MeiG M750-R2.0/SLM820/ SLM828/SLM828G AT Commands Manual

Controlled Version Number: V2.6

Release Date: 2022/05/30

MeiG Smart Technology Co.,Ltd
A Global Leading IoT Terminals and Wireless Data Solutions Provider
Add：32/F,Building B,Shenzhen International Innovation Center, No.1006 Shennan Avenue,Futian District,Shenzhen,China
Tel：+86-755-83218588 Fax：+86-755-83219788
E-mail：ir@meigsmart.com Web：www.meigsmart.com
MeiG Official Wechat QR Code

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Revision History

Version No.	Date	Reason for Revision
V1.0	2020-12-21	1. Establish for the first version 2. Delete invalid 5G parameters 3. Modify AT+CTZR parameter range
V1.1	2021-01-05	Added support for SLM820 project
V1.2	2021-2-2	1. Modify the +sgcellinfoex and cellinfo command parameters 2. Modify the ^syscfgex and ^spn parameter explain. 3. Add AT^CURCEX / AT^CURC
V1.3	2021-2-22	1. Add 3.12 AT+LCTSN to operate IMEISV
V1.4	2021-2-23	1. Add AT^AUTHDATA
V1.5	2021-2-26	1. ADD AT+ADCREAD 2. ADD AT+TEMP 3. Add Query the Service Provider Name Command：AT^EONS 4. Modify AT ^ CELLINFO parameter description
V1.6	2021-3-10	1.Add 3.14 AT^CPCM 2.Modify AT^SYSCFGEX band parameter description 3.Add AT+URCCFG
V1.7	2021-3-15	1. Add AT^CPBREADY command 2. Add AT^SIMREFRESH command
V1.8	2021-3-23	Add MBN operating chapter
V1.9	2021-5-7	1. Delete MBN operating chapter 2. Remove description of $QCRMCALL form ^CURC command.
V1.9	2021-5-21	1. Modify the AT+CGREG parameter description 2. Modify the AT+CEREG parameter description
V2.0	2021-10-30	1. Add 8.16 AT^SRVST commands 2. Add 8.17 AT^NETSCAN commands 3. Add 10.15 AT+ECMDUP commands 4. Add 13.4 CPCM parameters 5. Add 2.12 AT+CPAS commands 6. Add 2.13 AT+RESTORE commands
V2.1	2021-11-29	1. Modify 3.12 command example 2. Add 8.18 AT^NWCFG=”ims_enable” commands 3. Add 8.19 AT^PLMN commands 4. Add 8.20 AT^RRCSTAT commands 5. Add 8.21 AT^NWCFG commands 6. Add 8.22 AT^LTEATTACHINFO commands 7. Add 8.23 AT^NWCFG=”attach_profile_list” commands 8. Add 8.24 AT^REJINFO commands 9. Add 8.25 AT^MAPCFG=”dhcp” commands 10. Add 14.4 AT+GPIO commands

		11. Add 7.17 ^SMMEMFULL commands
V2.2	2022-02-10	1. Add AT+DATABURS 2. Support SLM828G 3. Add 8.26 AT^NWCFG=”acqdb_clear” commands 4. Add 8.27 AT^NWCFG=”acqdb_disable” commands
V2.3	2022-02-24	1. Modify 7.13 AT^STSF parameter description 2. Add 8.28 AT^NWCFG="disable_rplmn" commands
V2.4	2022-04-18	1. 10.7 AT+CGDCONT. Remark the cid value range 2. 10.8 AT$QCPDPP. Remark the cid value range 3. 10.9 AT^AUTHDATA. Modify query command connection error
V2.5	2022-05-18	1.Add 2.11 AT+TEMPLVL temperature control level command 2.Add 2.13 AT+TEMPLVLURC temperature control level active reporting function 3.Modify 10.15 AT+ECMDUP pdpid value range
V2.6	2022-5-30	1.Add AT+URCCFG test command description 2.Add module information recognition commands, include ATI/+GMI/+CGMI/+GMM/+CGMM/+GMR/+CGMR/+GSN/+CGSN/+SFHW/+SGSW/+LCTSN 3.Modify AT+CNMA test command return value 4.ModifyAT^SIMREFRESH test command return value 5.ModifyAT+CMGD test command return value 6.Add AT^SYSCFGEX test command description 7.Add AT^CELLLOCK test command description 8.Modify AT+SRVST test command return value 9.Add AT^CTZR test command description 10.Add AT^CTZR test command description 11.Add AT$QCRMCALL test command description 12.Modify AT^AUTHDATA test command description 13.Add AT+CGPADDR test command description 14.Add AT+CGCONTRDP test command description 15.Modify AT^DSFLOWQRY set command and test command description 16.Modify AT^DSFLOWRPT set command and test command description 17.Add AT+ECMDUP test command description

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1 Introduction

1.1 Scope of the document

This document presents the AT command set supported by MeiG SLM750-R2.0 module, including standard AT commands and MeiG dedicated extended AT commands. Guide users to interact with the module's commands and assist customers in their applications.

1.2 Content list

This document includes the following parts:

Chapter 1: Mainly introduce the purpose of the document, abbreviation explanation, etc.;

Chapter 2: Introduction to general related commands;

Chapter 3: Introduction to module information recognition commands;

Chapter 4: Introduction to SMS commands;

Chapter 5: Introduction to call control commands;

Chapter 6: Introduction to DTMF function commands;

Chapter 7: Introduction to SIM commands;

Chapter 8: Introduction to network service commands;

Chapter 9: Introduction to time and date commands;

Chapter 10: Introduction to data function commands;

Chapter 11: Introduction to enable/disable Sleep function;

Chapter 12: Introduction to serial port control commands;

Chapter 13: Introduction to voice control commands;

Chapter 14: Introduction to hardware and extension commands;

Chapter 15: Introduction to error codes.

1.3 Terms and Abbreviations

Table 1 Terms and Abbreviations

Abbreviation	Description
DCE	Data communication equipment
DTE	Data terminal equipment
DTR	Data Terminal Ready
EDGE	Enhanced Data rates for GSM Evolution
EFR	Enhanced Full Rate
EGSM	Enhanced GSM
EMC	Electromagnetic Compatibility
ESD	Electrostatic DSCIharge
FR	Frame Relay
GPIO	General Purpose Input Output
GPRS	General Packet Radio Service
GSM	Global Standard for Mobile Communications
HR	Half Rate
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
HSPA	HSPA High-Speed Packet Access
HSPA+	HSPA High-Speed Packet Access+
IEC	International Electro-technical Commission
IMEI	International Mobile Equipment Identity
MEID	Mobile Equipment Identifier
I/O	Input/Output

ISO	International Standards Organization
ITU	International Telecommunications Union
bps	bits per second
LED	Light Emitting Diode
M2M	Machine to machine
MO	Mobile Originated
MT	Mobile Terminated
NTC	Negative Temperature Coefficient
PC	Personal Computer
PCB	Printed Circuit Board
PCS	Personal Cellular System
PCI	Peripheral Component Interconnect
PCM	Pulse Code Modulation
PCS	Personal Communication System
PDU	Packet Data Unit
PPP	Point-to-point protocol
PS	Packet Switched
QPSK	Quadrate Phase Shift Keying
SIM	Subscriber Identity Module
UART	Universal asynchronous receiver-transmitter
USIM	Universal Subscriber Identity Module
UMTS	Universal Mobile Telecommunications System
USB	Universal Serial Bus
WCDMA	Wideband Code Division Multiple Access
TD-SCDMA	Time Division-Synchronous Code Division Multiple Access

TD-LTE	Time Division Long Term Evolution
FDD-LTE	Frequency Division Duplexing Long Term Evolution

2 General Commands

2.1 ATO Return data Status

The command is used to switch back the DCE from command mode to the online data /PPP status, and send CONNECT or CONNECT<text> result code.

Use this command to set DCE to return to online data/PPP status, and send CONNECT or CONNECT<text> result code.

Table 2 ATO operation command

Type	Command	Possible return results	Description
Execution Command	ATO[<value>]	CONNECT/CONNECT <text>	Connect successfully (<text> can be rate, error control, etc.)
		NO CARRIER	connection failed
		ERROR/+CME ERROR: <err>	<value> is not confirmed or not supported

2.2 ATE Set Command echo mode

The command is used to control whether TA echoes characters received from TE or not during AT command mode.

Table 3 ATE operation command

Type	Command	Possible return results	Description
Set Command	ATE<value>	OK	-
Command Example	ATE0 AT+COPS?	OK +COPS: 0,0,"CHINA MOBILE",7 OK	At this time, input AT+COPS? TA does not echo the characters received from TE, and directly returns the execution result of the command, without seeing the AT command to be executed.
	ATE1 AT+COPS?	ATE1 OK SIGNALIND:4 AT+COPS? +COPS: 0,0,"CHINA MOBILE",7	At this time, input AT+COPS? TA echoes the characters received from TE and returns the execution result of the command, and you can see the AT command to be executed.

	OK

Table 4 ATE parameter description

Parameter	Value	Description
<value>	0	Echo mode OFF
	[1]	Echo mode ON

2.3 AT&F Restore all TA parameters to factory configuration

Table 5 AT&F operation command

Type	Command	Possible return results	Description
Execution Command	AT&F	OK	-
Command Example	AT+CMEE?	+CMEE: 2 OK	Verbose mode <err> returns error result
	AT+CMEE=1	OK	Use numeric <err> returns error result
	AT+CMEE?	+CMEE: 1	Query the current error return result type
	AT&F	OK	Restore the error return result type to the factory configuration
	AT+CMEE?	+CMEE: 2 OK	Query the error return result type of the factory configuration

Table 6 AT&F parameter description

Command(AT&F)	Factory setting parameters
ATS0	000
ATS2	043

ATS3	013
ATS4	010
ATS5	008
ATS6	002
ATS7	000
ATS8	002
ATS9	006
ATS10	014
ATS11	095
ATS30	000
ATS103	001
ATS104	001
AT+CMEE	<n=0>
AT+COLP	<n=0>
AT+CCWA	<n=0>
ATV	<value=1>
ATE	<value=1>
ATQ	<value=0>
ATX	<value=0>
AT+CR	<mode=0>
AT+CRC	<mode=0>
AT+CLIP	<n=0>
AT+DR	<mode=0>
AT+CSDH	<show=0>
AT+CSSN	<n=0,m=0>

AT+CUSD	<n=0>
AT+CCWE	<mode=0>
AT+CAOC	<mode=1>
AT+CGREG	<n=0>

2.4 AT+CFUN Set mobile phone function

This command is used to select the function level of <fun> in ME. "All functions" indicates mobile phone's function is the most powerful; "minimum function "indicates mobile phone has the least function.

Table 7 AT+CFUN operation command

Type	Command	Possible return results	Description
Set Command	AT+CFUN=[<fun>[,<rst>]]	OK	Success
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Query Command	AT+CFUN?	+CFUN: <fun> OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Test Command	AT+CFUN=?	+CFUN: (<fun> value list),(<rst> value list) OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Command Example	AT+CFUN=0	OK	Set the function of the mobile phone to minimum, this command firstly logs off the network, then deactivates the SIM card
	AT+CFUN=1	OK	The current mobile phone functions are all functions, This command firstly actives the SIM card, then, starts the automatic network

			search+
	AT+CFUN?	+CFUN: 1 OK	-
	AT+CFUN=?	+CFUN: (0-1,4-7),(0-1) OK	-

Table 8 AT+CFUN parameter description

Parameter	Value	Description
<fun>	0	Min. functions, set as LPM (Low Power Mode) mode (the previous setting shall be non- offline mode)
	[1]	All functions, set as Online mode (the previous setting shall be non-offline mode)
	4	Prohibit the phone sending and receiving RF circuit, set as Offline mode (the previous setting shall be non-FTM mode) Note: FTM = Factory Test Mode
	5	FMT (Factory Test Mode) (the previous setting shall be online mode or FMT mode)
	6	Reset DCE (the previous setting shall be offline mode)
	7	Offline Mode
<rst>	0	Default value, become valid after setting ME as <fun>, no need to restart
	1	Set ME as<fun>, become valid after restart

The impact of the command on network registration depends on the specific manufacturer. "AT+COPS" or "AT%NRG" command is used for forced registration or forced log off.

2.5 AT+CSCS Set DTE character set command

The set command notifies character sets used by DCE and DTE to ensure that DCE and DTE can accurately convert character strings among agreed character sets.

Table 9 AT+CSCS operation command

Type	Command	Possible return results	Description
Set Command	AT+CSCS=<chset>	OK	Success

Query Command	AT+CSCS?	+CSCS: <chset> OK	Success
Test Command	AT+CSCS=?	+CSCS: (<chset> value list) OK	Return the parameter value list of CSCS command
Command Example	AT+CSCS="GSM"	OK	Set the current character set as "GSM"
	AT+CSCS?	+CSCS: "IRA" OK	Query the current character set
	AT+CSCS=?	+CSCS: ("IRA","GSM","UCS2") OK	Parameter value list of CSCS command

Table 10 AT+CSCS parameter description

Parameter	Value	Description	
<chset>	"GSM"	GSM 7bit default character set (3GPP TS 23.038 [25])	
	["IRA"]	International reference character set (ITU-T T.50[13])	
	"UCS2"	16bit multibyte universal character set (ISO/IEC10646 [32]). UCS2 value range: 0000 to FFFF. For example, "004200620063" represents three 16bit characters. Converted to decimal, which are 66, 98 and 99 respectively.	TBD

2.6 AT+CMEE Mobile device error report +CMEE command

Use the set command to enable or disable +CME ERROR: <err> result code. This code is used for indicating the errors related to ME functionality.

Table 11 AT+CMEE operation command

Type	Command	Possible return results	Description
Set Command	AT+CMEE=[<n>]	OK	-
Query Command	AT+CMEE?	+CMEE: <n> OK	-
Test Command	AT+CMEE=?	+CMEE: (<n>value list)	-

		OK	
Command Example	AT+CMEE=0 AT+CFUN=0,1	OK ERROR	Set "disable result code + CME ERROR: <err>, use ERROR"
	AT+CMEE=1 AT+CFUN=0,1	OK +CME ERROR: 4	Set "enable result code + CME ERROR: <err>, use digit <err> value" The reported error is "+CME ERROR: 4"
	AT+CMEE=2 AT+CFUN=0,1	OK +CME ERROR: operation not supported	Set "enable result code + CME ERROR: <err>, use verbose mode <err> value" The reported error is "+CME ERROR: operation not supported"
	AT+CMEE?	+CMEE: 2 OK	-
	AT+CMEE=?	+CMEE: (0,1,2) OK	-

Table 12 AT+CMEE parameter description

Parameter	Value	Description
<n>	0	Disable result code + CME ERROR: <err>, use ERROR
	1	Enable result code + CME ERROR: <err>, use figure<err> value
	[2]	Enable result code + CME ERROR: <err>, use verbose mode <err>value

2.7 AT+MGCFG Function switch control command

Table 13 AT+MGCFG operation command

Type	Command	Possible return results	Description
Set Command	AT+MGCFG=<Mgcfg_Index>[,<Mgcfg_Param1>[,<Mgcfg_Param2>[,<Mgcfg_Param3>...]]]	OK	Query command when parameter only include index; Set command when parameter include index and param
Query Command	AT+MGCFG?	OK	-

Test Command	AT+MGCFG=?	+MGCFG: 1,(0-100) +MGCFG: 2,(0-1),(0-1) +MGCFG: 3,(0-1) OK	Return all supported configuration index, name, number of parameters and corresponding parameter value range
Command Example	AT+MGCFG=1	+MGCFG: 1,0 OK	Query the configuration when index is 1, and return the name and the current parameter value when index is 1
	AT+MGCFG=1,15	OK	Set SIM card power up delay 15s
	AT+MGCFG=2,1,0 or AT+MGCFG=2,1	OK	Enable SIM card hot swap (Take effect after restart)

Table 14 AT+MGCFG parameter description

Parameter	Value	Description
<Mgcfg_Index>	1-3	Index of configuration parameter
<Mgcfg_Name>	-	Configuration parameter name
<Mgcfg_Param>	-	Configuration parameter information

Table 15 Mgcfg_Index parameter description

Index	Name	Description	Value	Description
1	sim/initdelay	<Mgcfg_Param1>: SIM card initialization delay	0-100	Unit: second (Take effect after restart)
2	sim/hotswap	<Mgcfg_Param1>: Enable SIM card hot swap	0-1	Disable (Default) Enable (Take effect after restart)
		<Mgcfg_Param2> hotswap polarity	0-1	LOW POLARITY HIGH POLARITY Note: if enable hotswap, the corresponding high and low levels should be 0/1 according to the hardware design (Take effect after restart)
3	WanPing	<Mgcfg_Param1>: WanPing switch	0-1	0- Device should not be ping when no dialing 1 Device should be ping when

no dialing (default)

2.8 AT^CURCEX / AT^CURC Unsolicited report command enable or disable

This command is used to control the unsolicited reporting of AT commands in AP-Modem form. Each unsolicited reporting command corresponds to an independent bit of a byte, and each controllable unsolicited reporting command can be controlled independently according to the demand, or all unsolicited reporting controlled by this command can be turned on or off together. Some unsolicited reporting commands have their own separate configuration commands, which need to be configured at the same time. The default value of the command is controlled by NV50044. The default values of different versions of the command may be customized differently, depending on the custom version.

The unsolicited AT command that this command supports is described in the following table.

Table 16 AT^CURCEX / AT^CURC operation command

Type	Command	Possible return results	Description
Set Command	AT^CURCEX=<mode>[,<report_cfg_map>]	<CR><LF>OK<CR><LF>	-
		<CR><LF>ERROR<CR><LF> Or: <CR><LF> +CME ERROR: <err><CR><LF>	Fail
Query Command	AT^CURCEX?	<CR><LF>^CURCEX: <mode>[,<report_cfg_map>]<CR><LF> <CR><LF>OK<CR><LF>	-
Test Command	AT^CURCEX=?	<CR><LF>^CURCEX: (0-2)[,(0-FFFFFFFF)]<CR><LF> <CR><LF>OK<CR><LF>	(among them, FFFFFFFF will increase with the increase in the number of commands that support unsolicited reporting, with a maximum length of 64 letters F)
Unsolicited report command	-	-	-
Command Example	AT^CURCEX=0	OK	-
	AT^CURCEX=2,102	OK	Be the same with AT^CURCEX=2,00000102

		^CURCEX: 2,00000102
	AT^CURCEX?	
		OK
		^CURCEX: (0-2)[,(0-FFFFFFFF)]
	AT^CURCEX=?	
		OK

Note: when the operation instruction is AT ^ CURC, the ^ CURCEX in the above table will be replaced with ^ CURC.

Table 17 AT^CURCEX / AT^CURC parameter description

Parameter	Value	Description
<mode>	0-2	Control mode, integer value, with a value of 0-2. The meaning of the value is as follows: 0: turn off the unsolicited reporting of all AT commands in the following described bit table. 1: turn on the unsolicited reporting of all AT commands in the following described bit table. 2: this mode requires the parameter <report_cfg_map> to configure the unsolicited reporting of AT commands in the following described bit table.
<report_cfg_map>	0-FFFFFFFF	Hexadecimal number string, bit configure of the unsolicited reporting command. Each bit corresponds to an unsolicited AT command, as shown in the following bit table. The value range is the hexadecimal string of 0~FFFFFFFF (input parameters without the hexadecimal leader '0x', and FFFFFFFF will increase with the increase in the number of commands that support unsolicited reporting, with a maximum length of 64 letters F), followed by the first byte, the second byte, and so on from right to left (for example, 102 is equivalent to 00000102). The value of each bit is as follows: 0: turn off unsolicited reporting. 1: turn on unsolicited reporting.

Table 18 The corresponding relationship between the bit in <report_cfg_map> and the unsolicited reporting AT command

bit3	**bit2**	**bit1**	**bit0**	
^SIMST	^MODE	^REJINFO	^SRVST	Byte 1
bit7	**bit6**	**bit5**	**bit4**	
^DSCI		^SMMEMFULL	^CPBREADY	
bit3	**bit2**	**bit1**	**bit0**	Byte 2

	^STIN	^SIMREFRESH	^SIMSLOTURC	
bit7	**bit6**	**bit5**	**bit4**	
bit3	**bit2**	**bit1**	**bit0**	
^HCSQ	^CACELLURC	^MMINFO	^PLMN	Byte 3
bit7	**bit6**	**bit5**	**bit4**	
^THERMLVL	^DSAMBR	^RRCSTAT	^LENDC	
bit3	**bit2**	**bit1**	**bit0**	
			^DSFLOWRPT	Byte 4
bit7	**bit6**	**bit5**	**bit4**	

2.9 AT+ADCREAD Get the ADC voltage

Query the voltage of a path ADC

Table 19 AT+ADCREAD operation command

Type	Command	Possible return results	Description
Set command	AT+ADCREAD=<n>	+ADCREAD: value OK	Query ADC succeeded
		ERROR	Not supported / Query failed
Query command	AT+ADCREAD?		NO SUPPORT QUERY
Test command	AT+ADCREAD=?	+ADCREAD: (0:ADC0,1:ADC1) OK	SUPPORT
		ERROR	NO SUPPORT
example	AT+ADCREAD=1	+ADCREAD: value OK	Return ADC voltage

	ERROR	Get ADC fail

Table 20 AT+ADCREAD parameter description

Type	Value	Description
n	0	Query ADC0 voltage unit (uV)
	1	Query ADC1 voltage unit (uV)
value	ADC voltage	unit
		uV

2.10 AT+TEMP Measure the real-time temperature of the equipment

This command is used to measure the real-time temperature of the equipment. The currently supported devices are pmic, xo_therm，pa_therm and tenser.

Table 21 AT+TEMP operation command

Type	Command	Possible return results	Description
Set Command	AT+TEMP	+TEMP: <sensor>,<temp> [....] OK	Report the temperature of equipment
Test Command	AT+TEMP =?	OK	
Command Example	AT+TEMP	AT+TEMP +TEMP: “pmic”,”25” +TEMP: “xo_therm”,”24” +TEMP: “pa_therm”,”25” +TEMP: “tenser”,”25” OK	At Command is used to query the real-time temperature of equipment and report the data (The output temperature is 65535, indicating that the read temperature is invalid)

Table 22 AT+TEMP parameter description

Parameter	Value	Description
<pmic>	integer	Real-time temperature of the pmic,The temperature range is -273℃ to +273℃
<xo_therm>	integer	Real-time temperature of the xo_therm ,The temperature range is -273℃ to +273℃
<pa_therm >	integer	Real-time temperature of the pa_therm ,The temperature range is -273℃ to +273℃
<tenser>	integer	Real-time temperature of the CPU ,The temperature range is -273℃ to +273℃

2.11 AT+TEMPLVL Temperature control level command

Used to query the current temperature level of each sensor.

Table 23 AT+TEMPLVL operation command

Type	Command	Possible return results	Description
Set command	AT^TEMPLVL=<sensor_name>,<level>	+CME ERROR: operation not supported	Currently, the command is not supported
Query command	AT+TEMPLVL?	+TEMPLVL: "sensor_name","level" ... OK	
Test command	AT+TEMPLVL=?	OK	-
	AT+TEMPLVL?	at+templvl? +TEMPLVL: "pa","0" +TEMPLVL: "modem","0" +TEMPLVL: "cpuv_restriction_cold","0" +TEMPLVL: "cx_vdd_limit","0" OK	

Table 24 AT+TEMPLVL parameter description

Parameter	Value	Description

<sensor_name>	Query sensor_name in the command list	The temperature sensor
<level>	0-3	Temperature level

2.12 AT+TEMPLVLURC Temperature control level active reporting function

The modem automatically reports the temperature control status of each sensor

The active reporting function is controlled by its own setting command and can be enabled or disabled by default

Table 25 AT+TEMPLVLURC operation command

Type	Command	Possible return results	Description
Active reporting		+TEMPLVLURC: <sensor_name>,<level>	
Set command	AT+TEMPLVLURC=<enable>	OK	Restart and save
Query command	AT+TEMPLVLURC?	+TEMPLVLURC: <enable> OK	
Test command	AT+TEMPLVLURC=?	+TEMPLVLURC: (0-1) OK	-
Command example	AT+TEMPLVLURC=1	OK	
	-	+TEMPLVLURC: pa,2	Active reporting
	AT+TEMPLVLURC?	+TEMPLVLURC: 0 OK	
	AT+TEMPLVLURC=?	+TEMPLVLURC: (0-1) OK	

Table 26 AT+TEMPLVLURC parameter description

Parameter	Value	Description
<enable>	0-1	0: disabled (default) 1: enable

<sensor_name>	Sensor name	The temperature sensor
<level>	0-3	Temperature control level

2.13 AT+URCCFG Set the message unsolicited report port

Table 27 AT+URCCFG operation command

Type	Command	Possible return results	Description
Set Command	AT+URCCFG=”urcport”[,<urc_port>]	If <urc_port> isn’t issued, query the current configuration of urc port: +URCCFG: “urcport”,<urc_port> OK If <urc_port> is issued, and the urc port is successfully set: OK If <urc_port> is issued, but the urc port is not set: ERROR	-
Test Command	AT+URCCFG=?	+URCCFG: “urcport”,(list of supported <urc_port>s) OK	Returns all supported urc ports
Command Example	AT+URCCFG=”urcport”,”usbat”	OK	Set the urc port as AT port
	AT+URCCFG=”urcport”	+URCCFG: “urcport”,”usbat“ OK	Query the current urc port
	AT+URCCFG=?	+URCCFG: “urcport”,(”usbat“,”usbmodem”,”uart1”,”cmux1”,”cmux2”,”cmux3”,”all”) OK	Query the AT+URCCFG. support ports. The ports supported by different platforms may not be the same, and the returned strings may different.

Table 28 AT+URCCFG parameter description

Parameter	Value	Description

<urc_port>	String type	Set the message unsolicited report port, the following values are supported (the ports supported by different platforms may not be the same, and use the test command to query the ports) : “usbat” – AT port “usbmodem” – Modem port “uart1” – uart “cmux1” – CMUX1 “cmux2” – CMUX2 “cmux3” – CMUX3 “all” – all of the ports

2.14 Mobile active AT commands AT + CPAS

This command only supports voice status query

Table 29 AT+CPAS operation command

Type	Command	Possible return results	Description
Test command	AT+CPAS=?	+CPAS: (list of supported <pas>s) OK	-
Executive command	AT+CPAS	+CPAS: <pas> OK	-
		ERROR	

Table 30 AT+CPAS parameter description

Parameter	Value	Description
<pas>	0	Ready (TE can send commands to MT)
	3	Ringing (ringing, but MT can execute TE commands)
	4	Call on (a call is ongoing, but MT can perform commands) of TE

2.15 AP restore factory Settings AT AT+RESTORE

This command is used to restore AP factory Settings, including setting the log output level, port mode, and user data saved in /usrdata.

Table 31 AT+RESTORE operation command

Type	Command	Possible return results	Description
Set command	AT+RESTORE=<mode>	<CR><LF>OK<CR><LF>	-
		<CR><LF>ERROR/+CME ERROR: <err><CR><LF>	FAIL
	AT+RESTORE=0	<CR><LF>OK<CR><LF>	Restore the default Settings and retain user data
	AT+RESTORE=1	<CR><LF>OK<CR><LF>	Restore the default Settings and retain user data
Test command	AT+RESTORE=?	<CR><LF>+RESTORE: <mode><CR><LF> <CR><LF>OK<CR><LF>	-
Command example	AT+RESTORE=0	OK	
	AT+RESTORE=1	OK	
	AT+ RESTORE=?	+RESTORE: (0-1) OK	

Table 32 AT+RESTORE parameter description

Parameter	Value	Description
<mode>	0~1	0: Restore log configuration and port mode, and retain user data. (0 option is not currently supported) 1: Reset usrdata partition all content, including the recovery log configuration, port, etc.;

3 Module information recognition commands

3.1 ATI TA manufacturer information command

Table 33 ATI operation command

Type	Command	Possible return results	Description
Execution Command	ATI	OK	TA returns the ME product information
Command Example	ATI	Manufacturer: MEIG INCORPORATED Model: SRM815 Revision: SRM815_2.0.2_EQ004 ESN: +GSN: 0x80809B4E +GCAP: +CGSM IMEI: 869635010008467 MEID: A1000010FE8056 OK	Returned value different from product. The following is an example.

3.2 AT+GMI TA manufacturer ID command

Table 34 AT+GMI operation command

Type	Command	Possible return results	Description
Execution Command	AT+GMI	+GMI: MEIG INCORPORATED OK	TA returns the manufacturer information This value may different in custom versions. The following is an example.
Test Command	AT+GMI=?	OK	-

3.3 AT+CGMI Query manufacturer name command

Table 35 AT+CGMI operation command

Type	Command	Possible return results	Description
Execution Command	AT+CGMI	<manufacturer> OK	DCE returns the manufacturer name
Test Command	AT+CGMI=?	OK	
Command Example	AT+CGMI	+CGMI: MEIG INCORPORATED OK	This value may different in custom versions. The following is an example.
	AT+CGMI=?	OK	

3.4 AT+GMM TA identifier command

Table 36 AT+GMM operation command

Type	Command	Possible return results	Description
Execution Command	AT+GMM	+GMM: SRM815 OK	TA returns the product model; 'X' is a character in {A,B,C,I}. This value different from product. The following is an example.
Test Command	AT+GMM=?	OK	-

3.5 AT+CGMM Model query command

Table 37 AT+CGMM operation command

Type	Command	Possible return results	Description
Execution Command	AT+CGMM	<model> OK	DCE returns the product model.
Test Command	AT+CGMM=?	OK	
Command Example	AT+CGMM	+CGMM: SRM815 OK	Return the module model. This value different from product. The following is an example.
	AT+CGMM=?	OK	

3.6 AT+GMR TA query version information command

Table 38 AT+GMR operation command

Type	Command	Possible return results	Description
Execution Command	AT+GMR	<revision> OK	-
Test Command	AT+GMR=?	OK	-
Command Example	AT+GMR	+GMR: SRM815_6.0.1_EQ100 OK	This value different from version. The following is an example.
	AT+GMR=?	OK	-

3.7 AT+CGMR Query version information command

Table 39 AT+CGMR operation command

Type	Command	Possible return results	Description
Execution Command	AT+CGMR	<revision> OK	DCE returns product firmware version information
Test Command	AT+CGMR=?	OK	
Command Example	AT+CGMR	+CGMR: SRM815_6.0.1_EQ100 OK	This value different from version. The following is an example.
	AT+CGMR=?	OK	The current version supports this command.

3.8 AT+GSN Query product IMEI number command

Table 40 AT+GSN operation command

Type	Command	Possible return results	Description
Execution Command	AT+GSN	<IMEI>	DCE returns the IMEI number.

		OK	
Test Command	AT+GSN=?	OK	-
Command Example	AT+GSN	869635010008467 OK	This value different from product. The following is an example.
	AT+GSN=?	OK	-

3.9 AT+CGSN Query product IMEI number command

Table 41 AT+CGSN operation command

Type	Command	Possible return results	Description
Execution Command	AT+CGSN	<IMEI> OK	DCE returns the IMEI number.
Test Command	AT+CGSN=?	OK	
Command Example	AT+CGSN	869635010008012 OK	This value different from product. The following is an example.
	AT+CGSN=?	OK	The current version supports this command.

3.10 AT+SFHW Query hardware version number command

Table 42 AT+SFHW operation command

Type	Command	Possible return results	Description
Execution Command	AT+SFHW	HardwareVersion: <XXXXX> OK	-Return the hardware version number
Command Example	AT+SFHW	HardwareVersion: SRM815_MB_V1.00 OK	This value different from version. The following is an example.

