UC15

AT Commands Manual

UMTS/HSPA Module Series

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GENERAL NOTES

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About the Document

History

Revision	Date	Author	Description
1.0	2013-12-12	Jacky ZHANG	Initial
1.1	2014-09-26	Rex ZHANG	1. Modified the response of AT Commands: +CSMP/+COPS 2. Added AT Commands: +CEER/+QSIMDET/+QSIMSTAT/+CGEREP/+QAUDLOOP/+QMIC/+QTONEDET/+QPCMV/+QWDTMF/+QLDTMF/+QLTONE 3. Deleted AT+ICF description in AT&W, ATZ 4. Modified the description of AT Commands: +CNMI/+CPMS 5. Added maximum response time to all AT Commands

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1 Introduction

1.1. Scope of the Document

This document presents the AT Commands Set for Quectel cellular engine UC15.

1.2. AT Command Syntax

The "**AT**" or "**at**" prefix must be set at the beginning of each command line. To terminate a command line enter **<CR>**. 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 UC15 is a combination of 3GPP TS 27.007, 3GPP TS 27.005 and ITU-T recommendation V.25ter and 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 missing.

● **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 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 UE

1.3. Supported Character Sets

The UC15 AT command interface defaults to the **GSM** character set. The UC15 supports the following character sets:

- GSM
- UCS2
- IRA

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

1.4. AT Command Interface

The UC15 AT command interface includes two USB ports (USB MODEM port and USB AT port) and one main UART port. Both the USB MODEM port and the main UART port support AT command and data transfer. The USB AT port only supports AT command.

UART Port Feature:

The baud rates of 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600, 3200000, 3686400 and 4000000 are supported at present. The default is 115200.

The main UART port supports hardware flow control lines RTS and CTS. But it is off by default. AT command "AT+IFC=2,2" is used to enable hardware flow control.

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 the UC15 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. For most of these messages, they will be outputted from USB AT port by default if CMUX function is disabled, and you can configure the interface for URC output by using the AT command "AT+QURCCFG" (This command only effects when CMUX function is disabled). If CMUX function is enabled, URCs will be outputted from CMUX2 port by default. While the interface used for URC output is reserved by an active data connection or a long running AT command, URCs are buffered internally and will be issued after the interface becomes idle status.

1.6. Turn off Procedure

It is recommended to execute AT+QPOWD command to turn 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 into a secure and safe data state before disconnecting the power supply.

After sending AT+QPOWD, do not enter any other AT commands. The module outputs message "POWERED DOWN" and sets the STATE pin as low to enter into the shutdown state. In order to avoid data loss, it is suggested to wait for 1s to switch off the VBAT after the STATE pin is set as low and the URC "POWERED DOWN" is outputted. If "POWERED DOWN" has not been received after 65s, you should force to switch off the VBAT.

2 General Commands

2.1. ATI   Display Product Identification Information

The ATI command delivers a product information text.

ATI Display Product Identification Information	
Execution Command **ATI**	Response TA issues product information text. **Quectel** **UC15** **Revision: <revision>** **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<revision>   Revision of software release

Example

ATI
Quectel
UC15
Revision: UC15EQAR01A01E1G

OK

2.2. AT+GMI   Request Manufacturer Identification

AT+GMI 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 permit the user to identify the manufacturer. **Quectel** **OK**
Maximum Response Time	300ms
Reference V.25ter	

2.3. AT+GMM   Request TA Model Identification

AT+GMM returns a product model identification text. Command is identical with AT+CGMM.

AT+GMM Request TA Model Identification	
Test Command **AT+GMM=?**	Response **OK**
Execution Command **AT+GMM**	Response TA returns a product model identification text. **UC15** **OK**
Maximum Response Time	300ms
Reference V.25ter	

2.4. AT+GMR   Request TA Revision Identification of Software Release

AT+GMR delivers a product firmware version identification. Command is identical with AT+CGMR.

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

Parameter

<revision>	Revision of software release

Example

AT+GMR
Revision: UC15EQAR01A01E1G

OK

2.5. AT+CGMI   Request Manufacturer Identification

AT+CGMI 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

AT+CGMM returns a product model identification text. Command 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.
UC15

OK |
| Maximum Response Time | 300ms |
| Reference
3GPP TS 27.007 | |

2.7. AT+CGMR Request TA Revision Identification of Software Release

AT+CGMR delivers a product firmware version identification. Command 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 software version.
Revision: <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)

AT+GSN returns the International Mobile Equipment Identity (IMEI). Command 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 permit the user to identify the individual ME device. **\<IMEI\>** **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

\<IMEI\>	IMEI of the telephone

> **NOTE**
>
> The serial number (IMEI) varies with the individual ME device.

2.9. AT+CGSN   Request Product Serial Number Identification

AT+CGSN returns International Mobile Equipment Identity (IMEI). Command is identical with: AT+GSN.

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

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

AT&F resets AT command settings to their factory default values. However, the command does not change the current baud rate of UART.

AT&F Set all Current Parameters to Manufacturer Defaults	
Execution Command **AT&F[<value>]**	Response TA sets all current parameters to the manufacturer defined profile. See Table 8: Factory Default Settings Restorable with AT&F **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<value>	<u>0</u>	Set all TA parameters to manufacturer defaults

2.11. AT&V   Display Current Configuration

AT&V 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 setting See Table 2: AT&V Response **OK**
Maximum Response Time	300ms
Reference V.25ter	

Table 2: AT&V Response

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

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

AT&W stores the current AT command settings to a user defined profile in non-volatile memory.

AT&W Store Current Parameters to User Defined Profile	
Execution Command **AT&W[<n>]**	Response TA stores the current parameter settings in the user defined profile. See Table 9: AT Command Settings Storable with AT&W. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>	0	Profile number to store current parameters

2.13. ATZ   Set all Current Parameters to User Defined Profile

ATZ restores the current AT command settings to the user defined profile in non-volatile memory, if one was stored with AT&W before. Any additional AT command on the same command line may be ignored. ATZ does not change the current baud rate of UART.

ATZ Set all Current Parameters to User Defined Profile	
Execution Command **ATZ[<value>]**	Response TA sets all current parameters to the user defined profile. See Table 10: AT Command Settings Storable with ATZ. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<value>	0	Reset to profile number 0

2.14. ATQ   Set Result Code Presentation Mode

ATQ controls whether the result code is transmitted to the CE. 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

This 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: 30,0

OK                                              //When <value>=1 result code is OK
ATV0                                            //Set <value>=0
0
AT+CSQ
+CSQ: 30,0
0                                               //When <value>=0 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 state to online data state
RING	2	The DCE has detected an incoming call signal from network
NO CARRIER	3	The connection has been terminated or the attempt to establish a connection failed
ERROR	4	Command not recognized, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line

NO DIALTONE	6	No dial tone detected
BUSY	7	Engaged (busy) signal detected
NO ANSWER	8	"@" (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer (S7)

2.16. ATE   Set Command Echo Mode

ATE controls if the module echoes characters received from TE during AT command state.

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 state. **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

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

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

Example

```
ATI
Quectel
UC15
Revision: UC15EQAR01A01E1G

OK
A/                                    //Repeat previous command
Quectel
UC15
Revision: UC15EQAR01A01E1G

OK
```

2.18. ATS3   Set Command Line Termination Character

ATS3 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 in output. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<n>   000-013-127 Command line termination character (Default 013=**<CR>**)

2.19. ATS4   Set Response Formatting Character

ATS4 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>	000-<u>010</u>-127 Response formatting character (Default 010=**<LF>**)

2.20. ATS5   Set Command Line Editing Character

ATS5 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>	000-<u>008</u>-127	Response editing character (Default 008=**<Backspace>**)

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

ATX determines whether or not the module transmits particular result codes to the TE. It also controls whether or not the module verifies the presence of a dial tone when it begins dialing, and whether or not engaged tone (busy signal) detection is enabled.

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

Parameter

<value>	0	**CONNECT** result code only returned, dial tone and busy detection are both disabled
	1	**CONNECT<text>** result code only returned, dial tone and busy detection are both disabled
	2	**CONNECT<text>** result code returned, dial tone detection is enabled, busy detection is disabled
	3	**CONNECT<text>** result code returned, dial tone detection is disabled, busy detection is enabled
	<u>4</u>	**CONNECT<text>** result code returned, dial tone and busy detection are both enabled

2.22. AT+CFUN   Set Phone Functionality

AT+CFUN controls the functionality level. It can also be used to reset the UE.

AT+CFUN Set Phone 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 error is related to ME functionality: +CME ERROR: <err>
Maximum Response Time	15s, determined by network.
Reference 3GPP TS 27.007	

Parameter

<fun>	0	Minimum functionality
	1	Full functionality (Default)
	4	Disable phone both transmit and receive RF circuits
<rst>	0	Do not reset the ME before setting it to **<fun>** power level
		This is default when **<rst>** is not given
	1	Reset the ME. The device is fully functional after the reset. This value is available only for **<fun>**=1

Example

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

OK
AT+CPIN?

```
+CME ERROR: 10                          //SIM is not inserted
AT+CFUN=1                               //Switch phone to full functionality
OK


+CPIN: SIM PIN
AT+CPIN=1234
OK


+CPIN: READY


+QIND: PB DONE


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


OK
AT+COPS?
+COPS: 0,0,"CHN-UNICOM",2               //Operator is registered


OK
```

2.23. AT+CMEE   Error Message Format

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

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

Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

Example

AT+CMEE=0	//Disable result code
OK	
AT+CPIN=1234	
ERROR	//Only "**ERROR**" will be displayed
AT+CMEE=1	//Enable error result code with numeric values
OK	
AT+CPIN=1234	
+CME ERROR: 10	
AT+CMEE=2	//Enable error result code with verbose (string) values
OK	
AT+CPIN=1234	
+CME ERROR: SIM not inserted	

2.24. AT+CSCS   Select TE Character Set

AT+CSCS write command informs the module which character set is used by the TE. It 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	Response
AT+CSCS=<chset>	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

This 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 configuration parameters are omitted, return current configuration： **+QURCCFG: "urcport",<urcportvalue>**

	OK	
	If configuration parameters are entered, response:	
	OK	
	ERROR	
Read Command **AT+QURCCFG?**	Response Return current configurations: **+QURCCFG: "urcport",<urcportvalue>** **OK**	
Maximum Response Time	300ms	

Parameter

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

NOTES

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

Example

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

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

OK
AT+QURCCFG="urcport","uart1"
OK
AT+QURCCFG?
+QURCCFG: "urcport","uart1"

OK
```

3 Serial Interface Control Commands

3.1. AT&C   Set DCD Function Mode

AT&C 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 line is always ON
	1	DCD line is ON only in the presence of data carrier

3.2. AT&D   Set DTR Function Mode

AT&D determines how the UE responds if DTR line is changed from the ON to the OFF condition during online 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 the ON to the OFF condition during data mode. **OK**

Maximum Response Time	300ms
Reference V.25ter	

Parameter

<value>	0	TA ignores status on DTR
	<u>1</u>	ON->OFF on DTR: Change to command mode with remaining the connected call
	2	ON->OFF on DTR: Disconnect data call, change to command mode. During state DTR=OFF, auto-answer is off

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

AT+ICF 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>	<u>3</u>	8 data 0 parity 1 stop
<parity>	0	Odd
	1	Even
	2	Mark (1)

<u>3</u>	Space (0)

> **NOTES**

1. The command is applied for command state.
2. The **<parity>** field is ignored if the **<format>** field specifies no parity.

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

AT+IFC determines the flow control behavior of the serial port.

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 serial interface for data mode. **OK**
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

NOTE

This flow control is applied for data mode.

Example

AT+IFC=2,2	//Open the hardware flow control
OK	
AT+IFC?	
+IFC: 2,2	
OK	

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

AT+IPR is used to query and set the baud rate of the UART. The default baud rate value (**<rate>**) is 115200bps. **<rate>** setting 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 serial 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 of per second
	9600
	19200
	38400
	57600
	<u>115200</u>
	230400
	460800
	921600
	3200000
	3686400
	4000000

NOTES

1. If a fixed baud rate is set, make sure that both TE (DTE, usually 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 is invalid and not stored even if **AT&W** is executed after the write command.
4. A selected baud rate takes effect after the write commands are executed and acknowledged by "**OK**".

Example

AT+IPR=115200	//Set fixed baud rate to 115200
OK	
AT&W	//Store current setting, that is, the serial communication speed is 115200 after restarting module
OK	
AT+IPR?	
+IPR: 115200	
OK	
AT+IPR=115200;&W	//Set fixed baud rate to 115200 and store current setting
OK	

3.6. AT+QRIR   Set Ring Line to Inactive

If the behavior of ring line is "always", you should restore ring line to inactive by AT+QRIR. The behavior of ring line is controlled by AT+QCFG. Please refer to AT+QCFG="urc/ri/ring", AT+QCFG="urc/ri/smsincoming" and "AT+QCFG="urc/ri/other".

AT+QRIR Restore Ring Line to Inactive	
Test Command **AT+QRIR=?**	Response **OK**
Execution Command **AT+QRIR**	Response **OK** **ERROR**
Maximum Response Time	300ms

4 Status Control Commands

4.1. AT+CPAS　Mobile Equipment Activity Status

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

Parameter

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

Example

AT+CPAS
+CPAS: 0　　　　　　　　　　　　//Module is idle

```
OK
ATD10086;
OK
AT+CLCC
+CLCC: 1,0,3,0,0,"10086",129

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

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

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

OK
```

4.2. AT+QCFG   Extended Configuration Settings

AT+QCFG is used to query and configure various settings of UE.

AT+QCFG Extended Configuration Settings	
Test Command AT+QCFG=?	Response **+QCFG: "pwrsavedtr",** (list of supported **<value>**s) **+QCFG: "temp",** ((list of supported **<temptype>**s)**,** (list of supported **<tempvalue>**s)**,** (list of supported **<temponoff>**s)) **+QCFG: "vbatt",** ((list of supported **<vbatttype>**s)**,** (list of supported **<vbattvalue>**s)**,** (list of supported **<vbattonoff>**s)) **+QCFG: "airplanecontrol",** (list of supported **<airplanecontrol>**s) **+QCFG: "gprsattach",** (list of supported **<attachmode>**s) **+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: "roamservice",

(list of supported **<roammode>**s)**,**

(list of supported **<effect>**s)

+QCFG: "servicedomain",

(list of supported **<service>**s)**,**

(list of supported **<effect>**s)

+QCFG: "band",

(list of supported **<bandval>**s)**,**

(list of supported **<effect>**s)

+QCFG: "hsdpacat",

(list of supported **<cat>**s)

+QCFG: "rrc",

(list of supported **<rrcr>**s)

+QCFG: "sgsn",

(list of supported **<sgsnr>**s)

+QCFG: "msc",

(list of supported **<mscr>**s)

+QCFG: "gprsmultislot",

(list of supported **<gprsslot>**s)

+QCFG: "edgemultislot",

(list of supported **<edgeslot>**s)

+QCFG: "dtmmultislot",

(list of supported **<dtmslot>**s)

+QCFG: "pcmclk",

(list of supported **<pcmclkout>**s)**,**

(list of supported **<pcmclkfreq>**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: "amrcodec",
	(list of supported **<preference>**s)
	+QCFG: "sms/unread"
	+QCFG: "call/alpha",
	(list of supported **<value>**s)
	+QCFG: "sms/alpha",
	(list of supported **<value>**s)
	+QCFG: "apready",
	(list of supported **<value>**s)
	OK
Maximum Response Time	300ms
Reference	

4.2.1. AT+QCFG="pwrsavedtr" Enable/Disable DTR to Control Power Save State

AT+QCFG="pwrsavedtr" can be used to enable or disable physical DTR pin to control power save state.

AT+QCFG="pwrsavedtr" Enable/Disable DTR to Control Power Save State	
Write Command **AT+QCFG="pwrsavedtr"[,<value>]**	Response If configuration parameters are omitted (**+QCFG="pwrsavedtr"**), return current configuration: **+QCFG: "pwrsavedtr",<value>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<value>	Number format, enable/disable DTR to control power save state
	While **<value>** is enabled, pulling up DTR pin can trigger module to sleep mode and pulling down DTR pin can wake up module. This option is only valid for non-mux mode, and cannot be saved. After module is restarted, it will return to default value
	0 Disable
	<u>1</u> Enable

4.2.2. AT+QCFG="temp"   Temperature Detection

AT+QCFG="temp" can enable temperature detection and set corresponding parameters.

About Temperature Detection:

When the temperature is lower than the lowest temperature limit, the module will output:

+QIND: "temp",-2

If the temperature did not rise to a degree greater than the lowest temperature within 50 seconds, the module will be turned off automatically. When the temperature is greater than the lowest temperature limit, but lower than the low temperature warning limit, the module will output:

+QIND: "temp",-1

When temperature is greater than the highest temperature limit, the module will output:

+QIND: "temp",2

If the temperature did not drop to a degree lower than the highest temperature limit within 5 seconds, the module will be turned off automatically.

When the temperature is lower than the highest temperature limit, but greater than the high temperature warning limit, the module will output:

+QIND: "temp",1

When the temperature comes back from the low temperature warning limit or the high temperature warning limit to normal temperature range, the module will output:

+QIND: "temp",0

The configuration will be stored to NV automatically.

AT+QCFG="temp" Temperature Detection	
Write Command **AT+QCFG="temp"[,<temptype>,<temp value>[,<temponoff>]]**	Response If configuration parameters are omitted (**+QCFG="temp"**), return current configuration: **+QCFG: "temp",** **(<temptype>,<tempvalue>,<temponoff>),** **(<temptype>,<tempvalue>,<temponoff>),** **…**

	OK
	If configuration parameters are entered:
	OK
	ERROR
	If error is related to ME functionality:
	+CME ERROR: <err>
Maximum Response Time	300ms

Parameter

<temptype>	Temperature type	
	-2	Indicate the lowest temperature
	-1	Indicate low temperature warning
	1	Indicate high temperature warning
	2	Indicate the highest temperature
<tempvalue>	Temperature threshold value (One over one thousand degrees Celsius)	
	(-35000~-40000)	The lowest temperature limit (If below this limit, the module will be shut down)
	(-30000~-35000)	Low temperature warning limit
	(70000~80000)	High temperature warning limit
	(80000~90000)	The highest temperature limit (If above this limit, the module will be shut down)
<temponoff>	Enable/disable temperature detection function	
	0	Disable
	1	Enable

Example

AT+QCFG="temp",-1   //Query the low temperature warning limit and setting
+QCFG: "temp",(-1,-35000,0)

OK
AT+QCFG="temp",-1,-35000,1   //Set the low temperature warning limit
OK

<Enable temperature detection, when greater than the lowest temperature limit, lower than low temperature warning limit>

+QIND: "temp",-1   //URC report, when temperature is lower than warning temperature

<Enable temperature detection, when temperature is back to normal temperature range>

+QIND: "temp",0   //URC report, when temperature is back to normal temperature

4.2.3. AT+QCFG="vbatt"   Voltage Detection

AT+QCFG="vbatt" can enable voltage detection and set corresponding parameters.

About Voltage Detection:

When the voltage is lower than the lowest voltage limit, the module will output:

+QIND: "vbatt",-2

If it does not come back to a degree greater than the lowest voltage limit within 2 seconds, the module will be turned off automatically.

When the voltage is greater than the lowest voltage limit, but lower than low voltage warning limit, the module will output:

+QIND: "vbatt",-1

When the voltage is greater than the highest voltage limit, the module will output:

+QIND: "vbatt",2

If it does not come back to a degree greater than highest voltage limit within 2 seconds, the module will be turned off automatically.

When the voltage is lower than the highest voltage limit, but greater than high voltage warning limit, the module will output:

+QIND: "vbatt",1

When the voltage comes back to normal voltage range, the module will output:

+QIND: "vbatt",0

Voltage detection is enabled by default. It is suggested to enable voltage detection in order to avoid module breakdown due to excessively high or low voltage.

The configuration will be stored to NV automatically.

AT+QCFG="vbatt" Voltage Detection	
Write Command **AT+QCFG="vbatt"[,<vbatttype>,<vbatt value>[,<vbatonoff>]]**	Response If configuration parameters are omitted (**+QCFG="vbatt"**), return current configuration: **+QCFG: "vbatt",**

	(<vbatttype>,<vbattvalue>,<vbattonoff>),
	(<vbatttype>,<vbattvalue>,<vbattonoff>),
	…
	OK
	If configuration parameters are entered: **OK** **ERROR**
	If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<vbatttype>	Voltage type	
	-2	Indicate the lowest voltage
	-1	Indicate low voltage warning
	1	Indicate high voltage warning
	2	Indicate the highest voltage
<vbattvalue>	Voltage threshold value (mv)	
	(<u>3200</u>~3420)	The lowest voltage limit (If below this limit, the module will shut down)
	(3480~<u>3500</u>~3520)	Low voltage warning limit
	(4190~<u>4210</u>~4230)	High voltage warning limit
	(4280~<u>4350</u>~4400)	The highest voltage limit (If above this limit, the module will shut down)
<vbattonoff>	Enable/disable voltage detection function	
	0	Disable
	<u>1</u>	Enable

Example

<Enable voltage detection, when greater than the lowest voltage limit，lower than the low voltage warning limit>

+QIND: "vbatt",-1   //URC report, when voltage is lower than low voltage warning limit

<Enable voltage detection, when the voltage is back to normal voltage range>

+QIND: "vbatt",0   //URC report, when the voltage is back to normal voltage
AT+QCFG="vbatt",-1   //Query low voltage warning limit
+QCFG: "vbatt",(-1,3500,1)

