and a short message has become full (1), or memory locations are available (0); the range is (0-1)
	"GPRS coverage"	GPRS coverage indicator (0-1)
	"callsetup"	Call setup indicator (0-3), no active call setup (0), MT call is waiting of ringing (1), MO call was initiated (2), MO call ringing at B- party (3)

NOTE

"*" means under development.

Example

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

OK

AT+CIND?                    //Get the status of MT indicators
+CIND: 0,0,0,1,0,0,0,0

OK
```

6.5. AT+CPOL Preferred Operator List

The command edits and queries the list of preferred operators.

AT+CPOL Preferred Operator List	
Test Command **AT+CPOL=?**	Response **+CPOL:** (list of supported **<index>**s)**,**(list of supported **<format>**s) **OK**
Read Command	Response

AT+CPOL?	Query the list of preferred operators: **+CPOL: <index>,<format>,<oper>[,<GSM>,<GSM_compact,<UTRAN>,<E-UTRAN>]** **<index>,<format>,<oper>[,<GSM>,<GSM_compact,<UTRAN>,<E-UTRAN>]** **[…]** **OK**
Write Command **AT+CPOL=<index>[,<format>[,<oper>[<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>]]]**	Response Edit the list of preferred operators: **OK** If there is any other error: **ERROR** If the **<index>** is given but the **<oper>** is left out, the entry will be deleted.
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

NOTES

1. The access technology selection parameters **<GSM>**, **<GSM_compact>**, **<UTRAN>** and **<E-UTRAN>** are required for SIM cards or UICCs containing PLMN selector with access technology.
2. The parameter **<UTRAN>** is invalid for BG95 and BG77.

6.6. AT+COPN Read Operator Names

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

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

Parameter

<numericn>	String type. Operator in numeric format (see **AT+COPS**).
<alphan>	String type. Operator in long alphanumeric format (see **AT+COPS**).

6.7. AT+CTZU Automatic Time Zone Update

The Write Command enables and disables automatic time zone update via NITZ. The configuration is stored to NVRAM automatically.

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

Parameter

<onoff>	Integer type. The mode of automatic time zone update.	
	0	Disable automatic time zone update via NITZ
	1	Enable automatic time zone update via NITZ

Example

```
AT+CTZU?
+CTZU: 0

OK

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

OK

AT+CTZU=1
OK

AT+CTZU?
+CTZU: 1
```

OK

6.8. AT+CPSMS Power Saving Mode Setting

The Write Command controls the setting of the UE’s Power Saving Mode (PSM) parameters.

AT+CPSMS Power Saving Mode Setting	
Test Command **AT+CPSMS=?**	Response **+CPSMS:** (list of supported **<mode>**s),(list of supported **<Requested_Periodic-RAU>**s),(list of supported **<Requested_GPRS-READY-timer>**s),(list of supported **<Requested_Periodic-TAU>**s),(list of supported **<Requested_Active-Time>**s) **OK**
Write Command **AT+CPSMS=[<mode>[,<Requested_Periodic-RAU>[,<Requested_GPRS-READY-timer>[,<Requested_Periodic-TAU>[,<Requested_Active-Time>]]]]]**	Response **OK** If there is any other error: **ERROR**
Read Command **AT+CPSMS?**	Response **+CPSMS: <mode>,[<Requested_Periodic-RAU>],[<Requested_GPRS-READY-timer>],[<Requested_Periodic-TAU>],[<Requested_Active-Time>]** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. Disable or enable the use of PSM in the UE. 0 Disable the use of PSM 1 Enable the use of PSM
<Requested_Periodic-RAU>	String type. One byte in an 8 bit format. Requested extended periodic RAU value (T3312) to be allocated to the UE in GERAN. (e.g. "01000111" equals to 70 hours) Bits 5 to 1 represent the binary coded timer value Bits 6 to 8 define the timer value unit as follows: Bits

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

Example

```
AT+CPSMS=1,,,"00000100","00001111"  //Set the requested T3412 value to 40 minutes, and set the
                                     requested T3324 value to 30 seconds.
OK
```

6.9. AT+QPSMS Power Saving Mode Setting

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

AT+QPSMS Power Saving Mode Setting	
Test Command **AT+QPSMS=?**	Response **+QPSMS:** (list of supported **<mode>**s),(list of supported **<Requested_Periodic-RAU>**s),(list of supported **<Requested_GPRS-READY-timer>**s),(list of supported **<Requested_Periodic-TAU>**s),(list of supported **<Requested_Active-Time>**s) **OK**
Write Command **AT+QPSMS=[<mode>[,<Requested_Periodic-RAU>[,<Requested_GPRS-READY-timer>[,<Requested_Periodic-TAU>[,<Requested_Active-Time>]]]]]**	Response **OK** If there is any other error: **ERROR**
Read Command **AT+QPSMS?**	Response **+QPSMS: <mode>,[<Network_Periodic-RAU>],[<Network_GPRS-READY-timer>],[<Network_Periodic-TAU>],[<Network_Active-Time>]** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. Disable or enable the use of PSM in the UE. 0 Disable the use of PSM 1 Enable the use of PSM
<Requested_Periodic-RAU>	String type. One byte in an 8 bit format. Requested extended

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

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

Example

```
AT+QPSMS=1,,,"00000100","00001111"   //Set the requested T3412 value to 40 minutes, and set the
                                     requested T3324 value to 30 seconds.
OK

AT+QPSMS?                            //Query the PSM mode and the timer from network.
+QPSMS: 1,,,"86400","2"

OK
```

6.10. AT+QPSMCFG PSM Feature and Minimum Threshold Value Setting

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

AT+QPSMCFG PSM Feature and Minimum Threshold Value Setting	
Test Command **AT+QPSMCFG=?**	Response **+QPSMCFG:** (list of supported **<threshold>**s),(list of supported **<psm_version>**s) **OK**
Write Command **AT+QPSMCFG=[<threshold>[,<psm_version>]]**	Response **OK** If there is any other error: **ERROR**
Read Command **AT+QPSMCFG?**	Response **+QPSMCFG: <threshold>,<psm_version>**

	OK

Parameter

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

Example

```
AT+QPSMCFG=100                //Set the threshold to 100 seconds.
OK

AT+QPSMCFG?                   //Query the threshold value and PSM mode.
+QPSMCFG: 100,5

OK
```

6.11. AT+QPSMEXTCFG Modem Optimization

The command is also used for PSM setting, and it is mainly used to set extended parameters for modem optimizations.

AT+QPSMEXTCFG Modem Optimization	
Test Command **AT+QPSMEXTCFG=?**	Response **+QPSMEXTCFG:** (list of supported **<psm_opt_mask>**s),(list of supported **<max_oos_full_scans>**s),(list of supported **<psm_duration_due_to_oos>**s),(list of supported **<psm_randomization_window>**s),(list of supported **<max_oos_time>**s),(list of supported **<early_wake_up_time>**s) **OK**
Write Command **AT+QPSMEXTCFG=[<psm_opt_mask>[,<max_oos_full_scans>[,<psm_dur**	Response **OK**

ation_due_to_oos>[,<psm_randomization_window>[,<max_oos_time>[,<early_wake_up_time>]]]]]	If there is any other error: **ERROR**
Read Command **AT+QPSMEXTCFG?**	Response **+QPSMEXTCFG: <psm_opt_mask>,<max_oos_full_scans>,<psm_duration_due_to_oos>,<psm_randomization_window>,<max_oos_time>,<early_wake_up_time>** **OK**

Parameter

<psm_opt_mask>	Numeric type. Range: 0-14-15. 1st bit of the parameter is used to enable/disable PSM ENTER request without sending PSM_READY_REQ to NAS. This is a quick PSM operation. 2nd bit of the parameter is used to enable/disable Out of Service (OoS) status indication from Modem to AP. 3rd bit of the parameter is used to enable/disable limited service status indication from Modem to AP. 4th bit the parameter is used to enable/disable deep-sleep mode if PSM duration is less than the threshold value. If enabled, it puts the device in deep-sleep mode, if PSM is not entered due to not meeting threshold value.
<max_oos_full_scans>	Maximum number of full scans to wait before modem declares SYS_PSM_STATUS_OOS to clients. Range: 1-2-100.
<psm_duration_due_to_oos>	PSM duration used by PSM daemon upon OOS/Limited Service indication, due to service outage. Range: 120-4294967295. Unit: second.
<psm_randomization_window>	PSM wakeup randomization window to avoid network congestion due to all the PSM devices waking up at the same time. Range: 1-5-1000. Unit: second.
<**max_oos_time**>	Maximum time in seconds to wait before declaring SYS_PSM_STATUS_OOS to clients. Range: 1-120-65535. Unit: second.
<**early_wakeup_time**>	Device wakes up early to account for boot-up and acquisition delay. While programming PMIC, PSM daemon reduces PSM duration by this duration. Range: 1-3-1000. Unit: second.

Example

