

EC20

AT Commands Manual

LTE Module Series

Rev. EC20_AT_Commands_Manual_V1.1

Date: 2015-07-14



Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

Quectel Wireless Solutions Co., Ltd.

Office 501, Building 13, No.99, Tianzhou Road, Shanghai, China, 200233

Tel: +86 21 5108 6236

Mail: info@quectel.com

Or our local office, for more information, please visit:

<http://www.quectel.com/support/salesupport.aspx>

For technical support, to report documentation errors, please visit:

<http://www.quectel.com/support/techsupport.aspx>

Or Email: Support@quectel.com

GENERAL NOTES

QUECTEL OFFERS THIS INFORMATION AS A SERVICE TO ITS CUSTOMERS. THE INFORMATION PROVIDED IS BASED UPON CUSTOMERS' REQUIREMENTS. QUECTEL MAKES EVERY EFFORT TO ENSURE THE QUALITY OF THE INFORMATION IT MAKES AVAILABLE. QUECTEL DOES NOT MAKE ANY WARRANTY AS TO THE INFORMATION CONTAINED HEREIN, AND DOES NOT ACCEPT ANY LIABILITY FOR ANY INJURY, LOSS OR DAMAGE OF ANY KIND INCURRED BY USE OF OR RELIANCE UPON THE INFORMATION. ALL INFORMATION SUPPLIED HEREIN IS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

COPYRIGHT

THIS INFORMATION CONTAINED HERE IS PROPRIETARY TECHNICAL INFORMATION OF QUECTEL CO., LTD. TRANSMITTABLE, REPRODUCTION, DISSEMINATION AND EDITING OF THIS DOCUMENT AS WELL AS UTILIZATION OF THIS CONTENTS ARE FORBIDDEN WITHOUT PERMISSION. OFFENDERS WILL BE HELD LIABLE FOR PAYMENT OF DAMAGES. ALL RIGHTS ARE RESERVED IN THE EVENT OF A PATENT GRANT OR REGISTRATION OF A UTILITY MODEL OR DESIGN.

Copyright © Quectel Wireless Solutions Co., Ltd. 2015. All rights reserved.

About the Document

History

Revision	Date	Author	Description
1.0	2015-02-13	Francis TANG	Initial
1.1	2015-07-14	Rex ZHANG/ Francis TANG	1. Added summary of UART 2. Added AT Commands: AT+IPR/+QCCID 3. Modified the description of AT commands: AT+QCFG="nwscanmode"/+QCFG="nwscanseq"/ +QCFG="band"/+CSQ/+QURCCFG

Contents

About the Document.....	2
Contents	3
Table Index.....	7
1 Introduction	8
1.1. Scope of the Document	8
1.2. AT Command Syntax	8
1.3. Supported Character Sets	9
1.4. AT Command Interface	9
1.5. Unsolicited Result Code	9
1.6. Turn off Procedure	10
2 General Commands	11
2.1. ATI Display Product Identification Information	11
2.2. AT+GMI Request Manufacturer Identification	12
2.3. AT+GMM Request TA Model Identification	12
2.4. AT+GMR Request TA Revision Identification of Software Release	13
2.5. AT+CGMI Request Manufacturer Identification	13
2.6. AT+CGMM Request Model Identification	14
2.7. AT+CGMR Request TA Revision Identification of Software Release	14
2.8. AT+GSN Request International Mobile Equipment Identity (IMEI)	15
2.9. AT+CGSN Request Product Serial Number Identification	16
2.10. AT&F Set all Current Parameters to Manufacturer Defaults	16
2.11. AT&V Display Current Configuration	17
2.12. AT&W Store Current Parameters to User Defined Profile	18
2.13. ATZ Set all Current Parameters to User Defined Profile	18
2.14. ATQ Set Result Code Presentation Mode	19
2.15. ATV TA Response Format	19
2.16. ATE Set Command Echo Mode	21
2.17. A/ Repeat Previous Command Line	21
2.18. ATS3 Set Command Line Termination Character	22
2.19. ATS4 Set Response Formatting Character	23
2.20. ATS5 Set Command Line Editing Character	23
2.21. ATX Set CONNECT Result Code Format and Monitor Call Progress	24
2.22. AT+CFUN Set Phone Functionality	25
2.23. AT+CMEE Error Message Format	26
2.24. AT+CSCS Select TE Character Set	27
2.25. AT+QURCCFG Configure URC Indication Option	28
3 Serial Interface Control Commands	30
3.1. AT&C Set DCD Function Mode	30
3.2. AT&D Set DTR Function Mode	30
3.3. AT+ICF Set TE-TA Control Character Framing	31

3.4.	AT+IPR Set TE-TA Fixed Local Rate	32
4	Status Control Commands	34
4.1.	AT+CPAS Mobile Equipment Activity Status.....	34
4.2.	AT+CEER Extended Error Report	35
4.3.	AT+QCFG Extended Configuration Settings	36
4.3.1.	AT+QCFG="gprsattach" GPRS Attach Mode Configuration.....	37
4.3.2.	AT+QCFG="nwscanmode" Network Search Mode Configuration.....	37
4.3.3.	AT+QCFG="nwscanseq" Network Searching Sequence Configuration.....	38
4.3.4.	AT+QCFG="roamservice" Roam Service Configuration	39
4.3.5.	AT+QCFG="servicedomain" Service Domain Configuration.....	40
4.3.6.	AT+QCFG="band" Band Configuration	41
4.3.7.	AT+QCFG="hsdpacat" HSDPA Category Configuration.....	42
4.3.8.	AT+QCFG="hsupacat" HSUPA Category Configuration	43
4.3.9.	AT+QCFG="rrc" RRC Release Version Configuration	43
4.3.10.	AT+QCFG="sgsn" UE SGSN Release Version Configuration	44
4.3.11.	AT+QCFG="msc" UE MSC Release Version Configuration.....	45
4.3.12.	AT+QCFG="airplanecontrol" Enable/Disable Airplane Mode Detection.....	46
5	SIM Related Commands	48
5.1.	AT+CIMI Request International Mobile Subscriber Identity (IMSI).....	48
5.2.	AT+CLCK Facility Lock	49
5.3.	AT+CPIN Enter PIN	51
5.4.	AT+CPWD Change Password	53
5.5.	AT+CSIM Generic SIM Access	54
5.6.	AT+CRSM Restricted SIM Access.....	55
5.7.	AT+QCCID Show ICCID	56
6	Network Service Commands	57
6.1.	AT+COPS Operator Selection	57
6.2.	AT+CREG Network Registration.....	59
6.3.	AT+CSQ Signal Quality Report.....	60
6.4.	AT+CPOL Preferred Operator List.....	62
6.5.	AT+COPN Read Operator Names.....	63
6.6.	AT+CTZU Automatic Time Zone Update	64
6.7.	AT+CTZR Time Zone Reporting	65
7	Call Related Commands.....	67
7.1.	ATA Answer an Incoming Call	67
7.2.	ATD Mobile Originated Call to Dial a Number	68
7.3.	ATH Disconnect Existing Connection	69
7.4.	AT+CVHU Voice Hang Up Control.....	70
7.5.	AT+CHUP Hang Up Call	71
7.6.	ATO Switch From Command Mode to Data Mode	71
7.7.	ATS0 Set Number of Rings before Automatically Answering Call.....	72
7.8.	ATS6 Set Pause Before Blind Dialing.....	73

