MeiG SRM815&SRM825(W) AT Commands Manual

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Revision History

Version Number	Date	Reason for Revision
V1.0	7/2020	Establish for the first version
V1.1	8/2020	1. Added 10.14 and 10.15 2. Modify 10.7 and 2.3 3. Modify 8.3 HCSQ 4. Add 8.2 AT+CGREG
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V1.9	11/2020	1. Modify 8.13 AT^CELLLOCK 2. Modify 8.3 the parameters of AT+CEREG 3. Add 8.4 AT+C5GREG command 4. Add 7.10 AT^SIMST command and delete the original 7.10 AT$SIMST 5. Modify 8.10 AT+CELLINFO command for AT^CELLINFO, and add a new parameter RESTRICT_DCNR 6. In the 8.11AT+SGCELLINFOEX command add a new parameter RESTRICT_DCNR 7. It is 8.10AT^CELLINFO extended parameter, AT^CELLINFO=4.
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		3. Modify the ability to obtain CQI in AT^CELLINFO=1 in 8.10; 4. Expand the AT^CELLINFO=4 of 8.10 to obtain the relevant parameters of the antenna transmission function; 5. Add 8.145 AT^LTEATTACHINFO Command; 6. Add 8.16 ^RRCSTAT; 7. Add 8.17 AT^NWCFG; 8. Add 8.18 UE Usage Setting Configuration AT^NWCFG="ue_usage_setting"; 9. Modify 8.12 AT^SYSCFGEX; 10. Add 7.11 AT^CPBREADY; 11. Add 8.19 AT^CACELLURC; 12. Add 8.20 AT^NWCFG="attach_profile_list"; 13. Add 8.21 AT^REJINFO; 14. Add 8.22 AT^PLMN; 15. Add 8.23 AT^SRVST; 16. Modify ^spn response and parameter explain;
V2.1	03/2021	1. Add 7.12 and 7.13; 2. Add 2.8 AT^CURCEX/AT^CURC; 3. Add 3.12 AT+LCTSN to operate IMEISV; 4. Add 10.9 AT^AUTHDATA; 5. Add 7.14 ^SMMEMFULL; 6. Add 2.9 AT+TEMP; 7. Add 2.10 AT+URCCFG; 8. Add 7.15 AT^SIMREFRESH; 9. Modify AT^SYSCFGEX band parameter description and AT^SYSCFGEX=? test command; 10. Add AT^LENDC command; 11. Modify 8.15/8.19/8.22/8.23 unit carriage return and line feed format； 12. Modify 2.8 ,change +TEMPLVLURC； 13. Modify 10.9 modify $ to ^； 14. Modify AT^DSFLOWQRY、AT^DSFLOWRPT、AT^DSFLOWCLR.
V2.2	04/2020	1.Add 15.1,15.2 and 15.3; 2.Deleted 2.9; 3.Add 7.16 AT^STSF, 7.17 ^STIN, 7.18 AT^STGI, 7.19 AT^STGR; 4.Modify 15.1 AT+TEMPLVL test command; 5.Add AT^DSAMBR and AT^DSAMBRURC commands to query APN-AMBR value; 6.Modify AT^CPBREADY parameter description; 7.Modify the description of the AT parameters related to SMS; 8.Modify AT^CELLINFOEX parameter description.

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1 Introduction

1.1 Scope of the document

This document presents the AT command set supported by MeiG Smart 5G NR module SR815/SRM825, including standard AT command set and extended AT commands used by MeiG only.

1.2 Content list

This document includes:

Chapter 1: Introduction to document purpose, references, modified records, commands format and interpretation of terms;

Chapter 2: General Commands;

Chapter 3: Introduction to module information recognition commands;

Chapter 4: Introduction to short message 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 sound control commands;

Chapter 14: Introduction to hardware and extension commands.

1.3 Terms and Abbreviations

Table 1-1 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 Discharge
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 Switch from Command Mode to 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.

Table 2-1 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 2-2 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 point, input AT+COPS? TA does not echo to the character received from TE, the results of the direct return of the command, AT command to be executed cannot be seen.
	ATE1 AT+COPS?	ATE1 OK SIGNALIND:4 AT+COPS? +COPS: 0,0,"CHINA MOBILE",7 OK	At this point, input AT+COPS? TA echoes the character received from TE, and returns the execution result of the command, and AT command to be executed can be seen.

Table 2-3 ATE Parameter

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

2.3 AT&F Restore all TA parameters to factory configuration

Table 2-4 AT&F operation command

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

Table 2-5 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

The command is used to control the functionality level.

"all functions" indicates mobile phone's function is the most powerful; "the minimum function "indicates mobile phone has the least function.

Table 2-6 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 functions of the phone to minimum, This command firstly logs off the network, then, deactivates SIM card
	AT+CFUN=1	OK	Current phone functions are all functions, This command firstly actives SIM card, then, starts the automatic network search
	AT+CFUN?	+CFUN: 1 OK	-
	AT+CFUN=?	+CFUN: (0-1,4-7),(0-1)	-

OK

Table 2-7 AT+CFUN Parameter Detailed description

Parameter	Value	Description
<fun>	0	Min. functions, set as LPM (Low Power 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 DTE character set 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 2-8 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 to 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	CSCS command parameter value list

Table 2-9 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. Convert into decimal system, i.e. 66, 98 and 99. 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 2-10 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	Set "enable result code+ CME ERROR: <err>, use verbose mode

		supported	<err> value" The reported error is "+CME ERROR: operation not supported"
	AT+CMEE?	+CMEE: 2 OK	-
	AT+CMEE=?	+CMEE: (0,1,2) OK	-

Table 2-11 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 +MGCFG Function switch control command

Table 2-12 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 patameter 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 support command
Command Example	AT+MGCFG=1	+MGCFG: 1,0 OK	Return the 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 2-13 AT+MGCFG parameter description

Parameter	Value	Description
<Mgcfg_Index>	1-3	Index value
<Mgcfg_Name>	-	Config parameter name
<Mgcfg_Param>	-	Config parameter information

Index	Name	Description	Value	
1	sim/initdelay	<Mgcfg_Param1>:SIM card initialization delay	0-100	In second value(Take effect after restart)
2	sim/hotswap	<Mgcfg_Param1>: Enable SIM card hot swap	0-1	0: Disable(Default) 1: Enable (Take effect after restart)
		<Mgcfg_Param2> : hotswap polarity	0-1	0-LOW POLARITY 1-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 feature control	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 2-14 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 2-15 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 2-16 The corresponding relationship between the bit in <report_cfg_map> and the unsolicited reporting AT command

bit3	**bit2**	**bit1**	**bit0**	
^SIMST	^MODE	^REJINFO	^SRVST	
bit7	**bit6**	**bit5**	**bit4**	Byte 1
^DSCI	$QCRMCALL	^SMMEMFULL	^CPBREADY	
bit3	**bit2**	**bit1**	**bit0**	
	^STIN	^SIMREFRESH	^SIMSLOTURC	
bit7	**bit6**	**bit5**	**bit4**	Byte 2
bit3	**bit2**	**bit1**	**bit0**	
^HCSQ	^CACELLURC	^MMINFO	^PLMN	
bit7	**bit6**	**bit5**	**bit4**	Byte 3
+TEMPLVLURC	^DSAMBR	^RRCSTAT	^LENDC	
bit3	**bit2**	**bit1**	**bit0**	
			^DSFLOWRPT	
bit7	**bit6**	**bit5**	**bit4**	Byte 4

2.9 AT+URCCFG Set the message unsolicited report port

Table 2-17 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”,”all”) OK	Query all supported urc ports

Table 2-18 AT+URCCFG parameter description

Parameter	Value	Description
<urc_port>	String type	Set the message unsolicited report port, the following values are supported： “usbat” – AT port “usbmodem” – Modem port “uart1” – uart “all” – all of the above ports

3 Module information recognition commands

3.1 ATI TA manufacturer information command

Table 3-1 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	-

3.2 AT+GMI TA manufacturer ID command

Table 3-2 AT+GMI operation command

Type	Command	Possible return results	Description
Execution Command	AT+GMI	+GMI: MEIG INCORPORATED OK	TA returns the manufacturer information
Test Command	AT+GMI=?	OK	-

3.3 AT+CGMI Manufacturer name query command

Table 3-3 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	
	AT+CGMI=?	OK	

3.4 AT+GMM TA identifier command

Table 3-4 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 among {A,B,C,I}.
Test Command	AT+GMM=?	OK	-

3.5 AT+CGMM Model query command

Table 3-5 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
	AT+CGMM=?	OK	

3.6 AT+GMR TA version information query command

Table 3-6 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	-
	AT+GMR=?	OK	-

3.7 AT+CGMR Version information query command

Table 3-7 AT+CGMR operation command

Type	Command	Possible return results	Description
Execution Command	AT+CGMR	<revision> OK	DCE returns the product hardware version information.
Test Command	AT+CGMR=?	OK	
Command Example	AT+CGMR	+CGMR: SRM815_6.0.1_EQ100 OK	
	AT+CGMR=?	OK	The current version supports this command.

3.8 AT+GSN Product IMEI number query command

Table 3-8 AT+GSN operation command

Type	Command	Possible return results	Description
Execution Command	AT+GSN	<IMEI> OK	DCE returns the IMEI number.
Test Command	AT+GSN=?	OK	-
Command Example	AT+GSN	869635010008467 OK	-
	AT+GSN=?	OK	-

3.9 AT+CGSN Product IMEI number query command

Table 3-9 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	
	AT+CGSN=?	OK	The current version supports this command.

3.10 AT+SFHW Hardware version number query command

Table 3-10 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	-Take iron tower project as an example

3.11 AT+SGSW Software version number query command

Table 3-11 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	-

3.12 AT+LCTSN IMEI number and SN number reading and modification command

Table 3-12 AT+LCTSN operation command

Type	Command	Possible return results	Description
Reading Command	AT+LCTSN=<option>,<type>	+LCTSN:<SN>/<IMEI> OK	Success
		ERROR	Return ERROR for space and time
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"	OK	
	AT+LCTSN=0,7	+LCTSN:"3520990017614823" OK	
	AT+LCTSN=1,5,"M815EA4AYA031300064"	OK	

AT+LCTSN=0,5	+LCTSN:"750MASRAS9041900040" OK

Table 3-13 AT+LCTSN parameter description

Parameter	Value	Description
<option>	0: Read	
	1: Write	
	2: Delete	
<type>	(5,7,8,9,11,13,15)	5: SN; 7: IMEI; 8: IMEISV; 9: MEID; 11: SN2; 13: SN3; 15: SN4;
<value>	Character string	SN or IMEI or IMEISV

4 Short message 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 4-1 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 4-2 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 4-3 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 4-4 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 4-5 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 4-6 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 4-7 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 4-8 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 4-9 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 4-10 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	[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))

short message command +CSCB		
<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 4-11 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>	SMS-STATUS-REPORT

		[<CR><LF> +CMGL:<index>,<stat>,<fo>,<mr>, [<ra>],[<tora>],<scts>,<dt>,<st>[...]] OK	
		+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 4-12 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)
<data>	-	SMS data content
<vp>		depending on SMS-SUBMIT <fo> setting: 3GPP TS 23.040 [3] TP-Validity-Period either in integer format (default 167) or in time-string format (refer <dt>)
<tosca>	-	3GPP TS 24.011 [6] RP SC address Type-of-Address octet in integer format (default refer <toda>)g
<sca>	-	3GPP TS 23.040 [3] TP-Recipient-Address Address-Value field
<dcs>	-	depending on the command or result code: 3GPP TS 23.038 [2] SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format