```
AT+QPSMEXTCFG=14,2,120
OK
```

```
AT+QPSMEXTCFG?
+QPSMEXTCFG: 14,2,120,5,120,15

OK
```

6.12. AT+CEDRXS e-I-DRX Setting

The Write Command controls the setting of the UE's e-I-DRX (extended Idle-mode DRX) parameters.

AT+CEDRXS e-I-DRX Setting	
Test Command **AT+CEDRXS=?**	Response **+CEDRXS:** (list of supported <**mode**>s),(list of supported <**AcT-type**>s),(list of supported <**Requested_eDRX_value**>s) **OK**
Write Command **AT+CEDRXS=[<mode>,[,<AcT-type>[,<Requested_eDRX_value>]]]**	Response **OK** If there is any other error: **ERROR**
Read Command **AT+CEDRXS?**	Response **[+CEDRXS: <AcT-type>,<Requested_eDRX_value>** **[+CEDRXS: <AcT-type>,<Requested_eDRX_value>** **[...]]]** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<mode>	Integer type. Disable or enable the use of e-I-DRX in the UE. 0 Disable the use of e-I-DRX 1 Enable the use of e-I-DRX 2 Enable the use of e-I-DRX and enable the unsolicited result code 3 Disable the use of e-I-DRX and discard all parameters for e-I-DRX or, if available, reset to the manufacturer specific default values.
<AcT-type>	Integer type. The type of access technology. 2 GSM (Not applicable)

4 eMTC
5 NB-IoT

<Requested_eDRX_value> String type. Half a byte in a 4-bit format.

bit

4	3	2	1	E-UTRAN e-I-DRX cycle length duration
0	0	0	0	5.12 seconds
0	0	0	1	10.24 seconds
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	0	61.44 seconds
0	1	0	1	81.92 seconds
0	1	1	0	102.4 seconds
0	1	1	1	122.88 seconds
1	0	0	0	143.36 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655,36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

<Paging_time_window> String type. Half a byte in a 4 bit format.

eMTC mode

bit

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

NB-IoT mode

bit

4	3	2	1	Paging Time Window length

	0	0	0	0	2.56 seconds
	0	0	0	1	5.12 seconds
	0	0	1	0	7.68 seconds
	0	0	1	1	10.24 seconds
	0	1	0	0	12.8 seconds
	0	1	0	1	15.36 seconds
	0	1	1	0	17.92 seconds
	0	1	1	1	20.48 seconds
	1	0	0	0	23.04 seconds
	1	0	0	1	25.6 seconds
	1	0	1	0	28.16 seconds
	1	0	1	1	30.72 seconds
	1	1	0	0	33.28 seconds
	1	1	0	1	35.84 seconds
	1	1	1	0	38.4 seconds
	1	1	1	1	40.96 seconds

Example

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

NOTE

<AcT-type>=2 is invalid in this command for BG95 and BG77.

6.13. AT+CEDRXRDP Read Dynamic Parameters

The Execution Command returns **<AcT-type>**, **<Requested_eDRX_value>**, **<NW-provided_eDRX_value>** and **<Paging_time_window>** if e-I-DRX is used for the cell that the MS is currently registered to.

AT+CEDRXRDP Read Dynamic Parameters	
Test Command **AT+CEDRXRDP=?**	Response **OK**
Execution Command **AT+CEDRXRDP**	Response **+CEDRXRDP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]** **OK**

Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<AcT-type> Integer type. The type of access technology.

2	GSM
4	eMTC
5	NB-IoT

<Requested_eDRX_value> String type. Half a byte in a 4 bit format.

bit

4	3	2	1	E-UTRAN e-I-DRX cycle length duration
0	0	0	0	5.12 seconds
0	0	0	1	10.24 seconds
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	0	61.44 seconds
0	1	0	1	81.92 seconds
0	1	1	0	102.4 seconds
0	1	1	1	122.88 seconds
1	0	0	0	143.36 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655,36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

<NW-provided_eDRX_value> String type. Half a byte in a 4 bit format.

bit

4	3	2	1	E-UTRAN e-I-DRX cycle length duration
0	0	0	0	5.12 seconds
0	0	0	1	10.24 seconds
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	0	61.44 seconds
0	1	0	1	81.92 seconds
0	1	1	0	102.4 seconds
0	1	1	1	122.88 seconds
1	0	0	0	143.36 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655,36 seconds

1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

<Paging_time_window> String type. Half a byte in a 4 bit format.

eMTC mode

bit

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

NB-IoT mode

bit

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

NOTE

<AcT-type>=2 or 3 is invalid in this command for BG95 and BG77.

6.14. AT+CTZR Time Zone Reporting

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

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

Parameter

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

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

Example

```
AT+CTZR=2
OK

AT+CTZR?
+CTZR: 2

OK

+CTZE: "+32",0,"2013/08/23,06:51:13"            //<reporting> is 2
```

6.15. AT+QNWINFO Query Network Information

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

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

Parameter

<Act>	String type. Access technology selected. "No Service" "GSM" "GPRS" "EDGE" "eMTC" "NBIoT"
<oper>	String type. Operator in numeric format.
<band>	String type. Band selected. "GSM 850" "GSM 900" "GSM 1800" "GSM 1900" "LTE BAND 1" – "LTE BAND 85"
<channel>	Integer type. Channel ID.

Example

```
AT+QNWINFO=?
OK

AT+QNWINFO
+QNWINFO: "EDGE","46001","GSM 1800",653

OK
```

6.16. AT+QCSQ Query and Report Signal Strength

The command is used to query and report the signal strength of the current service network. If the MT is registered on multiple networks in different service modes, customers can query the signal strength of networks in each mode. No matter whether the MT is registered on a network or not, the command can be run to query the signal strength or allow the MT to unsolicitedly report the detected signal strength if the MT camps on the network. If the MT is not using any service network or the service mode is uncertain, "NOSERVICE" will be returned as the query result.

AT+QCSQ Query and Report Signal Strength	
Execution Command **AT+QCSQ**	Response **+QCSQ: <sysmode>,[,<value1>[,<value2>[,<value3>[,<value4>]]]]**

	OK
Maximum Response Time	300ms

Parameter

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

"NOSERVICE"	NO SERVICE mode
"GSM"	GSM/GPRS/EDGE mode
"eMTC"	eMTC mode
"NBIoT"	NB-IoT mode

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

<sysmdoe>	**<value1>**	**<value2>**	**<value3>**	**<value4>**
"NOSERVICE"				
"GSM"	**<gsm_rssi>**			
"eMTC	**<lte_rssi>**	**<lte_rsrp>**	**<lte_sinr>**	**<lte_rsrq>**
"NBIoT"	**<lte_rssi>**	**<lte_rsrp>**	**<lte_sinr>**	**<lte_rsrq>**

<gsm_rssi>,<lte_rssi>	An integer indicating the received signal strength. These parameters are available for GSM and LTE mode respectively.
<lte_rsrp>	An integer indicating the reference signal received power (RSRP). This parameter is available for LTE mode.
<lte_sinr>	An integer indicating the signal to interference plus noise ratio (SINR). Logarithmic value of SINR. Values are in 1/5th of a dB. The range is 0-250 which translates to -20dB ~ +30dB.
<lte_rsrq>	An integer indicating the reference signal received quality (RSRQ) in dB.

Example

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

OK

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

OK
```

6.17. AT+QSPN* Display the Name of Registered Network

AT+QSPN* Display the Name of Registered Network	
Test Command **AT+QSPN=?**	Response **OK**
Execution Command **AT+QSPN**	Response **+QSPN: <FNN>,<SNN>,<SPN>,<alphabet>,<RPLMN>** **OK**
Reference	

Parameter

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

NOTES

1. If **<alphabet>** is 0, **<FNN>** and **<SNN>** will be shown in GSM 7 bit default alphabet string.
2. If **<alphabet>** is 1, **<FNN>** and **<SNN>** will be shown in UCS2 hexadecimal string.
3. “*” means under development.