7.9.	ATS7	Set Number of Seconds to Wait for Connection Completion.....	73
7.10.	ATS8	Set the Number of Seconds to Wait for Comma Dial Modifier	74
7.11.	ATS10	Set Disconnect Delay after Indicating the Absence of Data Carrier	75
7.12.	AT+CBST	Select Bearer Service Type	75
7.13.	AT+CSTA	Select Type of Address	78
7.14.	AT+CLCC	List Current Calls of ME.....	78
7.15.	AT+CR	Service Reporting Control	80
7.16.	AT+CRC	Set Cellular Result Codes for Incoming Call Indication	81
7.17.	AT+CRLP	Select Radio Link Protocol Parameter	82
7.18.	AT+QECCNUM	Configure Emergency Call Numbers.....	83
8	Phonebook Commands.....		86
8.1.	AT+CNUM	Subscriber Number.....	86
8.2.	AT+CPBF	Find Phonebook Entries	87
8.3.	AT+CPBR	Read Phonebook Entries	88
8.4.	AT+CPBS	Select Phonebook Memory Storage.....	89
8.5.	AT+CPBW	Write Phonebook Entry.....	90
9	Short Message Service Commands.....		92
9.1.	AT+CSMS	Select Message Service	92
9.2.	AT+CMGF	Message Format	93
9.3.	AT+CSCA	Service Center Address.....	94
9.4.	AT+CPMS	Preferred Message Storage.....	95
9.5.	AT+CMGD	Delete Message	97
9.6.	AT+CMGL	List Messages	98
9.7.	AT+CMGR	Read Message	101
9.8.	AT+CMGS	Send Message.....	104
9.9.	AT+CMMS	More Messages to Send	106
9.10.	AT+CMGW	Write Message to Memory.....	107
9.11.	AT+CMSS	Send Message From Storage.....	109
9.12.	AT+CNMA	New Message Acknowledgement to UE/TE.....	110
9.13.	AT+CNMI	SMS Event Reporting Configuration.....	112
9.14.	AT+CSCB	Select Cell Broadcast Message Types	114
9.15.	AT+CSDH	Show SMS Text Mode Parameters.....	115
9.16.	AT+CSMP	Set SMS Text Mode Parameters	116
10	Packet Domain Commands		117
10.1.	AT+CGATT	Attachment or Detachment of PS.....	117
10.2.	AT+CGDCONT	Define PDP Context.....	118
10.3.	AT+CGQREQ	Quality of Service Profile (Requested).....	119
10.4.	AT+CGQMIN	Quality of Service Profile (Minimum Acceptable).....	122
10.5.	AT+CGEQREQ	3G Quality of Service Profile (Requested)	125
10.6.	AT+CGEQMIN	3G Quality of Service Profile (Minimum Acceptable).....	129
10.7.	AT+CGACT	Activate or Deactivate PDP Context.....	133
10.8.	AT+CGDATA	Enter Data State.....	134
10.9.	AT+CGPADDR	Show PDP Address	135

10.10.	AT+CGCLASS	GPRS Mobile Station Class	136
10.11.	AT+CGREG	Network Registration Status.....	137
10.12.	AT+CGEREP	Packet Domain Event Reporting.....	139
10.13.	AT+CGSMS	Select Service for MO SMS Messages.....	141
10.14.	AT+CEREG	EPS Network Registration Status.....	142
11	Supplementary Service Commands		144
11.1.	AT+CCFC	Call Forwarding Number and Conditions Control	144
11.2.	AT+CCWA	Call Waiting Control	146
11.3.	AT+CHLD	Call Related Supplementary Services.....	148
11.4.	AT+CLIP	Calling Line Identification Presentation.....	150
11.5.	AT+CLIR	Calling Line Identification Restriction.....	151
11.6.	AT+COLP	Connected Line Identification Presentation.....	152
11.7.	AT+CSSN	Supplementary Service Notifications	154
11.8.	AT+CUSD	Unstructured Supplementary Service Data	155
12	Audio Commands		157
12.1.	AT+CLVL	Loud Speaker Volume Level.....	157
12.2.	AT+CMUT	Mute Control.....	157
12.3.	AT+VTS	DTMF and Tone Generation.....	158
12.4.	AT+QAUDMOD	Set Audio Mode	159
12.5.	AT+QDAI	Digital Audio Interface Configure.....	160
12.6.	AT+QSIDET	Set the Side Tone Gain in Current Mode.....	161
12.7.	AT+QAUDLOOP	Enable Audio Loop Test.....	162
13	Hardware Related Commands.....		164
13.1.	AT+QPOWD	Power Off.....	164
13.2.	AT+CCLK	Clock.....	164
13.3.	AT+CBC	Battery Charge.....	165
13.4.	AT+QADC	Read ADC	166
13.5.	AT+QSCLK	Configure Whether or not to Enter into Sleep Mode.....	167
14	Appendix.....		168
14.1.	Reference		168
14.2.	Factory Default Settings Restorable with AT&F		169
14.3.	AT Command Settings Storable with AT&W		171
14.4.	AT Command Settings Storable with ATZ		172
14.5.	Summary of CME ERROR Codes.....		172
14.6.	Summary of CMS ERROR Codes.....		174
14.7.	Summary of URC.....		176
14.8.	SMS Character Sets Conversions.....		178
14.9.	Release Cause Text List of AT+CEER		184

Table Index

TABLE 1: TYPES OF AT COMMANDS AND RESPONSES	9
TABLE 2: AT&V RESPONSE.....	17
TABLE 3: ATV0&ATV1 RESULT CODES NUMERIC EQUIVALENTS AND BRIEF DESCRIPTION	20
TABLE 4: PARAMETERS CONFIGURATIONS SUPPORTED BY AT+CBST	77
TABLE 5: DELAY CLASS	122
TABLE 6: RELATED DOCUMENTS.....	168
TABLE 7: TERMS AND ABBREVIATIONS.....	168
TABLE 8: FACTORY DEFAULT SETTINGS RESTORABLE WITH AT&F	169
TABLE 9: AT COMMAND SETTINGS STORABLE WITH AT&W	171
TABLE 10: AT COMMAND SETTINGS STORABLE WITH ATZ	172
TABLE 11: DIFFERENT CODING SCHEMES OF +CME ERROR: <ERR>	173
TABLE 12: DIFFERENT CODING SCHEMES OF +CMS ERROR: <ERR>.....	174
TABLE 13: SUMMARY OF URC	176
TABLE 14: THE WAY OF SMS TEXT INPUT OR OUTPUT.....	178
TABLE 15: THE INPUT CONVERSIONS TABLE (DCS=GSM 7 BIT AND AT+CSCS="GSM")	179
TABLE 16: THE OUTPUT CONVERSIONS TABLE (DCS=GSM 7 BIT AND AT+CSCS="GSM")	179
TABLE 17: GSM EXTENDED CHARACTERS.....	180
TABLE 18: THE INPUT CONVERSIONS TABLE (DCS=GSM 7 BIT AND AT+CSCS="IRA")	181
TABLE 19: IRA EXTENDED CHARACTERS	182
TABLE 20: THE OUTPUT CONVERSIONS TABLE (DCS=GSM 7 BIT AND AT+CSCS="IRA")	182
TABLE 21: GSM EXTENDED CHARACTERS.....	183
TABLE 22: RELEASE CAUSE TEXT LIST OF AT+CEER	184

1 Introduction

1.1. Scope of the Document

This document presents the AT Commands Set for Quectel cellular engine EC20.