4.6 AT+CMGR Short message reading command

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

Table 4-13 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> OK	Use PDU mode(+CMGF=0) and this command is 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>, 	Use text mode (+CMGF=1) and this command is executed successfully;

		<length>]<CR><LF><data> OK	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	

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

Table 4-14 AT+CMGR 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)
<data>	-	SMS data content
<vp>		depending on SMS-SUBMIT <fo> setting: 3GPP TS 23.040 [3] TP-Validity-Period either in integer format (default 167) or in time-string format (refer <dt>)
<tosca>	-	3GPP TS 24.011 [6] RP SC address Type-of-Address octet in integer format (default refer <toda>)g
<sca>	-	3GPP TS 23.040 [3] TP-Recipient-Address Address-Value field
<dcs>	-	depending on the command or result code: 3GPP TS 23.038 [2] SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format
<cdata>	-	3GPP TS 23.040 [3] TP-Command-Data in text mode responses; ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))

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 4-15 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	

Note:

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

Table 4-16 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 03.41TPDU 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 4-17 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 4-18 basic elements of short message PDU

Element	Name	Length	Description
SCA	Service Center Address	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 Address	2-12	Originator SME address
DA	Destination Address	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 2 <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 4-19 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 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 4-20 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)
<length>	-	integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
<index>	-	integer type; value in the range of location numbers supported by the associated memory
<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 4-21 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

Table 4-22 AT+CMGD parameter description

Parameter	Value	Description
<index>	-	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 4-23 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 4-24 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 4-25 +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 4-26 +CMTI parameter description

Parameter	Value	Description
<mem>	"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
<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 4-27 +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 4-28 +CDSI parameter description

Parameter	Value	Description
<mem>	"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
<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 4-29 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=?	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=?	OK	Support this function

Table 4-30 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 4-31 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 4-32 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 4-33 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	+CMGC: 124 OK	Send a PDU short message. The received number and the sending content

	AT+CMGC=25 >0011000D916831067184 81F70008000A004800650 06C006C006F <ctrl-Z/ESC>		shall be sent after conversion by PDU coding tool, and there shall be no carriage return at the end of data.
	AT+CMGC=?	OK	

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

Table 4-34 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 03.41TPDU 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 5-1 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 5-2 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 5-3 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:2,0,2,0,15091582551,0 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 5-4 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 5-5 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 5-6 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 5-7 ^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 5-8 ^DSCI parameter description

Parameter	Description
<id>	Lin 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 5-9 ^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 Calling line identification presentation 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 5-10 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 +CLIP: "13761928888",128,,,"TEST",0 RING	13761928888 is the caller number. TEST is the name of this number in the telephone directory.
	AT+CLIP =?	+CLIP: (0-1) OK	

Table 5-11 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 address 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 5-12 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. Its indicates the deletion is successful.
	AT+CCFC=?	+CCFC: (0,1,2,3,4,5) OK	-

Table 5-13 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 class	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 5-14 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 5-15 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 5-16 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 5-17 AT+CHLD parameter description

Parameter	Value	Description
<n> Integer; equal to figure inputted in front of button SEND in section 4.5.5.1 in GSM02.30 [19]	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.
	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 5-18 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 5-19 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 6-1 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 6-2 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 6-3 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 6-4 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 6-5 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 6-6 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 6-7 AT+DTMF operation command

Type	Command	Possible return results	Description
Set Command	AT+DTMF=<n>,<DTMF_string>[,<y>] AT+DTMF	OK After DTMF character is played: +DTMF: 5	
		ERROR/+CME ERROR:<err>	
Test Command	AT+DTMF=?	+DTMF: (<duration> value list) ,(<dtmf> value list) OK	
Command Example	//Test Command AT+DTMF=?	+DTMF: (1-1000),(0-9,*,#,A-D)	

		OK
	//Play "A,B,1,2,#"play period and mute period are 200ms AT+DTMF=2,"A,B,1,2,#"	OK +DTMF: 5 OK
	//Stop playing AT+DTMF	

Table 6-8 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 6-9 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=?
	
	//Play "A,B,1,2,# "playing period and mute period are 200ms
		+TONE: (0,1),(100-4000),(0-1000),(0-1000),(0-15300000)
		
		OK	

```
AT+TONE=1,1000,200,300,300
0                                   OK

                                    +TONE: 0
//Stop playing
AT+TONE=0                           OK
```

Table 6-10 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 7-1 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 7-2 AT+CLCK 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)
	"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 7-3 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 7-4 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 PIN input 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 7-5 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 7-6 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 7-7 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 7-8 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 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 7-9 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 7-10 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 7-11 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 7-12 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> Business related to phone number	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 7-13 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 7-14 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 7-15 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 7-16 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 7-17 AT^SIMST operation command

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	
	^SIMST: 1,0		

Table 7-18 AT^SIMST parameter description

Parameter	Value	Description
<n>	0-1	0: Disable 1: Enable
<simstatus>	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 AT^CPBREADY Phonebook initialization status display

Table 7-19 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	
	主动上报	^CPBREADY: 1	

Table 7-20 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 >	0	SIM card initialization is not complete
	1	Phonebook in SIM card slot 1
	2	No supporter

7.12 AT^SIMSLOT Dual SIM switch command

It is used for slot switch and status query of Dual SIM card. The switch function needs to be customized, otherwise it will not take effect.

Table 7-21 AT^SIMSLOT operation command

Type	Command	Possible return results	Description
Set Command	AT^SIMSLOT=<slot_num>	OK	Reboot saving
Query Command	AT^SIMSLOT?	^SIMSLOT: <slot1_card_state>,<slot1_slot_state>, <slot2_card_state>,<slot2_slot_state> OK	
Test Command	AT^SIMSLOT=?	^SIMSLOT: (1-2) OK	-
Command Example	AT^SIMSLOT=1	OK	
	AT^SIMSLOT?	^SIMSLOT: 1,1,1,0 OK	

Table 7-22 AT^SIMSLOT parameter description

Parameter	Value	Description
<slot_num>	1-2	1: slot_1 2: slot_2
<slot1_card_state>	0-1	0:Absent 1:Present
<slot1_slot_state>	0-1	0:INACTIVE 1:ACTIVE
<slot2_card_state>	0-1	0:Absent 1:Present
<slot2_slot_state>	0-1	0:INACTIVE 1:ACTIVE

7.13 AT^SIMSLOTURC SIMSLOT reporting function

It is used for modem to actively report dual card status.

The active report is controlled by its own setting command, which can be turned on or off, and is turned off by default.

Table 7-23 AT^SIMSLOTURC operation command

Type	Command	Possible return results	Description
Report Command		^SIMSLOTURC: <slot_num>,<card_state>,<slot_state>	
Set Command	AT^SIMSLOTURC=<n>	OK	Reboot saving
Query Command	AT^SIMSLOTURC?	^SIMSLOTURC: <n> OK	
Test Command	AT^SIMSLOTURC=?	^SIMSLOTURC: (0-1) OK	-
Command Example	AT^SIMSLOTURC=1	OK	
	AT^SIMSLOTURC?	^SIMSLOTURC: 1 OK	
	AT^SIMSLOTURC=?	^SIMSLOTURC: (0-1)	

OK

Table 7-24 AT^SIMSLOTURC parameter description

Parameter	Value	Description
<enable>	0-1	0: Disable（Default value） 1: Enable
<slot_num>	1-2	1: slot_1 2: slot_2
<card_state>	0-1	0:Absent 1:Present
<slot_state>	0-1	0:INACTIVE 1:ACTIVE

7.14 ^SMMEMFULL SMS memory full report

Table 118 ^SMMEMFULL operation command

Type	Command	Possible return results	Description
Report Command	^SMMEMFULL	^SMMEMFULL: <mem>	Sms memory full report
Command Example	AT^CURCEX=2,FF		Enable sms memory full reoprt
	^SMMEMFULL: "SM"		SIM full report
	AT^CURCEX=2,DF		Disable sms memory full report

Table 119 ^SMMEMFULL parameter description

Parameter	Value	Description
<mem>	“ME”	“ME”: sms is stored in ME
	“SM”	“SM”: sms is stored in SIM

7.15 AT^SIMREFRESH SIM Refresh active report

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 7-25 AT^SIMREFRESH operation command

Type	Command	Possible return results	Description
Report Command	-	^SIMREFRESH: <n>	
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 7-26 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

AT+C5GREG 5G 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 ＋C5GREG, i.e. report of +C5GREG:<stat>.

If <n>=2 and the registered cell changes, +C5GREG: <stat>[,<lac>,<ci>] ,[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]]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 <AcT>, <tac>, <ci>, <Allowed_NSSAI_length> and <Allowed_NSSAI>will be returned.

Table 7-27 AT+C5GREG operation command

Type	Command	Possible return results	Decription
Execution Command	AT+C5GREG=[<n>]	OK	Success
		ERROR/+CME ERROR:<err>	Fail
Query Command	AT+C5GREG?	+C5GREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]] OK	-
Test Command	AT+CEREG=?	+C5GREG: (<n> value list) OK	-
Command Example	AT+C5GREG=1	OK	
	AT+C5GREG?	+C5GREG: 2,1,"91D5","90C3301",11,1,”01” OK	-
		+C5GREG: 1,1 OK	-
	AT+C5GREG=?	+C5GREG: (0-2) OK	-

Table 7-28 AT+C5GREGoperation command parameter description

Parameter	Value	Description
<n>	[0]	Disable the network registration non-request result code+C5GREG:
	1	Enable the network registration non-request result code+C5GREG:<stat>
	2	Enable the network registration and position information non-request result code +C5GREG: <stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]]
<stat>	0	Not registered; ME doesn't search the new operator of registration business
	1	Registered, home network
	2	Not registered; ME is searching the new operator of registration business
	3	Registration rejected
	4	Unknown
	5	Registered, roaming
<tac>	-	String type; three byte tracking area code in hexadecimal format (e.g. "0000C3" equals 195 in decimal).
<ci>	-	String type; five byte NR cell ID in hexadecimal format.
<AcT>		Integer type; indicates the access technology of the serving cell.
	10	E-UTRA connected to a 5GCN (see NOTE 7)
	11	NR connected to a 5GCN (see NOTE 7) NOTE 7:3GPP TS 38.331 [160] specifies the information which, if present, indicates that the serving cell is connected to a 5GCN.
<Allowed_NSSAI_-length>	-	integer type; indicates the number of octets of the <Allowed_NSSAI> information element.
<Allowed_NSSAI>	-	string type in hexadecimal format. Dependent of the form, the string can be separated by dot(s), semicolon(s) and colon(s). This parameter indicates the list of allowed S-NSSAIs received from the network. The <Allowed_NSSAI> is coded as a list of <S-NSSAI>s separated by colons.

7.16 AT^STSF–Command for Configuring the STK Interface

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

Table 7-29 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> <CR><LF>OK<CR><LF>	0: Disable the STK interface function (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 7-30 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>	-	This parameter includes the coding of TERMINAL PROFILE. It is the list of STK functions supported by the UE (not supported currently).
<Timeout>	-	<Timeout>: this parameter includes the time for a user to respond to a proactive command (not supported currently).