```
OK
AT+QCFG="vbatt",-1,3500,0        //Disable low voltage warning limit
OK
```

4.2.4. AT+QCFG="gprsattach" GPRS Attach Mode Configuration

AT+QCFG="gprsattach" specifies the mode to attach GPRS when UE is powered on. This configuration is valid only after the module is restarted.

AT+QCFG="gprsattach" GPRS Attach Mode Configuration	
Write Command **AT+QCFG="gprsattach"[,<attachmode>]**	Response If configuration parameters are omitted (**+QCFG="gprsattach"**), return current configuration: **+QCFG: "gprsattach",<attachmode>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<attachmode>	Number format, the mode to attach GRPS when UE is powered on 0 Manual attach 1 Auto attach

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

AT+QCFG="nwscanmode" specifies the mode of searching network. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="nwscanmode" Network Search Mode Configuration	
Write Command **AT+QCFG="nwscanmode"[,<scanmode>[,<effect>]]**	Response If configuration parameters are omitted (**+QCFG="nwscanmode"**), return current configuration: **+QCFG: "nwscanmode",<scanmode>**

	OK
	If configuration parameters are entered:
	OK
	ERROR
	If error is related to ME functionality:
	+CME ERROR: <err>
Maximum Response Time	300ms

Parameter

<scanmode>	Number format, network search mode
	<u>0</u> AUTO
	1 GSM Only
	2 UMTS Only
<effect>	Number format, when to take effect
	0 Take effect after UE reboots
	<u>1</u> Take effect immediately

4.2.6. AT+QCFG="nwscanseq" Network Searching Sequence Configuration

AT+QCFG="nwscanseq" specifies the sequence of searching network. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="nwscanseq" Network Searching Sequence Configuration	
Write Command **AT+QCFG="nwscanseq"[,<scanseq>[, <effect>]]**	Response If configuration parameters are omitted (**+QCFG="nwscanseq"**), return current configuration: **+QCFG: "nwscanseq",<scanseq>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

\<scanseq\>	Number format, network search sequence	
	0	AUTO
	1	GSM prior to WCDMA
	<u>2</u>	WCDMA prior to GSM
\<effect\>	Number format, when to take effect	
	0	Take effect after UE restarts
	<u>1</u>	Take effect immediately

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

AT+QCFG="roamservice" 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 configuration parameters are omitted (**+QCFG="roamservice"**), return current configuration: **+QCFG: "roamservice",\<roammode\>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: \<err\>**
Maximum Response Time	300ms

Parameter

\<roammode\>	Number format, the mode of roam service	
	1	Disable roam service
	2	Enable roam service
	<u>255</u>	AUTO
\<effect\>	Number format, when to take effect	
	0	Take effect after UE reboots
	<u>1</u>	Take effect immediately

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

AT+QCFG="servicedomain" 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 configuration parameters are omitted (**+QCFG="servicedomain"**), return current configuration: **+QCFG: "servicedomain",<service>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<service>	Service domain of UE	
	0	CS only
	1	PS only
	<u>2</u>	CS & PS
<effect>	Number format, when to take effect	
	0	Take effect after UE reboots
	<u>1</u>	Take effect immediately

4.2.9. AT+QCFG="band" Band Configuration

AT+QCFG="band" specifies the band of UE. If **<effect>** is omitted, the configuration will take effect immediately.

AT+QCFG="band" Band Configuration	
Write Command **AT+QCFG="band"[,<bandval>[,<effect>]]**	Response If configuration parameters are omitted (**+QCFG="band"**), return current configuration: **+QCFG: "band",<bandval>**

	OK
	If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<bandval>	The band of UE(e.g. 511=1+2+4+8+16+128+256 means GSM900& GSM1800& GSM850& GSM1900& WCDMA2100& WCDMA900& WCDMA 800)
	1 GSM 900
	2 GSM 1800
	4 GSM 850
	8 GSM1900
	16 WCDMA 2100
	32 WCDMA 1900
	64 WCDMA 850
	128 WCDMA 900
	256 WCDMA 800
	512 Any, acquire any of the band class system.
<effect>	When to take effect
	0 Take effect after UE reboots
	<u>1</u> Take effect immediately

NOTES

1. UC15-A supports GSM850&GSM900&GSM1800&GSM1900&WCDMA850&WCDMA1900 band. The default value is 111.
2. UC15-E supports GSM900&GSM1800&WCDMA900&WCDMA2100 band. The default value is 147.

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

AT+QCFG="hsdpacat" specifies the HSDPA category. This configuration is valid only after the module is restarted.

AT+QCFG="hsdpacat" HSDPA Category Configuration	
Write Command	Response
AT+QCFG="hsdpacat"[,<cat>]	If configuration parameters are omitted

(**+QCFG="hsdpacat"**), return current configuration:
+QCFG: "hsdpacat",<cat>

OK

If configuration parameters are entered:
OK
ERROR

If error is related to ME functionality:
+CME ERROR: <err>

Maximum Response Time	300ms

Parameter

<cat>	HSDPA category
	6 Category 6
	12 Category 12

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

AT+QCFG="rrc" specifies the RRC release version. This configuration is valid only after the module is restarted.

AT+QCFG="rrc" RRC Release Version Configuration	
Write Command **AT+QCFG="rrc"[,<rrcr>]**	Response If configuration parameters are omitted (**+QCFG="rrc"**), return current configuration: **+QCFG: "rrc",<rrcr>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<rrcr>	RRC release version.
	0 R99
	<u>1</u> R5

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

AT+QCFG="sgsn" 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 configuration parameters are omitted (**+QCFG="sgsn"**), return current configuration: **+QCFG: "sgsn",<sgsnr>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

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

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

AT+QCFG="msc" 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 configuration parameters are omitted (**+QCFG="msc"**), return current configuration: **+QCFG: "msc",<mscr>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

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

4.2.14. AT+QCFG="gprsmultislot"   GPRS Multislot Class Configuration

AT+QCFG="gprsmultisolt" specifies the GPRS multislot class. This configuration is valid only after the module is restarted.

AT+QCFG="gprsmultislot" GPRS Multislot Class Configuration	
Write Command **AT+QCFG="gprsmultislot"[,<gprsslot>]**	Response If configuration parameters are omitted (**+QCFG="gprsmultislot"**), return current configuration: **+QCFG: "gprsmultislot",<gprsslot>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality:

	+CME ERROR: <err>
Maximum Response Time	300ms

Parameter

<gprsslot>	Number format, GPRS multislot class
	Range is 1-12, 30-34, default value is 10

4.2.15. AT+QCFG="edgemultislot" EDGE Multislot Class Configuration

AT+QCFG="edgemultisolt" specifies the EDGE multislot class. This configuration is valid only after the module is restarted.

AT+QCFG="edgemultislot" EDGE Multislot Class Configuration	
Write Command **AT+QCFG="edgemultislot"[,<edgeslot>]**	Response If configuration parameters are omitted (**+QCFG="edgemultislot"**), return current configuration: **+QCFG: "edgemultislot",<edgeslot>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<edgeslot>	Number format, EDGE multislot class
	Range is 1-34, default value is 12

4.2.16. AT+QCFG="dtmmultislot" DTM&EDTM Multislot Class Configuration

AT+QCFG="dtmmultisolt" specifies the DTM&EDTM multislot class. This configuration is valid only after the module is restarted.

AT+QCFG="dtmmultislot" DTM&EDTM Multislot Class Configuration	
Write Command **AT+QCFG="dtmmultislot"[,<dtmslot>]**	Response If configuration parameters are omitted (**+QCFG="dtmmultislot"**), return current configuration: **+QCFG: "dtmmultislot",<dtmslot>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<dtmslot>	Number format, DTM&EDTM multislot class	
	0	Class 0
	1	Class 5
	2	Class 9
	<u>3</u>	Class 11

4.2.17. AT+QCFG="urc/ri/ring"   Ring Line Behavior of RING

AT+QCFG="urc/ri/ring", AT+QCFG="urc/ri/smsincoming" and AT+QCFG="urc/ri/other" control the behavior of ring line when URC is reported. These configurations will be stored into NV automatically. The ring line is active low. AT+QCFG="urc/ri/ring" specifies the behavior of ring line when RING is presented to indicate an incoming call.

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

AT+QCFG="urc/ri/ring" Ring Line Behavior of RING	
Write Command **AT+QCFG="urc/ri/ring"[,<typeri>[,<pulseduration>[,<activeduration>[,<inactiveduration>[,<ringnodisturbing>[,<pulsecount>]]]]]]**	Response If configuration parameters are omitted (**+QCFG="urc/ri/ring"**), return current configuration: **+QCFG: "urc/ri/ring",<typeri>,<pulseduration>,<activeduration>, <inactiveduration>,<ringnodisturbing>,<pulsecount>**

	OK If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<typeri>	The behavior of the ring line when URCs are presented
	"off"　　　　No change. Ring line keeps inactive
	"<u>pulse</u>"　　 Pulse. Pulse width determined by **<pulseduration>**
	"always"　　Change to active. You may restore to inactive by **+QRIR**
	"auto"　　　When "RING" is presented to indicate an incoming call, ring line changes to and keeps active. When ring of the incoming call ends, either answering or hanging up the incoming call, ring line will change to inactive
	"wave"　　　When "RING" is presented to indicate an incoming call. The ring line 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, ring line will change to inactive
<pulseduration>	Set the width of pulse. Value ranges from 1 to 2000ms and default is 120ms. This parameter is only meaningful when **<typeri>** is "pulse". If this parameter is not needed, you can set it as null
<activeduration>	Set the active duration of the square wave, value ranges from 1 to 10000ms, and the default is 1000ms.This parameter is only meaningful when **<typeri>** is "wave"
<inactiveduration>	Set the inactive duration of the square wave, 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 line 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 you need the square wave not to be disturbed by other URCs (including SMS related URCs), you should set **<ringnodisturbing>** to "on"
	"<u>off</u>"　　　It can be disturbed by other URCs which the behavior of ring line is caused by an incoming call ringing

"on"	It cannot be disturbed by other URCs which the behavior of ring line is caused by an incoming call ringing.
<pulsecount>	The count of pulse. This parameter is only meaningful when **<typeri>** is "pulse". Value ranges from 1 to 5 and default is 1. The interval time between two pulse is equal to **<pulseduration>**.

4.2.18. AT+QCFG="urc/ri/smsincoming"   Ring Line Behavior of Incoming SMS

AT+QCFG="urc/ri/smsincoming" specifies the behavior of ring line when related incoming message URCs are presented. Related incoming message URCs list: **+CMTI,+CMT,+CDS,+CBM**.

AT+ QCFG="urc/ri/smsincoming"	Ring Line Behavior of Incoming SMS
Write Command **AT+QCFG="urc/ri/smsincoming"[,<typeri>[,<pulseduration>[,<pulsecount>]]]**	Response If configuration parameters are omitted (**+QCFG="urc/ri/smsincoming"**), return current configuration: **+QCFG: "urc/ri/smsincoming",<typeri>,<pulseduration>,<pulsecount>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<typeri>	The behavior of the ring line when URC are presented
	"off" No change. Ring line keeps inactive
	"pulse" Pulse. Pulse width determined by **<pulseduration>**
	"always" Change to active. You should restore to inactive by **+QRIR**
<pulseduration>	Set the width of pulse. Value ranges from 1 to 2000ms and the default is 120ms. This parameter is only valid when **<typeri>** is "pulse"
<pulsecount>	The count of pulse. This parameter is only meaningful when **<typeri>** is "pulse". Value ranges from 1 to 5 and default is 1. The interval time between two pulse is equal to **<pulseduration>**.

4.2.19. AT+QCFG="urc/ri/other"   Ring Line Behavior of Other URCs

AT+QCFG="urc/ri/other" specifies the behavior of ring line when other URCs are presented.

AT+QCFG="urc/ri/other" Ring Line Behavior of Other URCs	
Write Command **AT+QCFG="urc/ri/other"[,<typeri>[,<pulseduration>[,<pulsecount>]]]**	Response If configuration parameters are omitted (**+QCFG="urc/ri/other"**), return current configuration: **+QCFG: "urc/ri/other",<typeri>,<pulseduration>,<pulsecount>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

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

4.2.20. AT+QCFG="risignaltype"   Ring Line Signal Outputting Carrier

AT+QCFG="risignaltype" specifies the carrier of ring line signal outputting.

AT+QCFG="risignaltype" Ring Line Signal Outputting Carrier	
Write Command **AT+QCFG="risignaltype",[<risignatype>]**	Response If configuration parameters are omitted (**+QCFG="urc/ri/other"**), return current configuration: **+QCFG: "risignaltype",<risignatype>**

	OK
	If configuration parameters are entered: **OK** **ERROR**
	If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<risignatype>	The carrier of ring line signal output	
	"respective"	The ring line behaves on the port which URC is presented. For example, if URC is presented on UART port, it is physical ring line. If URC is presented on USB modem port, it is virtual ring line. If URC is presented on USB AT port, no ring line for USB AT port which does not support ring line. **+QURCCFG="urcport"** can get the port which URC is presented
	"physical"	No matter which port URC is presented on, URC only causes the behavior of physical ring line

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

AT+QCFG="urc/delay" can delay the output of URC indication until ring line pulse end.

AT+QCFG="urc/delay" Delay URC Indication	
Write Command **AT+QCFG="urc/delay"[,<enable>]**	Response If configuration parameter is omitted **+QCFG: "urc/delay",<enable>** **OK** If configuration parameter is entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Reference	

Parameter

<enable>	<u>0</u>	URC indication will be output when ring line pulse start
	1	URC indication will be output when ring line pulse end(only the type of ring line is "pulse", refer to **AT+QCFG="urc/ri/ring"**, **AT+QCFG="urc/ri/smsincoming"** and **AT+QCFG="urc/ri/other"**)

4.2.22. AT+QCFG="amrcodec" AMR Codec Configuration

AT+QCFG="amrcodec" can be used to configure the AMR. This configuration is valid only after the module is restarted.

AT+QCFG="amrcodec" AMR Codec Configuration	
Write Command **AT+QCFG="amrcodec"[,<preference >]**	Response If configuration parameters are omitted (**+QCFG="armcodec"**), return current configuration: **+QCFG: "amrcodec",<preference>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<preference>		AMR configurations(e.g. 7=1+2+4 means GSM AMR NB&GSM AMR WB&GSM HR AMR).
	0	No AMR configuration
	1	GSM AMR NB
	2	GSM AMR WB
	4	GSM HR AMR
	8	WCDMA AMR WB
	<u>15</u>	The above four AMR configurations are supported
	16	Reserved
	32	Reserved
	64	Reserved
	128	Reserved

255	All AMR configurations are supported

4.2.23. AT+QCFG="sms/unread" Query the Amount of Unread Message(s)

AT+QCFG="sms/unread" is used to query the amount of unread message(s).

AT+QCFG="sms/unread" Query the Amount of Unread Message(s)	
Write Command **AT+QCFG="sms/unread"**	Response **+QCFG: "sms/unread","SM",<smcount>,"ME",<mecount>** **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<smcount>	The amount of unread message(s) in SM storage
<mecount>	The amount of unread message(s) in ME storage

4.2.24. AT+QCFG="call/alpha" Display Alphanumeric Name in Call

AT+QCFG="call/alpha" can display the parameter **<alpha>** in the result of **+CLCC** and the result of other call related commands or URCs (e.g. **+CLIP**).

AT+QCFG="call/alpha" Display Alphanumeric Name in Call	
Write Command **AT+QCFG="call/alpha"[,<value>]**	Response If configuration parameters are omitted **+QCFG: "call/alpha",<value>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**

Maximum Response Time	300ms
Reference	

Parameter

<value>	Display parameter **<alpha>** or not
	0 Not display
	1 Display

4.2.25. AT+QCFG="sms/alpha" Display Alphanumeric Name in SMS

AT+QCFG="sms/alpha" can display the parameter **<alpha>** in the result of **+CMGR** and the result of other SMS related commands or URCs (e.g. **+CMT**).

AT+QCFG="sms/alpha" Display Alphanumeric Name in SMS	
Write Command **AT+QCFG="sms/alpha"[,<value>]**	Response If configuration parameters are omitted **+QCFG: "sms/alpha",<value>** **OK** If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference	

Parameter

<value>	Display parameter **<alpha>** or not
	0 Not display
	1 Display

4.2.26. AT+QCFG="apready"　　AP Ready Configuration

AT+QCFG="apready" is used to set AP ready pin status detection. AP_READY (PIN2) is the default indicator pin. MCU could change the level indicator pin according to its actual demands.

When URC is reported and the level of indicator pin is invalid, this module will store the reported URC and periodically detect indicator pin's level until it turns to valid, and then stored URC will be reported. When the reported URC is stored, RI pin status will still change according to your configuration.

AT+QCFG="apready"　　AP Ready Configuration	
Test Command **AT+QCFG=?**	Response **……** **+QCFG: "apready",(0,1),(0,1),(100-3000)** **……** **OK**
Read Command **AT+ QCFG="apready"**	**+QCFG:"apready",<enable>,<level>,<interval>** **OK**
Set Command **AT+QCFG="apready",<enable >[,<level>,[<interval>]]**	Response **OK** **ERROR**

Parameter

<enable>	Enable/disable AP ready status detection.
	0　　Disable AP ready status detection
	1　　Enable AP ready status detection
<level>	Indicator pin's valid level. The parameter is only effective when indicator pin's detection is running.
	0　　Low level
	1　　High level
<interval>	Detection period, unit is ms. The parameter is only effective when indicator pin's detection is running. When indicator pin's level is invalid and URC is reported, this parameter will be used as detection interval to check indicator pin's level until it is valid. The default value is 500ms.

NOTES

1. The configuration will be saved to NV automatically.
2. The maximum size to store URC is 15. Module will clear the earliest URC to store new one when exceeds 15.
3. When AP ready is running, module only stores one "RING" during call.

4. If AP_READY is suspending, the default level depends on parameter **\<level\>**.

Example

AT+QCFG="apready",1,0,800   //Set configuration
OK
AT+QCFG="apready"
+QCFG: "apready",0,0,300   //Read configuration

OK

4.3. AT+QINDCFG   URC Indication Configuration

AT+QINDCFG is used to control URC indication.

AT+QINDCFG URC Indication Configuration	
Test Command **AT+QINDCFG=?**	Response **+QINDCFG: "all",(0,1),(0,1)** **+QINDCFG: "csq",(0,1),(0,1)** **+QINDCFG: "smsfull",(0,1),(0,1)** **+QINDCFG: "ring",(0,1),(0,1)** **+QINDCFG: "smsincoming",(0,1),(0,1)** **+QINDCFG: "ccinfo",(0,1),(0,1)** **OK**
Read Command **AT+QINDCFG?**	Response **+QINDCFG: "all",\<enable\>** **+QINDCFG: "csq",\<enable\>** **+QINDCFG: "smsfull",\<enable\>** **+QINDCFG: "ring",\<enable\>** **+QINDCFG: "smsincoming",\<enable\>** **+QINDCFG: "ccinfo",\<enable\>** **OK**
Write Command **AT+QINDCFG=\<urctype\>[,\<enable\>[,\<savetonvram\>]]**	Response If configuration parameters are omitted (**AT+QCFG=\<urctype\>**), current configuration will be returned: **+QINDCFG: \<urctype\>,\<enable\>** **OK**

	If configuration parameters are entered: **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <errcode>**
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,+CBM.**
	"ccinfo"	Indication of voice call state change (Parameters similar to AT+CLCC). Default is off. When voice call state changes to connected (MO&MT call), alerting (MO call),incoming (MT call),ended (MO&MT call), present: **+QIND: "ccinfo",<idx>,<dir>,<stat>,<mode>,** **<mpty>[,<number>,<type>,[<alpha>]]** The value of **<stat>** as below: 0 Connected 3 Alerting 4 Incoming -1 End About the explanation of other parameters, please refer to AT+CLCC
<enable>	URC indication is on or off	
	0	Off
	1	On
<savetonvram>	Whether to save configuration into NV, the default is not saved	
	0	Not save
	1	Save

4.4. AT+CEER   Extended Error Report

AT+CEER is used to query an extended error and report the cause of the last failed operation, such as:

● Fail to release call
● Fail to set up a call (both mobile originated or terminated)
● Fail to modify a call by using Supplementary Services
● Fail to activate, register, query, deactivate or deregister a Supplementary Service
● Fail to attach GPRS or fail to activate PDP context
● Fail to detach GPRS or fail to deactivate PDP context

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

AT+CEER Extended Error Report	
Test command **AT+CEER=?**	Response **OK**
Execution command **AT+CEER**	Response **+CEER: <text>** **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <errcode>**
Maximum Response Time	300ms

Parameter

<text>   Release cause text. Reason for the last call failure to setup or release (listed in 14.9 Release Cause Text List of AT+CEER). Both CS and PS domain call types are reported. Cause data is captured from Call Manager events and cached locally to later use by this command.

4.5. AT+QGBAND   Get Module Operation Band

AT+QGBAND can get the current operation band of module.

AT+QGBAND Get Module Operation Band	
Test Command **AT+QGBAND=?**	Response **OK**

Execution Command	Response
AT+QGBAND	**+QGBAND: <currentband>**
	OK
Reference	

Parameter

<currentband>	Current operation band of module	
	1	GSM 900
	2	GSM 1800
	4	GSM 850
	8	GSM 1900
	16	WCDMA 2100
	32	WCDMA 1900
	64	WCDMA 850
	128	WCDMA 900
	256	WCDMA 800

5 SIM Related Commands

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

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

AT+CIMI Request International Mobile Subscriber Identity (IMSI)	
Test Command **AT+CIMI=?**	Response **OK**
Execution Command **AT+CIMI**	Response TA returns **<IMSI>** for identifying the individual SIM which is attached to ME. **<IMSI>** **OK** If error is 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 SIM which is attached to ME

OK

5.2. AT+CLCK   Facility Lock

AT+CLCK is used to lock, unlock or interrogate a MT or a network facility **<fac>**. The command can be aborted when network facilities are set or interrogated.

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

Parameter

<fac>	"SC"	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 issued)
	"AO"	BAOC (Barr All Outgoing Calls) (refer to 3GPP TS 22.088 clause 1)
	"OI"	BOIC (Barr Outgoing International Calls) (refer to 3GPP TS 22.088 clause 1)
	"OX"	BOIC-exHC (Barr Outgoing International Calls except to Home Country) (refer to 3GPP TS 22.088 clause 1)
	"AI"	BAIC (Barr All Incoming Calls) (refer to 3GPP TS 22.088 clause 2)
	"IR"	BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (refer

		to 3GPP TS 22.088 clause 2)
	"AB"	All Barring services (refer 3GPP TS 22.030) (applicable only for **<mode>**=0)
	"AG"	All outgoing barring services (refer 3GPP TS 22.030) (applicable only for **<mode>**=0)
	"AC"	All incoming barring services (refer 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 than the first SIM/UICC card is 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 sync
	32	Data circuit async
<status>	0	Off
	1	On

Example