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 EC20 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 EC20 AT command interface defaults to the **GSM** character set. The EC20 supports the following character sets:

- GSM format
- UCS2
- IRA

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

1.4. AT Command Interface

The EC20 AT command interface includes two USB ports (USB MODEM port and USB AT port) and one main UART port. The main UART port and two USB ports support AT command and data transfer.

1.5. Unsolicited Result Code

As an Unsolicited Result Code and a report message, URC is not issued as part of the response related to an executed AT command. URC is issued by the EC20 without being requested by the TE and it is issued automatically when a certain event occurs. Typical events leading to URCs are incoming calls (“RING”), received short messages, high/low voltage alarm, high/low temperature alarm etc.

1.6. Turn off Procedure

It is recommended to execute AT+QPOWD command to 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 STATUS 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.

Quectel
Confidential

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

EC20

Revision: <revision>

OK

Maximum Response Time

300ms

Reference

V.25ter

Parameter

<revision>

Revision of software release

Example

ATI

Quectel

EC20

Revision: EC20EQAR01A01E2G

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. EC20 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> OK
Maximum Response Time	300ms
Reference V.25ter	

Parameter

<revision>	Revision of software release
-------------------------	------------------------------

Example

```
AT+GMR
EC20EQAR01A01E2G

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. EC20 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> 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).

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.

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>	<u>0</u>	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 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>	<u>0</u>	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>
	<u>1</u>	Information response: <CR><LF><text><CR><LF> Long result code format: <CR><LF><verbose code><CR><LF>

Example

```

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

OK                                     //When <value>=1 result code is OK
ATV0                                     //Set <value>=0
0
AT+CSQ
+CSQ: 30,99
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
	<u>1</u>	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
EC20
Revision: EC20EQAR01A01E2G

OK
A/                                //Repeat previous command
Quectel
EC20
Revision: EC20EQAR01A01E2G

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>	0-13-127	Command line termination character (Default 13=<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>	0-10-127	Response formatting character (Default 10=<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>	0-8-127	Response editing character (Default 8=<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
	4	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
	<u>1</u>	Full functionality (Default)
	4	Disable phone both transmit and receive RF circuits
<rst>	<u>0</u>	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

+QUSIM: 1

+QIND: PB DONE

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

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

OK
```

2.23. 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
	<u>1</u>	Enable result code and use numeric values
	2	Enable result code and use verbose values

Example

```

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

```

2.24. AT+CSCS Select TE Character Set

AT+CSCS write command informs the module which character set is used by the TE. This enables the UE to convert character strings correctly between TE and UE character sets.

AT+CSCS Select TE Character Set

Test Command AT+CSCS=?	Response +CSCS: (list of supported <chest>s)
	OK
Read Command AT+CSCS?	Response +CSCS: <chest>

	OK
Write Command AT+CSCS=<chest>	Response Set character set <chest> 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"[,<urcportv	If configuration parameters are omitted, return current configuration:

alue>]	+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","usbmodem"
OK
AT+QURCCFG?
+QURCCFG: "urcport","usbmodem"

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
	<u>1</u>	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 function is disabled

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+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 per second
	9600
	19200
	38400
	57600
	<u>115200</u>
	230400
	460800

921600

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
```