7.17 ^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 7-31 ^STIN operation command

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

Table 7-32 ^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

7.18 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 7-33 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 3c0d00000005340540000000000001016100000000000006001450030250030301000000a9855014964002833788902000 10a40080d060e044d503150,0000,0c11550101102010	Send SMS

	AT^STGI=17	^STGI: 17,12,040a5669766f204368697000 ^STGI: 3,12,041450726f6d6f636f65732065205061636f74657300 ^STGI: 6,12,04094d657520566976 6f00 ^STGI: 9,12,040e526564657320536f636961697300 ^STGI: 12,12,04104e6f746963696173206520496e666f00 ^STGI: 15,12,04114d75736963617320652056696 4656f7300 ^STGI: 19,12,04144a6f676f7320652041706c6963617469766f7300 ^STGI: 22,12,0410496e746572617469766964616 4657300 ^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 7-34 AT^STGI parameter description

CmdType	Description	Response
1	Display Text	<CR><LF>^STGI: <CmdType>,<TextInfo>,<TextCode>,<ClearMode>[,<Duration Time>]<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>[,<HelpInfo>,<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>[,<HelpInfo>,<NextActionId>] <CR><LF> <CR><LF>^STGI: <Id2>,<NbItems>,<Alpha Id2Label>[,<HelpInfo>,<NextActionId>]<CR> ..... <CR><LF>OK<CR><LF>

Table 7-35 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

<table>
<tr><td></td><td></td><td>8: UCS2 coding</td></tr>
<tr><td></td><td><icon></td><td>indicates the icon information.</td></tr>
<tr><td rowspan="6">11
Select Item</td><td><NbItems></td><td>It is consistent with the <NbItems> in the STIN notification.</td></tr>
<tr><td><Alpha Identifier menu></td><td>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.</td></tr>
<tr><td><Idx></td><td>(1–255) Identifier items</td></tr>
<tr><td><NbItems></td><td>(1–255) Indicates the number of the menu items.</td></tr>
<tr><td><Alpha Idx Label></td><td>Indicates the alpha identifier label of the menu option, that is, the name of the menu option.</td></tr>
<tr><td><Help Info></td><td>0: The help information is unavailable.
1: The help information is available.</td></tr>
<tr><td><NextActionId></td><td>It includes a proactive command Identifier.</td></tr>
<tr><td rowspan="3">12
Send Short Message</td><td><TPDUInfo></td><td>The TPDU is formatted as described in TS23.040[6].
Format is as follows：<table><tr><td>Description</td><td>Length</td></tr><tr><td>Length (X)</td><td>Y</td></tr><tr><td>SMS TPDU</td><td>X</td></tr></table></td></tr>
<tr><td><Alpha Info></td><td></td></tr>
<tr><td><Address Info></td><td>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.<table><tr><td>Description</td><td>Length</td></tr><tr><td>Length (X)</td><td>Y</td></tr></table></td></tr>
</table>

		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.	

7.19 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 7-36 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 7-37 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. 2: The help information required by the user. 3: Return to the upper level menu.	Indicates that includes the item ID of the menu that user selected. Notes: When < Data_ItemID > Indicates the Item ID which is

	4: "Select Item" reported by SIM card is supported by MT.	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.

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>].

Read the command to return to current registration state <stat>, 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 8-1 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 the network registration non-request result code”
		+CREG: 1,1 OK	Set the query result of "enable the network registration non-request result code+CREG: <stat>"
	AT+CREG=?	+CREG:(0-2) OK	-

Table 8-2 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 +CGREG GPRS network registration status

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

network cell in GERAN/UTRAN. The parameters <AcT>, <lac>, <rac> and <ci> are provided only if available.

Table 8-3 AT+CGREG parameter description

Type	Command	Possible return results	Description
Execution Command	AT+CGREG=[<n>]	OK	Success
		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 8-4 AT+CGREG parameter description

Parameter	Value	Description
<n>	[0]	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code +CGREG: <stat>
	2	Enable network registration and location information unsolicited result code +CGREG: <stat>[,<[lac>,]<[ci>],[<AcT>],[<rac>]]
<stat>	0	not registered, MT is not currently searching an operator to register to
	1	Registered, local network
	2	Not registered; ME is searching the new operator of registration business
	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
<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 8-5 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 Example	AT+CEREG=1	OK	
	AT+CEREG?	+CEREG: 2,1,"91D5","90C3301",7 OK	-
		+CEREG: 1,1 OK	-
	AT+CEREG=?	+CEREG: (0-2) OK	-

Table 8-6 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:
	2	Enable the network registration and position information non-request result code+CEREG:<stat>[,<lac>,<ci>],[<AcT>]]
<stat>	0	Not registered; ME doesn't search the new operator of registration business
	1	Registered, home network
	2	Not registered; ME is searching the new operator of registration business
	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>	7	E-UTRAN
	9	E-UTRAN (NB-S1 mode) (see NOTE 6) NOTE 6:3GPP TS 36.331 [86] specifies the System Information blocks

	which give the information about whether the serving cell supports NB-IoT, which corresponds to E-UTRAN (NB-S1 mode).
13	E-UTRA-NR dual connectivity (see NOTE 8) NOTE 8: 3GPP TS 38.331 [160] specifies the information which, if present, indicates that the serving cell is supporting dual connectivity of E-UTRA with NR and is connected to an EPS core.

8.4 AT+C5GREG 5G network registration status command

The set command controls the display of some unsolicited result codes regarding the 5G registration status.

When <n>=1 and the 5G registration status of the MT changes, this command set controls the unrequested result code +C5GREG, there will be a report of +C5GREG:<stat>..

When <n>=2 and the registered cell changes, there will be a report of +C5GREG: <stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]].

The display form of the result code returned by the query command is <n> and a parameter <stat> that can indicate the MT network registration status.

Note:
Only when <n>=2 and the MT is registered in the network, the location information elements: <AcT>, <tac>, <ci>, <Allowed_NSSAI_length> and <Allowed_NSSAI> are returned.

Table 8-7 AT+C5GREG operation command

Type	Command	Possible return results	Description
Execution Command	AT+C5GREG=[<n>]	OK	Success
		ERROR/+CME ERROR:<err>	Fail
Query Command	AT+C5GREG?	+C5GREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]] OK	-
Test Command	AT+CEREG=?	+C5GREG: (<n> value list) OK	-
Command Example	AT+C5GREG=1	OK	
	AT+C5GREG?	+C5GREG: 2,1,"91D5","90C3301",11,1,”01” OK	-
		+C5GREG: 1,1 OK	-
	AT+C5GREG=?	+C5GREG: (0-2) OK	-

Table 8-8 AT+C5GREG operation command parameter description

Parameter	Value	Description
<n>	[0]	Disable network registration unsolicited result code +C5GREG:
	1	Enable network registration unsolicited result code +C5GREG: <stat>
	2	Enable network registration and location information unsolicited result code: +C5GREG: <stat>[,[<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]]
<stat>	0	Unregistered; ME currently has no new operators searching for registered services
	1	Registered, local network
	2	Not registered, but ME is searching for new operators to registered services
	3	Registration rejected
	4	Unknown
	5	Registered, roaming
<tac>	-	String type; location area code in three-byte hexadecimal format (for example, "0000C3" is equal to decimal 195).
<ci>	-	String type; NR cell number in five-byte hexadecimal format
<AcT>		Access technology of serving cell
	10	E-UTRA connects to 5GCN (see NOTE 7)
	11	NR connects to 5GCN (see NOTE 7) NOTE 7: 3GPP TS 38.331 [160] specifies the information (if any) indicating that the serving cell is connected to 5GCN
<Allowed_NSSAI_-length>	-	<Allowed_NSSAI_-length>: Integer type; Represents the number of octets of the information element.
<Allowed_NSSAI>	-	<Allowed_NSSAI>: the string type in hexadecimal format. According to the form, strings can be separated by dots, semicolons, and colons. This parameter represents the list of allowed S-NSSAIs received from the network. <Allowed NSSAI> is encoded as a colon-separated <S-NSSAI> list.

8.5 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 8-9 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>[,<value5>]]]]] 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 8-10 AT^HCSQ active report operation command

Type	Command	Possible return results	Description
Report Command	^HCSQ: <sysmode>[,<value1>[,<value2>[,<value3>[,<value4>[,<value5>]]]]]		-
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 8-11 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
	"NR5G"	SA/NSA mode

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

Table 8-12 AT^HCSQ parameter description

<sysmode>	value1	value2	value3	value4	value5	value6	value7	Description
"NOSERVICE"	-	-	-	-				
"GSM"	rxlev	ber	-	-				
"WCDMA"	rxlev	ecio	rscp	ber				
"LTE"	rxlev	rsrq	rsrp	snr				
"NR5G"	lte_rxlev	lte_rsrq	lte_rsrp	lte_snr	nr5g_rsrq	nr5g_rsrp	nr5g_snr	NSA
	nr5g_rsrq	nr5g_rsrp	nr5g_snr					SA

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

<nr5g_rsrq>: integer type, reference signal received quality (see3GPP TS 38.133 V15.9.0 subclause 10.1.11.1).

0	nr5g_rsrq<-43
1	-43≤ nr5g_rsrq<-42.5
2	-42.5≤ nr5g_rsrq<-42
3	-42≤ nr5g_rsrq<-41.5
4	-41.5≤ nr5g_rsrq<-41
..	..
122	17.5≤ nr5g_rsrq<18
123	18≤ nr5g_rsrq<18.5
124	18.5≤ nr5g_rsrq<19
125	19≤ nr5g_rsrq<19.5
126	19.5≤ nr5g_rsrq<20
127	20 ≤ nr5g_rsrq
Invalid	“-”

<nr5g_rsrp>: integer type, reference signal received power (see3GPP TS 38.133 V15.9.0 subclause 10.1.6).

0	nr5g_rsrp<-156
1	-156≤ nr5g_rsrp<-155
2	-155≤ nr5g_rsrp<-154
3	-154≤ nr5g_rsrp<-153
4	-153≤ nr5g_rsrp<-152
5	-152≤ nr5g_rsrp<-151
6	-151≤ nr5g_rsrp<-150
7	-150≤ nr5g_rsrp<-149
8	-149≤ nr5g_rsrp<-148

9	-148≤ nr5g_rsrp<-147
10	-147≤ nr5g_rsrp<-146
11	-146≤ nr5g_rsrp<-145
12	-145≤ nr5g_rsrp<-144
13	-144≤ nr5g_rsrp<-143
14	-143≤ nr5g_rsrp<-142
15	-142≤ nr5g_rsrp<-141
16	-141≤ nr5g_rsrp<-140
17	-140≤ nr5g_rsrp<-139
18	-139≤ nr5g_rsrp<-138
…	…
111	-46≤ nr5g_rsrp<-45
112	-45≤ nr5g_rsrp<-44
113	-44≤ nr5g_rsrp<-43
114	-43≤ nr5g_rsrp<-42
115	-42≤ nr5g_rsrp<-41
116	-41≤ nr5g_rsrp<-40
117	-40≤ nr5g_rsrp<-39
118	-39≤ nr5g_rsrp<-38
119	-38≤ nr5g_rsrp<-37
120	-37≤ nr5g_rsrp<-36
121	-36≤ nr5g_rsrp<-35
122	-35≤ nr5g_rsrp<-34
123	-34≤ nr5g_rsrp<-33
124	-33≤ nr5g_rsrp<-32

125	-32≤ nr5g_rsrp<-31
126	-31≤ nr5g_rsrp
Invalid	“-”

<nr5g_snr>: integer type, representing the signal-to-interference plus noise ratio, suitable for nr5g mode.