Example

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

OK
```

7 Call Related Commands

7.1. ATD Mobile Originated Call to Dial a Number

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

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

Parameter

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

NOTES

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

Example

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

7.2. ATH Disconnect Existing Connection

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

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

Parameter

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

7.3. AT+CVHU* Voice Hang up Control

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

AT+CVHU* Voice Hang up Control	
Test Command **AT+CVHU=?**	Response **+CVHU:** (list of supported **<mode>**s) **OK**
Read Command **AT+CVHU?**	Response **+CVHU: <mode>** **OK**
Write Command **AT+CVHU=<mode>**	Response **OK** If there is any other error: **ERROR**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<mode>	0	**ATH** can be used to disconnect the voice call.

1	**ATH** is ignored but **OK** response is returned.

NOTE

"*" means under development.

7.4. AT+CHUP* Hang up a Call

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

AT+CHUP* Hang up a Call	
Test Command **AT+CHUP=?**	Response **OK**
Execution Command **AT+CHUP**	Response **OK** If there is any other error: **ERROR**
Maximum Response Time	90s, determined by the network.
Reference 3GPP 27.007	

Example

```
RING                                  //A call is incoming

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

NOTE

"*" means under development.

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

The **+++** character sequence causes the module to switch from data mode to command mode. It allows inputting AT commands while maintaining the data connection with the remote device.

+++ Switch from Data Mode to Command Mode	
Execution Command **+++**	Response This command is only available when TA is in data mode. The **+++** character sequence causes the TA to cancel the data flow over the AT interface and switch to command mode. This allows customers to enter AT command while maintaining the data connection with the remote server. **OK**
Maximum Response Time	300ms
Reference V.25ter	

NOTES

1. To prevent the **+++** escape sequence from being misinterpreted as data, the following sequence should be followed:
    1) Do not input any character within 1s before inputting **+++**.
    2) Input **+++** within 1s, and no other characters can be inputted during the time.
    3) Do not input any character within 1s after **+++** has been inputted.
    4) Switch to command mode; otherwise return to step 1).
2. To return back to data mode from command mode, please enter **ATO0**.
3. Another way to switch to command mode is through DTR level change, and please refer to **AT&D** command for details.

7.6. ATO Switch from Command Mode to Data Mode

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

ATO Switch from Command Mode to Data Mode	
Execution Command **ATO[n]**	Response TA resumes the connection and switches back to data mode from command mode. If connection is not successfully resumed: **NO CARRIER**

	If connection is successfully resumed, TA returns to data mode from command mode: **CONNECT <text>**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0	Switch from command mode to data mode

NOTE

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

7.7. ATS0 Set Number of Rings before Automatically Answering Call

The command controls automatic answering mode for the incoming calls.

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

Parameter

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

NOTE

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

Example

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

RING                            //A call is incoming

RING

RING                            //Automatically answer the call after three rings
```

7.8. ATS6 Set Pause before Blind Dialing

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

ATS6 Set Pause before Blind Dialing	
Read Command **ATS6?**	Response **<n>** **OK**
Write Command **ATS6=<n>**	Response **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

7.9. ATS7 Set the Time to Wait for Connection Completion

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

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

Parameter

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

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

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

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

Parameter

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

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

The command determines the amount of time (unit: tenths of a second) during which the UE remains connected in absence of a data carrier.

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

Parameter

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

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

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

AT+CRC Set Cellular Result Codes for Incoming Call Indication	
Test Command **AT+CRC=?**	Response **+CRC:** (list of supported **<mode>**s) **OK**
Read Command **AT+CRC?**	Response **+CRC: <mode>** **OK**
Write Command **AT+CRC=[<mode>]**	Response TA controls whether or not the extended format of incoming call indication is used. **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

Example

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

+CRING: VOICE                             //Indicate incoming call to the TE

ATH
OK

AT+CRC=0                                  //Disable extended format
OK

RING                                      //Indicate incoming call to the TE
```

```
ATH
OK
```

8 Short Message Service Commands

8.1. AT+CSMS Select Message Service

The command selects messaging service and returns the types of messages supported by the ME.

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

Parameter

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

		descriptions).
<mt>	Mobile terminated messages	
	0	Type not supported
	1	Type supported
<mo>	Mobile originated messages	
	0	Type not supported
	1	Type supported
<bm>	Broadcast type messages	
	0	Type not supported
	1	Type supported

Example

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

OK

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

OK

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

OK
```

8.2. AT+CMGF Message Format

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

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

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

Parameter

<mode>	0	PDU mode
	1	Text mode

8.3. AT+CSCA Service Center Address

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

AT+CSCA Service Center Address	
Test Command **AT+CSCA=?**	Response **OK**
Read Command **AT+CSCA?**	Response **+CSCA: <sca>,<tosca>** **OK**
Write Command **AT+CSCA=<sca>[,<tosca>]**	Response **OK** If there is an error related to ME functionality:

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

Parameter

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

Example

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

AT+CSCA?                              //Query SMSC address
+CSCA: "+8613800210500",145

OK
```

8.4. AT+CPMS Preferred Message Storage

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

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

Write Command **AT+CPMS=<mem1>[,<mem2>[,<mem3>]]**	Response TA selects memory storages **<mem1>**, **<mem2>** and **<mem3>** to be used for reading, writing, etc. **+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>** **OK** If there is an error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<mem1>	Messages to be read and deleted from this memory storage.	
	"SM"	(U)SIM message storage
	"ME"	Mobile equipment message storage
	"MT"	The same as "ME" storage
	"SR"	Status report storage
<mem2>	Messages will be written and sent to this memory storage.	
	"SM"	(U)SIM message storage
	"ME"	Mobile equipment message storage
	"MT"	Same as "ME" storage
	"SR"	Status report storage
<mem3>	Received messages will be placed in this memory storage if routing to PC is not set (**AT+CNMI**).	
	"SM"	(U)SIM message storage
	"ME"	Mobile equipment message storage
	"MT"	Same as "ME" storage
<usedx>	Integer type. Number of current messages in **<memx>**.	
<totalx>	Integer type. Total number of messages which can be stored in **<memx>**.	

Example

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

OK

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

```
OK

AT+CPMS?                                    //Query the current SMS message storage
+CPMS: “SM”,0,50,“SM”,0,50,“SM”,0,50

OK
```

8.5. AT+CMGD Delete Messages

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

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

Parameter

<index>	Integer type value in the range of location numbers supported by the associated memory.	
<delflag>	0	Delete the message specified in **<index>**
	1	Delete all read messages from **<mem1>** storage
	2	Delete all read messages from **<mem1>** storage and sent mobile originated messages
	3	Delete all read messages from **<mem1>** storage, sent and unsent mobile

	originated messages
4	Delete all messages from **<mem1>** storage

Example

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

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

8.6. AT+CMGL List Messages

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

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

	For SMS-COMMANDs: **+CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF>** **+CMGL: <index>,<stat>,<fo>,<ct>[...]]** **OK** For CBM storage: **+CMGL:<index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[<CR><LF>** **+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[...]]** **OK** If in PDU mode (**AT+CMGF=0**) and the command is executed successfully: **+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu><CR><LF>** **+CMGL: <index>,<stat>,[alpha],<length><CR><LF><pdu>[...]]** **OK** If there is an error related to ME functionality: **+CMS ERROR: <err>**
Execution Command **AT+CMGL**	Response List all messages with "REC UNREAD" status from message storage **<mem1>**, and then the status in the storage changes to "REC READ".
Maximum Response Time	300ms. Note: Operation of **<stat>** depends on the storage of listed messages.
Reference 3GPP TS 27.005	

Parameter

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

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

	In the case of CBS: 3GPP TS 23.041 CBM Content of Message in text mode responses; format: - If **<dcs>**, indicates that 3GPP TS 23.038 GSM 7 bit default alphabet is used: - If TE character set other than "HEX" (refer to **AT+CSCS** command in *3GPP TS27.007*): ME/TA converts GSM alphabet into current TE character set according to rules of ***Annex A*** in *3GPP TS 27.007*. - If TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7 bit default alphabet into two IRA character long hexadecimal number. - If **<dcs>**, indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number.
<pdu>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<fo>	First octet. Depending on the command or result code: First octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted.
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<ra>	Recipient address. 3GPP TS 23.040 TP-Recipient-Address Address-Value field in string format. BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS command). The type of address is given by <tora>.
<tora>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format (default refer to **<toda>**).
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**).
<dt>	String type. Discharge time.
<st>	GSM03.40 TP-Status.
<ct>	GSM03.40 TP-Command-Type.
<sn>	3GPP TS 23.041 [4] CBM Serial Number in integer format.
<mid>	3GPP TS 23.041 [4] CBM Message Identifier in integer format.
<page>	Parameter bits 4-7 in integer format.
<pages>	Parameter bits 0-3 in integer format.