```
AT+CLCK="SC", 2
+CLCK: 0                         //Query the status of SIM card lock, 0-unlock

OK
AT+CLCK="SC",1,"1234"            //Lock SIM card, the password is 1234
OK
AT+CLCK="SC",2
+CLCK: 1                         //Query the status of SIM card lock, 1-lock

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

5.3. AT+CPIN   Enter PIN

AT+CPIN is used to enter a password or query whether or not module requires a password which is necessary before it can be operated (SIM PIN, 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 some password is required. **+CPIN: <code>** **OK**
Write Command **AT+CPIN=<pin>[,<new pin>]**	Response TA stores a password which is necessary before it can be operated (SIM PIN, SIM PUK, etc.). 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 SIM PUK or SIM PUK2, the second pin is required. This second pin, **<new pin>**, is used to replace the old pin in the 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 SIM PIN to be given
	SIM PUK	MT is waiting for SIM PUK to be given
	SIM PIN2	MT is waiting for SIM PIN2 to be given
	SIM PUK2	MT is waiting for 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\>		Password (string type). If the requested password was a PUK, such as SIM PUK1 or PH-FSIM PUK or another password, then **\<pin\>** must be followed by **\<new pin\>**
\<new pin\>		New password (string type) if the requested code was a PUK.

Example

```
//Enter PIN

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

OK
AT+CPIN=1234                            //Enter PIN
OK

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

OK

//Enter PUK and PIN

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

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

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

OK
```

5.4. AT+CPWD   Change Password

AT+CPWD sets a new password for the facility lock function defined by command Facility Lock **+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 password. **+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"	SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power-up and when this lock command issued)
	"AO"	BAOC (Barr All Outgoing Calls, refer to 3GPP TS 22.088 clause 1)
	"OI"	BOIC (Barr Outgoing International Calls, refer to 3GPP TS 22.088 clause 1)
	"OX"	BOIC-exHC (Barr Outgoing International Calls except to Home Country, refer to 3GPP TS 22.088 clause 1)
	"AI"	BAIC (Barr All Incoming Calls, refer to 3GPP TS 22.088 clause 2)
	"IR"	BIC-Roam (Barr 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"	SIM PIN2
<pwdlength>		Integer type, max 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 SIM card password to "4321"
OK
//Restart module or re-activate the SIM card
AT+CPIN   //Query PIN code is locked
+CPIN: SIM PIN
OK
AT+CPIN="4321"   //PIN must be entered to define a new password "4321"
OK
+CPIN: READY

5.5. AT+CSIM   Generic SIM Access

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

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

Parameter

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

5.6. AT+CRSM   Restricted SIM Access

AT+CRSM offers easy and limited access to the SIM database. It transmits the SIM **<command>** and its required parameters to the MT.

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

Parameter

<command>	USIM 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 USIM, if used by **<command>**	
<P1>, <P2>, <P3>	Integer type; parameters transferred by the MT to the 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 SIM (hexadecimal character fomat; refer to **+CSCS)**
<pathId>	Contains the directory path of an elementary file on a UICC in hexadecimal format
<sw1>, <sw2>	Integer type; information from the 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 **+CSCS)**. STATUS and GET RESPONSE return data, which gives information about the current elementary data field. This information includes the type of file and its size (refer 3GPP TS 51.011). After READ BINARY, READ RECORD or RETRIEVE DATA command the requested data will be returned. **<response>** is not returned after a successful UPDATE BINARY, UPDATE RECORD or SET DATA command

5.7. AT+QCCID   Show ICCID

AT+QCCID returns the ICCID (Integrated Circuit Card Identifier) number of the SIM card.

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

Example

AT+QCCID	//Query ICCID of the SIM card
+QCCID: 898600220909A0206023	
OK	

5.8. AT+QFUN Set Phone Extended Functionality

AT+QFUN can be used to perform a power up/down to the SIM card. "**OK**" will be returned immediately. Host can judge it works or not from querying +CPIN? or other commands and URCs about SIM card.

AT+QFUN Set Phone Extended Functionality	
Test Command **AT+ QFUN=?**	Response **+QFUN: (5,6)** **OK**
Write Command **AT+QFUN=<op>**	Response **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<op>	Operation
	5 Perform a power down to the SIM card
	6 Perform a power up to the SIM card

NOTES

1. If you want to use **+QFUN** to swap SIM card, there should be some time delay after power down or power up SIM card. The delay time is recommended as 5 seconds at least.
2. It is not recommended to swap SIM card fleetly or frequently.

Example

```
AT+CPIN?
+CPIN: READY

OK
AT+QFUN=5                        //Perform a power down to the SIM/USIM card
OK

+CPIN: NOT READY
```

AT+CPIN?

+CME ERROR: SIM not inserted

AT+QFUN=6   //Perform a power down to the SIM/USIM card

OK

+CPIN: READY

+QUSIM: 1   //If it is a USIM

AT+CPIN?

+CPIN: READY

OK

5.9. AT+QINISTAT   Query Status of SIM Card Initialization

AT+QINISTAT is used to query status of SIM/USIM card initialization.

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

Parameter

\<status>	Status of SIM card initialization. Actual value is the sum of several of the following four kinds (e.g. 7=1+2+4 means CPIN READY&SMS DONE&PHB DONE)
	0 Initial state
	1 CPIN READY. Operation like lock/unlock PIN is allowed
	2 SMS initialization complete
	4 Phonebook initialization complete

5.10. AT+QPIN2   Query/Unlock SIM PIN2/PUK2

AT+QPIN2 is used to query or unlock SIM PIN2/PUK2.

AT+QPIN2 Query/Unlock SIM PIN2/PUK2	
Test Command **AT+QPIN2=?**	Response **OK**
Read Command **AT+QPIN2?**	Response **+QPIN2: <code>** **OK**
Write Command **AT+QPIN2=<pin>[,<newpin>]**	Response **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	5s

Parameter

<code>	READY	MT is not pending for SIM PIN2/PUK2
	SIM PIN2	MT is waiting SIM PIN2 to be given
	SIM PUK2	MT is waiting SIM PUK2 to be given
<pin>	Password (string type). If the requested password is a PUK, then **<pin>** must be followed by **<new pin>**	
<new pin>	New password (string type) if the requested code is a PUK	

5.11. AT+QPINC   Display PIN Remainder Counter

AT+QPINC can query the number of attempts left to enter the password of SIM PIN/PUK.

AT+QPINC Display PIN Remainder Counter	
Test Command **AT+QPINC=?**	Response **+QPINC: ("SC","P2")** **OK**
Read Command	Response

AT+QPINC?	+QPINC: "SC", \<pincounter\>,\<pukcounter\>
	+QPINC: "P2", \<pincounter\>,\<pukcounter\>
	OK
Write Command	Response
AT+QPINC=\<facility\>	**+QPINC: \<facility\>,\<pincounter\>,\<pukcounter\>**
	OK
	ERROR
	If error is related to ME functionality:
	+CME ERROR: \<err\>
Maximum Response Time	300ms

Parameter

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

5.12. AT+QSIMDET SIM Card Detection

AT+QSIMDET enables SIM/USIM card hotswap function. SIM/USIM card is detected by GPIO interrupt. You should also set the level of SIM/USIM detecting pin when the SIM card is inserted. This command can be saved by AT&W.

AT+QSIMDET SIM Card Detection	
Test Command	Response
AT+QSIMDET=?	**+QSIMDET: (0,1),(0,1)**
	OK
Read Command	Response
AT+QSIMDET?	**+QSIMDET: \<enable\>,\<insert_level\>**
	OK
Write Command	Response
AT+QSIMDET=\<enable\>,\<insert_level\>	**OK**
	ERROR
Maximum Response Time	300ms

Parameter

<enable>	Switch on or off detecting SIM/USIM card
	<u>0</u> Off
	1 On
<insert_level>	The level of SIM detection pin when a SIM card is inserted
	<u>0</u> Low level
	1 High level

NOTE

Hotswap function is invalid if the configured value of **<insert_level>** is inconsistent with hardware design.

Example

AT+QSIMDET=1,0   //If SIM/USIM detection pin level is low when SIM/USIM card inserted
OK

<Remove SIM/USIM card>

+CPIN: NOT READY

<Insert SIM/USIM card>

+CPIN: READY   //If PIN1 of the SIM/USIM card is unlocked

5.13. AT+QSIMSTAT   SIM Inserted Status Report

AT+QSIMSTAT can query SIM/USIM inserted status or enable SIM/USIM inserted status report. The configuration of this command can be saved by AT&W.

AT+QSIMSTAT SIM Inserted Status Report	
Test Command **AT+QSIMSTAT=?**	Response **+QSIMSTAT: (0,1)** **OK**
Read Command **AT+QSIMSTAT?**	Response **+QSIMSTAT: <enable>,<inserted_status>** **OK**
Write Command **AT+QSIMSTAT=<enable>**	Response **OK** **ERROR**

Maximum Response Time	300ms

Parameter

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

Example

```
AT+QSIMSTAT?                    //Query SIM/USIM inserted status
+QSIMSTAT: 0,1

OK
AT+QSIMDET=1,0
OK
AT+QSIMSTAT=1                   //Enable SIM/USIM inserted status report
OK
AT+QSIMSTAT?
+QSIMSTAT: 1,1

OK

<Remove SIM/USIM card>

+QSIMSTAT : 1,0                 //Report of SIM/USIM inserted status: removed

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

OK

<Insert SIM/USIM card>

+QSIMSTAT : 1,1                 //Report of SIM/USIM inserted status: inserted

+CPIN: READY
```

6 Network Service Commands

6.1. AT+COPS   Operator Selection

AT+COPS returns the current operators and their status and allows to set 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 present in the network. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in order: home network, networks referenced in 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 error is 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, **<format>**, **<oper>** and **<Act>** are omitted. **+COPS: <mode>[,<format>[,<oper>][,<Act>]]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
Write Command **AT+COPS=** **<mode>[,<format>[,<oper>[,<Act>]]]**	Response TA forces an attempt to select and register the GSM/UMTS network operator. If the selected operator is not available, no other operator shall be selected (except **<mode>**=4). The

	format of selected operator name shall apply to further read commands (**+COPS?**).
	OK If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	180s, determined by network.
Reference 3GPP TS 27.007	

Parameter

<stat>	0	Unknown
	1	Operator available
	2	Operator current
	3	Operator forbidden
<oper>	Operator in format as per **<mode>**	
<mode>	0	Automatic mode; **<oper>** field is ignored
	1	Manual operator selection; **<oper>** field shall be present and **<Act>** optionally
	2	Manual deregister from network
	3	Set only **<format>** (for read Command **+COPS?**), do not attempt registration/deregistration (**<oper>** and **<Act>** fields are ignored); this value is not applicable in read command response
	4	Manual/automatic selected, **<oper>** field shall be presented; if manual selection fails, automatic mode (**<mode>**=0) is entered
<format>	0	Long format alphanumeric **<oper>**; 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
	2	UTRAN
	3	GSM W/EGPRS
	4	UTRAN W/HSDPA

Example

AT+COPS=?   //List all current network operators **+COPS:** **(2,"CHN-UNICOM","UNICOM","46001",2),(1,"CHN-UNICOM","UNICOM","46001",0),(3,"CHINA MOBILE","CMCC","46000",0),,(0,1,2,3,4),(0,1,2)** **OK** **AT+COPS?**   //Query the currently selected network operator

+COPS: 0,0,"CHN-UNICOM",0

OK

6.2. AT+CREG   Network Registration

AT+CREG returns the network registration status. The write command sets whether or not to present URC.

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

Parameter

<n>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code **+CREG: <stat>**
	2	Enable network registration unsolicited result code with location information **+CREG: <stat>[,<lac>,<ci>[,<Act>]]**

<stat>	0	Not registered, ME is not currently searching a new operator to register to
	1	Registered, home network
	2	Not registered, but ME is currently searching a new operator to register to
	3	Registration denied
	4	Unknown
	5	Registered, roaming
<lac>		String type, two bytes location area code in hexadecimal format
<ci>		String type, two bytes cell ID in hexadecimal format
<Act>		Access technology selected
	0	GSM
	2	UTRAN

Example

```
AT+CREG=1
OK

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

+CGREG: 1,"D504","08043799",2  //URC reports that operator has found location area code and cell ID
```

6.3. AT+CSQ   Signal Quality Report

AT+CSQ indicates the received signal strength **<rssi>** and the channel bit error rate **<ber>**.