3.11 AT+SGSW Query software version number command

Table 43 AT+SGSW operation command

Type	Command	Possible return results	Description
Execution Command	AT+SGSW	SoftwareVersion: <XXX> InnerVersion: <XXXXX> OK	
Command Example	AT+SGSW	SoftwareVersion: SRM815_6.0.1_EQ100 InnerVersion: SRM815-EA_EQ100_00B.B1EX55.BR2501_200121_600_C00_V01 Build_date: [Mar 13 2020 11:55:09] OK	This value different from version. The following is an example.

3.12 AT+LCTSN Read and modify IMEI number and SN number command

Table 44 AT+LCTSN operation command

Type	Command	Possible return results	Description
Reading Command	AT+LCTSN=<option>,<type>	+LCTSN:<SN>/<IMEI> OK	Success
		ERROR	Return ERROR when null
Modification Command	AT+LCTSN=<option>,<type>, <value>	AT+LCTSN=<option>,<type>, <value> OK	
Test Command	AT+LCTSN=?	+LCTSN:(0-1,0-15) OK	-
Command Example	AT+LCTSN=1,7,"3520990017614823" AT+LCTSN=0,7	OK +LCTSN:"3520990017614823" OK	This value different from version. The following is an example.
	AT+LCTSN=1,5,"M815EA4AYA031300064" AT+LCTSN=0,5	OK +LCTSN:"750MASRAS9041900040" OK	This value different from version. The following is an example.
	AT+LCTSN=1,6,"B4D4B25F3E01" AT+LCTSN=0,6	OK +LCTSN:"B4D4B25F3E01" OK	This value different from version. The following is an example.

AT+LCTSN=1,8,"1" AT+LCTSN=0,8	OK +LCTSN:"1" OK	IMEISV<value> parameter range 0-99. This value different from version. The following is an example.

Table 45 AT+LCTSN parameter description

Parameter	Value	Description
<option>	0: Read	
	1: Write	
<type>	(5,6,7,8,9,11,13,15)	5：SN； 6：MAC； 7：IMEI； 8：IMEISV； 9：MEID； 11：SN2； 13：SN3； 15：SN4；
<value>	String	Corresponding to the < type > string value

4 SMS related commands

4.1 AT+CMGF Short message format set command

The set command is used for specifying the short message input and sending format, i.e. notifying the TA input and output short message format. The current version supports PDU and TEXT short which can be switched by AT.

Table 46 AT+CMGF operation command

Type	Command	Possible return results	Description
Set Command	AT+CMGF=[<mode>]	OK	Success
		ERROR/+CMS ERROR: <err>	Fail
Query Command	AT+CMGF?	+CMGF: <mode> OK	-
Test Command	AT+CMGF=?	+CMGF: (<mode> value list) OK	-
Command Example	AT+CMGF?	+CMGF: 0 OK	Query the current short message format. PDU format is default.
	AT+CMGF=1	OK	Set the short message format as text format.
	AT+CPMS=?	+CMGF: (0-1) OK	

Table 47 AT+CMGF parameter description

Parameter	Value	Description
<mode> Display short message sending, list, reading and writing command and the format of active reporting of received SMS.	0	PDU mode, "0" as default
	1	Text mode

4.2 AT+CSCA SMS center address set command

This command is applicable to PDU and text format. This set command can be used for upgrading SMSC (Short Message Service Center) address. This address can be used for sending mobile terminal SMS. In text mode, the command can be sent and written by using this setting; in PDU mode, the command can be sent and set by this setting with the premise of SMSC address length after PDU coding as 0. It must be noted herein that although users can set the address of SMS center, they can't do what they want, otherwise the SMS will not be sent out. Therefore, before sending short messages, the user shall know the SMS center address of SIM card.

Table 48 AT+CSCA operation command

Type	Command	Possible return results	Description
Set Command	AT+CSCA=<sca>[,<tosca>]	OK	Success
		ERROR/+CMS ERROR: <err>	Fail
Query Command	AT+CSCA?	+CSCA:<sca>,<tosca> OK	-
Test Command	AT+CSCA=?	OK	The current version supports this command.
Command Example	AT+CSCA="+8613800210500",145	OK	Set the SMS center address and save it in SIM card
	AT+CSCA?	+CSCA: "+8613010314500",145 OK	The SMS center address of current SIM card is +8613800210500
	AT+CSCA=?	OK	-

Table 49 AT+CSCA parameter description

Parameter	Value	Description
<sca>	-	GSM 04.11 RP SC uses character address value field; BCD figure (or GSM default alphabetic character) shall be converted into character; address type specified by <tosca>
<tosca>	-	Service center address format; GSM 04.11 RP SC uses integer 8-digit address type (default value: <toda>) 129 ISDN/phone numbering mode design, national / world unknown. 145 ISDN/phone numbering mode design, world number.

	161 ISDN/phone numbering mode design, national number. 128~255 other values: refer to section 10.5.4.7 in GSM 04.08

The format specified by the service supplier shall be used during inputting SMS center.

4.3 AT+CSMP Text format short message parameter set command

This command is only applicable to text format. During sending short messages to network side or saving short message in the memory, this set command can be used to select the required additional parameter value. Besides, it can also be used to set the validity period of receiving this short message from SMSC (<vp> value range: 0 ~ 255) or define the absolute time of termination of validity period (<vp> is character string).

<vp> format is defined by <fo>. If TA supports the enhanced validity period format EVPF, please refer to GSM 03.40). The hexadecimal character strings shall be placed in double quotes (please refer to <pdu>).

Table 50 AT+CSMP operation command

Type	Command	Possible return results	Description
Set Command	AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]	OK	Success
		ERROR/+CMS ERROR: <err>	Fail
Query Command	AT+CSMP?	+CSMP:<fo>,<vp>,<pid>,<dcs> OK	-
Test Command	AT+CSMP=?	OK	Support
Command Example	AT+CSMP=17,7,0,8	OK	Set the TP validity period as 167, i.e. 24h; SMS digital coding mode is UCS2
	AT+CSMP?	+CSMP: 17,167,0,8 OK	
	AT+CSMP=?	OK	

Table 51 AT+CSMP parameter description

Parameter	Value	Description
<fo>	-	Depend on this command or result code; first 8 digits of GSM 03.40SMS-DELIVER; SMS-SUBMIT(default value: 17); or adopt the integer SMS-COMMAND (default value: 2)

<vp>	-	Depend on SMS-SUBMIT<fo> setting; adopt the integer (default value: 167) or time-character (please refer to <dt>) or enhanced (hexadecimal coding character strings in double quotes, support $(EVPF)$) GSM 03.40 TP-term of validity
<pid>	-	Please refer to GSM 03.40; adopt the integer TP- protocol - identification (default value: 0)
<dcs>	-	Depend on this command or result code; SMS data coding scheme in GSM 03.38; or adopt integer cell broadcast data coding scheme

Default value description:

<fo>：17(0x11)

Obtain 6 domains of SMS-SUBMIT short message parameters defined by <fo> based on MTI (please refer to GSM 03.40).

Table 52 6 domains of SMS-SUBMIT type short message parameters

b7	b6	b5	b4	b3	b2	b1	b0
RP	UDHI	SRR	VPF	-	RD	MTI	-

MTI: message type

b1=0&b0=0 represent SMS-DELIVER

b1=0&b0=1 represent SMS-SUBMIT

Please refer to GSM 03.40 for other message types

VPF: define the validity period format of short message

b4=1&b3=0：Relative format

<vp>: 167 defines the validity period of short message

If VPF is relative format, the definition is as follows:

Table 53 VPF definition

<vp> value	Validity period
0-143(00 to 8F)	(vp + 1) x5 min
144-167(90 to A7)	12h + ((vp – 143)×30min

168-196(A8 to C4)	(vp – 166) x 1 day
197-255(C5 to FF)	(vp – 192) x 1 week

<pid>: 0-255 protocol identifier, integer format. 0 as default. Refer to section 9.2.3.9. in 07.05

<dcs>: 0-255 data decoding scheme. Refer to GSM 03.38. UCS2.

In text mode, during saving SMS-DELIVER short messages of TE into preferred memory (please refer to short message writing into memory command "+CMGW), <vp> field can replace <scts>; as for parameter <dcs>, different SIM cards can have different default values and are related to coding schemes used during sending short message in text mode. For example, dcs (8) represents UCS2 coding; dcs (0) represents ASCII code.

4.4 AT+CNMI TE new short message indication command

This command is used for PDU format and text format. When TE is in the using state (such as: DTR signal is in "ON" state), this set command can set that how the new short message can be sent to TE from network side. If TE is in the standby state (such as: DTR signal is in "OFF" state), the short message receiving flow shall be in accordance with GSM 03.38. If DTR signal is unavailable or the signal state is neglected (V.25ter command: &D0), +CNMA confirmation flow can be used to ensure available transmission of short message. "SMS selection" command+CSMS shall be used for testing whether ME supports to receive SM and CBM, and deciding whether the short message directly sent to TE needs confirmation (please refer to +CNMA command).

Table 54 AT+CNMI operation command

Type	Command	Possible return results	Description
Set Command	AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	OK	Success
		ERROR/+CMS ERROR:<err>	Fail
Query Command	AT+CNMI?	+CNMI:<mode>,<mt>,<bm>,<ds>,<bfr> OK	-
Test Command	AT+CNMI=?	+CNMI: (<mode> value list),(<mt> value list),(<bm> value list),(<ds> value list),(<bfr> value list) OK	-
Command Example	AT+CNMI=2,1	OK +CMTI: "SM",1	After saving short message into ME or SIM card, give the new short message

		command.
AT+CNMI=1,2	OK +CMT:"+8613761928888",, "13/08/03,13:50:19+32" Hello	Receive the short message and directly give the short message content. Current code AT+CNMI=2, 2 is not allowed; directly return error.
AT+CNMI?	+CNMI: 2,1,0,0,0 OK	-
AT+CNMI=?	+CNMI: (0,1,2),(0,1,2,3),(0,2), (0,1,2),(0,1) OK	-

Table 55 AT+CNMI parameter description

Parameter	Value	Description
<mode> treatment situation of non-request result code specified by control	[0]	Non-request result code in buffer TA; if TA result code buffer is full, the result code indication can be saved in other storage spaces in a buffering way or the earliest non-request result code indication shall be discarded and replaced as the latest received indication.
	1	When TA-TE link is occupied (such as: in line data mode), discard the result code indication, and refuse to receive the short message non-request result code. Otherwise, directly send to TE.
	2	When TA-TE link is occupied (such as: in line data mode), buffer the TA non-request result code; when the link is released, all result codes shall be sent to TE. Otherwise, directly send to TE.
<mt> the rule of saving received short message depends on the data coding scheme (please refer to GSM 03.38 [2]); Optimally select the short message memory command (+CPMS) setting and value	[0]	No SMS-DELIVER indication is sent to TE
	1	If SMS-DELIVER is stored in ME/TA, the storage position can be sent to TE by non-request result code+CMTI: <mem>,<index>.
	2	Use the non-request result codes of following commands: +CMT([<alpha>],<length><CR><LF><pdu> (enable PDU mode)) or +CMT(<oa>,[<alpha>],<scts> ,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>(enable text mode)); SMS-DELIVER short message (short message with type 2 and in short message waiting indication group (stored short message)) is directly sent to TE.

		Note: if AT command interface is used as the unique display device, ME shall support the storage of short message with type 0 and in short message waiting indication group (discard short message).
	3	By using non-request result code defined by <mt>=2, SMS-DELIVER short message with type 3 can be directly sent to TE. All short message display results in other data coding schemes follow <mt>=1 definition.
<bm> the rule of saving received CBM depends on the data coding scheme (please refer to GSM 03.38 [2]); select the setting and value of cell broadcasting short message command +CSCB	[0]	No CBM indication is sent to TE.
	2	The received CBM is directly sent to TE in following formats: +CBM(<length><CR><LF><pdu>(enable PDU mode) or +CBM(<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>(enable text mode))
<ds>	[0]	No SMS-STATUS-REPORTS is sent to TE.
	1	SMS-STATUS-REPORT short message is directly sent to TE in following format: +CDS(<length><CR><LF><pdu>(enable PDU mode)) or+CDS(<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>(enable text template))
	2	If SMS-STATUS-REPORT is saved into ME/TA, the storage position indication is sent to TE use active result code: +CDSI: <mem>,<index>
<bfr>	[0]	When <mode> is 1～3, the result code in TA buffer defined by this command is sent to TE (before sending, OK shall be received)
	1	During inputting <mode> 1～3, the buffer of non-request result code in TA defined by this command shall be cleared.

4.5 AT+CMGL Short message query command

This short message is applicable to PDU format and text format. Use the set command to query the optimal short message in memory <mem1>. The short message with state value as <stat> is displayed in TE. If this short message is in "received and not read" state, its state will be changed as "received and read".

Table 56 AT+CMGL operation command

Type	Command	Possible return results	Description
Execution Command	AT+CMGL [=<stat>]	OK	Success
		ERROR/+CMS ERROR:<err>	Fail

		+CMGL:<index>,<stat>,[<alpha>], <length><CR><LF>< pdu><CR><LF> +CMGL:<index>,<stat>,[<alpha>], <length><CR><LF><pdu>[...]] OK	PDU mode (+CMGF=0), the command is executed successfully.
		+CMGL:<index>,<stat>,<oa/da>, [<alpha>],[<scts>][,<tooa/toda>, <length>]<CR><L F><data>[<CR><LF> +CMGL:<index>,<stat>,<da/oa>, [<alpha>],[<scts>][,<tooa/toda>, <length>]<CR><LF><data>[...]] OK	Text mode (+CMGF=1) and the command is executed successfully; SMS-SUBMIT and/or SMS-DELIVER
		+CMGL:<index>,<stat>,<fo>,<mr>, [<ra>],[<tora>],<scts>,<dt>,<st> [<CR><LF> +CMGL:<index>,<stat>,<fo>,<mr>, [<ra>],[<tora>],<scts>,<dt>,<st>[...]] OK	SMS-STATUS-REPORT
		+CMGL:<index>,<stat>,<fo>,<ct> [<CR><LF> +CMGL:<index>,<stat>,<fo>,<ct>[...]] OK	SMS-COMMAND
Test Command	AT+CMGL=?	+CMGL: (<stat> value list) OK	-
Command Example	AT+CMGF=1 AT+CMGL="REC READ"	+CMGL:0,"REC READ", "+8613761928888", ,"13/08/02,13:29:58+32" Hello +CMGL:1,"REC READ", "+8613761928888",,"13/08/02,13:30:21+32" Hello again OK	List all short messages in current storage area (SIM card) in text format
	AT+CMGL=?	+CMGL: "REC UNREAD","REC READ", "STO UNSENT","STO SENT","ALL" OK	Once the new short message list is read, these short messages will be marked as the read short messages.

Table 57 AT+CMGL parameter description

Parameter	Value	Description
<stat>	"REC UNREAD"	Use text mode (+CMGF=1), received and not read short message
	"REC READ"	Use text mode (+CMGF=1), received and read short message
	"STO UNSENT"	Use text mode (+CMGF=1), stored and not sent short message
	"STO SENT"	Use text mode (+CMGF=1), stored and sent short message
	"ALL"	Use text mode (+CMGF=1), all short message
	0	Use PDU mode (+CMGF=0), received and not read short message
	1	Use PDU mode (+CMGF=0), received and read short message
	2	Use PDU mode (+CMGF=0), stored and not sent short message
	3	Use PDU mode (+CMGF=0), stored and sent short message
	4	All short messages
<alpha>	-	Character; in the mode of letter and number mixed mode, MT phone book records corresponding <da> or <oa>; the application of this feature is related to manufacturer; the used character set shall be same with the character set selected by using "TE character set selection" command +CSCS (please refer to the definition of this command in TS 07.07)
<dt>	-	GSM 03.40 with time - character string format TP-DSCIharge-Time: "yy/MM/dd,hh:mm:ss±zz", in short messages with this format, characters represent year (last 2 digits), month, date, hour, minute, second and time zone. For example: 6th of May 1995,22:10:00 GMT+2 hours equal to "95/05/06,22:10:00+08".
<fo>	-	Depend on this command or result code of this command: GSM 03.40 SMS-DELIVER, SMS-SUBMIT short messages (default value: 17) or first 8 digits of integer SMS-COMMAND short message (default value: 2)
<length>	-	Integer value; in text mode (+CMGF=1), the character represents <data>(or <deata>) short message text length; 8-digit real TP data unit length (i.e.: 8-digit character in RP layer SMSC address will not be included in this length)
<ct>	-	Integer GSM 03.40 TP-Command-Type(default value: 0)

<da>	-	TP-Destination-Address address - value field in integer GSM 03.40; convert BCD value (or default GSM letter format character) into the character in currently selected TE character set (please refer to +CSCS command in TS 07.07); address type given by <toda>
<index>	-	integer; value within address code range supported by the associated memory
<mr>	-	Integer GSM 03.40TP-Message-Reference
<oa>	-	"Address - value" field in character GSM 03.40 TP-Originating-Address; convert BCD value (or character with GSM letter format by default) into character; <tooa> given address type
<pdu>	-	As for SMS: GSM 03.40 TPDU, hexadecimal, follow GSM04.11 SC address; ME/TA converts all 8-digit characters in TP data unit into hexadecimal figure which includes 2 IRA characters (such as: 8-digit character with integer 42 as 2-digit figure (2A, i.e. IRA50 and 65) is sent to TE). As for CBS: GSM 03.41TPDU with hexadecimal format is used
<ra>	-	"Address - value" field in character GSM 03.40 TP-Recipient-Address; convert BCD value (or character with default GSM letter format) into character; <tora>given address type
<scts>	-	GSM 03.40 TP- Service-Centre-Time-Stamp with “time-character string” format
<st>	-	Integer GSM 03.40 TP-Status
<toda>	-	In case of 8-digit “type-address” field in integer GSM 04.11 TP-Destination-Address (when the first character of <da> is +(IRA 43), the default value is 145; in other cases, the default value is 129)
<tooa>	-	8-digit “type-address” field in integer GSM 04.11 TP-Originating-Address
<tora>	-	8-digit “type-address” field in integer GSM 04.11 TP-Recipient-Address (please refer to <toda> for default value)

4.6 AT+CMGR Short message reading command

This setting value can return the <index> short message in short message memory <mem1> to TE. If this short message is in "received and not read" state, its state will be changed into "received and read".

Table 58 AT+CMGR operation command

Type	Command	Possible return results	Description
Set Command	AT+CMGR=<index>	OK	Success
		+CMS ERROR: <err>	Fail
		+CMGR:<stat>,[<alpha>],<length><CR><LF><pdu>	Use PDU mode(+CMGF=0) and this command is

		OK	executed successfully
		+CMGR:<stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> OK	Use text mode (+CMGF=1) and this command is executed successfully; SMS-DELIVER
		+CMGR:<stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data> OK	Use text mode (+CMGF=1) and this command is executed successfully; SMS-SUBMIT
		+CMGR:<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> OK	Use text mode (+CMGF=1) and this command is executed successfully; SMS-STATUS-REPORT
		+CMGR:<stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>] OK	Use text mode (+CMGF=1)and this command is executed successfully; SMS-COMMAND
Test Command	AT+CMGR=?	OK	-
Command Example	AT+CPMS="SM" AT+CMGF=1 AT+CMGR=2	AT+CPMS="SM" +CPMS: 11,50,0,23,11,50 OK OK +CMGR: "STO UNSENT","13681737903",test OK	This text format is used for reading the short message which has not been read. The short message is in <index>=2 area in SIM card.
	AT+CPMS="ME" AT+CMGF=0 AT+CMGR=2	+CMGR: 1,,25 0891683108200105F0040D9168310 6718481F700000180203103122305 C8329BFD06 OK	Read the short message with PDU format. This short message is in <index>=2 area in ME.
	AT+CMGR=?	OK	

Remark: in case of no short message, AT query short message will be OK.

Table 59 AT+CMGR parameter description

Parameter	Value	Description
<dcs>	-	Depend on this command or result code of this command; GSM 03.38 adopts integer short message data coding scheme (default value: 0) or cell broadcasting data coding scheme
<cdata>	-	In text mode, return the GSM03.40TP-Command-Data in result; ME/TA converts all 8-digit characters into hexadecimal figure which includes 2 IRA characters (such as: 8-digit character with integer 42 as 2-digit character (2A, i.e. IRA50 and 65) is sent to TE).
<pid>	-	Use integer (default value: 0) GSM 03.40 TP-Protocol-Identifier
<sca>	-	Use "address - value" field in character GSM 04.11; convert BCD value (or default GSM letter format character) into the character in currently selected TE character set (please refer to +CSCS command in TS 07.07); address type given by <toda>
<tosca>	-	8-digit "type - address" field in integer GSM 04.11 RP SC (please refer to <toda> for default value)
<vp>	-	Depend on SMS-SUBMIT<fo> setting; adopt integer (default value: 167) or time-character string format (please refer to <dt>) or enhanced format (hexadecimal coding character string in double quotes, support GSM 03.40 TP-validity period of $(EVPF)$)

4.7 AT+CMGS Short message sending command

This set command can send short message(SMS-SUBMIT) from TE to network side. After successful sending, the short message reference value <mr> will return to TE. During receiving the result code of non-request sending state report, this value can be used for short message recognition. This command will not store the short message.

Table 60 AT+CMGS operation command

Type	Command	Possible return results	Description
Set Command	AT+CMGS=<da>[,<toda>]<CR> text to send <ctrl-Z/ESC>	+CMGS:<mr>[,<scts>] OK	Text mode (+CMGF=1) Successful sending
		ERROR/+CMS ERROR: <err>	Text mode (+CMGF=1) Failed sending
	AT+CMGS=<length><CR> PDU to send <ctrl-Z/ESC>	+CMGS:<mr>[,<ackpdu>] OK	PDU mode (+CMGF=0) Successful sending

		ERROR/+CMS ERROR: <err>	PDU mode (+CMGF=0) Failed sending
Test Command	AT+CMGS=?	OK	-
Command Example	AT+CMGF=1 AT+CSCS="IRA" AT+CSMP=,,0,0 AT+CNMI=2,1 AT+CMGS="13761928888" >Hello <ctrl-Z/ESC>	+CMGS: 119 OK	send text short message "13761928888"--receiver number Hello-- short message content
	AT+CMGF=0 AT+CSCS="UCS2" AT+CMGS=25 AT+CSMP=,,0,8 AT+CNMI=2,1 >0011000D91685191512863F10008000A00480065006C006C006F <ctrl-Z/ESC>	+CMGS: 120 OK	Send PDU short message (refer to GSM 04.11 and 03.40) 25--length of PDU string of short message 0011000D91683106718481F70008000A00480065006C006C006F--PDU string, the short message content represented by PDU string is "Hello". The received number and the sending content shall be sent after conversion by PDU coding tool, and there shall be no carriage return at the end of data.
	AT+CMGS=?	OK	

Remark: as for sending short message, Ctrl+Z can be successfully sent after inputting the message content.

Table 61 AT+CMGS parameter description

Parameter	Value	Description
<da>	-	"Address - value" field in GSM 03.40 TP-Destination-Address, character; convert BCD value (or default GSM letter format character) into the character in currently selected TE character set (please refer to +CSCS command in TS 07.07); address type given by <toda>
<pdu>	-	As for SMS: GSM 03.40 TPDU, hexadecimal, follow GSM04.11 SC address; ME/TA converts all 8-digit characters in TP data unit into hexadecimal figure which includes 2 IRA characters (such as: 8-digit character with integer 42 as 2-digit figure (2A, i.e. IRA50 and 65) is sent to TE). As for CBS: GSM 03.41 TPDU with hexadecimal format is used
<length>	-	Integer value; in text mode (+CMGF=1), <data>(or <deata>) short message text length represented by character; in PDU mode (+CMGF=0), 8-digit real TP

		data unit length (i.e.: 8-digit character in RP layer SMSC address will not be included in this length, maximum PDU length is 155)
<mr>	-	Integer GSM 03.40 TP-Message-Reference
<scts>	-	Time - character (please refer to <dt>) GSM 03.40 TP-Service-Centre-Time-Stamp
<dt>	-	Time - character GSM 03.40 TP-DSCIharge-Time: "yy/MM/dd,hh:mm:ss±zz", in short message with this format, characters represents represent year (last 2 digits), month, date, hour, minute, second and time zone. For example: 6th of May 1995, 22:10:00 GMT+2 hours equal to "95/05/06, 22:10:00+08".
<ackpdu>	-	GSM 03.40 RP-User-Data element in RP-ACK PDU; in short message, the format is same with <pdu> format, but, there is no GSM 04.11 SC address field; this parameter shall be placed in double quotes, same with the common character parameters.
<toda>	-	In case of 8-digit “type-address” field in integer GSM 04.11 TP-Destination-Address (when the first character of <da> is +(IRA 43), the default value is 145; in other cases, the default value is 129)

Table 62 PDU short message sending format

SCA	PDU-Type	MR	DA	PID	DCS	VP	UDL	UD
1-12	1	1	2-12	1	1	0,1,7	1	0-140
00	11	00	0D91683106718481F7	00	08	00	0A	00480065006C006C006F

Table 63 basic elements of SMS PDU

Element	Name	Length	Description
SCA	Service Center Adress	1-12	SMS center information
PDU-type	Protocol Data Unit Type	1	Protocol data unit type
MR	Message Reference	1	All successful SMS-SUNMIT reference number (0-255)
OA	Originator Adress	2-12	Originator SME address
DA	Destination Adress	2-12	Destination SME address
PID	Protocol Identifier	1	SM treatment mode by SMSC
DCS	Data Coding Scheme	1	Coding scheme of user data (UD)

SCTS	Service Center Time Stamp	7	Time stamp of SMSC receiving short message
VP	Validity Period	0,1,7	Validity period of short message in SMSC
UDL	User Data Length	1	User data segment length
UD	User Data	0-140	SM data

4.8 AT+CMGW Memory short message writing command

This set command can sent short message (SMS-DELIVER or SMS-SUBMIT) to memory <mem2> from TE and return the stored short message position <index> parameter. Unless <stat> specifies other parameters, the short message state will be set as "stored and not sent".

Table 64 AT+CMGW operation command

Type	Command	Possible return results	Description
Execution Command	AT+CMGW[=<oa/da>[,<tooa/toda>[,<stat>]]]<CR> text is entered <ctrl-Z/ES C>	+CMGW: <index> OK	Text mode (+CMGF=1) Successful writing
		ERROR/+CMS ERROR: <err>	Text mode (+CMGF=1) Failed writing
	AT+CMGW=<length>[,<stat>]<CR> PDU is given <ctrl-Z/ESC>	+CMGW: <index> OK	PDU mode (+CMGF=0) Successful writing
		ERROR/+CMS ERROR: <err>	PDU mode (+CMGF=0) Failed writing
Test Command	AT+CMGW=?	OK	-
Command Example	AT+CMGF=1 AT+CSCS="IRA " AT+CSMP=,,0,0 AT+CNMI=2,1 AT+CMGW="13761928888" >Hello <ctrl-Z/ESC>	+CMGW: 0 OK	<mem2> stores text short message; this short message will be sent to "13761928888"; the short message content is Hello
	AT+CMGF=0 AT+CSCS="UCS2" AT+CSMP=,,0,8 AT+CNMI=2,1 AT+CMGW=25 >0011000D91683106718481F70008000A00480065006C006C006F <ctrl-Z/ESC>	+CMGW: 1 OK	PDU short message stored in <mem2> 25--length of PDU string in short message: 0011000D91683106718481F70008000A00480065006C006C006F--PDU string; the short message content represented by PDU string

	C006C006F <ctrl-Z/ESC>		is "Hello". The received number and the sending content shall be sent after conversion by PDU coding tool, and there shall be no carriage return at the end of data.
	AT+CMGW=?	OK	—

Table 65 AT+CMGW parameter description

Parameter	Value	Description
<da>	-	"Address - value" field in GSM 03.40 GSM 03.40 TP-Destination-Address; convert BCD value (or default GSM letter format character) into the character in currently selected TE character set (please refer to +CSCS command in TS 07.07); address type given by <toda>
<oa>	-	"Address - value" field in GSM 03.40 TP-Originating-Address; convert BCD value (or default GSM letter format character) into the character; address type given by <toda>
<toda>	-	In case of 8-digit “type-address” field in integer GSM 04.11 TP-Destination-Address (when the first character of <da> is +(IRA 43), the default value is 145; in other cases, the default value is 129)
<tooa>	-	8-digit "type - address" field in integer GSM 04.11 TP-Originating-Address (refer to <toda> for default value)
<stat>	"REC UNREAD"	Received and not read short message (+CMGF=1)
	"REC READ"	Received and read short message (+CMGF=1)
	"STO UNSENT"	Stored and not sent short message (+CMGF=1)
	"STO SENT"	Stored and sent short message(+CMGF=1)
	0	Received and not read short message (+CMGF=0)
	1	Received and read short message (+CMGF=0)
	2	Stored and not sent short message (+CMGF=0)
	3	Stored and sent short message (+CMGF=0)

4.9 AT+CMGD Short message deletion command

This setting company can delete short message with position number parameter of <index> in the optimal short message memory <mem1>.

Table 66 AT+CMGD operation command

Type	Command	Possible return results	Description
Set Command	AT+CMGD=<index>[,<delflag>]	OK	Successful (return OK if there is no short message)
		ERROR/+CMS ERROR: <err>	Fail
Test Command	AT+CMGD=?	+CMGD:(0-255),(0-4) OK	The first parameter feedback storage area has short message index indication. If there is no short message in the storage area, return +CMGD: (),(0-4) OK
Command Example	AT+CPMS="SM" AT+CMGD=1	OK	Delete the <index>=1 short message
	AT+CPMS="SM" AT+CMGD=1,4	OK	Delete all short messages in SIM card, including short message which is read, not read, sent and not sent
	AT+CMGD=?	+CMGD: (0,1,3),(0-4) OK	(0,1,3,)--there is short message in storage area 0,1,3. This value different from version. The following is an example.

Table 67 AT+CMGD parameter description

Parameter	Value	Description

<index>	0 ~ 255	Integer; value within address code range supported by the associated memory
<delflag>	-	Delete short message specified by <index>
	0	Delete short message specified by <index>
	1	Delete all read short messages in memory
	2	Delete all read and sent short messages in memory
	3	Delete all read, sent and not sent short messages in memory
	4	Delete all read, not read, sent and not sent short messages in memory

4.10 AT+CPMS Short message storage area selection command

This command is applicable to PDU and text mode for defining the storage area for reading and writing of short message. This set command is used for selecting the reading and storage memory, including <mem1>, <mem2> and <mem3>. These three memories can be set as SM and ME. SM is SIM card and ME is module or mobile terminal.