Example

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

AT+CMGL="ALL"                           //List all messages from message storage
+CMGL: 1,"STO UNSENT","",,

<This is a test from Quectel>
```

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

<This is a test from Quectel>

OK
```

8.7. AT+CMGR Read Messages

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

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

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

Parameter

<index>	Integer type. In the range of location numbers supported by the associated memory.	
<stat>	Text mode	Explanation
	"REC UNREAD"	Received unread messages
	"REC READ"	Received read messages
	"STO UNSENT"	Stored unsent messages
	"STO SENT"	Stored sent messages
	"ALL"	All messages
	PDU mode	Explanation
	0	Received unread messages
	1	Received read messages
	2	Stored unsent messages
	3	Stored sent messages
	4	All messages
<alpha>	String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry found in MT phonebook. Implementation of this feature is manufacturer specified. The used character set should be the one selected with **AT+CSCS** command (see definition of this command in *3GPP TS 27.007*).	
<da>	Destination address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<toda>**.	
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in	

	string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<tooa>**.
<scts>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to **<dt>**).
<fo>	First octet. Depending on the command or result code: First octet of 3GPP TS 23.040 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND in integer format. If a valid value has been entered once, the parameter can be omitted.
<pid>	Protocol identifier. 3GPP TS 23.040 TP-Protocol-Identifier in integer format (default 0).
<dcs>	Data coding scheme. Depending on the command or result code: 3GPP TS 23.038 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format.
<vp>	Validity period. Depending on SMS-SUBMIT **<fo>** setting: 3GPP TS 23.040 TP-Validity-Period either in integer format or in time-string format (refer to **<dt>**).
<mn>	Message number. 3GPP TS 23.040 TP-Message-Number in integer format.
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.
<ra>	Recipient address. 3GPP TS 23.040 TP-Recipient-Address Address-Value field in string format. BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command). The type of address is given by **<tora>**.
<tora>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format (default refer to **<toda>**).
<toda>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.
<tooa>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer to **<toda>**).
<sca>	Service center address. 3GPP TS 24.011 RP SC address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<tosca>**.
<tosca>	Type of service center address. 3GPP TS 24.011 RP SC address Type-of-Address octet in integer format (default refer to **<toda>**).
<length>	Message length, integer type. Indicating in text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**) the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<data>	The text of short message. Please refer to ***Chapter 14.8*** for details.
<pdu>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<prt>	Priority

	0 Normal 1 Interactive 2 Urgent 3 Emergency
<fmt>	Format 0 GSM 7 bit 1 ASCII 6 UNICODE
<prv>	Privacy 0 Normal 1 Restricted 2 Confidential 3 Secret
<lang>	Language 0 Unspecified 1 English 2 French 3 Spanish 4 Japanese 5 Korean 6 Chinese 7 Hebrew
<type>	0 Normal 1 CPT 2 Voice Mail 3 SMS Report

Example

```
+CMTI: "SM",3                        //Indicate that a new message has been received and
                                     saved to <index>=3 of "SM"
AT+CSDH=1
OK

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

<This is a test from Quectel>

OK
```

8.8. AT+CMGS Send Messages

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

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

Parameter

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

	Type-of-Address octet in integer format.
<length>	Integer type. Message length. Indicating in text mode (**AT+CMGF=1**) the length of the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<mr>	Message reference. 3GPP TS 23.040 TP-Message-Reference in integer format.

Example

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

AT+CSCS=“GSM”                            //Set character set as GSM which is used by the TE
OK

AT+CMGS=“15021012496”
> <This is a test from Quectel>          //Enter in text. Use Ctrl+Z to send message, or ESC
                                         to quit without sending.
+CMGS: 247

OK
```

8.9. AT+CMMS To Send More Messages

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

AT+CMMS To Send More Messages	
Test Command **AT+CMMS=?**	Response **+CMMS:** (list of supported**<n>**s) **OK**
Read Command **AT+CMMS?**	Response **+CMMS: <n>** **OK**
Write Command **AT+CMMS=<n>**	Response **OK** If there is an error related to ME functionality: **+CMS ERROR: <err>**

	If there is any other error: **ERROR**
Maximum Response Time	120s, determined by the network.
Reference 3GPP TS 27.005	

Parameter

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

NOTE

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

8.10. AT+CMGW Write Messages to Memory

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

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

AT+CMGW Write Messages to Memory	
Test Command **AT+CMGW=?**	Response **OK**
Write Command 1) If in text mode (**AT+CMGF=1**): **AT+CMGW=[<oa/da>[,<tooa/toda>[,<stat>]]]** After **>** is reponded, input the text	Response If message writing is successful: **+CMGW: <index>** **OK**

message. After that, tap **Ctrl+Z** to transmit the message to memory storage **<mem2>**. Transmitting can be cancelled by tapping **ESC**, and the abortion is acknowledged with **OK**, though the message will not be transmitted. 2) If in PDU mode (**AT+CMGF=0**): **AT+CMGW=<length>[,<stat>]** After **>** is reponded, input the PDU. After that, tap **Ctrl+Z** to indicate the ending of PDU and begin to transmit the message to memory storage **<mem2>**. Transmitting can be cancelled by tapping **ESC**, and the abortion is acknowledged with **OK**, though the message will not be transmitted.	If there is an error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<da>	Destination address. 3GPP TS 23.040 TP-Destination-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<toda>**.		
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format. BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to **AT+CSCS** command in *3GPP TS 27.007*). The type of address is given by **<tooa>**.		
<tooa>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer to **<toda>**).		
<stat>	PDU mode	Text mode	Explanation
	0	"REC UNREAD"	Received unread messages
	1	"REC READ"	Received read messages
	2	"STO UNSENT"	Stored unsent messages
	3	"STO SENT"	Stored sent messages
	4	"ALL"	All messages
<toda>	Type of destination address. 3GPP TS 24.011 TP-Destination-Address Type-of-Address octet in integer format.		
<length>	Integer type. Message length. Indicating in the text mode (**AT+CMGF=1**) the length of		

	the message body **<data>** (or **<cdata>**) in characters, or in PDU mode (**AT+CMGF=0**), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).
<pdu>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.04 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<index>	Index of message in selected storage **<mem2>**.

Example

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

AT+CSCS=“GSM”                            //Set character set as GSM which is used by the TE
OK

AT+CMGW=“15021012496”

> <This is a test from Quectel>          //Enter in text. Use Ctrl+Z to transmit the message to
                                           memory storage <mem2>.
+CMGW: 4

OK

AT+CMGF=0                                //Set SMS message format as PDU mode
OK

AT+CMGW=18
> 0051FF00000008000A0500030002016D4B8BD5
+CMGW: 5

OK
```

8.11. AT+CMSS Send Messages from Storage

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

AT+CMSS Send Messages from Storage	
Test Command **AT+CMSS=?**	Response **OK**
Write Command **AT+CMSS=<index>[,<da>[,<toda>]]**	Response If in text mode (**AT+CMGF=1**) and sent successfully: **+CMSS: <mr>[,<scts>]** **OK** If in PDU mode (**AT+CMGF=0**) and sent successfully: **+CMSS: <mr> [,<ackpdu>]** **OK** If there is an error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	120s, determined by the network.
Reference 3GPP TS 27.005	

Parameter

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

Example

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

AT+CSCS=“GSM”                              //Set character set as GSM which is used by the TE
```

```
OK

AT+CMGW="15021012496"
> Hello                                      //Enter in text. Use Ctrl+Z to send message.
+CMGW: 4