AT+CSQ Signal Quality Report	
Test Command **AT+CSQ=?**	Response **+CSQ:** (list of supported **<rssi>**s),(list of supported **<ber>**s) **OK**
Execution Command **AT+CSQ**	Response **+CSQ: <rssi>,<ber>** **OK** **+CME ERROR: <err>** Execution Command returns received signal strength indication **<rssi>** and channel bit error rate **<ber>** from the ME. Test Command returns values supported by the TA.
Maximum Response Time	300ms

Reference	
3GPP TS 27.007	

Parameter

<rssi>	0	-113 dBm or less
	1	-111 dBm
	2...30	-109... -53 dBm
	31	-51 dBm or greater
	99	Not known or not detectable
	According to 3GPP TS 27.007 [47], the **<rssi>** value is not applicable to 3G networks. Yet, with a view to employing **+CSQ** for all networks has been designed to show a **<rssi>** value derived from the 3G specific RSCP parameter is shown by AT+QENG . Nevertheless, please note that connection quality in 3G networks is depending on further factors. For example, despite good **<rssi>** or RSCP values for signal quality, data throughput may vary depending on the number of subscribers sharing the same cell. Please get details by **+QENG**	
<ber>	Channel bit error rate (in percent)	
	0...7	As RXQUAL values in the table in 3GPP TS 45.008 subclause 8.2.4
	99	Not known or not detectable

Example

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

OK
AT+CSQ
+CSQ: 28,0          //Query the current signal strength indication is 28 and channel bit error rate is 0

OK
```

NOTES

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

6.4. AT+CPOL   Preferred Operator List

AT+CPOL edits and queries the list of the preferred operators.

AT+CPOL   Preferred Operator List

Test Command **AT+CPOL=?**	Response **+CPOL:** (list of supported **<index>**s),(list of supported **<format>**s) **OK**
Read Command **AT+CPOL?**	Response Query the list of the preferred operators: **+CPOL:** **<index>,<format>,<oper>[,<GSM>,<GSM_compact,<UTRAN>]** **<index>,<format>,<oper>[,<GSM>,<GSM_compact,<UTRAN>]** **[…]** **OK**
Write Command **AT+CPOL=** **<index>[,<format>[,<oper>[<GSM>,<GSM_compact>,<UTRAN>]]]**	Response Edit the list of the preferred operators **OK** **ERROR** If the **<index>** is given but the **<operator>** is left out, the entry is deleted.
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<index>	Integer type; the order number of operator in the SIM/USIM preferred operator list	
<format>	0	Long format alphanumeric **<oper>**
	1	Short format alphanumeric **<oper>**
	2	Numeric **<oper>**
<oper>	String type; **<format>** indicates if the format is alphanumeric or numeric (see **+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

6.5. AT+COPN   Read Operator Names

The AT+COPN 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** **+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 **+COPS**)
<alphan>	String type; operator in long alphanumeric format (see **+COPS**)

6.6. AT+CTZU   Automatic Time Zone Update

This set command enables and disables automatic time zone update via NITZ. The configuration is stored to NV automatically.

AT+CTZU Automatic Time Zone Update	
Test Command **AT+CTZU=?**	Response **+CTZU: (0,1)** **OK**
Write Command	Response

AT+CTZU=<on_off>	OK
	ERROR
Read Command **AT+CTZU?**	Response **+CTZU: <on_off>** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

Example

AT+CTZU?
+CTZU: 0

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

OK
AT+CTZU=10
ERROR
AT+CTZU=1
OK
AT+CTZU?
+CTZU: 1

OK

6.7. AT+CTZR   Time Zone Reporting

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

AT+CTZR   Time Zone Reporting

Test Command **AT+CTZR=?**	Response **+CTZR: (0-2)** **OK**
Write Command **AT+CTZR=<reporting>**	Response **OK** **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 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 with the range -48 ... +56. To maintain a fixed width, numbers in the range -9 ... +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09"
<dst>	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

6.8. AT+QLTS   Obtain the Latest Network Time Synchronization

AT+QLTS is used to obtain the latest network time synchronization.

AT+QLTS Obtain the Latest Network Time Synchronization	
Test Command **AT+QLTS=?**	Response **OK**
Execution Command **AT+QLTS**	Response Execution Command returns latest time for Network synchronization: **+QLTS: <time>,<ds>** **OK**
Maximum Response Time	300ms

Parameter

<time>	String type. Format is "YYYY/MM/DD,hh:mm:ss±zz", indicates year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -48...+56). E.g. 6th of May 2004, 22:10:00 GMT+2 hours
<ds>	Daylight saving time. It is zero equals to "04/05/06,22:10:00+08,0"

Example

AT+QLTS
+QLTS: "13/08/23,06:51:13+32,0"

OK

7 Call Related Commands

7.1. ATA   Answer an Incoming Call

ATA connects the module to an incoming voice or data call indicated by a "RING" URC.

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

NOTES

1. Any additional commands on the same command line are ignored.
2. This command may be aborted generally by receiving a character during execution. The aborting is not possible during some states of connection establishment such as handshaking.
3. See also **ATX**.

Example

RING	//A voice call is ringing
AT+CLCC	
+CLCC: 1,1,4,0,0,"02154450290",129	
OK	
ATA	//Accept the voice call with **ATA**
OK	

7.2. ATD   Mobile Originated Call to Dial a Number

ATD can be used to set up outgoing voice and data calls. Supplementary Services can also be controlled with ATD.

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 (parameter setting **ATX2** or **ATX4**): **NO DIALTONE** If busy and (parameter setting **ATX3** or **ATX4**): **BUSY** If a connection cannot be established: **NO CARRIER** If connection is successful and non-voice call. **CONNECT<text>** TA switches to data mode. **<text>** output only if **ATX<value>** parameter setting with the **<value>** >0 When TA returns to command mode after call release: **OK** If connection is successful and voice call: **OK**
Maximum Response Time	5s, determined by 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 Actives **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. Parameter "I" and "i" only if no *# code is within the dial string.
3. See **ATX** command for setting result code and call monitoring parameters.
4. Responses returned after dialing with **ATD**
    For voice call two different responses mode can be determined. 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 returns "**OK**" immediately after dialing was completed, otherwise TA will return "**OK**", "**BUSY**", "**NO DIAL TONE**", "**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 the AT+CLCC command.

Example

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

7.3. ATH   Disconnect Existing Connection

ATH disconnects circuit switched data calls or voice calls. AT+CHUP is also used to disconnect the voice call.

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

Parameter

\<n\>	0	Disconnect from line and terminate call

7.4. AT+CVHU   Voice Hang Up Control

AT+CVHU 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** **ERROR**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

\<mode\>	<u>0</u>	ATH is disconnected
	1	ATH is ignored but "OK" response is returned

7.5. AT+CHUP   Hang Up Call

AT+CHUP cancels all voice calls in the state of Active, Waiting and Held. For data connections, use ATH.

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

Example

RING	//Incoming call
AT+CHUP	//Hang up call
OK	

7.6. +++   Switch From Data Mode to Command Mode

The +++ character sequence causes the module to switch from data mode to AT 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 during 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 you to enter AT command while maintaining the data connection with the remote server or, accordingly, the GPRS connection. **OK**
Maximum Response Time	300ms
Reference V.25ter	

NOTES

1. To prevent the"+++" escape sequence from being misinterpreted as data, it should comply to following sequence:
   - Do not input any character within T1 time (1000ms) before inputting "+++".
   - Input "+++" within 1000ms, and no other characters can be inputted during this time.
   - Do not input any character within T1 time (1000ms) after "+++" has been inputted.
   - Switch to command mode, otherwise return to step 1.
2. To return from command mode back to data mode: Enter **ATO**
   - Another way to change to command mode is through DTR, refer to **AT&D** command for details.

7.7. ATO   Switch From Command Mode to Data Mode

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

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

TA returns to data mode from command mode **CONNECT <text>**,**<text>** only if **ATX** parameter is set as value>0.

7.8. ATS0   Set Number of Rings before Automatically Answering Call

ATS0 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>	000	Automatic answering is disabled
	001-255	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	//Call coming
RING	
RING	//Automatically answering the call after three rings

7.9. ATS6   Set Pause Before Blind Dialing

ATS6 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> 000-<u>002</u>-010 Number of seconds to wait before blind dialing	

7.10. ATS7   Set Number of Seconds to Wait for Connection Completion

ATS7 specifies the amount of time to wait for the connection completion in case of answering or originating a call. If no connection is established during this time, the module disconnects from the line.

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

Parameter

\<n>	<u>000</u>	Disabled
	001-255	Number of seconds to wait for connection completion

7.11. ATS8   Set the Number of Seconds to Wait for Comma Dial Modifier

ATS8 is implemented for compatibility reasons only, and has no effect.

ATS8 Set the Number of Seconds 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>	000	No pause when comma encountered in dial string
	001-<u>002</u>-255	Number of seconds to wait

7.12. ATS10   Set Disconnect Delay after Indicating the Absence of Data Carrier

ATS10 determines the amount of time, which the UE remains connected in absence of a data carrier.

ATS10 Set Disconnect Delay after Indicating the Absence of Data Carrier	
Read Command **ATS10?**	Response **\<n>** **OK**
Write Command	Response

ATS10=<n>	This parameter setting determines the amount of time that the TA will remain connected in absence of 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>	001-015-254	Number of tenths of seconds to wait before disconnecting after UE has indicated the absence of received line signal

7.13. AT+CBST   Select Bearer Service Type

AT+CBST write command selects the bearer service **<name>**, the data rate **<speed>** and the connection element **<ce>** to be used when data calls are originated.

AT+CBST Select Bearer Service Type	
Test Command **AT+CBST=?**	Response **+CBST:** (list of supported **<speed>**s) ,(list of supported **<name>**s) ,(list of supported **<ce>**s) **OK**
Read Command **AT+CBST?**	Response **+CBST: <speed>,<name>,<ce>** **OK**
Write Command **AT+CBST=[<speed>[,<name>[,<ce>]]]**	Response TA selects the bearer service **<name>** with data rate **<speed>**, and the connection element **<ce>** to be used when data calls are originated. **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

\<speed>	0	Automatic speed selection
	7	9600 bps (V.32)
	12	9600 bps (V.34)
	14	14400 bps (V.34)
	16	28800 bps (V.34)
	17	32000 bps (V.34)
	39	9600 bps (V.120)
	43	14400 bps (V.120)
	48	28800 bps (V.120)
	51	56000 bps (V.120)
	71	9600 bps (V.110)
	75	14400 bps (V.110)
	80	28800 bps (V.110 or X.31 flag stuffing)
	81	38400 bps (V.110 or X.31 flag stuffing)
	83	56000 bps (V.110 or X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent UDI or RDI service in order to get FTM84 64000 bps (X.31 flag stuffing; this setting can be used in conjunction with asyn-chronous non-transparent UDI service in order to get FTM)
	84	64000 bps (X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent UDI service in order to get FTM)
	116	64000 bps (bit transparent)
	134	64000 bps (multimedia)
\<name>	0	Asynchronous Modem
	1	Synchronous Modem
	4	Asynchronous Modem (RDI)
\<ce>	0	Transparent
	1	Non-transparent

Table 4: Parameters Configurations Supported by AT+CBST

\<speed>	GSM	WCDMA	SYNC.	ASYNC.	ASYNC. (RDI)	TRANSP.	NON-TRANSP.
0	Y	Y	N	Y	N	N	Y
7	Y	N	N	Y	N	N	Y
12	Y	N	N	Y	N	N	Y
14	Y	Y	N	Y	N	N	Y
16	N	Y	N	Y	N	N	Y

17	N	Y	N	Y	N	N	Y
39	Y	N	N	Y	N	N	Y
43	Y	Y	N	Y	N	N	Y
48	N	Y	N	Y	N	N	Y
51	N	Y	N	Y	N	N	Y
71	Y	N	N	Y	N	N	Y
75	Y	Y	N	Y	N	N	Y
80	Y	Y	N	Y	N	N	Y
81	Y	Y	N	Y	N	N	Y
83	Y	Y	N	Y	Y	N	Y
84	N	Y	N	Y	N	N	Y
116	N	Y	Y	N	N	Y	N
134	N	Y	Y	N	N	Y	N

NOTE

3GPP TS 22.002 lists the allowed combinations of the sub-parameters.

7.14. AT+CSTA   Select Type of Address

AT+CSTA write command selects the type of number for further dialing commands ATD according to 3GPP Technical Specifications. Test command returns values supported a compound value.

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

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

Parameter

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

7.15. AT+CLCC   List Current Calls of ME

The execution command returns the list of all current calls. If the command is executed successfully, but no calls are existed, no information but OK response is sent to the TE.

AT+CLCC List Current Calls of ME	
Test Command **AT+CLCC=?**	Response **OK**
Execution Command **AT+CLCC**	Response TA returns a list of current calls of ME. If command execute successfully but no calls are existed, no information but OK response is sent to TE. **[+CLCC:** **<id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<** **alpha>]]** **[+CLCC: <id2>,<dir>,<stat>,<mode>,<mpty>[,** **<number>,<type>[,<alpha>]]** **[...]** **OK** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<idx>	Integer type; call identification number as described in 3GPP TS 22.030 sub clause 4.5.5.1; this number can be used in **AT+CHLD** command operations	
<dir>	0	Mobile originated (MO) call
	1	Mobile terminated (MT) call
<stat>	State of the call	
	0	Active
	1	Held
	2	Dialing (MO call)
	3	Alerting (MO call)
	4	Incoming (MT call)
	5	Waiting (MT call)
<mode>	Bearer/tele service	
	0	Voice
	1	Data
	2	FAX
<mpty>	0	Call is not one of multiparty (conference) call parties
	1	Call is one of multiparty (conference) call parties
<number>	Phone number in string type in format specified by **<type>**	
<type>	Type of address of octet in integer format(Refer to 3GPP TS 24.008 , sub clause 10.5.4.7 for details). Usually, it has three kinds of values:	
	129	Unknown type
	145	International type(contains the character "+")
	161	National type
<alpha>	Alphanumeric representation of **<number>** corresponding to the entry found in phonebook	

7.16. AT+CR   Service Reporting Control

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

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

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

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

Parameter

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

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

AT+CRC 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
```

7.18. AT+CRLP   Select Radio Link Protocol Parameter

AT+CRLP write command sets radio link protocol (RLP) parameters used when non-transparent data calls are originated.

AT+CRLP Select Radio Link Protocol Parameter	
Test Command **AT+CRLP=?**	Response TA returns values supported. RLP (Radio Link Protocol)

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

Parameter

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

7.19. AT+QECCNUM   Configure Emergency Call Numbers

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

The maximal supported ECC numbers of each type is 20.

AT+QECCNUM Configure Emergency Call Numbers	
Test Command **AT+QECCNUM=?**	Response **+QECCNUM: (0-2)** **OK**
Write Command **AT+QECCNUM=<mode>,<type>[,<ecc num1>[,<eccnum2>,…[,<eccnumN>]]]**	Response If **<mode>** is equal to 0, query the ECC numbers, **<eccnumN>** should be omitted, return: **+QECCNUM: <type>,<eccnum1>,<eccnum2>[…]** **OK** If **<mode>** is not equal to 0: <mode>=1 is used to add the ECC number; **<mode>**=2 is used to delete the ECC number. In this case, at least one ECC number **<eccnumN>** should be inputted, return: **OK** **ERROR**
Read Command **AT+QECCNUM?**	Response **+QECCNUM: 0,<eccnum1>,<eccnum2>[…]** **+QECCNUM: 1,<eccnum1>,<eccnum2>[…]** **OK**
Maximum Response Time	300ms

Parameter

<mode>	ECC number operation mode
	0 Query ECC numbers
	1 Add ECC numbers
	2 Delete ECC numbers

<type>	ECC number type
	0 ECC numbers without SIM
	1 ECC numbers with SIM
<eccnum>	String type; ECC numbers(e.g.110,119)

Example

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

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

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

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

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

OK
```

7.20. AT+QHUP   Hang Up Call with a Specific Release Cause

AT+QHUP can terminate call(s) with a specific 3GPP TS 24.008 release cause specified by host (Including voice and data calls).

AT+QHUP Hang Up Call with a Specific Release Cause	
Test Command	Response
AT+QHUP=?	OK

Write Command **AT+QHUP=<cause>[,<idx>]**	Response **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	90s, determined by network.

Parameter

<cause>	Release cause, 3GPP TS 24.008 release cause to be indicated to the network
	1 Release cause "unassigned (unallocated) number"
	16 Release cause "normal call clearing"
	17 Release cause "user busy"
	18 Release cause "no user responding"
	21 Release cause "call rejected"
	27 Release cause "destination out of order"
	31 Release cause "normal, unspecified"
	88 Release cause "incompatible destination"
<idx>	Call identification number is an optional index in the list of current calls indicated by **+CLCC**. **+QHUP** will terminate the call identified by the given call number. The default call number 0 is not assigned to any call, but signifies all calls
	0 Terminate all known calls. However, if circuit switches data calls and voice calls at the same time, this command only terminates the CSD calls
	1…7 Terminate the specific call with identification number

Example

```
AT+QHUP=?          //Test Command
OK
ATD10010;          //Dial10010
OK
ATD10086;          //Dial10086
OK
AT+CLCC            //Query the status of calls
+CLCC: 1,0,1,0,0,"10010",129
+CLCC: 2,0,0,0,0,"10086",129

OK
AT+QHUP=17,1       //Terminate call of which call ID is 1. Disconnect cause is "user busy"
OK
AT+CLCC            //Query the status of calls
```

```
+CLCC: 1,0,0,0,0,"10086",129

OK
AT+QHUP=16          //Terminate all existed calls. Disconnect cause is "normal call clearing"
OK
AT+CLCC
OK
```