Table 68 AT+CPMS operation command

Type	Command	Possible return results	Description
Set Command	AT+CPMS=<mem1> [,<mem2>[,<mem3>]]	+CPMS:<used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK	-
		ERROR/+CME ERROR: <err>	The selected memory is not applicable to ME
Query Command	AT+CPMS?	+CPMS:<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>X OK	-
		ERROR/+CME ERROR: <err>	Error relates to ME functionality
Test Command	AT+CPMS=?	+CPMS:(<mem1> value list),(<mem2> value list),(<mem3> value list) OK	-
Command Example	AT+CPMS?	+CPMS: "ME",0,23,"ME",0,23,"SM",11,50 OK	The memory which is used in priority during reading and deleting short message is ME

		by default
AT+CPMS="SM"	+CPMS: 20,20,0,23,20,20 OK	Set ME as the memory which is used in priority during reading and deleting short message; 20 - 20 short messages stored in current Sim card; 20 - Sim card can store 20 short messages; it indicates that Sim card is full. If the user wants to store continuously, the currently stored short message shall be deleted.
AT+CPMS=?	+CPMS: ("ME","MT","SM","SR"),("ME","MT","SM","SR"),("ME","MT","SM","SR") OK	-

Table 69 AT+CPMS parameter description

Parameter	Value	Description
<mem1> Memory for reading and deleting short messages. It can be set by three following AT commands: AT+CMGL, AT+CMGR , AT+CMGD	"MT"	Any storage area related to ME
	"ME"	Storage area with ME module
	"SM"	Storage area of SIM card
	"SR"	Storage area of module short message state report
<mem2> Memory for writing, storing and sending short messages.It can be set by two following AT commands: AT+CMSS and AT+CMGW	"MT"	Any storage area related to ME
	"ME"	Storage area of module
	"SM"	Storage area of SIM card
	"SR"	Storage area of module short message state report
<mem3> If there is no router in TE, the received short message will be stored in this memory	"MT"	Any storage area related to ME
	"ME"	Storage area of module

	"SM"	Storage area of SIM card
	"SR"	Storage area of module short message state report
<used1, 2, 3>	-	Number of short messages stored in <mem1, 2, 3>
<total1, 2, 3>	-	Total number of short messages that can be stored in <mem1, 2, 3>

In SIM card, ME support 100 short messages at most; in order to use AT+CPMS, firstly judge the preferred memory and then select one memory based on user's demand. For example, in case of AT+CPMS="me","sm", me can be selected. This preferred memory is used for reading and writing instead of representing the prior storage sequence of new short messages. In order to keep consistence, <mem1> is equal to <mem3> or all memories are the same.

"MT" is any storage area related to ME. If "MT" is set as the short message storage area, it default storage is "ME"; "SR" is the short message report storage area and will not store the short message or take any operation for the short message. Therefore, these two storage areas are not recommended as the short message storage areas.

4.11 +CMTI Short message arrival indication command

This command shows that the new short message arrives.

Table 70 +CMTI operation command

Type	Command	Possible return results	Description
Set Command		+CMTI: <mem>,<index>	New short message prompt
Command Example	AT+CMGF=1 AT+CSCS="IRA" AT+CSMP=,,0,0 AT+CNMI=2,1	+CMGS:468 OK +CMTI:"ME",0	Set the short message parameter as no need of short message return receipt, code is ASCII Set +CMTI as the new short message indication mode Receive one short message

Table 71 +CMTI parameter description

Parameter	Value	Description
<mem>	"SM"	UIM

	"ME"	NV
<index>		Storage position, i.e. index value

4.12 +CDSI New short message state report arrival indication command

This command is a non-request command which displays a new short message state report and shows the storage position.

Table 72 +CDSI operation command

Type	Command	Possible return results	Description
Execution Command		+CDSI:<mem>,<index>	Successfully receive a short message state report
Command Example	AT+CMGF=1 AT+CSCS="IRA" AT+CSMP=49,,0,0 AT+CNMI=2,1 AT+CMGS="189****7363" > GOOD[CTRL+Z]	+CMGS:468 OK +CMTI:"ME",0 +CDSI:"ME",42	The setting needs the short message state report (i.e. short message return receipt) The form of setting new short message indication is +CMTI. The reporting mode of short message state report is 2, report +CDSI Send a short message to itself

Table 73 +CDSI parameter description

Parameter	Value	Description
<mem>	"SM"	UIM
	"ME"	ME
<index>		Decimal integer, indicating the position of short message state report in memory, i.e. index value

4.13 AT+CNMA New short message confirmation command

This execution command can confirm whether the new short message (SMS-DELIVER or SMS-STATUS-REPORT) can be correctly received. This new short message is directly sent to TE from MT.

Table 74 AT+CNMA operation command

Type	Command	Possible return results	Description
Execution Command	AT+CNMA[=<n>[,<length>[<CR> PDU is given<ctrl-Z/ESC>]]]	OK	Success
		ERROR/+CMS ERROR: <err>	As for PDU mode (+CMGF=0) and the confirmation of new short message is failure
Test Command	AT+CNMA=?	+CNMA: (0-2) OK	-
Command Example	AT+CMGF=1 AT+CNMI=2,2,0,0,0 AT+CNMA	OK OK +CMT: "+8613761928888", ,"13/08/03, 13:50:19+32" Hello OK	Set the text format and set 2 as <mt> +CMT: "+8613761928888", ,"13/08/03,13:50:19+32" Hello Represent the receiving of short message Notify that the network side has received the short message
	AT+CNMA=?	+CNMA: (0-2) OK	

Table 75 AT+CNMA parameter description

Parameter	Value	Description
<n>	0	The execution of this command is similar to execution of the command defined by text mode
	1	Send RP-ACK (or correctly received butter result code)

	2	Send RP-ERROR (if PDU isn't given, ME/TA will send SMS-DELIVER-REPORT short message with "FF" GSM 03.40 TP-FCS (non-request error reason))

2 conditions are needed for confirmation of short message by AT+CNMA; by setting AT+CSMS=1, set <service>=1; by setting AT+CNMI=,2, set <mt>=2 or AT+CNMI=,,1, set <ds> =1;

After meeting above 2 conditions, if the short message isn't confirmed by AT+CNMA after receiving the short message, CNMI <mt> and <ds> will be reset as 0 and the sending and receiving of short message will be impacted.

4.14 AT+CMSS Memory short message sending command

This set command can send the short message in memory <mem2> and with position parameter value <index> into the network side (SMS-SUBMIT or SMS-COMMAND). If the new receiving address parameter <da> of SMS-SUBMIT short message is given, this parameter shall be used and parameter of stored short message shall not be used. After successfully sending, the reference value <mr> will return to TE. During receiving the result code of non-request send state report, the value of this command can be used for short message recognition. After using this command, the written short message will not be deleted.

Table 76 AT+CMSS operation command

Type	Command	Possible return results	Description
Set Command	AT+CMSS=<index>[,<da>[,<toda>]]	+CMSS: <mr>[,<scts>] OK	Text mode (+CMGF=1) Successful sending
		ERROR/+CMS ERROR: <err>	Text mode (+CMGF=1) Failed sending
		+CMSS: <mr>[,<ackpdu>] OK	PDU mode (+CMGF=0) Successful sending
		ERROR/+CMS ERROR: <err>	PDU mode (+CMGF=0) Failed sending
Test Command	AT+CMSS=?	OK	-
Command Example	AT+CMSS=1	+CMSS: 122 OK	Send the stored short message 1. The number of receiver is 13761928888.
	AT+CMSS=1,"13761928888"	+CMSS: 123 OK	Send the stored short message 1 and change the receiving number as 13761928888.
	AT+CMSS=?	OK	-

Table 77 AT+CMSS parameter description

Parameter	Value	Description
<ackpdu>	-	GSM 03.40 RP-User-Data element in RP-ACK PDU; in SMS, same with format of <pdu>, there is no GSM 04.11SC address field; this parameter shall be placed in double quotes and is same with common character parameter.
<index>	-	Integer; value within address code range supported by the associated memory
<da>	-	"Address－value" field in GSM 03.40 GSM 03.40 TP-Destination-Address; convert BCD value (or default GSM letter format character) into the character in currently selected TE character set (please refer to +CSCS command in TS 07.07); address type given by <toda>
<toda>	-	In case of 8-digit “type-address” field in integer GSM 04.11 TP-Destination-Address (when the first character of <da> is +(IRA 43), the default value is 145; in other cases, the default value is 129)
<mr>	-	Integer GSM 03.40 TP-Message-Reference
<scts>	-	"Time - character string" GSM 03.40 TP- Service-Centre-Time-Stamp (please refer to <dt>)

4.15 AT+CMGC Short message sending command

Table 78 AT+CMGC operation command

Type	Command	Possible return results	Description
Set Command	AT+CMGC=<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]]<CR> text is entered <ctrl-Z/ESC>	+CMGC: <mr>[,<scts>] OK	Text mode (+CMGF=1) Successful sending
		ERROR/+CMS ERROR: <err>	Text mode (+CMGF=1) Failed sending
	AT+CMGC=<length>< CR>PDU is given <ctrl-Z/ESC>	+CMGC: <mr>[,<ackpdu>] OK	PDU mode (+CMGF=0) Successful sending
		ERROR/+CMS ERROR: <err>	PDU mode (+CMGF=0) Failed sending
Test Command	AT+CMGC=?	OK	-
Command Example	AT+CMGF=0 AT+CSCS="IRA" AT+CSMP=,,0,0 AT+CNMI=2,1 AT+CMGC=25 >0011000D916831067184	+CMGC: 124 OK	Send a PDU short message. The received number and the sending content shall be sent after conversion by PDU coding tool, and there shall be no carriage return at the end of data.

	81F70008000A00480 0650 06C006C006F <ctrl-Z/ESC>
AT+CMGC=?	OK

Remark: as for sending short message, Ctrl+Z can be successfully sent after inputting the message content.

Table 79 AT+CMGC parameter description

Parameter	Value	Description
<length>	-	Integer value; in text mode (+CMGF=1), <data> (or <deata>) SMS text length represented by character; 8-digit real TP data unit length (i.e.: 8-digit character in RP layer SMSC address will not be included in this length)
<toda>	-	In case of 8-digit “type-address” field in integer GSM 04.11 TP-Destination-Address (when the first character of <da> is +(IRA 43), the default value is 145; in other cases, the default value is 129)
<pdu>	-	As for SMS: GSM 03.40 TPDU, hexadecimal, follow GSM04.11SC address; ME/TA converts all 8-digit characters in TP data unit into hexadecimal figure which includes 2 IRA characters (such as: 8-digit character with integer 42 as 2-digit figure (2A, i.e. IRA50 and 65) is sent to TE). As for CBS: GSM 03.41 TPDU with hexadecimal format is used
<mr>	-	Integer GSM 03.40 TP-Message-Reference
<fo>	-	Depend on this command or result code; first 8 digits of GSM 03.40 SMS-DELIVER; SMS-SUBMIT(default value: 17); SMS- STATUS-REPORT, or adopt the integer SMS-COMMAND (default value: 2)
<ct>	-	Integer GSM 03.40 TP-Command-Type (default value: 0)
<pid>	-	Integer GSM 03.40 TP-Protocol-Identifier (default value: 0)
<da>	-	"Address - value" field in GSM 03.40 GSM 03.40 TP-Destination-Address; convert BCD value (or default GSM letter format character) into the character in currently selected TE character set (please refer to +CSCS command in TS 07.07); address type given by <toda>
<scts>	-	Use "time--character string" GSM 03.40 TP-Service-Centre-Time-Stamp (please refer to<dt>

5 Call control

5.1 ATD[<dial_string>][;] Mobile station main calling command

The execution command is used for establishing the main calling of voice, data or fax as well as for controlling the supplementary business. If ATH command is received during execution, this command may be terminated. However, in some states of establishing connection (such as: signal exchange), this command will not terminate.

Table 80 ATD operation command

Type	Command	Possible return results	Description	
Execution Command	ATD[<dial_string>][;]	ERROR/ +CME ERROR: <err>	Error relates to ME functionality	
		BUSY	Face with busy situation (parameter: ATX3)	
		NO CARRIER	Establishment of connection failed	
		CONNECT<text>	If the connection with non-voice calling is successful, TA will switch to data state. Note: the <text> feedback result can be outputted only when ATX parameter is higher than 0;	
		OK	The first OK indicates that ATD command executes successfully. TA returns to command mode.	TBD
		OK	If the connection is successful, it is voice call. It will return to the second OK.	
Command Example	ATD10086;	ATD10086; OK ^ORIG:2,0 ^DSCI: 2,0,2,0,10086,0 ^CONN:2,0 ^DSCI: 2,0,3,0,10086,0	-VOLTE calling example. In case of CSFB, there will be GSM switching process. Therefore, during this period, the network state and the signal state will be reported simultaneously. Other cases are same with this.	

Table 81 ATD parameter description

Parameter	Description
<dial_string>	Dialing character string and optional V.25ter modification volume (dialing position): 0 ~ 9, *, #, +, A, B, C. V.25ter modification volume: negligible: , (comma), T, P, !, W and @
	In case of emergency call, call the emergency number 112 without the need of USIM/SIM card
[;]	It is only used for establishing the voice calling. DCE keeps the command mode unchanged.

AT+CLCC command can check current states of all calls.

5.2 ATD><str>[I][G]; Call making command

This command is used for dialing a number with name in the telephone directory. Before executing this command, firstly execute AT+CPBR command to search character string <str> of special user in current telephone directory. If the searched item exists, the corresponding number can be dialed. Use AT command AT+CPBS to set the current telephone directory. Use AT+CPBW to write character string of special user in the telephone directory. TA attempts to call the stored number. In some states with connection (for example: signal exchange), this command will not terminate. Its feedback result is same with ATD[<dial_string>][;].

Table 82 ATD><str>[I][G] operation command

Type	Command	Possible return results	Description
Execution Command	ATD><str>[I][G][;]	ERROR/+CME ERROR: <err>	Error relates to ME functionality
		BUSY	Face with busy situation (parameter: ATX3)
		NO CARRIER	Establishment of connection failed
		OK	The first OK indicates that ATD command executes successfully. TA returns to command mode.
		OK	If the connection is successful, it is voice call. It will return to the second OK.
Command Example	ATD>"TEST"; dial the number with the name of TEST	OK ^DSCI:2,0,2,0,150915825 51,0 SIGNALIND:1	Find the user in telephone directory and the current number is successfully dialed.

	+NWTYPEIND:34 SIGNALIND:5 ^MODE: 3, 3	
	ERROR	This user is not found in the telephone directory.

Table 83 ATD><str>[I][G] parameter description

Parameter	Description
<str>	Character: it shall be same with at least one field of telephone directory in the searched memory (figure and letter mixing mode). Use AT+CSCS command to select the character set to be used. In following two cases, <str> shall be placed in the double quotes. Otherwise, the double quotes can be selected. Use escape character or parameter [I] and [G]. The figure and letter mixed character strings include the blank space.
[I]	Neglect the default value of main calling recognition limitation supplementary business registration of this call; I = request (prohibit displaying of the phone number of caller on the called phone); -- TBD i = inhibition (allow displaying of the phone number of caller on the called phone); Please refer to "main calling recognition limitation: AT+CLIR" command
[G]	Control the CUG supplementary business of this call; by executing AT+CCUG command, use the index and information value collection: G=only be the request of this call to activate the user group closing; g=only be the request of this call to deactivate the user group closing; Please refer to "user group closing: AT+CCUG" command
[;]	The semicolon cannot be omitted, because the voice call only supports the dialing of number within telephone directory.

5.3 ATA Call response command

This command can be used to set the connection from DCE to this line and start the response process specified by DCE.

Table 84 ATA operation command

Type	Command	Possible return results	Description
Execution Command	ATA	CONNECT	Return to data communication and establish connection successfully
		CONNECT<text>	Return to data communication and establish connection successfully;

			<text> can be speed, error control, etc.
		OK	-
		NO CARRIER	Fail to establish connection;
		ERROR/+CME ERROR:<err>	Return this error in on-line command mode
Command Example	RING ATA	OK +DSCI:1,0,0,16,"+8613761928888",145	Return to voice call and establish connection successfully. The call finishes.

Neglect the additional command behind A in the same command line; during execution process, a character is receive. This command can be terminated. However, in some states of establishing connection (such as: signal exchange), this command will not be terminated.

5.4 AT+CHUP Call hanging up command

Table 85 AT+CHUP operation command

Type	Command	Possible return results	Description
Execution Command	AT+CHUP	OK	Cancel current call or hang up current call
		ERROR/+CME ERROR:<err>	Fail
Test Command	AT+CHUP=?	OK	-
Command Example	AT+CHUP	AT+CHUP OK ^DSCI: 2,0,6,0,10086,0 +NWTYPEIND:41 SIGNALIND:4 ^MODE: 9, 10	Successful hanging up

The application scenario of AT+CHUP is that both parties have established the calling connection during calling process, excluding the situation of dialing but not being connected; AT+CHUP is only a sub-set of ATH and is not absolutely same with ATH.

5.5 ^DSCI Calling process state reporting command

As for active reporting command, when the calling ends, the device will actively report the disconnection information in +DSCI format. 3GPP protocol AT command cannot report CDMA and EVDO calling state.

Table 86 ^DSCI reporting command

Type	Command	Possible return results	Description
Reporting Command	^DSCI:	^DSCI:<id>,<idr>,<stat>,<type>,<number>,<num_type>,	
Test Command	AT^DSCI=?	^DSCI: (<act> value list) OK	
Set Command	AT^DSCI=<act>	OK	Success
		ERROR/+CME ERROR: <err>	Fail
Command Example	ATD10086;	ATD10086; OK ^DSCI: 1,0,2,0,10086,0	

Table 87 ^DSCI parameter description

Parameter	Description
<id>	Link Id, value [0-17]
<idr>	Calling direction, 0 sent call, 1 received call
<stat>	Value [1-6], 1 represents CALL_ACTIVATING, 2 represents CALL_ORIG, 3 represents CALL_CONNECT, 4 represents CALL_INCOM, 5 represents CALL_WAITING, 6 represents CALL_END
<type>	Value [0,1], 0 represents initiating voice, 1 represents non-voice (data)
<number>	Number
<num_type>	Number type, for example, 0 represents unknown, 1 represents international number, and 2 represents domestic number

Table 88 ^DSCI parameter description

Parameter	Value	Description
<act>	0	Disable call hanging up active reporting
	[1]	Enable call hanging up active reporting

5.6 AT+CLIP Caller identification display command

In fact, this command is what we usually call the caller presentation business. This command is related to GSM/UTMS additional business CLIP (Calling Line Identification Presentation). When the called user receives mobile terminal call, the called user can obtain CLI (Calling Line Identification).

This set command can enable or disable CLI presentation on TE, but has no influence on execution of additional business CLIP in network. When CLI can be presented in TE and the caller allows, before all RINGs or +CRING: <type>; feedback result is sent to TE from TA, the command result +CLIP:<number>,<type>[,<subaddr>,<satype>[,[<alATpha>][,<CLI validity>]]] will return. By reference of normal receiving voice business, if this command result is used, this result depends on the manufacturer.

Query the <n> state given by this command and trigger the query of configuration state of CLIP business based on GSM 02.81 [3].

Table 89 AT+CLIP operation command

Type	Command	Possible return results	Description
Execution Command	AT+CLIP=<n>	OK	-
Query Command	AT+CLIP?	+CLIP: <n>,<m> OK	-
		ERROR/+CME ERROR: <err>	
Test Command	AT+CLIP=?	+CLIP: (<n> value list) OK	-
Command Example	AT+CLIP =1	OK	
	AT+CLIP?	+CLIP: 0,1 OK RING	NO caller ID
		+CLIP: 1,1 OK	13761928888 is the caller number. TEST is the name of this number in the telephone

	+CLIP: "13761928888",128,,,"TEST",0 RING	directory.
AT+CLIP =?	+CLIP: (0-1) OK	

Table 90 AT+CLIP parameter description

Parameter	Value	Description
<n> Display state of result code set or displayed in TA	[0]	Disable
	1	Enable
<m> Business state of user CLIP business in network	0	Not provide CLIP business
	1	Provide CLIP business
	2	Unknown (such as: no network, etc.)
<number>	-	Character; telephone number format specified by <type>
<type>	-	Integer 8-digit byte address type (please refer to section 10.5.4.7 in GSM 04.08 [8]); when the dialing character string includes international access code character "+", the default value is 145; in other situations, the default value is 129
<subaddr>	-	Character subaddress format specified by <satype>
<satype>	-	Integer 8-digit byte address type
<alpha>	-	Optional character (letter and figure mixing mode); it displays the corresponding item of telephone directory; the used character set shall be same with TE selection character set command AT+CSCS.
<CLI validity>	0	Valid
	1	Caller disabling CLI
	2	Due to the limitation of network communication issues or initial network, CLI is unavailable.

5.7 AT+CCFC Call forwarding condition and number set command

This command controls the call forwarding additional business based on GSM 02.82 [4], supports the registration, deletion, activation, deactivation and state query, but doesn't support telecommunication CDMA.

Table 91 AT+CCFC operation command

Type	Command	Possible return results	Description
Set Command	AT+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<atype>[,<time>]]]]]]	OK	-
		+CCFC:<status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]][<CR><LF>+CCFC:<status>,<class2>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]][...]] OK	<mode>=2 and the command successfully executes. If <mode>=2, <reason> cannot be 4 or 5
		ERROR/+CME ERROR: <err>	Fail
Test Command	AT+CCFC=?	+CCFC: (<reason> value list) OK	-
Command Example	AT+CCFC=0,3,"13761928888"	OK	Set unconditional forwarding to 13761928888
	AT+CCFC=0,2	+CCFC: 1,1,"+8613761928888",145,,, OK	Query the forwarding setting. The setting is successful.
	AT+CCFC=0,4	OK	Delete the unconditional forwarding setting
	AT+CCFC=0,2	+CCFC: 0,255 OK	Query again, indicating that the deletion is successful
	AT+CCFC=?	+CCFC: (0,1,2,3,4,5) OK	-

Table 92 AT+CCFC parameter description

Parameter	Value	Description
<reason>	0	Unconditional
	1	Busy
	2	No response
	3	Not accessible
	4	All call forwarding (please refer to GSM 02.30 [19])
	5	All condition call forwarding (please refer to GSM 02.30 [19])
<mode>	0	Disable
	1	Enable
	2	State query
	3	Registration
	4	Deletion
<number>	-	Character; telephone number of call forwarding address; its format shall meet the regulation of <type>
<type>	-	Integer 8-digit byte address type (please refer to section 10.5.4.7 in GSM 04.08 [8]); when the dialing character string includes international access code character "+", the default value is 145; in other situations, the default value is 129
<subaddr>	-	Character; format of character sub-address specified by <satype>
<satype>	-	Integer 8-digit byte sub-address type (please refer to section 10.5.4.8 in GSM 04.08 [8]); default value: 128
<classx> business type	1	Voice (telephone business)
	2	Data (refer to all bearing business; in case of <mode>=2, if TA doesn't support 16, 32,64 and 128, this parameter only represents some bearing businesses)
	4	Fax
	8	Short message
	16	Synchronous data circuit

	32	Asynchronous data circuit
	64	Special packet access
	128	Special PAD access
	255	Default
<time>	1 ~ 30	If there is “no response” for starting and querying, this parameter ensures the waiting period (unit: s, default: 20) of several seconds before this call forwarding.
<status>	0	Not activated
	1	Activated

5.8 AT+CCWA Call waiting command

This command controls the call waiting additional business based on GSM 02.83 [5]. GSM AT command isn’t used for starting CDMA and EVDO call waiting.

Table 93 AT+CCWA operation command

Type	Command	Possible return results	Description
Set Command	AT+CCWA=[<n>[,<mode> [,<class>]]]	OK	-
		+CCWA:<status>,<class1> [<CR><LF> +CCWA:<status>,<class2>[...]] OK	<mode>=2 and this command executes successfully
		ERROR/+CME ERROR:<err>	Fail
Query Command	AT+CCWA?	+CCWA: <n> OK	-
Test Command	AT+CCWA=?	+CCWA: (<n> value list) OK	-
Command Example	AT+CCWA=1,1 ATD10086;	OK +CCWA: "13601748187",128,1	Start the call waiting Establish communication with 10086 Prompt a call in other

			channel for the user
	AT+CCWA=1,2	+CCWA: 1,1 OK	Query the call waiting state
	AT+CCWA?	+CCWA: 1 OK	Query whether the call waiting is enabled

Table 94 AT+CCWA parameter description

Parameter	Value	Description
<n> displayed state of result code set or displayed in TA	[0]	Disable
	1	Enable
<mode> If this parameter is not given, the network query is not available	0	Disable
	1	Enable
	2	Query state
<classx> summary of integers of every information classes	1	Voice (telephone business)
	2	Data
	4	Fax
	8	Short message
	16	Synchronous data circuit
	32	Asynchronous data circuit
	64	Special packet access
	128	Special PAD access
<status>	0	Not activated
	1	Activated

5.9 AT+CHLD Call holding and multi-party call command

This command can temporarily release the current call from ME. However, this connection is kept for the network and the multi-party call. The user who has two calls (one call in holding and the other call in using or prompting) can connect with calls from other parties and releases the connection. This command belongs to 3GPP protocol and is not applicable to Telecom cards.

Table 95 AT+CHLD operation command

Type	Command	Possible return results	Description
Set Command	AT+CHLD=[<n>]	OK	-
		ERROR/+CME ERROR:<err>	Fail
Test Command	AT+CHLD=?	[+CHLD: (<n> value list)] OK	-
Command Example	AT+CCWA=1,1	OK	Enable the call waiting
	ATD13601748187 ;	OK +CCWA: "13601748187",128,1	Establish the communication with user 13601748187
	AT+CHLD=2	OK	The user 13601748187 calls Hold the first channel and connect the second channel At this time, CLCC displays 2-way call
	AT+CLCC	+CLCC: 1,0,1,0,0,"13601748187",129 +CLCC: 2,1,0,0,0,"13601748187",128,"TEST"	
	AT+CHLD=21	OK	Switch to the first channel
	AT+CHLD=11	OK	Release the first channel call
	AT+CHLD=?	+CHLD: (0,1,1x,2,2x,3,4) OK	

Table 96 AT+CHLD parameter description

Parameter	Value	Description
<n> Integer; equal to figure inputted in front of button SEND in	0	Release all held calls or decide the user busy (UDUB) condition for call setting user in waiting.
	1	If there is a current call, release all current calls and connect another call which is held or in waiting.

section 4.5.5.1 in GSM02.30 [19]	1X	Release a certain current call X.
	2	If there is a current call, hold all current calls and connect another call which is held or in waiting.
	2X	Hold all current calls except for call X necessary for communication.
	3	Add a held communication for session. (Not supported)
	4	Connect these two calls and release this user from these two calls (ECT). (Not supported)

5.10 ATH Hanging up control command

This command can terminate the current all data communications. However, in some states of connection establishment (such as signal exchange), this command will not terminate the current voice communication. Please refer to AT+CHUP for hanging up the voice call 3GPP and refer to AT+CHV for hanging up the voice call 3GPP2.

Table 97 ATH operation command

Type	Command	Possible return results	Description
Execution Command	ATH[<n>]	OK	-
		ERROR/+CME ERROR: <err>	<n>Not confirmed or not supported

Table 98 ATH parameter description

Parameter	Value	Description
<n>	0	Terminate the communication

6 DTMF

6.1 AT+VTS Single-character or multi-character DTMF Tone command

This command can send one or multiple ASCII character(s). The role of these characters is to make MSC (Mobile Switching Center) send DTMF(Dual Tone Multi Frequency) tone to remote users. The user is allowed to send DTMF tones in one sequence within a period of time. The user is allowed to send a single DTMF tone. In such case, the time segment can be decided separately during the calling.

Table 99 AT+VTS operation command

Type	Command	Possible return results	Description
Set Command	AT+VTS=<dtmf-string> AT+VTS=<dtmf>[,<duration>]	OK	-
		ERROR/+CME ERROR:<err>	-
Test Command	AT+VTS=?	+VTS: (<dtmf> value list) , (<duration> value list) OK	-
Command Example	AT+VTS=?	+VTS: (0-9,A-D,*,#) OK	

Table 100 AT+VTS parameter description

Parameter	Value
<dtmf-string>	ASCII character strings in the character set 0-9, #, *, A, B, C, D; maximum length 29; the character string shall be placed in the double quotes.
<dtmf>	ASCII characters in the character set 0-9, #, *, A, B, C, D
<duration>	Tone time segment within 1/10s, value range: 1～255

This set command is only suitable for current voice call.

6.2 AT+VTD VTS multi-character interval set command

This command is used for setting the duration of DTMF string. During sending multiple tones, the interval of two tones may be set.

Table 101 AT+VTD operation command

Type	Command	Possible return results	Description
Set Command	AT+VTD=<duraton>[,<interval>]	OK	
		ERROR/+CME ERROR:<err>	
Test Command	AT+VTD=?	+VTD: <duration>,<interval> OK	
Command Example	AT+VTD=?	+VTD: (0-255),(0-255) OK	

Table 102 AT+VTD parameter description

Parameter	Description
<duration>	Unit of duration tone: 1/10s. Range: 0-255; default value: 3. If the duration is shorter than the minimum duration specified by the network, the actual duration time is the time specified by the network.
<interval>	Interval of two tones in case of AT+VTS sending multiple tones simultaneously. Value range: 0-255; default value: 0.

6.3 AT+DTMFDET DTMF voice detection and switch command

This command can enable or disable the DTMF detection. After enabling this function, DTMF tone sent by the other party will be detected and will be reported at the specified serial port.

Table 103 AT+DTMFDET operation command

Type	Command	Possible return results	Description
Set Command	AT+DTMFDET=<enable>	OK	
		ERROR/+CME ERROR:<err>	
Test Command	AT+DTMFDET=?	+DTMFDET: <enable> OK	
Command Example	AT+DTMFDET=?	+DTMFDET: (0,1) OK	

Table 104 AT+DTMFDET parameter description

Parameter	Description
<enable>	0: disable 1: enable

Note:

1. This setting will immediately become valid. After resetting the module, it will recover to the default value.
2. DTMF character- ASCII.

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

6.4 AT+DTMF Local DTMF playing command

This command can play local DTMF character strings with the maximum length of 20 characters. It can stop the play of DTMF character strings.

Table 105 AT+DTMF operation command

Command Example	Command	Possible return results	Description
Command Example	AT+DTMF=<n>,<DTMF_string>[,<y>] AT+DTMF	OK After DTMF character is played: +DTMF: 5	
		ERROR/+CME ERROR:<err>	

Command Example	AT+DTMF=?	+DTMF: (<duration> value list) ,(<dtmf> value list) OK

Command Example	//Test Command
	AT+DTMF=?
	
	//Play "A,B,1,2,#"play period and mute period are 200ms
	AT+DTMF=2,"A,B,1,2,#"
	
	//Stop playing
	AT+DTMF
		+DTMF: (1-1000),(0-9,*,#,A-D)
		
		OK
		
		OK
		
		+DTMF: 5
		
		OK

Table 106 AT+DTMF parameter description

Parameter	Description
<n>	Int type. It represents the play time and mute time of every DTMF. Range: 1-1000; in case of <y>=1, the unit is 1/100s; if case of <y>=0, the unit is 1/10s.
<DTMF_string>	String type. Character string with maximum 20 DTMF characters. Separated by comma. DTMF format: 0-9, *, #, A-D.

6.5 AT+TONE Local play customized single-tone command

This command is used for playing the locally customized tones. <period_on> represents the play period, <period_off> represents the mute period, and <duration> represents the duration.

Table 107 AT+TONE operation command

Type	Command	Possible return results	Description
Set Command	AT+TONE=<mode>[,<frequency>,<period_on>,<period_off>,<duration>]	OK After playing of tone: +TONE: 0 ERROR/+CME ERROR:<err>	
Test Command	AT+TONE=?	+TONE: (mode),(frequency),(period_on),(period_off),(duration)	

		OK
Command Example	//Test Command AT+TONE=?	+TONE: (0,1),(100-4000),(0-1000),(0-1000),(0-15300000)
	//Play "A,B,1,2,# "playing period and mute period are 200ms AT+TONE=1,1000,200,300,3000	OK OK
	//Stop playing AT+TONE=0	+TONE: 0 OK

Table 108 AT+TONE parameter description

Parameter	Description
<mode>	0: stop playing 1: start playing
<frequency>	TONE frequency. Range: 100-4000, unit: Hz
<period_on>	TONE playing period. Range: 0-1000, unit: ms
<period_off>	TONE mute period. Range: 0-1000, unit: ms
<duration>	TONE duration. Range: 0-15300000, unit: ms

7 SIM

7.1 AT+CLCK Device locking AT command

It can lock, unlock and query ME or network device <fac>. In general, the password shall be entered. During querying the network business (<mode>=2) state, only when this business is in non-activation state for any parameter <class>, return to the return result line of “non-activation” state (<status>=0). During setting or querying the network device, this command will be terminated.