OK

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

OK
```

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

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

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

Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<n>	Parameter required only for PDU mode 0 Command operates similarly as in text mode 1 Send positive (**RP-ACK**) acknowledgement to the network. Accepted only in PDU mode. 2 Send negative (**RP-ERROR**) acknowledgement to the network. Accepted only in PDU mode.

NOTE

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

Example

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

OK

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

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

AT+CNMA                                      //Send ACK to the network
OK

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

8.13. AT+CNMI SMS Event Reporting Configuration

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

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

Parameter

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

to the TE.

2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.

<mt> The rules for storing received SMS depend on its data coding scheme (refer to *3GPP TS 23.038*) and preferred memory storage (**AT+CPMS**) setting, and the value is:

0 No SMS-DELIVER indications are routed to the TE.

1 If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE by using unsolicited result code: **+CMTI: <mem>,<index>**

2 SMS-DELIVERs (except class 2) are routed directly to the TE using unsolicited result code: **+CMT: [<alpha>],<length><CR><LF><pdu>** (PDU mode enabled) or **+CMT: <oa>,[<alpha>],<scts>[,<*tooa*>,<*fo*>,<*pid*>,<*dcs*>,<*sca*>,<*tosca*>,<*length*>]<CR><LF><data>** (text mode enabled; about parameters in italics, refer to **AT+CSDH**). Class 2 messages result in indication as defined in **<mt>**=1.

3 Class 3 SMS-DELIVERs are routed directly to TE by using unsolicited result codes defined in **<mt>**=2. Messages of other classes result in indication as defined in **<mt>**=1.

<bm> The rules for storing received CBMs depend on its data coding scheme (refer to *3GPP TS 23.038*) and the setting of Select CBM Types (**AT+CSCB**), and the value is:

0 No CBM indications are routed to the TE.

2 New CBMs are routed directly to the TE using unsolicited result code: **+CBM: <length><CR><LF><pdu>** (PDU mode); or **+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>** (text mode)

<ds> 0 No SMS-STATUS-REPORTs are routed to the TE.

1 SMS-STATUS-REPORTs are routed to the TE using unsolicited result code:
+CDS: <length><CR><LF><pdu> (PDU mode)
+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,,<st> (text mode)

2 If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:
+CDSI:<mem>,<index>

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

1 TA buffer of unsolicited result codes defined within this command is cleared when **<mode>** 1...2 is entered.

NOTE

Unsolicited result code:

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

Example

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

AT+CSCS="GSM"                            //Set character set as GSM which is used by the TE
OK

AT+CNMI=1,2,0,1,0                        //Set SMS-DELIVERs are routed directly to the TE
OK

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

8.14. AT+CSDH Show SMS Text Mode Parameters

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

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

Parameter

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

	mode.
1	Show the values in result codes.

Example

```
AT+CSDH=0
OK

AT+CMGR=2
+CMGR: "STO UNSENT" ,"",

<This is a test from Quectel>

OK

AT+CSDH=1
OK

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

<This is a test from Quectel>

OK
```

8.15. AT+CSMP Set SMS Text Mode Parameters

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

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

	OK
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

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

8.16. AT+QCMGS Send Concatenated Messages

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

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

Maximum Response Time	120s, determined by the network.

Parameter

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

NOTES

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

Example

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

AT+CSCS="GSM"                           //Set character set as GSM which is used by the TE
OK
```

```
AT+QCMGS="15056913384",120,1,2 <CR>          //Input 120 for <uid>, send the first segment of the
                                              concatenated SMS
>ABCD<Ctrl-Z>
+QCMGS: 190

OK

AT+QCMGS= "15056913384",120,2,2 <CR>         //Send the second segment of the concatenated SMS.
>EFGH<Ctrl-Z>
+QCMGS: 191

OK
```

8.17. AT+QCMGR Read Concatenated Messages

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

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

	st> **OK** For SMS-COMMANDs: **+QCMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]** **OK** If there is an error related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	Depends on the length of message content.

Parameter

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

NOTES

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

Example

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

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

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

OK
```

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

OK
```

9 Packet Domain Commands

9.1. AT+CGATT Attachment or Detachment of PS

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

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

Parameter

<state>	Indicates the state of PS attachment 0 Detached 1 Attached Other values are reserved and will result in an **ERROR** response to the Write Command.

Example

```
AT+CGATT=1                                //Attach to PS service
OK

AT+CGATT=0                                //Detach from PS service
OK

AT+CGATT?                                 //Query the current PS service state
+CGATT: 0

OK
```

9.2. AT+CGDCONT Define PDP Context

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

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

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

Parameter

<cid>	PDP context identifier. A numeric parameter which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value=1) is returned by the test form of the command.
<PDP_type>	Packet data protocol type. A string parameter which specifies the type of packet data protocol. "IP" IPv4 "PPP" PPP "IPV6" IPv6 "IPV4V6" IPv4v6
<APN>	Access point name. A string parameter that is a logical name used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.
<PDP_addr>	A string parameter identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The allocated address may be read using the **AT+CGPADDR** command.
<data_comp>	A numeric parameter that controls PDP data compression (applicable for SNDCP only) (refer to *3GPP TS 44.065*). 0 OFF (Default value if the parameter is omitted) 1 ON (Manufacturer preferred compression) 2 V.42bis 3 V.44 (Not supported currently)
<head_comp>	A numeric parameter that controls PDP header compression (refer to *3GPP TS 44.065* and *3GPP TS 25.323*). 0 OFF 1 ON 2 RFC1144 3 RFC2507 4 RFC3095

9.3. AT+CGACT Activate or Deactivate PDP Contexts

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

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

Parameter

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

Example

```
AT+CGDCONT=1,“IP”,“UNINET”                //Define a PDP context
OK

AT+CGACT=1,1                              //Activate the PDP
OK

AT+CGACT=0,1                              //Deactivate the PDP
OK
```

9.4. AT+CGPADDR Show PDP Address

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

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

Parameter

<cid>	A numeric parameter which specifies a particular PDP context definition (see **AT+CGDCONT** command).
<PDP_addr>	A string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the **AT+CGDCONT** command when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by **<cid>**. **<PDP_address>** is omitted if none is available.

Example

```
AT+CGDCONT=1,“IP”,“UNINET”              //Define a PDP context
OK

AT+CGACT=1,1                            //Activate the PDP
OK

AT+CGPADDR=1                            //Show the PDP address
+CGPADDR: 1,“10.76.51.180”
```

OK

9.5. AT+CGREG EGPRS Network Registration Status

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

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

Parameter

<n>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code: **+CGREG:<stat>**
	2	Enable network registration and location information unsolicited result code: **+CGREG: <stat>[,<lac>,<ci>[,<AcT>]]**
	4	For a UE that wants to apply PSM, enable network registration and location information unsolicited result code: **+CGREG: <stat>[,[<lac>],[<ci>],[<AcT>],[<rac>][,,[,[<ActiveTime>],[<Periodic-RAU>],[<GPRS-READY-timer>]]]]**
<stat>	0	Not registered. MT is not currently searching an operator to register to. The UE is in GMM state GMM-NULL or GMM-DEREGISTERED-INITIATED. The GPRS

		service is disabled, but the UE is allowed to attach for GPRS if requested by the user.
	1	Registered, home network. The UE is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED INITIATED on the home PLMN.
	2	Not registered, but MT is currently trying to attach or searching an operator to register to. The UE is in GMM state GMM-DEREGISTERED or GMM-REGISTERED-INITIATED. The GPRS service is enabled, but an allowable PLMN is currently not available. The UE will start a GPRS attach as soon as an allowable PLMN is available.
	3	Registration denied. The UE is in GMM state GMM-NULL. The GPRS service is disabled, and the UE is not allowed to attach for GPRS if requested by the user.
	4	Unknown
	5	Registered, roaming
<lac>	String type. Two-byte location area code in hexadecimal format (e.g. “00C3” equals 195 in decimal)	
<ci>	String type. Two-byte cell ID in hexadecimal format.	
<AcT>	Access technology selected.	
	0	GSM
	8	eMTC (Not applicable)
	9	NB-IoT (Not applicable)
<rac>	Routing area code.	

NOTE

The command is valid on BG95-M3 only.

Example

```
AT+CGREG=2
OK

AT+CGATT=0
OK

+CGREG: 2

AT+CGATT=1
OK

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

9.6. AT+CGEREP Packet Domain Event Report

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

AT+CGEREP Packet Domain Event Report	
Test Command **AT+CGEREP=?**	Response **+CGEREP:** (list of supported **<mode>**s),(list of supported **<bfr>**s) **OK**
Read Command **AT+CGEREP?**	Response **+CGEREP: <mode>,<bfr>** **OK**
Write Command **AT+CGEREP=mode[,<bfr>]**	Response **OK** If there is any other error: **ERROR**
Execution Command **AT+CGEREP**	Response **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

NOTE

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

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

Parameter

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

	B	Class B
	C	Class C in GPRS and circuit switched alternate mode
	CG	Class C in GPRS only mode
	CC	Class C in circuit switched only mode (lowest)

Example

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

OK

AT+CGEREP?
+CGEREP: 0,0

OK
```

9.7. AT+CGSMS Select Service for MO SMS Messages

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

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

Parameter

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

NOTE

The circuit switched service route is the default method.

9.8. AT+CEREG EPS Network Registration Status

The command queries the LTE network registration status and controls the presentation of:

- the unsolicited result code **+CEREG: <stat>** when **<n>**=1 and there is a change in the MT's EPS network registration status in E-UTRAN,
- the unsolicited result code **+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]** when **<n>**=2 and there is a change of the network cell in E-UTRAN, and
- the unsolicited result code **+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>],[<Periodic-TAU>]]]]** when **<n>**=4 and there is a change of the network cell in E-UTRAN.