0	nr5g_snr<-23	dB
1	-23≤ nr5g_snr<-22.5	dB
2	-22.5≤ nr5g_snr<-22	dB
3	-22≤ nr5g_snr<-21.5	dB
4	-21.5≤ nr5g_snr<-21	dB
..	..	…
123	38≤ nr5g_snr<38.5	dB
124	38.5≤ nr5g_snr<39	dB
125	39≤ nr5g_snr<39.5	dB
126	39.5≤ nr5g_snr<40	dB
127	40≤ nr5g_snr	dB
Invalid	“-”	

8.6 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 8-13 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 Example	AT+COPS=0,0	OK	
	AT+COPS? Corresponding <oper> after setting different <format> Operator name rule: plmn name + spn(if exist)	+COPS: 0,0,"CHINA MOBILE CMCC",7 OK	User long character to represent the current network operator
		+COPS: 0,1,"CMCC CMCC",7 OK	User short character to represent the current

			network operator
		+COPS: 0,2,"46000",7 OK	User digit to represent the current network operator
	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 8-14 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).
	10	E-UTRA connected to a 5GCN (see NOTE 5) (not applicable) Note: information specified by 3GPP TS 38.331[160]; if the information exists, it represents that the service cell is connected to 5G CN.
	11	NR connected to a 5GCN (see NOTE 5) (not applicable) Note: information specified by 3GPP TS 38.331[160]; if the information exists, it represents that the service cell is connected to 5G CN.
	12	NG-RAN Note: 5G wireless connection network
	13	E-UTRA-NR dual connectivity (see NOTE 6) Note: information specified by 3GPP TS 38.331[160]; if the information exists, it represents that the service cell supports the double connection between E-UTRA and NR, and connects to EPS core.

8.7 AT+CSQ Signal quality AT command

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

Table 8-15 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 8-16 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

8.8 AT^SPN EF-SPN information display

Table 8-17 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 8-18 AT^SPN parameter description

Type	Command	Possible return results
<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”

8.9 ^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 8-19 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 8-20 ^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 8-21 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 8-22 ^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
12	NR5G SA mode	82	5G SA
13	NR5G NSA mode	81	5G ENDC

8.10 AT^CELLINFO LTE adjacent cell information query enabling command

Note:
Neighbour cell in LTE mode, when <idle_mode> is 0, Except for <last_idle_search_timestamp> and <last_idle_meas_timestamp>, behind < idle_mode >, everything else is invalid. Only when <idle_mode> is 1, the parameters are valid.

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 8-23 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> 5g EN-DC: <CR><LF>^CELLINFO:<curr_mode>,<pcell_duplex_mode>,<mcc>,<mnc>,<pcell_global_cell_id>,<pcell_physical_cell_id>,<pcell_eNBID>,<pcell_cell_id>,<pcell_tac_id>,<pcell_band>,<pcell_bandwidth	The same to +sgcellinfoex function

		>,<pcell_dl_channel>,<pcell_ul_channel>,<pcell_rssi>,<pcell_rsrp>,<pcell_rsrq>,<pcell_sinr>,<pcell_snr>,<pcell_ue_category>,<pcell_pathloss>,<pcell_cqi>,<pcell_tx_power>,<pcell_tm>,<pcell_qci>,<pcell_volte>,<pcell_ims_sms>,<sib2_plmn_r15_info_present>,<sib2_upr_layer_ind>,<restrict_dcnr >,<pscell_rsrp>,<pscell_rsrq>,<pscell_sinr>,<pscell_band>,<pscell_freq>,<pscell_bandwidth>,<pscell_pci>,<pscell_scs><CR><LF><CR><LF>OK<CR><LF> 5G SA mode： <CR><LF>^CELLINFO:<curr_mode>,<duplex_mode>,<mcc>,<mnc>,<nr_cell_id>,<physical_cell_id>,<tac_id>,<band>,<bandwidth>,<sub_carrier_spacing>,<fr_type>,<dl_channel>,<ul_channel>,<rssi>,<rsrp>,<rsrq>,<sinr>,<vonr><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>,<channel>,<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_rese l_priority>,<thresh_gsm_high>,<thresh_gsm_low>, <ncc_permitted>… … OK WCDMA MODE: ^CELLINFO: "intra","WCDMA",<uarfcn>,<s_intra_search>,<s_in ter_search>,<s_search_RAT>,<rxagc>,<psc>,<rsc p>,<ecio>,<set>,<rank> … "inter","WCDMA",<uarfcn>,<s_intra_search>,<s_in ter_search>,<s_search_RAT>,<rxagc>,<psc>,<rsc p>,<ecio>,<set>,<rank> … "irat","LTE",<earfcn>,<s_intra_search>,<s_inter_s earch>,<s_search_RAT>,<priority>,<pcid>,<rsrp>, <rsrq>,<s_rxlev> … "irat","GSM",<arfcn>,<s_intra_search>,<s_inter_se arch>,<s_search_RAT>,<bsic>,<rssi>,<rank>,<s_r xlev> … 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>,<fr eq>,<dl_bandwidth>,<band>,<pci>,<rsrq>,<rsrp>, <rssi>,<sinr> ^CELLINFO: “SCC”,<ul_configured>,<scell_state>,<scc_id>,<fr eq>,<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> 5g EN-DC 下的 5g 信号参数: ^CELLINFO: "curr_mode","pscell_tx_info",<tx_is_in_traffic>,<tx_power>,<prach>,<pucch>,<pusch>,<srs>,<pa_gain_state> ^CELLINFO: "curr_mode","pscell_chain_1",<is radio_tuned>,<rx_power>,<ecio>,<rsrp>,<sinr >,<phase> ^CELLINFO: "curr_mode","pscell_chain_2",<is radio_tuned>,<rx_power>,<ecio>,<rsrp>,<sinr >,<phase> ^CELLINFO: "curr_mode","pscell_chain_3",<is radio_tuned>,<rx_power>,<ecio>,<rsrp>,<sinr >,<phase> ^CELLINFO: "curr_mode","pscell_chain_4",<is radio_tuned>,<rx_power>,<ecio>,<rsrp>,<sinr >,<phase> ^CELLINFO: "curr_mode","pscell_layer_1",<uplink>,<downlink> ^CELLINFO:

	"curr_mode","pscell_layer_2",<uplink>,<downlink> ^CELLINFO: "curr_mode","pscell_layer_3",<uplink>,<downlink> ^CELLINFO: "curr_mode","pscell_layer_4",<uplink>,<downlink>

Table 8-24 AT^CELLINFO parameter description

Parameter	Description
<MODE>	1: Service cell information 2: Neighbour cell information 3: CA cell information 4: Antenna classification information
<earfcn>	LTE earfcn info
<pcid>	LTE physical cell id
<rsrq>	LTE Reference Signal Receiving Quality
<rsrp>	LTE Reference Signal Receiving Power
<rssi>	Received Signal Strength Indication
<sinr>	Signal to Interference plus Noise Ratio. Neighbour cell could not get sinr , so show'-'.
<idle_mode>	Idle mode, if on idle mode, except for <last_idle_search_timestamp> and <last_idle_meas_timestamp>, behind < idle_mode >, everything else is invalid..
<srxlev>	Suitable receive level
<squal>	Difference between the Ec/No level measured by the UE and the minimum Ec/No level specified in the SIB (Q_qualmin)
<rank>	Rank of the cell
<cell_resel_priority>	Priority for the serving frequency
<s_non_intra_search>	Threshold to control non-intrafrequency searches
<thresh_serving_low>	Serving frequency threshold is low.
<thresh_serving_low>	service cell re-selection low threshold
<threshX_low>	To be considered for reselection, the suitable receive level value of an evaluated lower priority cell must be greater than this value.
<threshX_high>	To be considered for reselection, the suitable receive level value of an evaluated higher priority cell must be greater than this value

<s_intra_search>	Current cell threshold the measurement must fall below to consider intrafrequency for reselection
<Q_rxlevmin>	Minimum reference signal received power level for camping (intrafrequency)
<Q_qualmin>	Minimum Ec/No level specified in the SIB for intrafrequency
<last_idle_search_timestamp>	Time of last search
<last_idle_meas_timestamp>	Time of last measurement
<uarfcn>	WCDMA earfcn information
<psc>	WCDMA Primary scrambling code
<rscp>	WCDMA Receive Signal Channel Power
<ecno>	Carrier to noise ratio in dB = measured Ec/Io value in dB
<s_inter_search>	Cell selection parameter for the interfrequency cell
<s_search_RAT>	Cell selection parameter for the GSM cell
<rxagc>	Receiver automatic gain control on the interfrequency neighbor
<ecio>	Receiver automatic gain control on the camped frequency
<arfcn>	GSM arfcn information
<band_1900>	TRUE and the cell is in the overlapping region -- 1900 band FALSE -- 1800 band
<cell_id_valid>	Indicates whether the BSIC ID is valid
<bsic_id>	Base station identity code ID
<set>	Interfrequency cell type
<thresh_gsm_high>	Reselection threshold for high priority layers
<thresh_gsm_low>	Reselection threshold for low priority layers
<ncc_permitted>	Bitmask that specifies whether a neighbor with a particular network color code is to be reported. Bit n set to 1 means that a neighbor with NCC n is to be included in the report. This flag is synonymous with a blacklist in other RATs
<bsic>	Base station identity 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
pcell_bandwidth	LTE bandwidth in EN-DC mode, the AT result value is 5 times of the real bandwidth. For example: AT result 6 is 1.4MHz, ATresult 100 is 20MHz
pscell_bandwidth	5G bandwidth in EN-DC mode.
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
restrict_dcnr	Indicate whether to restrict NR add, 0-unrestricted; 1-restricted
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

8.11 AT+SGCELLINFOEX Cell information extended query command

Table 8-25 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:7:0 TX_POWER:3 TM:1 QCI:- VOLTE:1 IMS_SMS:1 SIB2_PLMN_R15_INFO_PRESENT:1 SIB2_UPR_LAYER_IND:1 RESTRICT_DCNR:0	

```
OK
5g EN-DC:
at+sgcellinfoex?
+SGCELLINFOEX:
CURR_MODE:EN-DC
PCELL DUPLEX MODE:FDD LTE
MCC:460
MNC:00
PCELL GLOBAL CELL ID:165891187
PCELL PHYSICAL_CELL_ID:343
PCELL eNBID:648012
PCELL CELL_ID:115
PCELL TAC_ID:37107
PCELL BAND:3
PCELL BANDWIDTH:100
PCELL DL CHANNEL:1300
PCELL UL CHANNEL:19300
PCELL RSSI:-62
PCELL RSRP:-90
PCELL RSRQ:-8
PCELL SINR:150
PCELL SNR:10
PCELL UE_category:16
PCELL PATHLOSS:255
PCELL CQI:-
PCELL TX_POWER:-10
PCELL TM:3
PCELL QCI:-
PCELL VOLTE:1
PCELL IMS_SMS:1
SIB2_PLMN_R15_INFO_PRESENT:1
SIB2_UPR_LAYER_IND:1
RESTRICT_DCNR:0
PSCELL RSRP:-96
PSCELL RSRQ:-12
PSCELL SINR:89
PSCELL BAND:41
PSCELL FREQ:504990
PSCELL BANDWIDTH:100
PSCELL PCI:409
PSCELL SCS:30

OK

5G SA mode:
at+sgcellinfoex
+SGCELLINFOEX:
CURR_MODE:5G
```