Table 109 AT+CLCK operation command

Type	Command	Possible return results	Description
Execution Command	AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	OK	-
		+CLCK: <status>[,<class1><CR><LF>+CLCK: <status>,<class2>[...]] OK	<mode>=2 and the command executes successfully
		ERROR/+CME ERROR: <err>	Fail
Test Command	AT+CLCK=?	+CLCK: (<fac> value list) OK	-
		ERROR/+CME ERROR: <err>	Fail
Command Example	AT+CLCK="SC",1,"1234"	OK	Enable SIM card PIN code locking
	AT+CLCK="SC",0,"1234"	OK	Disable SIM card PIN code locking
	AT+CLCK=?	+CLCK: ("AB","AC","AG","AI","AO","IR","OI","OX","SC","FD","PN","PU","PP","PC","PF") OK	

Table 110 AT+CLCK parameter description

Parameter	Value	Description
<fac> Value	"AO"	Disable all outgoing calls

currently adopted in this manual	"OI"	Disable all international outgoing calls
	"OX"	Disable all international outgoing calls, except for the home country
	"AI"	Disable all incoming calls
	"IR"	Except for home country, during international roaming, Disable all incoming calls
	"PS"	PH - SIM (lock SIM in phone)(when other SIM card is inserted in, ME will prompt to input the password; set ME to make it recognize several used SIM cards. In such way, after inserting these cards, ME will not prompt to input the password)
	"PN"	Network personalization (please refer to GSM 02.22 [33])
	"PP"	Service supplier personalization (please refer to GSM 02.22 [33])
	"PU"	Network sub-set personalization (please refer to GSM 02.22 [33])
	"PC"	Company personalization (please refer to GSM 02.22 [33])
	"PF"	Lock the first SIM inserted in the mobile phone (PH-FSIM in this manual) (when other SIM card is inserted, ME will prompt to input the password)
	"SC"	SIM
	"FD"	SIM card fixed dialing characteristics
	"AB"	Disable all services, only valid in case of mode=0
	"AG"	Disable all outgoing services, only valid in case of mode=0
	"AC"	Disable all incoming services, only valid in case of mode=0
<mode>	0	Unlock
	1	Lock
	2	Query state
<status>	0	Non activated
	1	Activated
<passwd>	-	Character; same with the device password for ME user interface and the password set by password modification command+CPWD
<classx>	1	Voice (telephone business)
	2	Data (all bearing businesses; in case of <mode>=2, if TA doesn't support 16, 32, 64 and 128 value. This parameter only represents some bearing businesses)

	4	Fax (fax business)
	8	Short message
	16	Synchronous data circuit
	32	Asynchronous data circuit
	64	Special packet access
	128	Special PAD access

7.2 AT+CPWD Password modification AT command

This command can modify the device locking password defined by device locking command +CLCK.

Table 111 AT+CPWD operation command

Type	Command	Possible return results	Description
Execution Command	AT+CPWD=<fac>,<oldpwd>,<newpwd>	OK	Success
		ERROR/+CME ERROR: <err>	Fail
Test Command	AT+CPWD=?	+CPWD: (<fac>,<pwdlength>) value list OK	Success
		ERROR/+CME ERROR: <err>	Fail
Command Example	AT+CPWD="SC","1234","4321"	OK	Set 4321 as the new PIN code. Become valid after restarting or reactivating SIM card.
	AT+CPWD=?	+CPWD: ("AB",4),("AC",4),("AG",4),("AI",4),("AO",4),("IR",4),("OI",4),("OX",4),("SC",8),("P2",8) OK	-

Table 112 AT+CPWD parameter description

Parameter	Value	Description
<fac> Value currently adopted in this manual	"AO"	Disable all outgoing calls
	"OI"	Disable all international outgoing calls
	"OX"	Disable all international outgoing calls, except for the home country
	"AI"	Disable all incoming calls
	"IR"	Except for home country, during international roaming, Disable all incoming calls
	"PS"	PH - SIM (lock SIM in phone)(when other SIM card is inserted in, ME will prompt to input the password; set ME to make it recognize several used SIM cards. In such way, after inserting these cards, ME will not prompt to input the password)
	"PN"	Network personalization (please refer to GSM 02.22 [33])
	"PP"	Service supplier personalization (please refer to GSM 02.22 [33])
	"PU"	Network sub-set personalization (please refer to GSM 02.22 [33])
	"PC"	Company personalization (please refer to GSM 02.22 [33])
	"PF"	Lock the first SIM inserted in the mobile phone (PH-FSIM in this manual)(when other SIM card is inserted, ME will prompt to input the password)
	"P2"	SIM PIN 2
	"SC"	SIM
	"AB"	Disable all services
	"AG"	Disable all outgoing services
	"AC"	Disable all incoming services
<oldpwd>, <newpwd>	-	Character; same with the device password for ME user interface and the password set by password modification command+CPWD
<pwdlength>	-	Integer, maximum password length supported by device

7.3 AT^CPIN Extended PIN management AT command

This set command can send the password necessary for operation to ME. The character returned by query command is in letter and figure mixing mode. It indicates whether the password is required.

Table 113 AT^CPIN operation command

Type	Command	Possible return results	Description
Set Command	AT^CPIN=<pin>[,<newpin>]	OK	Success
		ERROR/+CME ERROR: <err>	-
Query Command	AT^CPIN?	^CPIN:<code>,<times>,<puk_times>,<pin_times>,<puk2_times>,<pin2_times>	-
		ERROR/+CME ERROR: <err>	-
Test Command	AT^CPIN=?	OK	-
Command Example	AT^CPIN="1234"	OK	Input the PIN code
	AT^CPIN?	^CPIN: READY,3,10,3,10,3 OK	NOTE: PIN code is canceled No need of PIN code
		^CPIN: SIM PIN,3,10,3,10,3 OK	Input the PIN code
		^CPIN: SIM PUK,10,10,0,10,3 OK	NOTE: the query is locked by PUK PIN code is locked. PUK code is required
	AT^CPIN=?	OK	This version support this command

Table 114 AT^CPIN parameter description

Parameter	Value	Description
<pin>	-	Original password (character), such as: PIN code or locking/unlocking password of SIM card, such as: SIM-PUK or PH-SIM PUK
<new pin>	-	New password (character)

<code>	READY	ME needs no password
	SIM PIN	ME is waiting for providing the PIN code of SIM card
	SIM PUK	ME is waiting for providing the PUK code of SIM card
	PH-SIM PIN	ME is waiting for providing the phone-SIM card password
	PH-FSIM PIN	ME is waiting for providing the phone-first SIM card password
	PH-FSIM PUK	ME is waiting for providing the phone-first SIM card locking/unlocking password
	SIM PIN2	ME is waiting for providing SIM PIN2 (it is recommended that <code> only carries out authentication failure of PIN2 in using this command last time (such as: +CME ERROR: 17); after authentication failure, if wrong PIN2 is inputted again, it is recommended that ME doesn't lock this operation)
	SIM PUK2	ME is waiting for providing SIM PUK2 (it is recommended that <code> only carries out authentication failure of PUK2 in using this command last time (such as: +CME ERROR: 18); after authentication failure, if wrong PUK2 or new PIN2 is inputted again, it is recommended that ME doesn't lock this operation)
	PH-NET PIN	ME is waiting for providing network personalization password
	PH-NET PUK	ME is waiting for providing network personalization locking/unlocking password
	PH-NETSUB PIN	ME is waiting for providing network sub-set personalization password
	PH-NETSUB PUK	The network is waiting for providing network personalization locking/unlocking password
	PH-SP PIN	ME is waiting for service supplier personalization password
	PH-SP PUK	ME is waiting for service supplier personalization locking/unlocking
	PH-CORP PIN	ME is waiting for corporation personalization password
	PH-CORP PUK	ME is in waiting
<times>		Current corresponding <code> state unlocking remaining number; in case of ready, times =3 by default

7.4 AT+CPIN PIN input AT command

This set command can send the password necessary for operation to ME. The character strings returned by query command are in the letter and figure mixing mode. It indicates whether the password is needed.

Table 115 AT+CPIN operation command

Type	Command	Possible return results	Description
Set Command	AT+CPIN=<pin>[,<newpin>]	OK	Success
		ERROR/+CME ERROR: <err>	-
Query Command	AT+CPIN?	+CPIN: <code> OK	-
		ERROR/+CME ERROR: <err>	-
Test Command	AT+CPIN=?	OK	-
Command Example	AT+CPIN="1234"	OK	Input the PIN code
	AT+CPIN?	+CPIN: READY OK	NOTE: cancel the PIN code PIN code isn't required
		+CPIN: SIM PIN OK	Input the PIN code
		+CPIN: SIM PUK OK	NOTE: the query is locked by PUK code. PIN code is locked. PUK code is required
	AT+CPIN=?	OK	This version supports this command.

Table 116 AT+CPIN parameter description

Parameter	Value	Description
<pin>	-	Original password (character), such as: PIN code or locking/unlocking password of SIM card, such as: SIM-PUK or PH-SIM PUK
<new pin>	-	New password (character type)
<code>	READY	ME needs no password
	SIM PIN	ME is waiting for providing the PIN code of SIM card
	SIM PUK	ME is waiting for providing the PUK code of SIM card
	PH-SIM PIN	ME is waiting for providing the password from phone to SIM card

PH-FSIM PIN	ME is waiting for providing the phone-first SIM card password
PH-FSIM PUK	ME is waiting for providing the phone-first SIM card locking/unlocking password
SIM PIN2	ME is waiting for providing SIM PIN2 (it is recommended that <code> only carries out authentication failure of PIN2 in using this command last time (such as: +CME ERROR: 17); after authentication failure, if wrong PIN2 is inputted again, it is recommended that ME doesn't lock this operation)
SIM PUK2	ME is waiting for providing SIM PUK2 (it is recommended that <code> only carries out authentication failure of PUK2 in using this command last time (such as: +CME ERROR: 18); after authentication failure, if wrong PUK2 or new PIN2 is inputted again, it is recommended that ME doesn't lock this operation)
PH-NET PIN	ME is waiting for providing network personalization password
PH-NET PUK	ME is waiting for providing network personalization locking/unlocking password
PH-NETSUB PIN	ME is waiting for providing network sub-set personalization password
PH-NETSUB PUK	The network is waiting for providing network personalization locking/unlocking password
PH-SP PIN	ME is waiting for service supplier personalization password
PH-SP PUK	ME is waiting for service supplier personalization locking/unlocking
PH-CORP PIN	ME is waiting for corporation personalization password
PH-CORP PUK	ME is in waiting

7.5 AT+CRSM SIM card access limitation AT command

This set command can send SIM<command> and required parameters to ME.

Table 117 AT+CRSM operation command

Type	Command	Possible return results	Description
Set Command	AT+CRSM=<command> [,<fileid>[,<P1>,<P2>,<P3>[,<data>]]]	+CRSM: <sw1>,<sw2> [,<response>] OK	-
		ERROR/+CME ERROR:<err>	Fail
Test Command	AT+CRSM=?	OK	-

Command Example	AT+CRSM=242	+CRSM: 103,0,"" OK	242 is the command code of SIM card state query (refer to GSM 11.11)
	AT+CRSM=?	OK	-

Table 118 AT+CRSM parameter description

Parameter	Value	Description
<command> Command sent to SIM from ME; Please refer to GSM11.11 [28]	176	Binary readout
	178	Record readout
	192	Obtain the return result
	214	Binary update
	220	Record update
	242	State
	203	Retrieving data
	219	Setting data
<fileid>	-	Integer; for identifying the basic data file in SIM card
<P1>	-	Integer; parameter sent to SIM from ME, please refer to GSM 11.11 [28]
<P2>	-	Please refer to <P1>
<P3>	-	Please refer to <P1>
<data>	-	Information to be written in SIM card (hexadecimal; please refer to +CSCS)
<sw1>,<sw2>	-	Integer; information related to command execution in SIM card
<response>	-	Result returned after the previous command executes successfully(hexadecimal; please refer to +CSCS)

7.6 AT+CNUM User number AT command

The execution command returns the MSISDN (Mobile Station International ISDN Number) related to users. This information can be stored in SIM as well as ME. If a user has multiple MSISDNs which can meet different business demands, every MSISDN will occupy a single line to return.

Table 119 AT+CNUM operation command

Type	Command	Possible return results	Description
Execution Command	AT+CNUM	+CNUM:[<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]][<CR><LF>+CNUM:[<alpha2>],<number2>,<type2>[,<speed>,<service>[,<itc>]][...]] OK	Success
		ERROR/+CME ERROR: <err>	Fail
Test Command	AT+CNUM=?	OK	
Command Example	AT+CNUM	+CNUM: "abc","13601896411",129 OK	-Remark: no number returns. Only OK is returned
	AT+CNUM=?	OK	-

Table 120 AT+CNUM parameter description

Parameter	Value	Description
<alphax>	-	Related to <numberx>, optional, letter and figure mixing character string. The character set shall be that selected by "TE character set selection" command +CSCS.
<numberx>	-	Character phone number specified by <typex>
<typex>	-	Integer 8-digit byte address type (please refer to section 10.5.4.7 in GSM 04.08 [8])
<speed>	-	Please refer to AT+CBST
<service> Phone number related business	0	Asynchronous Modem
	1	Synchronous Modem
	2	PAD access (asynchronous)
	3	Packet access (synchronous)
	4	Voice
	5	Fax

<itc> Information transmission capability	0	3.1kHz
	1	UDI

7.7 AT^CARDMODE SIM or USIM card query mode

Table 121 AT^CARDMODE operation command

Type	Command	Possible return results	Description
Query Command	AT^CARDMODE	^CARDMODE: <sim type> OK	-
Command Example	AT^CARDMODE	^CARDMODE: 255 OK	

Table 122 AT^CARDMODE parameter description

Parameter	Value	Description
<sim type>	0-4,255	0: UNKONWN SIM 1: GSM SIM 2: USIM 3: CSIM 4: RUIM 255: NO SIM

7.8 AT+CIMI International mobile station device identifier IMSI number request command

Use the IMSI request execution command. DCE returns to <IMSI>. DCE reads the IMSI number in USIM/SIM of mobile device.

Table 123 AT+ CIMI operation command

Type	Command	Possible return results	Description
Execution Command	AT+CIMI	<IMSI> OK	<IMSI> queried IMSI number
		ERROR/+CME ERROR: <err>	Fail. USIM/SIM card is not inserted, their initialization is not

			finished or SIM is locked. PIN code or PUK code shall be inputted for unlocking.
Test Command	AT+CIMI=?	OK	When USIM/SIM card initialization if finished
		ERROR/+CME ERROR: <err>	Fail. USIM/SIM card is not inserted, their initialization is not finished or SIM is locked. PIN code or PUK code shall be inputted for unlocking.
Command Example	AT+CIMI	460110585049401 OK	Return to current IMSI number
	AT+CIMI=?	OK	The current version supports this command.
	AT+CIMI	ERROR/+CME ERROR: <err>	Fail. USIM/SIM card is not inserted, their initialization is not finished or SIM is locked. PIN code or PUK code shall be inputted for unlocking.

7.9 AT+ICCID Integrated circuit card identification code query command

Table 124 AT+ ICCID operation command

Type	Command	Possible return results	Description
Query Command	AT+ICCID	ICCID: XXX OK	Integrated circuit card identification code corresponding to SIM card
Test Command	AT+ICCID=?	OK	The version in instruction supports this command.
Command Example	AT+ICCID	ICCID: 89861118050291725433 OK	The identification codes of different SIM cards are also different.

7.10 AT^SIMST SIM card display state configuration

Table 125 AT^SIMST operation command

When n=1, ^SIMST: <sim_statues>,<sim_lock> will be reported when the sim card status changes

Type	Command	Possible return results	Description
Report Command		^SIMST: <sim_statues>,<sim_lock>	
Set Command	AT^SIMST=<n>	OK	-Reboot without saving
Query Command	AT^SIMST?	^SIMST: <sim_statues>,<sim_lock> OK	-
Test Command	AT^SIMST=?	^SIMST: (0-1) OK	-
Command Example	AT^SIMST=1	OK	
	AT^SIMST?	^SIMST: 1,0 OK	
	Proactively report	^SIMST: 1,0	

Table 126 AT^SIMST parameter description

Parameter	Value	Description
<n>	0-1	0: Disable 1: Enable (default)
<simstatus>		Integer type, sim card status
	0	SIM card status is invalid
	1	SIM card status is valid
	255	SIM card does not exist
<sim_lock>	0	Not supporter

7.11 Phonebook initialization status display AT^CPBREADY

Table 127 AT^CPBREADY operation command

Type	Command	Possible return results	Description
Report Command		^CPBREADY: <pb_statues>	

Set Command	AT^CPBREADY=<n>	OK	Reboot saving
Query Command	AT^CPBREADY?	^CPBREADY: <n>,<pb_status>,<pb_slot> OK	-
Test Command	AT^CPBREADY=?	^CPBREADY: (0-1) OK	-
Command Example	AT^CPBREADY=1	OK	
	AT^CPBREADY?	^CPBREADY: 1,1,1 OK	
	Proactive reporting	^CPBREADY: 1	

Table 128 AT^CPBREADY parameter description

Parameter	Value	Description
<n>	0-1	0: Disable 1: Enable（Default value）
<pb_status>	0	Phonebook initialization incomplete
	1	Phonebook initialization completed
< pb_slot >	1	Phonebook in SIM card slot 1
	2	No supporter

7.12 SIM Refresh active report AT^SIMREFRESH

When the SIM card sends the refresh active command to the modem, it will report the command to the upper application to update the file content of the card.

Table 129 AT^SIMREFRESH operation command

Type	Command	Possible return results	Description
Report Command	-	^SIMREFRESH: <type>	
Set Command	AT^SIMREFRESH=<n>	OK	Reboot saving
Query Command	AT^SIMREFRESH?	^SIMREFRESH: <n>	

		OK	
Test Command	AT^SIMREFRESH=?	^SIMREFRESH: (0,1) OK	-
Command Example	AT^SIMREFRESH=1	OK	
	AT^SIMREFRESH?	^SIMREFRESH: 1 OK	
	AT^SIMREFRESH=?	^SIMREFRESH: (0,1) OK	

Table 130 AT^SIMREFRESH parameter description

Parameter	Value	Description
<n>	0-1	0: Disable 1: Enable（Default value）
<type>	-	+ 10000 on the basis of refresh type sent by SIM card 10000 NAA Initialization and Full File Change Notification 10001 File Change Notification 10002 NAA Initialization and File Change Notification 10003 NAA Initialization 10004 UICC Rese 10005 NAA Application Reset, only applicable for a 3G platform 10006 NAA Session Reset, only applicable for a 3G platform

7.13 AT^STSF Command for Configuring the STK Interface

This command is used to active and de-active the STK interface function.

Table 131 AT^STSF operation command

Type	Command	Possible return results	Description
Set Command	AT^STSF=<Mode>[,<Config>][,<Timeout>]	<CR><LF>OK<CR><LF>	success
		<CR><LF >ERROR<CR><LF>	error
Read Command	AT^STSF?	<CR><LF>^STSF: <mode><CR><LF> <CR><LF>OK<CR><LF>	-
Test Command	AT^STSF=?	<CR><LF>^STSF: list of supported <mode><CR><LF>	0: Disable the STK interface function

		<CR><LF>OK<CR><LF>	(default value). 1: Active the STK interface function.
Examples	AT^STSF?	^STSF: 1 OK	-
	AT^STSF=?	^STSF: (0~1) OK	-
	AT^STSF=1	<CR><LF>OK<CR><LF>	Active STK interface

Table 132 AT^STSF parameter description

Parameters	Value	Description
<Mode>	0~1	0: Disable the STK interface function (default value). 1: Active the STK interface function.
<Config>	-	Not implemented yet

7.14 ^STIN Command for Reporting of the STK Event

This command is used to notify the TE that the SIM card reports a proactive command to the MT. When the TE receives the notification, it sends the ^STGI command to obtain the proactive command data and complete the unsolicited request.

Table 133 ^STIN operation command

Type	Command	Possible return results	Description
Proactive Command	^STIN=<CmdType>,<NbItems>,<istimeout>	<CR><LF>^STIN :<CmdType>,<NbItems>,<istimeout><CR><LF>	-
Examples	^STIN	^STIN: 17,12,0	

Table 134 ^STIN parameter description

Parameters	Value	Description
<CmdType>	0~20	0：Not used 1：Display Text 2：Get Inkey 3：Get Input

		4：Launch Browser, not supported currently 5：More Time, not supported currently 6：Play Tone 7：Poll Interval, not supported currently 8：Provide Local Information, not supported currently 9：Refresh, not supported currently 10：Run AT Command, not supported currently 11：Select Item 12：Send Short Message 13：Send SS, not supported currently 14：Send USSD, not supported currently 15：Set Up Call, not supported currently 16：Set Up Event List, not supported currently 17：Set Up Menu 18：Set Up Idle Mode Text, not supported currently 19：Polling Off, not supported currently 20：End of Proactive Command Session
<NbItems>	Deponses on <CmdType>	it is the number of menu items, ranging from 1to 50
<istimeout>	0/1	0: not timeout 1: timeout

7.15 AT^STGI Command for Obtaining Data of Proactive

This command is used to obtain the data of proactive commands. After the TE receives the notification of a proactive command, it performs this command to obtain the information of the proactive command.

Table 135 AT^STGI operation command

Type	Command	Possible return results	Description
Set Command	AT^STGI=<CmdType>,[<NbItems>]	Detail in table 6	-
		<CR><LF>ERROR<CR><LF>	Error
Read Command	AT^STGI?	<CR><LF>^STGI: <CmdType> , <NbItems><CR><LF> <CR><LF>OK<CR><LF>	-
Test Command	AT^STGI=?	<CR><LF>^STGI: list of supported<CmdType>,list of supported<NbItems><CR><LF> <CR><LF>OK<CR><LF>	-
Example	AT^STGI?	^STGI:17,0 OK	
	AT^STGI=?	^STGI:(1~20),(1~50)	

		OK	
	AT^STGI=12	^STGI: 12,4b41d906a131060100044102700000 3c0d00000000534054000000000000010161000000000000060014500302500303010000 0a98550149640028337889020001 0a40080d060e044d503150,0000,0c11550101102010	Send SMS
	AT^STGI=17	^STGI: 17,12,040a5669766f204368697000 ^STGI: 3,12,041450726f6d6f636f65732065205061636f74657300 ^STGI: 6,12,04094d6575205669766f00 ^STGI: 9,12,040e526564657320536f636961697300 ^STGI: 12,12,04104e6f74696369617320652049 6e666f00 ^STGI: 15,12,04114d75736963617320652056696465 6f7300 ^STGI: 19,12,04144a6f676f7320652041706c6963617469766f7300 ^STGI: 22,12,0410496e7465726174697669646164657300 ^STGI: 25,12,040f5669766f20436f6e65637461646f00 ^STGI: 28,12,040e4d6169732053657276696 36f7300 ^STGI: 31,12,041253617564652065204265 6d2d657374617200 ^STGI: 33,12,04125365677572616e6361205072612056632000 ^STGI: 35,12,04084d6169732e2e2e00 OK	SetUp Menu

Table 136 AT^STGI parameter description

CmdType	Description	Response
1	Display Text	<CR><LF>^STGI: <CmdType>,<TextInfo>,<TextCode>,<ClearMode>[,<DurationTime>]<CR><LF> <CR><LF>OK<CR><LF>

2	Get Inkey	<CR><LF>^STGI: <CmdType>,<TextInfo>,<textCode>,<rspFormat>,<HelpInfo>[,<Timeout>] <CR><LF> <CR><LF>OK<CR><LF>
3	Get Input	<CR><LF>^STGI: <CmdType>,<TextInfo>,<textCode>,<PackMode>,<EchoMode>,<rspFormat>,<SizeMin>,<SizeMax>,<HelpInfo>[,<DefaultTextInfo>] <CR><LF> <CR><LF>OK<CR><LF>
6	Play Tone	<CR><LF>^STGI: <CmdType>,<ToneType>[,<Duration>,[<TextInfo>,<textCode >[,<icon >]]]<CR><LF> <CR><LF>OK<CR><LF>
11	Select Item	<CR><LF>^STGI: <CmdType>,<NbItems>,<Alpha Identifier menu><CR><LF> <CR><LF>^STGI: <Id1>,<NbItems>,<Alpha Id1 Label>[,<Help Info>,<NextActionId>] <CR><LF> <CR><LF>^STGI: <Id2>,<NbItems>,<Alpha Id2Label>[,<HelpInfo>,<NextActionId>]<CR> ..... <CR><LF>OK<CR><LF>
12	Send Short Message	<CR><LF>^STGI: <CmdType>,<TPDUInfo>,<Alpha Info>,<Address Info><CR><LF> <CR><LF>OK<CR><LF>
17	Setup Menu	<CR><LF>^STGI: <CmdType>,<NbItems>,<Alpha Identifier menu><CR><LF> <CR><LF>^STGI: <Id1>,<NbItems>,<Alpha Id1 Label>[,<Help Info>,<NextActionId>] <CR><LF> <CR><LF>^STGI: <Id2>,<NbItems>,<Alpha Id2Label>[,<HelpInfo>,<NextActionId>]<CR> ..... <CR><LF>OK<CR><LF>

Table 137 AT^STGI parameter description

CmdType	Parameters	Description
1 Display Text	<TextInfo>	Indicates the text to be displayed. [Notes]TextInfo format is DLV(D: Dcs, L(Length of Data), D(Data)), APP should parse the Alpha according the DLV formatand display the Text info.All of the TextInfo mentioned in this article refer to DLV format. Including default Text info and all the text object.
	<TextFormat>	Indicates the coding scheme of the text to be displayed. 0: Compressed GSM 7-bit coding 4: 8-bit coding

		8: UCS2 coding
	<ClearMode>	The user disables the prompt mode. 0: The displayed text will be cleared after a certain period of time. 1: The displayed text remains until it is cleared by the user.
	<DurationTime>	Indicates the displaying duration requested for the displayed text.
2 Get Inkey	<TextInfo>	A character string that indicates the prompt information.
	<textCode>	0: Compressed GSM 7-bit coding 4: 8-bit coding 8: UCS2 coding
	<rspFormat>	Indicates the user's input mode or character type of the input contents. 0: GSM 7-bit coding 1: YES or NO mode 2: Digits (0–9, *, #, and +) 3: UCS2 coding
	<HelpInfo>	0: The help information is unavailable. 1: The help information is available.
	<Timeout>	Time-out time, in seconds
3 Get Input	<TextInfo>	A character string that indicates the prompt information.
	<textCode>	0: Compressed GSM 7-bit coding 4: 8-bit coding 8: UCS2 coding
	<PackMode>	0: Uncompressed mode 1: Compressed mode
	<EchoMode>	0: Disable the echo mode. 1: Enable the echo mode.
	<rspFormat>	Indicates the character type of contents that the user inputs. 0: GSM 7-bit coding characters 2: Digits (0–9, *, #, and +) 3: UCS2
	<SizeMin>	(1–255) Indicates the minimum input length,
	<SizeMax>	(1–255) Indicates the maximum input length
	<HelpInfo>	0: The help information is unavailable. 1: The help information is available.
	<DefaultTextInfo>	Text information. By default, it is the strings that the user inputs.
6 Play Tone	<ToneType>	Indicates the type of the tone. 1: Dial tone 2: Called Subscriber Busy tone 3: Congestion tone 4: Radio Path Acknowledgement tone

		5: Radio Path Not Availabe Call Dorp tone 6: Error tone 7: Call Waiting tone 8: Ring tone 16: General beep 17: Positive Acknowledgement tone 18:Negative Acknowledgement tone 19:Ring tone selected by the user 20:Short Message Alert tone selected by the user When the tone is not specified, the ME uses the default tone "general beep".
	<Duration>	The duration (in seconds) of Play Tone.
	<TextInfo>	Indicates the text information to be displayed.
	<TextCode>	Indicates the coding scheme of the text to be displayed. 0: Compressed GSM 7-bitcoding 4: 8-bit coding 8: UCS2 coding
	<icon>	indicates the icon information.
11 Select Item	<NbItems>	It is consistent with the <NbItems> in the STIN notification.
	<Alpha Identifier menu>	Indicates the alpha identifier of the main menu, that is, the title of the main menu. Alpha formatis DLV(D: Dcs, L(Length of Data), D(Data)), APP should parse the Alpha according to the DLV format and display the Alpha string. All of the Alpha mentioned in this article refer to DLV format.Including Alpha info for all the Alpha object.
	<Idx>	(1–255) Identifier items
	<NbItems>	(1–255) Indicates the number of the menu items.
	<Alpha Idx Label>	Indicates the alpha identifier label of the menu option, that is, the name of the menu option.
	<Help Info>	0: The help information is unavailable. 1: The help information is available.
	<NextActionId>	It includes a proactive command Identifier.
12 Send Short Message	<TPDUInfo>	The TPDU is formatted as described in TS23.040[6]. Format is as follows： Description | Length Length (X) | Y SMS TPDU | X
	<Alpha Info>	
	<Address Info>	If the ME is capable of SMS-MO, then it shall send the data as a Short Message TPDU to the destination address.TON/NPI is coded

		as for EFADN.Dialling number string is coded as for EFADN, and may include DTMF separators and DTMF digits, which the ME shall send in the same way as for EFADN but without locally generating audible DTMF tones to the user. Description: Length Length (X): Y TON and NPI: 1 Dialling number string: X-1
17 Setup Menu	<NbItems>	It is consistent with the <NbItems> in the STIN notification.
	<Alpha Identifier menu>	Indicates the alpha identifier of the main menu, that is, the title of the main menu. Alpha formatis DLV(D: Dcs, L(Length of Data), D(Data)), APP should parse the Alpha according to the DLV format and display the Alpha string. All of the Alpha mentioned in this article refer to DLV format.Including Alpha info for all the Alpha object.
	<Idx>	(1–50) Identifier items
	<NbItems>	(1–50) The same as<NbItems> in the ^STIN notification
	<Alpha Idx Label>	Indicates the alpha identifier label of the menu option, that is, the name of the menu option.
	<Help Info>	0: The help information is unavailable. 1: The help information is available.
	<NextActionId>	It includes a proactive command Identifier.

7.16 AT^STGR Command for STK Responding

This command is used to report the result of the proactive command that the TE executes to the SIM card.

Table 138 AT^STGR operation command

Type	Command	Possible return results	Description
Set Command	AT^STGI=<CommandType>,<Result>[,<Data_ItemID>]	<CR><LF>OK<CR><LF>	-
		<CR><LF>ERROR<CR><LF>	Error
Read Command	AT^STGR?	<CR><LF>^STGR: <CommandType> , <Result>[,<Data_ItemID>] <CR><LF>	-
Test Command	AT^STGR=?	<CR><LF>^STGR: list of supported<CommandType>, list of supported<Result><CR><LF> <CR><LF>OK<CR><LF>	-

Example	AT^STGR?	17,1,3,"" OK	
	AT^STGR=?	^STGR:(0~20),(0~4) OK	
	AT^STGR=17,1,1	OK	Choose the id1 item

Table 139 AT^STGR parameter description

CmdType	Result	Data/ItemID
1 Display Text	0: The user terminated the session. 1: The command is executed successfully. 4: "Display Text" reported by SIM card is supported by MT.	-
2 Get Inkey	0: The user terminated the session. 1: The command is executed successfully. 2: The help information required by the user. 4: "Get Inkey" reported by SIM card is supported by MT.	Indicates that includes the contents that the user inputs. Notes: When <Data_ItemID >Indicates the contents which format is DLV(D: Dcs, L(Length of Data), D(Data)), APP should pass the <Data_ItemID >according the DLV format to modem. All of the <Data> of contents that user input mentioned in this article refer to DLV format.
3 Get Input	0: The user terminated the session. 1: The command is executed successfully. 2: The help information required by the user. 4: "Get Input" reported by SIM card is supported by MT.	Indicates that includes the contents that the user inputs. Notes: When < Data_ItemID > Indicates the contents which format is DLV(D: Dcs, L(Length ofData), D(Data)), APP should pass the < Data_ItemID >according the DLV format to modem. All of the <Data> of contents that user input mentioned in this article refer to DLV format.
6 Play Tone	0: The user terminated the session. 1: The command is executed successfully. 4: "Tone" reported by SIM card is supported by MT.	-
11 Select Item	0: The user terminated the session. 1: The menu selected by the user.	Indicates that includes the item ID of the menu that user selected.