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
```

```

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

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

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

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

OK

```

4.2. AT+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.
---------------------	---

4.3. AT+QCFG Extended Configuration Settings

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

AT+QCFG Extended Configuration Settings

Test Command	Response
AT+QCFG=?	+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 <ltebandval>s) (list of supported <effect>s) +QCFG: "hsdpacat", (list of supported <cat>s) +QCFG: "hsupacat", (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: "airplanecontrol", (list of supported <airplanecontrol>s)
	OK
Maximum Response Time	300ms
Reference	

4.3.1. 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
<u>1</u>	Auto attach

4.3.2. 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	WCDMA only
3	LTE only
4	TD-SCDMA only
5	UMTS only
<effect>	Number format, when to take effect
0	Take effect after UE reboots
<u>1</u>	Take effect immediately

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

AT+QCFG="nwscanseq" specifies the sequence of searching network. This configuration is valid only after the module is restarted.

AT+QCFG="nwscanseq" Network Searching Sequence Configuration

Write Command AT+QCFG="nwscanseq"[,<scanseq>]	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 (eg.: 04030201(LTE/WCDMA/TD-SCDMA/GSM)) 00 Automatic (LTE/ WCDMA/TD-SCDMA/GSM) 01 GSM 02 TD-SCDMA 03 WCDMA 04 LTE
------------------------	--

4.3.4. 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

4.3.5. 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

4.3.6. 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>,<ltebandval>,<tdsbandval>,<effect>]]

Response

If configuration parameters are omitted

(+QCFG="band"), return current configuration:

+QCFG: "band",<bandval>,<ltebandval>,<tdsbandval>

OK

If configuration parameters are entered:

OK

ERROR

If error is related to ME functionality:

+CME ERROR: <err>

Maximum Response Time

300ms

Parameter

<bandval>

A hexadecimal value that specifies the GSM and WCDMA frequency band. If set <bandval> to 0 it means not to change GSM and WCDMA frequency band. (eg.: 00000013=00000001(GSM900)+00000002(GSM1800)+00000010(WCDMA 2100))

00000000	No change
00000001	GSM900
00000002	GSM1800
00000004	GSM850
00000008	GSM1900
00000010	WCDMA 2100
00000020	WCDMA 1900
00000040	WCDMA 850
00000080	WCDMA 900
00000100	WCDMA 800
00000200	Any frequency band

<ltebandval>

A hexadecimal value that specifies the LTE frequency band. If set <ltebandval> to 0 or 0x40000000 it means not to change LTE frequency band. (eg.: 0x15=0x1(LTE BC1)+0x4(LTE BC3)+0x10(LTE BC5))

0x1 (CM_BAND_PREF_LTE_EUTRAN_BAND1)	LTE BC1
0x4 (CM_BAND_PREF_LTE_EUTRAN_BAND3)	LTE BC3

	0x10 (CM_BAND_PREF_LTE_EUTRAN_BAND5)	LTE BC5
	0x40 (CM_BAND_PREF_LTE_EUTRAN_BAND7)	LTE BC7
	0x80 (CM_BAND_PREF_LTE_EUTRAN_BAND8)	LTE BC8
	0x800000(CM_BAND_PREF_LTE_EUTRAN_BAND20)	LTE BC20
	0x7FFFFFFFFFFFFFFF(CM_BAND_PREF_ANY)	Any frequency band
<tdsbandval>	A hexadecimal value that specifies the <tdscdma> frequency band. If set <tdsbandval> to 0 or 0x40000000 it means not to change TDS-CDMA frequency band. (eg.: 0x21=0x1(TDS BCA) +0x20(TDS BCF))	
	0x1 (CM_BAND_PREF_TDS_BANDA)	TDS BCA
	0x2 (CM_BAND_PREF_TDS_BANDB)	TDS BCB
	0x4 (CM_BAND_PREF_TDS_BANDC)	TDS BCC
	0x8 (CM_BAND_PREF_TDS_BANDD)	TDS BCD
	0x10 (CM_BAND_PREF_TDS_BANDE)	TDS BCE
	0x20 (CM_BAND_PREF_TDS_BANDF)	TDS BCF
<effect>	When to take effect	
	0	Take effect after UE reboots
	<u>1</u>	Take effect immediately

4.3.7. 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

AT+QCFG="hsdpacat"[,<cat>]

Response

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

8	Category 8
10	Category 10
12	Category 12
14	Category 14
18	Category 18
20	Category 20
<u>24</u>	Category 24

4.3.8. AT+QCFG="hsupacat" HSUPA Category Configuration

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

AT+QCFG="hsupacat" HSUPA Category Configuration

Write Command

AT+QCFG="hsupacat"[,<cat>]

Response

If configuration parameters are omitted
(+QCFG="hsupacat"), return current configuration:
+QCFG: "hsupacat",<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>	HSUPA category
5	Category 5
<u>6</u>	Category 6

4.3.9. 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
1	R5
2	R6
3	R7
4	R8

4.3.10. 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
1	R99
<u>2</u>	Dynamic

4.3.11. 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
<u>2</u>	Dynamic

4.3.12. AT+QCFG="airplanecontrol" Enable/Disable Airplane Mode Detection

AT+QCFG="airplanecontrol" is used to enable or disable airplane mode detection.

Both the **W_DISABLE#** pin and **+CFUN** command can control the module to enter into airplane mode. When **W_DISABLE#** pin is pull-down, the module will enter into airplane mode no matter what the status of **+CFUN** is, meanwhile, **+CFUN** status cannot be switched.

When setting parameter of **<airplanecontrol>**, the parameter will be saved to NV. After enabling the airplane mode detection functionality and the module is powered on, it will detect the **W_DISABLE#** pin first. If the pin is in low level, module will enter into airplane mode instantly.

AT+QCFG="airplanecontrol" Enable/Disable Airplane Mode Detection

Write Command

AT+QCFG="airplanecontrol",<airplanecontrol>]

Response

If configuration parameters are omitted
(**+QCFG="airplanecontrol"**), return current configuration:
+QCFG:
"airplanecontrol",<airplanecontrol>,<airplanestatus>

OK

If configuration parameters are entered:

OK

ERROR

If error is related to ME functionality:

+CME ERROR: <err>

Maximum Response Time

300ms

Parameter

<airplanecontrol>	Enable/disable the airplane mode detection. Enable this function and pull down the W_DISABLE# pin, and UE will enter to the airplane mode. Pull up the W_DISABLE# pin, UE will enter to normal mode. The W_DISABLE# pin is in high level when it is suspending. 0 Disable 1 Enable
<airplanestatus>	Indicates the current status. 0 In normal mode 1 In airplane mode

NOTE

The state of the **W_DISABLE#** pin may change the state of **+CFUN**.

Example

```
AT+QCFG="airplanecontrol",1           //Enable the airplane mode detection
OK

<Pull down W_DISABLE# pin>

AT+QCFG="airplanecontrol"             //Query whether to enable airplane mode detection
+QCFG: "airplanecontrol",1,1          //Enable and enter to airplane mode
OK

<Pull up W_DISABLE# pin>

AT+QCFG="airplanecontrol"
+QCFG: "airplanecontrol",1,0          //Enable, exit from airplane mode
OK
```

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 being set or interrogated. The factory default password of PF, PN, PU, PP and PC lock is "12341234".

AT+CLCK Facility Lock	
Test Command AT+CLCK=?	Response +CLCK: (list of supported <fac> s) OK
Write Command AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	Response This command is used to lock, unlock or interrogate 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 to 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 to 3GPP TS 22.030) (applicable only for <mode>=0).
"AG"		All outgoing barring services (refer to 3GPP TS 22.030) (applicable only for <mode>=0).
"AC"		All incoming barring services (refer to 3GPP TS 22.030) (applicable only for <mode>=0).
"FD"		SIM card or active application in the UICC (GSM or USIM) fixed dialing memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as <passwd>).
"PF"		Lock Phone to the very first inserted SIM/UICC card (also referred in the present document as PH-FSIM) (MT asks password when other 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 format; 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 to +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 to 3GPP TS 51.011). After READ BINARY, READ RECORD or RETRIEVE DATA command the requested data will be returned. <response> is not returned after a successful UPDATE BINARY, UPDATE RECORD or SET DATA command.

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: 89860025128306012474
OK

```

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. Values 3,4,5,6 occur only in read command response while MS is in data service state and are not intended for the AT+COPS write command.	
	0	GSM
	2	UTRAN
	3	GSM W/EGPRS
	4	UTRAN W/HSDPA
	5	UTRAN W/HSUPA
	6	UTRAN W/HSDPA and HSUPA
	7	E-UTRAN

Example

```
AT+COPS=? //List all current network operators
+COPS:
(1,"CHN-UNICOM","UNICOM","46001",2),(1,"CHN-UNICOM","UNICOM","46001",0),(2,"CHN-UNICO
```

```
M","UNICOM","46001",7),(1,"46011","46011","46011",7),(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
	3	GSM W/EGPRS
	4	UTRAN W/HSDPA
	5	UTRAN W/HSUPA
	6	UTRAN W/HSDPA and HSUPA
	7	E-UTRAN

Example

```

AT+CREG=1
OK

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

+CREG: 1,"D509","80D413D",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	Response
AT+CSQ=?	+CSQ: (list of supported <rssi>s),(list of supported <ber>s)

	OK
Execution Command AT+CSQ	Response +CSQ: <rss>,<ber>
	OK +CME ERROR: <err> Execution Command returns received signal strength indication <rss> 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

<rss>	0	-113dBm or less
	1	-111dBm
	2...30	-109... -53dBm
	31	-51dBm or greater
	99	Not known or not detectable
	100	-116dBm or less
	101	-115dBm
	102...190	-114...-26dBm
	191	-25dBm or greater
	199	Not known or not detectable
	100~199	Extended to be used in TDSCDMA indicating received signal code power (RSCP)
<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: 28,99                                //Query the current signal strength indication is 28 and
                                              channel bit error rate is 99