	DUPLEX MODE:TDD NR5G MCC:001 MNC:01 NR CELL ID:0 PHYSICAL_CELL_ID:0 TAC_ID:0052 BAND:78 BANDWIDTH:100 SUB_CARRIER_SPACING:30 FR_TYPE:0 DL CHANNEL:647040 UL CHANNEL:647040 RSSI:-125 RSRP:-83 RSRQ:-12 SINR:175 VONR:- 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	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 >
AT+SGCELLINFOEX	<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,-1,16,255,7:0,-,3,-,1,1,0,0,0 OK 5g EN-DC: <CR><LF>+SGCELLINFOEX:<curr_mode>,<pcell_duplex_mode>,<mcc>,<mnc>,<pcell_global_cell_id>,<pcell_physical_cell_id>,<pcell_eNBID>,<pcell_cell_id>,<pcell_tac_id>,<pcell_band>,<pcell_bandwidth>,<pcell_dl_channel>,<pcell_ul_channel>,<pcell_rssi>,<pcell_rsrp>,<pcell_rsrq>,<pcell_sinr>,<pcell_snr>,<pcell_ue_category>,<pcell_pathloss>,<pcell_cqi>,<pcell_tx_power>,<pcell_tm>,<pcell_qci>,<pcell_volte>,<pcell_ims_sms>,<sib2_plmn_r15_info_present>,<sib2_upr_layer_ind>,<restrict_dcnr >,<pscell_rsrp>,<pscell_rsrq>,<pscell_sinr>,<pscell_band>,<pscell_freq>,<pscell_bandwidth>,<pscell_pci>,<pscell_scs><CR><LF><CR><LF>OK<CR><LF> Example: at+sgcellinfoex +SGCELLINFOEX:EN-DC,FDD LTE,460,11,38848275,141 ,151751,19,9537,5,25,2452,20452,-71,-99,-15,93,-1,16,255,-,-,3,-,1,1,1,1,0,-96,-12,89,41,504990,100,409,30 OK 5G SA mode: <CR><LF>+SGCELLINFOEX:<curr_mode>,<duplex_mode>,<mcc>,<mnc>,<nr_cell_id>,<physical_cell_id>,<tac_id>,<band>,<bandwidth>,<sub_carrier_spacing>,<fr_type>,<dl_channel>,<ul_channel>,<rssi>,<rsrp>,<rsrq>,<sinr>,<vonr><CR><LF><CR><LF>OK<CR><LF> Example: at+sgcellinfoex +SGCELLINFOEX:5G,TDD NR5G,001,01,0,0,0052

		,78,100,30,0,647040,647040,-125,-83,-12,1 75,- OK WCDMA mode: <CR><LF>+SGCELLINFOEX:<curr_mode> ,<mcc>,<mnc>,<global_cell_id>,<psc>,<No deB>,<cell_id>,<lac_id>,<band>,<dl_chann el>,<ul_channel>,<rssi>,<ecio>,<sir>,<rscp ><CR><LF><CR><LF>OK<CR><LF> Example: at+sgcellinfoex +SGCELLINFOEX:WCDMA,460,01,203244 337,483,3101,17201, ,47901,1,10663,9713,-53,-3,255,-55 OK GSM mode（current version not support） <CR><LF>+SGCELLINFOEX:<curr_mode> ,<mcc>,<mnc>,<global_cell_id>,<lac_id>,<c hannel>,<band>,<rssi>,<bsic><CR><LF>< CR><LF>OK<CR><LF>	
Test Command	AT+SGCELLINFO=?	OK	Success

Table 8-26 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" NSA's ENDC service："EN-DC" SA's 5G service："5G" EVDO service："EVDO" 1xEVDO service："HYBRID" 1xLTE service："1XLTE"
DUPLEX MODE	FDD LTE or TDD LTE	LTE duplex mode
PCELL DUPLEX MODE	-	ENDC primary cell 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
PCELL GLOBAL CELL ID	Decimal value	Primary cell GCI value in EN-DC mode
eNBID	Decimal value	Base station identifier (eNodeB-ID)
PCELL eNBID	Decimal value	Primary cell base station identifier in EN-DC mode (eNodeB-ID)
CELL_ID	Decimal value	Cell ID
PCELL CELL_ID	Decimal value	Primary cell ID in EN-DC mode
PHYSICAL_CELL_ID	Decimal value	LTE physical cell ID
PCELL PHYSICAL_CELL_ID	Decimal value	Primary cell physical cell ID in EN-DC mode
TAC_ID	Decimal value	Track Area Code, position area code
PCELL TAC_ID	Decimal value	Primary cell position area code in EN-DC mode
BAND	-	Frequency band
PCELL BAND	-	Primary cell frequency band in EN-DC mode
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
BANDWIDTH	-	SA registered bandwidth
PCELL BANDWIDTH	-	Primary cell LTE registered bandwidth in EN-DC mode. The AT result value is 5 times of the real bandwidth. For example: AT result 6 is 1.4MHz, ATresult 100 is 20MHz
PSCELL BAND	-	5G cell's band in EN-DC mode
PSCELL FREQ	-	5G cell's frequency in EN-DC mode
PSCELL BANDWIDTH	-	5G cell's bandwidth in EN-DC mode
PSCELL PCI	-	5G cell's physical cell id in EN-DC mode
PSCELL SCS	-	5G cell's Sub-Carrier Spacing in EN-DC mode

DL CHANNEL	-	Downlink channel
PCELL DL CHANNEL		Primary cell LTE downlink channel in EN-DC mode
UL CHANNEL:	-	Uplink channel
PCELL UL CHANNEL:		Primary cell LTE uplink channel in EN-DC mode
RSSI	-120.0dBm~0dBm	Received signal strength
PCELL RSSI	-	Strength of signal received by primary cell in ENDC
RSRP	-44dBm~-140dBm	LTE reference signal receiving power
PCELL RSRP	-	Primary cell LTE reference signal receiving power in ENDC
RSRQ	-20.0dB~-3.0dB	LTE reference signal receiving quality
PCELL RSRQ	-	Primary cell LTE reference signal receiving quality in ENDC
SINR	-	Signal to interference plus noise ratio. Company: 1/10 dBm
PCELL SINR		Primary cell signal to interference plus noise ratio in ENDC. Company: 1/10 dBm
UE CATEORY	-	LTE carrier frequency
PCELL UE CATEORY		Primary cell LTE carrier frequency in ENDC
PATHLOSS	-	Path loss in connection mode(Not supported at the moment, 255 is an invalid value)
PCELL PATHLOSS		Primary cell path loss in connection mode in ENDC. (Not supported at the moment, 255 is an invalid value)
SNR	-	Signal to noise ratio. SNR=(SINR*2-200)/10
PCELL SNR		Primary cell signal to noise ratio in ENDC
CQI	0~15	Channel quality indication(Currently only LTE is supported). CQI is represented by two codewords as CQI0: CQI1
PCELL CQI	Not realized, reserved	Primary cell channel quality indication in ENDC
TX_POWER	-	Maximum transmission power in UL channel. Company: 1/10 dBm
PCELL TX_POWER		Primary cell UL channel maximum transmission power in ENDC. Company: 1/10 dBm
TM		Antenna transmission mode

PCELL TM		Primary cell antenna transmission mode in ENDC
QCI	Not realized, reserved	Qos class identifier in LTE
PCELL QCI	Not realized, reserved	Primary cell LTE Qos class identifier in ENDC
VOLTE	0~1	volte (0: not support, 1: support)
PCELL VOLTE	0~1	Volte (0: not support, 1: support)
IMS_SMS	0~1	ims short message (0: not support, 1: support)
PCELL IMS_SMS	0~1	ims short message (0: not support, 1: support)
SIB2_PLMN_R15_INFO_PRESENT	0~1	Currently registered PLMN supports EN-DC mode (0: not support, 1: support)
SIB2_UPR_LAYER_IND	0~1	Current cell supports EN-DC mode (0: not support, 1: support)
PSCELL RSRP	-31dBm~-156dBm	5g reference signal receiving power in EN-DC
PSCELL RSRQ	-20.0dB~-3.0dB	5g reference signal receiving quality in EN-DC
PSCELL SINR	-	5g signal to interference plus noise ratio in ENDC
NR CELL ID	Decimal value	NCI in 5G mode
SUB_CARRIER_SPACING	-	Sub-carrier wave spacing
FR_TYPE	0~1	Frequency band classification 0: sub6G; 1: mm wave
VONR	Not realized, reserved	Voice function in 5G
NodeB_ID	-	Base station identifier
SIR	-	Signal to interference ratio
RSCP	-	Signal coverage strength
PSC	-	Primary scrambling code
ECIO	-	Signal quality
-		Invalid parameter
RESTRICT_DCNR	-	Indicate whether to restrict NR add, 0-unrestricted; 1-restricted
UE_CATEGORY	-	UE category

8.12 AT^SYSCFGEX Extension setting system configuration command

Table 8-27 AT^SYSCFGEX operation command

Type	Command	Possible return results	Description
Set Command	AT^SYSCFGEX=<acqorder>[,<band>[,<roam>[,<srvdomain>[,<lteband 1-64bit>,<lteband 65-128bit>[,<nr5gband1-64bit>,<nr5gband65-512bit>[,<change_duration>]]]]]]	OK or +CME ERROR: <err>	Accoding to the need of parameter setting,only set the pararmeters needed to be modified,not modified parameters is omitted by comma or not carried <nr5gband65-512bit> check parameter description
Query Command	AT^SYSCFGEX?	^SYSCFGEX: <acqorder>,<band>,<roam>,<srvdomain>,<lteband1-64bit>,<lteband 65-128bit>,<nr5gband1-64bit>,<nr5gband65-512bit>,<change_duration> OK	
Test Command	at^syscfgex=?	^SYSCFGEX: ("00","02","03","04","99"),("GU bands"),(0-4),(0-3),("LTE 1-64bit bands"),("LTE 65-128bit bands"),("NR5G 1-64bit bands"),("NR5G 65-512bit bands"),(0-1) OK	
Command Example	at^syscfgex="03" at^syscfgex="00",200000D400000,1,2,1E200000084,0,10000000000,4000,1	OK OK	
	at^syscfgex?	^SYSCFGEX: "00",200000D400000,1,2,1E200000084,0,10000000000,0	

	,1 OK	
at^syscfgex="00",400000,0,2,4,0,10000000000,0,1	OK	
at^syscfgex?	^SYSCFGEX: "00",400000,0,2,4,0,10000000000,0,1 OK	After locking band test,command:at^syscfgex="00",all,0,2,all,all,all,all,1 recover supported full bands
at^syscfgex="00",all,0,2,all,all,all,all,1	OK	
at^syscfgex?	^SYSCFGEX: "00",200000D400000,0,2,1E200000084,0,10000000000,4000,1 OK	
at^syscfgex=?	^SYSCFGEX: ("00","02","03","04","99"),(200000D400000),(0-4),(0-3),(3E2080E00D5),(0),(180080000 05),(7000),(0-1) OK	

Table 8-28 AT^SYSCFGEX parameter description

Parameter	Description
<acqorder>	Network access sequence, character string. Value: ”00”, ”99” or combination of following parameters. • “00”: automatic mode; • “02”: WCDMA; • “03”: LTE; • “04”: NR5G • “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>	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 such as the following parameters or the superimposed value 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。 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>	Lteband 65-128bit remark："all"parameter recover all lte bands.
<nr5g 1-64bit>	NR5G 1-64bit Paremeter and bands corresponding relationship: 1:nr5g-> n1 10000000000:nr5g-> n41 Remark: ● "all"parameter recover all nr5g band； ● thie parameter must be set with<nr5g 65-512bit>together，otherwise response error. This parameter set 5g SA and NSA supported bands at the same time
<nr5g 65-128bit>	NR5G 65-128bit NR5G 65-512bit Paremeter and bands corresponding relationship： 2000:nr5g-> n78 7000:nr5g->n77 n78 n79 :::1:nr5g->n257 毫米波 remark： ● This parameter use:semicolon separation to set NR5G 65-512bit band For example：when set parameter :"111:222:333:444:555:666:777" detailed description： 5g band 65 -128bit to nr5g_bits_449_512 each 64bit band use one:semicolon separation， bands corresponding relationship: bits_65_128 = 111 bits_129_192 = 222 bits_193_256 = 333 bits_257_320 = 444 bits_321_384 = 555 bits_385_448 = 666 bits_449_512 = 777 ● When high bit band not modofy,omit other parameter For example：only modify bits_65_128，set this parameter "111" ● Middle 64bit parameter not to modify, direct:semicolon separation,(Middle more than one parameter not to modify，echo 64bit:semicolon separation，semicolon number must be enough)

	For example：bits_193_256 not modify，this parameter set is “111:222::444:555:666:777” bits_193_256、bits_257_320not to modify，this parameter set is “111:222:::555:666:777”
<change_duration>	Set paremeter whether is power down storage 0:not power down storage 1: power down storage（default）

8.13 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 8-29 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 8-30 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: GSM 2: CDMA 3: WCDMA 4: TD-SCDMA 5: LTE 6: NSA 7: NR5G 8: EVDO 9: LTE 10: HYBRID 11: 1XLTE 12: 5G(NR5G) 13: 5G(EN-DC) 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. Remark: sysmode 12 and 13 are 5G. SA and NSA are distinguished only by <submode>.
<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 81 EN-DC 82 NR5G
<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.