	2: The help information required by the user. 3: Return to the upper level menu. 4: "Select Item" reported by SIM card is supported by MT.	Notes: When < Data_ItemID > Indicates the Item ID which is the item ID of the menu that user selected.
12 Send Short Message	0: The user terminated the session. 1: The command is executed successfully. 2: unsuccessful transmission of the Short Message. 3: network currently unable to process command.	-
17 Setup Menu	0: The command is performed successfully. 1: The menu selected by the user. 2: The help information required by the user. 3: Return to the upper level menu (not supported currently because the current menu is already the main menu).	Indicates that includes the item ID of the menu that user selected. Notes: When <Data_ItemID >Indicatesthe Item ID which is the item ID of the menu that user selected.

7.17 SMS memory full active reporting function ^SMMEMFULL

Table 140 AT^SMMEMFULL operating command

Type	Command	Possible return results	Description
Report to the command	^SMMEMFULL	^SMMEMFULL: <mem>	SMS memory full report
Command example	AT^CURCEX=2,FF		Description full SMS reporting enabled
	^SMMEMFULL: "SM"		The card side memory is full
	AT^CURCEX=2,DF		Disable the report of full SMS messages

Table 141 AT^SMMEMFULL parameter description

Parameter	Value	Description
<mem>	“ME” “SM”	ME: SMS messages are stored on the device SM: SMS messages are stored on the card side

8 Network service

8.1 AT+CREG Network registration information command

The set command mainly controls +CREG active report event.

If <n>=1, when the network registration state changes, report +CREG: <stat>.

If <n>=2, when the cell information changes, report +CREG: <stat>[,<lac>,<ci>].

The read command returns current registration status <stat>, and the position information <lac>. <ci> is only reported only in case of <n>=2.

In CDMA mode:

If <n>=2, <lac> and <ci> return values are CDMA <sid>,<nid_bid>:

+CREG: <n>,<stat>[,[<sid>],[<nid_bid>],[<AcT>]

Note: there is no underline between nid and bid.

Table 142 AT+CREG operation command

Type	Command	Possible return results	Description
Execution Command	AT+CREG=[<n>]	OK	Success
		ERROR/+CME ERROR:<err>	Fail
Query Command	AT+CREG?	+CREG: <n>,<stat>[,[<lac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]] OK	-
Test Command	AT+CREG=?	+CREG: (<n> value list) OK	-
Command Example	AT+CREG=2	OK	
	AT+CREG?	+CREG:2,1,9191,2E50 OK	With position area ID and cell ID
		+CREG: 0,1 OK	Set the query result of "Disable network registration non-requested result code"

		+CREG: 1,1 OK	Set the query result of "Enable network registration non-requested result code + CREG: <stat>"
	AT+CREG=?	+CREG:(0-2) OK	-

Table 143 AT+CREG parameter description

Parameter	Value	Description
<n>	[0]	Disable the network registration non-request result code
	1	Enable the network registration non-request result code +CREG: <stat>
	2	Enable the network registration and position information non-request result code +CREG: <stat>[,<lac>,<ci>]
	3	(Not support) Enable the network registration and position information non-request result code +CREG: <stat>[,[<lac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]]
<stat>	0	Not registered; ME doesn't search the new operator of registration business
	1	Registered, local network
	2	Not registered; ME is searching the new operator of registration business
	3	Registration rejected
	4	Unknown
	5	Registered, roaming
	6	Registered as SMS only, local network, when <AcT> indicates E-UTRAN
	7	Registered as SMS only, roaming, when <AcT> indicates E-UTRAN
	8	Only bear the emergency service, not applicable for business
	9	Register "CSFB unavailable", local network, when <AcT> indicates E-UTRAN
	10	Register "CSFB unavailable", roaming, when <AcT> indicates E-UTRAN
<lac>	-	Position area number
<ci>	-	Cell ID, four-byte hexadecimal GERAN/UTRAN/E-UTRAN network ID

<AcT>		Data access technology of service network
	0	GSM
	1	GSM Compact
	2	UTRAN
	3	GSM w/EGPRS (see NOTE 3)
	4	UTRAN w/HSDPA (see NOTE 4)
	5	UTRAN w/HSUPA (see NOTE 4)
	6	UTRAN w/HSDPA and HSUPA (see NOTE 4)
	7	E-UTRAN
	8	CDMA
<cause_type>	0	Show the cause value of <reject_cause> containing one MM. Refer to appendix G in 3GPP TS24.008[8].
	1	Show the special cause of <reject_cause> containing the manufacturer
<reject_cause>		Integer; include the cause of registration rejection. This type is defined by <cause_type>.

8.2 AT+CGREG GPRS network registration status

The set command controls the +CGREG actively report events. When <n>=1 and the MT's GPRS registration status changes, this command set controls the unrequested result code +CGREG, which means +CGREG:<stat> will be reported. When <n>=2 and the registered cell changes, there will be: +CGREG: <stat>[,<lac>,<ci>] reported. The display form <n> of the result code returned by the query command and a parameter <stat> that can indicate the MT network registration status. Only when <n>=2 and the MT is registered in the network, the location information elements <lac> and <ci> are returned.

Table 144 AT+CGREG parameter description

Type	Command	Possible return results	Description
Execution Command	AT+CGREG=[<n>]	OK	-
		ERROR/+CME ERROR: <err>	Fail
Query Command	AT+CGREG?	+CGREG: <n>,<stat>[,[<lac>],[<ci>],[<AcT>],[<rac>][,<cause_type>,<reject_cause>]]	-

		OK	
Test Command	AT+CGREG=?	+CGREG:(<n> value list) OK	-
Command Example	AT+CGREG=1	OK	-
	AT+CGREG?	+CGREG: 1,1 OK	-
	AT+CGREG=?	+CGREG: (0-2) OK	-

Table 145 AT+CGREG parameter description

Parameter	Value	Description
<n>	[0]	Disable network registration unsolicited result code +CGREG:
	1	Enable network registration unsolicited result code+CGREG: <stat>
	2	Enable network registration and location information unsolicited result code +CGREG:<stat>[,<[lac>,]<[ci>],[<AcT>],[<rac>]]
<stat>	0	Not registered; ME doesn't search the new operator of registration business
	1	Registered, local network
	2	Not registered, but ME is searching the new operators for registered services
	3	Registration rejected
	4	Unknown
	5	Registered, roaming
<lac>	-	Character; 2-byte hexadecimal position area code (such as: 00C3 equals to 195 in decimal system)
<ci>	-	String type; four byte E-UTRAN cell ID in hexadecimal format.
[<AcT>]	0	GSM
	1	GSM Compact
	2	UTRAN

	3	GSM w/EGPRS
	4	UTRAN w/HSDPA
	5	UTRAN w/HSUPA
	6	UTRAN w/HSDPA and HSUPA
	7	EUTRAN
	8	AUTO
	9	MAX（Invalid value）
<cause_type>	0	Show the cause value of <reject_cause> containing one MM. Refer to appendix G in 3GPP TS24.008[8].
	1	Show the special cause of <reject_cause> containing the manufacturer
<reject_cause>		Integer; include the cause of registration rejection. This type is defined by <cause_type>.

8.3 AT+CEREG LTE network registration state command

This set command controls the display of some non-request result codes of LTE registration state. If <n>=1 and MT LTE registration state changes, this command set controls the non-request result code +CEREG, i.e. report of +CEREG:<stat>.

If <n>=2 and the registered cell changes, +CEREG: <stat>[,<lac>,<ci>] will be reported. The query command returns the display form <n> of result code and a parameter <stat> that can represent MT network registration state. Only if <n>=2 and MT is registered in network, the position information element <lac> and <ci> will be returned.

Table 146 AT+CEREG operation command

Type	Command	Possible return results	Description
Execution Command	AT+CEREG=[<n>]	OK	Success
		ERROR/+CME ERROR:<err>	Fail
Query Command	AT+CEREG?	+CEREG: <n>,<stat>[,[<lac>],[<ci>],[<AcT>]] OK	-
Test Command	AT+CEREG=?	+CEREG: (<n> value list) OK	-
Command	AT+CEREG=1	OK	

Example		+CEREG: 2,1,"91D5","90C3301",7 OK	-
	AT+CEREG?	+CEREG: 1,1 OK	-
	AT+CEREG=?	+CEREG: (0-2) OK	-

Table 147 AT+CEREG operation command parameter description

Parameter	Value	Description
<n>	[0]	Disable the network registration non-request result code +CEREG:
	1	Enable the network registration non-request result code +CEREG: <stat>
	2	Enable the network registration and position information non-request result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]
<stat>	0	Not registered; ME doesn't search the new operator of registration business
	1	Registered, local network
	2	Not registered, but ME is searching the new operators for registered services
	3	Registration rejected
	4	Unknown
	5	Registered, roaming
<lac>	-	Character; 2-byte hexadecimal position area code (such as: 00C3 equals to 195 in decimal system)
<ci>	-	Character; 2-byte hexadecimal cell number
<AcT>		Access technology of serving cell
	7	E-UTRAN

8.4 AT^HCSQ Signal strength query and report command

This command queries and reports the signal strength of current service network. If MT is registered in multiple networks in different service modes, query the signal strength of network in different modes. No

matter whether MT is registered in network, this command can query this signal strength or allow MT active report.

Note: the signals queried and reported are not the real value, but are the positive value converted by the conversion mode in CESQ command in 27.007. The specific conversion algorithm is at the end of the description of this command.

Table 148 AT^HCSQ operation command

Type	Command	Possible return results	Description
Set Command	AT^HCSQ=<n>,<m>	OK	-
		ERROR	Fail
Query Command	AT^HCSQ?	^HCSQ: <n><m><sysmode>[,<value1>[,<value2>[,<value3>[,<value4>]]]] OK	-
Test Command	AT^HCSQ=?	^HCSQ: (<n> value list ,<m> value list) OK	-
Command Example	AT^HCSQ?	^HCSQ: 5,0,"LTE",63,20,68,151 OK	-
	AT^HCSQ=3	OK	Enable the active report (report if the signal quality change is higher than 3dB)
	AT^HCSQ?	^HCSQ: 3,0,"LTE",63,32,68,171 OK	

Example

Table 149 AT^HCSQ active report operation command

Type	Command	Possible return results	Description
Report Command	^HCSQ: <sysmode>[,<value1>[,<value2>[,<value3>[,<value4>]]]]		-
Command Example	AT^HCSQ=2,5	AT^HCSQ=2,5 OK	If the ^HCSQ signal change is higher than 2db, actively report. The minimum interval

of report is 5s.

Table 150 AT^HCSQ parameter description

Parameter	Value	Description
<n>	0~5	0: no active report of extended signal quality, if <n> is 0, <m> parameter is invalid, <n> is 0 by default. 1~5: when the signal quality change is higher than ndB, actively report the extended signal quality. If the mode switches, only staying in the cell, the active report is enabled.
<m>	1~20	0: no time limit for reporting the extended signal quality; 1~20: minimum interval of two signal quality reports, unit: S Optional parameter, 0 by default.
<sysmode>	"NOSERVICE"	NOSERVICE mode
	"GSM"	GSM/GRPS/EDGE mode
	"WCDMA"	WCDMA/HSDPA/HSPA mode
	"LTE"	LTE mode

The following table shows the signal strength types of every service mode.

Table 151 AT^HCSQ parameter description

<sysmode>	value1	value2	value3	value4	Description
"NOSERVICE"	-	-	-	-	
"GSM"	rxlev	ber	-	-	
"WCDMA"	rxlev	ecio	rscp	ber	
"LTE"	rxlev	rsrq	rsrp	snr	

Defined values

<rxlev>: integer type, received signal strength level (see 3GPP TS 45.008 [20] subclause 8.1.4).

0 rssi < -110 dBm

1 -110 dBm ≤ rssi < -109 dBm

2 -109 dBm ≤ rssi < -108 dBm

: : : :

61 -50 dBm ≤ rssi < -49 dBm

62 -49 dBm ≤ rssi < -48 dBm

63 -48 dBm ≤ rssi

99 not known or not detectable

<ber>: integer type; channel bit error rate (in percent)

0...7as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4

99 not known or not detectable

<rscp>: integer type, received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3).

0 rscp < -120 dBm

1 -120 dBm ≤ rscp < -119 dBm

2 -119 dBm ≤ rscp < -118 dBm

: : : :

94 -27 dBm ≤ rscp < -26 dBm

95 -26 dBm ≤ rscp < -25 dBm

96 - 25 dBm ≤ rscp

255 not known or not detectable

<ecio>: integer type, ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [95] subclause).

0 Ec/Io < -24 dB

1 -24 dB ≤ Ec/Io < -23.5 dB

2 -23.5 dB ≤ Ec/Io < -23 dB

: : : :

47 -1 dB ≤ Ec/Io < -0.5 dB

48 -0.5 dB ≤ Ec/Io < 0 dB

49 0 dB ≤ Ec/Io

255 not known or not detectable

<rsrq>: integer type, reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7).

0 rsrq < -19.5 dB

1 -19.5 dB ≤ rsrq < -19 dB

2 -19 dB ≤ rsrq < -18.5 dB

: : : :

32 -4 dB ≤ rsrq < -3.5 dB

33 -3.5 dB ≤ rsrq < -3 dB

34 -3 dB ≤ rsrq

255 not known or not detectable

<rsrp>: integer type, reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4).

0 rsrp < -140 dBm

1 -140 dBm ≤ rsrp < -139 dBm

2 -139 dBm ≤ rsrp < -138 dBm

: : : :

95 -46 dBm ≤ rsrp < -45 dBm

96 -45 dBm ≤ rsrp < -44 dBm

97 -44 dBm ≤ rsrp

255 not known or not detectable

<snr>: integer type, representing the signal-to-interference plus noise ratio, suitable for LTE mode

0 snr < -20 dBm

1 -20 dBm ≤ snr< -19.8 dB

2 -19.8 dBm ≤ snr< -19.6 dB

: : : :

249 29.6 dB ≤ snr< 29.8 dB

250 29.8 dBm ≤ rsrp < 30 dB

251 30 dB ≤ snr

255 not known or not detectable

8.5 AT+COPS Operator selection command

This set command compulsively selects and registers GSM/UTSM network operator. <mode> sets that ME automatically selects the operator <oper> or compulsively selects operator <oper> by this command. If the selected operator is unavailable, it cannot select other operators, except for <mode>=4. If <mode>=2, it represents the forced cancellation in this network. The registration mode will influence all registration behaviors later on. For example, if <mode>=2, ME isn't registered until <mode>=0 or 1.

Table 152 AT+COPS operation command

Type	Command	Possible return results	Description
Execution Command	AT+COPS=[<mode> [,<format>[,<oper> [,<AcT>]]]]	OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Query Command	AT+COPS?	+COPS: <mode>[,<format>,<oper>[,<AcT>]] OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Test Command	AT+COPS=?	+COPS: [support list (<stat>, long character <oper>, short character <oper>, digit <oper>[,< AcT>])s][,,(support list <mode>s),(support list <format>s)] OK	-
		ERROR/+CME ERROR:<err>	Auto mode doesn't support, or, related to ME function
Command	AT+COPS=0,0	OK	

Example	AT+COPS? Corresponding <oper> after setting different <format> Operator name rule: plmn name + spn (if exist)	+COPS: 0,0,"CHINA MOBILE CMCC",7 OK	Use long characters to indicate the current network operator (Note: the current telecom card does not display SPN)
		+COPS: 0,1,"CMCC CMCC",7 OK	Use short characters to indicate the current network operator (Note: The current telecom card does not display SPN)
		+COPS: 0,2,"46000",7 OK	Use numbers to indicate current network operators
	AT+COPS=?	+COPS: (2,"CHINA MOBILE","CMCC","46000",0),(3,"CHN-CUGSM","CU-GSM","46001",2),(3,"CHN-CUGSM","CU-GSM","46001",0),, (0,1,2,3,4),(0,1,2) OK	List all current network operator

Table 153 AT+COPS parameter description

Parameter	Value	Description
<mode>	[0]	Automatic (<oper> field can be neglected)
	1	Manual (<oper> field can be neglected)
	2	Log off from registration network
	3	Only set <format>(for query command +COPS?); not try to register or log off(<oper> field can be neglected); this value is not applicable to return result of query command.
	4	Manual/automatic(<oper> field cannot be neglected); if the manual selection is in failure, enter the automatic selection mode (<mode>=0)
<format>	[0]	Long character (adopt the letter and figure format), maximum 16 characters
	1	Short character (adopt the letter and figure format), maximum 8 characters
	2	Figure <oper>

<oper>	-	Character; <format> represents letter and figure mixing type or figure type of this character string; the figure type represents GSM position area identifier number (please refer to section 10.5.1.3 in GSM 04.08 [8]). This number includes one 3-digit BCD national code (meet the ITU-T E.212 Annex A [10] standard) and one 2-digit BCD network code. The latter one is related to management.
<stat>	0	Unknown
	1	Available
	2	Current
	3	Disable
<Act>	0	GSM
	1	GSM compact
	2	UTRAN
	3	GSM w/EGPRS (see NOTE1)
	4	UTRAN w/HSDPA (see NOTE2)
	5	UTRAN w/HSUPA (see NOTE2)
	6	UTRAN w/HSDPA and HSUPA (see NOTE2)
	7	E-UTRAN
	8	EC-GSM-IoT (A/Gb mode) (see NOTE 3) **Note:** 3GPP TS 44.018[156] specifies EC-SCH INFORMATION message, if this message exists, it represents that the service cell supports EC-GSM-IoT.
	9	E-UTRAN (NB-S1 mode) (see NOTE 4) **Note:** 3GPP TS 36.331[86] specifies the system information block, provides the information that whether the service cell supports NB-IoT, corresponding to E-UTRAN (NB-S1 mode).

8.6 AT+CSQ Signal quality AT command

The execution command returns the received signal strength indication <rssi> and channel error rate <ber> from MT.

Table 154 AT+CSQ operation command

Type	Command	Possible return results	Description
Execution Command	AT+CSQ	+CSQ: <rssi>,<ber> OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Test Command	AT+CSQ=?	+CSQ: (<rssi> value list),(<ber> value list) OK	-
Command Example	AT+CSQ	+CSQ: 27,59 OK	-
	AT+CSQ=?	+CSQ: (0-31,99),(0-7,99) OK	-
		TDSCDMA returns are different with others: +CSQ: (100-191,199),(0-7,99) OK	

Table 155 AT+CSQ parameter description

Parameter	Value	Description
<rssi>	0	≤-113dBm
	1	-111dBm
	2～30	-109～-53dBm
	31	≥-51dBm
	99	Unknown or unpredictable
<ber>	0	BER < 0,2 %
	1	0,2 % < BER < 0,4 %
	2	0,4 % < BER < 0,8 %

	3	0,8 % < BER < 1,6 %
	4	1,6 % < BER < 3,2 %
	5	3,2 % < BER < 6,4 %
	6	6,4 % < BER < 12,8 %
	7	12,8 % < BER
	99	Unknown or unpredictable

8.7 AT^SPN EF-SPN information display

Table 156 AT^SPN operation command

Type	Command	Possible return results	Description
Query Command	AT^SPN	^SPN: <cond>,<encoding type>,<name> OK Or ERROR	-not support UCS2 encoding type
Command Example	AT^SPN	^SPN: 1,1,"CMCC" OK	

Table 157 AT^SPN parameter description

Parameter	Value	Description
<cond>	0-1	0: display condition enable 1: display condition disable
<encoding type>	0-8	0: International Reference Alphabet T.50 1: GSM 7 bit alphabet, not packed to 7 bits (will not contain @ (0x00); might have got mapped to 0xe6 at the ATCOP parser) 2: UCS2 Unicode, rep'd by "4 hex character"-tuplets 3: HEX, rep'd by "2 hex character"-tuplets 4: Octets, of 0-255 value 5: PBM's 8 bit alphabet 6: GSM 7 bit alphabet, which contains @ (0x00) This character set should be used when dsatutil_convert_chset has to be called for sending the converted string to modules other than

		ATCOP.the output might contain GSM7 bit @ (0x00) so, str_len on output string might return a wrong value. Output_len has to be calculated from the input string only.This is for internal use with in ATCOP. This character set is exactly the same as ALPHA_GSM above 7: The 2 byte representation of UCS2 for PBM 8: Special GSM encoding of UCS2 as specified in GSM TS 11.11 Annex B
<name>	String type	CMCC: “CMCC” China unicom: “China unicom” China telecom: “China telecom”

8.8 ^MODE System mode change indication command

This command reports the switch system mode and sub-mode. Enable the active report by default. Recover the default value after restart.

Table 158 AT^MODE operation command

Type	Command	Possible return results	Description
Execution Command	AT^MODE=<act>	OK	Enable the ^MODE reporting; enable by default
Query Command	AT^MODE=1	OK	
Test Command	AT^MODE?	^MODE: (0-1) OK	-
Command Example	AT^MODE=0	OK	-

Table 159 ^MODE active report operation command

Type	Command	Possible returned result	Description
Report Command	^MODE: <sysmode>,<sub_sysmode>		-
Command Example	AT^MODE=1 AT+CFUN=0 AT+CFUN=1	OK OK ^MODE: 0,0 ^MODE: 13,81	-

Table 160 AT^MODE operation command parameter description

Parameter	Value	Description
<act>	0-1	0: Disable ^MODE active report 1: Enable ^MODE active report by default

Table 161 ^MODE active report parameter description

sys_mode		CELL_SERVICE	
-1	FOR INTERNAL USE ONLY	-1	ERR
0	No service	0	NONE
2	CDMA mode	13	CDMA20001X
3	GSM mode	1	GSM
4	HDR mode	14	EVDO
5	WCDMA mode	41	WCDMA
		42	HSDPA
		43	HSUPA
		44	HSDPA and HSUPA
		45	HSDPA+
		46	HSDPA+ and HSUPA
		47	DC HSDPA+
		48	DC HSDPA+ and HSUPA
		49	64QAM HSDPA+ and HSUPA
		50	64QAM HSDPA+
		51	DC HSUPA
9	LTE mode	71	FDD LTE
		72	TDD LTE
11	TDS mode	61	TD-SCDMA

8.9 AT^CELLINFO Cell information query command

This command queries the current serving cell information, neighboring cell information and CA cell information.

Note: Neighboring cell in LTE mode, the parameters after <idle_mode>, except for <last_idle_search_timestamp> and <last_idle_meas_timestamp>, are only valid in idle mode, but not in non-idle mode.

When MODE=4, the relevant parameters are returned according to the status of the antenna. If some antennas are not working, the corresponding value cannot be obtained.

When the obtained value is' - ', the identity value is invalid.

Table 162 AT^CELLINFO operation command

Type	Command	Possible return results	Description
Set Command	AT^CELLINFO=<MODE>	OK	-
		ERROR/+CME ERROR:<err>	
Test Command	AT^CELLINFO=?	^CELLINFO: (1-4) OK	
Command Example	AT^CELLINFO=1	LTE MODE： 4G: <CR><LF>^CELLINFO:<curr_mode>,<duplex_mode>,<mcc>,<mnc>,<global_cell_id>,<physical_cell_id>,<eNBID>,<cell_id>,<tac_id>,<band>,<lte_bandwidth>,<dl_channel>,<ul_channel>,<rssi>,<rsrp>,<rsrq>,<sinr>,<snr>,<ue_category>,<pathloss>,<cqi>,<tx_power>,<tm>,<qci>,<volte>,<ims_sms>,<sib2_plmn_r15_info_present>,<sib2_upr_layer_ind>,<restrict_dcnr><CR><LF><CR><LF>OK<CR><LF> WCDMA mode: <CR><LF>^CELLINFO:<curr_mode>,<mcc>,<mnc>,<global_cell_id>,<psc>,<NodeB>,<cell_id>,<lac_id>,<band>,<dl_channel>,<ul_channel>,<rssi>,<ecio>,<sir>,<rscp><CR><LF><CR><LF>OK<CR><LF> GSM mode (current version not support) <CR><LF>^CELLINFO:<curr_mode>,<mcc>,<mnc>,<global_cell_id>,<lac_id>,<ch	The same to +sgcellinfoex function

		annel>,<band>,<rssi>,<bsic><CR><LF><CR><LF>OK<CR><LF>
Command Example	AT^CELLINFO=2	LTE MODE: ^CELLINFO: "intra","LTE",<earfcn>,<pcid>,<rsrq>,<rsrp>,<rssi>,<sinr>,<idle_mode>,<srxlev>,<squal>,<rank>,<cell_resel_priority>,<s_non_intra_search>,<thresh_serving_low>,<s_intra_search>,<Q_rxlevmin>,<Q_qualmin>,<srxlev>,<squal>,<last_idle_search_timestamp>,<last_idle_meas_timestamp> … ^CELLINFO: "inter","LTE",<earfcn>,<pcid>,<rsrq>,<rsrp>,<rssi>,<sinr>,<idle_mode>,<srxlev>,<squal>,<rank>,<cell_resel_priority>,<threshX_low>,<threshX_high>,<last_idle_search_timestamp>,<last_idle_meas_timestamp> … ^CELLINFO: "irat","WCDMA",<uarfcn>,<psc>,<rscp>,<ecno>,<idle_mode>,<srxlev>,<squal>,<cell_resel_priority>,<threshX_low>,<threshX_high>,<last_idle_search_timestamp>,<last_idle_meas_timestamp> … ^CELLINFO: "irat","GSM",<arfcn>,<band_1900>,<cell_id_valid>,<bsic_id>,<rssi>,<idle_mode>,<srxlev>,<cell_resel_priority>,<thresh_gsm_high>,<thresh_gsm_low>,<ncc_permitted>… … OK WCDMA MODE: ^CELLINFO: "intra","WCDMA",<uarfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<rxagc>,<psc>,<rscp>,<ecio>,<set>,<rank> … "inter","WCDMA",<uarfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<rxagc>,<psc>,<rscp>,<ecio>,<set>,<rank

		>… "irat","LTE",<earfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<priority>,<pcid>,<rsrp>,<rsrq>,<s_rxlev>… "irat","GSM",<arfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<bsic>,<rssi>,<rank>,<s_rxlev>… OK
		ERROR/+CME ERROR:<err>
Command Example	AT^CELLINFO=3	CA setting success: ^CELLINFO: “PCC”,<srv_status>,<freq>,<dl_bandwidth>,<band>,<pci>,<rsrq>,<rsrp>,<rssi>,<sinr> ^CELLINFO: “SCC”,<ul_configured>,<scell_state>,<scc_id>,<freq>,<dl_bandwidth>,<band>,<pci>,<rsrq>,<rsrp>,<rssi>,<sinr> ^CELLINFO: “SCC”,<ul_configured>,<scell_state>,<scc_id>,<freq>,<dl_bandwidth>,<band>,<pci>,<rsrq>,<rsrp>,<rssi>,<sinr> ... ... Current net not support CA: +CME ERROR: service option not supported Not configure CA: +CME ERROR: Ca service deconfigured No service: +CME ERROR: no network service
Command Example	AT^CELLINFO=4	^CELLINFO: "curr_mode","tx_info",<tx_is_in_traffic>,<tx_power>,<prach>,<pucch>,<pusch>,<srs>,<pa_gain_state> ^CELLINFO: "curr_mode","chain_1",<is radio_tuned>,<rx_power>,<ecio>,<rsrp/rscp>,<sinr>,<phase> ^CELLINFO: "curr_mode","chain_2",<is radio_tuned>,<rx_power>,<ecio>,<rsrp/rscp>,<sinr>,<phase> ^CELLINFO: "curr_mode","chain_3",<is radio_tuned>,<rx_power>,<ecio>,<rsrp/rscp>,<sinr>,<phase>

	^CELLINFO: "curr_mode","chain_4",<is radio_tuned>,<rx_power>,<ecio>,<rsrp/rscp>,<sinr>,<phase> ^CELLINFO: "curr_mode","layer_1",<uplink>,<downlink> ^CELLINFO: "curr_mode","layer_2",<uplink>,<downlink> ^CELLINFO: "curr_mode","layer_3",<uplink>,<downlink> ^CELLINFO: "curr_mode","layer_4",<uplink>,<downlink>

Table 163 AT^CELLINFO parameter description

Parameter	Description
<MODE>	Command mode. 1: Service cell information 2: Neighbour cell information 3: CA cell information
<earfcn>	LTE earfcn info
<pcid>	LTE physical cell id
<rsrq>	LTE Reference Signal Receiving Quality
<rsrp>	LTE Reference Signal Receiving Power
<rssi>	Signal strength
<sinr>	The ratio of signal to interference plus noise cannot be obtained in the neighboring area, and "-" is displayed.
<idle_mode>	Judge whether it is idle mode. If it is idle mode, the following parameters are invalid except for <last_idle_search_timestamp> and <last_idle_meas_timestamp>.
<srxlev>	Suitable receive level
<squal>	Suitable receive quality
<rank>	Rank of the cell
<cell_resel_priority>	Cell reselection priority

<s_non_intra_search>	Different system measurement threshold
<thresh_serving_low>	Different system measurement threshold
<thresh_serving_low>	Service cell reselection threshold
<threshX_low>	Low threshold of target cell
<threshX_high>	High threshold of target cell
<s_intra_search>	Same frequency cell reselection threshold
<Q_rxlevmin>	The minimum received power of the camping cell
<Q_qualmin>	Minimum reception quality of the camped cell
<last_idle_search_timestamp>	Last idle mode search time
<last_idle_meas_timestamp>	Last idle mode measurement time
<uarfcn>	WCDMA uarfcn information
<psc>	WCDMA Primary scrambling code
<rscp>	WCDMA signal coverage strength
<ecno>	Received power
<s_inter_search>	Inter-frequency frequency threshold
<s_search_RAT>	Different system frequency threshold
<rxagc>	Receiver automatic gain control on the interfrequency neighbor
<ecio>	Signal quality
<arfcn>	GSM frequency
<band_1900>	Is it 1900 band
<cell_id_valid>	Is <bsic_id> valid
<bsic_id>	Base station identity code ID
<set>	Interfrequency cell type
<thresh_gsm_high>	GSM high receiving threshold
<thresh_gsm_low>	GSM low receiving threshold