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

Write Command **AT+CEREG[=<n>]**	Response **OK** If there is any other error: **ERROR**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code: **+CEREG:<stat>**
	2	Enable network registration and location information unsolicited result code: **+CEREG: <stat>[,<tac>,<ci>[,<AcT>]]**
	4	For a UE that has applied PSM, and network assigns T3324 to UE, enable network registration and location information unsolicited result code: **+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>],[<Periodic-TAU>]]]]**
<stat>	0	Not registered. MT is not currently searching an operator to register to.
	1	Registered, home network
	2	Not registered, but MT is currently trying to attach or searching an operator to register to
	3	Registration denied
	4	Unknown
	5	Registered, roaming
<tac>	String type. Two-byte tracking area code in hexadecimal format.	
<ci>	String type. Four-byte E-UTRAN cell ID in hexadecimal format.	
<AcT>	Access technology selected	
	0	GSM (Not applicable)
	8	eMTC
	9	NB-IoT
<cause_type>	Integer type. The type of **<reject_cause>**.	
	0	Indicates that **<reject_cause>** contains an EMM cause value.
	1	Indicates that **<reject_cause>** contains a manufacturer-specific cause.
<reject_cause>	Integer type. Contains the cause of the failed registration. The value is of type as defined by **<cause_type>**.	
<Active-Time>	String type. One byte in an 8 bit format. Active Time value (T3324) to be allocated to the UE. (e.g. "00001111" equals to 1 minute) Bits 5 to 1 represent the binary coded timer value. Bits 6 to 8 define the timer value unit as follows: Bits	

	8 7 6 0 0 0 value is incremented in multiples of 2 seconds 0 0 1 value is incremented in multiples of 1 minute 0 1 0 value is incremented in multiples of decihours 1 1 1 value indicates that the timer is deactivated.
<Periodic-TAU>	String type. One byte in an 8 bit format. Extend periodic TAU value (T3412_ext) to be allocated to the UE in E-UTRAN. (e.g. "00001010" equals to 100 minutes) Bits 5 to 1 represent the binary coded timer value. Bits 6 to 8 define the timer value unit as follows: Bits 8 7 6 0 0 0 value is incremented in multiples of 10 minutes 0 0 1 value is incremented in multiples of 1 hour 0 1 0 value is incremented in multiples of 10 hours 0 1 1 value is incremented in multiples of 2 seconds 1 0 0 value is incremented in multiples of 30 seconds 1 0 1 value is incremented in multiples of 1 minute

10 Supplementary Service Commands*

All commands in this chapter are still under development.

10.1. AT+CCFC Call Forwarding Number and Conditions Control

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

AT+CCFC Call Forwarding Number and Conditions Control	
Test Command **AT+CCFC=?**	Response **+CCFC:** (list of supported **<reads>**s) **OK**
Write Command **AT+CCFC=<reads>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,time]]]]]]**	Response TA controls the call forwarding supplementary service. Registration, erasure, activation, deactivation, and status query are supported. Only **<reads>** and **<mode>** should be entered with **<mode>**= 0, 1, 2 or 4. If **<mode>** is not equal to 2 and the command is executed successfully: **OK** If **<mode>**=2 and the command is executed successfully (only in connection with **<reads>=**0-3): For registered call forwarding numbers: **+CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]] [<CR><LF>+CCFC: ....]** **OK** If no call forwarding numbers are registered (and therefore all classes are inactive): **+CCFC: <status>,<class>**

	OK where **<status>**=0 and **<class>**=15 If there is an error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

Example

AT+CCFC=0,3,"15021012496"	//Register the destination number for unconditional call forwarding (CFU)

```
OK
AT+CCFC=0,2                          //Query the status of CFU without specifying <class>
+CCFC: 1,1,"+8615021012496",145,,,

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

OK
```

10.2. AT+CCWA Call Waiting Control

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

AT+CCWA Call Waiting Control	
Test Command **AT+CCWA=?**	Response **+CCWA:** (list of supported **<n>**s) **OK**
Read Command **AT+CCWA?**	Response **+CCWA: <n>** **OK**
Write Command **AT+CCWA[=<n>][,<mode>[,<class>]]**	Response TA controls the call waiting supplementary service. Activation, deactivation and status query are supported. If **<mode>** is not equal to 2 and the command is executed successfully: **OK** If **<mode>**=2 and the command is executed successfully: **+CCWA: <status>,<class1>[<CR><LF>+CCWA:<status>,<class2>[...]]** **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**

Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	0	Disable presentation of an unsolicited result code
	1	Enable presentation of an unsolicited result code
<mode>	When **<mode>** parameter is not given, network is not interrogated	
	0	Disable
	1	Enable
	2	Query status
<class>	A sum of integers, each integer represents a class of information	
	1	Voice (telephony)
	2	Data (bearer service)
	4	Fax (facsimile)
	16	Data circuit synchronization
	32	Data circuit asynchronization
<status>	0	Disable
	1	Enable
<number>	Phone number in string type of calling address in format specified by **<type>**	
<type>	Type of address octet in integer format	
	129	Unknown type (IDSN format number)
	145	International number type (ISDN format)
<alpha>	Optional string type alphanumeric representation of **<number>** corresponding to the entry found in phone book	

NOTES

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

Example

```
AT+CCWA=1,1                          //Enable presentation of an unsolicited result code
OK
```

```
ATD10086;                              //Establish a call
OK

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

10.3. AT+CHLD Call Related Supplementary Services

The command allows the control of the following call related services:

- A call can be temporarily disconnected from the MT but the connection is retained by the network;
- Multiparty conversation (conference calls);
- The served subscriber who has two calls (one held and the other either active or alerting) can connect the other parties and release the served subscriber’s own connection.

Calls can be put on hold, recovered, released and added to a conversation, and transferred similarly as defined in *3GPP TS 22.030*.

This is based on the GSM/UMTS supplementary services HOLD (Call Hold; refer to *3GPP TS 22.083 clause 2*), MPTY (MultiParty; refer to *3GPP TS 22.084*) and ECT (Explicit Call Transfer; refer to *3GPP TS 22.091*). The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standards. Call Hold, MultiParty and Explicit Call Transfer are only applicable to teleservice 11. Please note that UMTS related services are not supported on BG95 and BG77.

AT+CHLD Call Related Supplementary Services	
Test Command **AT+CHLD=?**	Response **+CHLD:** (list of supported **<n>**s) **OK**
Write Command **AT+CHLD[=<n>]**	Response TA controls the supplementary services call hold, multiparty and explicit call transfer. Calls can be put on hold, recovered, released, added to conversation and transferred. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	0	Terminate all held calls or UDUB (User Determined User Busy) for a waiting call. If a call is waiting, terminate the waiting call. Otherwise, terminate all held calls (if any).
	1	Terminate all active calls (if any) and accept the other call (waiting call or held call)
	1X	Terminate the specific call number X (X=1-7)
	2	Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call
	2X	Place all active calls except call X (X=1-7) on hold
	3	Add the held call to the active calls
	4	Connects the two calls and disconnects the subscriber from both calls (ECT)

Example

```
ATD10086;                                //Establish a call
OK

+CCWA: “02154450293”,129,1               //Indication of a call that has been waiting

AT+CHLD=2                                //Place the active call on hold and accept the waiting call as
                                          the active call
OK

AT+CLCC
+CLCC: 1,0,1,0,0,“10086”,129             //The first call on hold

+CLCC: 2,1,0,0,0,“02154450293”,129       //The second call be active

OK

AT+CHLD=21                               //Place the active call except call X=1 on hold
OK

AT+CLCC
+CLCC: 1,0,0,0,0,“10086”,129             //The first call be active

+CLCC: 2,1,1,0,1,“02154450293”,129       //The second call on hold

OK

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

```
OK

AT+CLCC
+CLCC: 1,0,0,0,1,“10086”,129

+CLCC: 2,1,0,0,1,“02154450293”,129

OK
```

10.4. AT+CLIP Calling Line Identification Presentation

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

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

Parameter

<n>	0	Suppress unsolicited result codes
	1	Display unsolicited result codes
<m>	0	CLIP not provisioned

	1 CLIP provisioned 2 Unknown
<number>	Phone number in string type of calling address in format specified by **<type>**
<subaddr>	String type subaddress of format specified by **<satype>**
<satype>	Type of subaddress octet in integer format (refer to *3GPP TS 24.008 [8] subclause 10.5.4.8*)
<type>	Type of address octet in integer format; 129 Unknown type (IDSN format) 145 International number type (ISDN format) 161 National number
<alpha>	String type alphanumeric representation of **<number>** corresponding to the entry found in phone book.
<CLI validity>	0 CLI valid 1 CLI has been withheld by the originator 2 CLI is not available due to interworking problems or limitations of originating network

NOTE

Unsolicited result code:

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

+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI validity>

Example

```
AT+CPBW=1,“02151082965”,129,“QUECTEL”
OK

AT+CLIP=1
OK

RING

+CLIP: “02151082965”,129,,,“QUECTEL”,0
```

10.5. AT+CLIR Calling Line Identification Restriction

The command refers to the CLIR supplementary service (Calling Line Identification Restriction) according to *3GPP TS 22.081* and the OIR supplementary service (Originating Identification Restriction) according to *3GPP TS 24.607* that allows a calling subscriber to enable or disable the presentation of the calling line identity (CLI) to the called party when originating a call.