8.14 AT^CELLLOCK Lock to the specific arfcn and cell

Note:
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/NR5G). Only when UE camp on this RAT, it will work. You can use another command “AT^SYSCFGEX” together to lock the UE onto the specific RAT firstly.
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 by AT command SYSCFGEX unless you have unlocked WCDMA and restart the terminal.
5. Strongly advise that LTE cell/earfcn lock function should be used in flight mode(at+cfun=0), or there may be some abnormal circumstance happen, while you can make unlock function work by re-starting the device.
6. Strongly advise that 5G cell/earfcn lock function should be used in flight mode(at+cfun=0), or there may be some abnormal circumstance happen, while you can make unlock function work by going in and going out flight mode(at+cfun=0/at+cfun=1).
7. CELLLOCK setting would be available after power-off and repower-on, while SYSCFGEX has a optional parameter to keep its setting when power-off, please note this difference when you use these two commands together.
8. Once you have locked to the specific arfcn/cell, the UE would not meet the mobility requirments of 3GPP, and UE would not perform reselection or handover function.

Table 8-31 AT^CELLLOCK operation command

Type	Command	Possible return results	Description
Set Command	AT^CELLLOCK=<enable>[,<rat>,<lock_type>,<arfcn>[,<pci/psc>,<scs>,<band>]]	<CR><LF>OK<CR><LF>	Success
		<CR><LF>ERROR/+CME ERROR: <err><CR><LF>	Failure
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 celllock state of all 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”),(list of supported <scs>s),(“band”)<CR><LF> <CR><LF>OK<CR><LF>	
Command Example	AT^CELLLOCK?	^CELLLOCK: 1,3,0,100 ^CELLLOCK: 1,4,0,636768,,30, OK	Qurey current celllock setting
	AT^CELLLOCK=?	^CELLLOCK:	Enable：0-1

		(0-1),("02","03","04"),(0-1),("arfcn"),("pci"),(15,30,60,120,240),("band") OK	Rat：WCDMA/LTE/NR5G Lock_type：0-1
	AT^CELLLOCK=1,"03",1,1300,343	OK	Lock on LTE cell of earfcn=1300,pci=343
	AT^CELLLOCK=1,"04",1,636768,100,30,78	OK	Lock on NR5G cell of (band=78,arfcn=636768,scs=30KHz,pci=100)
	AT^CELLLOCK=0	OK	Unlock all

Table 8-32 AT^CELLLOCK parameter description

Parameter	Value	Description
<enable>	0-1	integer type, celllock function setting type,No default value. 0: disable celllock function 1: enable celllock function
<rat>	"0"/0 "02"/02/2 "03"/03/3 "04"/04/4	Integer and string type are all supported; the specific RAT in which the cell be locked. No default value. "0"/0: all RATs "02"/02/2: WCDMA "03"/03/3: LTE "04"/04/4: NR5G
<lock_type>	0-1	integer type, the type of celllock, arfcn or cell. No default value. 0: lock onto arfcn 1: lock onto cell
<arfcn>	Depend on <rat>	integer type, No default value. The specific arfcn related with <RAT>
<pci/psc>	Depend on <rat>	integer type, No default value. The specific phisical cell id related with <RAT> WCDMA psc: 0~511, Primary scrambel code, currently not support LTE pci: 0~503 NR5G pci: 0~1007
<scs>	Descret value：15,30,60,120,240	integer type, the subcarrier space of the nr5g cell locked. No default value. WCDMA: No this parameter LTE: No this parameter NR5G：the scs(subcarrier space) of the specific arfcn/cell,（15:15KHz; 30:30KHz; 60:60KHz; 120:120KHz; 240:240KHz）
<band>	Depend on <rat>	integer type, the DL band of the 5g cell locked, No default value. WCDMA: No this parameter LTE: No this parameter NR5G：the specific band of NR5G(N：NR5G band_N)

8.15 AT^LTEATTACHINFO Command to get the LTE default APN from Network

This command get the LTE default APN from Network. It can get the APN IP type and APN string.

Table 8-33 AT^LTEATTACHINFO instruction

Function	Command	Response	Description
Read Command	AT^LTEATTACHINFO?	^LTEATTACHINFO: <ip_type>,<apn> OK	-
Test Command	AT^LTEATTACHINFO=?	OK	-
Command Example	AT^DORMANT?	^LTEATTACHINFO: 0,3gwap OK	-
	AT^DORMANT=?	OK	-
Notes			

Table 8-34 AT^LTEATTACHINFO Parameter description

Parameters	Value	Description
<ip_type>	0~2	0 - IPV4 1 - IPV6 2 - IPV4V6
<apn>	-	LTE default APN string.

8.16 ^RRCSTAT RRC status query and report command

Table 8-35 AT^RRCSTAT operation command

Parameter	Description	Parameter	Description
Set Command	AT^RRCSTAT=<enable>	OK or ERROR/+CME ERROR: <err>	Set ^RRCSTAT report enable switch
Query Command	AT^RRCSTAT?	^RRCSTATE: <enable>,<rrc_status>	

Test Command	AT^RRCSTAT=?	^RRCSTAT: (0,1)	
Report Command		^RRCSTAT: <rrc_status>	If report enable, if RRC status changes, report RRC status
Command Example	AT^RRCSTAT=1	OK	
	AT^RRCSTAT?	^RRCSTAT: 1,1	
	AT^RRCSTAT=?	^RRCSTAT: (0,1)	
	Report Command	^RRCSTAT: 0	

Table 8-36 AT^RRCSTAT parameter description

Parameter	Description
<enable>	0:disable rrc_status report 1:enable rrc_status report
<rrc_status>	RRC connect status 0:RRC idle status; 1:RRC connect status; 2:RRC INACTIVE status; 3:RRC invalid status;

Note:
Not LTE or NR, RRCSTAT query command return error.

8.17 AT^NWCFG="nr5g_disable_mode" 5G SA NSA Capability Configuration

Table 8-37 AT^NWCFG="nr5g_disable_mode"operation command

Type	Command	Possible return results	Description
Set Command	AT^NWCFG="nr5g_disable_mode"[,<disable_mode>]	If the optional parameter is omitted <disable_mode>，query current 5G Capability ^NWCFG: "nr5g_disable_mode",<disable_mode> OK If the optional parameter is specified,set 5G Capability OK Or	

		ERROR/+CME ERROR: <err>
Test Command	AT^NWCFG=?	^NWCFG: "nr5g_disable_mode",(0-3) ..... OK
Command Example	AT^NWCFG="nr5g_disable_mode",1	OK
	AT^NWCFG="nr5g_disable_mode"	^NWCFG: "nr5g_disable_mode",1 OK
	AT^NWCFG=?	^NWCFG: "nr5g_disable_mode",(0-3) ..... OK

Table 8-38 AT^NWCFG="nr5g_disable_mode"parameter description

Parameter	Description
<disable_mode>	0：enable SA NSA 1：disable SA，enable NSA 2：disable NSA, enbale SA 3：no change

8.18 AT^NWCFG="ue_usage_setting" UE Usage Setting Configuration

Table 8-39 AT^NWCFG="ue_usage_setting"operation command

Parameter	Description	Parameter	Description
Set Command	AT^NWCFG="ue_usage_setting"[,<setting>]	If the optional parameter is omitted <setting>，query current Usage setting ^NWCFG: "ue_usage_setting",<setting> OK If the optional parameter is specified,set Usage setting 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 8-40 AT^NWCFG="ue_usage_setting"parameter description

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

8.19 AT^CACELLURC Unsolicited reporting of CA cell configuration and activation status

Used for Modem to actively report cell uplink and downlink CA configuration activation status, frequency point, bandwidth, frequency band, physical cell ID parameters.

The changing conditions include: uplink CA configuration on and off, downlink CA configuration on and off, CA activation and deactivation.

The unsolicited reporting is controlled by the self-setting command and can be turned on or off. When there are multiple CA cells, the CA configuration and activation status of each cell will be reported many times.

Table 8-41 AT^CACELLURCO operation instruction

Type	Command	Possible return results	Description
Set Command	AT^CACELLURC=<report_switch>	OK	-
		ERROR	Fail
Execution Command	AT^CACELLURC?	^CACELLURC: < report_switch> OK	-

Test Command	AT^CACELLURC=?	^CACELLURC: (0-1) OK	-
Report Command	-	^CACELLURC: <sysmode_name>,<ul_configured>,<scell_state>,<scc_id>,<freq>,<dl_bandwidth>,<band>,<pci>	-
Command Example	AT^CACELLURC?	^CACELLURC: 1 OK	
	AT^CACELLURC=0	OK	
		^CACELLURC: “LTE”, 0,1,1,1850,100,3,42 ^CACELLURC: “LTE”,0,0,1,1850,100,3,42	Report when the CA status of the cell changes.