OK

```

NOTE

After using network related commands such as **+CCWA** and **+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>,<E-UTRAN>] <index>,<format>,<oper>[,<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>] [...] OK
Write Command AT+CPOL=<index>[,<format>[,<oper>[<GSM>,<GSM_compact>,<UTRAN>,<E-UTRAN>]]]	Response Edit the list of 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
<E-UTRAN>	E-UTRAN access technology 0 Access technology is not selected 1 Access technology is selected

NOTE

The Access Technology selection parameters **<GSM>**, **<GSM_compact>**, **<UTRAN>** and **<E-UTRAN>** are required for SIM cards or UICC's containing PLMN selector with Access Technology.

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

<numeric>	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

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 AT+CTZU=<onoff>	Response OK ERROR
Read Command AT+CTZU?	Response +CTZU: <onoff> 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=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

```

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: 1,0,0,1,0,"",128

//PS call in LTE mode

```
+CLCC: 2,1,4,0,0,"02154450290",129 //Incoming call

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>[<mgs>][:]	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, @
<mgs>	String of GSM modifiers: I Activates CLIR (Disable presentation of own number to called party) i Deactivates CLIR (Enable presentation of own number to called party) G Activates closed user group invocation for this call only g Deactivates closed user group invocation for this call only
<;>	Only required to set up voice call, return to command state

NOTES

1. This command may be aborted generally by receiving an **ATH** command or a character during execution. The aborting is not possible during some states of connection establishment such as handshaking.
2. 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>	0	ATH can be used to disconnect the voice call
	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. 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.

7.7. ATSO Set Number of Rings before Automatically Answering Call

ATSO controls automatic answering mode for the incoming calls.

ATSO Set Number of Rings Before Automatically Answering Call

Read Command ATSO?	Response <n> OK
Write Command ATSO=<n>	Response This parameter setting determines the number of rings before auto-answer. OK
Maximum Response Time	300ms
Reference V.25ter	

Parameter

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

NOTE

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

Example

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

```
RING                                     //Call coming

RING

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

7.8. 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>	0-2-10	Number of seconds to wait before blind dialing
-----	--------	--

7.9. 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	Response

ATS7=<n>	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>0</u>	Disabled
	1-255	Number of seconds to wait for connection completion

7.10. 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>	<u>0</u>	No pause when comma encountered in dial string
	1- <u>2</u> -255	Number of seconds to wait

7.11. 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 ATS10=<n>	Response 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>	1- <u>15</u> -254	Number of tenths of seconds to wait before disconnecting after UE has indicated the absence of received line signal
-----	-------------------	---

7.12. 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>	<u>0</u>	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 asynchronous 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)
<name>	116	64000 bps (bit transparent)
	134	64000 bps (multimedia)
	<u>0</u>	Asynchronous Modem
	1	Synchronous Modem
<ce>	4	Asynchronous Modem (RDI)
	0	Transparent
	<u>1</u>	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.

7.13. 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 "+")

7.14. 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 existed, no information response but OK is sent to 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 executed 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, 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
<alpha>	Alphanumeric representation of <number> corresponding to the entry found in phonebook.

Example

```

ATD10086;           //Establish a call
OK
AT+CLCC
+CLCC: 1,0,0,1,0,"",128      //PS call in LTE mode
+CLCC: 2,0,0,0,0,"10086",129 //Establish a call, and the call has been answered
OK

```

7.15. 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>	ASYNCR	Asynchronous transparent

SYNC	Synchronous transparent
REL ASYNC	Asynchronous non-transparent
REL SYNC	Synchronous non-transparent
GPRS	GPRS

7.16. 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

```

7.17. 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 presented). +CRLP: (list of supported <iws>s),(list of supported <mws>s),(list of supported <T1>s),(list of supported <N2>s), <ver> +CRLP: (list of supported <iws>s),(list of supported <mws>s),(list of supported <T1>s),(list of supported <N2>s), <ver> +CRLP: (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 presented). +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- <u>61</u> 0- <u>240</u> -488	Interworking window size (IWF to MS) For <ver>=2
<mws>	0- <u>61</u> 0- <u>240</u> -488	Mobile window size (MS to IWF) For <ver>=2
<T1>	38- <u>48</u> -255 42- <u>52</u> -255	Acknowledgment timer T1 in a unit of 10ms For <ver>=2
<N2>	1- <u>6</u> -255	Retransmission attempts N2
<ver>	0-2	RLP version number in integer format

7.18. 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 can't 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>[,<eccnum1>[,<eccnum2>,...[,<eccnumN>]]]	Response If <mode> is equal to 0, query the ECC numbers, <eccnumN> should be omitted, returns: +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, returns: 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
```

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+CPBR 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 messaging 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 **<chest>** 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	Response
AT+CMGF=?	+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>** to be used for reading, writing, etc.

AT+CPMS Preferred Message Storage

Test Command AT+CPMS=?	Response +CPMS: (list of supported <mem1> s),(list of supported <mem2> s),(list of supported <mem3> s) OK
Read Command AT+CPMS?	Response +CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> OK
Write Command AT+CPMS=<mem1>[,<mem2>[,<mem3>]]	Response TA selects memory storages <mem1> , <mem2> and <mem3> to be used for reading, writing, etc. +CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK

	If 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>

Example

```

AT+CPMS?                                     //Query the currently SMS message storage
+CPMS: "ME",0,255,"ME",0,255,"ME",0,255

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

OK
AT+CPMS?                                     //Query the 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 2 Delete all read messages from <mem1> storage and sent mobile originated messages 3 Delete all read messages from <mem1> storage, sent and unsent mobile originated messages 4 Delete all messages from <mem1> storage

Example

```

AT+CMGD=1           //Delete 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: <code><index>,<stat>,<oa/da>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[<CR><LF></code> +CMGL: <code><index>,<stat>,<da/oa>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[...]]</code> For SMS-STATUS-REPORTs: +CMGL: <code><index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>]<CR><LF></code> +CMGL: <code><index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>]<CR><LF><data>[...]]</code> For SMS-COMMANDs: +CMGL: <code><index>,<stat>,<fo>,<ct>]<CR><LF></code> +CMGL: <code><index>,<stat>,<fo>,<ct>]<CR><LF><data>[...]]</code> For CBM storage: +CMGL: <code><index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[<CR><LF></code> +CMGL: <code><index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[...]]</code> 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 centre 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 <dc>, 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 II (GSM 7 bit default alphabet 23) is presented as 17 (IRA 49 and 55)). - If <dc>, 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 <dc>, 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 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 the GSM 7 bit default alphabet into two IRA character long hexadecimal number. - If <dc>, 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>,<dcsc>,<sca>,<tosca>,<length>]<CR><LF><data> OK For SMS-SUBMIT: +CMGR: <stat>,<da>,<[alpha]>,<[toda>,<fo>,<pid>,<dcsc>,<[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>,<dc>,<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).
<dc>	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 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>	The text of short message. Please refer 14.8 SMS Character Sets Conversions for the detail.
<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,"+861380021050
0",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):	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:

AT+CMGS=<length><CR> PDU is given <ctrl-Z/ESC>	+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> send 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 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 2) If PDU mode (+CMGF=0): AT+CMGW=<length>[,<stat>]<CR> PDU is given <ctrl-Z/ESC>	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: +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>).		
<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
<tda>	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> write 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. 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> send 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 confirm successful receipt of a new message (SMS-DELIVER or SMS-STATUS-REPORT) routed directly to the TE. If the UE does not receive acknowledgement within required time (net-work timeout), it sends an "RP-ERROR" message to the network. The UE will automatically disable routing to the TE by setting both **<mt>** and **<ds>** values of AT+CNMI to 0.