AT+CLIR Calling Line Identification Restriction	
Test Command **AT+CLIR=?**	Response **+CLIR:** (list of supported **<n>**s) **OK**
Read Command **AT+CLIR?**	Response **+CLIR: <n>,<m>** **OK**
Write Command **AT+CLIR[=<n>]**	Response TA restricts or enables the presentation of the calling line identity (CLI) to the called party when originating a call. The command overrides the CLIR subscription (default is restricted or allowed) when temporary mode is provisioned as a default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite command. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	15s, determined by the network.
Reference 3GPP TS 27.007	

Parameter

<n>	Parameter sets the adjustment for outgoing calls	
	0	Presentation indicator is used according to the subscription of the CLIR service
	1	CLIR invocation
	2	CLIR suppression
<m>	Parameter shows the subscriber CLIR service status in the network	
	0	CLIR not provisioned
	1	CLIR provisioned in permanent mode
	2	Unknown (e.g. no network, etc.)
	3	CLIR temporary mode presentation restricted
	4	CLIR temporary mode presentation allowed

10.6. AT+COLP Connected Line Identification Presentation

The command refers to the GSM/UMTS supplementary service COLP (Connected Line Identification Presentation) that enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call. The command enables or disables the presentation of the COL at the TE. It has no effect on the execution of the supplementary service COLR in the network.

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

Parameter

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

<subaddr>	String type sub-address of format specified by **<satype>**
<satype>	Type of sub-address octet in integer format (refer to *3GPP TS 24.008 sub clause 10.5.4.8*)
<alpha>	Optional string type alphanumeric representation of **<number>** corresponding to the entry found in phone book

NOTE

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

Example

```
AT+CPBW=1,“02151082965”,129,“QUECTEL”
OK

AT+COLP=1
OK

ATD02151082965;
+COLP: “02151082965”,129,,,“QUECTEL”

OK
```

10.7. AT+CSSN Supplementary Service Notifications

The command refers to supplementary service related network initiated notifications. The Write Command enables/disables the presentation of notification result codes from TA to TE.

AT+CSSN Supplementary Service Notifications	
Test Command **AT+CSSN=?**	Response **+CSSN:** (list of supported **<n>**s),(list of supported **<m>**s) **OK**
Read Command **AT+CSSN?**	Response **+CSSN: <n>,<m>** **OK**
Write Command	Response

AT+CSSN=<n>[,<m>]	**OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

NOTES

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

10.8. AT+CUSD Unstructured Supplementary Service Data

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

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

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

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

Parameter

<mode>	Integer type. Sets/shows the result code presentation status to the TE	
	0	Disable the result code presentation to the TE
	1	Enable the result code presentation to the TE
	2	Cancel session (not applicable to Read Command response)
<reqstr>	Unstructured Supplementary Service Data (USSD) to be sent to the network. If this parameter is not given, network is not interrogated.	

<rspstr>	Unstructured Supplementary Service Data (USSD) received from the network	
<dcs>	Integer type. 3GPP TS 23.038 Cell Broadcast Data Coding Scheme (default 15)	
<status>	USSD response from the network or the network initiated operation	
	0	No further user action required (network initiated USSD Notify, or no further information needed after mobile initiated operation)
	1	Further user action required (network initiated USSD Request, or further information needed after mobile initiated operation)
	2	USSD terminated by network
	3	Another local client has responded
	4	Operation not supported
	5	Network time out

11 Hardware Related Commands

11.1. AT+QPOWD Power down

The command is used to power off the module. The UE will return **OK** immediately when the command is executed successfully. The UE will then deactivate the network, after which it will output **POWERED DOWN** and enter power-off state. The maximum time for unregistering network is 60 seconds. To avoid data loss, the power supply for the module cannot be disconnected before the module's STATUS pin is set low and the URC **POWERED DOWN** is outputted.