```
+CLCC: 1,0,0,0,0,"10086",129
```

8 Phonebook Commands

8.1. AT+CNUM   Subscriber Number

AT+CNUM can get the subscribers own number(s) from the SIM.

AT+CNUM Subscriber Number	
Test Command **AT+CNUM=?**	Response **OK**
Execution Command **AT+CNUM**	Response **[+CNUM: [<alpha>], <number>,<type>]** **[+CNUM: [<alpha>], <number>,<type>]** **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP 27.007	

Parameter

<alpha>	Optional alphanumeric string associated with **<number>**; the used character set should be the one selected with command Select TE Character Set **+CSCS**
<number>	String type phone number of format specified by **<type>**
<type>	Type of address of octet in integer format (Refer to 3GPP TS 24.008, subclause 10.5.4.7 for details). Usually, it has three kinds of values: 129 Unknown type 145 International type(contains the character "+") 161 National type

8.2. AT+CPBF   Find Phonebook Entries

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

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

Parameter

<nlength>	Integer type, indicates the maximum length of field **<number>**
<tlength>	Integer type, indicates the maximum length of field **<text>**
<findtext>	String type, field of maximum length **<tlength>** in current TE character set specified by **+CSCS**
<index>	Integer type, in the range of location numbers of phone book memory
<type>	Type of address of octet in integer format (Refer to 3GPP TS 24.008, subclause 10.5.4.7 for details). Usually, it has three kinds of values:
	129 Unknown type
	145 International type(contains the character "+")
	161 National type
<text>	String type, field of maximum length **<tlength>** in current TE character set specified by **+CSCS**

8.3. AT+CPBR   Read Phonebook Entries

AT+CPBF can return phonebook entries in location number range **<index1>... <index2>** from the current phonebook memory storage selected with **+CPBS**. If **<index2>** is left out, only location **<index1>** is returned.

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

Parameter

<index>	Integer type, in the range of location numbers of phone book memory
<nlength>	Integer type, indicates the maximum length of field **<number>**
<tlength>	Integer type, indicates the maximum length of field **<text>**
<index1>	The first phone book record to read
<index2>	The last phonebook record to read
<type>	Type of address of octet in integer format (Refer to 3GPP TS 24.008, subclause 10.5.4.7 for details). Usually, it has three kinds of values:
	129 Unknown type
	145 International type(contains the character "**+**")
	161 National type
<text>	String type, field of maximum length **<tlength>** in current TE character set specified by **+CSCS**

8.4. AT+CPBS   Select Phonebook Memory Storage

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

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

Parameter

<storage>	"SM"	SIM phonebook
	"DC"	ME dialed calls list (**+CPBW** may not be applicable on this storage)
	"FD"	SIM fix dialing-phone book (**+CPBW** operation need the authority of PIN2)
	"LD"	SIM last-dialing-phone book (**+CPBW** may not be applicable on this storage)
	"MC"	ME missed (unanswered) calls list(**+CPBW** may not be applicable on this storage)
	"ME"	Mobile equipment phonebook

	"RC"	ME received calls list (**+CPBW** may not be applicable on this storage)
	"EN"	SIM (or ME) emergency number (**+CPBW** may not be applicable on this storage)
	"ON"	SIM own numbers (MSISDNs) list
<used>	Integer type, indicates the total number of used locations in selected memory	
<total>	Integer type, indicates the total number of locations in selected memory	

8.5. AT+CPBW   Write Phonebook Entry

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

AT+CPBW Write Phonebook Entry	
Test Command **AT+CPBW=?**	Response **+CPBW:** (The range of supported **<index>**s)**, <nlength>**, (list of supported **<type>**s), **<tlength>** **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Write Command **AT+CPBW=[<index>][,<number>[,<type>[,<text>]]]**	Response **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP 27.007	

Parameter

<index>	Integer type, in the range of location numbers of phone book memory. If **<index>** is not given, the first free entry will be used. If **<index>** is given as the only parameter, the phonebook entry specified by **<location>** is deleted
<nlength>	Integer type, indicates the maximum length of field **<number>**
<tlength>	Integer type, indicates the maximum length of field **<text>**
<type>	Type of address of octet in integer format (Refer to 3GPP TS 24.008, subclause 10.5.4.7 for details). Usually, it has three kinds of values:

	129	Unknown type
	145	International type(contains the character "+")
	161	National type
<text>	String type field of maximum length **<tlength>** in current TE character set specified by **+CSCS**

Example

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

9 Short Message Service Commands

9.1. AT+CSMS   Select Message Service

AT+CSMS selects message service **<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 error is 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 description-s)	
<mt>	Mobile terminated messages	
	0	Type not supported
	<u>1</u>	Type supported
<mo>	Mobile originated messages	
	0	Type not supported
	<u>1</u>	Type supported
<bm>	Broadcast type messages	
	0	Type not supported
	<u>1</u>	Type supported

Example

AT+CSMS=?	//Test command
+CSMS: (0,1)	
OK	
AT+CSMS=1	//Set type of message service as 1
+CSMS: 1,1,1	
OK	
AT+CSMS?	//Read command
+CSMS: 1,1,1,1	
OK	

9.2. AT+CMGF Message Format

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

Mode can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters). Text mode uses the value of parameter **<chset>** specified by command **+CSCS** 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>	<u>0</u>	PDU mode
	1	Text mode

9.3. AT+CSCA   Service Center Address

AT+CSCA write command updates the SMSC address when mobile originated SMS are transmitted. In text mode, the setting is used by write commands. In PDU mode, setting is used by the same commands, 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 error is 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 **+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 SMS service center address
OK	
AT+CSCA?	//Query SMS service center address
+CSCA: "+8613800210500",145	
OK	

9.4. AT+CPMS   Preferred Message Storage

AT+CPMS selects memory storages **\<mem1\>**, **\<mem2\>** and **\<mem3\>** for reading and writing and so on.

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 error is 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" SIM message storage
	"ME" Mobile Equipment message storage
	"MT" Same as "ME" storage
<mem2>	Messages will be written and sent to this memory storage
	"SM" SIM message storage
	"ME" Mobile equipment message storage
	"MT" Same as "ME" storage
<mem3>	Received messages will be placed in this memory storage if routing to PC is not set ("**+CNMI**")
	"SM" 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>**
<totalx>	Integer type, number of messages storable in **<memx>**

Example

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

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

OK
```

9.5. AT+CMGD   Delete Message

AT+CMGD deletes a short message 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 Message

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 error is 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, in the range of location numbers supported by the associated memory	
\<delflag\>	0	Delete message specified in **\<index\>**
	1	Delete all read messages from **\<mem1\>** storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched
	2	Delete all read messages from **\<mem1\>** storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched
	3	Delete all read messages from **\<mem1\>** storage, sent and unsent mobile originated messages, leaving unread messages untouched
	4	Delete all messages from **\<mem1\>** storage

Example

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

9.6. AT+CMGL   List Messages

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

AT+CMGL List Messages	
Test Command **AT+CMGL=?**	Response **+CMGL:** (list of supported **<stat>**s) **OK**
Write Command **AT+CMGL=<stat>**	Response If text mode (**+CMGF=1**) and command successful: 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>[...]]** 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>[...]]** For SMS-COMMANDs: **+CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF>** **+CMGL: <index>,<stat>,<fo>,<ct>[...]]** 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**

	Else if PDU mode (**+CMGF=0**) and Command successful: **+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu><CR><LF>** **+CMGL:<index>,<stat>,[alpha],<length><CR><LF><pdu>[...]]** **OK** Else if error is related to ME functionality: **+CMS ERROR: <err>**
Execution Command **AT+CMGL**	Response List all messages with "REC UNREAD" status from message storage **<mem1>**, then 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 command **+CSCS** in 3GPP TS 27.007); type of address is given by **<toda>**	
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **+CSCS** in TS 27.007); type of address is given by **<tooa>**	
<alpha>	String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry	

	found in MT phonebook; implementation of this feature is manufacturer specified; the used character set should be the one selected with command Select TE Character Set +CSCS (see definition of this command in 3GPP TS 27.007)
\<scts\>	Service center time stamp. 3GPP TS 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer to **\<dt\>**)
\<toda\>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format.
\<tooa\>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer to **\<toda\>**)
\<length\>	Message length, integer type, indicating in the text mode (**+CMGF**=1) the length of the message body **\<data\>** (or **\<cdata\>**) in characters; or in PDU mode (+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 command Select TE Character Set +CSCS in 3GPP TS 27.007): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A
	- 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 command +CSCS in 3GPP TS27.007): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A
	- 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))3GPP TS 27.007

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	

9.7. AT+CMGR   Read Message

AT+CMGR write command returns SMS message with location value **<index>** from message storage **<mem1>** to the TE. If status of the message is "REC UNREAD", status in the storage changes to "REC READ".

AT+CMGR Read Message	
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". 1) If text mode (**+CMGF=1**) and 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

2) If PDU mode (**+CMGF=0**) and command successful:
+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu>

OK

3) If error is 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>	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
<alpha>	String type alphanumeric representation of **<da>** or **<oa>** corresponding to the entry		

found in MT phonebook; implementation of this feature is manufacturer specified; the used character set should be the one selected with command Select TE Character Set +CSCS (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 command **+CSCS** in 3GPP TS 27.007); type of address is given by **<toda>**

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

<tora> Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format (default refer **<toda>**)

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

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

<sca> Service center address. 3GPP TS 24.011 RP SC address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command +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 **<toda>**)

<length> Message length, integer type, indicating in the text mode (+CMGF=1) the length of the message body **<data>** (or **<cdata>**) in characters; or in PDU mode (+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 command Select TE Character Set +CSCS in 3GPP TS 27.007): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A
	- 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 command +CSCS in 3GPP TS 27.007): ME/TA converts GSM alphabet into current TE character set according rules of Annex A
	- 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))3GPP TS 27.007

Example

```
+CMTI: "SM",3                          //Indicates that new message has been received and saved
                                         to <index>=3 of "SM"
AT+CSDH=1
OK
AT+CMGR=3                              //Read message
+CMGR: "REC UNREAD","+8615021012496",,"13/12/13 15:06:37+32",145,4,0,0,"+8
613800210500",145,27

<This is a test from Quectel>

OK
```

9.8. AT+CMGS   Send Message

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

AT+CMGS Send Message	
Test Command **AT+CMGS=?**	Response **OK**
Write Command 1) If text mode (**+CMGF=1**): **AT+CMGS=<da>[,<toda>]**<CR> **text is entered** <ctrl-Z/ESC> ESC quits without sending 2) If PDU mode (**+CMGF=0**): **AT+CMGS=<length>**<CR> **PDU is given** <ctrl-Z/ESC>	Response TA sends message from a TE to the network (SMS-SUBMIT). Message reference value **<mr>** is returned to the TE on successful message delivery. Optionally (when **+CSMS <service>** value is 1 and network supports) **<scts>** is returned. Values can be used to identify message upon unsolicited delivery status report result code. If text mode (**+CMGF=1**) and sent successfully: **+CMGS: <mr>** **OK** If PDU mode (**+CMGF=0**) and sent successfully: **+CMGS: <mr>** **OK** If error is related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	120s, determined by 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 **+CSCS** in 3GPP TS 27.007); type of address is given by **<toda>**
<toda>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address

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

Example

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

9.9. AT+CMMS   More Messages to Send

AT+CMMS 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 More Messages to Send	
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** **ERROR** If error is related to ME functionality: **+CMS ERROR: \<err>**

Maximum Response Time	120s, determined by network.
Reference 3GPP TS 27.005	

Parameter

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

NOTE

After the use of read command, a delay of 5-10 seconds is required before issuing the write command, otherwise the "**+CMS ERROR: 500**" may appear.

9.10. AT+CMGW   Write Message to Memory

AT+CMGW write and execution commands store a short message (either SMS-DELIVER or SMS-SUBMIT) from TE to memory storage **<mem2>**. Memory location **<index>** of the stored message is returned. Message status will be set to "stored unsent" by default, but parameter **<stat>** also allows other status values to be given.

The syntax of input text is same as the one specified in the write command **+CMGS**.

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

2) If PDU mode (**+CMGF**=0): **AT+CMGW=<length>[,<stat>]**<CR> **PDU is given** <ctrl-Z/ESC>	**+CMGW: <index>** **OK** If error is 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 command **+CSCS** in 3GPP TS 27.007); type of address is given by **<toda>**
<oa>	Originating address. 3GPP TS 23.040 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to command **+CSCS** in TS 27.007); type of address given by **<tooa>**
<tooa>	Type of originating address. 3GPP TS 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer to **<toda>**)
<toda>	Type of recipient address. 3GPP TS 24.011 TP-Recipient-Address Type-of-Address octet in integer format
<length>	Message length. Integer type, indicating in the text mode (**+CMGF**=1) the length of the message body **<data>** (or **<cdata>**) in characters; or in PDU mode (**+CMGF**=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
<pdu>	In the case of SMS: 3GPP TS 24.011 SC address followed by 3GPP TS 23.04TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))
<index>	Index of message in selected storage **<mem2>**

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, **<CTRL+Z>** writes message, **<ESC>** quits

	without sending
+CMGW: 4	
OK	
AT+CMGF=0	//Set SMS message format as PDU mode
OK	
AT+CMGW=18	
> 0051FF00000008000A0500030002016D4B8BD5	
+CMGW: 5	
OK	

9.11. AT+CMSS   Send Message From Storage

AT+CMSS write command sends message with location value **<index>** from message storage **<mem2>** to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address **<da>** is given for SMS-SUBMIT, it shall be used instead of the one stored with the message.

AT+CMSS Send Message From Storage	
Test Command **AT+CMSS=?**	Response **OK**
Write Command **AT+CMSS=<index>[,<da>[,<toda>]]**	Response TA sends message with location value **<index>** from message storage **<mem2>** to the network (SMS-SUBMIT). If new recipient address **<da>** is given, it shall be used instead of the one stored with the message. Reference value **<mr>** is returned to the TE on successful message delivery. Values can be used to identify message upon unsolicited delivery status report result code. 1) If text mode (**+CMGF=1**) and sent successfully: **+CMSS: <mr>[,<scts>]** **OK** 2) If PDU mode(**+CMGF=0**) and sent successfully; **+CMSS: <mr> [,<ackpdu>]** **OK** 3) If error is related to ME functionality: **+CMS ERROR: <err>**

Maximum Response Time	120s, determined by network.
Reference 3GPP TS 27.005	

Parameter

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

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, **<CTRL+Z>** sends message, **<ESC>** quits without sending
+CMGW: 4	
OK	
AT+CMSS=4	//Send the message of index is 4 from memory storage.
+CMSS: 54	
OK	

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

AT+CNMA write and execute command confirms 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

the required time (net-work timeout), it will send a "RP-ERROR" message to the network. The UE will automatically disable rout 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** **ERROR** If error is related to ME functionality: **+CMS ERROR: <err>**
Write Command **AT+CNMA=<n>**	Response **OK** **ERROR** If error is related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

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

---

NOTE

Execute and write command 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
OK
AT+CNMI=1,2,0,0,0
OK
+CMT: "+8615021012496",,"13/12/03,17:07:21+32",145,4,0,0,"+8613800551500",145,28
This is a test from Quectel.   //Short message is outputted directly when SMS is incoming.
AT+CNMA   //Send ACK to the network
OK
AT+ CNMA
+CMS ERROR：340   //The second time returns error, it needs ACK only once

9.13. AT+CNMI   SMS Event Reporting Configuration

AT+CNMI write command selects the procedure, how the received new messages from the network are indicated to the TE when TE is active, e.g. DTR signal is ON. If TE is inactive (e.g. DTR signal is OFF), message receiving should be done as specified in 3GPP TS 23.038.

AT+CNMI SMS Event Reporting Configuration	
Test Command **AT+CNMI=?**	Response **+CNMI:** (list of supported **<mode>**s),(list of supported **<mt>**s),(list of supported **<bm>**s),(list of supported **<ds>**s),(list of supported **<bfr>**s) **OK**
Read Command **AT+CNMI?**	Response **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>** **OK**
Write Command **AT+CNMI[=<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]**	Response 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 signal is ON. If TE is inactive (e.g. DTR signal is OFF), receiving message should be done as specified in 3GPP TS 23.038. **OK** **ERROR** If error is related to ME functionality:

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

Parameter

<mode>	0	Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications
	1	Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line 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 on-line 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 3G PPTS 23.038), preferred memory storage (+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 Command Show Text Mode Parameters **+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 3 GPP TS 23.038), the setting of Select CBM Types (**+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 directly to the TE
<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	

Unsolicited result code:

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

Example

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

9.14. AT+CSCB   Select Cell Broadcast Message Types

AT+CSCB write command selects which types of CBMs are to be received by the ME. The command writes the parameters in non-volatile memory.

AT+CSCB Select Cell Broadcast Message Types	
Test Command **AT+CSCB=?**	Response It returns supported modes as a compound value. **+CSCB:** (list of supported **\<mode>**s) **OK**
Read Command **AT+CSCB?**	Response **+CSCB: \<mode>,\<mids>,\<dcss>** **OK**
Write Command **AT+CSCB=\<mode>[,mids>[,\<dcss>]]**	Response TA selects which types of CBMs are to be received by the ME. **OK** If error is related to ME functionality:

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

Parameter

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

9.15. AT+CSDH   Show SMS Text Mode Parameters

AT+CSDH write command controls whether or not 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** **ERROR**
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

<show>	<u>0</u>	Do not show header values defined in commands **+CSCA** and **+CSMP** (**<sca>**, **<tosca>**, **<fo>**, **<vp>**, **<pid>** and **<dcs>**) nor **<length>**, **<toda>** or **<tooa>** in **+CM**T, **+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
```

9.16. AT+CSMP Set SMS Text Mode Parameters

AT+CSMP 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 (**+CMGF=1**). It is possible to set the validity period starting from when the SM is received by the SMSC (**<vp>** is in range 0... 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 and SMS-COMMAND in integer format. If a valid value has been entered once, parameter can be omitted
<vp>	Validity period. Depending on SMS-SUBMIT **<fo>** setting: 3GPP TS 23.040 TP-Validity-Period either in integer format or in time-string format (refer to **<dt>**)
<pid>	Protocol identifier. 3GPP TS 23.040 TP-Protocol-Identifier in integer format (default 0).
<dcs>	Data coding scheme. Depending on the command or result code: 3GPP TS 23.038 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format

9.17. AT+QCMGS　Send Concatenated Messages

AT+QCMGS is used to send concatenated massages. When sending a concatenated message, which is different from AT+CMGS, 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 text mode (**+CMGF=1**): **AT+QCMGS=<da>[,<toda>][,<uid>,<msg_seg>,<msg_total>]**<CR> **text is entered** <ctrl-Z/ESC>	Response If text mode (**+CMGF=1**) and sent successfully: **+QCMGS: <mr>** **OK** **ERROR**

	If error is related to ME functionality: **+CMS ERROR: <err>**
Maximum Response Time	120s, determined by network.

Parameter

<uid>	Message identification in the user data header (UDH). Range from 0 to 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 from 0 to 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 from 0 to 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, because the two kinds of **<uid>** are 8 bit and 16 bit. AT+QCMGS uses 8 bit **<uid>**. So:
    - 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.
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 the SMS-DELIVER 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 doesn't support to send message in PDU mode (AT+CMGF=0).

Example

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