AT+CNMA New Message Acknowledgement to UE/TE

Test Command AT+CNMA=?	Response +CNMA: (list of supported <n>s) OK
Execution Command AT+CNMA	Response OK 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 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",,"13/03/18,17:07:21+32",145,4,0,0,"+8613800551500",145,28
This is a test from Quectel.           //Short message is outputted directly when SMS is incoming.
AT+CNMA                               //Send ACK to the network
OK
AT+CNMA
+CMS ERROR: 340                       //The second time return error, it needs ACK only once

```

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. <u>1</u> 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: <u>0</u> 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>	<u>0</u> No SMS-STATUS-REPORTs are routed to the TE. 1 SMS-STATUS-REPORTs are routed directly to the TE.
<bfr>	<u>0</u> TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...2 is entered ("OK" response shall be given before flushing the codes). 1 TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...2 is entered.

NOTE

Unsolicited result code:

+CMTI: <mem>,<index>	Indicates that 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 <dc>) (default is empty string), e.g. "0-3,5"	

9.15. AT+CSDH Show SMS Text Mode Parameters

AT+CSDH write command controls whether detailed header information is shown in text mode result codes.

AT+CSDH Show SMS Text Mode Parameters

Test Command AT+CSDH=?	Response +CSDH: (list of supported <show>s) OK
Read Command AT+CSDH?	Response +CSDH: <show> OK
Write Command AT+CSDH[=<show>]	Response OK ERROR
Maximum Response Time	300ms
Reference 3GPP TS 27.005	

Parameter

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

Example

```
AT+CSDH=0
OK
AT+CMGR=2
+CMGR: "STO UNSENT", "",
<This is a test from Quectel>
OK
AT+CSDH=1
OK
AT+CMGR=2
+CMGR: "STO UNSENT", "",128,17,0,0,143,"+8613800551500",145,18
```

<This is a test from Quectel>

OK

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>,<dc> OK
Write Command AT+CSMP=<fo>[,<vp>[,<pid>[,<dc>]]]	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, 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).
<dc>	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.

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	140s, 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" IPV4 "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 or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The allocated address may be read using the +CGPADDR command.
<data_comp>	A numeric parameter that controls PDP data compression (applicable for SNDCCP only) (refer to 3GPP TS 44.065). <u>0</u> Off (Default if value is omitted) 1 On (Manufacturer preferred compression) 2 V.42bis 3 V.44 (not supported currently)
<head_comp>	A numeric parameter that controls PDP header compression (refer to 3GPP TS 44.065 and 3GPP TS 25.323). <u>0</u> Off 1 On 2 RFC1144 3 RFC2507 4 RFC3095

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 <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 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 in frequent 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	1000 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 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 <u>Q</u> Network subscribed value
<reliability>	A numeric parameter which specifies the reliability class.

	<u>0</u>	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
	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.	
	<u>0</u>	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.	
	<u>0</u>	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	1000 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>]
[...]

delay>	
handling priority>	
statistics descriptor>	
g indication>]]]]]]]]]]]]]]]]]]]]	
Response Time	300ms
.007	

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

> Packet data protocol type, a string parameter which specifies the type of packet data protocol

- "IP" IPV4
- "PPP"
- "IPv6"
- "IPv4V6"

<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

Packet data protocol type, a string parameter which specifies the type of packet data protocol

“IP” IPV4

“PPP”

“IPv6”

“IPV4V6”

The following parameters are defined in 3GPP TS 23.107

Integer type, indicates the type of application for which the UMTS bearer service is optimized (refer to 3GPP TS 24.008 subclause 10.5.6.5). If the 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

	4	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, ...).	
	0	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, ...).	
	0	Subscribed value
	1~42200	
<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, ...).	
	0	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, ...).	
	0	Subscribed value
	1~42200	
<Delivery order>	Integer type, indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer to 3GPP TS 24.008 subclause 10.5.6.5).	
	0	No
	1	Yes
	2	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 to 3GPP TS 24.008 subclause 10.5.6.5).	
	0	Subscribed value
	10...1520	(Value needs to be divisible by 10 without remainder)
	1520	
<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", ...).	
	"0E0"	Subscribed value
	"1E1"	
	"1E2"	
	"7E3"	

	"1E3"
	"1E4"
	"1E5"
	"1E6"
<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 $5 \cdot 10^{-3}$ 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

<Signalling Indication>	1	Characteristics of SDUs corresponds to a speech source
	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+CGEQMIN 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>,

	bearer service is optimized (refer to 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
	1~42200
<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
	1~42200
<Delivery order>	Integer type, indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer to 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 to 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 $5 \cdot 10^{-3}$ would be specified as "5E3" (e.g. AT+CGEQREQ=..., "5E3", ...).

0E0 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 $5 \cdot 10^{-3}$ would be specified as "5E3" (e.g. AT+CGEQREQ=..., "5E3", ...).

0E0 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

3 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).

0 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).
	0 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>**s specify 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
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>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code +CGREG:<stat>
	2	Enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>[,<Act>]]
<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 bytes location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)	
<ci>	String type, two byte cell ID in hexadecimal format	
<Act>	Access technology selected	
	0	GSM
	2	UTRAN
	3	GSM W/EGPRS
	4	UTRAN W/HSDPA
	5	UTRAN W/HSUPA
	6	UTRAN W/HSDPA and HSUPA
	7	E-UTRAN

Example

```
AT+CGREG=2
```

```
OK
```

```
AT+CGATT=0
```

```
OK
```

```
+CGREG: 2
```

```
AT+CGATT=1
```

```
OK
```

```
+CGREG: 1,"D504","80428B5",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>	<u>0</u>	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>	<u>0</u>	MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered.
	1	MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes).

NOTE

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

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

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.