<ncc_permitted>	GSM NCC allowed
<bsic>	Base station identification code
<s_rxlev>	GSM cell suitable receive level
ul_configured	Indicated whether UL CA is enabled on this cell or not.
scell_state	State of the secondary cell. 0 - Deconfigured, 1 - Configured and deactivated, 2 - Configured and activated
scc_id	SCC ID of the secondary cell for LTE.
lte_bandwidth	LTE bandwidth, the AT result value is 5 times of the real bandwidth. For example: AT result 6 is 1.4MHz, ATresult 100 is 20MHz
dl_bandwidth	LTE bandwidth in CA mode, the AT result value is 5 times of the real bandwidth. For example: AT result 6 is 1.4MHz, ATresult 100 is 20MHz
curr_mode	Current network mode
tx_is_in_traffic	Whether the device is in communication 1: The device is in communication 0: When the device is not in communication, tx_power is invalid
tx_power	Transmit power. It is the maximum of all UL channel TX power. The tx_power value is only meaningful when the device is in traffic. Company: 1/10 dBm
prach	Physical Random Access Channel Tx power.The prach value is only meaningful when the device is in traffic. Company: 1/10 dBm
pucch	Physical Uplink Control Channel Tx power.The pucch value is only meaningful when the device is in traffic. Company: 1/10 dBm
pusch	Physical Uplink Shared Channel Tx power.The pusch value is only meaningful when the device is in traffic. Company: 1/10 dBm
srs	Sounding Reference Signal Tx power.The valid value of this parameter cannot be obtained at present (- 32768 is an invalid value)
pa_gain_state	Power amplifier gain state
is radio_tuned	Whether the Rx is tuned to a channel. 0. The radio is not tuned, delayed or invalid values are set depending on each technology 1. The radio is tuned, instantaneous values are set for the signal information fields.
rx_power	Received power. The rx_power value is only meaningful when the device is in traffic. Company: 1/10 dBm
phase	Current phase in degrees. Range: 0.00 to 360.00.

uplink	Uplink modulation
downlink	Downlink modulation
SIB2_PLMN_R15_INFO_PRESENT	Currently registered PLMN supports EN-DC mode (0: not supported, 1: supported)
SIB2_UPR_LAYER_IND	The current cell supports EN-DC mode (0: not supported, 1: supported)
RESTRICT_DCNR	Indicates whether to restrict the addition of NR, 0-no restriction; 1-restriction

8.10 AT+SGCELLINFOEX Cell information extended query command

Table 164 AT+SGCELLINFOEX operation command

Type	Command	Possible return results	Description
Execution Command	AT+SGCELLINFOEX?	4G: at+sgcellinfoex +SGCELLINFOEX: CURR_MODE:LTE DUPLEX MODE:TDD LTE MCC:460 MNC:00 GLOBAL CELL ID:17760257 PHYSICAL_CELL_ID:343 eNBID:69376 CELL_ID:1 TAC_ID:37107 BAND:3 LTE_BANDWIDTH:100 DL CHANNEL:504990 UL CHANNEL:504990 RSSI:-65 RSRP:-93 RSRQ:-9 SINR:134 SNR:6 UE_category:16 PATHLOSS:255 CQI:- TX_POWER:3 TM:1 QCI:- VOLTE:1	

		IMS_SMS:- SIB2_PLMN_R15_INFO_PRESENT:0 SIB2_UPR_LAYER_IND:0 RESTRICT_DCNR:0 OK WCDMA mode: at+sgcellinfoex +SGCELLINFOEX: CURR_MODE:WCDMA MCC:460 MNC:01 GLOBAL CELL ID:203244337 PSC:483 NodeB_ID:3101 CELL_ID:17201 LAC_ID:47901 BAND:1 DL CHANNEL:10663 UL CHANNEL:9713 RSSI:-53 ECIO:-3 SIR:255 RSCP:-55 OK
Execution Command	AT+SGCELLINFOEX	4G: <CR><LF>+SGCELLINFOEX:<curr_mode>,<duplex_mode>,<mcc>,<mnc>,<global_cell_id>,<physical_cell_id>,<eNBID>,<cell_id>,<tac_id>,<band>,<lte_bandwidth>,<dl_channel>,<ul_channel>,<rssi>,<rsrp>,<rsrq>,<sinr>,<snr>,<ue_category>,<pathloss>,<cqi>,<tx_power>,<tm>,<qci>,<volte>,<ims_sms>,<sib2_plmn_r15_info_present>,<sib2_upr_layer_ind>,<restrict_dcnr><CR><LF><CR><LF>OK<CR><LF> Example: at+sgcellinfoex +SGCELLINFOEX:LTE,FDD LTE,460,11,38848275,141,151751,19,9537,5,25,2452,20452,-71,-99,-15,93,-1,16,255,-,-,3,-,1,-,0,0,0 OK

		WCDMA mode: <CR><LF>+SGCELLINFOEX:<curr_mode>,<mcc>,<mnc>,<global_cell_id>,<psc>,<NodeB>,<cell_id>,<lac_id>,<band>,<dl_channel>,<ul_channel>,<rssi>,<ecio>,<sir>,<rscp><CR><LF><CR><LF>OK<CR><LF> Example: at+sgcellinfoex +SGCELLINFOEX:WCDMA,460,01,203244337,483,3101,17201, ,47901,1,10663,9713,-53,-3,255,-55 OK GSMmode (current version not support) <CR><LF>+SGCELLINFOEX:<curr_mode>,<mcc>,<mnc>,<global_cell_id>,<lac_id>,<channel>,<band>,<rssi>,<bsic><CR><LF><CR><LF>OK<CR><LF>	
Test Command	AT+SGCELLINFO=?	OK	Success

Table 165 AT+SGCELLINFOEX parameter description

Parameter	Value	Description
CURR_MODE	-	System format: No service: "NO SERVICE" GSM service: "GSM" CDMA service: "CDMA" WCDMA service: "WCDMA" TD-SCDMA service: "TD-SCDMA" LTE service: "LTE" EVDO service: "EVDO" 1xEVDO service: "HYBRID" 1xLTE service: "1XLTE"
DUPLEX MODE	FDD LTE or TDD LTE	LTE duplex mode
MCC	-	Mobile Country Code, composed of 3 digits, unique way to identify the country of mobile user, (China: 460) ;
MNC	-	Mobile network number (such as: CMCC: 00; China Unicom: 01)
GLOBAL CELL ID	Decimal value	GCI value in LTE mode
eNBID	Decimal value	Base station identifier (eNodeB-ID)

CELL_ID	Decimal value	Cell ID
PHYSICAL_CELL_ID	Decimal value	LTE physical cell ID
TAC_ID	Decimal value	Track Area Code, position area code
BAND	-	Frequency band
LTE_BANDWIDTH	-	LTE bandwidth, the AT result value is 5 times of the real bandwidth. For example: AT result 6 is 1.4MHz, AT result 100 is 20MHz
BANDWIDTH	-	LTE registration bandwidth
DL CHANNEL	-	Downlink channel
UL CHANNEL:	-	Uplink channel
RSSI	-120.0dBm~0dBm	Received signal strength
RSRP	-44dBm~-140dBm	LTE reference signal receiving power
RSRQ	-20.0dB~-3.0dB	LTE reference signal receiving quality
SINR	-	Signal to interference plus noise ratio
UE CATEORY	-	LTE carrier frequency
PATHLOSS	-	Path loss in connection mode
SNR	-	Signal to noise ratio
CQI	Not realized, reserved	Channel quality indication
TX_POWER	-	Maximum transmission power in UL channel
TM		Antenna transmission mode
QCI	Not realized, reserved	Qos class identifier in LTE
VOLTE	0~1	volte (0: not support, 1: support)
IMS_SMS	Not realized, reserved	ims short message (0: not support, 1: support)
SUB_CARRIER_SPACING	-	Sub-carrier wave spacing
FR_TYPE	0~1	Frequency band classification 0: sub6G; 1: mm wave
NodeB_ID	-	Base station identifier

SIR	-	Signal to interference ratio
RSCP	-	Signal coverage strength
PSC	-	Primary scrambling code
ECIO	-	Signal quality
SIB2_PLMN_R15_INFO_PRESENT	0~1	Currently registered PLMN supports EN-DC mode (0: not supported, 1: supported)
SIB2_UPR_LAYER_IND	0~1	The current cell supports EN-DC mode (0: not supported, 1: supported)
RESTRICT_DCNR	0~1	Indicates whether to restrict the addition of NR, 0-no restriction; 1-restriction
-		Invalid parameter

8.11 AT^SYSCFGEX Extension setting system configuration command

Table 166 AT^SYSCFGEX operation command

Type	Command	Possible return results	Description
Set Command	AT^SYSCFGEX=<acqorder>[,<band>[,<roam>[,<srvdomain>[,<lteband 1-64bit>,<lteband 65-128bit>[,,[,<change_duration>]]]]]]	OK	
Query Command	AT^SYSCFGEX?	^SYSCFGEX: <acqorder>,<band>,<roam>,<srvdomain>,<lteband1-64bit>,<lteband 65-128bit>,,,<change_duration> OK	
Test Command	AT^SYSCFGEX=?	at^syscfgex=(acqorder ranges), (GU bands), (roam ranges), (srvdomain ranges), (lteband 1-64bit), (lteband 65-128bit),,, (change_duration ranges) OK	Return value has specific values in different version, the following is just a rough description of parameters.

Command Example	at^syscfgex="03" at^syscfgex="00",200000D400000,1,2,1E200000084,0	OK OK
	at^syscfgex?	at^syscfgex? ^SYSCFGEX: "00",200000D400000,1,2,1E200000084,0,,,1 OK
	at^syscfgex=?	^SYSCFGEX: ("00","01","02","03","99"),("GU bands"),(0-4),(0-3), ("LTE 1-64bit bands"), ("LTE 65-128bit bands"),,,(0-1) OK

Table 167 AT^SYSCFGEX operation command

Parameter	Description
<acqorder>	Network access sequence, character string. Value: ”00”, ”99” or combination of following parameters. “00”: automatic mode； “01”：GSM； “02”: WCDMA； “03”: LTE； “99”: no change
<band>	2/3G Band setting: 80: GSM DCS 1800 band 100:GSM Extended GSM (E-GSM) 900 band (900 MHz) 200:GSM Primary GSM (P-GSM) 900 band 10000:GSM 450 band (450 MHz) 20000:GSM 480 band (480 MHz) 40000:GSM 750 band (750 MHz) 80000:GSM 850 band(850 MHz) 100000:GSM Railways (R-GSM) 900 band (900 MHz) 200000:GSM PCS band (1900 MHz) 400000:WCDMA_I_IMT_2000(WCDMA IMT EUROPE JAPAN & CHINA 2100 MHz) 800000:WCDMA_II_PCS_1900(WCDMA US PCS 1900 band) 1000000:WCDMA_III_1700(WCDMA Europe and China DCS 1800 band) 2000000:WCDMA_IV_1700 (WCDMA US 1700 bandWCDMA_IV_1700) 4000000:WCDMA_V_850(WCDMA US850 band) 8000000:WCDMA_VI_800(WCDMA Japan 800 band)

	1000000000000:WCDMA_VII_2600(WCDMA Europe 2600 band) 2000000000000:WCDMA_VIII_900(WCDMA Europe and Japan 900 band) 4000000000000:WCDMA_IX_1700(WCDMA Japan 1700 band) 2000000000000000:WCDMA_XI_1500(WCDMA 1500 band) 1000000000000000:WCDMA_XIX_850(Japan 850 band) 40000000 (CM_BAND_PREF_NO_CHANGE) : frequency band unchanged As above 2G/3G corresponding set band value for example：this parameter query is 2000000080180 Support these bands: 80: GSM DCS 1800 band 100:GSM Extended GSM (E-GSM) 900 band (900 MHz) 80000:GSM 850 band(850 MHz) 2000000000000:WCDMA_VIII_900(WCDMA Europe and Japan 900 band) remark：set parameter “all”use to resume all 2G/3G band
<roam>	roam fuction not support 0:enable roam（enable domestic and international roam） 1:enable domestic roam,disable international roam 2:disable domestic roam,enable international roam 3:disable roam（disable domestic and international roam） 4:no change
<srvdomain>	0: CS only 1: PS only 2: CS and PS 3: no change
<lteband 1-64bit>	LTE frequency band selection, 1-64bit, the parameter is hexadecimal, and the value is the following parameters or the superimposed value of each parameter other than 0x7FFFFFFFFFFFFFFF. 7FFFFFFFFFFFFFFF (CM_BAND_PREF_ANY): any frequency band; 1 (CM_BAND_PREF_LTE_EUTRAN_BAND1)：LTE BC1； 40 (CM_BAND_PREF_LTE_EUTRAN_BAND7)：LTE BC7； 1000 (CM_BAND_PREF_LTE_EUTRAN_BAND13)：LTE BC13； 10000 (CM_BAND_PREF_LTE_EUTRAN_BAND17)：LTE BC17； 80 0000 0000 (CM_BAND_PREF_LTE_EUTRAN_BAND40)： LTE BC40。 800000000000000 (CM_BAND_PREF_NO_CHANGE): frequency band not changed LTE band value corresponding to binary bit, for example：this parameter is 800D5, Support these bands: B1:1 B3:4 B5:10 B7:40 B8:80 B20:80000 B1 + B3 + B5 + B7 + B8 + B20:800D5

	remark:”all”parameter recover all lte bands.this parameter must be set with <lteband 65-128bit>together,otherwise response error.
<lteband 65-128bit>	LTE frequency band selection, 65-128bit remark: “all”parameter recover all lte bands.
<change_duration>	Set whether to save the parameters after power-off 0: do not save when power-off 1: save when power-off (default save when power off)

8.12 AT^SYSINFOEX Extended query system information command

This command can query the current system information, such as system service state, domain, roaming selection, system mode, SIM card state, etc.

Table 168 AT^SYSINFOEX operation command

Type	Command	Possible return results	Description
Query Command	AT^SYSINFOEX	<CR><LF>^SYSINFOEX:<srv_status>,<srv_domain>,<roam_status>,<sim_state>,<lock_state>,<sysmode>,<sysmode_name><submode>,<submode_name><CR><LF><CR><LF>OK<CR><LF>	-
Command Example	AT^SYSINFOEX	AT^SYSINFOEX ^SYSINFOEX:2,3,0,1,0,9,LTE,72,TDD LTE OK	
Test Command	AT^SYSINFOEX= ?	OK	

Table 169 AT^SYSINFOEX parameter description

Parameter	Description
<srv_status>	System service state. 0: No service; 1: Limited service; 2: Valid service; 3: Limited regional service; 4: Power saving and deep sleep state.
<srv_domain>	System service domain. 0: No service; 1: CS service only; 2: PS service only;

	3: PS+CS service; 4: Settle in the cell but not adhered or registered; 5: CS+VoLTE service; 6: VoLTE service only;
<roam_status>	Roaming state 0: Non-roaming state; 1: Roaming state;
<sim_state>	SIM card state. 0: SIM card state invalid; 1: SIM card state valid; 2: SIM invalid in CS; 3: SIM invalid in PS; 4: SIM invalid in PS and CS;
<lock_state>	SIM card LOCK state. (This mark position is reserved as later stage simlock, at present, it is fixed as 0) 0: Disable simLock function; 1: Enable simLock function
<sysmode>	System format: 0: NO SERVICE； 1: AMPS 2: CDMA 3: GSM 4: EVDO 5: WCDMA 6: GPS 7: GW 8: WLAN 9: LTE 10: GWL 11: TD-SCDMA 14: HYBRID 15: 1XLTE 16: NO CHANGE
<sysmode_name>	Character string presentation of the system format. This parameters returns the current system mode name in character string form. Its value is corresponding to command parameter. Character string in <sysmode> value, for example <sysmode> = 5, <sysmode_name>=WCDMA.
<submode>	0 NO SERVICE 1 GSM 2 PRS 3 DGE 11 IS95A

	12 IS95B 13 CDMA2000 1X 14 EVDO Rel0 15 EVDO RelA 16 EVDO RelB 17 HYBIRD CDMA20001X 18 HYBRID(EVDO Rel0) 19 HYBRID(EVDO RelA) 20 HYBRID(EVDO RelB) 31 EHRPD 41 WCDMA 42 HSDPA 43 HSUPA 44 HSDPA and HSUPA 45 HSDPA+ 46 HSDPA+ and HSUPA 47 DCHSDPA+ 48 DCHSDPA+ and HSUPA 49 QAM64 HSDPA+ and HSUPA 50 QAM64 HSDPA+ 51 DCHSDPA+ and DCHSUPA 61 TD-SCDMA 62 TD HSDPA 63 TD HSUPA 64 TD HSPA 65 TD HSPA+ 71 FDD LTE 72 TDD LTE
<submode _name>	System sub-mode. This parameter returns the current network sub-mode name in form of character strings. Its value is corresponding to the character string of the second parameter <submode> of this command, such as <submode> = 71, <submode _name> = FDD LTE.

8.13 AT^CELLLOCK Lock to the specific frequency and cell

This command used for lock the arfcn and cell specified by user. Please note the following points:

1. CELLLOCK command is used for locking arfcn/cell on the specific RAT (WCDMA/LTE) Only when UE camp on this RAT, it will work. (Can be used in conjunction with the SYSCFGEX command to lock to the corresponding RAT).

2. If the specific RAT has been on locking state and you want to make another locking operation on this RAT, you would have to make sure the following locking operation with the same lock type, i.e. it

must be on unlocking state before you lock to another arfcn/cell on the same RAT. Different RAT operation has no this limitation.

3. You can use locking/unlocking function for each one RAT seperatly, or you can unlock all RATs through one operation, but you should not lock arfcns/cells on different RAT through one operation.

4. You have to restart terminal to make it work if you have locked/unlocked the WCDMA arfcn/cell. Please note that UE would switch to WCDMA-Only mode once you have locked WCDMA arfcn/cell, it does not support to switch to aother mode (including auto mode) by AT command SYSCFGEX unless you have unlocked WCDMA and restart the terminal.

5. It is strongly recommended to enable the function of locking LTE cells/frequency points in flight mode (at+cfun=0), and then exit the flight mode (at+cfun=1) to make it effective, otherwise there may be abnormalities. Unlocking the LTE cell/frequency point requires restarting the terminal to take effect.

6. The CELLLOCK command has the power-off retention function, and whether the SYSCFGEX command has the power-off retention function can be set. When the two commands are used together, you need to pay attention to whether the RAT of the locked cell and the camped RAT are the same after the power failure and restart.

7. After locking a specific frequency point or cell, the UE will not be able to meet the requirements of the mobility protocol and cannot reselect or switch to a new cell.

Table 170 AT^CELLLOCK operation command

Type	Command	Possible return results	Description
Set Command	AT^CELLLOCK=<enable>[,<rat>,<lock_type>,<arfcn>[,<pci/psc>]]	<CR><LF>OK<CR><LF>	Success
		<CR><LF>ERROR/+CME ERROR: <err><CR><LF>	Fail
Query Command	AT^CELLLOCK?	<CR><LF>^CELLLOCK: <enable>[,<rat>,<lock_type>,<arfcn>]<CR><LF>[[^CELLLOCK: <enable>[,<rat>,<lock_type>,<arfcn>]<CR><LF>]] <CR><LF>OK<CR><LF>	Return the lock status of each RAT
Test Command	AT^CELLLOCK=?	<CR><LF>^CELLLOCK: (range of supported <enable>s),(list of supported <rat>s),(range of supported <lock_type>s),(“arfcn”),(“pci”)<CR><LF> <CR><LF>OK<CR><LF>	Refer to the return value of the query command of syscfgex: at^syscfgex? ^SYSCFGEX: "00",200000D400000,1,1,95,0,,,1 at^syscfgex=? ^SYSCFGEX: ("00","01","02","03","99")

			,("GU bands"),(0-3),(0-3),("LTE 1-64bit bands"),("LTE 65-128bit bands"),,,(0-1)
Command Example	AT^CELLLOCK?	^CELLLOCK: 1,3,0,100 ^CELLLOCK: 1,4,0,636768,,30, OK	Query current lock cell settings
	AT^CELLLOCK=?	^CELLLOCK: (0-1),("01","02","03"),(0-1),("arfcn"),("pci"),(15,30,60,120,240),("band") OK	Enable: 0-1 Rat: GSM/WCDMA/LTE Lock_type: 0-1 This value different from version. The following is an example.
	AT^CELLLOCK=1,”03”,1,1300,343	OK	Lock to LTE earfcn=1300, pci=343 cell
	AT^CELLLOCK=0	OK	Unlock all locked cells

Table 171 AT^CELLLOCK parameter description

Parameter	Value	Description
<enable>	0-1	There is no default value. Locking a specific cell is related to the environment. If you lock to a cell that is not in the environment, you will not be able to camp on the network. 0: disable celllock function 1: enable celllock function
<rat>	“02”/02/2 ”03”/03/3	There is no default value. Integer and string type are all supported; “02”/02/2: WCDMA “03”/03/3: LTE
<lock_type>	0-1	There is no default value. 0: lock onto arfcn 1: lock onto cell
<arfcn>	Depend on <rat>	There is no default value. The downlink frequency to be locked by the user, the value of the frequency is related to the RAT.
<pci/psc>	Depend on <rat>	There is no default value. The LTE physical layer cell ID to be locked by the user. The value depends on the RAT:

		WCDMA：Primary scrambel code, currently not support LTE pci：0~503	

8.14 Query the Service Provider Name Command AT^EONS

Table 172 AT^EONS operation command

Type	Command	Possible return results	Description
Set Command	AT^EONS=<type>[,<plmn_id>[,<plmn_name_len>]]	^EONS: <type>,<plmn_id>,<plmn_name1>,<plmn_name2>[,<spn_cond>,<spn>] OK Or +CME ERROR： <err>	remark:when<type>is 1/2/3/4，command format support AT^EONS=<type> or AT^EONS=<type>,<plmn_id>,when without <plmn id>response current registered plmn operator name. AT reponse coding type base on +CSCS character set response(default is ”IRA”,if”IRA”can’t coding，need to set”UCS2”character set，operator name response ”UCS2”character set) when<type> is 5，command format support AT^EONS=<type> or AT^EONS=<type>,,<plmn_name_len>,without <plmn_name_len>using default value.
Test Command	AT^EONS=?	^EONS: (list of supported<type>)	
Command Example	at^eons=1	”IRA”character set: ^eons: 1,46000,"CHINA MOBILE","CMCC",0,"CMCC" OK “UCS2” character set: ^eons: 1,46000,"004300480049004E00410020004D004F00420049004C0045","0043004D00430043",0,"0043004D00430043" OK	

	”IRA”character set: ^eons: 2,46000,"","",0,"CMCC" OK
at^eons=2	”UCS2” character set: ^eons: 2,46000,"","",0,"0043004D004 30043" OK
at^eons=3	”IRA”character set: ^eons: 3,46000,"","",0,"CMCC" OK ”UCS2”character set: ^eons: 3,46000,"","",0,"0043004D004 30043" OK
at^eons=4	”IRA”character set: ^eons: 4,46000,"CHINA MOBILE","CMCC",0,"CMCC" OK “UCS2” character set: ^eons: 4,46000,"004300480049004E 00410020004D004F0042004 9004C0045","0043004D0043 0043",0,"0043004D00430043 " OK
at^eons=5	”IRA”character set: at^eons=5 ^eons: 5,46000,"CMCC","" OK “UCS2” character set: ^eons: 5,46000,"0043004D00430043 "," OK

Table 173 AT^ENOS parameter description

Parameter	Value Description
<type>	1: Automatic mode. For 3GPP,the priority for<plmn_name1>and<plmn_name2>is as follows： Information saved in the EFPNN file corresponding to the USIM EPOPL. Information released from the network side(MM/GMM/EMM Information) Information saved in the internal network name table list 2: Query the network name in the MM/GMM/EMM Information 3: Query the network name in the EFPNN file corresponding to the USIM EPOPL. 4: Query the network name in the internal network name table list. 5: Automatic length limit mode: <plmn_name1>operator name as following table 148 rule <plmn_name2>show empty string, not include<spn_cond>and<spn>. remark： when<type>is 1,2,3,4: - support command format is AT+EONS=<type> or AT+EONS=<type>,<plmn_id>，if<plmn_id>not include，response current registered plmn operator name。 - <plmn_name1>indicates the long name，<plmn_name2>indicates the short name，the value contains a maximum of 128 characters(32 valid characters)，if a name exceeds the maximum length,the first 128 characters are retained.if<plmn_name1> or <plmn_name2>cannot be obtained,its value is left empty. - In the response,<spn_cond>and <spn>are handled as follows:If the SIM card for the current registered network has an EFspn file that is not empty,the content of the EPspn file is returned.Otherwise,nothing is returned. When<type>is set to5: -The command format is AT+EONS=<type> or AT+EONS=<type>,,<plmn_name_len>is not included,its default value is used. - The response does not need to contain <spn_cond> or <spn>.
<plmn_id>	Ruery plmn_id
<plmn_name_len>	Integer，default value 20，va1ue rang:0-32
<plmn_name1>	Long name，if show format is UCS2,the maxmum len divided by 4. When<type>is 5，show name follow as table 148 <plmn_name1> show rule
<plmn_name2>	Short name，if show format is UCS2,the maxmum len divided by 4. When<type>is 5, a null character string is reported.
<spn_cond>	An integer type value that ranges from 0 to 255.The value of the <spn_cond>parameter if the first byte in the EFspn file of the SIM card.
<spn>	spn name that indicates the content of the EPspn file.

A UCS2 hexadecimal character string is converted using the big-endian encoding scheme.For example.character ‘A’is represented by 0041.

Table 174 <plmn_name1>show rule

If a long name exists and its length does not exceed the limit set by<plmn_name_len>:		
	(Non-Roaming or RPLMN Is Listed in EFspdi) and EFspn is Valid	(Roaming and RPLMN Is Not Listed in EFspdi) or EPspn Is Invalid
<plmn_name1> returns	SPN	plmn long name
If a short name exists and its length does not exceed the limit set by<plmn_name_len>:		
	(Non-Roaming or RPLMN Is Listed in EFspdi) and EFspn is Valid	(Roaming and RPLMN Is Not Listed in EFspdi) or EPspn Is Invalid
plmn_name1	SPN	plmn short name
In other cases:		
	(Non-Roaming or RPLMN Is Listed in EFspdi) and EFspn is Valid	(Roaming and RPLMN Is Not Listed in EFspdi) or EPspn Is Invalid
plmn_name1	SPN	"MCC MNC"

The priority for the long and short names(from high to low)is as follows：

1.Information saved in the EPspn file corresponding to the EPopl

2.Information released from the network side(MM/GMM/EMM information)

3.Information saved in the internal network name list.

4.Information from registered plmn.

8.15 Get network information report command AT^MMINFO

This command is used to obtain network mobility management information report

Table 175 AT^MMINFO operation command

Type	Command	Possible return results	Description
Set Command	AT^MMINFO=<ena	OK	

	ble>	ERROR/+CME ERROR: <err>	
Query Command	AT^MMINFO?	^MMINFO: <enable> OK	
Test Command	AT^MMINFO=?	^MMINFO: (0-1) OK	
Command Example	AT^MMINFO?	^MMINFO: 0 OK	MMINFO not report
	AT^MMINFO=?	^MMINFO: (0-1) OK	Enable：0-1
	AT^MMINFO=1	OK	
	AT^MMINFO=0	OK	

Table 176 ^MMINFO active report operation command

Type	Command	Possible return results	Description
Report Command	^MMINFO: <date>,<time>,<daylight_saving_adj>[,<code_scheme>,<full_name>,<code_scheme>,<short_name>]	OK	-
Command Example		^MMINFO: 21/01/11,16:20:34+08,00 ^MMINFO: 21/01/13,07:20:34+08,00,1,HUAWEI-MBB,,	

Table 177 AT^MMINFO parameter description

Parameter	Value	Value Description
<enable>	0-1	0：Close ^MMINFO report 1：Open ^MMINFO report
<date>	yy/mm/dd	-
time	hh/mm/ss<+zz>	hour/minute/second<+time zone>
daylight_saving_adj	0-3	DST

code_scheme	0-1	encoding
full_name	-	Operator long name
short_name	-	Operator short name
yy/mm/dd	1980-2030/01-12/01-31	year/month/day
hh/mm/ss<+zz>	01-24/00-60/00-60+<-96~+96>	hour/minute/second<+time zone>

8.16 SRVST actively reports the switch command AT^SRVST

Actively report switch instruction to ^SRVST.

When the service status changes, the service type is reported.

Table 178 At^SRVST operation command

Type	Command	Possible return results	Description
Set command	AT^SRVST=<enable>	OK or ERROR/+CME ERROR: <err>	
Query command	AT^SRVST?	^SRVST: <enable>,<service_status> OK	
Test command	AT^SRVST=?	^SRVST: (0,1) OK	
Proactive reporting		^SRVST: <service_status>	
Command example	AT^SRVST=1	OK	
	AT^SRVST?	^SRVST: 1,0 OK	
	Proactive reporting	^SRVST: 2	

Table 179 AT^SRVST parameter description

Parameter	Value	Description
<enable>	(0,1)	^SRVST active reporting switch: 0: disables SRVST active reporting

		1: enable SRVST active reporting. Default value.
<service_status>	0	No service
	1	Restricted service
	2	Effective service
	3	Limited regional service
	4	Power saving and deep sleep

8.17 AT^NETSCAN frequency information scanning

Currently, AT supports cardless frequency sweep

Table 180 AT^NETSCAN operation command

Type	Command	Possible return results	Description
Set command	AT^NETSCAN=<mode>[,<band>]	^NETSCAN: <arfcn>,<pci>,<global cellid>,<rsrp>,<plmn> ^NETSCAN: <arfcn>,<pci>,<global cellid>,<rsrp>,<plmn> ..... OK or ERROR/+CME ERROR: <err>	Currently only supports the LTE PCI frequency sweep, sweep frequency must be set before the AT ^ SYSCFGEX = 03 to LTE only, otherwise an error
Query command	AT^NETSCAN?	OK	
Test command	AT^NETSCAN=?	^NETSCAN: (3),(band) OK	
Command example	AT^NETSCAN=3	^NETSCAN: 200,333,46592,-78,46050 ^NETSCAN: 275,57,38921995,-,46001 ^NETSCAN: 275,59,38921997,-,46001 ^NETSCAN: 275,213,38848269,-,46001 ^NETSCAN: 1650,396,197159473,-78,46001	

		^NETSCAN: 1850,102,10960306,-,46011 ^NETSCAN: 1300,343,165891187,-,46000 ^NETSCAN: 1850,100,9030067,-,46011 ^NETSCAN: 3590,435,164640588,-95,46000 ^NETSCAN: 3741,305,196148768,-,46001 ^NETSCAN: 3741,304,196148758,-,46001 ^NETSCAN: 36275,313,184620325,-94,46000 ^NETSCAN: 36275,282,151296292,-,46000 ^NETSCAN: 37900,336,46595,-109,46050 ^NETSCAN: 38400,313,184620290,-94,46000 ^NETSCAN: 38400,282,151296257,-,46000 ^NETSCAN: 39148,340,151678216,-88,46000 ^NETSCAN: 38950,65,151678215,-,46000 OK
	AT^NETSCAN=3,1	^NETSCAN: 200,333,46592,-81,46050 ^NETSCAN: 275,57,38921995,-,46001 ^NETSCAN: 275,59,38921997,-,46001 OK
	AT^NETSCAN=?	^NETSCAN: (3),(band) OK

Table 181 AT^NETSCAN parameter description

Parameter	Description
<mode>	Access technology 3: LTE

<band>	LTE band corresponds to two customized bits. The parameters are in hexadecimal format, such as the following parameters or the superposition of each parameter. 1 (CM_BAND_PREF_LTE_EUTRAN_BAND1)：LTE BC1； 40 (CM_BAND_PREF_LTE_EUTRAN_BAND7)：LTE BC7； 1000 (CM_BAND_PREF_LTE_EUTRAN_BAND13)：LTE BC13； 10000 (CM_BAND_PREF_LTE_EUTRAN_BAND17)：LTE BC17； 80 0000 0000 (CM_BAND_PREF_LTE_EUTRAN_BAND40)： LTE BC40。 ..... For example, set this parameter to 800D5. Represents a search for the following band: B1:1 B3:4 B5:10 B7:40 B8:80 B20:80000 B1 + B3 + B5 + B7 + B8 + B20:800D5 If the LTE band scanning exceeds 64-bit, set the LTE band scanning to higher 64-bit, for example, D5:2 D5 is lower 1-64bit: B1 + B3 + B5 + B7 + B8 2 is high 65-128bit: B66
<arfcn>	Frequency point
<pci>	Physical cell ID
<global cellid>	Global cell id
<rsrp>	Signal quality
<plmn>	Cell corresponds to PLMN (if there are multiple PLMN outputs, separate the outputs by:)

8.18 The IMS carries the default configuration AT^NWCFG="ims_enable"

This command is used to open/close the ims, After the AT is delivered, the command takes effect only after being restarted.