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

Parameter

<n>	0	Immediate power down
	1	Normal power down

11.2. AT+CCLK Clock

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

AT+CCLK Clock	
Test Command **AT+CCLK=?**	Response **OK**

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

Parameter

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

Example

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

OK
```

11.3. AT+CBC Battery Charge

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

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

	OK If there is an error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

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

The command is used to control whether the module enters sleep mode. When entering into sleep mode is enabled and DTR is pulled up, the module can enter sleep mode directly. If entering into sleep mode is enabled and DTR is pulled down, there is a need to pull up the DTR pin first to make the module enter sleep mode.

AT+QSCLK Configure Whether or Not to Enter Sleep Mode	
Test Command **AT+QSCLK=?**	Response **+QSCLK:** (list of supported **<n>**s) **OK**
Read Command **AT+QSCLK?**	Response **+QSCLK: <n>** **OK**
Write Command **AT+QSCLK=<n>**	Response **OK**
Maximum Response Time	300ms
Reference Quectel	

Parameter

<n>	0	Disable sleep mode
	1	Enable sleep mode. It is controlled by DTR.

12 DFOTA Related AT Command

Please refer to *Quectel_BG95&BG77_DFOTA_Application_Note* for details of DFOTA function.

Table 4: DFOTA Related AT Command

Command	Description
AT+QFOTADL	Upgrade firmware via DFOTA

13 FTP(S) Related AT Commands

Please refer to *Quectel_BG95&BG77_FTP(S)_Application_Note* for details of FTP(S) function.

Table 5: FTP(S) Related AT Commands

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

14 HTTP(S) Related AT Commands

Please refer to *Quectel_BG95&BG77_HTTP(S)_Application_Note* for details of HTTP(S) function.

Table 6: HTTP(S) Related AT Commands

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

15 TCP(IP) Related AT Commands

Please refer to *Quectel_BG95&BG77_TCP(IP)_Application_Note* for details of TCP(IP) function.

Table 7: TCP/IP Related AT Commands

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

16 GNSS Related AT Commands

Please refer to *Quectel_BG95&BG77_GNSS_Application_Note* for details of GNSS function.

Table 8: GNSS Related AT Commands

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

17 SSL Related AT Commands

Please refer to *Quectel_BG95&BG77_SSL_Application_Note* for details of SSL function.

Table 9: SSL Related AT Commands

Command	Description
AT+QSSLCFG	Configure parameters of an SSL context
AT+QSSLOPEN	Open an SSL socket to connect remote server
AT+QSSLEND	Send data via SSL connection
AT+QSSLRECV	Receive data via SSL connection
AT+QSSLCLOSE	Close an SSL connection
AT+QSSLSTATE	Query the state of SSL connection

18 FILE Related AT Commands

Please refer to *Quectel_BG95&BG77_FILE_Application_Note* for details of FILE function.

Table 10: FILE Related AT Commands

Command	Description
AT+QFLDS	Get the space information of storage
AT+QFLST	List file name and file size
AT+QFDEL	Delete files
AT+QFUPL	Upload a file
AT+QFDWL	Download a file
AT+QFOPEN	Open a file
AT+QFREAD	Read a file
AT+QFWRITE	Write a file
AT+QFSEEK	Set file pointer to a position
AT+QFPOSITION	Get the offset of a file pointer
AT+QFTUCAT	Truncate a file from the file pointer
AT+QFCLOSE	Close a file

19 MQTT Related AT Commands

Please refer to *Quectel_BG95&BG77_MQTT_Application_Note* for details of MQTT function.

Table 11: MQTT Related AT Commands

Command	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

20 Appendix

20.1. References

Table 12: Related Documents

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

Table 13: Terms and Abbreviations

Abbreviation	Description
AMR	Adaptive Multi-Rate
CSD	Circuit Switch Data
DCD	Dynamic Content Delivery
DCE	Data Communication Equipment
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
ECT	Explicit Call Transfer supplementary service

eMTC	enhanced Machine Type Communication
FTP	File Transfer Protocol
GPRS	General Packet Radio Service
HTTP	HyperText Transfer Protocol
IMS	IP Multimedia Subsystem
LwM2M	Lightweight M2M
ME	Mobile Equipment
MQTT	Message Queuing Telemetry Transport
MS	Mobile Station
NB-IoT	Narrowband Internet of Things
PDP	Packet Data Protocol
PSC	Primary Synchronization Code
RAT	Radio Access Technology
RRC	Radio Resource Control
RTS/CTS	Request To Send/Clear To Send
SGSN	Serving GPRS Support Node
TA	Terminal Adapter
TCP	Transmission Control Protocol
TE	Terminal Equipment
UDP	User Datagram Protocol
UE	User Equipment
NVRAM	Non-Volatile Random Access Memory
VoLTE	Voice over LTE (Long Term Evolution)

20.2. Factory Default Settings Restorable with AT&F

Table 14: Factory Default Settings Restorable with AT&F

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATS0	<n>	0
ATS3	<n>	13
ATS4	<n>	10
ATS5	<n>	8
ATS6	<n>	2
ATS7	<n>	0
ATS8	<n>	2
ATS10	<n>	15
ATV	<value>	1
ATX	<value>	4
AT&C	<value>	1
AT&D	<value>	1
AT+ICF	<format>,<parity>	3,3
AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+CMEE	<n>	1
AT+CSCS	<chset>	“GSM”
AT+CSTA	<type>	129
AT+CR	<mode>	0

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

20.3. AT Command Settings Storable with AT&W

Table 15: AT Command Settings Storable with AT&W

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

20.4. AT Command Settings Restorable with ATZ

Table 16: AT Command Settings Restorable with ATZ

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

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

20.5. Summary of CME ERROR Codes

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

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

Table 17: Different Coding Schemes of +CME ERROR: <err>

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

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

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

20.6. Summary of CMS ERROR Codes

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

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

Table 18: Different Coding Schemes of +CMS ERROR: <err>

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

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

20.7. Summary of URC

Table 19: Summary of URC

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

16	+CLIP: <number>,<type>,[subaddr],[satype],[<alpha>],<CLI validity>	Mobile terminating call indication	AT+CLIP=1
17	+CRING: <type>	An incoming call is indicated to the TE with unsolicited result code instead of the normal RING	AT+CRC=1
18	+CCWA: <number>,<type>,<class>[,<alpha>]	Call waiting indication	AT+CCWA=1,1
19	+CSSI: <code1>	Shows the +CSSI intermediate result code presentation status to the TE	AT+CSSN=1
20	+CSSU: <code2>	Shows the +CSSU unsolicited result code presentation status to the TE	AT+CSSN=<n>,1
21	+CUSD: <status>[,<rspstr>,[<dcs>]]	USSD response from the network, or a network initiated operation	AT+CUSD=1
22	RDY	ME initialization is successful	N/A
23	+CFUN: 1	All function of the ME is available	N/A
24	+CPIN: <state>	SIM card pin state	N/A
25	+QIND: SMS DONE	SMS initialization finished	N/A
26	POWERED DOWN	Module power down	AT+QPOWD
27	+CGEV: REJECT <PDP_type>, <PDP_addr>	A network request for PDP activation, and was automatically rejected.	AT+CGEREP=2,1
28	+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]	The network request PDP reactivation	AT+CGEREP=2,1
29	+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]	The network has forced a context deactivation	AT+CGEREP=2,1
30	+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]	The ME has forced a context deactivation.	AT+CGEREP=2,1
31	+CGEV: NW DETACH	The network has forced a Packet Domain detach.	AT+CGEREP=2,1
32	+CGEV: ME DETACH	The mobile equipment has forced a Packet Domain detach.	AT+CGEREP=2,1
33	+CGEV: NW CLASS <class>	The network has forced a change of MS class.	AT+CGEREP=2,1
34	+CGEV: ME CLASS <class>	The mobile equipment has forced a change of MS class.	AT+CGEREP=2,1
35	+QPSMTIMER: <tau_timer>,<T3324_timer>	Indicate the TAU Duration and Active Time Duration.	AT+QCFG="psm/urc”,1

20.8. SMS Character Sets Conversions

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

Table 20: The Way of SMS Text Input or Output

DCS	AT+CSCS	The Way of SMS Text Input or Output
GSM 7 bit	GSM	Input or output GSM character sets.
GSM 7 bit	IRA	Input or output IRA character sets. Input: UE will convert IRA characters to GSM characters. Output: UE will convert GSM characters to IRA characters.
GSM 7 bit	UCS2	Input or output a hex string similar to PDU mode. So only support characters '0'-'9' and 'A'-'F'. Input: UE will convert the UCS2 hex string to GSM characters. Output: UE will convert the GSM characters to UCS2 hex string.
UCS2	-	Ignore the value of AT+CSCS, input or output a hex string similar to PDU mode. So only support characters '0'-'9' and 'A'-'F'.
8 bit	-	Ignore the value of AT+CSCS, input or output a hex string similar to PDU mode. So only support characters '0'-'9' and 'A'-'F'.

When DCS=GSM 7 bit, the input or output needs conversion. The detailed conversion tables are shown as below.

Table 21: The Input Conversions Table (DCS=GSM 7 bit and AT+CSCS="GSM")

	0	1	2	3	4	5	6	7
0	00	10	20	30	40	50	60	70
1	01	11	21	31	41	51	61	71
2	02	12	22	32	42	52	62	72
3	03	13	23	33	43	53	63	73
4	04	14	24	34	44	54	64	74
5	05	15	25	35	45	55	65	75

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

Table 22: The Output Conversions Table (DCS=GSM 7 bit and AT+CSCS="GSM")

	0	1	2	3	4	5	6	7
0	00	10	20	30	40	50	60	70
1	01	11	21	31	41	51	61	71
2	02	12	22	32	42	52	62	72
3	03	13	23	33	43	53	63	73
4	04	14	24	34	44	54	64	74
5	05	15	25	35	45	55	65	75
6	06	16	26	36	46	56	66	76
7	07	17	27	37	47	57	67	77
8	08	18	28	38	48	58	68	78
9	09	19	29	39	49	59	69	79
A	0D0A		2A	3A	4A	5A	6A	7A
B	0B		2B	3B	4B	5B	6B	7B
C	0C	1C	2C	3C	4C	5C	6C	7C

D	0D	1A	2D	3D	4D	5D	6D	7D
E	0E	1E	2E	3E	4E	5E	6E	7E
F	0F	1F	2F	3F	4F	5F	6F	7F

Table 23: GSM Extended Characters (GSM Encode)

	0	1	2	3	4	5	6	7
0					1B40			
1								
2								
3								
4		1B14						
5								
6								
7								
8			1B28					
9			1B29					
A								
B								
C				1B3C				
D				1B3D				
E				1B3E				
F			1B2F					

Table 24: The Input Conversions Table (DCS=GSM 7 bit and AT+CSCS="IRA")

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

Table 25: IRA Extended Characters

	A	B	C	D	E	F
0	20	20	20	20	7F	20
1	40	20	20	5D	20	7D
2	20	20	20	20	20	08
3	01	20	20	20	20	20
4	24	20	5B	20	7B	20

5	03	20	0E	20	0F	20
6	20	20	1C	5C	1D	7C
7	5F	20	09	20	20	20
8	20	20	20	0B	04	0C
9	20	20	1F	20	05	06
A	20	20	20	20	20	20
B	20	20	20	20	20	20
C	20	20	20	5E	07	7E
D	20	20	20	20	20	20
E	20	20	20	20	20	20
F	20	60	20	1E	20	20

Table 26: The Output Conversions Table (DCS=GSM 7 bit and AT+CSCS="IRA")

	0	1	2	3	4	5	6	7
0	40	20	20	30	A1	50	BF	70
1	A3	5F	21	31	41	51	61	71
2	24	20	22	32	42	52	62	72
3	A5	20	23	33	43	53	63	73
4	E8	20	A4	34	44	54	64	74
5	E9	20	25	35	45	55	65	75
6	F9	20	26	36	46	56	66	76
7	EC	20	27	37	47	57	67	77
8	F2	20	28	38	48	58	68	78
9	C7	20	29	39	49	59	69	79
A	0D0A		2A	3A	4A	5A	6A	7A
B	D8		2B	3B	4B	C4	6B	E4

C	F8	C6	2C	3C	4C	D6	6C	F6
D	0D	E6	2D	3D	4D	D1	6D	F1
E	C5	DF	2E	3E	4E	DC	6E	FC
F	E5	C9	2F	3F	4F	A7	6F	E0

Table 27: GSM Extended Characters (ISO-8859-1/Unicode)

	0	1	2	3	4	5	6	7
0					7C			
1								
2								
3								
4		5E						
5								
6								
7								
8			7B					
9			7D					
A								
B								
C				5B				
D				7E				
E				5D				
F			5C					

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

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

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