Table 8-42 AT^CACELLURC parameter description

Parameter	Value	Description
<report_switch>	[0]	unsolicited reporting disable
	1	unsolicited reporting enable
<sysmode_name>	String	Name of current network mode: "LTE": indicates LTE network
<ul_configured>	0~1	Whether the uplink CA is configured. 0 means it is not configured, 1 means it is configured.
<scell_state>	0~2	Whether the downlink CA is configured or activated. 0 means it is not configured, 1 means it is configured, 2 means it has been activated.
<scc_id>	1~7	Scell index.
<freq>	0-65535	Absolute Radio Frequency Channel Number
<scell_dl_bandwidth>	int32	bandwidth 6：1.4M； 15：3M； 25：5M； 50：10M； 75：15M； 100：20M

<band>	int32	Frequency band. Among them,-2147483647 and 2147483647 indicate that the frequency band is unknown, and the others are normal frequency bands.
<pci>	0-503	Physical cell ID

8.20 AT^NWCFG="attach_profile_list" Attach Profile List setting Configuration

Table 8-43 AT^NWCFG="attach_profile_list" operation command

Parameter	Description	Parameter	Description
Set Command	AT^NWCFG="attach_profile_list"[,<profile_list_action>,<profile_list>]	If the optional parameter is omitted [,<active_profile_list>,<pending_profile_list>]，query current Usage setting ^NWCFG: "attach_profile_list",<active_profile_list>,<pending_profile_list> OK If the optional parameter is specified,set <active_profile_list>,<pending_profile_list> OK or ERROR/+CME ERROR: <err>	
Test Command	AT^NWCFG=?	..... ^NWCFG: "attach_profile_list",(1-2),"profile list" ..... OK	
Command Example	AT^NWCFG="attach_profile_list",1,"1"	OK	
	AT^NWCFG="attach_profile_list",1,"1:3:2"	OK	
	AT^NWCFG="attach_profile_list"	^NWCFG: "attach_profile_list","1:3:2","0", OK	
	AT^NWCFG=?	..... ^NWCFG: "attach_profile_list",(1-2),"profile list"..... OK	

Table 8-44 AT^NWCFG="attach_profile_list" parameter description

Parameter	Description
<profile_list_action>	1: This setting will be active while attach next time. It needs to send at+cfun=0 and at+cfun=1 cmd to make it work. 2: This profile list will active now, DUT will reattach after setting；
<profile_list>	One or more profile list, separated by :

8.21 AT^REJINFO Rejinfo status query and report command

Table 8-45 AT^REJINFO operation command

Parameter	Description	Parameter	Description
Set Command	AT^REJINFO=<enable>	OK or ERROR/+CME ERROR: <err>	Set ^REJINFO report enable switch
Query Command	AT^REJINFO?	^REJINFO: <enable>, <plmn id>,<service domain>,<reject cause>,<rat type>,<rej type>,<is attempt max counter>	
Test Command	AT^REJINFO=?	^REJINFO: (0,1)	
Report Command		^REJINFO: <plmn id>,<service domain>,<reject cause>,<rat type>,<rej type>,<is attempt max counter>	If report enable, report rejinfo information
Command Example	AT^REJINFO=1	OK	
	AT^REJINFO=?	^REJINFO: (0,1)	

Table 8-46 AT^REJINFO parameter description

parameter	Description
<enable>	0: disable rejinfo report 1: enable rejinfo report
<plmn id>	Plmn ID
<service domain>	Service type: 1： CS only 2 : PS only 3 : CS+PS

<reject cause>	Reject cause
<rat type>	Reject rat type: 0：GSM 1：UMTS 2：LTE 3：TD-SCDMA 4：NR5G
<rej type>	Reject type: 0：register reject
<is attempt max counter>	Whether has attempted max count 0：Ue has not attempted max count 1：Ue has attempted max count

8.22 AT^PLMN Actively report switch commands for PLMN

Actively report the switch command for ^PLMN. If the ^PLMN command enables active reporting, the resident network changes and actively reports the PLMN.

Table 8-47 AT^PLMN operation 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	
Report Command	--	^PLMN: <mcc>,<mnc>	
Command Example	AT^PLMN=1	OK	Setup routine
	AT^PLMN?	^PLMN: 1,460,10 OK	Query routine
	Report Command	^PLMN: 460,01	Active reporting routine

Table 8-48 AT^PLMN parameter description

parameter	Value	Description
<enable>	(0,1)	PLMN active reporting switch: 0: Active reporting is disabled, the default value. 1: Active reporting is enabled
<mcc>	--	Mobile country code
<mnc>	--	Mobile network code

8.23 AT^SRVST SRVST actively reports switch commands

Actively report the switch command for ^SRVST. When the service status changes, the service type is actively reported.

Table 8-49 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	
Report Command		^SRVST: <service_status>	
Command Example	AT^SRVST=1	OK	
	AT^SRVST?	^SRVST: 1,0 OK	
	Report Command	^SRVST: 2	

Table 8-50 AT^SRVST parameter description

parameter	Value	Description
<enable>	(0,1)	^SRVST active reporting switch: 0: Disable SRVST proactive reporting 1: Enable SRVST active reporting, the default value.
<service_status>	0	no service
	1	Limited service
	2	Service effective
	3	Limited area service
	4	Power saving and deep sleep state

8.24 AT^EONS Query the Service Provider Name Command

Table 8-51 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
	at^eons=2	”IRA”character set: ^eons: 2,46000,"","",0,"CMCC" OK ”UCS2” character set: ^eons: 2,46000,"","",0,"0043004D00430043" OK
	at^eons=3	”IRA”character set: ^eons: 3,46000,"","",0,"CMCC" OK ”UCS2”character set: ^eons: 3,46000,"","",0,"0043004D00430043" OK
	at^eons=4	”IRA”character set: ^eons: 4,46000,"CHINA MOBILE","CMCC",0,"CMCC" OK “UCS2” character set: ^eons: 4,46000,"004300480049004E00410020004D004F00420049004C0045","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 8-52 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 133 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 133 <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 8-53 <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.

8.25 AT^MMINFO Get network information report command

This command is used to obtain network mobility management information report

Table 8-54 AT^MMINFO operation command

Type	Command	Possible return results	Description
Set Command	AT^MMINFO=<enable>	OK	
		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 8-55 ^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 8-56 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	
full_name	-	
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>	

8.26 ^LENDC ENDC connection status query and report command

Table 8-57 AT^LENDC operation command

Type	Command	Possible return results	Description
Set Command	AT^LENDC=<enable>	OK Or ERROR/+CME ERROR: <err>	
Query Command	AT^LENDC?	^LENDC: <enable>,<endc_available>,<endc_plmn_avail>,<endc_restricted>,<nr_pscell> OK	
Test Command	AT^LENDC=?	^LENDC: (0,1) OK	
Report Command		^LENDC: <endc_available> ,<endc_plmn_avail>,<endc_restricted>,<nr_pscell>	

Command Example	AT^LENDC=1	OK
	AT^LENDC?	^LENDC: 1,1,1,0,1 OK
	AT^LENDC=?	^LENDC: (0,1) OK

Table 8-58 AT^LENDC parameter description

Parameter	Value Description
<enable>	Integer value，ENDC whether active report if connected status has changed. 0：disable the active report 1：enable the active report
<endc_available>	Integer value，the current cell whether support ENDC mode，through LTE RRC SIB2 upperLayerIndication-r15 marked 0 not support 1 support
<endc_plmn_avail>	Integer value，PLMN LIST whether exist PLMN support ENDC mode 0 no PLMN support ENDC mode 1 exist PLMN support ENDC mode
<endc_restricted>	Integer value，LTE NAS attach ACCEPT information ENDC capability 0 The core network does not limit the endc capability 1 The core network does limit the endc capability
<nr_pscell>	Integer value，current PSCell whether is NR or not，whether is ENDC double connected 0 not ENDC state 1 ENDC state

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 9-1 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 9-2 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> or +CTZE: <tz>,<dst>,[<time>].

Table 9-3 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: (0-2) OK	-

Table 9-4 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>
	2	Enable the time zone report function, report format: +CTZE: <tz>,<dst>,[<time>]
<tz>	Character string	-Summary of local time zone (the difference between the local time and GMT is represented by one fourth of one hour) and summer time, format: "±zz", fixed length, range -48 ... +56
<dst>	0	<tz>Exclude summer time
	1	<tz> Include 1 hour (equivalent to <tz>+4) summer time
	2	<tz>Include 2 hours (equivalent to<tz>+8) summer time
<time>	Character string	Local time, format: “YYYY/MM/DD,hh:mm:ss”

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 9-5 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>	If the time zone is set, the time zone will be displayed during

		OK	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 9-6 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 9-7 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 9-8 AT+CSDF parameter description

Parameter	Value	Description	
<mode>	1	DD-MMM-YYYY	1. The presentation of MMM depends on language. 2. 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	If <auxmode> = 1, <CCLK and + CALA <time> format is “yy / MM / dd, hh: mm: sszz”; if 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 10-1 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 the 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 10-2 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 10-3 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 10-4 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 10-5 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=?	$QCRMCALL: (0-1),(1,2,3,4,5,6,7,8),(1-3),(1-2),(1-42),, OK	-
Command Example	AT$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 10-6 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 10-7 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 10-8 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 10-9 +++ 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 10-10 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 10-11 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	

Table 10-12 AT+CGDCONT parameter description

Parameter	Value	Description
<cid>	(1-16)	Figure type parameter; specify the PDP context identifier. As for TE-MT interface, this parameter is local parameter and can be used in other PDP context commands.
<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_address>	-	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 10-13 AT$ QCPDPP operation command

Type	Command	Possible return results	Description
Set Command	AT$QCPDPP=<cid>,<auth_type>,<password>,<username>	OK	-
Query Command	AT$QCPDPP?	$QCPDPP: <cid>,<auth_type>,<username> OK	-
Test Command	AT$QCPDPP=?	$QCPDPP: (1-42),(0-3),, OK	-
Command Example	AT$QCPDPP=1,1,123456,test	OK	
	AT$QCPDPP?	$QCPDPP: 1,1,"test" OK	

Table 10-14 AT$ QCPDPP parameter description

Parameter	Value	Description
<cid>	1-24	Int type
<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 10-15 AT^AUTHDATA operation command

Type	Command	Possible return results	Description
Set Command	AT^AUTHDATA=<cid>,<auth_type>,<PLMN>,<password>,<username>	OK	-PLMN not support

Query Command	AT^AUTHDATA?	^AUTHDATA: <cid>,<auth_type>,<password>, <username>,<PLMN> OK	-PLMN not support
Test Command	AT^AUTHDATA =?	^AUTHDATA: (1-42),(0-3),("plmn"),("password"),("username") OK	-
Command Example	AT^AUTHDATA=1,1,46000,123456,test	OK	
	AT^AUTHDATA?	^AUTHDATA: 1,1,"123456","test","" OK	

Table 10-16 AT^AUTHDATA parameter description

Parameter	Value	Description
<cid>	1-42	Int type(The value of list is adapted to the baseline)
<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, return to <cid> value list.

Table 10-17 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	-

Table 10-18 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 10-19 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

Table 10-20 AT+CGCONTRDP parameter description

Parameter	Value	Description
<p_cid>	1-24	pdp id
<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 Flow statistics command

When in the online mode, the current traffic and the total traffic are queried. Otherwise, it is the traffic and total traffic generated during the last dial-up process. The total traffic is the traffic generated after startup.support to query flow according to cid,

Table 10-21 AT^DSFLOWQRY operation command

Type	Command	Possible return results	Description
Execution Command	^DSFLOWQRY(?) Or ^DSFLOWQRY=cid	^DSFLOWQRY: <last_ds_time>,<last_tx_flow>, <last_rx_flow>,<total_ds_time>,<total_tx_flow>, <total_rx_flow> OK For example: ^DSFLOWQRY: 592,478,0,592,645c,3c0f OK	Omit CID parameter, default CID 1
		ERROR/+CME ERROR:<err>	Fail
Test Command	^DSFLOWQRY=?	^DSFLOWQRY: (1-42,"all") OK	

Table 10-22 AT^DSFLOWQRY 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,

10.13 ^DSFLOWRPT Report flow statistics command

When the active report enable switch is started, when the MT ss in online data status, the active reporting message will be reported every 2 seconds by default (the user 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,current according to the cid flow statistics, the first cid is the default.