Table 182 AT^NWCFG="ims_enable" operating command

Type	Command	Possible return results	Description
Set command	AT^NWCFG="ims_enable” [,<switch>]	If the optional parameter <switch> is ignored, the current IMS status is queried. The following output is	

		displayed:</switch> ^NWCFG: "ims_enable",<switch> OK If you set the current configuration with optional parameters, the following output is displayed: OK or ERROR/+CME ERROR: <err>	
Query command	AT^NWCFG="ims_enable"	^NWCFG: "ims_enable",<switch> OK	
Test command	AT^NWCFG=?	^NWCFG: "ims_enable",(0-2) ..... OK	
Command example	AT^NWCFG="ims_enable",1	OK	Enabling Qualcomm IMS
	AT^NWCFG="ims_enable"	^NWCFG: "ims_enable",1 OK	
	AT^NWCFG=?	^NWCFG: "ims_enable",(0-2) ..... OK	

Table 183 AT^NWCFG="ims_enable" parameter description

Parameter	Value	Description
switch	0-2	0：Disabling IMS 1：Enabling Qualcomm IMS 2：Enabling the third-party IMS (not implemented yet)

8.19 Proactively report switch instruction for PLMN AT^PLMN

Actively report switch instruction to ^PLMN.
If the ^PLMN command enables active reporting, the PLMN is reported after the resident network changes.

Table 184 AT^PLMN operating command

Type	Command	Possible return results	Description
Set command	AT^PLMN=<enable>	OK or ERROR/+CME ERROR: <err>	

Query command	AT^PLMN?	^PLMN: <enable>,<mcc>,<mnc> OK	
Test command	AT^PLMN=?	^PLMN: (0,1) OK	
Proactive reporting	--	^PLMN: <mcc>,<mnc>	
Command example	AT^PLMN=1	OK	Set up routines
	AT^PLMN?	^PLMN: 1,460,10 OK	Query routines
	Reporting command	^PLMN: 460,01	Proactive reporting routines

Table 185 AT^PLMN parameter description

Parameter	Value	Description
<enable>	(0,1)	PLMN active reporting switch: 0: active reporting disabled. Default value. 1: Enable active reporting
<mcc>	--	Mobile country code
<mnc>	--	Mobile country code

8.20 RRC status query and active reporting AT^RRCSTAT

Table 186 AT^RRCSTAT operating command

Type	Command	Possible return results	Description
Set command	AT^RRCSTAT=<enable>	OK or ERROR/+CME ERROR: <err>	Note: Set ^RRCSTAT Whether active reporting is enabled
Query command	AT^RRCSTAT?	^RRCSTATE: <enable>,<rrc_status>	
Test command	AT^RRCSTAT=?	^RRCSTAT: (0,1)	
Report to the command		^RRCSTAT: <rrc_status>	If active reporting is enabled, the system automatically reports when the RRC connection status changes
Command	AT^RRCSTAT=1	OK	

example	AT^RRCSTAT?	^RRCSTAT: 1,1
	AT^RRCSTAT=?	^RRCSTAT: (0,1)
	Report to the command	^RRCSTAT: 0

Table 187 AT^RRCSTAT parameter description

Parameter	Description
<enable>	Indicates whether active reporting is enabled 0: disables rrc_status active reporting 1: enables rrc_status active reporting
<rrc_status>	RRC connection status: 0: the RRC state is disconnected. 1: the RRC is in the connected state. 2: the ARRC state is INACTIVE; 3: the RRC status is invalid.

Note：
When receiving the RRCSTAT query command in non-LTE mode, the modem directly replies with error.

8.21 UE Usage Setting AT^NWCFG

Table 188 AT^NWCFG="ue_usage_setting" operating command

Type	Command	Possible return results	Description
Set command	AT^NWCFG="ue_usage_setting"[,<setting>]	If the optional <setting> parameter is ignored, the current Usage Setting queried</setting> ^NWCFG: "ue_usage_setting",<setting> OK If optional parameters are carried, set the current configuration OK or ERROR/+CME ERROR: <err>	
Test command	AT^NWCFG=?	..... ^NWCFG: "ue_usage_setting",(0-2) ..... OK	

Command example	AT^NWCFG="ue_usage_setting",0	OK
	AT^NWCFG="ue_usage_setting"	^NWCFG: "ue_usage_setting",0 OK
	AT^NWCFG=?	..... ^NWCFG: "ue_usage_setting",(0-2) ..... OK

Table 189 AT^NWCFG="ue_usage_setting" parameter description

Parameter	Description
<setting>	0：voice centric 1：data centric 2：no change

8.22 Command to query LTE default bearer registration information AT^LTEATTACHINFO

This command is used to query the registration information carried by default on LTE. You can obtain the IP address type and APN name assigned by the network.

Table 190 AT^LTEATTACHINFO operating command

Type	Command	Possible return results	Description
Query command	AT^LTEATTACHINFO?	^LTEATTACHINFO: <ip_type>,<apn> OK	-
Test commanf	AT^LTEATTACHINFO=?	OK	-
Command example	AT^LTEATTACHINFO=?	OK	Support AT command
	AT^LTEATTACHINFO?	^LTEATTACHINFO: 0,3gwap OK	
Using description			

Table 191 AT^LTEATTACHINFO parameter description

Parameter	Value	Description
<ip_type>	0~2	0 - IPV4 1 - IPV6 2 - IPV4V6
<apn>	string	APN name at registration time of LTE

8.23 Attach Profile List Configuration AT^NWCFG="attach_profile_list"

Table 192 AT^NWCFG="attach_profile_list" operating command

Type	Command	Possible return results	Description
Set command	AT^NWCFG="attach_profile_list"[,<profile_list_action>,<profile_list>]	Optional parameters are omitted [,<active_profile_list>,<pending_profile_list>], Query the current attach_profile_list ^NWCFG: "attach_profile_list",<active_profile_list>,<pending_profile_list> OK If optional parameters are carried, set the parameters carried in the current configuration OK or ERROR/+CME ERROR: <err>	
Test command	AT^NWCFG=?	..... ^NWCFG: "attach_profile_list",1,"profile list" ..... OK	
Command example	AT^NWCFG="attach_profile_list",1,"1"	OK	
	AT^NWCFG="attach_profile_list",1,"1:3:2"	OK	Register in order of number 1,3,2 of the profile
	AT^NWCFG="attach_profile_list"	^NWCFG: "attach_profile_list","1:3:2","0", OK	If pending_profile_list is not set, 0 is displayed

AT^NWCFG=?	..... ^NWCFG: "attach_profile_list",1,"profile list"..... OK

Table 193 AT^NWCFG="attach_profile_list" parameter description

Parameter	Description
<profile_list_action>	1: set up after the next time registered to take effect, namely the need to manually register, can send the at + cfun = 0 and the at + cfun = 1 2: after setting up effective immediately, namely will automatically register. Note: This can only be set to 1;
<profile_list>	Can be 1 or more, separated by colons; The profile number must already exist;

8.24 Reject status query and actively report instructions AT^REJINFO

Table 194 AT^REJINFO operating command

Type	Command	Possible return results	Description
Set command	AT^REJINFO=<enable>	OK or ERROR/+CME ERROR: <err>	Note: Set ^REJINFO Whether to enable active reporting
Query command	AT^REJINFO?	^REJINFO: <enable>, <plmn id>,<service domain>,<reject cause>,<rat type>,<rej type>	
Test command	AT^REJINFO=?	^REJINFO: (0,1)	
Command example	AT^REJINFO=1	OK	
	AT^REJINFO=?	^REJINFO: (0,1)	
	Report to the command	^REJINFO: <plmn id>,<service domain>,<reject cause>,<rat type>,<rej type>	If the active report function is enabled, the system automatically reports the rejection information when the registration is rejected

Table 195 AT^REJINFO parameter description

Parameter	Description
<enable>	0: The rejected status is not reported 1: The rejection status is reported
<plmn id>	Network ID
<service domain>	Service domain that reports the rejection cause value 1：CS only 2 : PS only 3 : CS+PS
<reject cause>	Rejection reason value
<rat type>	The network type that was rejected 0：GSM 1：UMTS 2：LTE 3：TD-SCDMA 4：NR5G
<rej type>	Rejection type 0: registration rejected

8.25 DHCP address pool parameters AT^MAPCFG="dhcp"

Configure DHCP address pool parameters.

Table 196 AT^MAPCFG="dhcp" operating command

Type	Command	Possible return results	Description
Set command	AT^MAPCFG="dhcp",<enable_dhcp>[,<gateway>[,<dhcp_start_ip>[,<dhcp_end_ip>[,<netmask>[,<lease_time>]]]]]	OK or ERROR/+CME ERROR:<err>	
Query command	AT^MAPCFG="dhcp"	^MAPCFG: “dhcp”,<enable_dhcp>,<gateway>,<dhcp_start_ip>,<dhcp_end_ip>,<netmask>,<lease_time> OK	
Test command	AT^MAPCFG=?	^MAPCFG: "dhcp",(0-1),(gateway),(dhcp_start_ip),(d	

		hcp_end_ip),(netmask),(lease_time) …… OK
Command example	AT^MAPCFG="dhcp",1,192.168.200.1,192.168.200.2,192.168.200.254	OK
	AT^MAPCFG="dhcp",1,192.168.200.1,192.168.200.2,192.168.200.254,255.255.255.0,3600	OK
	AT^MAPCFG="dhcp"	^MAPCFG: "dhcp",1,192.168.200.1,192.168.200.2,192.168.200.254,255.255.255.0,3600 OK

Table 197 AT^MAPCFG="dhcp" parameter description

Parameter	Description
<enable_dhcp>	Whether to enable the DHCP service: 0: Disable 1: Enable

8.26 Clear saved historical frequency points AT^NWCFG="acqdb_clear"

Table 198 AT^NWCFG="acqdb_clear" operating command

Type	Command	Possible return results	Description
Set command	AT^NWCFG="acqdb_clear"[,<setting>]	If the optional parameter <setting> is omitted, the current historical frequency point is queried ^NWCFG: "acqdb",<state> OK If optional parameters are carried, set the current configuration OK or ERROR/+CME ERROR: <err>	
Test command	AT^NWCFG=?	^NWCFG: "nr5g_disable_mode",(0-3)	

		OK
Command example	AT^NWCFG="acqdb_clear",0	OK
	AT^NWCFG="acqdb_clear"	^NWCFG: "acqdb_clear",1 OK

Table 199 AT^NWCFG="acqdb_clear" operating command

Parameter	Value	Description
setting	0	0: Clear historical frequency points
state	0-1	0: Historical frequency point does not exist 1: Historical frequency points exist

8.27 Disable the historical frequency search function AT^NWCFG="acqdb_disable"

Table 200 AT^NWCFG="acqdb_disable" operating command

Type	Command	Possible return results	Description
Set command	AT^NWCFG="acqdb_disable"[,<setting>]	If <setting> is omitted, the function of querying the current historical frequency point is disabled ^NWCFG: "acqdb_disable",<state> OK If optional parameters are carried, set the current configuration OK or ERROR/+CME ERROR: <err>	
Test command	AT^NWCFG=?	^NWCFG: "nr5g_disable_mode",(0-3) ..... OK	
Command example	AT^NWCFG="acqdb_disable",1	OK	
	AT^NWCFG="acqdb_disable"	^NWCFG: "acqdb_disable",1 OK	

Table 201 AT^NWCFG="acqdb_disable" operating command

Parameter	Value	Description
setting	0-1	0: Do not disable the history frequency function 1: Disable the history frequency function
state	0-1	0: Do not disable the history frequency function 1: Disable the history frequency function

8.28 Disable RPLMN switch AT^NWCFG=" disable_rplmm"

Table 202 AT^NWCFG="disable_rplmn" operating command

Type	Command	Possible return results	Description
Set command	AT^NWCFG="disable_rplmn"[,<setting>]	If <setting> is omitted, the function of querying the current rplmn is disabled ^NWCFG: "disable_rplmn",<state> OK If optional parameters are carried, set the current configuration OK	
Test command	AT^NWCFG=?	^NWCFG: "nr5g_disable_mode",(0-3) ..... OK	
Command example	AT^NWCFG="disable_rplmn",1	OK	
	AT^NWCFG="disable_rplmn"	^NWCFG: "disable_rplmn",1 OK	

Table 203 AT^NWCFG=" disable_rplmn" parameter description

Parameter	Value	Description
setting	0-1	0: Do not disable the RPLMN 1: Disable the RPLMN
state	0-1	0: Do not disable the RPLMN 1: Disable the RPLMN

9 Time and date

9.1 AT+CTZU Automatic time zone updating function command

The set command can select whether to start the functions in automatic updating time zone in ME by using NITZ (Network Identity and Time Zone).

Table 204 AT+CTZU operation command

Type	Command	Possible return results	Description
Set Command	AT+CTZU=<fun>	OK	Success
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Query Command	AT+CTZU?	+CTZU: <fun> OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Test Command	AT+CTZU=?	+CTZU: (<fun> value list) OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Command Example	AT+CTZU=0	OK	Disable the automatic time zone updating
	AT+CTZU=1	OK	Enable the automatic time zone updating
	AT+CTZU?	+CTZU: 1 OK	At this time, this terminal enables the time zone automatic updating function
	AT+CTZU=?	+CTZU: (0-1) OK	-

Table 205 AT+CTZU parameter description

Parameter	Value	Description
<fun>	[0]	Disable the automatic time zone updating
	1	Enable the automatic time zone updating, default value

During leaving factory, if the default value is 1, enable this function. If this function needs to be disabled, the value shall be set as 0. This parameter is stored in a nonvolatile memory;

When the automatic updating function of time zone is enabled, if the time obtained from network is inconsistent with the local time AT+CCLK, the local time will automatically update based on the network time.

9.2 AT+CTZR Time zone report function command

The set command can select whether to enable the time zone report function in ME. This function isn't influenced by AT+CTZU. After enabling this function, as long as the current time zone changes, the time zone after change will be reported through the active report result code +CTZV: <tz>

Table 206 AT+CTZR operation command

Type	Command	Possible return results	Description
Set Command	AT+CTZR=<fun>	OK	Success
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Query Command	AT+CTZR?	+CTZU: <fun> OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Test Command	AT+CTZR=?	+CTZR: (<fun> value list) OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Command Example	AT+CTZR=0	OK	Disable the time zone report function
	AT+CTZR=1	OK +CTZV: <tz>	Enable the time zone report function
	AT+CTZR?	+CTZR: 1 OK	At this time, the terminal enables the time zone report function
	AT+CTZR=?	+CTZR: (0-1)	This value different from version. The following is an example.

	OK

Table 207 AT+CTZR parameter description

Parameter	Value	Description
<fun>	[0]	Disable the time zone report function, default value
	1	Enable the time zone report function, report format: +CTZV: <tz>
<tz>	Character string	-Indicates the local time zone (the difference between the local time and GMT is expressed as a quarter of an hour) and summer time, the format is "±zz", fixed length, range -48 ... +56

9.3 AT+CCLK Real-time clock command

AT+CCLK sets and queries the real-time clock (RTC) of the module. Before the module is absolutely disconnected with the power supply, the setting is kept unchanged.

Table 208 AT+CCLK operation command

Type	Command	Possible return results	Description
Set Command	AT+CCLK=<time>	OK	If the setting is successful, set the module time (3GPP2 network setting time, no matter whether the time zone synchronization is enabled, the time will be automatically synchronized to the latest network time)
		ERROR/+CME ERROR:<err>	Fail
Query Command	AT+CCLK?	+ CCLK: YY/MM/DD,hh:mm:ss<+zz> OK	If the time zone is set, the time zone will be displayed during querying. Otherwise, the time zone will not be displayed. The default time zone is 00.
Command Example	AT+CCLK ="13/08/01,16:20:30"	OK	The set time is 16: 20: 30 on Aug. 1, 2013
	AT+CCLK ="13/08/01,16:20:30+ 08"	OK	The set time is 16: 20: 30 on Aug. 1, 2013. The time zone is east zone II.

	AT+CCLK?	+CCLK: "13/08/01,16:20:34+08" OK	Query the current time
	AT+CCLK=?	OK	

Table 209 AT+CCLK parameter description

Parameter	Value	Description
<time>	YY/MM/DD,hh:mm:ss<+zz >	Character
yy	1980-2100	Figure
mm	01-12	Figure
dd	01-31	Figure
hh	01-24	Figure
mm	00-60	Figure
ss	00-60	Figure
zz	-96~+96	Figure

Remark: if the format of year to be inputted is YYYY, please refer to AT+CSDF command to set the <auxmode> parameter as 2.

9.4 AT+CSDF Time format set command

This command provides the date information and date format for user by MMI setting. This date information is specified by parameter <mode>. <mode> will influence the date format on phone screen, but not influence the date format of AT command serial port. This command can also set the date formation of TE-TA interface. This format is specified by parameter <auxmode> (for example, <auxmode> influences <time> of + CCLK and + CALA). If this parameter is omitted (“+ CSDF =”, “+ CSDF = <mode>”, “+ CSDF =, <auxmode>”) , the default value is set.

Table 210 AT+CSDF parameter description

Type	Command	Possible return results	Description
Set Command	AT+CSDF=[[<mode>][, <auxmode>]]	OK	Set the time format
		ERROR/+CME ERROR:<err>	Fail

Query Command	AT+CSDF?	+ CCLK: YY/MM/DD,hh:mm:ss<+zz> OK	If the time zone is set, the time zone will be displayed during querying. Otherwise, the time zone will not be displayed. The default time zone is 00.
Command Example	AT+CSDF=7,2	OK	The time format displayed on the display screen is YY-MM-DD. CCLK format is YYYY / MM / DD
		ERROR/+CME ERROR:<err>	Fail
	AT+CSDF?	+CSDF: 7,2 OK	Query the time format of current setting
	AT+CSDF=?	+CSDF: (1-7),(1-2) OK	-

Table 211 AT+CSDF parameter description

Parameter	Value	Description	Remark
<mode>	1	DD-MMM-YYYY	The presentation of MMM depends on language. This parameter only influences the date format displayed on the phone screen, but will not influence the date format of AT command serial port.
	2	DD-MM-YY	
	3	MM / DD / YY	
	4	DD / MM / YY	
	5	DD.MM.YY	
	6	YYMMDD	
	7	YY-MM-DD	
<auxmode>	1	YY / MM / DD	When <auxmode> = 1, <CCLK and + CALA <time> format is “yy / MM / dd, hh: mm: sszz”; when it is “yyyy / MM / dd, hh: mm: sszz”, <auxmode> = 2. If MT doesn’t support the time zone information, the last three characters can be omitted (refer to + CCLK command).

10 Data

10.1 AT+CGACT PDP context activation and deactivation AT command

This execution command can activate or deactivate the specified PDP context. After this command is successfully executed, MT is kept in V.250ter command state. If PDP context is already in the requested state, the state remains unchanged. If it cannot enter the context state specified by the request, ERROR or +CME ERROR response will be returned. Utilize the error response extended by +CMEE command. When executing the activation form of the command, if MT does not attach GPRS, MT firstly attaches GPRS and then attempts to activate the specified context. If the attachment fails, MT responds to ERROR, or, if the extended error response is enabled, MT responds with the appropriate message that failed to connect. If <cid> is not specified, the activation form of the command activates all defined contexts. If <cid> is not specified, the invalidation form of the command invalidates all active contexts. The query command returns current activation states of all defined PDP contexts. The test command is used for requesting to obtain information related to PDP context activation state supported.

Table 212 AT+CGACT operation command

Type	Command	Possible return results	Description
Set Command	AT+CGACT=<state>,<cid>[,<cid>[,…]]]	OK	-
		ERROR/+CME ERROR:<err>	Fail
Query Command	AT+CGACT?	+CGACT: <cid>,<state>[<CR><LF> +CGACT:<cid>,<state>[...]] OK	-
Test Command	AT+CGACT=?	+CGACT: (<state> value list) OK	-
Command Example	AT+CGDCONT=1,"IP","CMNET" AT+CGACT=1,1 AT+CGACT=0,1	OK(Set PDP context) OK(PDP activation) OK(PDP deactivation)	-
	AT+CGACT?	+CGACT: 1,0 OK	-
	AT+CGACT=?	+CGACT: (0,1) (before activating the context, MT shall connect the GPRS network by finishing the automatic GPRS connection)	-

	OK	
AT+CGACT＝0	OK(deactivate all contexts)	-
AT+CGACT＝1	OK(activate the first possible context)	-

Table 213 AT+CGACT parameter description

Parameter	Value	Description
<state> Activation state of PDP context	[0]	Deactivate
	1	Activate
<cid>	-	Please refer to AT+CGDCONT

10.2 AT+CGDATA Data mode entering AT command

The execution command sets that MT uses one or multiple packet domain PDP type, executes relevant operation and establishes communication between TE and network. It includes execution of PS domain attachment and one or multiple PDP contexts. If the command is executed successfully, it will display CONNECT and enter V.250ter online data state; If the command fails, for example, L2P parameter cannot be accepted by MT, MT will return ERROR or +CME ERROR (if enabled) to respond.

This command successfully executes the AT command of inputting after entering the online data state. MT cannot treat again.

After the data transmission is finished, and the 2nd layer protocol termination process finishes successfully. Re-enter V.25ter command state. MT returns the final result code OK. If the error terminates or the start fails, enter V.25ter command state again, and MT returns the final result code NO CARRIER or +CME ERROR (if enabled). Report the connection, activation and other wrong indication.

The test command is used for requesting information of layer 2 protocol supported by request. This command can be used for normal mode and modem compatible mode.

Table 214 AT+CGDATA operation command

Type	Command	Possible return results	Description
Set Command	AT+CGDATA=[<L2P>, [<cid> [,<cid> [,…]]]]	CONNECT	If the communication establishes successfully, MT returns to CONNECT and enters V.250ter online data state.

		OK	After the data transmission finishes and layer 2 protocol termination flow successfully finishes, enter V.250ter command state again and MT returns to the final result code OK.
		ERROR/+CME ERROR: <err>	Fail
Test Command	AT+CGDATA=?	+CGDATA: (<L2P> value list) OK	-
Command Example	AT+CGDATA=?	+CGDATA: ("PPP") OK	The layer 2 protocol used between TE and MT is "PPP"
	AT+CGDATA="PPP",1	CONNECT	-

Table 215 AT+CGDATA parameter description

Parameter	Value	Description
<L2P>	"PPP"	Character parameters; used for representing layer 2 protocol between TE and MT
<cid>	-	Required, please refer to AT+CGDCONT

If the value of cid is undefined for MT, MT will return an ERROR or + CME ERROR response. Otherwise, MT sends out intermediate result code CONNECT and enters V.25ter connection data state;

If the +CGATT and ++CGACT commands have not been used to execute GPRS attachment and PDP context activation, these two processes can be performed prior to or during PDP starting;

If the context activation is performed during PDP starting, one or more <cid> can be specified to provide the required information for the context activation request. In each PDP starting process, MT can get some or all of the following information - MT with prior knowledge. For example, it can implement only one PDP type. During PDP starting, TE can provide MT with a PDP type and / or PDP address;

If any information conflicts, the command fails. Any PDP type and PDP address in the above information will be compared with any PDP type and PDP address in any context definition specified in this command in <cid> sequence. To match a context definition, the PDP type shall be strictly matched;

If PDP addresses are the same or one or both of them are not specified, PDP addresses are considered being matched. For example, if PPP NCP request confirms that PDP type is IP and there is no PDP address, MT will search for a definition with PDP type IP and no PDP address in the specified context definition. Use the available matching values related to the PDP type and usable static PDP address. Combining with other information in the PDP context definition, activate the context. If the static PDP address is not available, a dynamic address is requested;

If <cid> is not given or there is no matching context definition, MT will attempt to activate the context with any information available. Other context parameters will be set to default values.

10.3 AT$QCRMCALL NDIS dialing command

This command is a RMNET-based dialing command to connect and disconnect the data.

Table 216 AT$QCRMCALL operation command

Type	Command	Possible return results	Description
Set Command	AT$QCRMCALL=<Action>,<Instance> [,<IP Type> [,<Tech Pref > [,<umts profile number> [,<cdma profile number > [,<APN>]]]]]	OK	Successful dialing
		NO CARRIER	Failed dialing
Query Command	AT$QCRMCALL?	Disconnect: OK Connect: $QCRMCALL: 1, V4 $QCRMCALL: 1, V6 OK	-
Test Command	AT$QCRMCALL=?	$QCRMCALL: (0-1),(1,2,3,4,5,6,7,8),(1-3),(1-2),(1-42),, OK	This value different from version. The following is an example.
Command Example	AT$QCRMCALL=1,1,1,2,1	$QCRMCALL: 1, V4 OK	Dial
	AT$QCRMCALL=0,1,1,2,1	OK $QCRMCALL: 0, V4	Disconnect the dialing

Table 217 AT$QCRMCALL parameter description

Parameter	Value	Description
< Action >	0	Stop
	1	Start
<Instance>		1 to RMNET_ NUM_LAPTOP_ INSTANCES

<IP Type>	1	Ipv4
	2	Ipv6
	3	Ipv4v6
<Tech Pref>	1	3GPP2
	2	3GPP
<umts_profile>	1 to 42	-
<APN >	1	String type, maximum length is 100

10.4 ATD*99# GPRS server request command

This command will enable MT to initiate a series of necessary operations to establish a communication link between TE and PDN (Public Data Network). Execute V.25ter 'D' (dialing) command. MT will enter V.25ter online data state, and start the specified layer 2 protocol together with TE. Other AT commands that follow this line will not be executed. The detailed behavior after entering the online data state depends on PDP (Packet Data Protocol) type. If AT+CGATT and AT+CGACT commands have not been used for GPRS attachment and PDP context activation, these two operations can occur before or during PDP starting. If <cid> is supported, its usage is the same as in +CGDATA command. Commands such as +CGDCONT and +CGQREQ can be used by the modem to initialize AT command character string to set values such as PDP type, APN, QoS, etc. If <cid> is not supported, or if it is supported but ignored, MT will attempt to activate the context with the following information: any information provided by TE during PDP starting, i.e., TE can provide PDP type and/or PDP address to MT; Prior knowledge, i.e. MT only can realize one PDP type; utilize "Empty PDP type"(GSM 04.08) (in such situation, don't send PDP address and APN, only the PDP context reservation records will exist in the subscriber's HLR).

Table 218 ATD*99# operation command

Type	Command	Possible return results	Description
Set Command	ATD*99[*[<called_address>][*[<L2P>][*[<cid>]]]]#	CONNECT	Successfully connect
		NO CARRIER	If the layer 2 protocol is terminated, no matter normal disabling or error disabling, MT will enter V.25ter command state and return this result.
		ERROR/ +CME RROR:<err>	Error in command execution
Command Example	ATD*99#	CONNECT 150000000	Then, close the opened serial port, exit the data state and

	return to NO CARRIER. Then, SSCOM can normally send other AT commands.

Table 219 ATD*99# parameter description

Parameter	Value	Description
<called_address>	-	It shall be ignored
<L2P>	"PPP"	-
<cid>	-	Please refer to AT+CGDCONT

10.5 +++ Data mode to command mode switching command

This command can switch from the data mode to AT command mode.

Table 220 +++ operation command

Type	Command	Possible return results	Description
Execution Command	+++	OK	Successful
		ERROR/+CME ERROR: <err>	<value>Nor confirmed or not supported
Command Example			

10.6 CONNECT Data connection downlink rate indication command

This command is used for reporting the maximum downlink rate during successful dial connection of data business.

Table 221 CONNECT operation command

Type	Command	Possible return results	Description
Report Command		CONNECT <n>	Successful connection Note: refer to ATD items for parameter description

10.7 AT+CGDCONT PDP context definition command

The set command can define the parameters for PDP contexts. This PDP context is identified by local context identification parameter <cid>. The special form +CGDCONT=<cid> of this set command will make the context number <cid> become the undefined value. The test commands returns a complex value. If MT supports several PDP types <PDP_type>, the range of every <PDP_type> parameter value returns on a separated line.

Table 222 AT+CGDCONT operation command

Type	Command	Possible return results	Description
Set Command	AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>[,<Reliable_Data_Service>[,<SSC_mode>[,<S-NSSAI>[,<Pref_access_type>[,<RQoS_ind>[,<MH6-PDU>[,<Always-on_req>]]]]]]]]]]]]]]]]	OK	-
		ERROR/+CME ERROR: <err>	Fail
Query Command	AT+CGDCONT?	[+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>[,<Reliable_Data_Service>[,<SSC_mode>[,<S-NSSAI>[,<Pref_access_type>[,<RQoS_ind>[,<MH6-PDU>[,<Always-on_req>]]]]]]]]]]]]]]]] OK	-
Test Command	AT+CGDCONT=?	+CGDCONT: (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported	-

		<P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s),(list of supported <NSLPI>s),(list of supported <securePCO>s),(list of supported <IPv4_MTU_discovery>s),(list of supported <Local_Addr_Ind>s),(list of supported <Non-IP_MTU_discovery>s),(list of supported <Reliable_Data_Service>s),(list of supported <SSC_mode>s),,(list of supported <Pref_access_type>s),(list of supported <RQoS_ind>s),(list of supported <MH6-PDU>s),(list of supported <Always-on_req>s) OK	
Command Example	AT+CGDCONT?	+CGDCONT: 1,"IPV4V6","IMS","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0,,,,,,,,,"",,,,0 OK	-
	AT+CGDCONT＝1	OK	delete <cid>
	AT+CGDCONT=1,"IP","CMNET"	OK	APN is CMNET, PDP type is IP
	AT+CGDCONT=?	+CGDCONT: (1-42),"IP",,,(0-3),(0-4),(0-1),(0-1),,,,,,,,,(0-1),,(0-1),,,(0-1) +CGDCONT: (1-42),"PPP",,,(0-3),(0-4),(0-1),(0-1),,,,,,,,,(0-1),,(0-1),,,(0-1) +CGDCONT: (1-42),"IPV6",,,(0-3),(0-4),(0-1),(0-1),,,,,,,,,(0-1),,(0-1),,,(0-1) +CGDCONT: (1-42),"IPV4V6",,,(0-3),(0-4),(0-1),(0-1),,,,,,,,,(0-1),,(0-1),,,(0-1) OK	There are differences between the different platforms cid support range, (1 - 42) here just for example.