```
OK
AT+QCMGS= "15056913384",120,1,2 <CR>        //Input 120 for <uid>,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
```

9.18. AT+QCMGR   Read Concatenated Messages

The function of AT+QCMGR is similar to AT+CMGR, except that the message to be read is a segment of concatenated messages, parameters: **<uid>,<msg_seg>** and **<msg_total>** would be show in the result. You should concatenate several segments to a whole concatenated message according to these three parameters. Similar to AT+QCMGS, and 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 text mode (**+CMGF=1**) and 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
	Else If error is 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 from 0 to 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 from 1 to 7
<msg_total>	The total number of the segments of one concatenated message. Range is from 2 to 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, **<uid>,<msg_seg>** and **<msg_total>** would not be showed in the result.

Example

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

ABCD

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

OK

10 Packet Domain Commands

10.1. AT+CGATT　Attachment or Detachment of PS

The AT+CGATT write command is used to attach the MT to, or detach the MT from the Packet Domain service. After the command has 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 error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	75s, determined by 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	

10.2. AT+CGDCONT   Define PDP Context

AT+CGDCONT 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 AT+CGDCONT 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** **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" Internet Protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6"
<APN>	Access point name, a string parameter that is a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested
<PDP_addr>	A string parameter identifies the MT in the address space applicable to the PDP. If the value is null of 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 +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 if value is omitted) 1 On (manufacturer preferred compression) 2 V.42bis 3 V.44
<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

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

AT+CGQREQ allows the TE to specify a quality of service profile that is used when the MT activates a PDP context.

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

AT+CGQREQ Quality of Service Profile (Requested)

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

Parameter

<cid>	A numeric parameter which specifies a particular PDP context definition (see **+CGDCONT** command)
<PDP_type>	Packet Data Protocol type "IP" Internet Protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6"
<precedence>	A numeric parameter which specifies the precedence class 0 Network subscribed value 1 High priority. Service commitments shall be maintained ahead of precedence classes 2 and 3

	2	Normal priority. Service commitments shall be maintained ahead of precedence class 3
	3	Low priority. Service commitments shall be maintained
<delay>		A numeric parameter which specifies the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network. For the detail please refer to Table 5: Delay Class
	0	Network subscribed value
<reliability>		A numeric parameter which specifies the reliability class
	0	Network subscribed value
	1	Non real-time traffic, error-sensitive application that cannot cope with data loss
	2	Non real-time traffic, error-sensitive application that can cope with infrequent data loss
	3	Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS
	4	Real-time traffic, error-sensitive application that can cope with data loss
	5	Real-time traffic, error non-sensitive application that can cope with data loss
<peak>		A numeric parameter which specifies the peak throughput class, in octets per second.
	0	Network subscribed value
	1	Up to 1 000 (8 kbit/s)
	2	Up to 2 000 (16 kbit/s)
	3	Up to 4 000 (32 kbit/s)
	4	Up to 8 000 (64 kbit/s)
	5	Up to 16 000 (128 kbit/s)
	6	Up to 32 000 (256 kbit/s)
	7	Up to 64 000 (512 kbit/s)
	8	Up to 128 000 (1024 kbit/s)
	9	Up to 256 000 (2048 kbit/s)
<mean>		A numeric parameter which specifies the mean throughput class, in octets per hour
	0	Network subscribed value
	1	100 (~0.22 bit/s)
	2	200 (~0.44 bit/s)
	3	500 (~1.11 bit/s)
	4	1 000 (~2.2 bit/s)
	5	2 000 (~4.4 bit/s)
	6	5 000 (~11.1 bit/s)
	7	10 000 (~22 bit/s)
	8	20 000 (~44 bit/s)
	9	50 000 (~111 bit/s)
	10	100 000 (~0.22 kbit/s)
	11	200 000 (~0.44 kbit/s)
	12	500 000(~1.11 kbit/s)
	13	1 000 000 (~2.2 kbit/s)
	14	2 000 000 (~4.4 kbit/s)

	15	5 000 000 (~11.1 kbit/s)
	16	10 000 000 (~22 kbit/s)
	17	20 000 000 (~44 kbit/s)
	18	50 000 000 (~111 kbit/s)
	31	Best effort

Table 5: Delay Class

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

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

AT+CGQMIN allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile when the PDP context is activated.   The write command specifies a profile for the context identified by the context identification parameter **<cid>**.

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

AT+CGQMIN Quality of Service Profile (Minimum Acceptable)	
Test Command **AT+CGQMIN=?**	Response **+CGQMIN: <PDP_type>**, (list of supported **<precedence>**s), (list of supported **<delay>**s),

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

Parameter

<cid>	A numeric parameter which specifies a particular PDP context definition (see **+CGDCONT** command)
<PDP_type>	Packet Data Protocol type "IP" Internet protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6"
<precedence>	A numeric parameter which specifies the precedence class <u>0</u> Network subscribed value 1 High priority. Service commitments shall be maintained ahead of precedence classes 2 and 3 2 Normal priority. Service commitments shall be maintained ahead of precedence class 3 3 Low priority. Service commitments shall be maintained
<delay>	A numeric parameter which specifies the delay class. This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network

	For the detail please refer Table 5: Delay Class	
	0	Network subscribed value
<reliability>	A numeric parameter which specifies the reliability class	
	0	Network subscribed value
	1	Non real-time traffic, error-sensitive application that cannot cope with data loss
	2	Non real-time traffic, error-sensitive application that can cope with infrequent data loss3
	3	Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS
	4	Real-time traffic, error-sensitive application that can cope with data loss
	5	Real-time traffic, error non-sensitive application that can cope with data loss
<peak>	A numeric parameter which specifies the peak throughput class, in octets per second	
	0	Network subscribed value
	1	Up to 1 000 (8 kbit/s)
	2	Up to 2 000 (16 kbit/s)
	3	Up to 4 000 (32 kbit/s)
	4	Up to 8 000 (64 kbit/s)
	5	Up to 16 000 (128 kbit/s)
	6	Up to 32 000 (256 kbit/s)
	7	Up to 64 000 (512 kbit/s)
	8	Up to 128 000 (1024 kbit/s)
	9	Up to 256 000 (2048 kbit/s)
<mean>	A numeric parameter which specifies the mean throughput class, in octets per hour	
	0	Network subscribed value
	1	100 (~0.22 bit/s)
	2	200 (~0.44 bit/s)
	3	500 (~1.11 bit/s)
	4	1 000 (~2.2 bit/s)
	5	2 000 (~4.4 bit/s)
	6	5 000 (~11.1 bit/s)
	7	10 000 (~22 bit/s)
	8	20 000 (~44 bit/s)
	9	50 000 (~111 bit/s)
	10	100 000 (~0.22 kbit/s)
	11	200 000 (~0.44 kbit/s)
	12	500 000(~1.11 kbit/s)
	13	1 000 000 (~2.2 kbit/s)
	14	2 000 000 (~4.4 kbit/s)
	15	5 000 000 (~11.1 kbit/s)
	16	10 000 000 (~22 kbit/s)

17	20 000 000 (~44 kbit/s)
18	50 000 000 (~111 kbit/s)
31	Best effort

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

AT+CGEQREQ allows the TE to specify a UMTS Quality of Service Profile that is used when the MT activates a PDP context. Details can be found in 3GPP TS 23.107 and all of parameters save in NV automatically.

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

	<Traffic handling priority>, <Source statistics descriptor>, <Signalling indication>] [...] **OK**
Write Command **AT+CGEQREQ=[<cid>[,<Traffic class>[,<Maximum bitrate UL>** **[,<Maximum bitrate DL>** **[,<Guaranteed bitrate UL>** **[,<Guaranteed bitrate DL>** **[,<Delivery order>** **[,<Maximum SDU size>** **[,<SDU error ratio>** **[,<Residual bit error ratio>** **[,<Delivery of erroneous SDUs>** **[,<Transfer delay>** **[,<Traffic handling priority>** **[,<Source statistics descriptor>** **[,<Signalling indication>]]]]]]]]]]]]]]]**	Response **OK** **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" Internet Protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6" The following parameters are defined in 3GPP TS 23.107
<Traffic class>	Integer type, indicates the type of application for which the UMTS bearer service is optimized (refer 3GPP TS 24.008 subclause 10.5.6.5). If the Traffic class is specified as conversational or streaming, then the Guaranteed and Maximum bitrate parameters should also be provided 0 Conversational

	1	Streaming
	2	Interactive
	3	Background
	<u>4</u>	Subscribed value
\<Maximum bitrate UL>	Integer type, indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bit rate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…,32, …)	
	<u>0</u>	Subscribed value
	1~5760	
\<Maximum bitrate DL>	Integer type, indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…,32, …)	
	<u>0</u>	Subscribed value
	1~21600	
\<Guaranteed bitrate UL>	Integer type, indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. T+CGEQREQ=…,32, …)	
	<u>0</u>	Subscribed value
	1~5760	
\<Guaranteed bitrate DL>	Integer type, indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…,32, …)	
	<u>0</u>	Subscribed value
	1~21600	
\<Delivery order>	Integer type, indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer 3GPP TS 24.008 subclause 10.5.6.5)	
	0	No
	1	Yes
	<u>2</u>	Subscribed value
\<Maximum SDU size>	Integer type, (1,2,3,…) indicates the maximum allowed SDU size in octets. If the parameter is set to '0' the subscribed value will be requested (refer 3GPP TS 24.008 subclause 10.5.6.5)	
	<u>0</u>	Subscribed value
	10...1520	(value needs to be divisible by 10 without remainder)
	1502	
\<SDU error ratio>	String type, indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of $5*10^{-3}$ would be specified as "5E3" (e.g.AT+CGEQREQ=…,"5E3",…)	
	<u>"0E0"</u>	Subscribed value
	"1E2"	
	"7E3"	

	"1E3"
	"1E4"
	"1E5"
	"1E6"
	"1E1"
<Residual bit error ratio>	String type, indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as "mEe". As an example a target residual bit error ratio of 5•10-3 would be specified as "5E3" (e.g. AT+CGEQREQ=…,"5E3",…)
	<u>"0E0"</u> Subscribed value
	"5E2"
	"1E2"
	"5E3"
	"4E3"
	"1E3"
	"1E4"
	"1E5"
	"1E6"
	"6E8"
<Delivery of erroneous SDUs>	Integer type, indicates whether SDUs detected as erroneous shall be delivered or not (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5)
	0 No
	1 Yes
	2 No detect
	<u>3</u> Subscribed value
<Transfer delay>	Integer type, (0,1,2,…) indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds. If the parameter is set to '0' the subscribed value will be requested (refer to 3GPP TS 24.008 subclause 10.5.6.5)
	<u>0</u> Subscribed value
	100~150 (value needs to be divisible by 10 without remainder)
	200~950 (value needs to be divisible by 50 without remainder)
	1000~4000 (value needs to be divisible by 100 without remainder)
<Traffic handling priority>	Integer type, (1,2,3,…) specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers. If the parameter is set to '0' the subscribed value will be requested (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5)
	<u>0</u> Subscribed
	1
	2
	3
<Source Statistics Descriptor>	Integer type, specifies characteristics of the source of the submitted SDUs for a PDP context

	0	Characteristics of SDUs is unknown
	1	Characteristics of SDUs corresponds to a speech source
<Signalling Indication>	Integer type, indicates signaling content of submitted SDUs for a PDP context	
	0	PDP context is not optimized for signaling
	1	PDP context is optimized for signaling **<PDP_type>**

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

AT+CGEQMIN allows the TE to specify a minimum acceptable profile, which is checked by the MT against the negotiated profile returned in the PDP context establishment and PDP context modification procedures. Details can be found in 3GPP TS 23.107 and all of parameters save in NV automatically.

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

	<Residual bit error ratio>, **<Delivery of erroneous SDUs>,** **<Transfer delay>,** **<Traffic handling priority>,** **<Source statistics descriptor>,** **<Signalling indication>]** **[…]** **OK**
Write Command **AT+CGEQMIN=[<cid>[,<Traffic class>** **[,<Maximum bitrate UL>** **[,<Maximum bitrate DL>** **[,<Guaranteed bitrate UL>** **[,<Guaranteed bitrate DL>** **[,<Delivery order>** **[,<Maximum SDU size>** **[,<SDU error ratio>** **[,<Residual bit error ratio>** **[,<Delivery of erroneous SDUs>** **[,<Transfer delay>** **[,<Traffic handling priority>** **[,<Source statistics descriptor>** **[,<Signalling indication>]]]]]]]]]]]]]]**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**
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" Internet Protocol (IETF STD 5) "PPP" "IPV6" "IPV4V6" The following parameters are defined in 3GPP TS 23.107
<Traffic class>	Integer type, indicates the type of application for which the UMTS bearer

	service is optimized (refer 3GPP TS 24.008 subclause 10.5.6.5). If the Traffic class is specified as conversational or streaming, then the Guaranteed and Maximum bitrate parameters should also be provided
	0 Conversational
	1 Streaming
	2 Interactive
	3 Background
	<u>4</u> Subscribed value
<Maximum bitrate UL>	Integer type, indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…,32, …)
	<u>0</u> Subscribed value
	1~5760
<Maximum bitrate DL>	Integer type, indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…,32, …)
	<u>0</u> Subscribed value
	1~21600
<Guaranteed bitrate UL>	Integer type, indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. T+CGEQREQ=…,32, …)
	<u>0</u> Subscribed value
	1~5760
<Guaranteed bitrate DL>	Integer type, indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=…,32, …)
	<u>0</u> Subscribed value
	1~21600
<Delivery order>	Integer type, indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer 3GPP TS 24.008 subclause 10.5.6.5)
	0 No
	1 Yes
	<u>2</u> Subscribed value
<Maximum SDU size>	Integer type, (1,2,3,…) indicates the maximum allowed SDU size in octets. If the parameter is set to '0' the subscribed value will be requested (refer 3GPP TS 24.008 subclause 10.5.6.5)
	<u>0</u> Subscribed value
	10...1520 (value needs to be divisible by 10 without remainder)
	1502
<SDU error ratio>	String type, indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of

$5*10^{-3}$ would be specified as "5E3" (e.g. AT+CGEQREQ=…,"5E3",…)

    <u>"0E0"</u>   Subscribed value

    "1E2"

    "7E3"

    "1E3"

    "1E4"

    "1E5"

    "1E6"

    "1E1"

<Residual bit error ratio> String type, indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as "mEe". As an example a target residual bit error ratio of 5•10-3 would be specified as "5E3" (e.g. AT+CGEQREQ=…,"5E3",…)

    <u>"0E0"</u>   Subscribed value

    "5E2"

    "1E2"

    "5E3"

    "4E3"

    "1E3"

    "1E4"

    "1E5"

    "1E6"

    "6E8"

<Delivery of erroneous SDUs> Integer type, indicates whether SDUs detected as erroneous shall be delivered or not (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5)

    0   No

    1   Yes

    2   No detect

    <u>3</u>   Subscribed value

<Transfer delay> Integer type, (0,1,2,…) indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds. If the parameter is set to '0' the subscribed value will be requested (refer to 3GPP TS 24.008 subclause 10.5.6.5)

    <u>0</u>   Subscribed value

    100~150   (value needs to be divisible by 10 without remainder)

    200~950   (value needs to be divisible by 50 without remainder)

    1000~4000   (value needs to be divisible by 100 without remainder)

<Traffic handling priority> Integer type, (1,2,3,…) specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers. If the parameter is set to '0' the subscribed value will be requested (refer to 3GPP TS 24.008 [8] subclause 10.5.6.5)

    <u>0</u>   Subscribed

    1

	2	
	3	
<Source Statistics Descriptor>	Integer type, specifies characteristics of the source of the submitted SDUs for a PDP context	
	0	Characteristics of SDUs is unknown
	1	Characteristics of SDUs corresponds to a speech source
<Signalling Indication>	Integer type, indicates signaling content of submitted SDUs for a PDP context.	
	0	PDP context is not optimized for signaling
	1	PDP context is optimized for signaling **<PDP_type>**

10.7. AT+CGACT   Activate or Deactivate PDP Context

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

AT+CGACT Activate or Deactivate PDP Context	
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 error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	150s, determined by 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 **+CGDCONT** command)	

Example

AT+CGDCONT=1,"IP","UNINET"	//Define PDP context
OK	
AT+CGACT=1,1	//Activated PDP
OK	
AT+CGACT=0,1	//Deactivated PDP
OK	

10.8. AT+CGDATA   Enter Data State

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

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

AT+CGDATA Enter Data State	
Test Command **AT+CGDATA=?**	Response **+CGDATA:** (list of supported **<L2P>**s) **OK**
Write Command **AT+CGDATA=<L2P>[,<cid>[,<cid>[,…]]]**	Response **CONNECT** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**

Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

10.9. AT+CGPADDR   Show PDP Address

The AT+CGPADDR 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** **ERROR** **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<cid>	A numeric parameter which specifies a particular PDP context definition (see **+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 **+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 **<cid>** **<PDP_ address>** is omitted if none is available

Example

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

OK
```

10.10. AT+CGCLASS   GPRS Mobile Station Class

AT+CGCLASS is used to set the MT to operate according to the specified mode of operation, see 3GPP TS 23.060.

AT+CGCLASS GPRS Mobile Station Class	
Test Command **AT+CGCLASS=?**	Response **+CGCLASS:** (list of supported **<class>**s) **OK**
Read Command **AT+CGCLASS?**	Response **+CGCLASS: <class>** **OK**
Write Command **AT+CGCLASS=<class>**	Response **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<class>		A string parameter which indicates the GPRS mobile class (Functionality in descending order)
	"A"	Class A

10.11. AT+CGREG   Network Registration Status

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

AT+CGREG Network Registration Status	
Test Command **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** **ERROR**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	<u>0</u>	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code **+CGREG:<stat>**
	2	Enable network registration and location information unsolicited result code **+CGREG: <stat>[,<lac>,<ci>[,<Act>]]**
<stat>	0	Not registered, MT is not currently searching an operator to register to .The UE is in GMM state GMM-NULL or GMM-DEREGISTERED-INITIATED. The GPRS service is disabled, the UE is allowed to attach for GPRS if requested by the user.
	1	Registered, home network .The UE is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED INITIATED on the home PLMN.