10.14. AT+CEREG EPS Network Registration Status

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

AT+CEREG EPS Network Registration Status	
Test Command AT+CEREG=?	Response +CEREG: (list of supported <n>s) OK
Read Command AT+ CEREg?	Response +CEREG: <n>,<stat>[,<tac>,<ci>[,<Act>]] OK
Write Command AT+ CEREg[=<n>]	Response OK ERROR
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code +CEREG:<stat>
	2	Enable network registration and location information unsolicited result code +CEREG: <stat>[,<tac>,<ci>[,<Act>]]
<stat>	0	Not registered, MT is not currently searching an operator to register to
	1	Registered, home network
	2	Not registered, but MT is currently trying to attach or searching an operator to register to
	3	Registration denied
	4	Unknown
	5	Registered, roaming
<tac>	String type, two byte tracking area code in hexadecimal format	
<ci>	String type, four byte E-UTRAN cell ID in hexadecimal format	
<Act>	Access technology selected	
	0	GSM
	2	UTRAN

3	GSM W/EGPRS
4	UTRAN W/HSDPA
5	UTRAN W/HSUPA
6	UTRAN W/HSDPA and HSUPA
7	E-UTRAN

Quectel
Confidential

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	Erase
<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>
+CFC: 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 (ISDN 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 aborted by pressing any key.
3. Unsolicited result code:
When the presentation call waiting at the TA is enabled (and call waiting is enabled) and a terminating call set up during an established call, an unsolicited result code is returned:
+CCWA: <number>,<type>,<class>[,<alpha>]

Example

```

AT+CCWA=1,1           //Enable presentation of an unsolicited result code
OK
ATD10086;             //Establish a call
OK
+CCWA: "02154450293",129,1 //Indication of a call that has been waiting

```

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 to 3GPP TS 22.083 clause 2), MPTY (MultiParty; refer to 3GPP TS 22.084) and ECT (Explicit Call Transfer; refer to 3GPP TS 22.091). The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standards. Call Hold, MultiParty and Explicit Call Transfer are only applicable to teleservice 11.

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).

1X	Terminate the specific call number X (X=1-7)
2	Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call
2X	Place all active calls except call X (X=1-7) on hold
3	Add the held call to the active calls
4	Connects the two calls and disconnects the subscriber from both calls (ECT)

Example

```

ATD10086;           //Establish a call
OK

+CCWA: "02154450293",129,1 //Indication of a call that has been waiting
AT+CHLD=2           //Place the active call on hold and accept the waiting call as
                    //the active call
OK
AT+CLCC
+CLCC: 1,0,1,0,0,"10086",129 //The first call on hold

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

OK
AT+CHLD=21          //Place the active call except call X=1 on hold
OK
AT+CLCC
+CLCC: 1,0,0,0,0,"10086",129 //The first call be active

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

OK
AT+CHLD=3           //Add a held call to the active calls in order to set up a
                    //conference (multiparty) call
OK
AT+CLCC
+CLCC: 1,0,0,0,1,"10086",129

+CLCC: 2,1,0,0,1,"02154450293",129

OK

```

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 to 3GPP TS 24.008 [8] subclause 10.5.4.8)	
<type>	Type of address octet in integer format;	
	129	Unknown type (ISDN format)
	145	International number type (ISDN format)
	161	National number

<alpha>	String type alphanumeric representation of <number> corresponding to the entry found in phone book	
<CLI validity>	0	CLI valid
	1	CLI has been withheld by the originator
	2	CLI is not available due to interworking problems or limitations of originating network

NOTE

Unsolicited result code:

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

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

Example

```
AT+CPBW=1,"02151082965",129,"QUECTEL"
OK
AT+CLIP=1
OK

RING

+CLIP: "02151082965",129,,,"QUECTEL",0
```

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 AT+CLIR[=<n>]	Response TA restricts or enables the presentation of the calling line identity (CLI) to the called party when originating a call. The command overrides the CLIR subscription (default is restricted or allowed) when temporary mode is provisioned as a default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite Command. OK If 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
0	Presentation indicator is used according to the subscription of the CLIR service
1	CLIR invocation
2	CLIR suppression
<m>	Parameter shows the subscriber CLIR service status in the network
0	CLIR not provisioned
1	CLIR provisioned in permanent mode
2	Unknown (e.g. no network, etc.)
3	CLIR temporary mode presentation restricted
4	CLIR temporary mode presentation allowed

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

Parameter

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

- 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>
- 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>[,<dc>]]**.

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

AT+CUSD Unstructured Supplementary Service Data

Test Command AT+CUSD=?	Response +CUSD: (list of supported <mode> s) OK
Read Command AT+CUSD?	Response +CUSD: <mode> OK
Write Command AT+CUSD[=<mode>[,<reqstr>[,<dc>]]]	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 0 Disable the result code presentation to the TE 1 Enable the result code presentation to the TE 2 Cancel session(not applicable to read command response)
<reqstr>	Unstructured Supplementary Service Data (USSD) to be sent to the network. If this parameter is not given, network is not interrogated.
<rspstr>	Unstructured Supplementary Service Data (USSD) received from the network
<dc>	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+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 <level>s) OK
Read Command AT+CLVL?	Response +CLVL: <level> OK
Write Command AT+CLVL=<level>	Response OK If error is related to ME functionality: +CME ERROR: <err>
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<level>	Integer type, value (0-3-5) with manufacturer specific range (Smallest value represents the lowest sound level)
---------	---

12.2. 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 <n>s) OK
Read Command AT+CMUT?	Response +CMUT: <n> OK
Write Command AT+CMUT=<n>	Response OK If error is related to ME functionality: +CME ERROR: <err>
Maximum Response Time	300ms
Reference 3GPP TS 27.007	

Parameter

<n>	<u>0</u>	Mute off
	1	Mute on

12.3. AT+VTS DTMF and Tone Generation

The AT+VTS command is used to send ASCII characters which causes 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=<dtmfstring>[,<duration>]	Response OK ERROR If error is related to ME functionality: +CME ERROR: <err>

Maximum Response Time	Depends on the length of <dtmfstring> and <duration> .
Reference 3GPP TS 27.007	

Parameter

<dtmfstring>	ASCII characters in the set 0...9,#,*, A, B, C, D. The string should enclose in quotation marks ("...") When sending multiple tones at a time, the time interval of two tones <interval> 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 value depended on the network, the actual duration is depended on the network If this parameter is omitted, <duration> is specified by +VTD

Example

```

ATD12345678900;           //Dial
OK

<Call connect>

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

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

```

12.4. AT+QAUDMOD Set Audio Mode

AT+QAUDMOD sets the audio mode required for the connected device. It will take effects at next sound activity.

AT+QAUDMOD Set Audio Mode

Test Command AT+QAUDMOD=?	Response +QAUDMOD: (0-2) OK
Read command AT+QAUDMOD?	Response +QAUDMOD: <mode> OK

Write Command AT+QAUDDMOD=<mode>	Response OK If error is related to ME functionality: +CME ERROR: <err>
Maximum Response Time	300ms

Parameter

<mode>	Numeric type, indicates the current configured audio mode
<u>0</u>	Echo canceller, noise suppressor, digital gain and calibration parameter for Handset
1	Echo canceller, noise suppressor, digital gain and calibration parameter for Headset
2	Echo canceller, noise suppressor, digital gain and calibration parameter for Speaker

12.5. AT+QDAI Digital Audio Interface Configure

AT+QDAI is used to configure the digital audio interface. While **<io>=1**, you can define the PCM mode (master/slave mode) by themselves; while **<io>=3**, and the external codec chip linked with PCM interface is the ALC5616 model through the I2C. The settings will take effect after reboot module.

AT+QDAI Digital Audio Interface Configure

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>	1	Digital PCM output (customer defined)
	2	Reserved

	<u>3</u>	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. Now support master& slave mode under short sync signal, master mode under long sync signal.
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.