Table 223 AT+CGDCONT parameter description

Parameter	Value	Description
<cid>	-	Numerical parameter; Used to specify the PDP context identity. This parameter is local to the TE-MT interface and can be used for other PDP context specific instructions. The value range supported by cid depending on different platforms. Run the test command to query the supported value range.
<PDP_type>	["IP"]	(Packet data protocol type) character parameters; specify the packet data protocol type. Support "IP" network protocol IP(Internet Protocol)(IETF STD5) by default
	X.25	ITU-T/CCITT X.25 layer 3 (Obsolete)
	IPV6	Internet Protocol, version 6 (IETF RFC 2460)
	OSPIH	Internet Hosted Octect Stream Protocol (Obsolete)
	PPP	Point to Point Protocol (IETF STD 51)
<APN>	-	Access point name; represent a character string parameter; select the logic name of GGSN or external packet data network. If this parameter is empty or omitted, the signing value shall be requested.
<PDP_addr>	-	Character; identify the address space assigned by MT for special PDP content. If this parameter value is empty or omitted, TE provides other values during PDP starting; if it cannot provide other values, the dynamic address shall be requested. Even if the address has been assigned during PDP starting, the read form of the command continues null return. The assigned address can be read out by using the +CGPADDR command.
<d_comp>	0	Disable (if the value is omitted, this parameter shall be default value) figure parameter; control the PDP data compression
	1	Enable (PDP data compression preferred by manufacturer)
	2	V.42
	3	V.44
		Other values are reserved
<h_comp>	0	Disable (if the value is omitted, this parameter shall be default value) figure parameter; control the PDP head compression
	1	Enable (PDP head data compression preferred by manufacturer)
	2	RFC114 (only applicable to SNDCP)

	3	RFC2507
	4	RFC3095 (applicable for PDCP only)
		Other values are reserved
<IPv4AddrAlloc>	0	IPv4 address allocation through NAS signalling
	1	IPv4 address allocated through DHCP
<request_type>	0	PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP context is for new PDP context establishment or for handover is implementation specific)
	1	PDP context is for emergency (bearer) services
	2	PDP context is for new PDP context establishment
	3	PDP context is for handover from a non-3GPP access network
	4	PDP context is for handover of emergency (bearer) services from a non-3GPP access network
<P-CSCF_discovery>	0	Preference of P-CSCF address discovery not influenced by +CGDCONT
	1	Preference of P-CSCF address discovery through NAS signalling
	2	Preference of P-CSCF address discovery through DHCP
<IM_CN_Signalling_Flag_Ind>	0	UE indicates that the PDP context is not for IM CN subsystem-related signalling only
	1	UE indicates that the PDP context is for IM CN subsystem-related signalling only
<NSLPI>	0	Indicates that this PDP context is to be activated with the value for the low priority indicator configured in the MT.
	1	Indicates that this PDP context is to be activated with the value for the low priority indicator set to "MS is not configured for NAS signalling low priority".
<securePCO>	0	Security protected transmission of PCO is not requested
	1	Security protected transmission of PCO is requested
<IPv4_MTU_discovery>	0	Preference of IPv4 MTU size discovery not influenced by +CGDCONT
	1	Preference of IPv4 MTU size discovery through NAS signalling
<Local_Addr_Ind>	0	indicates that the MS does not support local IP address in TFTs
	1	indicates that the MS supports local IP address in TFTs

<Non-IP_MTU_discovery>	0	Preference of Non-IP MTU size discovery not influenced by +CGDCONT
	1	Preference of Non-IP MTU size discovery through NAS signalling
<Reliable_Data_Service>	0	Reliable Data Service is not being used for the PDN connection
	1	Reliable Data Service is being used for the PDN connection
<SSC_mode>	0	indicates that the PDU session is associated with SSC mode 1
	1	indicates that the PDU session is associated with SSC mode 2
	2	indicates that the PDU session is associated with SSC mode 3
<S-NSSAI>	sst	only slice/service type (SST) is present
	sst;mapped_sst	SST and mapped configured SST are present
	sst.sd	SST and slice differentiator (SD) are present
	sst.sd;mapped_sst	SST, SD and mapped configured SST are present
	sst.sd;mapped_sst.mapped_sd	SST, SD, mapped configured SST and mapped configured SD are present
<Pref_access_type>	0	indicates that the preferred access type is 3GPP access
	1	indicates that the preferred access type is non-3GPP access
<RQoS_ind>	0	indicates that reflective QoS is not supported for the PDU session
	1	indicates that reflective QoS is supported for the PDU session
<MH6-PDU>	0	indicates that IPv6 multi-homing is not supported for the PDU session
	1	indicates that IPv6 multi-homing is supported for the PDU session
<Always-on_req>	0	always-on PDU session is not requested
	1	always-on PDU session is requested

The defined <cid> shall not be same with <cid> defined in +CGDSCONT.

10.8 AT$QCPDPP PDP authentication set command

Table 224 AT$ QCPDPP operation command

Type	Command	Possible return results	Description
Set Command	AT$QCPDPP=<cid>,<auth_type>,<password>,<username>	OK	PLMN temporarily does not support the configuration
Query Command	AT$QCPDPP?	$QCPDPP: <cid>,<auth_type>,<username> OK	PLMN temporarily does not support the configuration
Test Command	AT$QCPDPP=?	$QCPDPP: (1-42),(0-3),, OK	There are differences between the different platforms cid support range, (1 - 42) here just for example.
Command Example	AT$QCPDPP=1,1,123456,test	OK	
	AT$QCPDPP?	$QCPDPP: 1,1,"test" OK	

Table 225 AT$ QCPDPP parameter description

Parameter	Value	Description
<cid>	-	Please refer to AT + CGDCONT
<auth_type>	0: None 1: PAP 2: CHAP	0: <password> and <username> not needed 1: <password> and <username> needed 2: Only accept <password>
<password>		Authentication password
<username>		Authentication user name

10.9 AT^AUTHDATA PDP authentication set command

Table 226 AT^AUTHDATA operation command

Type	Command	Possible return results	Description
Set Command	AT^AUTHDATA=<cid>,<auth_type>,<PLMN>,<password>,<username>	OK	PLMN temporarily does not support the configuration
Query Command	AT$AUTHDATA?	$AUTHDATA: <cid>,<auth_type>,<password>,<username>,<PLMN> OK	PLMN temporarily does not support the configuration
Test Command	AT^AUTHDATA =?	^AUTHDATA: (1-42),(0-3),("plmn"),("password"),("username") OK	There are differences between the different platforms cid support range, (1 - 42) here just for example.
Command Example	AT^AUTHDATA=1,1,46000,123456,test	OK	
	AT^AUTHDATA?	^AUTHDATA: 1,1,"123456","test","" OK	

Table 227 AT^AUTHDATA parameter description

Parameter	Value	Description
<cid>	-	Please refer to AT + CGDCONT
<auth_type>	0: None 1: PAP 2: CHAP	0: <password> and <username> not needed 1: <password> and <username> needed 2: Only accept <password>
<password>		Authentication password
<username>		Authentication user name
<plmn>		Operator PLMN

10.10 AT+CGPADDR PDP address display command

This execution command can return to the PDP address list identified by context. After the test command is executed, the value list of <cid> is returned.

Table 228 AT+CGPADDR operation command

Type	Command	Possible return results	Description
Set Command	AT+CGPADDR=[<cid>[,<cid>[,…]]]	+CGPADDR:<cid>,<PDP_addr>[<CR><LF>+CGPADDR:<cid>,<PDP_addr>[...]] OK	-
		ERROR/+CME ERROR: <err>	Fail
Test Command	AT+CGPADDR=?	+CGPADDR: (<cid> value list) OK	-
Command Example	AT+CGPADDR	+CGPADDR: 1,10.186.149.149 OK	Display current IP address
	AT+CGPADDR=?	+CGPADDR: (1) OK	This value different from version. The following is an example.

Table 229 AT+CGPADDR parameter description

Parameter	Value	Description
<cid>	-	Figure; specify the definition of special PDP context (please refer to AT+CGDCONT). If <cid> is omitted, return addresses defined with content.
<PDP_address>	-	Character; identify the address relative to special PDP context obtained from MT. This address can be static and dynamic. The static address is the address set by+CGDCONT command; as for dynamic address, during the last PDP context activation process, use the address assigned during context definition by reference of <cid>. When the address is unavailable, omit <PDP_address>.

10.11 AT+CGCONTRDP DNS query command

Table 230 AT+CGCONTRDP operation command

Type	Command	Possible return results	Description
Set Command	AT+CGCONTRDP=[<p_cid>]	+CGCONTRDP: <p_cid>,<bearer_id>,<apn>,<pdp_ipv4_addr>[,<pdp_ipv6_addr>],<pdp_ipv4_gateway_addr>,<pdp_ipv6_gateway_addr>,<pdp_ipv4_pdns>,<pdp_ipv6_pdns>,<pdp_ipv4_sdns>,<pdp_ipv6_sdns>,<pims_ipv4_addr>[,<pims_ipv6_addr>],<sims_ipv4_addr>[,<sims_ipv6_addr>] OK	
		ERROR/+CME ERROR:<err>	
Test Command	AT+CGCONTRDP=?	+CGCONTRDP: (p_cid list) OK	
Command Example	AT+CGCONTRDP=?	+CGCONTRDP: (1) OK	This value different from version. The following is an example.

Table 231 AT+CGCONTRDP parameter description

Parameter	Value	Description
<p_cid>	-	Please refer to the AT+CGDCONT
<bearer_id>		
<apn>	String type	APN
<pdp_ipv4_addr>	String type	pdp ipv4 address
<pdp_ipv6_addr>	String type	pdp ipv6 address
<pdp_ipv4_gateway_addr>	String type	pdp ipv4 gateway address
<pdp_ipv6_gateway_addr>	String type	pdp ipv6 gateway address
<pdp_ipv4_pdns>	String type	pdp ipv4 first dns address

<pdp_ipv6_pdns>	String type	pdp ipv6 first dns address
<pdp_ipv4_sdns>	String type	pdp ipv4 second dns address
<pdp_ipv6_sdns>	String type	pdp ipv6 second dns address
<pims_ipv4_addr>	String type	First IMS ipv4 address
<pims_ipv6_addr>	String type	First IMS ipv6 address
<sims_ipv4_addr>	String type	Second IMS ipv4 address
<sims_ipv6_addr>	String type	Second IMS ipv6 address

10.12 AT^DSFLOWQRY DS flow query command

When in the online_data mode, the current dial-up DS flow and the total DS flow after startup are queried. Otherwise, it is the last DS flow generated during the last dial-up process and the total DS flow generated after startup.(This command query depend on AT^DSFLOWRPT=1 enble ds flow)

Table 232 AT^DSFLOWQRY operation command

Type	Command	Possible return results	Description
Set Command	^^DSFLOWQRY=<cid>	OK or ERROR/+CME ERROR:<err>	
Query Command	^DSFLOWQRY(?)	^DSFLOWQRY: <last_ds_time>,<last_tx_flow>, <last_rx_flow>,<total_ds_time>,<total_tx_flow>, <total_rx_flow> OK Error: +CME ERROR: <err> For example: ^DSFLOWQRY: 592,478,0,592,645c,3c0f OK When the traffic statistics switch is closed: +CME ERROR: operation not allowed	
Test Command	^DSFLOWQRY=?	^DSFLOWQRY: (1-42,"all") OK	This value different from version. The following is an example.

Table 233 AT^DSFLOWQRY parameter description

Parameter	Value	Description
<cid>	Value or "all"	For numerical values refer to AT+CGDCONT All indicates that all cid are included
<last_ds_time>	0x0000_0000~0xFFFF_FFFF	In seconds, 8-bit hexadecimal number, indicating the last DS connection time
<last_tx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	In Bytes,16-bit hexadecimal number, indicating the last DS transmitted data,
<last_rx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	In Bytes,16-bit hexadecimal number, indicating the last DS receive data,
<total_ds_time>	0x0000_0000~0xFFFF_FFFF	In seconds, 8-bit hexadecimal number, indicating the cumulative connection time of DS
<total_tx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	In Bytes,16 bit hexadecimal number, which represents the cumulative transmitted data of DS,
<total_rx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	In Bytes,16 bit hexadecimal number, which represents the cumulative receive data of DS,

10.13 AT^DSFLOWRPT Report DS flow statistics command

When the report switch is started(AT^DSFLOWRPT=1), when the MT is in online_data status, the active reporting message will be reported every 2 seconds by default (users can set the reporting cycle). The reported contents include the current DS connection time, current sending flow, current receiving flow, total connection time, total sending flow and total receiving flow.

Table 234 AT^DSFLOWRPT operation command

Type	Command	Possible return results	Description
Set Command	^DSFLOWRPT=<oper>[,<time>]	OK Error: +CME ERROR: <err>	
Query Command	^DSFLOWRPT?	^DSFLOWRPT: <oper>,<time> OK For example: ^DSFLOWRPT: 0,2 OK	
Test Command	^DSFLOWRPT=?	^DSFLOWRPT: (0,1),(time) OK	

Report Command	^DSFLOWQRY: <last_ds_time>,<last_tx_flow>, <last_rx_flow>,<total_ds_time>,<total_tx_flow>, <total_rx_flow> For example: ^DSFLOWRPT: 220,2b4,6a,220,4e30,3b3b ^DSFLOWRPT: 222,304,13e,222,4e80,3c0f

Table 235 ^DSFLOWRPT parameter description

Parameter	Value	Description
<oper>	0: disable ds flow statistic 1: enble ds flow statistic	When <oper> is 0, the traffic cannot be queried or reported actively
<time>	Set periodic reporting interval 0: disable active reporting function	When <time> is 0, only AT^DSFLOWQRY can query the traffic
<cid>	Value or "all"	For numerical values refer to AT+CGDCONT All indicates that all cid are included

Table 236 ^DSFLOWRPT parameter description

Parameter	Value	Description
<last_ds_time>	0x0000_0000～0xFFFF_FFFF	In seconds, 8-bit hexadecimal number, indicating the last DS connection time.
<last_tx_flow>	0x0000_0000_0000_0000～0xFFFF_FFFF_FFFF_FFFF	In Bytes,16-bit hexadecimal number, indicating the last DS transmitted data.
<last_rx_flow>	0x0000_0000_0000_0000～0xFFFF_FFFF_FFFF_FFFF	In Bytes,16-bit hexadecimal number, indicating the last DS receive data.
<total_ds_time>	0x0000_0000～0xFFFF_FFFF	In seconds, 8-bit hexadecimal number, indicating the cumulative connection time of DS.
<total_tx_flow>	0x0000_0000_0000_0000～0xFFFF_FFFF_FFFF_FFFF	In Bytes,16 bit hexadecimal number, which represents the cumulative transmitted data of DS.
<total_rx_flow>	0x0000_0000_0000_0000～0xFFFF_FFFF_FFFF_FFFF	In Bytes,16 bit hexadecimal number, which represents the cumulative receive data of DS.

10.14 AT+ECMSTATE ECM dial query state command

Table 237 AT+ECMSTATE operation command

Type	Command	Possible return results	Description
Query Command	AT+ECMSTATE?	OK +ECMSTATE: <dial_state>,<ip_type>,<v4_ip>,<v4_primary_dns> ,<v4_secondary_dns>,<v6_ip>,<v6_primary_dns>, <v6_secondary_dns>	
		ERROR/+CME ERROR:<err>	Fail

Table 238 AT+ECMSTATE parameter description

Parameter	Value	Description
<dial_state>	1	Being connected
	2	Connected
	3	Being disconnected
	4	Disconnected
<ip_type>	0	Invalid
	1	IPV4
	2	IPV6
	3	IPV4V6
<v4_ip>	-	IPV4 IP address
<v4_primary_dns>	-	IPV4 main DNS
<v4_secondary_dns>	-	IPV4 auxiliary DNS
<v6_ip>	-	IPV6 IP address
<v6_primary_dns>	-	IPV6 main DNS
<v6_secondary_dns>	-	IPV6 auxiliary DNS

10.15 AP dial-up command AT+ECMDUP

This command is used for ECM dialing and status management on Linux.

Table 239 AT^ECMDUP operation command

Type	Command	Possible return results	Description
Set command	AT+ECMDUP=<pdpid>,<action>[,<pdp_type>[,<APN>[,<username>[,<passwd>[,<auth_type>]]]]]	<CR><LF>OK<CR><LF>	-
		<CR><LF>ERROR/+CME ERROR: <err><CR><LF>	FAIL
Query command	AT+ECMDUP?	<CR><LF>+ECMDUP: <pdpid>,<status>,"IPV4",<status>,"IPV6"<CR><LF><CR><LF>OK<CR><LF>	-
Test command	AT+ECMDUP=?	<CR><LF>+ECMDUP: (list of supported <pdpid>s),(list of supported <action>s),(list of supported<pdptype>s),<APN>,<username>,<password>,(list of supported <authtype>s)<CR><LF><CR><LF>OK<CR><LF>	-
Command example	AT+ECMDUP?	+ECMDUP: 1,1,"IPV4",0,"IPV6" OK	-
	AT+ECMDUP=1,1	OK ^DCONN: 1,"IPV4"	
	AT+ECMDUP=1,0	OK ^DEND: 1,0,"IPV4"	
	AT+ ECMDUP=?	+ECMDUP: (1-9),(0-1),(0-2),(apn),(username),(password),(1-2) OK	This value different from version. The following is an example.

Table 240 AT^ECMDUP parameter description

Parameter	Description
<pdpid>	Integer value, the PDP context identifier, support 1-9
<action>	Integer value, set up the connection state. The values are as follows: 0: Disconnects. 1: Establishes the connection.
<pdp_type>	Dial type. The value can be: 0: IPV4 dialing 1: indicates IPV6 dialing

	2: IPV4V6 dial-up
<APN>	String type, access point name, 0 ~ 99 byte.
<username>	String type, the user name, 0 ~ 255 byte.
<passwd>	Byte string type, password, 0 ~ 255.
<auth_type>	Integer value, authentication protocol. The values are as follows: 1: PAP. 2: CHAP.
<status>	Integer, indicates the dialing status. The value can be: 0: No dialing 1: The number is dialed

10.16 AT+DATABURS Data backup/recovery/query commands

Table 241 AT+DATABURS operating command

Type	Command	Possible return results	Description
Set command	AT+DATABURS=0	+databurs: 0 OK or +databurs: -1 ERROR	Data backup
Set command	AT+DATABURS=1	+databurs: 0 OK or +databurs: -1 ERROR	Data recovery
Set command	AT+DATABURS=2	+databurs: 0 OK or +databurs: -1 ERROR	Data backup query
Set command	AT+DATABURS=3	Start-> data: nv_gw_msg_data	List backup data (only file names, NV ID, etc.)

		nv_gw_msg_header <-End OK
Command example	AT+DATABURS=0	+databurs: 0 OK
	AT+DATABURS=3	Start-> data: nv_gw_msg_data nv_gw_msg_header <-End OK

11 Enable/Disable Sleep Function

11.1 AT+WAKEUPCFG Sleep function enabling command

This command can enable or disable the module dormancy function.

Table 242 AT+WAKEUPCFG operation command

Type	Command	Possible return results	Description
Set Command	AT+WAKEUPCFG=<n>	OK	-
Query Command	AT+WAKEUPCFG?	+WAKEUPCFG: 0 OK	-
Test Command	AT+WAKEUPCFG=?	+WAKEUPCFG: (0-1) OK	-
Command Example	AT+WAKEUPCFG=1	OK	Enable the dormancy function

Table 243 AT+WAKEUPCFG parameter description

Parameter	Value	Description
<n>	0	Disable the dormancy function
	1	Enable the dormancy function

12 Serial port control command

12.1 AT&D DTR use state command

Use this command to set the return result of TA1 when the DTR circuit changes from enabling to disabling in the data state.

Table 244 AT&D operation command

Type	Command	Possible return results	Description
Set Command	AT&D<value>	OK	-
		ERROR/+CME ERROR: <err>	The drives doesn't support DTR

Table 245 AT&D parameter description

Parameter	Value	Description
<value>	[0]	TA neglects DTR state
	1	At the same time of keeping current call, convert to command mode
	2	Release the data communication. Convert to command mode. When DTR=OFF, disable the automatic response.

12.2 AT+IPR TE-TA data rate fixing command

This command can set the DTE-DCE band rate. After successful setting, this command will automatically save the parameters in the file system. If the baud rate is fixed, Must ensure that the baud rate configured for TE and TA are the same.

Table 246 AT+IPR operation command

Type	Command	Possible return results	Description
Set Command	AT+IPR=<rate>	OK	-
		ERROR/ +CME ERROR <err>	Error relates to ME functionality
Query Command	AT+IPR?	+IPR: <rate> OK	-

Test Command	AT+IPR=?	+IPR: rate value list OK	-
Command Example	AT+IPR?	+IPR: 115200 OK	The current baud rate is 115200
	AT+IPR=9600	OK	Set the baud rate into 9600
	AT+IPR=?	+IPR: 300,600,1200,2400,4800,9600,19200,38400,57600,115200,230400,460800 OK	-

Table 247 AT+IPR parameter description

Parameter	Value	Description
<rate>	300 600 1200 2400 4800 9600 19200 38400 57600 [115200] 230400 460800	The values represent the fixed baud rates, default: 115200

13 Voice control

13.1 AT+CLVL Speaker volume control command

Use AT+CLVL to set the speaker volume level, there are eight levels in total, 0-7. 0 represents mute; 7 represents the maximum volume. The default value is 3.

Table 248 AT+CLVL operation command

Type	Command	Possible return results	Description
Set Command	AT+CLVL=<level>	OK	-
		ERROR	Fail
Query Command	AT+CLVL?	+CLVL: 3 OK	Fail
Test Command	AT+CLVL=?	+CLVL: (0-7) OK	-
Command Example	AT+CLVL=1	OK	-

Table 249 AT+CLVL parameter description

Parameter	Value	Description
<level>	0-7	Set different volume levels

13.2 AT+CMIC Mic volume control command

Use AT+CMIC to set the Mic volume level, there are eight levels in total, 0-7. 0 represents mute; 7 represents the maximum volume. The default value is 3.

Table 250 AT+CMIC operation command

Type	Command	Possible return results	Description
Set Command	AT+CMIC=<level>	OK	-
		ERROR/+CME ERROR:<err>	Fail

Query Command	AT+CMIC?	+CMIC: 3 OK	-
Test Command	AT+CMIC=?	+CMIC: (0-7) OK	-
Command Example	AT+CMIC=1	OK	-
	AT+CMIC?	+CMIC: 3 OK	-

Table 251 AT+CMIC parameter description

Parameter	Value	Description
<level>	0-7	Set different volume levels

13.3 AT+CMUT Support mute setting command

This command can set the analog voice mute and is valid for mic.

Table 252 AT+CMUT operation command

Type	Command	Possible return results	Description
Set Command	AT+CMUT=<n>	OK	-
		ERROR	Fail
Query Command	AT+CMUT?	+CMUT: <n> OK	-
		ERROR	Fail
Test Command	AT+CMUT=?	+CMUT: (<n>value list) OK	-
Command Example	AT+CMUT=?	+CMUT: (0-1) OK	-
	AT+CMUT=0	OK	-
	AT+CMUT?	+CMUT: 0 OK	-

Table 253 AT+CMUT parameter description

Parameter	Value	Description
<n>	0	Mute OFF
	1	Mute ON

13.4 AT^CPCM Support PCM setting command

This command can set the pcm mode.

Table 254 AT^CPCM operation command

Type	Command	Possible return results	Description
Set Command	AT^CPCM=<mode>[,<format>,<clock>,<frame>,<offset>,<sample>,<num_slots>,<num_slots>,<slot_map0>,<slot_map1>]	OK	-
		ERROR	Fail
Query Command	AT+CPCM?	^CPCM: <mode>,<format>,<clock>,<frame>,<offset>,<sample>,<num_slots>,<num_slots>,< slot_map0>,< slot_map1> OK	-
		ERROR	Fail
Test Command	AT+CPCM=?	^CPCM: (0-2), (0-2), (0-4), (0-1), (0-2),(0-1), (1-2), (1-16), (2-16) OK	-
Command Example	AT^CPCM=?	^CPCM: (0-2), (0-2), (0-4), (0-1), (0-2) ,(0-1), (1-2), (1-16), (2-16) OK	-
	AT^CPCM =0,0,0,0,0,0,1,1	OK	-
	AT^CPCM?	^CPCM: 0,0,0,0,0,0,1,1	-

OK

Table 255 AT+CMUT parameter description

Parameter	Value	Description
< mode >	0	MASTER_PRIM mode (default) clk2.048 syn 8k
	1	MASTER_AUX mode (no support)
	2	SLAVE mode
<format>	0	linear (default)
	1	u-law (no support)
	2	a-law (no support)
<clock>	0	2.048MHz (default)
	1	1.024 MHz (no support)
	2	512k Hz (no support)
	3	256k Hz (no support)
	4	4.096MHz (16 k sampling rate effectively)
<frame>	0	short frame (default)
	1	long frame
<offset>	0	Offset cleared (default) SYN and CLK synchronize rising edge alignment
	1	Short synchronization offset (not supported) In primary PCM mode, synchronization starts at the last quarter of the CLK rising edge
	2	Long synchronization offset settings (support) aux PCM mode, synchronization in CLK rose along the 1/4 cycle after launch
< sample >	0	8k (default)
	1	16k
< num_slots >	1-2	Slot (default value is 1)
< slot_map0 >	1-16	Slot_map value default value is 1

< slot_map1 >	2-16	Effective when num_slots = 2

14 Hardware control extension commands

14.1 AT+WDISABLEEN Hardware W_Disable pin control command

This command can enable/disable the hardware pin function. When AT+WDISABLEEN=1, the hardware pin operation can be operated (whether to enter the airplane mode); when AT+WDISABLEEN=0, the hardware pin operation is invalid.

Table 256 AT+WDISABLEEN operation command

Type	Command	Possible return results	Description
Set Command	AT+WDISABLEEN =<n>	OK	-
Query Command	AT+WDISABLEEN?	+ WDISABLEEN:0 OK	-
Test Command	AT+WDISABLEEN=?	+WDISABLEEN(0-1) OK	-
Command Example	AT+WDISABLEEN=1	OK	Hardware pin operation is valid

Table 257 AT+WDISABLEEN parameter description

Parameter	Value	Description
<n>	0	Hardware pin operation is valid
	1	Hardware pin operation is invalid

14.2 AT+RESET Module reset command

Table 258 AT+RESET operation command

Type	Command	Possible return results	Description

Execution Command	AT+RESET	OK	After executing AT+RESET command, wait a moment. The module will be powered off and restarted.

14.3 AT+POWEROFF Software power off command

Table 259 AT+POWEROFF operation command

Type	Command	Possible return results	Description
Execution Command	AT+POWEROFF	OK	After executing AT+POWEROFF, wait a moment. The module will be powered off.

14.4 GPIO control instruction AT+GPIO

This command is used to control the GPIO level of modules, including PMU and BB chips. Multiple GPIO levels can be set at a time, but the GPIO type delivered at a time must be the same.

Table 260 AT+GPIO operating command

Type	Command	Possible return results	Description
Set command	AT+GPIO=<type>,<gpio_num>,<gpio_value>[[,<gpio_num>,<gpio_value>][…]]	<CR><LF>OK<CR><LF> or <CR><LF>ERROR<CR><LF> or <CR><LF> +CME ERROR: <err><CR><LF>	-
Query command	AT+GPIO=<type>,<gpio_num>	<CR><LF>+GPIO: <type>,<gpio_num>,<gpio_value><CR><LF> <CR><LF>OK<CR><LF> or <CR><LF>ERROR<CR><LF> or <CR><LF> +CME ERROR: <err><CR><LF>	
Test command	AT+GPIO=?	<CR><LF>+GPIO: <0,1>,(gpio num),<0,1><CR><LF> <CR><LF>OK<CR><LF> or <CR><LF>ERROR<CR><LF> or	-

		<CR><LF> +CME ERROR: <err><CR><LF>	
Command example	Set GPIO_6 to low on the AP The AT + GPIO,6,0 = 1	OK	-
	Set GPIO_6 to low and GPIO_8 to high on the AP The AT + GPIO,6,0,8,1 = 1	OK	
	Query the GPIO_6 level status on an AP The AT + GPIO = 1, 6	+GPIO: 1,6,0 OK	

Table 261 AT+GPIO parameter description

Parameter	Description
<type>	The type of GPIO, PMU or AP 0 PMU 1 AP
< gpio_num >	GPIO number on chip
< gpio_value>	GPIO output level 0 Set GPIO to low 1 Set GPIO to high

Type	Description
Save by power failure	N
PIN number	N

15 Error code

Table 262 Error code

Error code number	Error code
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
49	EAP method not supported
50	Invalid EAP parameter
51	Parameter length error for all Auth commands
52	Temporary error for all auth cmds
100	unknown
103	Illegal Mem_Store
106	Illegal ME
107	GPRS services not allowed
111	PLMN not allowed

112	Location area not allowed
113	Roaming not allowed in this location area
126	insufficient resources
127	missing or unknown APN
128	unknown PDP address or PDP type
129	user authentication failed
130	activation rejected by GGSN, Serving GW or PDN GW
131	activation rejected, unspecified
132	service option not supported
133	requested service option not subscribed
134	service option temporarily out of order
140	feature not supported
141	semantic error in the TFT operation
142	syntactical error in the TFT operation
143	unknown PDP context
144	semantic errors in packet filter(s)
145	syntactical errors in packet filter(s)
146	PDP context without TFT already activated
148	unspecified GPRS error
149	PDP authentication failure
150	invalid mobile class
177	Operator Determined Barring
178	maximum number of PDP contexts reached
179	requested APN not supported in current RAT and PLMN combination
180	request rejected, Bearer Control Mode violation

257	network rejected supserv request
258	retry operation
259	invalid deflected to number
260	deflected to own number
261	unknown subscriber
262	service not available
263	unknown class
264	unknown network message
273	Minimum TFT per PDP address error
274	Duplicate TFT eval prec index
275	Invalid TFT param combination
320	Call index error
321	Call state error
322	Sys state error
323	Parameters error
324	Qmi send error
325	ERROR
1001	Normal error
1002	The link has not been established yet
1003	The link has been established already
1004	Fail to establish link
1005	Fail to bind the specified port
1006	Fail to connect to the specified address
1007	The server has not been established yet
1008	The server has been established already

1009	Fail to establish server
1010	Fail to bind the specified port with server
1011	Fail to establish listening
1012	The network has not been opened yet
1013	The network has been actived already
1014	Fail to open network
1015	Invalid domain name
1016	Fail to resolve DNS
1017	Port error
1018	Current transport mode isn't buffer mode
1019	Previous command is not complete
1020	Too many data to be sent
1021	Forbidden operation in transparent mode
1022	Invalid port for transparent mode
1023	Fail to send data in transparent mode
1024	Fail to send data because it is too long
1025	Quit transparent mode because buffer is full
1026	More than one link in physical port
1027	The physical port is in listen state and has no client
1028	Quit transparent mode because link is down
1030	The TCP or UDP link has been established already
1031	The FTP link has been established already
1032	The SMTP link has been established already
1033	The HTTP link has been established already
1035	The FTPS link has been established already

1036	The SMTPS link has been established already
1037	The HTTPS link has been established already
1038	SSL not enabled
1039	SSL handshake failed
1040	Server has not responded
1041	Command result nothing
1042	Operation successful
1043	PDP operation in progress
1044	Invalid Socket data
1045	Send buff full
1046	The link has not been established yet
1047	The link has been established already
1048	Socket send data fail
1049	+MIPOK
1050	SIO entry fail
1051	Socket is closing
1052	DNS analysis fail
1053	Invalid Socket data
1101	Operation failed due to system error
1102	Socket not enabled
1103	Socket not connected
1104	Socket already enabled
1105	Socket already connected
1106	Invalid socket ID
1107	SSL error during handshake

1108	Fail to establish connection
1109	Fail to connect specified address
1110	Invalid arguments
1111	Certification error
1112	Invalid Operation
1113	Certificate maximum limit reached
1114	Network timeout
1115	Socket read failed
1116	Socket write failed
1117	Normal Connecton Opened
1118	Normal Connection Not Opened
1119	Secure Connection Opened
1120	Secure Connection Not Opened
1201	file not exist
1202	directory not exist
1203	file name is too long
1204	permission denied
1205	file already exist
1206	directory already exist
1207	no space left
1208	file currently used
1209	file write failed
1210	file read failed
1211	get MD5 failed
1212	too many files opened

1213	file not opened
1214	file already opened
1215	invalid file name
1216	CA service deconfigured