	2	Not registered, but MT is currently trying to attach or searching an operator to register to. The UE is in GMM state GMM-DEREGISTERED or GMM-REGISTERED-INITIATED. The GPRS service is enabled, but an allowable PLMN is currently not available. The UE will start a GPRS attach as soon as an allowable PLMN is available
	3	Registration denied. The UE is in GMM state GMM-NULL. The GPRS service is disabled, 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 to 195 in decimal)
<lac>		String type, two byte location area code in hexadecimal format
<ci>		String type, two byte cell ID in hexadecimal format
<Act>		Access technology selected
	0	GSM
	2	UTRAN

Example

AT+CGATT=0
OK

+CGREG: 2
AT+CGATT=1
OK

+CGREG: 1,"D504","080428B5",2

10.12. AT+CGEREP   Packet Domain Event Reporting

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

AT+CGEREP Packet Domain Event Reporting	
Test Command **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** **ERROR**
Execution Command **AT+CGEREP**	Response **OK**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

Example

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

OK
AT+CGEREP?
+CGEREP: 0,0

OK
```

10.13. AT+CGSMS   Select Service for MO SMS Messages

AT+CGSMS 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 error is 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
	<u>1</u> Circuit switch
	2 GPRS preferred (use circuit switched if GPRS not available)
	3 Circuit switch preferred (use GPRS if circuit switched not available)

NOTE

The circuit switched service route is the default method.

11 Supplementary Service Commands

11.1. AT+CCFC   Call Forwarding Number and Conditions Control

AT+CCFC 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 (0-2,4) If **<mode><>**2 and command successful **OK** If **<mode>**=2 and command successful (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 error is 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 sync
	32	Data circuit async
\<time>	1…30	When "no reply" (**\<reads>**=no reply) is enabled or queried, this gives the time in seconds to wait before call is forwarded, default value is 20
\<status>	0	Not active
	1	Active

Example

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

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

OK

11.2. AT+CCWA   Call Waiting Control

The AT+CCWA 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>**\<>2 and command successful **OK** If **\<mode>**=2 and command successful **+CCWA:\<status>,\<class1>[\<CR>\<LF>+CCWA:\<status>,\<class2>[...]]** **OK** If error is 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 sync
	32	Data circuit async
<status>	0	Disable
	1	Enable
<number>	Phone number in string type of calling address in format specified by <**type**>	
<type>	Type of address octet in integer format	
	129	Unknown type (IDSN format number)
	145	International number type (ISDN format)
<alpha>	Optional string type alphanumeric representation of **<number>** corresponding to the entry found in phone book	

NOTES

1. **<status>**=0 should be returned only if service is not active for any **<class>** i.e. +CCWA: 0, 7 will be returned in this case.
2. When **<mode>**=2, all active call waiting classes will be reported. In this mode the command is abortable 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

---

11.3. AT+CHLD   Call Related Supplementary Services

The AT+CHLD 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 3GPP TS 22.083 clause 2), MPTY (Multi Party; refer 3GPP TS 22.084) and ECT (Explicit Call Transfer; refer 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, Multi Party and Explicit Call Transfer are only applicable to teleservice 11.

AT+CHLD Call Related Supplementary Services	
Test Command **AT+CHLD=?**	Response **+CHLD:** (list of supported **\<n>**s) **OK**
Write Command **AT+CHLD[=\<n>]**	Response 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 error is 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). It can terminate active call if there is only one call

1X	Terminate the specific call number X
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 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	

11.4. AT+CLIP   Calling Line Identification Presentation

AT+CLIP 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 error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	15s, determined by network.
Reference 3GPP TS 27.007	

Parameter

<n>	0	Suppress unsolicited result codes
	1	Display unsolicited result codes
<m>	0	CLIP not provisioned
	1	CLIP provisioned
	2	Unknown
<number>	Phone number in string type of calling address in format specified by **<type>**	
<subaddr>	String type subaddress of format specified by **<satype>**	
<satype>	Type of subaddress octet in integer format (refer 3GPP TS 24.008 [8] subclause 10.5.4.8)	
<type>	Type of address octet in integer format;	
	129	Unknown type (IDSN format number)
	145	International number type (ISDN format)
<alpha>	String type alphanumeric representation of **<number>** corresponding to the entry	

<CLI validity>	0	found in phone book 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
```

11.5. AT+CLIR   Calling Line Identification Restriction

AT+CLIR 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	Response
AT+CLIR=\<n>	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 error is related to ME functionality: **+CME ERROR: \<err>**
Maximum Response Time	15s, determined by network.
Reference 3GPP TS 27.007	

Parameter

\<n>	Parameter sets the adjustment for outgoing calls	
	<u>0</u>	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

11.6. AT+COLP   Connected Line Identification Presentation

AT+COLP 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	Response
AT+COLP?	**+COLP: <n>,<m>**
	OK
Write Command	Response
AT+COLP[=<n>]	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 network.
Reference 3GPP TS 27.007	