Example

```

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 8-bit a-law.
OK

```

12.6. 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. It will take effects at next sound activity.

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: <st_gain> OK
Write Command AT+QSIDET=<st_gain>	Response OK ERROR
Maximum Response Time	300ms

Parameter

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

NOTE

This parameter will not be saved.

12.7. 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) OK
Read Command AT+QAUDLOOP?	Response +QAUDLOOP: <enable> OK

Set Command AT+QAUDLOOP=<enable>	Response OK ERROR
Maximum Response Time	300ms

Parameter

<enable>	Numeric type; to enable or disable audio loop test
<u>0</u>	Disable audio loop test
1	Enable audio loop test

NOTE

These parameters will not be saved.

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 message "POWERED DOWN" and enter into the shutdown state. The maximum time for unregistering network is 60 seconds. The UE is not allowed to turn off the power before the module STATE pin is set low or the URC "POWERED DOWN" is output to avoid data loss.

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”, indicate year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -48...+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 command “AT+QSCLK” is used to control whether the module enters into sleep mode. When AT+QSCLK is enabled and DTR is pulled up, WAKEUP_IN is pulled up, the module can directly enter sleep mode. If AT+QSCLK is enabled and DTR is pulled down, WAKEUP_IN is pulled down, you need pull the DTR pin up and pull the WAKEUP_IN pin up, then module can enter sleep mode.

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>	<u>0</u>	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
TA	Terminal Adapter
TE	Terminal Equipment
UE	User Equipment

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>	0
ATS3	<n>	13
ATS4	<n>	10
ATS5	<n>	8
ATS6	<n>	2
ATS7	<n>	0

ATS8	<n>	2
ATS10	<n>	15
ATV	<value>	1
ATX	<value>	4
AT&C	<value>	1
AT&D	<value>	1
AT+ICF	<format>,<parity>	3,3
AT+CREG	<n>	0
AT+CGREG	<n>	0
AT+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>,<dc>	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

14.3. AT Command Settings Storable with AT&W

Table 9: AT Command Settings Storable with AT&W

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

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

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

Index	URC Display	Meaning	Condition
1	+CREG: <stat>	Indicate registration status of the ME	AT+CREG=1
2	+CREG: <stat>[,<lac>,<ci>[,<Act>]]	After cell neighborhood changing shows whether the network has currently indicated the registration of the ME, with location area code	AT+CREG=2
3	+CGREG: <stat>	Indicate network registration status of the ME	AT+CGREG=1
4	+CGREG: <stat>[,<lac>,<ci>[,<Act>]]	Indicate network registration and location information of the ME	AT+CGREG=2
5	+CTZV: <tz>	Time zone reporting	AT+CTZR=1
6	+CTZE: <tz>,<dst>,<time>	Extended time zone reporting	AT+CTZR=2
7	+CMTI: <mem>,<index>	New message is received, and saved to memory	See AT+CNMI
8	+CMT: [<alpha>],<length><CR><LF> <pdu>	New short message is received and output directly to TE (PDU mode)	See AT+CNMI
9	+CMT: <oa>[,<alpha>],<scts>[,<toa> ,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>	New short message is received and output directly to TE (Text mode)	See AT+CNMI
10	+CBM: <length><CR><LF><pdu>	New CBM is received and output directly (PDU mode)	See AT+CNMI
11	+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>	New CBM is received and output directly to TE (Text mode)	See AT+CNMI
12	+CDS: <length><CR><LF><pdu>	New CDS is received and output directly (PDU mode)	See AT+CNMI

13	+CDS: <fo>,<mr>,<ra>,<tora>,<sct s>,<dt>,<st>	New CDS is received and output directly to TE (Text mode)	See AT+CNMI
14	+COLP: <number>,<type>,<subaddr>,<satype>,<alpha>	The presentation of the COL (connected line) at the TE for a mobile originated call	AT+COLP=1
15	+CLIP: <number>,<type>,<subaddr>,<s atype>,<alpha>,<CLI validity>	Mobile terminating call indication	AT+CLIP=1
16	+CRING: <type>	An incoming call is indicated to the TE with unsolicited result code instead of the normal RING	AT+CRC=1
17	+CCWA: <number>,<type>,<class>,<alpha>	Call waiting indication	AT+CCWA=1,1
18	+CSSI: <code1>	shows the +CSSI intermediate result code presentation status to the TE	AT+CSSN=1
19	+CSSU: <code2>	shows the +CSSU unsolicited result code presentation status to the TE	AT+CSSN=<n>,1
20	+CUSD: <status>,<rspstr>,<dc>]]	USSD response from the network, or a network initiated operation	AT+CUSD=1
21	RDY	ME initialization is successful	N/A
22	+CFUN: 1	All function of the ME is available	N/A
23	+CPIN: <state>	SIM card pin state	N/A
24	+QIND: SMS DONE	SMS initialization finished	N/A
25	+QIND: PB DONE	Phonebook initialization finished	N/A
26	POWERED DOWN	Module power down	AT+QPOWD
27	+CGEV: REJECT <PDP_type>,<PDP_addr>	A network request for PDP activation, and was automatically rejected.	AT+CGEREP=2,1
28	+CGEV: NW REACT <PDP_type>,<PDP_addr>,<cid>	The network request PDP reactivation	AT+CGEREP=2,1
29	+CGEV: NW DEACT <PDP_type>,<PDP_addr>,<cid>	The network has forced a context deactivation	AT+CGEREP=2,1
30	+CGEV: ME DEACT <PDP_type>,<PDP_addr>,<cid>	The ME has forced a context deactivation.	AT+CGEREP=2,1

31	+CGEV: NW DETACH	The network has forced a Packet Domain detach.	AT+CGEREP=2,1
32	+CGEV: ME DETACH	The mobile equipment has forced a Packet Domain detach.	AT+CGEREP=2,1
33	+CGEV: NW CLASS <class>	The network has forced a change of MS class.	AT+CGEREP=2,1
34	+CGEV: ME CLASS <class>	The mobile equipment has forced a change of MS class.	AT+CGEREP=2,1

14.8. SMS Character Sets Conversions

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

Table 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

Because the low 8 bit of UCS2 character is same as the IRA character. The conversion table of DCS=GSM 7 bit and **AT+CSCS="UCS2"** is similar to **AT+CSCS="IRA"**. The difference is the way of SMS text input or output, please refer to Table 14.

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/unallocated number

No route to destination

Channel unacceptable

Operator determined barring

Normal call clearing

User busy

No user responding

User alerting, no answer

Call rejected

Number changed

Non selected user clearing

Destination out of order

Invalid/incomplete number

Facility rejected

Response to status enquiry

Normal, unspecified

No circuit/channel available

Network out of order

Temporary failure

Switching equipment congestion

Access information discarded

Requested circuit/channel not available

Resources unavailable, unspecified

Quality of service unavailable

Requested facility not subscribed

Incoming calls barred within the CUG

Bearer capability not authorized

Bearer capability not available

Service/option not available

Bearer service not implemented

ACM $\geq$ 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

SNDP 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

Quectel
Confidential