Table 10-23 AT^ DSFLOWRPT operation command

Type	Command	Possible return results	Description
Set Command	^DSFLOWRPT=<oper>[,<time>[,<cid>]]	OK	-
		ERROR/ +CME ERROR: <err>	
Execution Command	^ DSFLOWRPT?	^DSFLOWRPT: <oper>,<time>,<cid> OK For example: ^DSFLOWRPT: 1,2,1 OK	
		ERROR/+CME ERROR:<err>	Fail
Test Command	^DSFLOWRPT= ?	^DSFLOWRPT: (0,1),(time),(1-42,"all") 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 10-24 AT^DSFLOWRPT parameter description

Parameter	Value	Description
<oper>	0	Disable ds flow statistic, also ^DSFLOWQRY and ^DSFLOWRPT could not use
	1	Enble ds flow statistic
<time>	-	Set periodic reporting interval, if <time> is 0, could use AT^DSFLOWQRY command
<cid>	1-42	Set report cid
	all	Set string “all” report all cid DS flow

Table 10-25 AT^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,
<tx_rate>	0x0000_0000_0000_0000 ~ 0xFFFF_FFFF_FFFF_FFFF	In Bytes,16 bit hexadecimal number, which represents the send data rate of DS
<rx_rate>	0x0000_0000_0000_0000 ~ 0xFFFF_FFFF_FFFF_FFFF	In Bytes,16 bit hexadecimal number, which represents the receive data rate of DS

10.14 AT^DSFLOWCLR DS flow clear

Clear DS flow，include current DS connection time、current sending flow、current receiving flow、total connection time、total sending flow and total receiving flow (For this six option details, see ^DSFLOWQRY and ^DSFLOWRPT).

Table 10-26 AT^DSFLOWCLR operation command

Type	Command	Possible return results	Description
Set Command	^DSFLOWCLR	OK	

10.15 AT+ECMSTATE ECM dial query state command

Table 10-27 AT+ECMSTATE operation command

Type	Command	Possible return results	Description
Execution Command	AT+ECMSTATE?	+ECMSTATE: <dial_state>,<ip_type>,<v4_ip>,<v4_primary_dns>,<v4_secondary_dns>,<v6_ip>,<v6_primary_dns>,<v6_secondary_dns>, OK	-
		ERROR	Fail
Command Example	AT+ECMSTATE?	+ECMSTATE: 4,0,””,””,””,””,””,””	Disconnected
		+ECMSTATE: 1,3,”192.168.32.112”,”192.168.32.1”,”114.114.114.114”,”fe80::49a7:1b49:697f:ffec%11”,”fe80::49a7:1b49”,”::”	Connected

Table 10-28 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

10.16 ^DSAMBR Query the APN data rate

This command is used to query APN-AMBR value when pdn or pdu session has been connected.

Table 10-29 AT^DSAMBR operation command

Type	Command	Possible return results	Description
Set Command	AT^DSAMBR=<cid>	<CR><LF>^DSAMBR: <ambr_ul>,<ambr_dl>,<ambr_ul_ext>,<ambr_dl_ext>,<ambr_ul_ext2>,<ambr_dl_ext2>[,<ext_ambr_ul>,<ext_ambr_dl>,<5g_ambr_ul>,<5g_ambr_dl>] <CR><LF> <CR><LF>OK<CR><LF>	-
		<CR><LF>ERROR<CR><LF>	fail
Query Command	AT^DSAMBR?	<CR><LF>^DSAMBR: <ambr_ul>,<ambr_dl>,<ambr_ul_ext>,<ambr_dl_ext>,<ambr_ul_ext2>,<ambr_dl_ext2>[,<ext_ambr_ul>,<ext_ambr_dl>,<5g_ambr_ul>,<5g_ambr_dl>] <CR><LF> <CR><LF>OK<CR><LF>	Query apn-ambr value of default pdn
Test Command	AT^DSAMBR=?	<CR><LF>^DSAMBR: <support list of cid><CR><LF> <CR><LF>OK<CR><LF>	-
Command Example	AT^DSAMBR?	^DSAMBR: 8640,8640, 106496 , 50176 ,0, 1107392 ,0,0,0,0 OK	

		^DSAMBR: (1-16)
	AT^DSAMBR =?	
		OK
note	NA	

Table 10-30 AT^DSAMBR parameter description

Parameter	Value	Description
<cid>	1-16	Profile id
<ambr_ul>	0kbps-8640 kbps	Uplink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ambr_dl>	0kbps -8640 kbps	Downlink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ambr_ul_ext>	8700kbps-256Mbps	Extend uplink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ambr_dl_ext>	8700kbps-256Mbps	Extend downlink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ambr_ul_ext2>	264.64Mbps-65280Mbps	Extend uplink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ambr_dl_ext2>	264.64Mbps-65280Mbps	Extend downlink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ext_ambr_ul>	65280Mbps-256*2^16Pbps	Extend uplink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ext_ambr_dl>	65280Mbps-256*2^16Pbps	Extend downlink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<5g_ambr_ul>	0kbps-256*2^16Pbps	In SA,uplink rate of NR5G PDU session
<5g_ambr_dl>	0kbps-256*2^16Pbps	In SA,downlink rate of NR5G PDU session

10.17 ^DSAMBRURC Enable APN data rate report

This command is used to enable/disable APN-AMBR urc report when pdn or pdu session has been connected/disconnected.

Table 10-31 AT^DSAMBRURC operation command

Type	Command	Possible return results	Description
Set Command	AT^DSAMBRURC=<enable>	<CR><LF>OK<CR><LF>	-
		<CR><LF>ERROR<CR><LF>	fail
Test Command	AT^DSAMBRURC=?	<CR><LF>^DSAMBRURC: (support list of command)<CR><LF><CR><LF>OK<CR><LF>	
URC report		<CR><LF>^DSAMBRURC: <cid>,<ambr_ul>,<ambr_dl>,<ambr_ul_ext>,<ambr_dl_ext>,<ambr_ul_ext2>,<ambr_dl_ext2>[,<ext_ambr_ul>,<ext_ambr_dl>,<5g_ambr_ul>,<5g_ambr_dl>] <CR><LF>	-
Command Example	AT^DSAMBRURC=1	OK	
	AT^DSAMBRURC=?	^ DSAMBRURC : (0-1) OK	
note	Setting will be saved when power off.		

Table 10-32 AT^DSAMBRURC parameter description

Parameter	Value	Description
< enable >	0-1	Default value:0 0 enable urc report 1 disable urc report
<cid>	1-16	Profile id
<ambr_ul>	0kbps-8640 kbps	Uplink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ambr_dl>	0kbps -8640 kbps	Downlink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ambr_ul_ext>	8700kbps-256Mbps	Extend uplink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter

<ambr_dl_ext>	8700kbps-256Mbps	Extend downlink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ambr_ul_ext2>	264.64Mbps-65280Mbps	Extend uplink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ambr_dl_ext2>	264.64Mbps-65280Mbps	Extend downlink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ext_ambr_ul>	65280Mbps-256*2^16Pbps	Extend uplink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<ext_ambr_dl>	65280Mbps-256*2^16Pbps	Extend downlink rate,for more detail,see 3GPP 24.301 9.9.4.2 chapter
<5g_ambr_ul>	0kbps-256*2^16Pbps	In SA,uplink rate of NR5G PDU session
<5g_ambr_dl>	0kbps-256*2^16Pbps	In SA,downlink rate of NR5G PDU session

11 Enable/Disable Sleep Function

11.1 AT+WAKEUPCFG Sleep function enabling command

This command can enable or disable the module dormancy function.

Table 11-1 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 11-2 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

This command can set the TA1 return result of DTR circuit from enabling to disabling in data state.

Table 12-1 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 12-2 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. If 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, ensure that the baud rate of TE is same with that of TA.

Table 12-3 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 12-4 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 Sound control

13.1 AT+CLVL Speaker volume control command

AT+CLVL can set speaker volume grade. There are eight grades in total, i.e. 0-7. 0 represents mute; 7 represents the maximum volume. Default: 3.

Table 13-1 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 13-2 AT+CLVL parameter description

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

13.2 AT+CMIC Mic volume control command

AT+CMIC can set Mic volume grade. There are eight grades in total, i.e. 0-7. 0 represents mute; 7 represents the maximum volume. Default: 3.

Table 13-3 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 13-4 AT+CMIC parameter description

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

13.3 AT+CMUT Mute set supporting command

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

Table 13-5 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 13-6 AT+CMUT parameter description

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

14 Hardware control extension commands

14.1 AT+WDISABLEEN Hardware W_Disable pin control command

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

Table 14-1 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 valid

Table 14-2 AT+WDISABLEEN parameter description

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

14.2 AT+RESET Module reset command

Table 14-3 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 14-4 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.

15 Temperature control commands

15.1 AT+TEMPLVL Temperature control level command

Used to query the current temperature level of each sensor.

Table 15-1 AT+TEMPLVL operation command

Type	Command	Possible return results	Description
Set Command	AT^TEMPLVL=<sensor_name>,<level>	+CME ERROR: operation not supported	Not support
Query Command	AT+TEMPLVL?	+TEMPLVL: "sensor_name","level" ... OK	
Test Command	AT+TEMPLVL=?	OK	-
	AT+TEMPLVL?	+TEMPLVL: "pa","0" +TEMPLVL: "pa_fr1","0" +TEMPLVL: "modem","0" +TEMPLVL: "cpuv_restriction_cold","0" +TEMPLVL: "modem_current","0" +TEMPLVL: "cpr_cold","0" +TEMPLVL: "vbatt_low","0" +TEMPLVL: "charge_state","0" +TEMPLVL: "modem_skin","0" +TEMPLVL: "modem_bw","0" +TEMPLVL: "mmw0","0" +TEMPLVL: "mmw1","0" +TEMPLVL: "mmw2","0" +TEMPLVL: "mmw3","0" +TEMPLVL: "mmw_skin0","0" +TEMPLVL: "mmw_skin1","0" +TEMPLVL: "mmw_skin2","0" +TEMPLVL: "mmw_skin3","0" +TEMPLVL: "mmw_skin0_dsc","0" +TEMPLVL: "mmw_skin1_dsc","0" +TEMPLVL: "mmw_skin2_dsc","0" +TEMPLVL: "mmw_skin3_dsc","0" +TEMPLVL: "wlan","0" +TEMPLVL: "wlan_bw","0" +TEMPLVL: "modem_skin_lte_dsc","0" +TEMPLVL: "modem_skin_nr_dsc","0" +TEMPLVL: "pa_dsc","0" +TEMPLVL: "pa_fr1_dsc","0" OK	

Table 15-2 AT+TEMPLVL parameter description

Parameter	Value	Description
<sensor_name>	Query sensor_name in the command list	Temperature sensor
<level>	0-3	Temperature level

15.2 AT+TEMPLVLURC Active reporting function of temperature control level

Used for the modem to actively report the temperature control level status of each sensor.

The active report is controlled by its own setting command, which can be enable or disable, and it is disable by default.

Table 15-3 AT+TEMPLVLURC operation command

Type	Command	Possible return results	Description
Active Report		+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 report
	AT+TEMPLVLURC?	+TEMPLVLURC: 0 OK	
	AT+TEMPLVLURC=?	+TEMPLVLURC: (0-1) OK	

Table 15-4 AT+TEMPLVLURC parameter description

Parameter	Value	Description
<enable>	0-1	0: Disable (Defaults) 1: Enable
<sensor_name>	Sensor name	Temperature sensor
<level>	0-3	Temperature control level

15.3 AT+TEMP Get the real-time temperature control command

Table 15-5 AT+TEMP operation command

Type	Command	Possible return results	Description
Set Command	AT+TEMP	+TEMP: <sensor>,<temp> [….] OK	Report various temperature of equipment (65535 is an invalid value).
Test Command	AT+MGCFG=?	OK	-
Command Example	AT+TEMP	AT+TEMP +TEMP: "modem-lte-sub6-pa1","27" +TEMP: "modem-lte-sub6-pa2","28" +TEMP: "modem-mmw0-usr","27" +TEMP: "modem-mmw1-usr","65535" …… OK	Collect the temperature of each sensor and report it.

Table 15-6 AT+TEMP Parameter description

Parameter	Value	Description
<sensor>	string	Name of the sensor
<temp>	-273~+273	The size of the temperature value

16 Error code

Table 16-1 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