Parameter

<n>	Parameter sets/shows the result code presentation status in the TA
	<u>0</u>　　　　　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
```

11.7. AT+CSSN   Supplementary Service Notifications

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

Parameter

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

<m>	Integer type (parameter sets/shows the **+CSSU** unsolicited result code presentation status to the TE)
	0 Disable
	1 Enable
<code1>	Integer type, it is manufacturer specific, which of these codes are supported
	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, which of these codes are supported
	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 other party
	10 Additional incoming call forwarded

NOTES

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

11.8. AT+CUSD   Unstructured Supplementary Service Data

AT+CUSD 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	Response

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

Parameter

<mode>	Integer type, sets/shows the result code presentation status to the TE
	<u>0</u> 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 Other local client has responded
	4 Operation not supported
	5 Network time out

12 Audio Commands

12.1. AT+CMUT   Mute Control

AT+CMUT is used to enable and disable the uplink voice muting during a voice call.

AT+CMUT Mute Control	
Test Command **AT+CMUT=?**	Response **+CMUT: (**list of supported**<on>**s**)** **OK**
Read Command **AT+CMUT?**	Response **+CMUT: <on>** **OK**
Write Command **AT+CMUT=<on>**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<on>   Numerical type.
          <u>0</u>   Uplink volume is normal during the call.
          1   Uplink volume is mute during the call.

NOTES
1.   This command is valid only during the call.
2.   After the call is over, it returns to default value.

12.2. AT+CALM   Mute the Ring Tone

AT+CALM is used to mute the ring tone, i.e., there is no ring tone when a call is coming.

AT+CALM Mute the Ring Tone	
Test Command **AT+CALM=?**	Response **+CALM: (**list of supported**<on>**s**)** **OK**
Read Command **AT+CALM?**	Response **+CALM: <on>** **OK**
Write Command **AT+CALM=<on>**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<on>	Numeric type.
	0 Ring tone is normal.
	1 Ring tone is mute.

NOTE

This parameter will not be saved.

12.3. AT+CRSL   Set Ring Tone Volume

AT+CRSL can be used to set the volume of ring tone.

AT+CRSL Set Ring Tone Volume	
Test Command **AT+CRSL=?**	Response **+CRSL: (**list of supported**<volume>**s**)** **OK**

Read Command **AT+CRSL?**	Response **+CRSL: <volume>** **OK**
Write Command **AT+CRSL=<volume>**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<volume>	Numeric type, indicates the configured volume of ring tone. Range: 0-7, default: 3

NOTE

This parameter will not be saved.

12.4. AT+CLVL   Loud Speaker Volume Level

AT+CLVL is used to select the volume of the internal loudspeaker of the MT.

AT+CLVL Loud Speaker Volume Level	
Test Command **AT+CLVL=?**	Response **+CLVL: (**list of supported**<volume>**s**)** **OK**
Read Command **AT+CLVL?**	Response **+CLVL: <volume>** **OK**
Write Command **AT+CLVL=<volume>**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<volume>	Numeric type, indicates the configured call volume. Range: 0-7, default: 3

NOTE

This parameter will not be saved.

12.5. AT+QAUDMOD   Set Audio Mode

AT+QAUDMOD is used to set the audio mode, including the default gain of uplink and downlink, echo cancellation mode and so on to suit for corresponding application scenarios.

AT+QAUDMOD Set Audio Mode	
Test Command **AT+QAUDMOD=?**	Response **+QAUDMOD: (0-8)** **OK**
Test Command **AT+QAUDMOD?**	Response **+QAUDMOD: <mode>** **OK**
Write Command **AT+QAUDMOD=<mode>**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<mode>	Numeric type, indicates the current configured audio mode.
	0 Handset mode.
	1 Headset mode.
	2 Hands free kit mode.
	3 Analog hands free kit mode.
	4 Loudspeaker mode.
	5 AUX PCM Handset mode.
	6 AUX PCM Headset mode.

| 7 | AUX PCM Loudspeaker mode. |
| 8 | Bluetooth headset mode. |

> **NOTE**
>
> This parameter will not be saved.

12.6. AT+QAUDPATH   Set the Audio Output Path

AT+QAUDPATH can be used to set the current audio output path, that is MIC&SPEAKER path or AUX PCM path.

AT+QAUDPATH Set Audio Output Path	
Test Command **AT+QAUDPATH=?**	Response **+QAUDPATH: (0-2)** **OK**
Read Command **AT+QAUDPATH?**	Response **+QAUDPATH: <path>** **OK**
Write Command **AT+QAUDPATH=<path>**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<path>	Numeric type, indicates the configured output path.	
	0	MIC1&SPEAKER1
	1	MIC2&SPEAKER2
	2	AUX PCM

> **NOTE**
>
> This parameter will not be saved.

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

AT+QSIDET is used to set the side tone gain value of the current mode.

AT+QSIDET Set the Side Tone Gain in Current Mode	
Test Command **AT+QSIDET=?**	Response **+QSIDET: (0-65535)** **OK**
Read Command **AT+QSIDET?**	Response **+QSIDET: <stgain>** **OK**
Write Command **AT+QSIDET=<stgain>**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<stgain>	Numeric type; indicates the configured side tone gain in current mode. Range: 0-65535. Default value might be different in different audio mode.

NOTE

This parameter will not be saved.

12.8. AT+QAUDLOOP   Enable Audio Loop Test

This command is used to enable audio loop test.

AT+QAUDLOOP Enable Audio Loop Test	
Test Command **AT+QAUDLOOP=?**	Response **+QAUDLOOP: (0,1),(0-2)** **OK**

Read Command AT+QAUDLOOP?	Response +QAUDLOOP: <enable>,<path> OK
Set Command AT+QAUDLOOP=<enable>[,<path>]	Response OK ERROR
Maximum Response Time	300ms

Parameter

<enable>   Numeric type, to enable or disable audio loop test.
            0   Disable audio loop test.
            1   Enable audio loop test.
<path>   Numeric type, indicates test path.
            0   MIC1&SPEAKER1
            1   MIC2&SPEAKER2
            2   AUX PCM

NOTE

This parameter will not be saved.

12.9. AT+QMIC   Set Uplink (MIC) Gains

This command is used to set MIC gains in order to change uplink volume.

AT+QMIC Set Uplink (MIC) Gains	
Test Command AT+QMIC=?	Response +QMIC: (1),(0-65535),(0-65535) OK
Read Command AT+QMIC?	Response +QMIC: <txgain1>,<txgain2>,<txdgain> OK
Set Command	Response

AT+QMIC=<txgain1>,<txgain2>[,<txd gain>]	OK ERROR

Parameter

<txgain1>	Numeric type, reserved, set to 1.
<txgain2>	Numeric type, indicates uplink codec gain, ranges: 0-65535. Default value might be different in different audio mode.
<txdgain>	Numeric type, indicates uplink digital gain, ranges: 0-65535. Default value might be different in different audio mode.

NOTE

1. This parameter will be saved to NV immediately by default
2. If you set AT+QAUDPATH=2, the **<txgain2>** is invalid on UC15 module.

12.10. AT+QRXGAIN   Set Downlink Gains

This command is used to set RX gains which aim to change downlink volume.

AT+QRXAGIN Set Downlink Gains	
Test Command **AT+QRXGAIN=?**	Response **+QRXGAIN: (0),(0-65535),(0-65535)** **OK**
Read Command **AT+QRXGAIN?**	Response **+QRXGAIN: <rxgain1>,<rxgain2>,<rxdgain>** **OK**
Write Command **AT+QRXGAIN=<rxgain1>,<rxgain2>[,<rxdgain>]**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<rxgain1>	Numeric type, reserved, set to 0
<rxgain2>	Numeric type, indicates downlink codec gain, range: 0-65535. Default value might be different in different audio modes
<rxdgain>	Numeric type, indicates downlink digital gain, range: 0-65535. Default value might be different in different audio modes

---

NOTE

1. This parameter will be saved to NV immediately by default.
2. If you set AT+QAUDPATH=2, the **<rxgain2>** is invalid by UC15.

12.11. AT+QTONEDET   Enable/Disable DTMF Detection

This command is used to enable or disable DTMF detection. When you enable this function, DTMF tones sent by other side will be detected, and report ASCII code on the serial port which you assigned.

AT+QTONEDET Enable/Disable DTMF Detection	
Test Command **AT+QTONEDET=?**	Response **+QTONEDET: (0,1)** **OK**
Read Command **AT+QTONEDET?**	Response **+QTONEDET: <enable>** **OK**
Write Command **AT+QTONEDET=<enable>**	Response **OK** **ERROR**
Maximum Response Time	300ms
Reference	

Parameter

<enable>	Enable/disable DTMF detected.	
	<u>0</u>	Disable
	1	Enable

NOTES

1. Settings will take effect immediately, but when you reset the module, settings will revert to the default values.
2. DTMF characters – ASCII table:

DTMF	ASCII	DTMF	ASCII
0	48	8	56
1	49	9	57
2	50	A	65
3	51	B	66
4	52	C	67
5	53	D	68
6	54	*	42
7	55	#	35

12.12. AT+QWDTMF   Play/Send DTMF Tone (s)

This command is used to play or send DTMF tone(s).

AT+QWDTMF Play/Send DTMF Tone (s)	
Test Command **AT+QWDTMF=?**	Response **+QWDTMF:** **(0-7),(0-7),("<DTMF_code>,<continuance_time>,<mute_time>[,...]")** **OK**
Set Command **AT+QWDTMF=<ulvolume>,<dlvolume>,("<DTMF_code>,<continuance_time>,<mute_time>[,...]")**	Response **OK** **ERROR** After playing completely, report: **+QWDTMF: 5**
Maximum Response Time	300ms

Parameter

<ulvolume>	Numeric type, up-link volume, range: 0-7.
<dlvolume>	Numeric type, down-link volume, range: 0-7.
<DTMF_code>	String type

	0	DTMF 0
	1	DTMF 1
	2	DTMF 2
	3	DTMF 3
	4	DTMF 4
	5	DTMF 5
	6	DTMF 6
	7	DTMF 7
	8	DTMF 8
	9	DTMF 9
	A	DTMF A
	B	DTMF B
	C	DTMF C
	D	DTMF D
	*	DTMF *
	#	DTMF #
<continuance_time>		Numeric type, indicates duration of each DTMF tone. Unit: ms.
<mute_time>		Numeric type, indicates mute time. Unit: ms.

NOTES

This parameter will not be saved.

12.13. AT+QDAI   Configure Digital Audio Interface

AT+QDAI is used to configure the digital audio interface. While **<io>**=1, you can define the PCM mode (master/slave mode) by yourself; while **<io>**=2, and the external codec chip linked with PCM interface is the NAU8814 model through the I2C, the module can be used directly and set by the default configurations; while **<io>**=3, and the external codec chip linked with PCM interface is the ALC5616 model through the I2C, the module can be used directly and set by the default configurations.

AT+QDAI Configure Digital Audio Interface	
Test Command **AT+QDAI=?**	Response **+QDAI: (1-3),(0,1),(0,1),(0-5),(0-2)** **OK**
Read Command **AT+QDAI?**	Response **+QDAI: <io>[,<mode>,<fsync>,<clock>,<format>]** **OK**

Write Command **AT+QDAI=<io>[,<mode>,<fsync>,<clock>[,<format>]]**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<io>	<u>1</u>	Digital PCM output (customer defined)
	2	Analog output (for our default audio codec NAU8814)
	3	Analog output (for our default audio codec ALC5616)
<mode>	<u>0</u>	Master mode
	1	Slave mode
<fsync>	<u>0</u>	Primary mode (short-sync)
	1	Auxiliary mode (long-sync)
<clock>	0	128K
	1	256K
	2	512K
	3	1024K
	<u>4</u>	2048K
	5	4096K
<format>	<u>0</u>	16-bit linear
	1	8-bit a-law
	2	8-bit u-law

NOTES

1. Configuration of **<io>** will be saved to NV immediately by default.
2. Support master& slave mode under short sync signal, master mode under long sync signal by now.
3. When you select short-sync& master mode, support 256K-4096K clock frequency. And if you select long-sync& master mode, only support 128K clock frequency.
4. When you select slave mode, you must provide master& sync clock to module.
5. When you select NAU8814 or ALC5616, please do not input other parameters, the PCM interface will be set by the default configurations.
6. UC15 module does not support ALC5616 codec. If you set AT+QDAI=3, it will return ERROR.

12.14. AT+QPCMV   Enable to Transfer PCM Data through Port

This command is used to transfer PCM data through USB/UART port. When you dial a call, the sound from the opposite side will be decoded as PCM data and output from PCM port. When you input PCM

data to the port, the data will be transmitted to the opposite side through the network. Once the call is over, the port will stop outputting, and the input data will be invalid. PCM data format is 8K, 16bit linear.

AT+QPCMV Enable to Transfer PCM Data through Port	
Test Command **AT+QPCMV=?**	Response **+QPCMV: (0,1),(0)** **OK**
Read Command **AT+QPCMV?**	Response **+QPCMV: <enable>,<port>** **OK**
Write Command **AT+QPCMV=<enable>[,<port>]**	Response **OK** **ERROR**
Maximum Response Time	300ms
Reference	

Parameter

<enable>	If this function is enabled when you dial a call, the sound from the opposite side will be output from PCM port. When you input PCM data to the port, the data will be transmitted to the opposite side. 0 Disable 1 Enable
<port>	PCM port 0 USB reserved port

NOTE

All the settings will take effect immediately. When you reset the module, settings will revert to the default values.

12.15. AT+QLDTMF   Play Local DTMF

AT+QLDTMF is used to play a DTMF string, maximum length is 20 characters. You can use AT+QLDTMF to stop playing.

AT+QLDTMF   Play Local DTMF

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

Parameter

<n>	Numeric type, indicates every DTMF play time and mute time. Range: 0-1000, unit is 1/100 second when **<y>** is set to 1; or 1/10 second when **<y>** is not set.
<DTMF_string>	String type, max 20 DTMFs, separated by comma. DTMFs: 0-9, #, *, A-G.
<err>	901 Audio unknown error
	902 Audio invalid parameters
	903 Audio operation not supported
	904 Audio device busy

12.16. AT+QLTONE   Play a Local Customized Tone

AT+QLTONE is used to play a customized tone, use **<period_on>** to indicate play time, **<period_off>** to indicate mute time and **<duration>** to indicate total time.

AT+QLTONE   Play a Local Customized Tone

Test Command **AT+QLTONE=?**	Response **+QLTONE: (0,1),(100-4000),(0-1000),(0-1000),(0-15300000)** **OK**
Write Command **AT+QLTONE=<mode>[,<frequency>,**	Response **OK**

<period_on>,<period_off>,<duration>]	After playing completely, report: **+QLTONE: 0**
	If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<mode>	0	Stop playing
	1	Start playing
<frequency>	Tone frequency, unit: Hz, range: 100-4000Hz	
<period_on>	Play time of tone, unit: ms, range: 0-1000ms	
<period_off>	Mute time of tone, unit: ms, range: 0-1000ms	
<duration>	Total time of tone, unit ms, range: 0-15300000ms	
<err>	901	Audio unknown error
	902	Audio invalid parameters
	903	Audio operation not supported
	904	Audio device busy

12.17. AT+VTS   DTMF and Tone Generation

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

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

Parameter

<DTMF_string>	ASCII characters including 0-9, #, *, A, B, C, D. The string should be enclosed in quotation marks ("...")
	When sending multiple tones at a time, the time **<interval>** of two tones can be specified by +VTD. The maximal length of the string is 31
<duration>	The duration of each tone in 1/10 seconds with tolerance. Value ranges from 0 to 255 and default is 0. If the duration is less than the minimum time specified by the network, the actual duration will be network specified time. If this parameter is omitted, **<duration>**is specified by **+VTD**

12.18. AT+QRCH   Set the Ring Output Path

AT+QRCH can be used to set the ring output path, that is SPEAKER1, SPEAKER2 or AUX PCM.

AT+QRCH Set Ring Output Path	
Test Command **AT+QRCH=?**	Response **+QRCH: (0-2)** **OK**
Read Command **AT+QRCH?**	Response **+QRCH: <path>** **OK**
Write Command **AT+QRCH=<path>**	Response **OK** **ERROR**
Maximum Response Time	300ms

Parameter

<path>	Numeric type, indicates the configured output path
	0 SPEAKER1
	1 SPEAKER2
	2 AUX PCM

NOTE

Configuration will be not saved.

12.19. AT+VTD   Set Tone Duration

AT+VTD is used to set the duration of DTMF tones. This command can also set time interval of two tones when sending multiple tones at a time.

AT+VTD Set Tone Duration	
Test Command **AT+VTD=?**	Response **+VTS: (0-255),(0-255)** **OK**
Read Command **AT+VTD?**	Response **+VTD: <duration>,<interval>** **OK**
Write Command **AT+VTD=<duration>[,<interval>]**	Response **OK** **ERROR** If error is related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<duration>	The duration of each tone in 1/10 seconds with tolerance. Value ranges from 0 to 255 and default is 3. If the duration is less than the minimum time specified by the network, the actual duration will be network specified time.
<interval>	The time interval of two tones when sending multiple tones at a time by **+VTS**. Value ranges from 0 to 255 and default is 0.

NOTE

Configuration will be not saved.

Example

AT+CMUT=1	//The uplink volume will be 0 when the command is used during the call.
OK	
AT+CMUT=1	//If there is no call, it will return ERROR when using commands.

ERROR
AT+CALM=1   //Mute the ring tone.
OK
RING   //A call is coming, but no ring tone.
AT+CRSL=1   //Set the ring tone volume as 1.
OK
AT+CLVL=4   //Set the downlink volume as 4.
OK
AT+QAUDMOD=4   //Set the current audio mode as loudspeaker mode.
OK
AT+QAUDPATH=1   //Set the MIC2&SPEAKER2 as current input path and output path.
OK
AT+QSIDET=1234   //During a call, set the current side tone gain as 1234.
OK
AT+QAUDLOOP=1   //Enable audio loop test.
OK
AT+QMIC=1,4000,4000   //Set uplink path codec gain&digital gain to 4000.
OK
AT+CLVL=5   //Set speaker volume to 5
OK
AT+QRXGAIN=0,4000   //Set downlink path codec gain to 4000
OK
AT+QTONEDET=1   //Enable DTMF detection.
OK

//When the opposite side sends a DTMF 0; module will detect the tone, and it will report in the format of ASCII code.

+QTONEDET: 48
AT+QWDTMF=5,5,"0,100,100,1,200,200,2,300,300"
OK

//When playing completed, report complete URC.

+QWDTMF: 5

AT+QDAI=?   //Query the range.
+QDAI: (1-3),(0,1),(0,1),(0-5),(0-2)

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

OK
AT+QDAI=1,1,0,4,1   //Set AUX PCM interface to slave short-sync mode, PCM format is
                          8-bit a-law.

OK

AT+QDAI=2   //Select NUA8814.

OK

AT+QDAI=3   //Select ALC5616.

OK

AT+QPCMV=1,0   //Enable USB audio and use reserved port to transfer PCM data.

OK

//Some PCM data will be output from reserved port during a call.

AT+QPCMV=0   //Disable USB audio.

OK

AT+QLDTMF=?   //Query the range.

+QLDTMF: (1-1000),(0-9,*,#,A-G)

OK

AT+QLDTMF=2,"A,B,1,2,#"   //Play A,B,1,2,#, paly time and mute time is 200ms.

OK

AT+QLDTMF   //Stop playing.

OK

AT+QLTONE=?   //Query the range.

+QLTONE: (0,1),(100-4000),(0-1000),(0-1000),(0-15300000)

OK

AT+QLTONE=1,1000,200,300,3000 //Play a 1000Hz tone, play time is 200ms, mute time is 300ms and total time is 3000ms.

OK

AT+QLTONE=0   //Stop playing.

OK

ATD12345678900;   //Dial.

OK

<Call connected>

AT+VTS="1"   //The remote can listen DTMF tone.

OK

AT+VTS="1234567890A"   //Send multiple tones at a time.

OK

13 Hardware Related Commands

13.1. AT+QPOWD   Power Off

The command AT+QPOWD is used to shut down the module. The UE will return OK immediately when the command is executed. Then the UE deactivates the network. After it is completed, the UE outputs the message "POWERED DOWN" and sets the STATE pin as low to enter into the shutdown state. The maximum time for network log-off is 60 seconds. In order to avoid data loss, it is only allowed to turn off the UE power after the module's STATE pin is set as low and the URC "POWERED DOWN" is outputted. If "POWERED DOWN" has not been received after 65s, you should force to switch off the VBAT.

AT+QPOWD Power Off	
Execute Command **AT+QPOWD**	Response **OK**
Maximum Response Time	300ms

13.2. AT+CCLK   Clock

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

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 error is 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", indicates year (two last digits),month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range: -48...+56). E.g. May 6th, 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"

Example

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

13.3. AT+CBC   Battery Charge

AT+CBC returns battery connection 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 error is related to ME functionality: **+CME ERROR: \<err\>**
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

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

13.4. AT+QADC   Read ADC

This command is used to read the voltage of the ADC channel.

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

Parameter

<port>	Channel number of the ADC	
	0	ADC Channel 0
	1	ADC Channel 1
<status>	0	Fail
	1	Success
<value>	The voltage of the ADC port (mV)	

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

AT+QSCLK command is used to control whether the module enters into sleep mode or not. When AT+QSCLK is enabled and DTR is pulled up, the module can directly enter sleep mode. If AT+QSCLK is enabled and DTR is pulled down, you need to pull up the DTR pin first, then module can enter into sleep mode. The module will be waked up by some temporarily network interaction message (such as regularly listening to paging messages from the base station).

AT+QSCLK Configure Whether or Not to Enter into 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

Parameter

<n>	0	Disable slow clock
	1	Enable slow clock, it is controlled by DTR

14 Appendix

14.1. Reference

Table 6: 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 7: Terms and Abbreviations

Abbreviation	Description
AMR	Adaptive Multi-Rate
ME	Mobile Equipment
TA	Terminal Adapter
MS	Mobile Station
DCE	Data Communication Equipment
TE	Terminal Equipment
DTE	Data Terminal Equipment
RTS/CTS	Request To Send/Clear To Send

GPRS	General Packet Radio Service
DCD	Dynamic Content Delivery
DTR	Data Terminal Ready
CSD	Circuit Switch Data
PSC	Primary Synchronization Code
PDP	Packet Data Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
ECT	Explicit Call Transfer supplementary service

14.2. Factory Default Settings Restorable with AT&F

Table 8: Factory Default Settings Restorable with AT&F

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATS0	<n>	000
ATS3	<n>	013
ATS4	<n>	010
ATS5	<n>	008
ATS6	<n>	002
ATS7	<n>	000
ATS8	<n>	002
ATS10	<n>	015
ATV	<value>	1

Command	Parameters	Default
ATX	<value>	4
AT&C	<value>	1
AT&D	<value>	1
AT+ICF	<format>,<parity>	3,3
AT+IFC	<dce_by_dte>,<dte_by_dce>	0,0
AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+CBST	<speed>,<name>,<ce>	0,0,1
AT+CMEE	<n>	1
AT+CSCS	<chset>	"GSM"
AT+CSTA	<type>	129
AT+CR	<mode>	0
AT+CRC	<mode>	0
AT+CSMS	<service>	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+CLVL	\<level\>	2
AT+CMUT	\<n\>	0
AT+QAUDMOD	\<mode\>	0

14.3. AT Command Setting Storable with AT&W

Table 9: AT Command Settings Storable with AT&W

AT Command	Parameters	Display with AT&V
ATE	\<value\>	Yes
ATQ	\<n\>	Yes
ATS0	\<n\>	Yes
ATS7	\<n\>	Yes
ATS10	\<n\>	Yes
ATV	\<value\>	Yes
ATX	\<value\>	Yes
AT&C	\<value\>	Yes
AT&D	\<value\>	Yes
AT+IFC	\<dce_by_dte\>,\<dte_by_dce\>	No
AT+IPR	\<rate\>	No
AT+CREG	\<n\>	No
AT+CGREG	\<n\>	No
AT+QSIMDET	\<enable\>,\<insert_level\>	No
AT+QSIMSTAT	\<enable\>	No

14.4. AT Command Settings Storable with ATZ

Table 10: AT Command Settings Storable with ATZ

AT Command	Parameters	Factory Defaults
ATE	<value>	1
ATQ	<n>	0
ATS0	<n>	000
ATS7	<n>	000
ATS10	<n>	015
ATV	<value>	1
ATX	<value>	4
AT&C	<value>	1
AT&D	<value>	1
AT+IFC	<dce_by_dte>,<dte_by_dce>	0,0
AT+CREG	<n>	0
AT+CGREG	<n>	0

14.5. Summary of CME ERROR Codes

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

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

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

Code of <err>	Meaning
0	Phone failure
1	No connection to phone
2	Phone-adaptor link reserved
3	Operation not allowed
4	Operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	Incorrect password
17	SIM PIN2 required
18	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

14.6. Summary of CMS ERROR Codes

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

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

Table 12: Different Coding Schemes of +CMS ERROR: <err>

Code of <err>	Meaning
300	ME failure
301	SMS ME reserved
302	Operation not allowed

303	Operation not supported
304	Invalid PDU mode
305	Invalid text mode
310	SIM not inserted
311	SIM pin necessary
312	PH SIM pin necessary
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	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	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

14.7. Summary of URC

Table 13: Summary of URC

Type	Index	URC Display	Meaning	Condition
	1	N/A	Main switch of all URCs. Default is on	AT+QINDCFG="all",1
Power on/off	2	RDY	ME initialization is successful	N/A
	3	+CFUN: 1	All function of the ME is available	N/A
	4	+CPIN: <state>	SIM card pin state	N/A
	5	+QUSIM: 0	Use SIM card	N/A
	6	+QUSIM: 1	Use USIM card	N/A
	7	+QIND: SMS DONE	SMS initialization finished	N/A
	8	+QIND: PB DONE	Phonebook initialization finished	N/A
	9	POWERED DOWN	Module power down	AT+QPOWD
Network	10	+QIND: "csq",<rssi>,<ber>	Indication of signal strength and channel bit error rate change	AT+QINDCFG="csq",1
	11	+CREG: <stat>	Indicate registration status of the ME	AT+CREG=1
	12	+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
	13	+CGREG: <stat>	Indicate network registration status of the ME	AT+CGREG=1
	14	+CGREG: <stat>[,<lac>,<ci>[,<Act>]]	Indicate network registration and location information of the ME	AT+CGREG=2

	15	+CTZV: \<tz\>	Time zone reporting	AT+CTZR=1
	16	+CTZE: \<tz\>,\<dst\>,\<time\>	Extended time zone reporting	AT+CTZR=2
SMS	17	+CMTI: \<mem\>,\<index\>	New message is received, and saved to memory	See AT+CNMI
	18	+CMT: [\<alpha\>],\<length\>\<CR\>\<LF\>\<pdu\>	New short message is received and output directly to TE (PDU mode)	See AT+CNMI
	19	+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
	20	+CBM: \<length\>\<CR\>	New CBM is received and output directly (PDU mode)	See AT+CNMI
	21	+CBM: \<sn\>,\<mid\>,\<dcs\>,\<page\>,\<pages\>,\<CR\>,\<LF\>\<data\>	New CBM is received and output directly to TE (Text mode)	See AT+CNMI
	22	+CDS:\<length\>\<CR\>\<LF\>\<pdu\>	New CDS is received and output directly (PDU mode)	See AT+CNMI
	23	+CDS:\<fo\>,\<mr\>,[\<ra\>],[\<tora\>],\<scts\>,\<dt\>,\<st\>	New CDS is received and output directly to TE (Text mode)	See AT+CNMI
	24	+QIND: "smsfull",\<storage\>	SMS storage full indication	AT+QINDCFG="smsfull",1
	25	+CMTI,+CMT,+CDS,+CBM	Incoming message indication	AT+QINDCFG="smsincoming",1
Call	26	RING	"RING" indication	AT+QINDCFG="ring",1
	27	+COLP: \<number\>,\<type\>,[\<subaddr\>],[\<satype\>],[\<alpha\>]	The presentation of the COL (connected line) at the TE for a mobile originated call	AT+COLP=1
	28	+CLIP: \<number\>,\<type\>,[subaddr],[satype],[\<alpha\>],\<CLI validity\>	Mobile terminating call indication	AT+CLIP=1
	29	+CRING: \<type\>	An incoming call is indicated to the TE with unsolicited result code instead of the normal RING	AT+CRC=1

	30	+CCWA: <number>,<type>,<class>[,<alpha>]	Call waiting indication	AT+CCWA=1,1
	31	+CSSI: <code1>	Show the +CSSI intermediate result code presentation status to the TE	AT+CSSN=1
	32	+CSSU: <code2>	Show the +CSSU unsolicited result code presentation status to the TE	AT+CSSN=<n>,1
	33	+CUSD: <status>[,<rspstr>,[<dcs>]]	USSD response from the network, or a network initiated operation	AT+CUSD=1
	34	+QIND: "ccinfo",<idx>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>,[<alpha>]]	Indication of voice call state change	AT+QINDCFG="ccinfo",1
	35	+QIND: "temp",-2	Indicate the lowest temperature	AT+QCFG="temp",-2,<tempvalue>,1
	36	+QIND: "temp",-1	Indicate low temperature warning	AT+QCFG="temp",-1,<tempvalue>,1
	37	+QIND: "temp",1	Indicate high temperature warning	AT+QCFG="temp",1,<tempvalue>,1
	38	+QIND: "temp",2	Indicate the highest temperature	AT+QCFG="temp",2,<tempvalue>,1
	39	+QIND: "temp",0	The temperature comes back to normal temperature range	N/A
Hardware	40	+QIND: "vbatt",-2	Indicate the lowest voltage	AT+QCFG="vbatt",-2,<vbattvalue>,1
	41	+QIND: "vbatt",-1	Indicate low voltage warning	AT+QCFG="vbatt",-1,<vbattvalue>,1
	42	+QIND: "vbatt",1	Indicate high voltage warning	AT+QCFG="vbatt",1,<vbattvalue>,1
	43	+QIND: "vbatt",2	Indicate the highest voltage	AT+QCFG="vbatt",2,<vbattvalue>,1
	44	+QIND: "vbatt",0	The voltage comes back to normal voltage range	N/A
	45	+CGEV: REJECT <PDP_type>, <PDP_addr>	A network requests for PDP activation, and was automatically rejected.	AT+CGEREP=2,1
	46	+CGEV: NW REACT	The network requests PDP reactivation	AT+CGEREP=2,1

	<PDP_type>, <PDP_addr>, [<cid>]		
47	+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]	The network has forced a context deactivation	AT+CGEREP=2,1
48	+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]	The ME has forced a context deactivation.	AT+CGEREP=2,1
49	+CGEV: NW DETACH	The network has forced a Packet Domain detach.	AT+CGEREP=2,1
50	+CGEV: ME DETACH	The mobile equipment has forced a Packet Domain detach.	AT+CGEREP=2,1
51	+CGEV: NW CLASS <class>	The network has forced a change of MS class.	AT+CGEREP=2,1
52	+CGEV: ME CLASS <class>	The mobile equipment has forced a change of MS class.	AT+CGEREP=2,1

14.8. SMS Character Sets Conversions

3GPP TS 23.038 DCS (Data Coding Scheme) defined three kinds of character sets, 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. Because the low 8 bit of UCS2 character is same as the IRA character, so the conversion table of DCS=GSM 7 bit and **AT+CSCS="UCS2"** is similar to **AT+CSCS="IRA"**. The difference lies in the way of SMS text input or output, please refer to Table 14.

Table 14: The Way of SMS Text Input or Output

DCS	AT+CSCS	The Way of SMS Text Input or Output
GSM 7 bit	GSM	Input or output GSM character sets.
GSM 7 bit	IRA	Input or output IRA character sets. 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 15: 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 16: 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 17: GSM Extended Characters

	0	1	2	3	4	5	6	7
0					1B40			
1								
2								
3								
4		1B14						

5						
6						
7						
8		1B28				
9		1B29				
A						
B						
C			1B3C			
D			1B3D			
E			1B3E			
F		1B2F				

Table 18: The Input Conversions Table (DCS=GSM 7 bit and AT+CSCS="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 19: 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 20: 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 21: GSM Extended Characters

	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	

14.9. Release Cause Text List of AT+CEER

Table 22: Release Cause Text List of AT+CEER

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

No response received from network

GPS call ended for user call

SMS call ended for user call

Data call ended for emergency call

Rejected during redirect or handoff

Lower-layer ended call

Call origination request failed

Client rejected incoming call

Client rejected setup indication

Network ended call

No funds available

No service available

Full service not available

Maximum packet calls exceeded

Video connection lost

Video protocol closed after setup

Video protocol setup failure

Internal error

CS Network Cause

Unassigned/unalloacted number

No route to destination

Channel unacceptable

Operator determined barring

Normal call clearing

User busy

No user responding

User alerting, no answer

Call rejected

Number changed

Non selected user clearing

Destination out of order

Invalid/incomplete number

Facility rejected

Response to status enquiry

Normal, unspecified

No circuit/channel available

Network out of order

Temporary failure

Switching equipment congestion

Access information discarded

Requested circuit/channel not available

Resources unavailable, unspecified

Quality of service unavailable

Requested facility not subscribed

Incoming calls barred within the CUG

Bearer capability not authorized

Bearer capability not available

Service/option not available

Bearer service not implemented

ACM >= ACM max

Requested facility not implemented

Only RDI bearer is available

Service/option not implemented
Invalid transaction identifier value
User not member of CUG
Incompatible destination
Invalid transit network selection
Semantically incorrect message
Invalid mandatory information
Message non-existent/not implemented
Message type not compatible with state
IE non-existent/not implemented
Conditional IE error
Message not compatible with state
Recovery on timer expiry
Protocol error, unspecified
Interworking, unspecified
CS Network Reject
IMSI unknown in HLR
Illegal MS
IMSI unknown in VLR
IMEI not accepted
Illegal ME
GPRS services not allowed
GPRS and non GPRS services not allowed
MS identity cannot be derived
Implicitly detached
PLMN not allowed

Location area not allowed
Roaming not allowed
GPRS services not allowed in PLMN
No suitable cells in location area
MSC temporary not reachable
Network failure
MAC failure
Synch failure
Congestion
GSM authentication unacceptable
Service option not supported
Requested service option not subscribed
Service option temporary out of order
Call cannot be identified
No PDP context activated
Semantically incorrect message
Invalid mandatory information
Message type non-existent
Message type not compatible with state
Information element non-existent
Message not compatible with state
RR release indication
RR random access failure
RRC release indication
RRC close session indication
RRC open session failure

Low level failure	
Low level failure, no redial allowed	
Invalid SIM	
No service	
Timer T3230 expired	
No cell available	
Wrong state	
Access class blocked	
Abort message received	
Other cause	
Timer T303 expired	
No resources	
Release pending	
Invalid user data	
PS Internal Cause	
Invalid connection identifier	
Invalid NSAPI	
Invalid primary NSAPI	
PDP establish timeout	
Invalid field	
SNDCP failure	
RAB setup failure	
No GPRS context	
PDP activate timeout	
PDP modify timeout	
PDP inactive max timeout	

PDP lower layer error
PDP duplicate
Access technology change
PDP unknown reason
CS PS Network Cause
LLC or SNDCP failure
Insufficient resources
Missing or unknown APN
Unknown PDP address or PDP type
User authentication failed
Activation rejected by GGSN
Activation rejected, unspecified
Service option not supported
Requested service option not subscribed
Service option temporary out of order
NSAPI already used (not sent)
Regular deactivation
QoS not accepted
Network failure
Reactivation required
Feature not supported
Semantic error in the TFT operation
Syntactical error in the TFT operation
Unknown PDP context
PDP context without TFT already activated
Semantic errors in packet filter

Syntactical errors in packet filter
Invalid transaction identifier
Semantically incorrect message
Invalid mandatory information
Message non-existent/not implemented
Message type not compatible with state
IE non-existent/not implemented
Conditional IE error
Message not compatible with state
Protocol error, unspecified